

FORD OWNER *and* DEALER

Of Course, They Know "Hasslers" in France!

Even before the war, the French people used Ford Cars and equipped them with Hassler Shock Absorbers. They are thrifty people, and it appealed to them to save one-third of upkeep, tire and depreciation costs, which they are doing with Hasslers. One million sets of Hassler Shock Absorbers are in use today — wherever Ford Cars are found. Hasslers are for all models — passenger cars and trucks. You can buy Hasslers on 10-day trial — from any dealer — and he'll refund every cent of your money if you're not satisfied. Write us if you don't know your dealer.

Robert H. Hassler, Inc.

1591 Naomi St.

INDIANAPOLIS, IND.

Robert H. Hassler, Ltd., Hamilton, Ont.



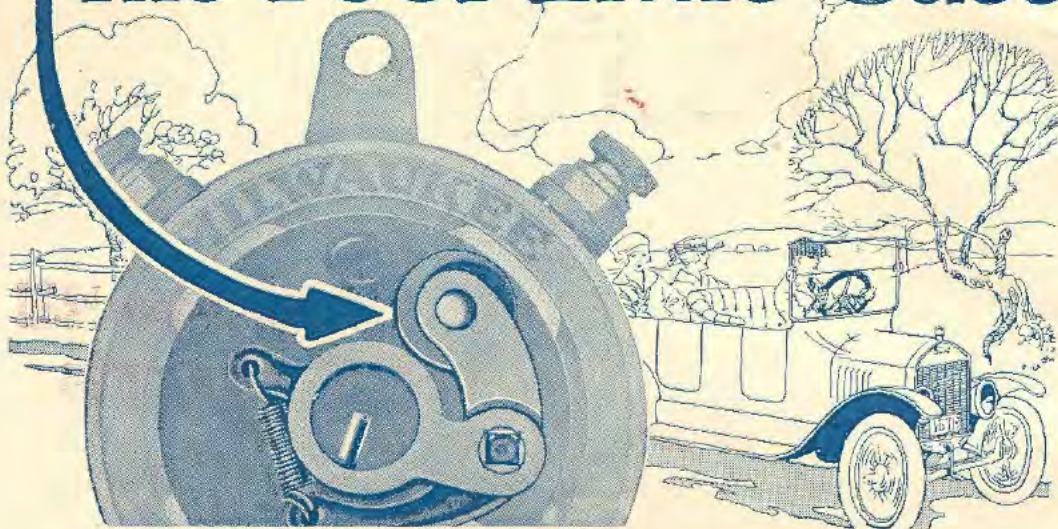
NOT CONNECTED WITH THE
FORD MOTOR COMPANY

September 1921
15 Cents

The Ford in France



This Poor Little Cuss



Revolves 8,417,585 Times While You "Ford" One Season

Perhaps you didn't even know it was there—the brush assembly in the timer on your Ford.

Just two small castings, a steel roller, and a short coil spring—but it's one of the hardest-working parts of a Ford, whirling ceaselessly in a mess of grit and grease (for few Ford owners clean and oil their timers often enough).

Quality is vital here. To the Milwaukee's brush assembly—finely fitted, wonderfully durable—is largely due the faultless performance of the *Milwaukee Timer*.

The Milwaukee's brush assembly castings are fine bronze, the steel roller is glass-hard and polished all over like a ball bearing; the spring is a sturdy coil of fine piano wire. The fibre and anchored steel contacts are as nearly wear-proof as fifteen years of development can make them. A season's driving leaves them still smooth and perfect.

Endorsed by 1,000,000 Ford owners, the *Milwaukee Timer* is today the *largest selling Ford replacement*.

Put one on your Ford (a 15-minute job with a pair of pliers) and you will get perfect timer service for the rest of the season—*easier starting, steadier pulling, less carbon*. Sold by auto supply and hardware dealers everywhere. Retail price, \$2.10 (\$2.25 west of the Rocky Mts.)

Milwaukee Auto Engine & Supply Co.

MILWAUKEE, U. S. A.



The Counter Sign of a Good Auto Supply Dealer

If one of our new steel display stands is not on your counter, write us for one today. This attractive stand, in which the "Expert on Fords" holds an actual Milwaukee Timer before the customer's eyes, is a regular "silent salesman." Put it to work for you.

MILWAUKEE TIMER *for* FORDS



Don't let Your Ford shake itself into the repair shop

—Don't pay for repairs to rear end and transmission.
It's unnecessary.

Give your Ford a Square Deal. It's better made than most cars. Built to run smoothly. It rattles and chatters because of faulty brake lining.

Ordinary brake lining gets hard, flinty, slick—hasn't any grip—grabs and slips every time you press the pedal. This shaking loosens nuts and bolts—makes the whole car rattle.

Cork Insert stops the shivering and shaking when you work the brake. Grips instantly, smoothly. No shaking or chattering. Never gets hard and slick.

Why shake your Ford to pieces with hard, slick brake lining? If it's new, put in Cork Insert and keep it new. If it's a used car, Cork Insert will make it work surprisingly smooth—free from rattle and vibration. Saves repairs to rear end and transmission.

BE SURE YOU GET GENUINE ADVANCE CORK INSERT. Your garage, repair or accessory man has it or can get it; every wholesale house carries it in stock.

REMEMBER: Cork Insert will save you relining expense—one set will outlast three sets of ordinary lining.

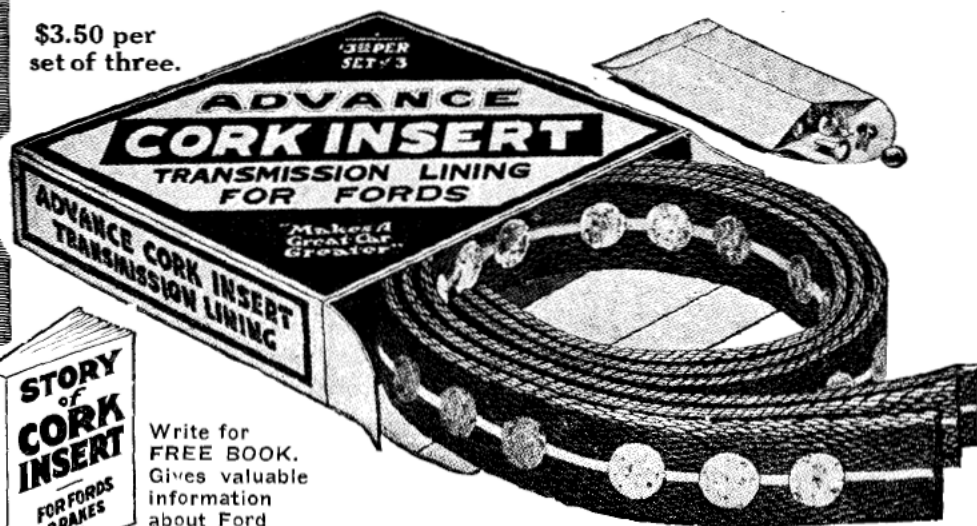
Advance Automobile Accessories Corp.

Dept. 100, 1721 Prairie Ave., Chicago.

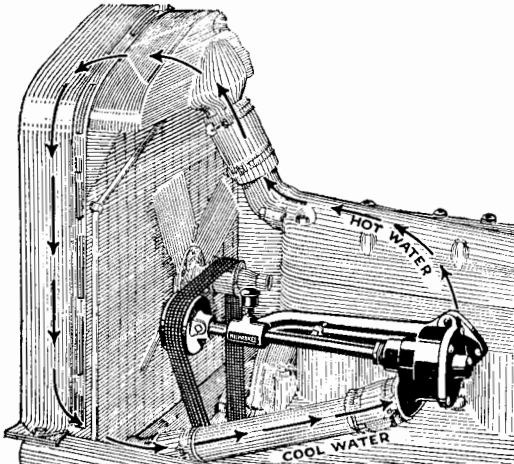
Publishers of "Let's Go."

DEALERS:—Order From Your Jobber or Write Us Direct

\$3.50 per
set of three.



Write for
FREE BOOK.
Gives valuable
information
about Ford
Brake and Clutch.



The Pump That Keeps the Ford Motor Cool in the Hottest Weather

Excessive carbon deposits, scored cylinders and bearings and thinned lubricating oil are all caused by constantly overheated engines. You can prevent these injurious results and bring your cooling system up to the highest efficiency, increasing your power and fuel economy, if you install the



"BUILT FOR SERVICE"

And it's just as important to have this pump on in the Winter for it insures against freezing the radiator. Summer or Winter Your Ford Will Run Better.

The "Milwaukee" is so skillfully designed and built that after you have put it on, it virtually becomes a built-in part of your motor—operating without trouble for the life of the car.

The "Milwaukee" eliminates all guess work in selecting a water pump because it's made right—even down to three bronze bearings a grease well, cast bronze propeller—each pump is tested under pressure and guaranteed for workmanship and materials.

Don't assume that "just any" pump will do what the "Milwaukee" does. Be sure you get a Milwaukee Circulating Water Pump. Sold by all dealers and distributed through recognized jobbers.

JOBBERS—Write to the nearest office of our sales representatives.

CRAMER MFG. CO

387-9 Tenth St., Dept. B MILWAUKEE, WIS.
SALES REPRESENTATIVES

C. N. & F. W. JONAS

525 Transportation Bldg., Chicago, Ill.
San Francisco, 111 New Montgomery St.
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Dallas, 1403 Grand Ave.



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The FORD OWNER AND DEALER is an independent monthly journal having no connection with the Ford Motor Company. We are trying to serve the best interests of the dealers and owners of Ford Cars and propose to "hew in the line, let the chips fall where they may."

15 cents a copy, \$2.00 a year in U. S., Canada and Mexico. Foreign Countries, \$2.50.

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Paul C. Treviranus, Business Manager
Harry J. Larkin, Managing Editor
Murray Fahnestock, Technical Editor
J. D. Campbell, Art Editor

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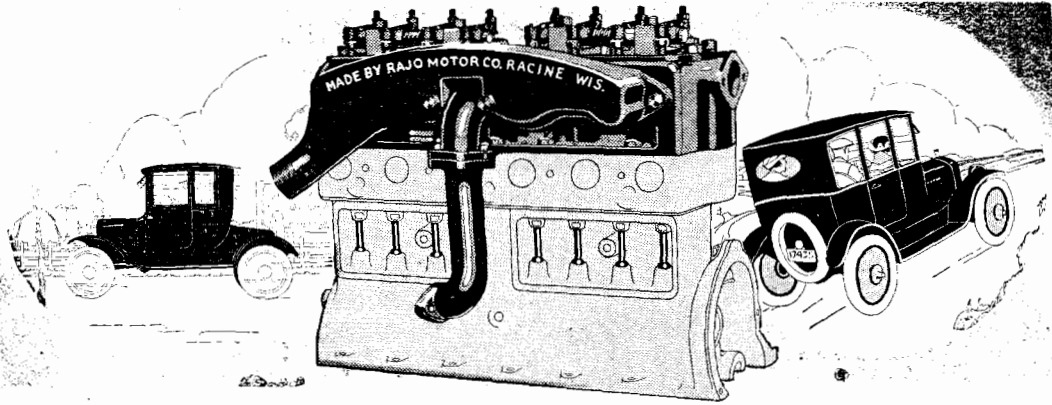
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When writing advertisers—Just say FORD OWNER and DEALER



Rajo Prices Reduced 45%!

THE tremendous demand for the RAJO Valve-in-Head for Fords has compelled us to triple our anticipated 1921 production. Now, into large-scale manufacturing—with materials back to almost normal figures—prices on both the regular RAJO for passenger cars and trucks and the special RAJO for racers are reduced 45%!

And think of it—not only will a RAJO Valve-in-Head add 8 to 14 horsepower to your Ford motor and increase passenger car speed 50%, but it will save enough in gasoline alone to pay for itself the first 2,500 miles! For RAJO, with its Hot-Spot and Cored Intake, gives 25 to 35 miles on a gallon.



This is the famous Ford Special which finished second behind a 200 h.p. Fiat at Dallas, Tex., last year. It is equipped with the special RAJO racing head, weighs only 940 lbs., and is capable of between 90 and 100 miles an hour on the straight-away. As a special service to those who own Ford racers, the Rajo Motor Co. maintains a special department in charge of Joe Jaegersberger and Louis Disbrow, racers of old and present-day fame. Any suggestions desired on Ford racing design gladly given without charge.

Rajo Will Make Your Ford Out-Perform High-Priced Cars

No more edging to the side of the road to let larger, more expensive cars pass; no more transmission band "chatter" or frequent gear shifting. RAJO makes the Ford the most powerful pleasure car in the world per pound of weight—capable of out-performing many automobiles costing six times the money.

Practically the only time you use low gear is in starting. RAJO'S double-size overhead valves instantly clear each cylinder of dead gases and keep the incoming mixture fresh and clean to exert its full force at the instant explosion occurs. RAJO also prolongs the life of the Ford motor by reducing vibration.

Easily Installed—Replaces Present Head

It's only a 4 to 5-hour job to replace the regular Ford head with RAJO. No extra fittings to buy—no machining required. Cast in one piece of highest grade cylinder iron; combustion chambers machined to 1/1000 of an inch accuracy; Tungsten steel valves practically unbreakable.

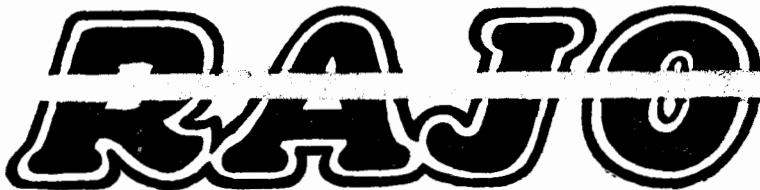
A new RAJO folder—fully illustrated and more complete than ever—just issued. A postcard will bring you a copy.

DEALERS—We have an extremely liberal proposition on a number of RAJO improvements for Fords. Write today for details.

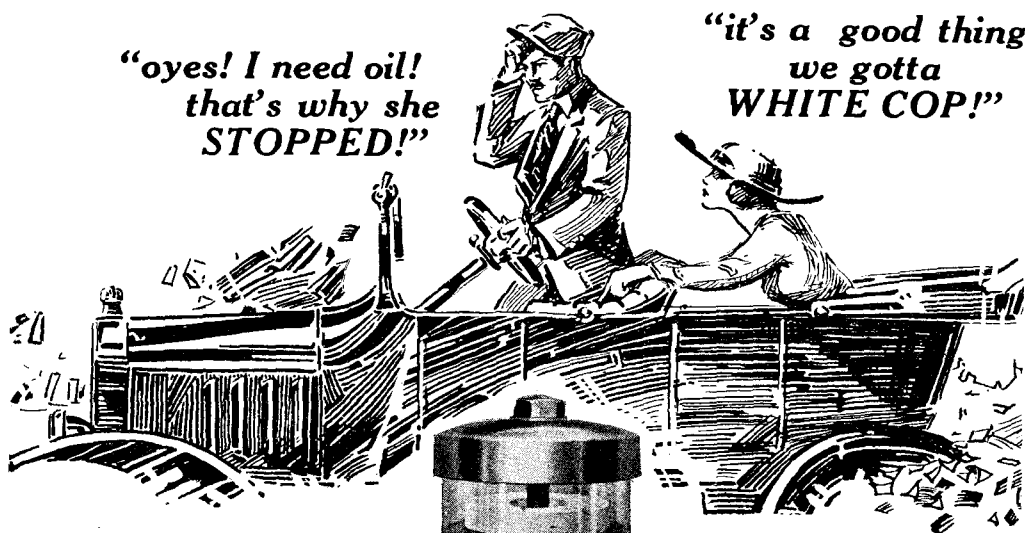
RAJO MOTOR CO.

1355 Racine St., RACINE, WIS.

Louis Disbrow, internationally famous racing driver, is our distributor for Illinois, Indiana, Iowa and Michigan.

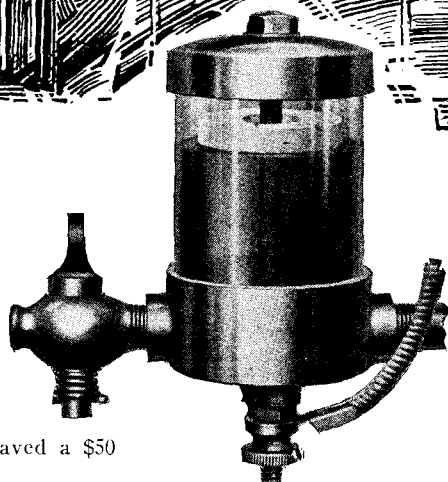


When writing advertisers—Just say FORD OWNER and DEALER



**"oyes! I need oil!
that's why she
STOPPED!"**

**"it's a good thing
we gotta
WHITE COP!"**



That's how Henry saved a \$50 repair bill!

This time, and forever more, Mr. and Mrs. Henry's outings will not be spoiled by burned out bearings, scored pistons or cylinders.

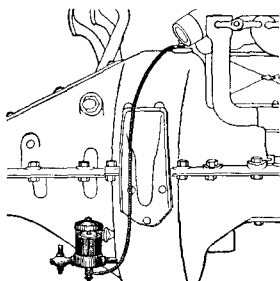
That's why they're grateful to some active dealer for their White Cop Oil Gauge.

Henry's is a forgetful nature; his White Cop jogs his memory.

White Cop stopped his Ford before impending trouble started!

When the oil got dangerously low, the little white float dropped to the bottom of the glass gauge, "shorted" and the magneto and automatically stopped the car.

**WHITE COP
jogs the memory
of the forgetful
Fordist!**



Tube goes in lower petcock opening; cable attaches to magneto post. That's all.

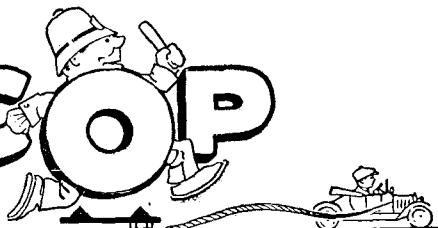
All Henry did then was to throw dash ignition switch over to battery connection (before, when equipped with magneto only, he disconnected White Cop wire at magneto post) and drove 12 miles, without any kind of trouble, to renew his oil supply.

But usually Henry now and then looks at his White Cop! He never crawls under the car; the oil supply is always visible; its glass cylinder constructed so as to resist heat, cold, vibration and stone throw. Henry put his White Cop on in five minutes without drilling or otherwise altering the appearance of his car. It's there to stay.

JOBBERs and DEALERs:
Henry paid \$5 for this protection. White Cop is guaranteed and going strong! A Ford is being produced every six seconds! Wire order or send for literature.

SIGNAL-SIGHT AND AUTOMATIC OIL GAUGE CO.
142 W. Bridge Street,
CATSKILL, NEW YORK.

White COP
SIGNAL SIGHT AND AUTOMATIC
OIL GAUGE



WITH THE WHITE FLOAT THAT STOPS THE FORD

WHEN IT NEEDS OIL

When writing advertisers—Just say FORD OWNER and DEALER



Special Model for Ford Cars

The special Ford Model pictured below, has the "dropped spider" which brings rim of wheel into same relation with control levers as on original Ford wheel. The 17-inch diameter of this wheel makes Ford cars easier to steer and less tiresome to drive. This feature makes NU-WAY Wheels especially appreciated by lady drivers.

Five Models for five cars

NU-WAY Clearance Steering Wheels are made to fit the five cars listed below,—without need of changing position of control levers on steering post. NU-WAY Wheels can be attached in a few minutes without the need of special tools other than a wrench.

Model F for Fords	\$9.80
Model M for Maxwells	10.60
Model C for Chevrolets	10.60
Model O for Overland 4s	10.60
Model D for Dodge Cars	10.60

DEALERS and JOBBERs

NU-WAY Clearance Wheels carry liberal margin of profit, and are sold direct only where we have no dealer. Write for discounts and dealer proposition TODAY.

Plenty of Room to Get in and Out of Car

No need to twist and turn to squeeze in behind the wheel. No longer necessary to tear clothing, rip off buttons and otherwise damage garments. It makes no difference whether you drive a closed or an open car, the NU-WAY Clearance Wheel enables you to get in and out easily and quickly. Think what that means in an emergency.

Nu-Way

Clearance Steering Wheel

COMBINES, COMFORT, CONVENIENCE and SAFETY

Not only prevents tearing garments and jerking off buttons when getting in and out of driver's seat, but it makes driving easier and safer. No matter what happens, there's a sense of security with the NU-WAY Clearance Steering Wheel. The knowledge that you can get from behind the wheel quickly if necessary, is worth far more than the mere cost of the wheel.



OPERATES EASILY WITH ONE HAND

The operation of the NU-WAY Wheel is simplicity itself. The instant car is stopped and before driving hand is removed, the spring pin can be easily released with two fingers and the wheel tilted forward and slid downward. It takes only a second to do this, an operation so simple and easy that a child can execute it without difficulty.

Gives Driver More Room

Does away with that cramped-up feeling. Gives driver greater confidence. Safety and convenience important factors. Even when hurried, it is only a matter of seconds to release wheel, tip it upward and forward, and step out with ease and comfort. A big advantage for lady drivers.

LARGE WHEEL MAKES STEERING EASY

The NU-WAY Wheel is made with laminated dished and corrugated rim, 17 inches in diameter. Fits the hand perfectly. Its liberal size gives easy control of steering gears. Rim is made of black walnut, beautifully grained, rubbed and polished.

SAISFACTION GUARANTEED

NU-WAY Wheels have been thoroughly tested by hundreds of car owners. They are guaranteed to give entire satisfaction. After once enjoying the convenience of a NU-WAY Wheel, you would not part with it for double its cost. Every NU-WAY Wheel owner is an enthusiastic booster.

Ask Your Dealer For NU-WAY CLEARANCE WHEEL. If he hasn't them, send direct, giving name of dealer and make of your car, enclosing remittance to cover. Wheel will be forwarded direct to your address.

HIGH GRADE SALESMEN WANTED.

Excellent opportunity. Exclusive territory. Write for details and attractive sales plan.



CAN'T RATTLE

A "take-up" screw underneath center plate keeps wheel firmly set,—can't work loose. Entirely prevents any disturbing clatter while driving.



SAFETY LOCKING FEATURE

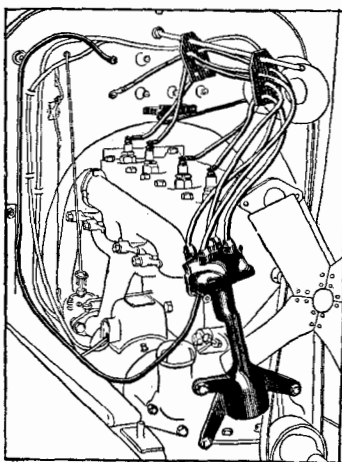
The NU-WAY Wheel is so designed that, after being tilted forward, a padlock can be inserted in the manner here shown, making theft of car almost impossible,—a safety feature of great importance.

MOTT MANUFACTURING CO.

940 Michigan Street,
ADRIAN, MICH.

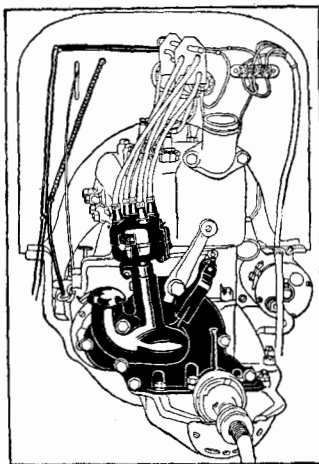
ATWATER KENT

IGNITION OUTFIT FOR FORDS



Equipped with electric starting and lighting, 1919 and later models

Atwater Kent ignition outfits for Ford cars are special only in that they are provided with all necessary fittings for mounting and installation. Otherwise they are of the same high quality that distinguishes all Atwater Kent equipment.



Non-Automatic Advance (Type CC) \$16⁰⁰

SPECIAL ADVANTAGES TYPE CC

Makes use of present coil box and coils—the vibrators are cut by screwing down the adjusting screws.

Gives you 3 spare coils for emergency use.

These modern scientific ignition equipments are easily and quickly applied to any Ford. Complete instructions, wiring and fittings furnished with each outfit.

Automatic Advance (Type CA) \$24⁰⁰

SPECIAL ADVANTAGES TYPE CA

An Atwater Kent heavy duty coil takes the place of the vibrator coils and coil box.

The Automatic Spark Advance produces maximum power at any speed without knocking—unnecessary to constantly shift spark lever while driving. Increases gas economy because spark is automatically, timed right for maximum power at any speed.

System mounted on special cover plate which takes the place of the regular Ford cover plate—enclosing the hardened steel special gears, guaranteeing lubrication and quiet operation.

GENERAL ADVANTAGES OF ATWATER KENT IGNITION on the FORD

- 1—Eliminates inefficient, hard-to-get-at commutator by using same high-grade ignition instrument that is standard equipment on twenty-five of America's best cars.
- 2—Eliminates fussy, buzzy, hard-to-adjust vibrators.
- 3—Gives you a single hot dynamic spark per cylinder.
- 4—Hot spark makes starting easy, and prolongs life of battery.

- 5—Spark, perfectly synchronized, enables you to throttle down and run slower in high gear.
- 6—Smooth, rapid acceleration without knocking. (This is greatly increased when the Type CA automatic advance outfit is used.)
- 7—Utilizes present low-grade fuel to greater advantage, increasing mileage.
- 8—Only one contact point and two moving parts in entire system.

When writing advertisers—Just say FORD OWNER and DEALER

35,000 Miles with One HY-POWER TIMER

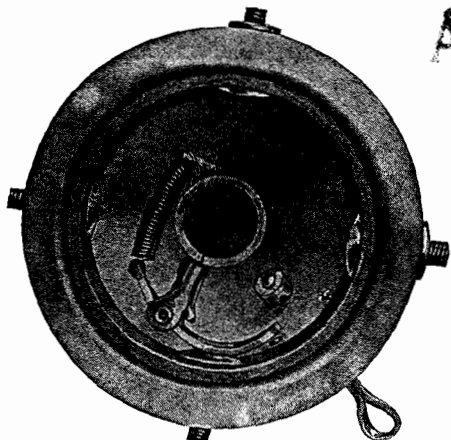
For Ford Cars, Ford Trucks, Fordson Tractors

Price \$1.50

**OUTLASTS FOUR
ORDINARY
TIMERS!**

Can't

Short-Circuit — the case-hardened sliding shoe and convex contacts give longest life and marvelously improves the efficiency of the Ford Motor.



**A SENSATIONAL
PERFORMANCE**

**FAR BEYOND OUR
GREATEST
CLAIM.**

An almost unbelievable mileage, with the original timer still in service. Mr. Kernan is a salesman who uses his car at the rate of 1,000 miles a week, which makes this experience even more remarkable.

Read Mr. Kernan's Letter Send for YOURS NOW

JOHN C. KERNAN
Nitrogen, Tungsten and Carbon Lamps
ELECTRICAL SPECIALTIES
Port Chester, N. Y.

Benford Auto Products, Inc. Mch. 18, 1921.
Mt. Vernon, N. Y.
Gentlemen:

Permit me to congratulate you on the wonderful Timer that you manufacture. It is, without a doubt, the greatest Timer for Ford cars ever invented.

I have tried all kinds of Timers, including the most expensive, and after a few weeks at the longest found they had to be replaced as they were no longer of any use.

You might be interested in knowing that I used one of your HY-POWER Timers and got between thirty-five and forty thousand miles with it and it was still in excellent condition when I sold the car.

I now have one of these Hy-Power Timers on a car and it has given over eight thousand miles and I have never even taken it off to look at it.

I am sure that if all Ford owners realized what a wonderful Timer you manufacture there would be few, if any, others sold.

My advice to Ford owners is to buy a Benford HY-POWER Timer and all their timer troubles would be a thing of the past. I am quite sure that they will agree it to be the best \$1.50 investment they ever made.

Wishing you all kinds of success, I remain
Very truly yours,

JOHN C. KERNAN.

DEALERS: A Sample Order of one timer starts you right on the road and gives you a quick return.

SEND US YOUR ORDER TODAY

Benford Auto Products, Inc.

MT. VERNON, N. Y.

You cannot afford to be without a Hy-Power Timer another day. Supporting Mr. Kernan's letter, we have dozens of recent unsolicited testimonials, whose average reported mileage is far over 16,000, and in many cases the Hy-Power Timer is still rolling up the trouble-free miles.

**Stop That "Bucking"
Motor**

Hy-Power will give you a sweet-running, flexible motor with a smooth flow of power—a new motor for an old one! Does not skip or miss—prevents "Bucking," which is due to unexploded gas charges.

WE GIVE DEALERS AND JOBBERS FULL CREDIT ON ALL ORDERS TAKEN BY MAIL.

**Fill in and Send the
Coupon NOW!**

F. O.
Benford
Auto Products, Inc.,
Mt. Vernon, N. Y.
Enclosed find \$1.50
for which send me at
once a Hy-Power Timer.

Name.....

Address.....

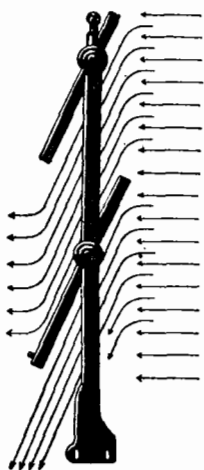
My Dealer's name is.....

His address.....

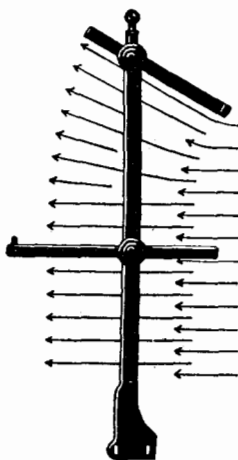
MOTOR PRODUCTS

Rain Vision and Ventilating Windshields

Meet All Weather Conditions



Both panels tilted inward, directing air current downward.



Letting the breezes straight in. Eat your lunch from the lower panel.



Rain vision position. Upper panel tilted out. Leaves rain vision space.



Both upper and lower panels closed tight for cold weather driving.

Model No. Z17—Complete with glass ready to install, has lamp brackets for side oil lamps.

Model No. 170—Same as Z 17 but without side oil lamp brackets. For Starter Equipped Cars.

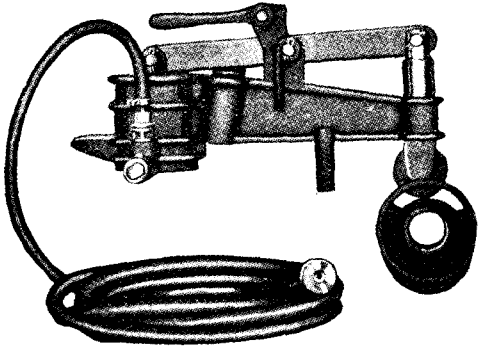
Model No. 150—Everything complete except glass. For Re-Framing glass of regular Ford Shield.

Model No. 160—Same as No. 150 but without lamp brackets for Re-Framing glass of starter equipped cars.

Free Booklet Sent Upon Request

Motor Products Corporation, Detroit, Mich.

Two Wonderful New Inventions for Ford Cars



Price \$12.00

DEALERS: Write Dept. 59 for special dealers' discounts and retail selling plan for JIG-TIME Power Pump and Conord Auxiliary Transmission. Both sell at sight. Our guarantee stands behind every one sold.

JIG-TIME Power Pump

Something every Ford Owner has always longed for—a "Free Air" Station in his own car! This wonderful gearless pump, the only one specially prepared for the Ford Car, can be permanently installed in your car (just behind the fan) by anyone in a few minutes. There, when you wish to use it, it can be operated by your own engine, quickly and easily pumping up your tires.

4 Tires in 4 Minutes

No fuss, no trouble! All you need do is to lift your hood, attach the air tube to any one of the valves, pull a lever and in a minute or less that tire is inflated! Don't be a slave to your tires any longer. Install a JIG-TIME Power Pump and let it save you all the old disagreeable labor, the precious time, and the loss of temper!

CONORD AUXILIARY TRANSMISSION

Save your tires and gas! Reduce the wear and tear of your car! The Conord Auxiliary Transmission eliminates vibration, gives more speed

and power, and doubles the pleasure of driving. It is the only Ford Auxiliary Transmission which combines **OVERDRIVE** (for speed) and **UNDERDRIVE** (for power) in the **ONE UNIT**. The Conord does not replace the regular Ford Transmission, but **Supplements** it, so can be easily installed. If you want greater pleasure and increased service from your car, install a Conord now! It will furnish you with "a gear for every road and every load!"

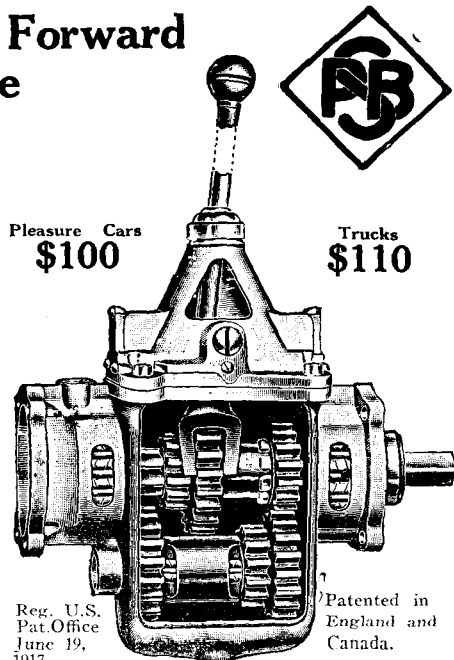
**6 Speeds Forward
3 Reverse**

Both Fully Guaranteed

Only the best material and the most expert workmanship go into the construction of the JIG-TIME Power Pump and the Conord Auxiliary Transmission. We are therefore able to fully guarantee every part of each of these Attachments.

Write for Information Today

Let us tell you about these wonderful inventions. Write today for literature, price-lists and dealers' discounts. Thousands of Ford Owners everywhere are finding in the Pump and Transmission the very things which they have wished they had for their cars. Ford Dealers, awake to the possibilities of these essential Ford Attachments, are cashing in big on their great popularity. Get further particulars about them. Write TODAY!



Pleasure Cars
\$100

Trucks
\$110

Reg. U.S.
Pat. Office
June 19,
1917.

Patented in
England and
Canada.

PARTRIDGE, SINGER & BALDWIN, Inc.

Dept. 59

44 Whitehall St.

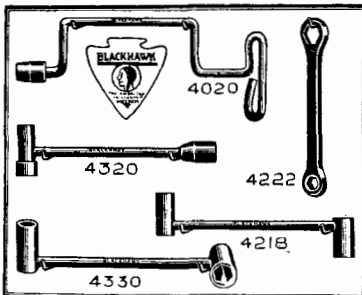
NEW YORK CITY

When writing advertisers—Just say FORD OWNER and DEALER

"he should worry"



No. 45 FORD OWNER SET.



No. 45 Ford Owner Set.

Wrenches in this set will take care of practically all bolts and nuts on Ford Cars. Every wrench guaranteed and Parker Rust Proof Finish.

his dealer sold him a BLACKHAWK wrench outfit

THE man who carries Blackhawk Wrenches has few worries because he knows he has just **THE WRENCH** in his kit at all times, for any emergency job that comes along.

And the dealer who sells him Blackhawk Wrenches has no worries about "satisfied customers" because he knows Blackhawk Welded Wrenches will make good. They are well made tools. They won't "round out" under hard usage; they fit in **EVERYWHERE**; they are machined to 64-1000 of an inch and thus are accurate and, best of all, the socket is welded right to the handle, not riveted. It can't work loose.

Forget your worries—use Blackhawk.

DEALERS:

We have a good proposition for you on Blackhawk Welded Wrenches. Write today for our **Service Station Plan** of merchandising, with complete display outfits to take care of **EVERY** wrench user in **ALL** lines, including the automobile field.

GUARANTEE:

Blackhawk Welded Wrenches are sold under this guarantee: If not satisfactory we replace without cost to you or to the dealer.

Blackhawk Welded Wrenches are made by
The American Grinder Mfg. Co., Milwaukee, Wis.

BLACKHAWK Welded Wrenches

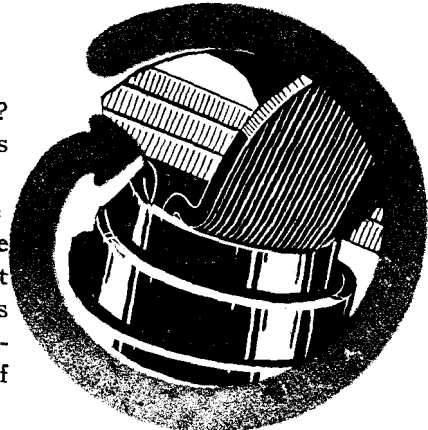
When writing advertisers—Just say **FORD OWNER AND DEALER.**

HOW "CUSHION-COILS"

Fight Rebound

FOLLOW the arrow—see those shoulders? They make the Ford leaf spring snub its own rebound.

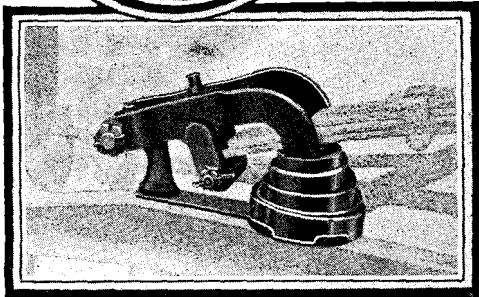
The upthrow of the coil spring brings the shoulders in contact with the underside of the main leaf. They can't rise any farther without sharply flexing the leaf—so the rebound is killed right at the start. The usual Ford bouncing gives way to the luxurious, steady roll of heavy, long wheel-base cars.



In all shock absorber action **CUSHION-COILS** set a new standard of efficiency. They excel in resiliency, neat appearance and durability. Study the **TELESCOPING CUSHION-COIL** springs of chrome vanadium steel—their advantages are obvious. Note that the Ford springs are not clamped.

CUSHION COILS *do not raise the Ford body*—yet they have the widest range of spring action of all shock absorbers. Sidesway is eliminated—they make Fords *safer* to drive.

CUSHION-COIL fit all Ford models, open or closed, and are easily installed without machine work of any kind. Reasonably priced at \$21.00 per set of four. If your dealer doesn't carry them, write us direct.



Try Them 10 Days—Free!

Put a set of **CUSHION-COILS** on your car—at our risk. If ten days' severe test does not convince you that **CUSHION-COILS** are the best shock absorbers ever put under a Ford car, return them. Your money will be promptly refunded.

Dealers: Write us today for details of our merchandising plan. Be sure to name your jobber (**CUSHION-COILS** are sold only through legitimate jobbers and dealers).

Pressed Metal Mfg. Co.

103 Barstow St., Waukesha, Wis., U. S. A.

TUTHILL SALES CO.

St. Louis, Dallas, Kansas City, Mid-West Distributors.

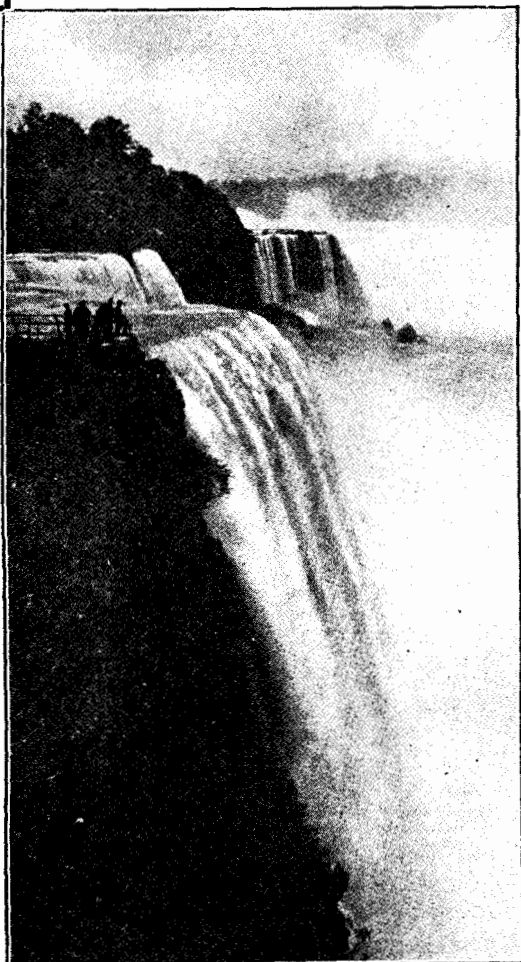


FOR FORD CARS

When writing advertisers—Just say **FORD OWNER and DEALER**

THE NIAGARA WATER PUMP

for
POWER!



There is one best, economical and sure way to realize from your Ford the full power that is in it.

The Niagara Water Pump Will Do It

Hundreds of car owners have found that the Niagara increases power immediately and maintains this power continuously.

They have proven that it saves gas and oil and provides perfect circulation, resulting in a better running motor in all seasons and preventing overheating, boiling and freezing.

They have declared it to be a device of surprising efficiency and simplicity—a completely satisfactory success and a splendid investment.

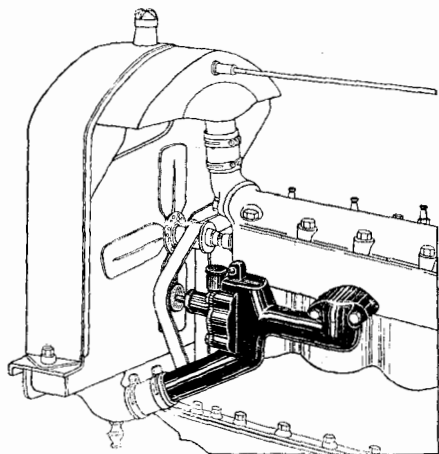
As a matter of sure economy and car satisfaction put a Niagara Water Pump on your car now.

IT WILL SOON PAY
ITS COST OF
\$12.00

\$14.00 in the West.
COMPLETE.

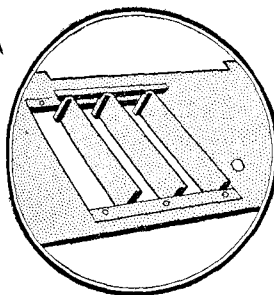
If your distributor cannot supply you, order direct.

DEALERS—Here is a satisfying product that will build business for you. Send for our liberal discount offer.

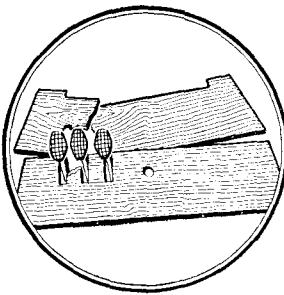


CASTOR DISTRIBUTING CORP.

1434 E. Falls St., NIAGARA FALLS, N. Y.



Don't endanger innocent lives by worrying along with a loose or broken foot board on your Ford. One slip—a locked gear at the wrong moment—may be fatal! Safeguard yourself and others by equipping your car with



For
Ford

WILLIAMS

For

Cars

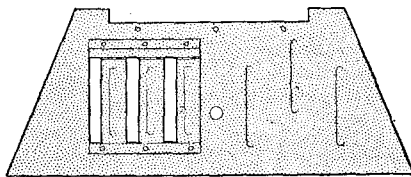
ONE PIECE

For

STEEL FOOT BOARD

Cars

Fits ANY Ford roadster, coupe or touring car, since 1914 model. Can't rattle, slip, break or lock your car in gear. Slips over pedals and is held firmly and snugly in place by

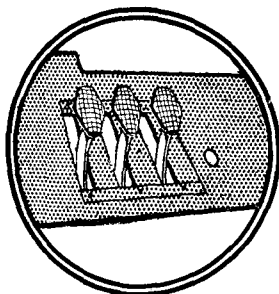


Easily put on or taken off in a minute. Durably made of 16-gauge steel. The Williams One Piece Steel Foot Board will easily outwear your car

and give you **REAL** protection against accidents.

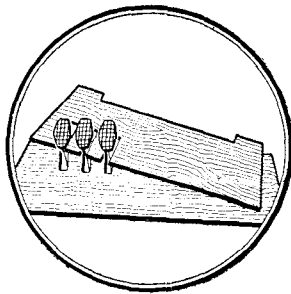
SEND NO MONEY. If your dealer can't supply you, simply send us your name and address and a Williams One Piece Steel Foot Board will be sent to you by return parcel post. Pay the postman \$3.50 on delivery—use it 5 days—then if you are not entirely satisfied your money will be refunded to you without question or delay.

DEALERS. There's big money in supplying the demand for Williams Foot Boards in your territory. Our dealer proposition will interest you. Write for particulars **TODAY.**



Williams
Manufacturing Co.

305 Gloyd Building
Kansas City, Missouri



Timer Problems Solved At Last!

TWENTY Per Cent Saving of Gas

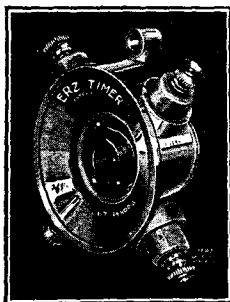
Lasts as Long as Ford's Engine.

Herz (THE PATENTED) Hammerblow Timer

IT'S THE PRESS CONTACT BETWEEN DIAMOND
HARD TOOL STEEL SURFACES AND THE SUDDEN
HAMMER-BLOW BREAK THAT DOES IT.

*No smearing
arcing roller.*

We discarded
those
ten years ago.



*No sparking
Glide Pieces.*

We discarded
those
ten years ago.

GUARANTEE

A WONDERFULLY ELASTIC ENGINE.
CLOCKLIKE REGULAR IGNITION.
A SMOOTHLY, SLOWLY IDLING ENGINE
INSTANTANEOUS STARTING.
IMMEDIATE PICKUP—and last but not least—

20% SAVING OF GAS

IMMEDIATELY UPON INSTALLATION YOU TURN THE GAS LEVER BACK
ONE-QUARTER TURN.

It's made of Bronze and Tool Steel. By 1000 per cent the best Timer value in motordom. SEE YOUR DEALER or send us \$1.00 with your name. Pay balance to postman.

Price \$4.75

**MONEY BACK IF YOU ARE NOT DELIGHTED
DON'T WASTE MONEY. WRITE NOW!**

HERZ,

182 LOCUST AVENUE

New York

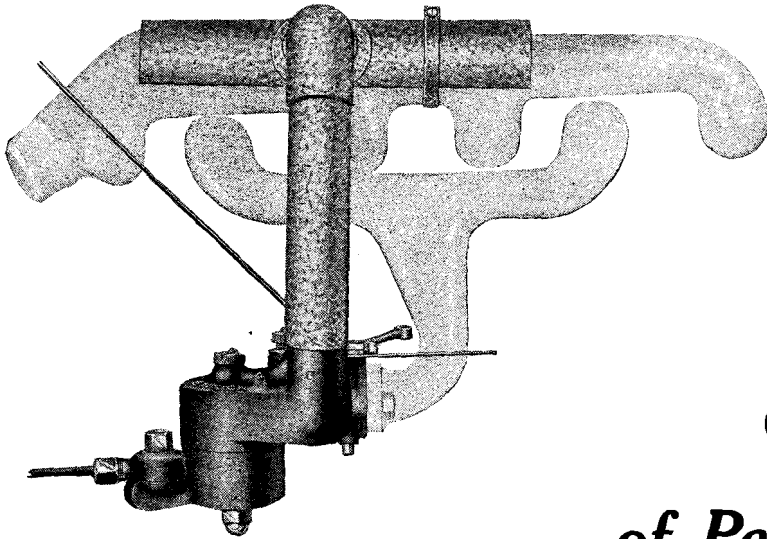
Makers of the HERZPLUG
(Since 1894)

When we first made timers for Stevens-Duryea and Buick, **seventeen years ago**, the English language had no name for such a device. We coined the name Timer.
(Herz Timer).

*— lots of “Jazz”
and Much Mileage*

ENSIGN

FORD SPECIAL



Sold on an
Absolute
Guarantee
of Performance

*And you are the
Judge—*

DEALERS—The only way you can really know the *Real Value* of the ENSIGN is to try it out for yourself—write nearest Branch for details of our Sales Proposition. It is good.

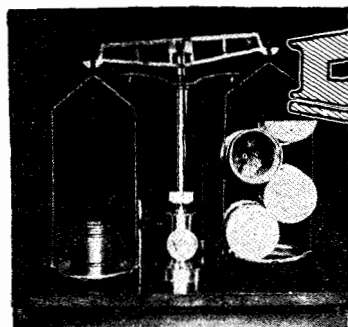
OWNERS—If there is not an ENSIGN Agency in your city we will ship a Ford Outfit C. O. D. on a 10 day trial.

Your money refunded with our “Thank you for the Test” if you ask it.
Refer to any Mercantile Agency.

ENSIGN CARBURETOR CO
Makers of Carburetors for All Internal Combustion Engines

CHICAGO—2900 So. Michigan Ave.
LOS ANGELES—217 E. 17th St.
SEATTLE—309 E. Pine St

When writing advertisers—Just say FORD OWNER and DEALER



DOWMETAL

**LIGHTEST
WEIGHT
PISTON**

**WEIGHT
13 ounces
with bronze
bushings.**



*Dowmetal is $\frac{1}{4}$ the Weight of Castiron—
Aluminum Piston Alloys are 65%
Heavier than Dowmetal*

THIS NEW WONDER-PISTON NOW DEMANDED EVERYWHERE

Nobody ever realized, until Milton startled the automotive world by winning the Indianapolis race, that such an apparently commonplace thing as a piston could revolutionize all ideas of motor car performance.

Yet here is an opportunity to get sales territory on the long needed improvement—the lightest known piston—com-

bining with its lightness and strength, unusual toughness and non-scoring qualities. The story of this lightest metal, not mined but pumped from wells is a wonder story of chemical and metallurgical achievement now the talk of the scientific and industrial world. The sales possibilities are boundless.

For You — A Big Sales and Service Opportunity

One out of four Fords needs Piston replacement.

And think of all the used cars to be pepped up for resale.

Think of the speed bugs who take pleasure in driving their Fords past the bigger cars.

There are Ford truck drivers who want more pickup and power—greater hill climbing ability which Dowmetal pistons positively will provide.

All these and many others are ready prospects.

Every possessor of Dowmetal Pistons is a potential salesman, continually demonstrating how much faster and smoother his car runs since Dowmetal pistons were installed. You only need to get a few sets scattered about a territory and your sales work is easy.

Every member of your organization can sell Dowmetal pistons. You will find the profits on this business amount to a very sizeable sum. Although sold at present for *Fords Only*, we will before long be able to supply pistons for a number of makes. Get your territory now on this new wonder profit maker.

**Write for special dealer plan and prices.
We give full co-operation and sales helps.**

THE DOW CHEMICAL CO.,

DOW

Midland Mich U.S.A.

Make Your Ford a \$3,000 Car

From the Standpoint
of Motor Service



Carl B. Witter, Kenton, Ohio, in his Laurel equipped Ford, one of the fastest cars in the Central West.

Roof 16 Overhead Valve Equipment

POWER DEVICE NEEDED BY EVERY FORD OWNER

One hundred per cent extra efficiency, with greater gasoline and oil economy for either touring car or truck. Hill climbing for the touring car owner beyond his wildest dreams. Sand, mud, or the steepest grades have no terrors for the Ford owner with the Roof 16 valve cylinder head.

FORD RACING CARS

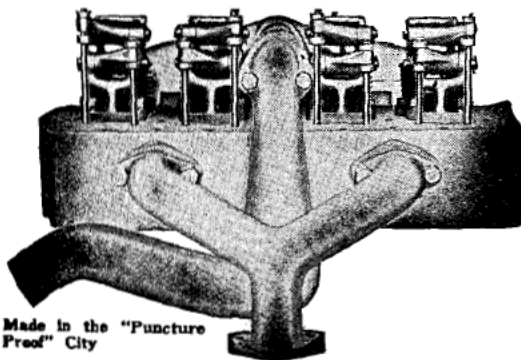
SPEED—Ford cars with the Roof 16—valve cylinder head equipment have been rivals of the best racing cars on mile and half mile tracks and have practically driven the high priced racing cars from competition, excepting on speedways. Joseph C. Hayes, L. E. Kerbs, Williams Bros., Ben Lawell, C. F. Goltry, Paul M. Boozer, James C. Hackney, Fatz Willard and hundreds of other famous Ford drivers with speed records of from 75 to 97 miles per hour attest the wonderful power given to a Ford car by the use of the Roof 16 overhead valve equipment.

We are headquarters for everything necessary in Ford speed equipment, including polished nickel Roof 16 overhead valve equipment, Aluminite, Magnesium and Triple Lite pistons and rings, grey iron pistons and rings complete, Aluminite, Magnesium and Triple Lite connecting rods, parts for under-sliding chassis, nickel steel racing gears three to one ratio, racing carburetors, everything in ignition equipment, counter-balances for crank shaft, high speed cam shafts, wire wheels and steering gears.

Tell us what you want. We can supply it. Send for photographs of our beautiful racing bodies and racing radiators, which are our own special design. Our body construction and low prices are beyond competition. You cannot afford to buy elsewhere.

Get Our Special Circular on Long Mileage Tires and Illustrated Folder Showing Our Full Line of Special Touring, Roadster and Racing Bodies for Fords.

Sixteen Valve Cylinder Head for Dodge Motor



Made in the "Puncture Proof" City

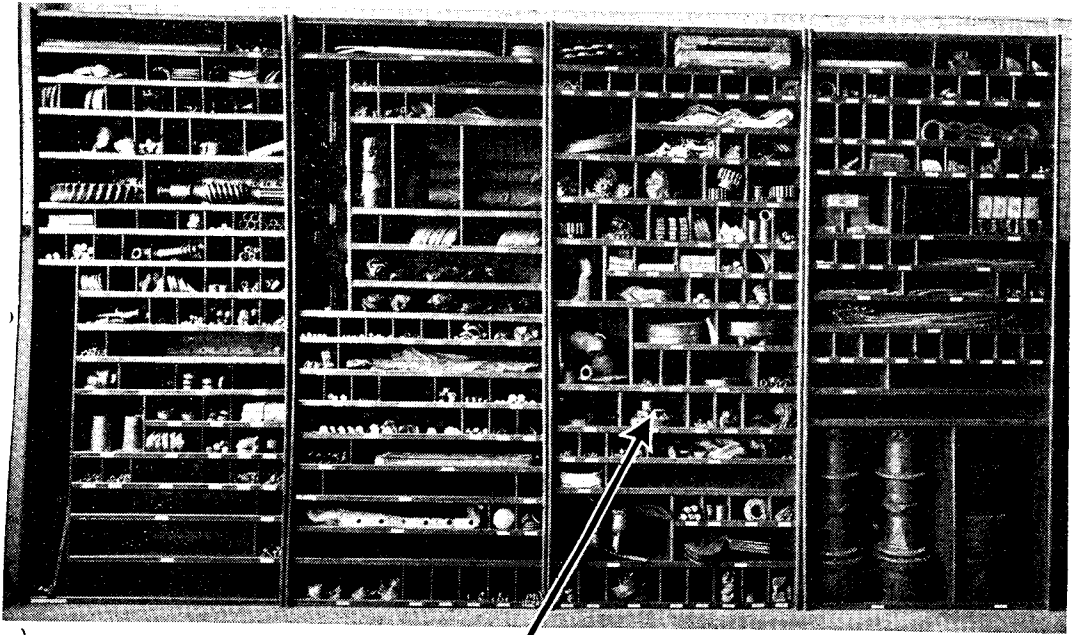
United States Motor Transport Corps official test report shows 60 horsepower for Dodge motor with our sixteen valve cylinder equipment. Puts the Dodge car in the \$5,000 class from the standpoint of road and hill-climbing ability and general all-around efficiency. If you are a Dodge owner do not fail to get our special folder on the Dodge sixteen valve cylinder head.

DEALERS—GARAGEMEN—REPAIRMEN

The ROOF-PEUGEOT TYPE CYLINDER HEAD FOR FORDS IS AN ALL-YEAR SELLER. THEY ARE QUICKLY AND EASILY INSTALLED—SET RIGHT IN PLACE OF THE OLD CYLINDER HEAD. ROCKER ARMS OPERATE FROM THE REGULAR CAM-SHAFT. Every Ford owner is a likely prospect, every Ford truck owner is a SURE SALE. If you want a steady stream of business throughout the year that pays, get our agency terms. Send for free illustrated literature of the greatest selling specialty for 1921. Place one equipment in your territory and it will bring every Ford owner to your door.

WRITE TODAY FOR SPECIAL AGENCY TERMS.

Laurel Motors Corporation
ANDERSON, INDIANA



BEE LINES TO

Not only Ford Passenger car and truck parts, but Fordson tractor parts, are provided for in Lupton Auto Parts Storage. It's the modern efficiency principle applied to selling parts. They are grouped by unit assemblies—rear axle parts together, front axle parts, etc.—in Parts Book order. You can put your hand on anything at once. Quantities are proportioned to the average monthly demand; there's no waste space or idle stock.



FORDSON PARTS

And everything is displayed! L. A. P. S. says "Come here when you need parts" plainer than words. Your customers know that you can serve them quickly.

"L. A. P. S." pays for itself in a few months, in time saved, quicker turnover on smaller stock, and increased sales. It will make your parts business a real profit-earner.

Several sizes for car and truck parts stocks from \$5,000 to \$50,000; Fordson parts from \$1,000 to \$5,000. All build of STEEL in units 3 x 7 x 1 ft. Shipped fully assembled: no erection cost. Fit anywhere: readily moved or bins adjusted if needed. Sold by leading jobbers everywhere. Delivered from warehouse stock.

Write below your name and address, and size of stock intended, and send to nearest Lupton office for full particulars. State Fordson stock separately.

David Lupton's Sons Company

Allegheny Avenue and Tulip Street

PHILADELPHIA, PA.

CLEVELAND: 806 Swetland Building.
CHICAGO: 1114 Steger Building.

NEW YORK: 50 Church Street.
DETROIT: 938 Majestic Building.

Lupton

PARTS STORAGE

INVESTMENT VALUE

FOR FORDS

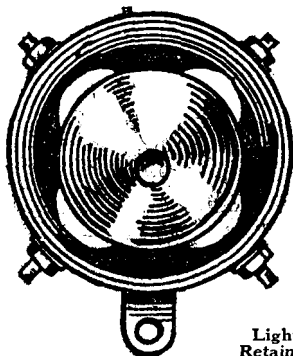
When writing advertisers—Just say FORD OWNER AND DEALER.

"BIG FOUR"

The Timer De Luxe for Ford Cars, Trucks and Tractors

Order from your jobber or dealer.
If he cannot supply you send us
\$2.50 and we will ship direct prepaid.

Crescent
Shaped
Contacts



Light
Retainer
Spring



Hardened
Contact
Washer
Having
Four
Contact
Surfaces



The Timer will last four times as long as the ordinary Timer for the following Reasons:

contact being made by means of a and maintained by means of a spring, giving only a wear. That's all there is to it, a and a spring.

This washer is divided into four contact surfaces. Each surface will wear as long as the ordinary timer (from 6000 to 9000 miles). After one surface has worn, the washer is pushed back against the spring and turned to the next surface, and this is continued until all four surfaces are worn.

which are very desirable from an electrical standpoint, for when the circular contact disk leaves the crescent shaped contact, it leaves only one point and not on a straight line, which would be the case if the contacts were any other shape. In this way the damaging flash and electrical wear so common in timers, is avoided.

as it contains no rollers or roller pins. The contact washer can tilt and accommodate itself to any position, and will work just as well with defective and worn camshaft bearings, and allows a large end play. Gives perfect ignition because it is perfectly made and thoroughly insulated.

Sales Dept.

Chas. M. S. Foster

243 Columbus Avenue
BOSTON, MASS.

Write for Agency Terms

FARLEY & MacNEILL

RETAIL AND WHOLESALE
DISTRIBUTORS

105 Federal Street, BOSTON, MASS.

When writing advertisers—Just say FORD OWNER AND DEALER.

**QUALITY
SNAP RINGS**

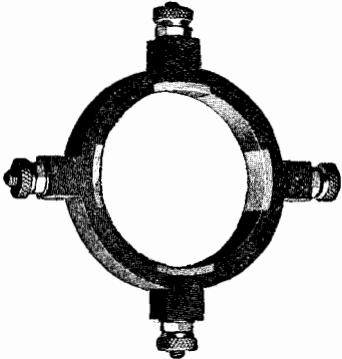
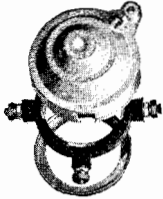
*More Than
a Million a Month*

Ask your
Dealer for
Quality
Snap Rings.

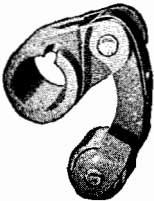
THE Piston RING COMPANY
MUSKOGON, MICH.

More power To Your Ford Car

The timer shell is stamped with the colors of the wires. The contact plates are wider. The Life-Timer cannot rust.



This is the commutator in a "close-up." Note simplicity and accuracy. It is interchangeable at nominal cost. No other timer has this feature. Note how insulating material extends right through timer shell, absolutely eliminating "shorts."



This contact arm has hardened ball bearing races; 18 chrome nickel steel balls; hardened roller and clock steel spring. Its perfect contact with minimum wear means life to timer and to motor.

**Adds 20% Power and Speed
Saves 20% Gasoline
Insures Easy Starting**

THERE'S power in your car that only a Life-Timer will bring out. Power that now may be going to waste because of inaccurate ignition.

Life-Timer puts a hotter, fatter spark into the plug **EXACTLY** on time—to the one-hundredth of a second.

This means that you always "catch" the piston on the full down stroke and not only save every drop of "gas" but turn every drop to account in driving the car or tractor.

Most Perfect Timer That Can Be Made—It Cannot "Short"

Life-Timer is perfectly machined throughout. We are safe in saying that never before has such perfect accuracy and simplicity of design been applied to a timer for Fords and Fordsons.

You can get this added engine efficiency at small cost, and Life-Timer lasts a long time after you get it. See the illustrations depicting Life-Timer's good points.

DEALERS—Write for our Life-Timer proposition. We guarantee this timer, its simplicity and moderate price, together with the service it renders Fords and Fordsons, make it a ready seller, and it pulls **NEW** business, too.

Our dealers have records as high as 25 new customers a month. We will ship sample at dealer's price, if you say so.

\$3.50 Complete

C. N. & F. W. JONAS 608 So. Dearborn St.
CHICAGO
EXCLUSIVE REPRESENTATIVES

Life-Timer

For Fords and Fordson Tractors

MECHANICAL PRODUCTION COMPANY
Franklin and Fratney Streets
MILWAUKEE, WIS.

YOUR TROUBLES ARE OVER

Three miles an hour on level ground and forty miles an hour up the hill. Van Kerr Transformers enable you to do both these things "in high."

Van Kerr Transformers

Decrease gasoline consumption—give greater power—reduce carbon deposits. They can be attached in a few minutes, and from that time on you will have a sweet, smoothly running motor which starts easily even in zero weather.

Does Your Motor Pump Oil? Don't Worry!

Van Kerr Transformers will overcome the troubles due to this condition. The intense hot flash at your plug points, due to our patented, fireproof, open air gap, explodes every particle of oil and gas, giving greater power, leaving no carbon and permitting the use of a

leaner mixture. There is no necessity of having your cylinder rebored, or installing new piston rings. Van Kerr Transformers instantly remove the difficulties caused by motors pumping oil and insure against fouled plugs and carbonized motors.

For pleasure cars, motor cycles, tractors and gas engines

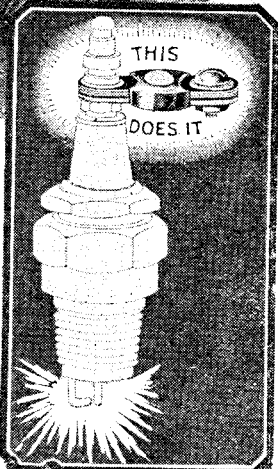
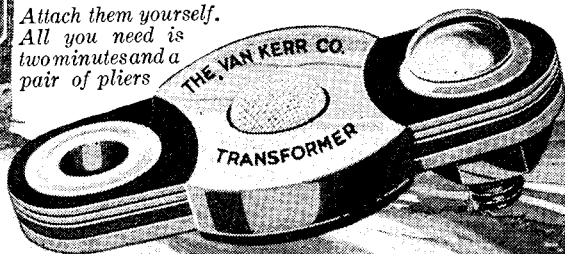
We Will Send You a Set of Transformers

by parcel post. Write us today and tell us your dealer's name and the kind of car you drive. Send no money. Simply pay the postman \$2.00 for a four-cylinder set or \$2.50 for a six cylinder set. Use them ten days and if you are not satisfied that they do all we say they will, return them and you will get your money back.

The Van Kerr Co., Dept. 782, 3160 N. Clark St., Chicago

Over 100,000 satisfied customers are using Van Kerr Transformers

*Attach them yourself.
All you need is
two minutes and a
pair of pliers*



When writing advertisers—Just say FORD OWNER AND DEALER.

ARE YOU WAITING *for* BUSINESS?



Waiting for business this summer is like waiting for rain in a drought.

Big business and fat profits are going to the garage man who adopts "Go get 'em methods," advertises his business and renders first class service with up-to-date equipment.

The waiters and wishers won't get it.

ROMORT

AIR AND WATER STATION

installed in front of your place of business will bring you hundreds of new customers that would otherwise drive by. It puts your business out in front and gets the attention of the approaching motorist a block or two away. Once he uses Romort Service he gets the habit of stopping at your garage and soon becomes a regular customer for the things you sell.

Car owners appreciate the cleanliness and efficiency of Romort Service. The "ever clean" air hose that never touches the ground—the way it reaches all four tires without moving the car—the automatic governor that returns the hose to an upright position after using and eliminates the necessity of putting it away—and the convenient grip valve water hose for radiator use.

Built in five styles, including models for outside wall installation and interior ceiling installation.

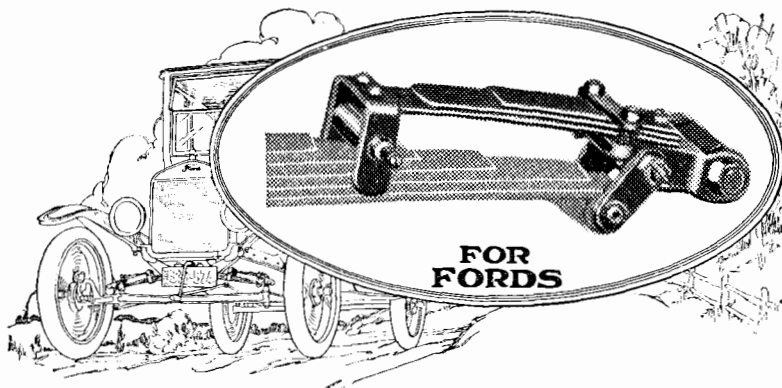
Your name on a postal addressed to our Sales Dept. will bring full details by return mail.

Manufactured by
ROMORT MFG. CO.
Oakfield, Wis.

Sales Dept.
The Zinke Company
1323 Michigan Avenue,
Chicago, Illinois.



When writing advertisers—Just say FORD OWNER AND DEALER.



Note the Big Roller Bearing

Strength, durability and unlimited satisfactory service is structurally indicated in every line of Defender Shock Absorbers for Fords

Like all Ford owners, you will be quick to see and appreciate the perfection and soundness of the Defender Shock Absorber mechanical principle.

In combination with the "Defender" leaf spring assembly, big roller bearings easily cushion — actually break up and dispel the heaviest road shocks and load strains; safely check dangerous rebounding car

action and body sidesway, literally multiplying the riding and driving comfort of Ford cars a hundred fold.

And, the leaf spring, roller bearing features of Defender Shock Absorbers are not only exclusive "Defender" points of superiority, but ensure positive, dependable operation under all road or load conditions.

The chances are YOUR dealer is a Defender Dealer. If not, just write direct to us.

DEFENDER SHOCK ABSORBERS

"Defenders" pay for themselves in physical comfort. They prevent spring breakage, lower operating expense, decrease repair bills, and add greatly to the re-sale value of your car.

Your dealer is authorized to install a set of Defender Shock Absorbers on your car under a written ten-day, money-back, if-you'll-take-it trial test guarantee. Try them at our risk.

DEFENDER AUTO-LOCK COMPANY

Allegan, Michigan

Pioneers in the Ford Lock Field and Makers of the New Defender Thief-Proof Steering Wheel Locks for Fords.

September, 1921

FORD OWNER and DEALER

*If you don't get 26 to 30 miles per gallon from
your FORD you do not have the*

NEW MODEL L-4

Kingston Carburetor

THE NEW KINGSTON MODEL L-4 CARBURETOR, which is being used as regular equipment by the Ford Motor Company on its new cars, is the biggest step forward in carburetion in the last twenty years. Here is the story in brief:

Tested in all weathers, in all parts of the country, under all conditions, it produced more power than any other carburetor we ever produced. A wonderful hill climber.

Positive and repeated tests insure this mileage:

Touring Cars 26 to 30.6 miles to gallon.

Sedans 21 to 25.4 miles to gallon.

The New Kingston Model L-4 is provided with the improved spray nozzle, involving an entirely new principle in carburetion, and providing a super carburetor. More pep, quicker getaway, economy and power. Fully guaranteed.

Price \$6.00

WITH FUEL STRAINER \$7.50

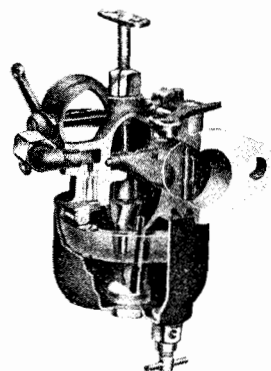
At Your Nearest Dealer, or Write Manufacturers Direct

Note — This carburetor is not sold on extravagant claims, but upon its proved record of actual performance. It is guaranteed to do exactly what we say it will do.

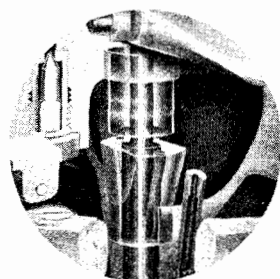
BYRNE, KINGSTON & COMPANY
KOKOMO, INDIANA, U. S. A.

Branches — New York, Chicago, Detroit, Boston, San Francisco

*Kingston Carburetors are Used by 80 per cent. of American
Farm Tractor Manufacturers*



Cut-away view of the famous Kingston Model L-4, the NEW carburetor for Fords—simplest, staunchest and most efficient carburetor made.

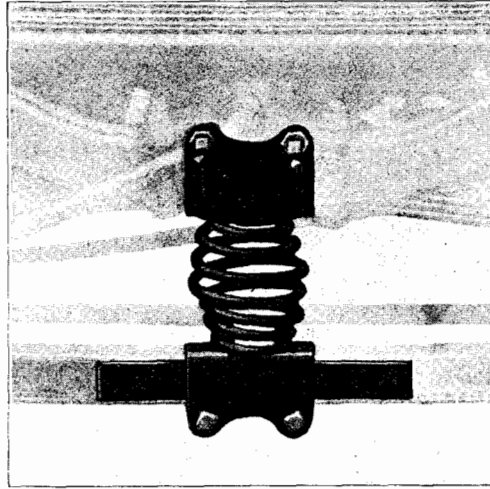


Close-up view of the Kingston Model L-4 Spray Nozzle, the device that has made better carburetion possible. To be had ONLY on the new Kingston carburetor

KINGSTON

CARBURETORS

When writing advertisers—Just say FORD OWNER and DEALER

\$5.00**\$5.00**

**DESIGN OF IT'S SPIRAL SPRING
ACCOUNTS FOR THE SUCCESS OF THE**

Gemco
MILWAUKEE
TRADE MARK

TRI-CHEK

Patented

This "egg" shaped spring with a bulge in the center COMPRESSES easily. There's just enough compression to absorb the many unexpected shocks, but not so much that the Ford springs are hindered from full play under usual road conditions.

A Tri-Chek acts as a "cushion" not as a "stiffener."

It's Expansion is gradual and checks or snubs the rebound at the proper moment, thus saving the springs from breaking.

The TENSION of the spiral between the axle and the frame is just enough to check the sidesway of the axle in the shackle bolts. This is noticed especially when turning a sharp corner, and when running at a good speed on a country road.

The TRI-CHEK is attached in a few minutes without touching a bolt on the car, or attaching to any part of the steering mechanism. It is guaranteed to be satisfactory or money refunded.

New Model for Fords With Single Spring Clips

We are now in production on the new model TRI-CHEK for late model Fords with the single spring clip. Be sure and give the correct symbol, as shown below, when ordering.

Symbol	Price
C4860B—For Fords With Double Spring Clip	\$5.00
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Gemco Manufacturing Co., Milwaukee, Wis.



"It's FIERCE, the way they are stealing cars—and especially Fords.

"Police don't seem to be able to do anything. Guess I'll have to be my own policeman—guard my Ford with a

HUGRO PERFECTION

Steering Wheel Lock

"My friends say it simply CAN'T be beaten. Crooks can't jimmy it and they can't work the old trick of knee pressure or side-stress, when this lock is locked."—JIM.

To Dealers

Here's a WINNER! Sells on sight, and every one you sell sells others, 'cause the Ford fans tell the good news to each other.

This is the only REAL Ford lock. And the big oversize corrugated walnut-rim steering wheel gives "class" to the Ford.

Approved by Underwriters Laboratory, and given preferential insurance rate.

Retail price \$15.00. Send for discount and dealer proposition in your territory.

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WARSAW, INDIANA.



TIMER with a different construction—with “wipe” contacts instead of a roller. A super-accurate Timer that times to the smallest fraction of a second. Its action never fails—your engine never misses through faulty timing. Smooth, self-cleaning, self-burnishing contacts that require no oil or grease, provide a perfect cycle of electrical contacts under all conditions and during the full life of the Timer. With the

ECLIPSE TIMER

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“The Timer that Times in Perfect Time All of the Time”

When writing advertisers—Just say **FORD OWNER AND DEALER**.

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\$1.50

New Set of Contacts

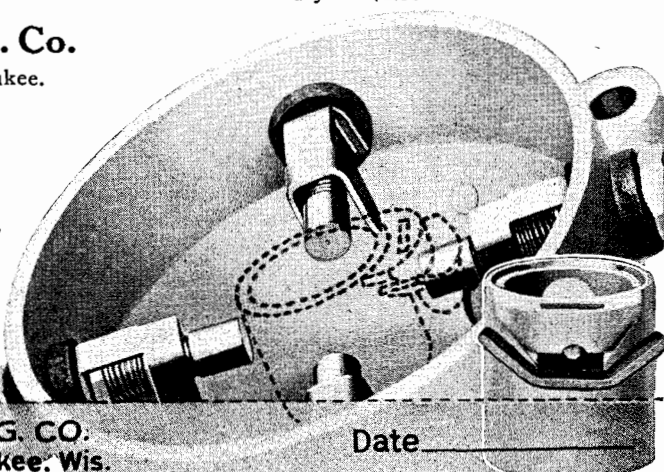
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Date _____

Please send me one of your Eclipse Timers for which I enclose \$1.50
It is understood that I can return it if not satisfactory and my \$1.50 will be refunded

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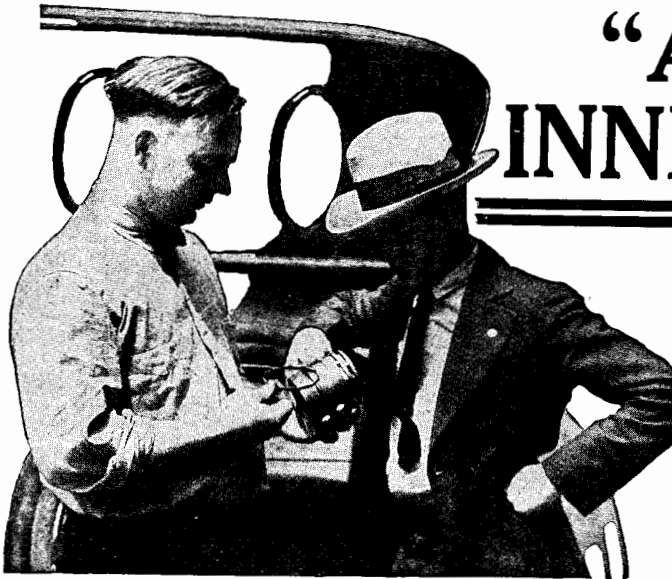
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are installed in the ring groove under the regular piston ring. Made of imported, thin spring steel. Geometrically shaped by specially designed machinery. Give regular rings more expansion, exerting a constant, yet gentle, flexible pressure.

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"I'm sure for these Apex 'Innerings.'* And I tell you this, you can't go wrong on them. I've put them in hundreds of motors of all kinds now, and believe me, I'll tell the world they stop that old 'slap' and 'oil pumping.' And you know that means a clean, quiet 'peppy' motor."

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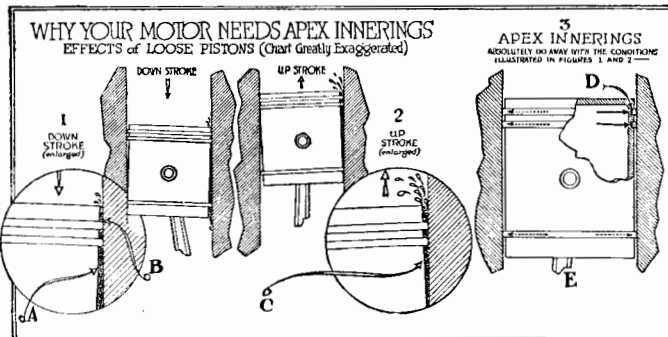
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* "Innering"* is the name applied by the Thomson-Friedlob Mfg. Co. to their product. Any other device so named is not genuine. Ask for Apex "Innerings."*



A Shows oil being sucked past piston and rings (on intake stroke) and locked in by reverse position of piston on beginning of up stroke, and forced into combustion chamber. (See Figure 2.) B. Shows how ring edges wear, due to loose pistons. Rings so worn naturally lose all effectiveness. C. Shows how, on the up stroke position of worn piston is reversed allowing oil shown "locked in" (Figure

1) to "pump" past worn rings into combustion chamber. D. "Innering"* lies here between piston and piston ring. E. Innerings are inserted in the piston ring groove, under the regular rings. They exert a gentle, flexible pressure (shown by arrows Figure 3,) on the rings holding them to perfect contact with the cylinder wall at every point of the ring-face, and keeping pistons centralized always. Only the piston rings touch the cylinder wall.



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No.6

The Month of Awakening

September is the month of awakening.

This may appear as a radical statement; an effort to upset traditions which consider springtime as the period of revival.

But we here contend that humans do not follow the rest of nature in this regard.

About the time when flowers, trees and birds are preparing for seasonal activity, we think about vacation.

But when September days arrive, with their bracing autumnal air, we come out of our summer lethargy.

We feel active; anxious to get going—accomplishing things—working—making money.

If you feel that way, remember that there is plenty of work to do.

Good crops promise good business.
Let's all go after it.

Multi-Speed Transmissions

Utility and Pleasure of Auxiliary Transmission.

By MURRAY FAHNESTOCK.

WHEN the high speed gear is used, the car has speed but not so much power. When the low speed gear is used, then the car has plenty of pulling power—but the speed is lacking. It is in order to get a “betwixt-and-between” speed that these auxiliary transmissions are used. Then, when conditions of road or grade call for more power than can be supplied by the high speed gear, and for more speed than can be supplied by the low speed gear, an intermediate gear will be available, which will combine both speed and power to the most useful degree.

By using special-ratio gears in the rear axle system, of say the 4-to-one or of the 4.2-to-one type, we can get increased power. But this is at the sacrifice of a certain amount of speed on smooth, level roads. By installing 3-to-one ratio gears in the rear axle, we can get increased speed over smooth, level roads. But we will naturally sacrifice pulling power for traveling over hilly roads or through sand or mud. As it is obviously impractical to change the rear axle drive gears, when traveling along the road, the only practical alternative is to install a multi-speed transmission, which will perform the same function of changing the rear axle gears, whenever the driver so desires.

It is thus to act, as a changeable gear ratio, that these multi-speed transmissions are designed. And by suitable combining a multi-speed transmission with special-ratio gears on the rear axle system, even better results can sometimes be secured. For instance, if one is driving a touring car over generally smooth and level roads, or over what would be called “rolling country” without too many steep hills; then it might be desirable to install a set of 3-to-one gears in the rear axle system for general use over level roads and easy grades. While the intermediate gear of the multi-speed transmission could be used to secure greater pulling power over hills.

However, if one has a Ford Sedan of considerably greater weight, and if this car is used over mountainous roads, then it may be preferable to use a set of 4-to-one gears in the rear axle, and to use the multi-speed transmission to obtain greater pulling power, or higher speed, as desired.

Speed or Power.

In a previous article in this magazine, it was shown by means of pulleys used as a

hoist that it was possible to get either speed or power by a suitable arrangement of pulleys, which had the same effect as changing the gear ratio. The big word in this case is the little word “or.” It is not possible, by any means of gearing to obtain both speed and power at the same time, as the power is the product of the speed times the pull, or vice versa.

Most of these multi-speed transmissions are so arranged that they can be used to give what is called an “over-drive,” which has the effect of gearing up the speed of the car. In other words, when the multi-speed transmission is in the highest gear position, then the car is geared up to travel at a higher rate of speed than the car would travel if the regular Ford high gear were used.

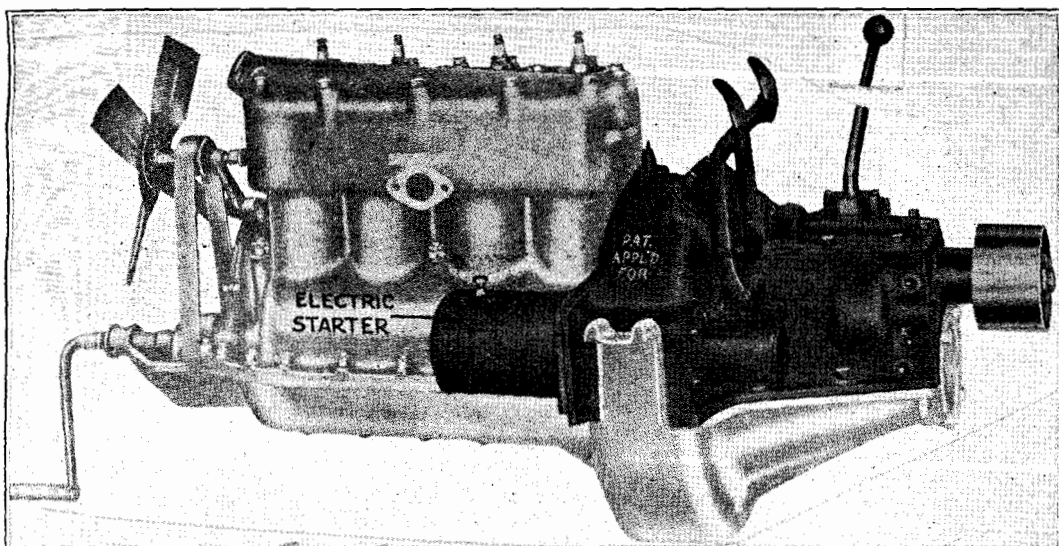
By installing these transmissions in the opposite direction or by turning them under “end-for-end,” it is possible to use what is called the “under-drive.” This has the effect of reducing the speed of the car when the intermediate gear is used, and thus increasing the available pulling power.

Enclosed Cars.

It is on such enclosed car models as the Ford Sedan or Coupelet, the multi-speed transmissions will most frequently be used because, owing to the greater weight of these enclosed car bodies, a special ratio of transmission is more imperatively needed. There is another reason why the owners of enclosed Fords will be more apt to buy these special ratio transmissions, and this is due to the fact that these enclosed Fords cost almost twice as much as the open Ford cars. And the man who pays that much for a car is usually willing to pay the additional amount to get just what he wants in speed and power.

Another important reason why a multi-speed transmission is needed more on the enclosed cars is due to the fact that, when low gear is used with an enclosed car and the engine is spinning at a high rate of speed, the enclosed car body acts as a sounding box, resembling the effect of a violin. Thus intensifying the sound, and making it very disagreeable for the driver and passengers, if the engine is running at all fast.

By using a multi-speed transmission, it is possible to keep the engine running more regularly at its most efficient speed of about



SIMPLEX THREE-SPEED SLIDING

a thousand revolutions per minute, at which rate of speed the Ford engine develops its **maximum power**, with the least amount of thumping and vibration.

Efficient Engine Speed.

At speeds of over a thousand revolutions per minute, the unbalanced forces of the pistons and crank shaft tend to give such considerable thumps, that the whole car is subjected to considerable strain and vibration. And the **normal** engine speed, of about one thousand revolutions per minute, is the "happy medium" at which the Ford engine works most efficiently and smoothly.

With the regular Ford rear axle gear ratio of 3.63-to-one in the rear axle, the Ford engine is traveling at its normal speed of a thousand revolutions per minute when traveling along in high gear at a rate of speed of approximately twenty-five miles an hour. When low gear is used, this normal engine speed, of one thousand revolutions per minute, is attained when the car is traveling at about eight miles an hour. For this reason, the Ford car should not usually be driven much over eight miles an hour, when low gear is used.

The Ford Ton-Truck.

Multi-speed transmissions find another useful application for use with Ford Ton-Trucks, owing to the fact that the **load** carried by these trucks is so **variable**. For example, the truck may be overloaded to the extent of carrying a ton or a ton and a half of goods, and this load may be carried up to a hilly district. Returning from the same trip, the truck may be **empty**, and the route may be generally down grade.

Under such conditions the use of a multi-speed transmission will enable the **right** gear ratios to be used in carrying the **overload up** the long, hilly road, while the multi-speed transmission affords another **change** of gear ratio to enable the truck to return **empty** at a considerable higher rate of speed, without

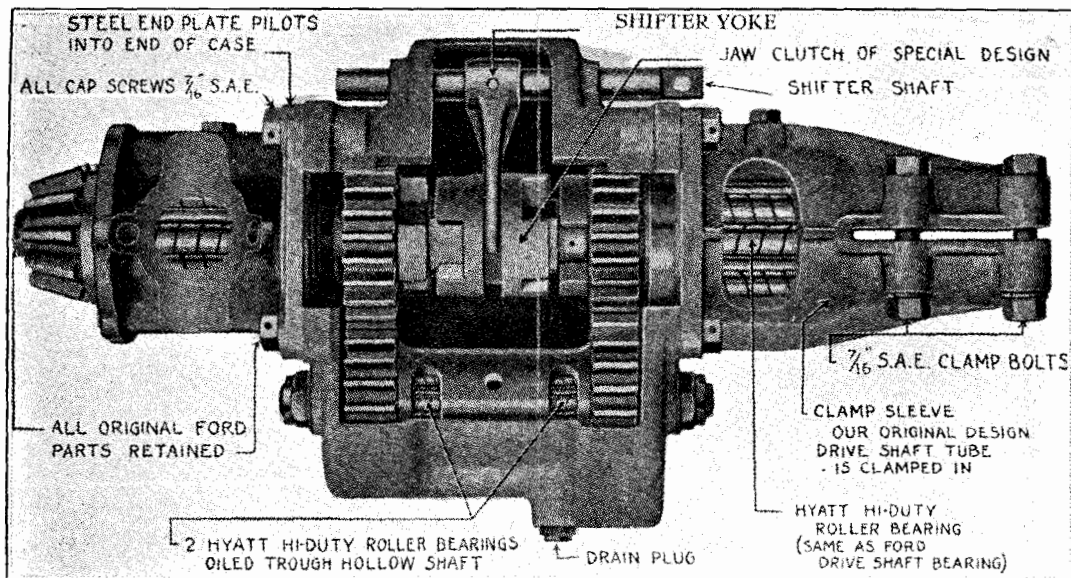
racing the engine and shaking the engine all to pieces.

The "critical" speed for the Ford Ton-Truck, using the regular gear ratio of 7.25-to-one in the rear axle, is from 15 to not over 17 miles an hour. If the truck is driven much faster than this—even though empty—the engine will soon be racked and shaken to pieces. While if a suitable over-drive transmission is used, it may be quite feasible to drive the truck on its return trip at a speed of 25 miles an hour or so, thus saving about 50% of the time.

If the time of the truck is worth ten dollars a day, then this may result in a saving of several dollars per day. And as truck operations is a "dollar-and-cents" proposition, it is worth considering each and every factor which will multiply the utility of the truck.

Some of these multi-speed transmissions are expressly designed for use on the Ford Ton-Truck, all the parts being made "extra heavy" to withstand the abuse to which they may be subjected when carelessly driven by indifferent drivers. Of course, when the Ton-Truck is used on the farm, and a member of the family is the driver, then the transmission will be handled with the same care as the sliding gears in a touring car of "other-than-Ford" make. And there is no reason why these transmissions should not give as long service as the transmissions in the average automobile.

As we have previously mentioned, a car may be unable to ascend a certain hill in high gear, and so the speed of the car may drop suddenly, from 25 miles an hour to about 8 miles an hour. However, if one has a multi-speed transmission and an **intermediate** gear is available, then a speed of 18 miles an hour may be easily maintained up the same hill, or when pulling through deep sand or mud. Thus the **average** speed of the car may be considerably increased on a long trip.



Moore Transmission.

If an "over-drive" transmission is used, so that an even higher than regular speed can be used, then the normal running speed over good roads, without excessive vibration of the engine, may be increased from 25 up to say 35 miles an hour. By thus giving two additional speed changes, we may be able to increase the *average* speed to a considerable extent, thus enabling the car or truck to cover much more territory during the day.

Fuel Saving.

In considering fuel economy tests, it is generally known that the Ford car will cover most miles per gallon when the car is not driven over 20 or 25 miles an hour. This is due to the fact that, at higher rates of speed, much of the power from the fuel is wasted in "shaking" the engine and in vibration and noise. Consequently, if an "over-drive" transmission is used, and the engine speed can be kept at about a thousand revolutions per minute, even though the car speed is about 30 miles an hour, it stands to reason that considerably better fuel mileage will be secured.

This will be evident if we will consider how wasteful of fuel it would be to drive ten miles over a level road using "low gear" all the way. An evidence of this is given by the fact that the engine soon causes the radiator to boil over, if this "stunt" is attempted. The fact that the radiator boils over is good evidence that the fuel is being burned up to produce an excessive amount of heat, and this is a good way of proving that fuel is wasted, when the gear ratio is too low.

If, when walking, one takes little steps, of about six inches in length, it is easy to surmise that this will take much more energy and be much more tiring than taking normal strides of about 27 inches. While if one attempts to take 4-foot steps, then this will also be a much more tiring method of walking than by taking steps of *normal* length. It is to enable the Ford engine to exert the power impulses of a normal amount that

multi-speed transmissions are designed to accommodate the gear ratio to the conditions of road, grade, and load.

Easier Driving.

If one is driving up a hill which is too steep for the use of high gear and which makes it necessary to use low gear, then it will be *easier* for the driver if he has a multi-speed transmission. Then he can shift back into intermediate speed, and thus drive the car up the hill in a gear ratio which pulls the car along at a good rate of speed, yet without "racing" the engine and getting on the driver's nerves.

Also, this makes it unnecessary for the driver to keep the low speed pedal constantly pressed down, which is very tiring. As one must hold this low speed pedal pressed down firmly, when traveling up a hill of a half a mile or more in length. The ability to shift into intermediate gear, which makes it unnecessary to use low gear so frequently, is very convenient when driving through traffic or through sandy or muddy roads, thus making it much *pleasanter* to drive the car and lessening the strain on the driver.

If one wishes to get back into high gear, and a multi-speed transmission is available, the car can be speeded up to 20 or 25 miles an hour in the "intermediate" gear; thus making it easier to get back into high gear and maintain the speed of the car up the rest of the hill. One of the requisites, of getting back into high speed easier, is a sufficiently high speed of the car to enable the change to be made smoothly and easily.

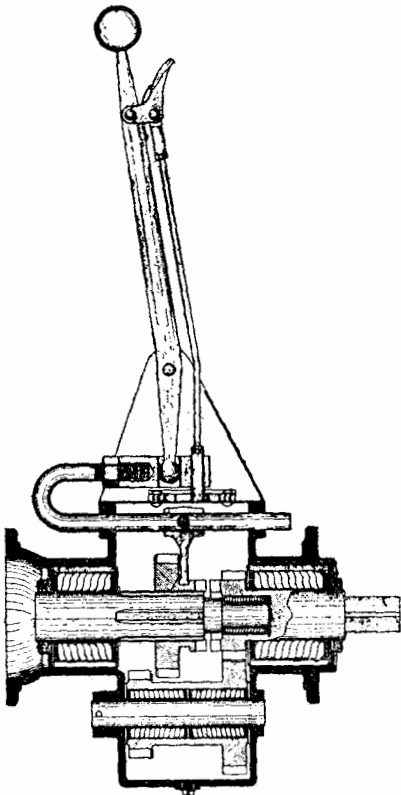
Needs An Intermediate Gear.

Most of the emphasis of the utility for multi-speed transmissions lies in the need for the intermediate, or "betwixt-and-between" gear. This is the gear ratio which is usually most needed, just as most of us long for spring in December and January, while we often long just as fervently for cooler weather in the heat of July and August. The seasons of the year, at which the most work can

be done, are the **intermediate** seasons of spring and fall.

One of the advantages of the intermediate gear is that the ability to secure the correct gear also lessens the strain of pulling the car up hills. This makes it easier on the engine and reduces the wear on the bearings of the crank shaft, and also the wear of the pistons and cylinder walls.

While some of us might manage to carry a 200-pound load across the street, we could much more easily handle this same load by carrying it in two or three trips. In the



Woodward Transmission.

same manner, the Ford engine can then propel the car up a certain hill much easier by using the "intermediate" gear ratio to obtain a more suitable ratio between the engine speed and the load.

The reason that the regular Ford low speed is not made higher is that this is the only "emergency" pulling gear that the Ford transmission has. While it would be generally useful to have the Ford low speed higher than it now is, there are occasions when the Ford car needs every bit of power that the low speed makes available. In order to obtain this reserve of pulling power, it has been necessary to make the Ford low gear ratio lower than would be generally convenient for the average driver.

For instance, when one is starting the car in deep sand or mud, then the car needs every bit of power that the regular Ford low gear will give. Or when starting the car up hill, then the Ford low gear is needed to

afford the necessary power. And if the Ford low gear were designed to give a higher speed, it would lack the necessary power to cope with these conditions.

Lower-than-Low.

As it is the "intermediate" speed which is most imperatively needed, the question may arise, "Why are many of these transmissions of the four-speed or six-speed type?" The answer is that most of these auxiliary transmissions really only give two changes of gear ratio. But as these two changes of gear ratio are applied to each available speed of the regular Ford transmission, this gives two changes of gear ratio for the Ford "high" speed gear, and also two changes of gear ratio for the Ford "low" speed gear, thus making **four** forward speeds ahead available.

This has the effect of also doubling the reverse speed and making **two** reverse speeds available. Though this is only an incidental consideration, as the reverse speed is so seldom used and for such short distances. It is not important whether or not an extra reverse speed is available, and it has been the experience of the writer that even when two reverse speeds are available, only one of these is generally used.

Over-Drive Transmissions.

When the transmission is installed in the "over-drive" position, thus **gearing up** the Ford car and increasing the car speed at the normal engine speed, then this means that when the Ford high gear is used, together with the high speed of the auxiliary transmission; then the effect will be to increase the car speed, without increasing the speed of the engine.

Suppose for example, that the engine speed remains constant at the normal speed of one thousand revolutions per minute, and that the regular ratio gears of 3.63-to-one are used in the rear axle. This would ordinarily mean a car speed of 25 miles an hour. But when an "over-drive" auxiliary transmission is used, this car speed would be increased to about 30 or 35 miles an hour, with the engine speed remaining constant at the same normal speed of one thousand revolutions.

When the auxiliary transmission is shifted into the lower speed, then the gear ratio, from the engine to the rear axle, will be the same as if no auxiliary transmission were used; thus giving the "straight" drive from engine to rear axle of 3.63-to-one. When the auxiliary transmission gear shift lever is then placed in the "high" gear position and the Ford low speed pedal is pressed, then the effect of an "intermediate" speed, between the regular Ford low speed and the Ford high speed will be secured, the "gearing up" being secured in the auxiliary transmission.

When the gear shift lever of the auxiliary transmission is moved to the "low" speed position, and the Ford low speed lever is pressed; then this will give the same effect as the regular Ford low gear.

All this is about as clear as mud. But the result is that the regular Ford high and low speed are not changed, and that an "over-drive" is secured which makes available a higher gear ratio for faster car speeds over smooth, level roads.

In our opinion, the over-drive transmission should only be used with the regular Ford 3.63-to-one gears in the rear axle, with the Ford Sedan or Coupelet, when the roads are unusually smooth and level. Though this over-drive transmission might be used with the Ford touring cars or roadsters under average conditions of dirt roads, which are not too hilly.

Under-Drive Transmissions.

When the auxiliary transmission is turned "end-for-end" and installed in the under-drive position, this means that, when the auxiliary transmission is used, the engine speed will be "geared down," and so greater pulling power, but less speed, will be available.

When the "under-drive" transmission is used, and the gear shift lever is in the "high" speed position, and the Ford transmission is in the high gear; then the regular ratio of 3.6-to-one will exist between the engine and the rear axle. And the drive will not be through any of the gears of the auxiliary transmission, so that the Ford car will have just the same pulling power in high gear, and just the same speed, as if no auxiliary transmission were used.

When the gear shift lever is moved to the "low" speed position, then the effect of an excellent intermediate gear will be secured, thus securing greater power than can be secured through the use of the regular Ford transmission in high gear, and greater speed than can be secured through the use of the Ford low speed.

By moving the gear shift lever of the auxiliary transmission to the "high" speed position and pressing the low speed pedal, then the same effect will be secured as if the regular Ford low speed were used and no auxiliary transmission were installed.

If the gear shift lever of the multi-speed transmission is moved to the low speed position and the low speed pedal be depressed, then a "lower-than-low" gear is secured, which gives greater pulling power but less available speed than can be secured by the use of the regular Ford low gear. This "lower-than-low" gear ratio may be especially desirable on Ford Sedans or trucks driven over rough and muddy roads, or for pulling over exceptionally steep grades. And this "lower-than-low" speed also makes it easier to start the heavily loaded car, when the car is standing on an uphill grade.

Free Neutral Saves Fuel.

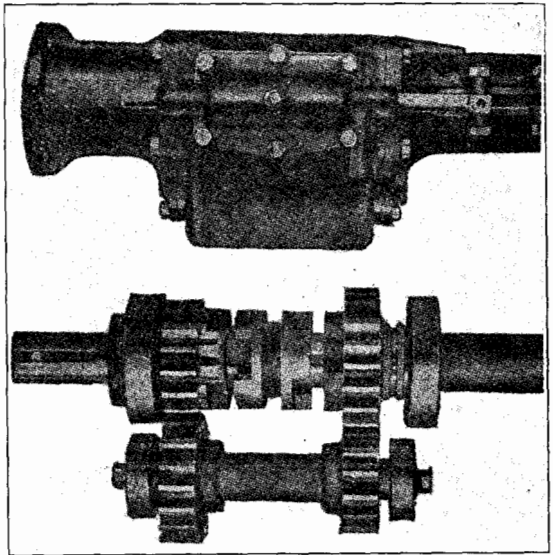
The fact that a "sliding" gear transmission is used enables a really "free neutral" to be secured. When the gears are disengaged, then the two shafts can rotate freely without regard to each other. This gives a "free neutral" that is impossible to secure with the ordinary Ford transmission.

When the Ford transmission is used, the so-called "neutral" is with the clutch disengaged. As the Ford high speed clutch is

composed of 25 steel discs, this means that there are about 24, contact surfaces between the discs of the high-speed clutch.

Now the entire clutch assembly only releases about a quarter of an inch or .25 of an inch. This means that the distance between adjacent plates of the high speed clutch will only be about .01 of an inch. By the time .01 of an inch is filled with oil, there may be considerable "drag" or friction between the discs of the high-speed clutch.

Of course, when the engine is warmed up and the oil is thin, then this "drag" is not so noticeable. But this is the reason why the Ford car does not coast freely, no matter in what position the clutch pedal is held when the engine is stopped. Of course, when the



Langebin Truck Transmission.

engine is still running, then there is not so much difference between the engine speed and the car speed, and so the "drag" in the high speed clutch is not so noticeable.

In making fuel economy tests in other-than-Ford cars, it is usually customary to speed the car up to about thirty miles an hour. Then stop the engine, and allow the car to coast until the car speed decreases. Then the clutch is engaged and the engine started. Thus driving with a series of "jumps" which secures the maximum fuel efficiency in covering the greatest distance over level roads.

On some down grades, where the Ford car will not ordinarily coast with the engine stopped, using the regular Ford transmission; it is possible, with one of these special transmissions, to use the "free neutral" and thus allow the car to coast for a much greater portion of the time. Over rolling country roads, where traffic is not too heavy, it is sometimes possible to coast for a quarter of the total distance covered, thus greatly increasing the fuel economy and the miles per gallon.

Easier Starting.

When cranking the Ford engine, the greatest difficulty in cranking is the apparent "stiffness" of the Ford engine. This is really due to the "drag" between the discs of the high-speed clutch. In cold weather, when the oil is congealed and stiff, it is the custom of many owners of Ford cars to jack up one of the rear wheels, and thus eliminate the "drag" in the high-speed clutch, by rotating the drive shaft and the gears in the rear axle as well as one of the rear wheels.

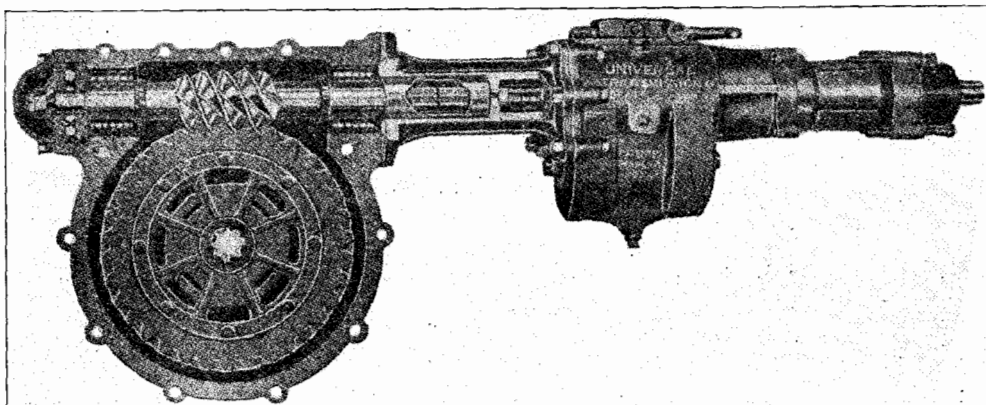
Even the heavy grease in the rear axle housing does not cause as much friction and "drag" as that which usually exists between the discs of the high-speed clutch. Consequently, this method of easier starting is an effective aid in really cold weather.

But if the car is fitted with one of these multi-speed transmissions, then the gears can

be shifted to the really free neutral, and the from the rear axles and covers these cast-iron brake shoes, the coefficient of friction is very low, and the brakes are not effective. So that we recommend the installation of some form of "lined" rear hub brake shoes, as these fabric-lined brake shoes are much more effective in stopping the car than the plain, cast-iron brake shoes.

Many car owners consider it even better to install a set of "contracting" rear hub brakes. Some of these "contracting" rear hub brakes are arranged to be connected to the foot pedal or "service" brake of the car. And they are much easier to relined than the Ford foot brake inside of the transmission.

But the multi-speed transmissions have the advantage that they allow the engine to be more effectively used as a "brake," when the car is being driven over hilly country roads.



Truck Model Universal.

engine can be cranked just as easily as the engines of "other-than-Ford" cars of similar size. This advantage of easier starting is most useful in cold weather, and also for those who crank the engine by the "Armstrong" method. However, even when an electric starting system is fitted, this method is useful as it reduces the strain on the battery and on the electric starting motor.

Rear Hub Brakes.

The fact that a really "free neutral" is provided must be considered in the braking system of the car. For if one attempted to shift gears while descending a hill, and should fail to engage the gears; then the regular Ford foot brake and reverse would be inoperative for controlling the speed of the car. For when these auxiliary transmissions are in "neutral," there is no connection between the engine and the rear axle.

By speeding up the engine, so that the gears are rotating at the same speed as that at which they would rotate if the engine were driving the car, it is usually possible to engage the gears. But not every driver is skillful and so it is better to increase the efficiency of the rear hub brakes, when one of these multi-speed transmissions is installed.

The regular Ford rear hub brakes have cast-iron brake shoes, acting against pressed steel drums. And when the grease works out

When the regular Ford transmission is used, and the hill is too steep for the engine to hold back the car in high gear with the ignition switched off; then there is usually too much of a "jump" between the high speed and the Ford low speed, as the use of the Ford low speed would generally stop the car altogether, unless the hill is unusually steep. That is why the Ford low speed gear is practically never used, in connection with the engine, for slowing down the car.

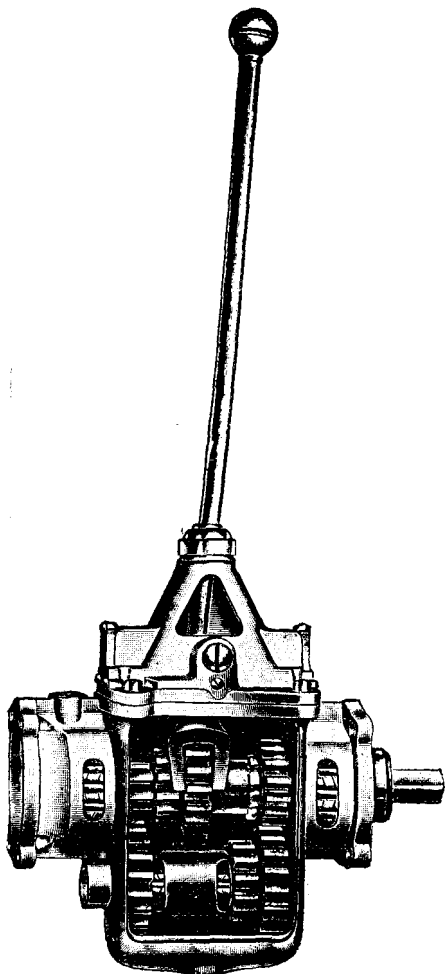
When one of these multi-speed transmissions is installed and the hill is too steep for the use of the high gear, then the "intermediate" speed can be used and the engine will act as an effective brake, thus practically eliminating wear on the regular transmission brakes and saving them so that they will stop the car smoothly and easily in traffic.

Simplex Sliding Transmission.

The Simplex "sliding gear" transmission can be used equally well on either Ford passenger cars or Ford Ton Trucks, because it replaces the regular transmission of the Ford car. And there is no difference between the Ford passenger car, and the Ford Ton Truck, until after the universal joint is passed.

In the Simplex sliding gear transmission there are three forward speeds. And this

sliding gear transmission is of the same general type as is used in most "other-than-Ford" cars. This is considered an advantage by some drivers, who own two or more cars, one of these cars being a Ford used for general city work, while the other car may be a larger car used for touring and special occasions. In such cases, the driver may be accustomed to the sliding gear transmission, as found on the large cars, and by installing a sliding gear transmission on the small Ford; then both cars can have the same type of



Conord Transmission.

transmission, and the driver is less apt to become confused when changing from one car to another. This transmission has the standard S. A. E. gear shift.

One of the advantages of these Simplex transmissions is that it eliminates the Ford transmission bands, and the necessity of replacing the band linings. In this transmission, the regular Ford multiple disc clutch is used for the forward and reverse speeds. The foot brake operates on a drum, on a shaft extending at the back of the transmission. As this foot brake operates on a wide drum, a brake of ample capacity is secured. And

when it does become necessary to reline this brake band, it is not necessary to remove the transmission cover.

As this transmission has three speeds, the use of the intermediate gear makes it unnecessary for the driver to rush hills on high gear in order to avoid the necessity of dropping into the use of the disagreeable Ford low gear. When the intermediate gear is used, fairly steep hills can be taken at a speed of about 15 to 20 miles an hour, without racing or straining the engine. When the roads are muddy or sandy, it is possible to shift into the intermediate speed, thus making it unnecessary for the driver to hold his foot on the low speed pedal over long stretches of road.

The low gear ratio of this transmission is lower than the regular Ford low speed, thus giving more power, which is convenient for use on the Ford Ton Truck. The high gear ratio is the same as the regular Ford high gear, being a direct drive from the engine crank shaft to the rear axle. The intermediate speed is half-way between the low and high gears.

Owing to the location of the foot brake, outside of the transmission, there is no lint or strands of cotton worn from the band linings to clog the oil feed pipe, and to interfere with the oiling system. This tends to promote greater reliability of the engine bearings.

The cover of this transmission replaces the regular Ford transmission cover. And it will be noticed that this transmission cover is fitted for the installation of a Ford electric starting motor, so that the Ford electric starting system can be more easily installed on old Ford cars.

Moore Transmission.

The Moore transmission is of the "four-speed" type, giving two speed ratios in the sliding gears. These two speed ratios are used in connection with the regular Ford transmission, which gives two speeds with the Ford high gear, and two speeds with the Ford low gear; thus making a total of four forward speeds. Of course, two reverse speeds are also afforded, but this is a secondary consideration.

The Moore transmission replaces part of the drive shaft, just ahead of the drive shaft roller bearing housing. This transmission can be installed with the aid of an ordinary hacksaw, and the regular Ford wrenches. The Moore transmission does away with the use of sliding gears, as there is a pair of jaw clutches, which are used to engage the different gears. This means that the gears are "always-in-mesh" and there is no clashing or grinding of the gears, even though the gear shift lever may be carelessly operated by an indifferent driver.

When the "regular" Ford transmission is used, the low gear ratio is about 10-to-one. That is, the engine makes about 10 turns, to one revolution of the rear wheel. When the Moore transmission is used, the low gear is considerably lower, and the engine makes about 20 turns for each revolution of the rear wheels, thus practically doubling the power. This is sometimes of advantage, in securing

an easy start up hill, or in pulling the car out of heavy sand or mud. And this "extra low" gear is especially convenient for use on Ford Ton Trucks, as it practically doubles the power available for emergency use.

When the intermediate gear is used, there is almost twice the pulling power as when the regular Ford "high" speed is used. Consequently, when the gears are set in this speed, the car can be driven up almost any hill without the necessity of the driver holding his foot on the low-speed pedal.

Two different types of this transmission are furnished. In the "under-drive" type, the power furnished to the rear wheels is doubled. While in the "over-drive" type, the road speed of the car is increased about 20 per cent. When the gears are shifted into the "positive neutral," this makes it easy to crank the engine and the car can be more easily moved about the garage without the necessity of starting the engine.

One of the features of this transmission is the Hyatt roller bearings on which both the secondary shaft and the drive shaft are mounted. The Hyatt bearings, on which the drive shaft are mounted, are the same as the regular Ford drive shaft bearings, so that it is easy to secure new roller bearings if ever they should be needed. The installation of one of these transmissions means the addition of only 35 pounds to the net weight of the car.

Woodward Transmission.

The Woodward transmission is of the "sliding gear" type and is attached to the rear end of the Ford transmission, replacing the universal joint, which is then moved farther back.

This transmission is of the "front end" design and the weight is carried by the car springs, rather than directly on the axles. All the shafts of this transmission are mounted on roller bearings, thus preventing loss of power through friction. This transmission is made for both the Ford cars and trucks—the same transmission being used for both.

The No. 1 transmission is of the "90 per cent under-drive" type, while the No. 2 transmission gives "37½ per cent over-drive," thus increasing the road speed of the car to this extent. Another transmission, of the "90 per cent over-drive" is also made.

One of the features of this transmission is that the three different types of transmissions are the same, with the exception of the gears. If one has a set of extra gears at hand, a different set of gears can be installed in the same transmission, to accommodate the car to different work, or different seasons. As an example of this, the No. 1, or 90 per cent under-drive type, could be used to give more power to the car or truck during the winter and spring, when more power is needed. If the roads are level and good, the No. 2 over-drive, giving 37½ per cent more speed, could be used during the summer and fall.

Langbein Transmission.

One of the chief features of the Langbein transmission is the use of Hess-Bright annular

ball-bearings to support the main shaft and the side shaft. These annular ball bearings are accurately and expensively made, and must not be confused with the cheap, adjustable cone ball bearings which were formerly used as standard equipment on Ford front wheels.

Friction imposes a constant drag on the engine and limits the load carrying capacity of the truck or car, thus increasing the amount of fuel required. By the use of these expensive annular bearings the losses, due to friction, are greatly reduced, and the gears are held in accurate mesh, so that the transmission runs freely and quietly in either high or low speed positions.

These Langbein transmissions are made in two sizes—one for use on the Ford passenger cars, and the other size for use with the Ford Ton-Truck. Both sizes are made in either the "over-drive" and under-drive" designs. With the "over-drive" design, there is 45 per cent more road speed with the same engine speed. While with the "under-drive" type the power is increased 45 per cent, with the same engine speed.

With the "over-drive" type installed on a Ford Ton-Truck, the maximum speed of the truck is increased, from the usual speed of 12 to 17 miles an hour up, to a maximum of 17 to 30 miles an hour.

Langbein Truck Transmission. Universal Transmission.

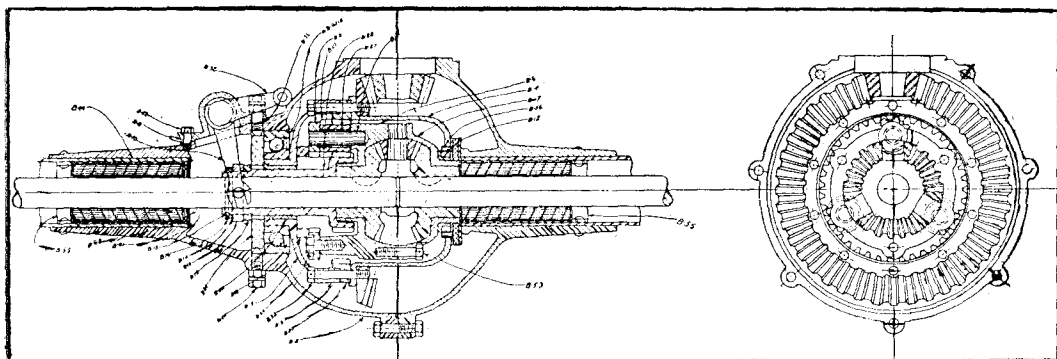
The Universal transmission is of the sliding, jaw-clutch type and is mounted on the drive shaft just forward of the drive shaft roller bearing. This transmission is made in either the "over-drive" or "under-drive" type. When the "over-drive" transmission is used, a high gear ratio of 2.75-to-one is secured—while the regular Ford high gear remains the same as before. Then between the Ford "high" gear and the "low" gear, there is an intermediate speed of 7.25-to-one, which is secured by using the high speed of the over-drive, together with the Ford low speed.

When the under-drive transmission is used, the high speed is the regular Ford high speed of 3.63-to-one. When intermediate is used, the gear ratio is changed to 7.25-to-one, but a "special low" gear ratio of 20-to-one is available.

All the gears of this Universal transmission are constantly in mesh, thus practically eliminating the danger of stripping the gears, as the engagement is made by sliding the jaw clutch along the shaft.

These gears are made of alloy steel of one inch face and are heat treated and oil tempered. The shafts are carried on Hyatt roller bearings. The gear case is made of one piece of Manganese bronze, which has a high tensile strength and is practically unbreakable. The same Ford drive shaft sleeve and Hyatt bearings are used as a part of the regular Ford equipment.

The control lever is mounted on the bracket attached to the transmission cover and has a double ball lock, to hold the gears in proper mesh.



Perfecto Two Speed Axle.

A Universal transmission is made for use with the Ford Ton Truck, and this transmission works in the same manner, and uses the same size gears, as the passenger car transmission. But of course the gear ratios are changed, owing to the fact that the Ford Ton Truck has a rear axle gear ratio of 7.25-to-one, as compared to the ratio of 3.63-to-one, as used in the Ford passenger car.

The Conord Transmission.

The Conord transmission is different from all the others in that it affords **three** changes of speed in the auxiliary transmission. And each of these three speed changes can be applied to either the regular Ford "high" or to the "low" gear, thus making a total of **six forward** speeds available. This also gives three reverse speeds, which are more than most of us have occasion to use.

The chief advantage, claimed for this six-speed transmission, is that an "over-drive" for **speed**, and an "under-drive" for **power** are both **combined** in the same transmission, and are available without using the Ford "low" gear at all. With such a wide range of gear ratios available, one can adapt the gear ratio to the conditions of road and load, and thus secure the maximum of fuel efficiency and road ability of the car. As three speeds are available with the Ford low gear, it is possible to secure tremendous pulling power, for carrying heavy loads.

As this transmission is attached above the springs, it does not add any weight to the rear axle. And this transmission only adds a total of about 30 pounds to the net weight of the complete car.

This Conord transmission is mounted in an aluminum gear case and cover. And there is a lock on the shift lever, so that the gears cannot slide out of mesh. With this transmission, the extra high gear is 3.2-to-one. Then the next speed is the regular Ford high speed of 3.63-to-one. The next speed is the intermediate speed of 7.25-to-one, and these three speeds are all available, without using the Ford's low gear.

When the Ford low gear is used, the "higher-low" gear of 8.5-to-one is available. Then the regular Ford low of 10 to - can be used. By shifting the auxiliary transmission to the "emergency low," a gear ratio of practi-

cally 20-to-one can be secured. And this practically doubles the pulling power of the Ford car in low gear.

Perfector Two-Speed Axle.

Another type of auxiliary transmission, which differs from those already described in that it is located in the rear axle housings, is the Perfecto 2-Speed Axle. When this Perfecto 2-Speed Axle is used, the high gear, or direct brake drive is the same as the regular high gear. But the **intermediate**, about half-way between high and low, is available for harder pulling.

With the Ford "low" in use, two speeds are available, thus doubling the pulling power when the emergency low gear is used. In the Perfecto device, the gears are of the planetary type and are constantly in mesh in all positions. The gears have three points of contact bearing, thus reducing the wear and making the gears as durable and reliable as the Ford differential gears, which give but little trouble in actual service. These gears are cut from chrome-nickel steel, and are hardened and ground.

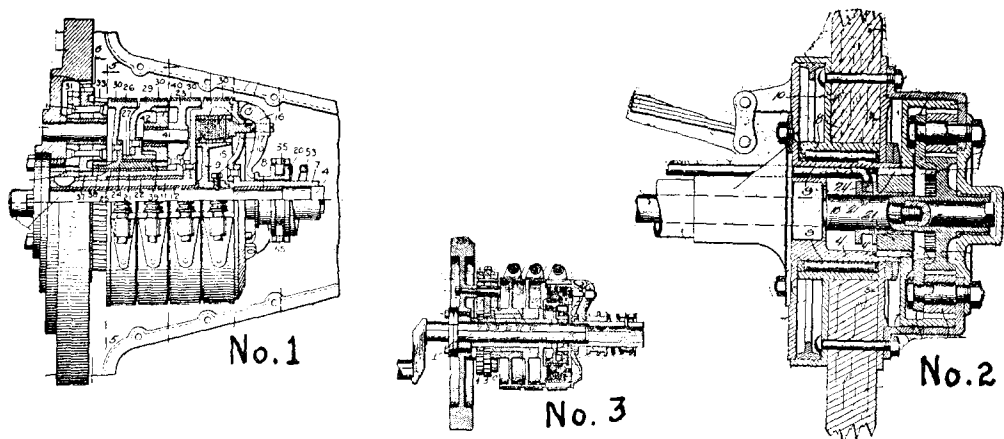
To eliminate friction, all those parts run in oil, in the **same** direction as the wheels, thus reducing the friction to a minimum and making it unnecessary to supply lubrication to any other parts.

The installation is made by simply exchanging one of the regular Ford drive shaft housings for another housing of special make, and changing the parts attached to the differential. When driving in high gear, all parts revolve as a "unit," and no noise at all is caused by the gears. When this transmission is used, the additional weight is only 15 pounds, and additional power of about 60% is made available. The road clearance is the same as that of the regular Ford rear axle system.

Patent Transmissions.

In an earlier part of this article, we stated that a four-speed "planetary" transmission was hardly a practical device, owing to the complication and numerous parts which would be required, but sketch No. 1 shows a patent which has been obtained for a four-speed "planetary" transmission.

A study of this drawing will bear out what we have said about the complication and friction which are involved in a four-speed planetary type of transmission. And if one will



Interesting Transmission Patents.

count the bushings and bearing surfaces between the transmission drive shaft and the outer row of planetary gears, one will understand that there would probably be a tremendous lot of "friction" in a four-speed transmission of this type.

While the regular Ford transmission only has one set of triple gears mounted on pins attached to the fly wheel, this four speed transmission has **another** set of double planetary gears, which are mounted on pins attached to the drum next to the brake drum.

With four brake drums in use, a different transmission cover would have to be used, thus giving "four" pedals for the driver to use instead of three. Also this might make it necessary to use **narrower** transmission bands which might wear out more rapidly. Consequently while this transmission is **interesting**, it does not seem probable that it will soon be placed on the market.

In patent No. 2, we see a very interesting form of two-speed planetary transmission in which the two speed gears are mounted directly in the **hub** of the rear wheel, so that no changes need be made except to remove the wheels, and to fit this special transmission in the wheel hubs. There is an internal gear, carried in the wheel hub which, when low

gear is to be used, meshes with a sliding pinion slipped over the drive shaft, thus giving a slow speed gear reduction. This is a very interesting type of transmission.

Patent No. 2 shows the Duncombe Auto Coaster which is intended as a "free" engine device to allow the car speed to **exceed** the engine speed at any time, or to act as a **friction** clutch for driving the car when the engine speed equals the speed at which it should drive the car.

As a result of this, whenever the car has a chance to coast, it dies so **automatically**, thus securing greater fuel efficiency, as the car does not have to drag the engine when high gear is used.

This device only acts in connection with the high gear, and does not interfere with the regular use of the Ford low gear or Ford transmission brake. And it would seem that, besides securing increased gasoline mileage, this device should increase the life of the rear tires, by decreasing the strains to which they are subjected.

The Auto Coaster consists of a cam and eccentric rings on a disc holder which fits inside the high-speed disc drum, and make a very simple and durable mechanism.

SONG OF THE JOYOUS CHAUFFEUR

By Everett McNeil
Three boys and a girl,
Six geese and a squirrel,
Four dogs and a cat,
Two hens and a rat

I bagged in one day!
And still got away!
Hurrah! Hurrah!! Hurrah!!!

I sing as I fly,
For what care I
How many I kill,
So I show my skill—

And yet get away,
For another day!
Hurrah! Hurrah!! Hurrah!!!

One horse and a sheep,
Ten pigs in a heap,
A calf and her ma,
A boy and his pa

I hit in one day!
And yet got away!
Hurrah! Hurrah!! Hurrah!!!

Housing The Ford

By MURRAY FAHNESTOCK.

JUST as the problem of homes for human beings has become a pressing one, due to the lack of building construction during the last four or five years; so too the problem of homes for the Ford car has also become an acute one at the present time. For several years, other and more important things have occupied the attention of the people, and any sort of a roof was considered sufficient to protect the car.

During the last couple of years, the cost of building materials has been so high that those who really desired to build garages felt that it was not expedient to do so. However, during the last few months, the price of building materials has undergone a tremendous slump so that the cost of building a garage is now within reason, and there is no reason why the building of these private car garages should be longer deferred. Even though it is possible that the cost of labor may be reduced, still the garage rentals paid during the year of waiting for these changes in labor costs would probably amount to more than the slight increase in cost of building now, as compared with next year.

We must remember that this is a sad world and that one reason that the cost of building materials is so low is due to the fact that the cost of building labor is high, and consequently less building is being done. If the cost of building labor comes down, then there will be a rush to put up buildings of all sorts, and the see-saw will be tilted in the other direction, resulting in higher costs for building materials.

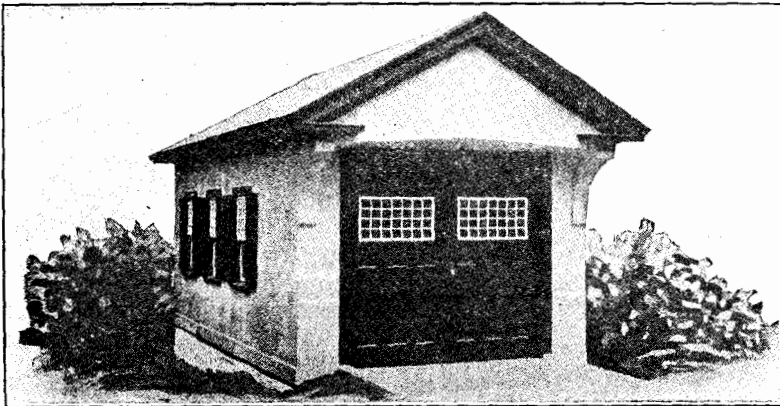
The owner who takes a real interest in his car will hardly care to keep his car in a

chicken coop; he will want a garage that is a credit to his property in appearance, as well as in utility and convenience and in fire-proof qualities, and as a safe place to store the car.

One of the first principles in building a neat garage is that it should be in harmony with the house which it accompanies. If possible, the garage should be built of exactly the same materials, both roof and walls as the house on the same premises. This applies particularly to the outside surfaces of the garage, for if it is desired to make the garage more fire-proof inside, this can sometimes be done without interfering with the outside appearance.

A second very important principle of design is that the garage should be of the same type of architecture as the house and other buildings. If the house is of plain and simple architecture, the garage should be built to correspond. Since, as a rule, the roof is the chief characteristic of both house and garage, these two roofs should be made of as nearly the same style and material as possible.

A third important principle is that the smaller structure should never be more substantial than the larger. It gives a ridiculous appearance to have a stone or concrete garage, together with a frame or brick house. However, appearances sometimes have to be sacrificed to other considerations. And when one builds a garage within city limits, and the garage is within 25 feet or less of surrounding buildings; then the fire laws and building restrictions may compel one to put up a fire-proof garage, even though the owner's home may not be of fire-proof construction.



Solid Concrete Garage.

Among the possible building materials are wood and frame garages, which sometimes are the cheapest in first cost, though they require frequent painting to keep them in good condition. For those places where the garage is located at a distance from the house, and where cost is a prime consideration, a ready-built frame garage of the portable type, may be considered most suitable.

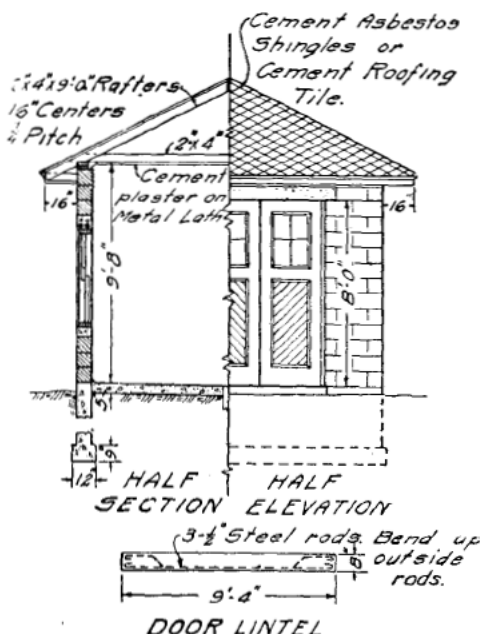


Frame Garage.

Other materials are made of the so-called pro-slate or other artificial building materials, and such garages are both low in cost, fairly fire-proof, and are easy to put up.

Another and more permanent type of garage is the stucco construction. This stucco may be applied over a wood framework covered with metal lath, or over an all-steel framework, giving a fire-proof construction.

After stucco we have concrete, and this is made of either the solid type, or the garage may be built of hollow concrete blocks.



Half section and half elevation of one-car concrete block garage corresponding to floor plan shown.

Another type of cheap and easily built garage is the hollow tile construction, though very fine effects can be secured by the use of some of the more expensive makes of hollow tile.

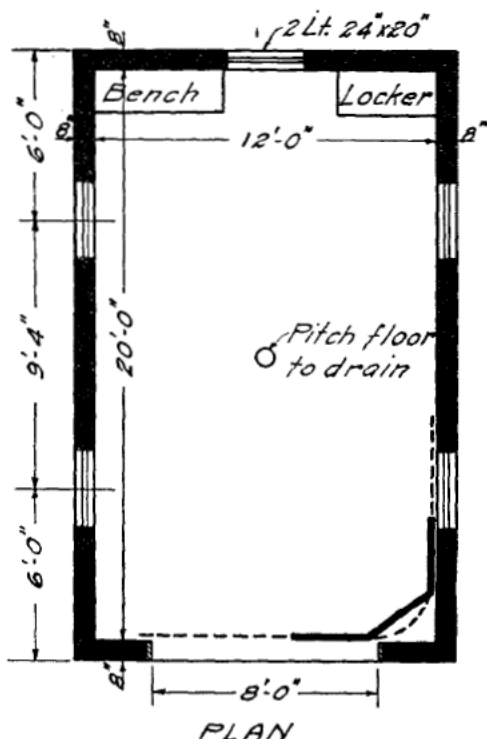
Finally there are the pressed steel garages, some of which have a rather "tin can" appearance, but which are fairly fire-proof and are quickly and easily erected. As sheet steel is rather high in price at the present time, this type of garage will probably be more economical to build six months from now than at the present time, as sheet steel has been one of the last of the building materials to start on its downward path in regard to price.

Type of Owner.

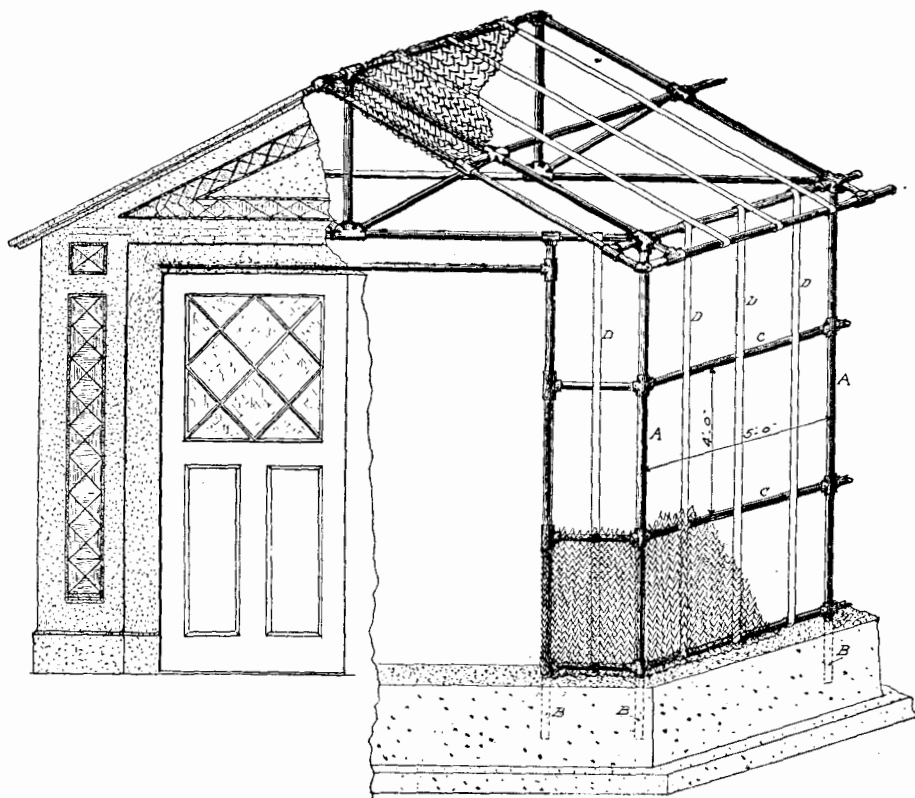
Before deciding on the type of garage one wishes to build, one of the most important considerations is to decide just what type of owner is going to use the garage for his car. There are two broad classes of owners.

In the first place, there are those owners who only use the garage as a "place for the car to sleep in." In other words, they use the garage as a place of storage only for the car. For these owners it is only necessary to make the garage large enough to allow the car to be driven in and out, so that from six to twelve inches clearance on each side of the car may be sufficient, if the owner is in the habit of driving the car to a repair shop or public garage to have all repairs and adjustments made.

However, the larger class of our readers are those who like to take some interest in their own cars, and to do at least some of the



Floor plan of simple one-car concrete block garage



Pipe Frame for Stucco.

tinkering, cleaning and adjusting, even if they do not do much repair work on their cars. For this class of owners, it is desirable to have the garage large enough so that there will be about two feet of clearance completely around the car, so that there will be room enough for the owner to work at all sides of the car, without having to move the car from one side of the garage to the other every few minutes, while the work is in progress.

For those who make their own repairs, it is desirable that the garage should be of sufficient size to give room for a work bench and for a supply of tools and equipment. And when the car owner does much of the repair work, himself; he will naturally be more particular as to the kind of floor that he stands on for several hours at a time, and he will take greater interest in the heating and ventilation of the garage. If the garage is damp and unhealthy, then it stands to reason that the car owner will not do as much work on the car in bad weather as he otherwise would. What is desired is a "bad-weather garage," which will be clean, light and dry in bad weather, as that is the time that the car owner will have most time available for tinkering and adjusting with the car. When the weather is good, the car owner will naturally spend most of his time on the road, enjoying the pleasure of driving the car.

As it is hard enough for many car owners to do the work with their eyes open, few will wish to work blindfolded. That is why it is

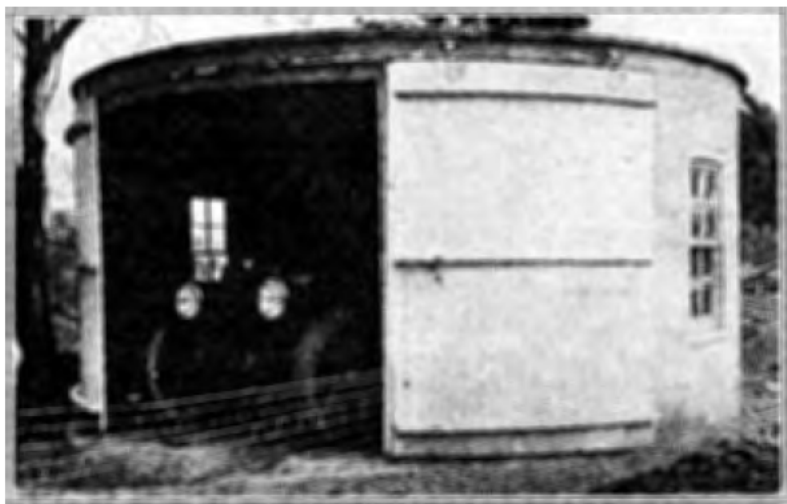
so desirable to have as many windows as possible on the "sunny side" of the garage, if much repairing is to be done. If the garage is to be used chiefly as a place of storage, then it may be desirable to have fewer windows, and these smaller and strongly barred, in order to reduce the chances of a thief getting into the garage and stealing some of the equipment or the car.

Cost—Size—Quality.

In considering the building of a garage, it has been cleverly suggested that the designing of a building of this kind can be represented by a "three-sided triangle." The three sides of the triangle may be represented by the three factors, **size**, **cost** and **quality**. We may remember, from our study of geometry, that when the length of **two** sides of a triangle are given, these two sides necessarily determine the **length** of the third side, and no other combination is possible. Consequently, if we decide to build a garage of a certain **quality** or kind of material for a certain **cost**, then the **size** of the garage may be limited. If we decide on the **size** and **quality** of the garage, then the building contractor will usually be able to furnish us with the third factor, which is **cost**.

The most cleverly designed garage is a **compromise**, which does not sacrifice either size, quality, or become excessive in cost; so that it is as nearly as possible the "happy medium" which is the aim of good designing.

In order to secure a garage of good quality and of a certain size at a reasonable cost, we



Garage Built from Silo Form.

can often increase the quality and size, without excessive increase in cost by **clever designing**, which naturally implies the calling in of **competent counsel**. Sometimes, this competent counsel may be represented by an **architect**. At other times, an experienced building contractor will be able to give useful assistance and advice in the planning of the garage.

If the garage is a **small** one, for only one or two cars, it will seldom be found profitable to call in the skilled assistance of an architect for this designing, especially if this little garage be of steel or wood. Though if the garage is of brick or stone, and if it is to cost a thousand dollars or over; it would certainly seem foolish not to employ the advice and good taste of a skillful architect.

Before deciding on the **materials** of which the garage is to be built, it is important to consider local building regulations, especially if one lives in the city, or in a built-up part of the town. In the country districts, the fire-proof qualities of the garage are not so important, as the garage can often be placed at a **distance** from the house, so that a fire in the garage would not endanger adjacent buildings. However, even in the country, one has to consider bad weather, and it may be unpleasant to wade through several hundred feet of deep snow in order to reach the garage for working on the car.

In the city, the building and insurance laws will have to be carefully studied, as a garage of combustible construction, which cancels the insurance on one's house, can hardly be considered as a sensible or safe investment.

In the city where less space is available, there may not always be room for a separate garage, and it is sometimes possible to build the garage under the porch or as a part of the house, thus saving space and making it easier to heat the garage, or the garage can be made of part of the basement or the cellar.

Among the advantages of building the garage as a unit with the house is that this makes the garage accessible from the house in bad weather, without the driver and pas-

sengers having to leave the shelter. Also, a garage in this location is easily heated by the same heating system which warms the house. Among the disadvantages of locating the car in the basement of the house are the liability of having to pay additional insurance on the house, and the odor of gasoline which is sometimes found to be objectionable, and the noise.

Before deciding on the type of garage, one should consult the insurance agent, who has placed the insurance on the car owner's house, so that the garage can be built in such form as will not conflict with obtaining a low rate of insurance on **both** house and garage. If the garage is so cheaply constructed, and so poorly located that it increases the insurance rate on the house by sixty dollars a year; then it would be more profitable to spend a few dollars extra and build a better garage, as sixty dollars a year is six per cent on a thousand dollars.

Lighting the Garage.

The ideal garage will have the same lighting effect as a **greenhouse** or conservatory, as the pleasure of tinkering with the car is greatly increased if the garage is properly supplied with daylight. Of course, if the car owner does most of his repairing at **night** and does not do much tinkering with the car on Saturday afternoons or Sundays; then the subject of good daylight is not so important. Though with the daylight saving laws coming into such general use all over the country, this means that most car owners will have some time to tinker with their cars before or after supper while it is still daylight, if the garage has a sufficient number of windows.

To make repairing a pleasure, there should be light and lots of it. In the dark garage, parts of the machinery are often indistinguishable from each other. Cleaning the car, or touching it up with a little paint, is twice as hard if there is a lack of daylight.

In winter when most overhauling should be done, the average garage is such a dark,

gloomy den that many car owners shun necessary repair work, until the dry summer days arrive and they can shove their cars out into the street or alley. Using the street as a garage has a disadvantage in that the parts removed from the car may be stolen by small boys, or a sudden shower may put a damper on the work. Also comparatively warm weather is necessary to make it comfortable to work out of doors.

The solution of the garage problem only occurred to us rather recently when we saw a



Concrete Block Garage.

motor boat house made of glass, like a greenhouse. This was both pretty and attractive, and was as cheerful and bright as a conservatory. Just as the old style, dimly lighted factory has given place to the modern, nearly "all glass" side windows in the factory building; so too we think that the car owner's garage will eventually be fitted with more and more windows. For the car owner's garage is really a small-scale factory, in which the car owner is supposed to manufacture repairs.

Among the advantages of the glass garage is that the glass does not require painting. And if wire glass is used, it is practically fire-proof, and the glass is a good insulator against the cold of winter.

Shades, mounted on rollers, will afford protection against sunlight when desirable. And it is not necessary to use clear glass as frosted, wired, or translucent glass can be used. This glass roofed garage will not rust like a metal garage, or rot from lack of paint like a wooden one. If one does not wish a glass-roofed garage, a metal roof and glass side walls could be used. This might be more suitable for those parts of the country where hail-storms occur.

Access to the Garage.

The size of the doors, and the driveway leading into the garage, work together in deciding what size of a garage will be needed. If the garage doors lead out on a narrow alley so that it will be necessary to turn the car within the garage, then it will be advisable to use wider doors, and a larger garage than is necessary when one can drive the car straight into or straight out of the garage. If the garage doors are sufficiently wide, say ten feet wide for a single car garage; then it will be easier to drive the car into a garage ten foot wide, than if eight foot doors were used.

In planning the lay-out of the garage, it is a good plan to make a sketch, or accurate scale drawing showing the width of the alley or street, and approaches to the garage, as

well as the garage itself. By making a little paper "model" to represent the outside dimensions of the car, and then shoving this paper model around the drive-way, and in and out of the drawing of the proposed garage, one can get a mental idea as to whether it would be possible to get the car in and out of the garage easily.

Since the passing of prohibition, it is no longer necessary to make a wide doorway for easier access when the driver is feeling a little tipsy. But one must not forget that when the roads are covered with ice or snow, then it may be desirable to have more clearance than when the weather is good, and the roads are not so slippery.

The desirability of having plenty of clearance around the doorway of the garage is especially important when there is a fairly steep grade or turn right at the doorway. For if the grade is steep, then it is necessary to run the car at a fairly high speed, in order to get the car up or down the grade, and if the driveway is slippery, skidding may occur if the doorway is too narrow.

Next in importance to the doorway is the driveway—as a well arranged driveway with wide, sweeping curves makes it easy to drive into the garage, with less danger of damaging the car or the sides of the doorway.

One of the neatest ideas which we have seen in garage driveways for restricted spaces was made with two strips of cement, one strip being of flat cement about between 12 to 18 inches wide, forming a narrow pathway for one of the wheels to roll over.

For the other side of the car, a concrete trough or of groove construction was built, having a gutter about 4 inches deep. This "gutter" was made about 6 inches wide so as to allow ample room for the 3½ inch tires of the Ford car, even when fitted with tire chains. By getting the wheels, on one side of the car, in this groove, the car was safely and naturally guided up a narrow driveway, without requiring any particular care or skill on the part of the driver.

The use of this concrete "gutter" prevents the wheels slipping off into the soft grass of the lawn and tearing up the grass, especially when the ground is soft and wet. And by leaving the concrete runway on one side flat, this flat runway can be used as a walk for pedestrians. And there is less strain on the car than there would be if grooved concrete runways were used on both sides.

The Obsolete Pit.

It used to be the custom to build every garage with a pit, which was usually a space which accumulated dirt and grease and a lot of trash that the car owner did not feel quite energetic enough to dispose of otherwise. The idea of the pit was to make it easier to work under the car. But a pit is not necessary for use on the Ford car, as the car is so arranged that practically all the more important repair work can be done without getting under the car. The better way, of working under the car, is to either use a 'buggy' or creeper, or to jack up the front or rear axle on a couple of trestles, so as to afford sufficient room to work under the car more conveniently.

When a pit is used, there is always the

danger that the door of the pit may be left partly open, and some one may be hurt by falling through it. Also the pit tends to accumulate dangerous gasoline fumes and moisture, and is hard to drain.

With clean, hard, cement floor which can be washed off with a hose and thus more easily kept clean, and which allows a creeper to roll around smoothly and easily on its little casters; it is easy enough to get under the car, without the need of a dirty and dangerous pit.

In considering the building of a garage, it is much better to have at least one of the roof beams or rafters sufficiently strong so that it can be used as support for a hoist, to raise either front or rear end of the car several feet from the ground.

This hoist affords much more light and is much more convenient for working under the car than climbing out of a greasy pit every time one wishes to get a cotter pin or some other tool. This same hoist is very helpful when taking off the front or rear axles, for replacing spring leaves, removing the motor or transmission, or doing other heavy work around the car.

The Garage Floor.

While some cheap and carefully finished garages simply have a dirt floor, pounded down hard, such a floor will always be dirty and damp, and will make the garage an unhealthy place for the car owner to work on the car. It will also make the garage so damp at the car will tend to rust and tarnish at all times. And this increases the labor necessity to keep the car in neat and clean condition.

While we have built garage floors of wood, thinking that this would be drier and warmer for the feet than a floor of concrete; we have found that a wooden floor, unless provided with a foot or so of clear air space between the ground and floor, is a failure in the garage. The boards tend to become damp and

to absorb moisture, and these boards warp so that it is difficult to use a 'buggy,' or to keep the garage floors smooth and level.

If a sufficient 'air space' is left between the boards strongly nailed down to heavy beams; then a wood floor is a feasible proposition, however, as most garage floors are built directly on the ground, a concrete floor is usually found preferable.

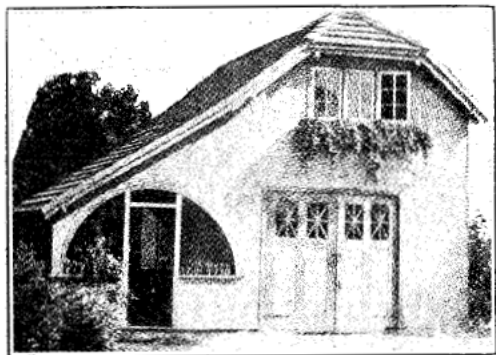
A concrete floor should be laid after the garage floor and the ground and the erection of the walls. It may be laid in slabs so that the contraction or expansion of the floor will not cause the floor to crack so easily. The floor may be divided into four quarters, one quarter of the floor being for each slab. By using a light wire mesh, or some similar steel reinforcing material, placed about two inches below the surface of the floor, a single slab of concrete may be used for the entire floor.

The excavation should be carried down to a depth of not less than seven inches and should be filled in with crushed stone or cinders or brick bits broken up to the two inch size, or with broken tile, to within about four inches of the surface of the finished floor. A four-inch layer of concrete should then be placed and spread evenly over the entire area. A mixture of 1 part cement, 2 parts sand, 3 parts sand or gravel should be used. This surface should be troweled to a smoother surface and should be set for about twenty-four hours before being used.

As there will always be more or less oil leakage from the car, and as it is desirable to be able to wash the car, a concrete floor which can be easily scraped off, seems most desirable. Of course, the floor should be made with a slope to a drain, so that the water will drain off more readily. In front of the work bench, where the car owner stands most of the time, an old rubber floor mat or a wood grating may be placed.



Another practical garage floor is composed of tile blocks. The tile floor is built as follows: After the foundations have been put in place, one should fill in between the walls with sand, and level down to give the floor a slight slope towards the center of the garage, and towards the large doors, to provide for drainage. On top of this sand, one should spread a couple of sacks of Portland cement and rake this sand evenly with a heavy rake. The moisture in the sand hardens the cement, and makes a firm bed over which is laid the sidewalk tiles of the 24x24x2 inch size, which are to compose the floor. These tile blocks should be laid before the cement bed has set and hardened. After the tile blocks are all in place, one should fill in the cracks in these



Shelter House Garage.

blocks with dry cement and flush with water, and the cement will harden and the floor will be finished.

Frame Garages.

In some parts of the country where lumber is plentiful and other materials are scarce, and especially in rural districts where the garage can be built a distance from one's home, a frame garage may be considered desirable. Such a frame garage should be built to harmonize as nearly as possible with the house. Sometimes the walls of the garage are covered with clapboards. Again, they may be covered with rough, siding boards, and then covered with shingles.

Another type of garage, which can be quickly put up, is supplied by some of the makers of portable houses who supply garages built in sections, and all ready to be put up and bolted together. These garages are often the cheapest of all to build, and can be easily taken down and moved to some other location if the owner moves. Thus they can be used on rented property, where one does not wish to make the garage a permanent improvement.

Among the possible advantages of wood are the cheapness and the speed and ease with which such a garage can be built. Also, the ease with which changes or additions can be made to such a building, such as putting in extra windows or extra doors. And the wood garage can be made in a variety of forms, to harmonize with the other buildings on the same property.

Among the dangers of the frame garage is the fact that a wood garage is apt to a fire

risk, both from within and from without, especially if the roof is not of fire-proof material, for if the garage burns up, the sparks from this building may set fire to adjoining property.

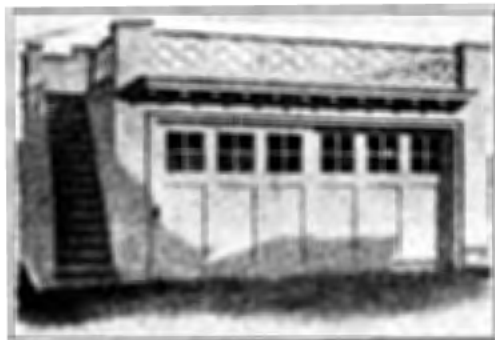
To protect the garages from fires originating outside of the garage, it is important that the roof be of fire-proof material, as most fires from outside sources are spread through the sparks or embers igniting the roof of the building.

Pro-Slate Garages.

The Pro-Slate portable garages are factory built, and are delivered in sections ready for quick erection. Both walls and roof of a Pro-Slate garage are built of this permanent, stucco board. The walls are surfaced with gray green rock, and the roofs are of a reddish brown tint. The English timber work, which sets off the roof and rock surface walls, is painted an autumn brown color.

These Pro-Slate garages are built in both the one and two-car sizes. The single-car garage is built in two lengths, either 11x16 foot, or in what is known as the 'long single' of the 11 foot x 19 foot size. The full size garage door openings are 7 foot 9 inches high, by 7 foot 9 inches wide. The walls are 8 feet high.

The double garage gives ample room for the housing of two cars, and gives ample space for working around the cars. The dimensions of this garage are 16 feet wide by 19 feet long. Two separate, full-sized garage door openings extend across the front of the garage, and an additional window panel and side entrance door are included. These Pro-Slate buildings are sectional and of portable construction so that the building can be easily taken down and moved to a new location. The panels themselves carry with them a studded-in rafter. And the building is furnished complete with sills and hinges and framed glass windows.



Two-Car Garage.

The Pro-Slate special Ford garage has a floor space of 8 1/2 x 13 1/2 feet, and the walls are 8 feet high. This garage has the same sized doors as the garages previously mentioned, with large sash light openings in the doors, and the additional window is included. The shipping weight of the Ford special garage is 2200 pounds.

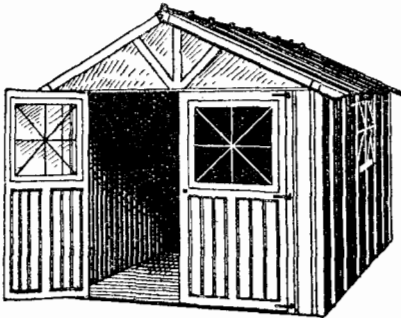
Brick Garages.

Brick forms a very good material for building a garage (since brick has come down in

price) especially if the house which the garage accompanies is also built of brick. In building a brick garage, it will probably be desirable to make the walls about two bricks in thickness, and to leave the inside of the garage with the rough brick surface. Right over the work bench, where the tools are to be used, one can cover the bricks with a layer of one-inch boards, to make a tool rack on which the tools and equipment can be hung.

The cost of building a brick garage will be largely dependent on what the bricklayer charges for his work, as the cost of lifting the bricks up on to the wall is usually about equivalent to the entire cost of the bricks. Among the advantages of making a brick garage, are the fire-proof qualities, the neat and permanent appearance, and the fact that it does not require painting to keep it in good condition. And also the fact that the brick garage can be made practically fire and theft-proof.

Another advantage of the brick garage is that when these solid walls are used, an overhead beam, of sufficient strength to hold an overhead hoist, can be easily carried by these walls, without danger of the walls collapsing when the car is raised up on the hoist.



Sheet Steel Garage.

The brick garage is fairly cool in summer and can easily be kept snug and warm in winter, as brick is a fairly good insulator against both heat and cold.

Stucco Garages.

Among the advantages of stucco, in building a garage, are the wide variety of forms in which this material can be used, so that it can be adapted to the requirements of the adjoining buildings and will give a fire-proof and reasonably permanent structure. This stucco can be placed over wire lath, fastened to a framework made of pipe fittings, and this will be the type of garage that a plumber will naturally build. Or the stucco can be applied to wooden laths nailed to wood framework, thus making a semi fire-proof construction.

The wood framework may be constructed by 2x4 inch wooden studding, set on 16 inch centers. And the wire lath should be stapled to the wooden studs, but the staplings should be sufficiently loose to allow a certain amount of play between the wire lath and the studding.

Use two coats of stucco on the outside, and apply one coat inside, between the 2x4 inch studding. A neater appearing garage may be made and a more fire-proof construction secured, by lathing and stuccoing the interior

in the same manner as the exterior has been constructed. But in place of making a rough finish, the finished coat on the inside should be floated smoothly.

Stucco work may be also used to cover rough wood, brick, stone, or other building material, provided that special precautions are taken to properly prepare the surface so that the stucco will adhere firmly, and not crack or scale off. This requires that the work should be done by an experienced plasterer.

As a rule, two coats of stucco are used, the first is a 'scratch coat' composed of 5 parts of Portland cement, 12 parts of clean, coarse sand, and 3 parts of slaked lime putty to a small quantity of hair. The second, or finishing coat, is composed of 1 part of Portland cement, and 3 to 5 parts of clean, coarse sand, and 1 part of slaked lime paste. Some masons prefer mortar in which no lime is used, but this requires more time for its application.

To apply the 'stucco' to a brick or concrete surface, clean the surface of the wall thoroughly, using plenty of clean water so as to soak the wall. If the surface is of concrete, roughen the surface by picking with a stone axe. Plaster with a 1½ inch coat, and finish the surface with a wood float. Or to make a rough surface, cover the surface of the wood float with burlap. Protect the stucco work from the sun, and keep it thoroughly wet for three or four days, as the longer it is kept wet, the better.

Concrete Garages.

The concrete garage may be of the solid, or massed concrete type, which is built between temporary wooden forms, and is one of the most durable and substantial types of construction. The floor is made of the same material, but is preferably reinforced with steel.

In preparing the footing for the concrete garage, excavate a trench to below the frost line, and about six inches wider than the proposed wall. Fill to within eight inches of the ground level with the filling mixture of concrete, consisting of 1 part of Portland cement, 3 parts of clean, coarse sand, and 6 parts of broken stone or gravel.

After this concrete foundation is sufficiently strong to withstand the weight, build the wooden forms for the proposed wall in the center of the footing. Use a filling mixture of concrete, consisting of 1 part of Portland cement, 2 parts of clean, coarse sand, and four parts of broken sand or gravel, using a steel fork to work the larger pieces of stone away from the surface, and to let the mortar and fine material through, so as to make a dense hard surface. The forms for the wall may be taken off in 48 hours in warm weather, but should be allowed to remain for a longer time if the weather is cool.

In cold weather, the concrete may be handled with good results, providing that all materials are heated, including the cement and water, to at least 80 degrees. As soon as the concrete is put in place, it must be thoroughly covered, and kept warm until the concrete has hardened. In hot weather, the concrete should be kept sheltered from the sun as much as possible and continuously wet down. Too much water cannot be given to the concrete after it has set.

For a single-car garage, the walls of the solid concrete garage need not be over 6 to 8 inches thick.

The wooden forms for the concrete walls should be made of one-inch matched wood, held in place by 2x4 timbers, sufficiently close together to prevent bulging. These forms should be built the full height of the wall for a small garage of this type. After these forms have been removed, and before the surface of the concrete is dried out; the board marks can be removed by rubbing the surface with carborundum brick, and washing with clean water. This method is preferable to applying a wash of cement to the surface.

Concrete Block Garages.

Concrete block garages differ in their method of construction, in that the blocks are cast **individually** in molds. The advantage of this type of construction is that a **single mold** does for the forming of the blocks of the entire garage, and makes it unnecessary to make the wood forms for the concrete walls. As wood is comparatively expensive in some sections of the country, this form of construction may be less costly than building a garage of the solid concrete type.

These concrete blocks are generally made with a rock face, or else with finished surfaces, and consequently do not require any surface treatment or stucco. There are many types of these concrete blocks on the market, and there is little choice between them. However, a wall made of two pieces is, as a rule, superior to a wall made with one piece. These blocks are not as weather tight as solid concrete, and the wall is apt to be damp, if made of one-piece blocks.

By using good facing material and a rich mixture, containing a large proportion of cement, very good weather-proof blocks can be made. The sills and lintels may be cast in wooden forms, to fit the window and door openings. These concrete blocks are laid in the same manner as cut stone, and any good mason can do this work. Garages built in this manner are sometimes stuccoed, if a special form of outside surface is desired.

We have given the plan, view, and elevation of a one-car concrete block garage, which is really longer than is necessary if the garage is a place of storage only. But if the garage is to be used for the repairing and cleaning of the car, then this sized garage is not at all too large.

Hollow-Tile.

One of the cheapest ways of constructing a garage is to make it of hollow-tile. How-

ever, it must be admitted that some of these hollow-tile garages leave much to be desired in the way of neatness of appearance. This hollow-tile is made in blocks of different sizes, though the standard block is about 5 inches high, 8 inches wide, and 12 inches long. Owing to the **lightness** of these hollow-tile blocks, they are easily shipped and put in place. If afterwards covered with stucco, the appearance is not so bad.

They give a fire-proof construction, without requiring excessively heavy foundations, and can be erected quickly and easily. After having been once put up, these hollow-tile garages give good protection against cold and heat owing to the air spaces which they contain. It is also possible to have a hollow-tile garage which is faced outside with a single layer of brick, thus giving a strong and durable construction at a very reasonable cost.

Pressed Steel

In many of the city districts, garages of the pressed steel or 'portable' type are used. These garages can be easily packed and shipped and when sheet steel becomes more reasonable in price, these pressed steel garages form one of the lowest price fire-proof garages. Of course a pressed steel garage offers fairly good protection from fire on the outside though, owing to its light construction, is easily buckled and collapsed by fires occurring within the garage.

One of the disadvantages of the pressed steel garage is that the metal is such a good conductor of heat and cold that these pressed steel garages are **excessively hot in summer** and **exceedingly cold in winter**. And it is almost impossible to heat them in winter as they radiate the heat too rapidly. Another disadvantage of the pressed steel garage is that it requires **painting** at fairly frequent intervals if the metal is to be preserved against rust. Also it is impossible to drive nails into pressed steel walls for hanging tools or other equipment, and it is difficult to attach shelves or brackets to these walls for hanging up the spare tires and other fittings that accumulate in the care of the car.

For these reasons, while the steel garage may be suitable as a place to **store the car**, it is not usually considered so desirable when the garage is to be used as a workshop owing to the reasons which we have mentioned. For while the steel garage protects the car against the weather, it does not afford very adequate protection for the car owner.

A Few Old Sayings With Ford Attachments.

Charity covereth a multitude of sins,
But it just takes a flivver to keep you in grins.

The pen is mightier than the sword,
But neither compares with a good old Ford.

The hand is quicker than the eye,
But the swiftest of all is the Ford-driving guy.

The better the day the better the deed,
So just try a lizzie on Sunday for speed.

Well begun is halfway done—
Buy you a Ford and start the fun.

Handsome is as handsome does;
Why, that just suits my old Ford bus!

All good things have their end, they say;
Well, a flivver has two, 'cause they're built that way!

Which, dear readers, I consider a rattling good place to stop. Good buy—yea, that's a Ford.

"Little Ben"

Bendix Drive Gears on Ford Electric Starters.

By Ed. Technical.

THE installation of the Ford electric starting and lighting system has brought new problems for the repairman and the dealer to solve. And while electric starter troubles have not been so numerous in the past, they can be confidently expected to increase from now on, as the number of electrically equipped Fords swells every day. And as those now in service begin to wear out, after a year or two of service.

As we do not know any too much about Bendix gear drives, we thought that the best way to learn more about them would be to write an article on the subject. Ben Franklin, of penny-wise fame, may have said to "learn to do a thing by doing it," and another good way is by writing about it! If any of our readers think that changes or additions should be made to this article, we shall be glad to hear from them—as it is teamwork that counts, and we depend on our readers for a lot of help.

Briefly, the purpose of "Little Ben," as the Bendix drive gears connecting the starting motor to the fly-wheel are sometimes called, is to gear the starting motor to the fly-wheel when the current is sent through the starting motor, and to keep the gears engaged until the Ford engine begins to run under its own power. Then "Little Ben" automatically disengages, so that the Ford engine can speed up, without spinning the starting motor at a terrific rate of speed.

In order to give sufficient "torque" or turning effort, to enable a small, high-speed electric motor to turn over a stiff, cold Ford engine, it is necessary to use a gear ratio of about 12-to-1 between the Ford starting motor and the fly-wheel. This means that the starting motor makes 12 turns for each turn of the crank shaft, and so gives 12 times as much turning power for cranking the engine.

But, here's where the necessity for the Bendix gears comes in. Since the normal speed of the Ford engine is 1,000 revolutions per minute, and the starting motor is geared to run twelve times as fast, this means that—if the gears are kept in mesh—the starting motor would be humming at 12,000 revolutions per minute. If the engine were raced in low gear, and the engine speed reached 2,000

revolutions—then the starting motor would hum at 24,000 revolutions. And it would be some HUM—if the starting motor did not throw the wires out of the armature at about 5,000 revolutions or so, wreck the starting motor, and perhaps strip the fly-wheel gear.

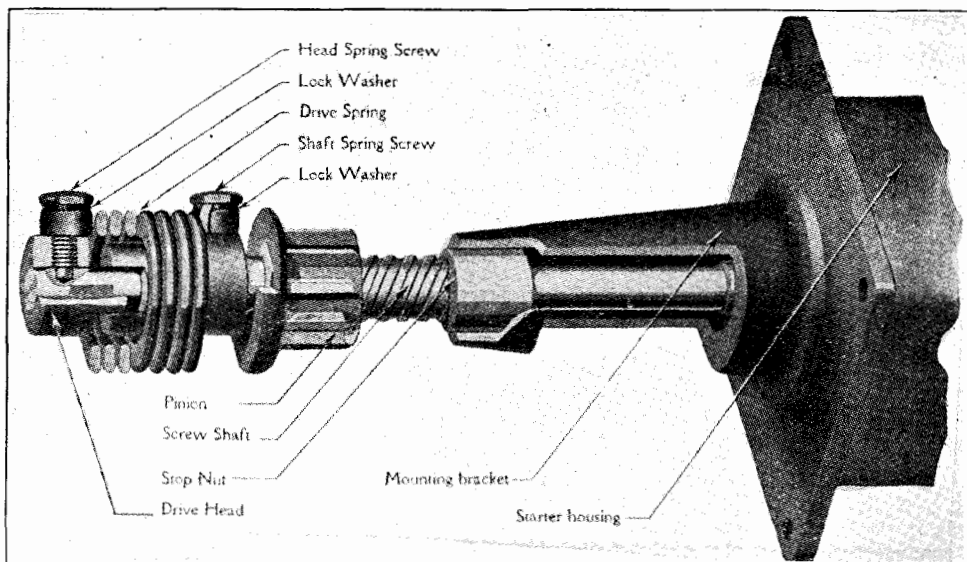
All of which emphasizes the imperative necessity of taking care of the Bendix drive gears, so that they will disengage properly, and not stick when the speed of the Ford engine is higher than that at which the starting motor would normally turn through the gearing. As the normal, free-running speed of the electric starting motor is probably not over 2,400 revolutions—this means that with the 12-to-1 ratio—the Bendix gears should disengage when the Ford engine is running at less than 200 to 300 revolutions.

If after the engine is started a loud "Hum" comes from the starting motor under the floor boards, one should not race the engine, but the engine should be tried at various low speeds, by changing the throttle. If this does not help, then the engine should be stopped, then started over again, and the driver should notice whether or not the gears seem to slide into engagement in the usual manner. But this trouble is very rare indeed, as the gears do not often stick in mesh.

Both the Liberty FA electric starting motor, as supplied as regular factory equipment, and the Atwater-Kent starting motor, use the Eclipse-Bendix drive number L-10FA, and this should be mentioned when ordering spare Bendix drive parts.

In this designation, the "L" refers to the fact that the screw threads and spring coils are "left-hand." The number "10" refers to the fact that there are 10 teeth on the pinion of the starting motor. These gear teeth are of 8-10 pitch, and 20 degrees pressure angle.

On other than Ford cars, it is the custom to install the Bendix drive so that it can be kept clean and free from oil, as the makers advise that the screw gear works to best advantage when the screw shaft is clean and dry. However, this cannot be done on the Ford car, as the Bendix gears must work in the same crank case and exposed to the same oil splash that lubricates the engine and transmission.



Cutaway View of Little Ben.

As the result of this running in oil, it is desirable that, since the oil cannot be kept off, that this oil be kept as **clean** as possible. If the driver never changes the oil in the crank case, and the oil becomes fouled with carbon, bits of metal worn from the bearings, and threads of fabric worn from the band linings, then this dirt may get into the working parts of the Bendix gears, and cause them to stick—either in mesh, or out of mesh. Consequently, the frequent changing of the engine oil is of great help in keeping the Bendix gear drive in good working order.

The coil spring is designed to ease the "shock" of starting by permitting slight play between the starter motor shaft and the screwed extension.

Back-Kicks.

The driver should protect the starting motor as he would his own arm, if he were doing the cranking. While attempting to start with an advanced spark and a wide-open throttle may result in a back-kick that will put the starter out of business and cause a ten-dollar repair, still the same accident might cause a broken arm and a hundred-dollar doctor bill, if the same carelessness occurred when the car was cranked by hand.

Back-fires are unnecessary, because the driver of the car should always have the spark lever retarded, and the gasoline throttle only opened enough to ensure an easy start. With the spark and throttle levers only slightly advanced, the engine starts easily and quickly, and back-kicks are avoided. If the throttle is only open a **little ways** and the engine does back-kick, then the back-kick will not be nearly so apt to cause a damage as if the throttle were wide open.

In case of a back-kick, the shock is taken through the coil spring, which absorbs most of the destructive blow, and is one of the automatic means of protection afforded by "Little Ben." As an extra precaution against back-fires, the drive spring and drive screws

are designed with large factors of safety—though extreme back-fires may exceed even these factors of safety and bend the drive spring or bend the shaft.

The teeth on the drive gear are chamfered on only one side and are specially rounded and polished, to make meshing natural and easy. However, if the teeth should meet end to end, the screw shaft itself is designed to automatically move backwards and compress the coil spring. This gives the drive gear time enough to turn and enter the fly-wheel gear.

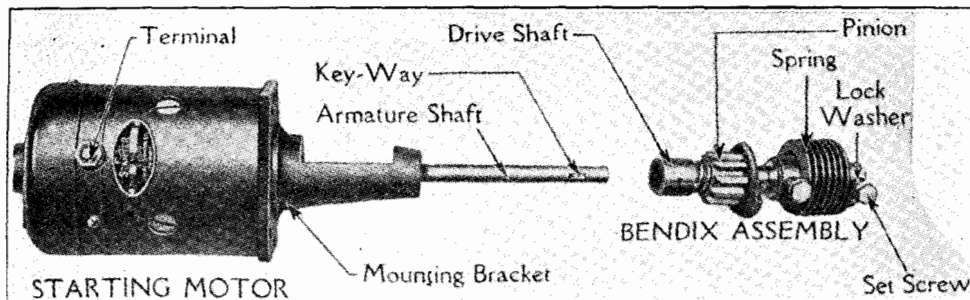
Should sticking of the gears ever occur, they can be released by throwing in the clutch and moving the car backwards and forwards. Such trouble is due to incorrect location, or inaccurate alignment of the gears. Also, it may be due to binding of the drive parts, which would prevent compressing and proper functioning, and such defects should be corrected.

If while the engine is running, the electric motor is accidentally started, the drive gear will of course screw over against the turning fly-wheel gear. But, instead of the clashing and smashing of the gears which might be expected, no damage will occur, as the gears will only touch once. This is because the fly-wheel gear will speed up the drive gear, and will then automatically clutch and bind on the screw shaft, in just the same manner as when it has been demeshed when the engine starts after cranking.

The Flying Start.

The manner in which the Bendix gears operate can be compared to a bolt and nut. If the nut is held, and the bolt is turned, then the nut will move along the bolt.

The Bendix pinion gear is held from revolving by its inertia and the weight of the "lop-sided" weight. When the electric motor is started, it turns the screw shaft through the spring drive. The gear then automatically moves over and meshes with the fly-wheel gear. When the engine starts, it of



Starting Motor and Bendix Gears.

course runs faster and turns the drive gear faster than the screw shaft. Therefore, the drive gear turns on, and overruns the screw shaft and is automatically demeshed from the fly-wheel gear. The overbalanced counter-weight effect of the drive gear causes it to clutch the screw shaft, and it then turns with the shaft until all comes to rest.

One of the features of the Bendix gear drive is that it adds to the ability of the starting motor to crank a stiff engine. When the electric motor is first started, it takes time to screw the gear over into mesh with the fly-wheel gear, until it reaches the drive stop and begins cranking. All of this time, the electric motor is accelerating, until it is turning the screw shaft at over 1,000 revolutions per minute. This is before it even starts turning the fly-wheel.

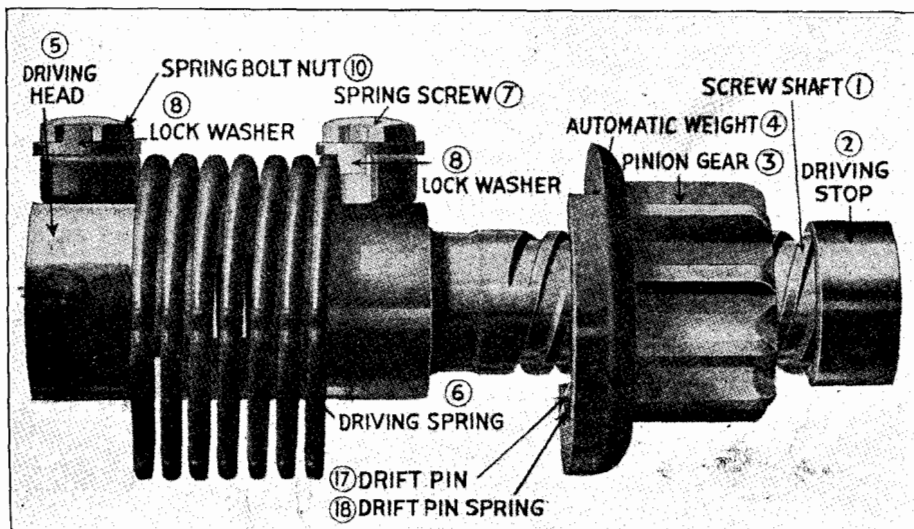
Thus, when the gear reaches the drive stop at the end of the screw shaft, the electric motor is running at 1,000 revolutions. And this shock of suddenly applying the starting power to the fly-wheel would eventually break either the teeth of the fly-wheel gear or the screw shaft; if it were not for the coil spring drive, which transmits this great power without any damaging shock, because it coils up and stores up this energy. Then this force stored up in the spring, in addition to the power of the electric motor, is applied to the

fly-wheel and used in "breaking the engine loose"—that is in starting to crank. It also helps to crank the engine over the first compression point, before all the spring power has been used up. Thus a running, or "flying" start is secured, which aids in starting the cold Ford engine.

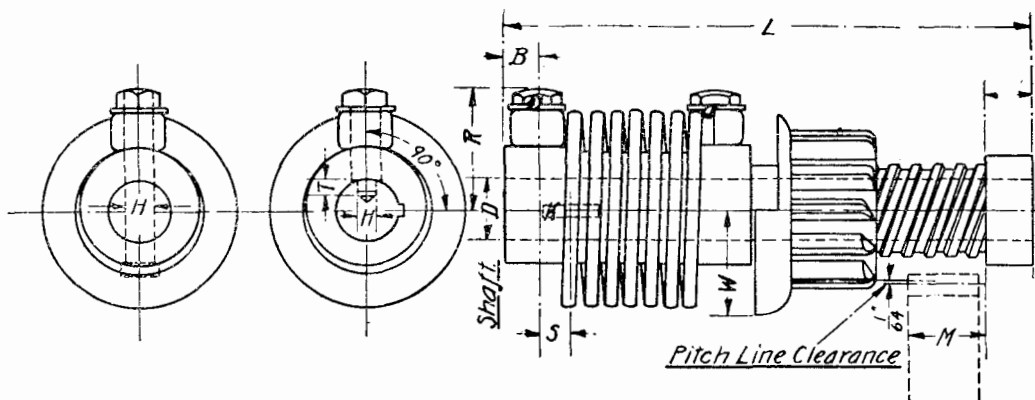
Bendix Gear Troubles.

If the starting motor runs, but does not spin the engine, the driving spring may be broken. If not, a slight tapping on the starting motor housing may eliminate this trouble. This difficulty is only apt to occur in cold weather, when the oil congeals and tends to cause the parts of the Bendix gear to stick and not move into mesh with the fly-wheel ring gear. If the engine is started with the hand crank, the Bendix gears will probably work all right after the engine has warmed up. The use of an oil that is too heavy, or that congeals too easily may be a contributing cause of this trouble.

If the pinion gear goes into mesh with a "bang" and if the gears are noisy in action, this suggests that the bolts holding the starting motor to the crank case may be loose. The starting motor should be lined up while the bolts are being tightened. By turning the threaded sleeve with the fingers, the pinion can be moved into mesh with the gears. Un-



Names of Bendix Parts.



Measurements of Bendix.

less the pinion meshes easily, the starting motor is not in line.

Sometimes the starting motor will not budge the engine and the engine cannot be turned even by using the hand crank. When this occurs, throw the emergency brake lever forward, so as to put the engine into high gear, and then grasp the spokes of one of the rear wheels and "rock" the car backwards and forwards a little, until a "click" is heard, which indicates that the Bendix gears are no longer "jammed."

This trouble is due to the ends of the teeth of the pinion wedging against the ends of the teeth of the fly-wheel gear, and the parts "binding" so that the gears will not slide into mesh. Do not use "brute" force when this trouble occurs, or it may result in broken gear teeth, or a "sprung" starting motor shaft.

The jamming of the gear teeth may be due to the "burring" or smearing over of the ends of the teeth after long wear. To make an effective cure, it may be necessary to file or grind the ends of the teeth of the gears to the proper contour again.

Another manner, in which this jamming of the gears may occur, may be by "toying" with the starter button. If the starter button is but lightly pressed, so that the pinion is brought almost into contact with the ring gear, and then the starter button again pressed, the pinion gear, instead of making its usual "flying start" may be merely shoved against the fly-wheel gear, and may fail to slide into mesh. Of course, even with this faulty manipulation of the starter button, the gears will usually mesh—but once in a while, trouble occurs.

Therefore, when you push the starter button down "Tramp on it" and push down the button with firm determination—making good contact the first time. He who hesitates on the starter button may have to get out and crank. An oily commutator, causing "lazy" motor, may cause the same trouble.

If the spiral spring is twisted or broken, this indicates that a back-fire has occurred while the engine was being started. This may have been due to carelessness, the spark never being too far advanced, to the center-to-

center distance, between the commutator pull rod and bolt holding the timer retaining spring, being more than $2\frac{1}{2}$ inches; or to a loose or broken timer wire. Be careful of loose strands of wire around the timer, as they may cause back-kicks of the engine and injury to the Bendix drive gears.

"Little Ben" is a clever and well-made bit of equipment, but has hard work to do, and needs intelligent treatment if the best results are to be obtained. While business was abnormal, Bendix drive assemblies were seldom repaired, but simply replaced entire—thus giving a **big profit** and **little trouble** to the repairmen. With the return of competition, some repairmen are already repairing Bendix drives when only small parts have been damaged, thus saving money and giving real service to their customers.

Removing Bendix Drive.

To remove the starting motor, it is first necessary to remove the Bendix drive. The opening in the transmission cover, through which the armature shaft and Bendix drive extends, is closed by a cap attached to the cover by means of four screws. These screws are to be removed and the cap withdrawn. It is necessary to manipulate the clutch pedal, in order to obtain clearance between the Bendix drive and slow speed connection.

The Bendix drive is now exposed and is removed as follows: Bend down the ear of the lock washer, which is against the head of the set screw with a pair of pliers and run the set screw out of the drive head. The drive head is keyed to the shaft with a Woodruff key. It is therefore necessary to draw off the head with a straight pull. Sometimes a burr is thrown up on the shaft by the set screw, causing the head to bind. Under such conditions, the head should be removed with a 3Z-4712 extractor, which can be purchased from a Ford branch.

After the head has been pulled off, the key is removed by driving a screw driver under it. And then the remainder of the Bendix can be withdrawn. If the burr thrown up by the set screw is very heavy, it may be necessary to dress it down with a fine file, before withdrawing the Bendix.

While it is perfectly easy and proper to replace broken drive springs, the Bendix should not be taken further apart than this, and the pinion should not be removed from the screw shaft. It will be noted that both the shoulder to which the spring is attached and the drive head are eccentric, this to allow them to fit the coil in the spring.

Sometimes, under unusual circumstances, the edge of the Bendix gear tooth will register with the edge of the tooth of the fly-wheel

gear, thus preventing meshing. The sudden end thrust may shear the set screw, thus allowing the head to move back. This will cause the Bendix to bind, so that it will be impossible to use the motor. It is then necessary to pull off the head, remove the broken set screw from the shaft, run the motor to see that the shaft is not "sprung" and, after a careful inspection of the other parts of the Bendix, reassemble it on the shaft.

ROUNDEL (To the Ford)

By Lloyd McFarling

RUN, little lord of the valley and hill,
Assistant in business and maker of fun,
Bringer of many a pleasure and thrill——
RUN!

Set you a task and it quickly is done——
Done with completeness and done with a will,
Finished almost as soon as begun!

Yours is the power that nothing can kill——
Load you down with a couple o' ton,
Give you the gas and the road and you still
RUN!

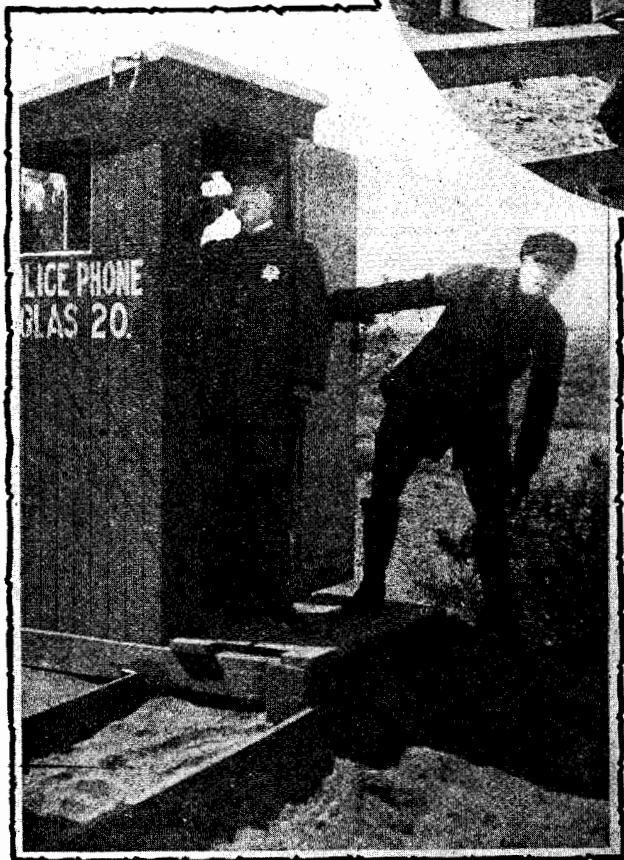
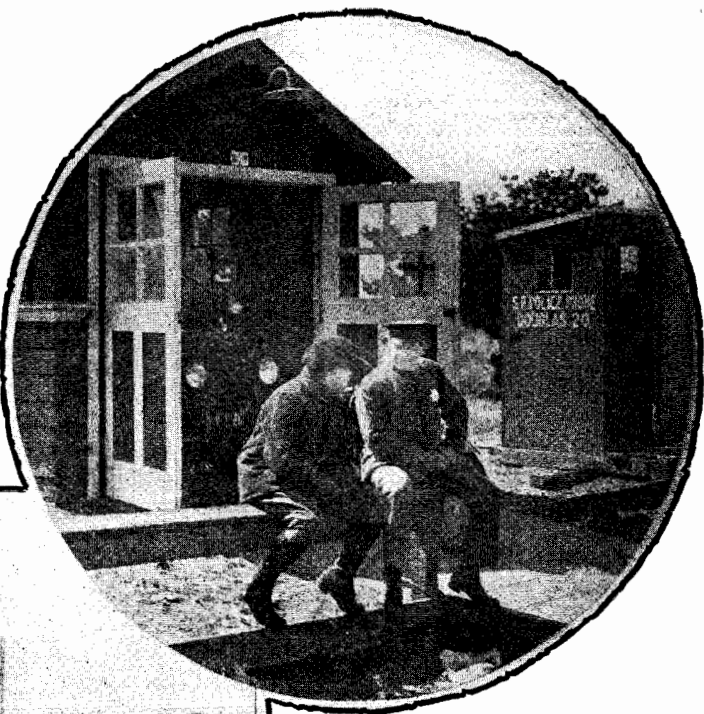
The "Cough Drop Car"



Herewith we introduce to our readers the latest addition to the long list of roles which the Ford car has played. It is the "Cough Drop Car," so called by residents of San Francisco to whom it is familiar as it is often seen on the streets carrying relief to tickling throats. We need hardly introduce to you the famous brothers whose products it car-

ries, for their faces, name, and black lozenges were familiar to most people long before the world was blessed with Ford cars. We should charge advertising rates for this, but since there is a sort of a eulogy in the extensive fame of the cough drops and Ford cars we will let it pass.

Ford Car Catches Thieves



and Speeders in California

The Ford car is making life miserable for the auto thief and speeder out in California. The illustrations show one of the outposts and garages used in carrying on a very effective work against the law breaker. Upon the theft of a car word is immediately telephoned to these outposts and the speedy

Ford is alert and ready to dash out on the road intercepting the car thief or speeder whose notoriety has preceded him. It is claimed that the Ford with the incidental aid of the police is doing much to discourage the wrong doer of the west.

Entire Family Operates Two Ford Agencies

Lansdowne, Pa., and Wilmington, Del.,
Centers for the Unusual Activities of
Thomas Hughes, Inc.

THIS BUSINESS HAS A PERSONALITY

FIVE brothers and a sister are conducting flourishing authorized Ford agencies in Lansdowne, Pa., and Wilmington, Del., as well as four other automotive businesses in various localities, every one of which is succeeding.

They own two farms upon which they demonstrate Fordson tractors—one in Lansdowne and the other in West Chester, Pa.

The concern has produced an automatic dump wagon trailer for use with a Fordson, in either country or city work.

Painstaking and unusual methods are employed to obtain prospects and the concern prints for its own use every two years large volumes of these names, addresses and ratings.

By K. H. Lausing

UNIQUE in the annals of authorized Ford agents in the East, and probably in the whole United States, is the fact of an entire family of six-five brothers and a sister—engaged in merchandising Ford passenger cars and trucks and Fordson tractors. Further than this, their exclusively Ford enterprises extend to two cities in as many States and in addition, they maintain four other flourishing units of business in which a variety of cars is handled.

These six persons, conducting virtually half a dozen businesses, comprise the Hughes family, whose main center is the notably beautiful city of Lansdowne, Pa., famous for its residences in a semi-rural setting that enthalls the visitor. Lansdowne is, to all intents and purposes, a country town with a city's advantages in good motoring thoroughfares and accessibility for shipping.

Thomas Hughes, the father, who died some years ago, started in Lansdowne in the wagon-building industry with a single small building. He prospered and, in 1908, possessed a going automobile agency with a large building and a smaller repair shop.

The children all became thoroughly interested in the business and were fascinated by its steady growth. It was not until 1910, however, that connections were made with Henry Ford and from that time on, the advancement of the family's interests was even more rapid. The business of Thomas Hughes, Inc., soon began to branch out.

The enterprises, as now constituted, include the following units:

Headquarters, Baltimore avenue and Wycombe street, Lansdowne, Pa., exclusively a Ford agency.

No. 900 French street, Wilmington, Del., exclusively a Ford agency.

Delaware County Motor Company, warehouse, garage and sawmill for bodies, Nyack and Wycombe streets, Lansdowne, Pa. This building is used also as a service station in connection with the agency, next door, conducted by the family, for Oakland passenger cars. The agency is next to the railroad tracks, one block from the family's Ford agency.

No. 1017 East Linden street, Coatesville, Pa.

North Walnut street, West Chester, Pa.

No. 520 West Fifth street, Chester Pa.

The officers of this remarkable family corporation are as follows: President, William F. Hughes, West Chester, Pa.; vice-presidents, Thomas Hughes, and Joseph A. Hughes, Lansdowne, Pa.; May T. Hughes treasurer; Charles V. Hughes, secretary and John F. Hughes, recording secretary.

Miss Hughes, the treasurer, who attends to all the financial details of the business—and enjoys doing so—is as much of an enthusiast about the automobile business as any of her brothers.

The Ford agency's group of buildings at Baltimore avenue and Wycombe street, Lansdowne, in the business center of the city, forms a conspicuous "L." The show room is a substantial, single-story gray stone-front



1—Show-room built on main Building
2—View of General Warehouse
3—A Corner of the Show-room

4—Machine Shop and Service Building
5—A Fordson Always on Display
6—A Fordson Demonstration

structure directly in front of the main building, which is three stories high and constructed of brick. This latter structure contains on the first floor the private and general offices; on the second floor, the stock room for Ford parts and accessories for immediate use and on the third floor, reserve stocks of parts for Ford cars, trucks and Fordson tractors.

Not only do the Hughes' keep a good selection of Ford car models in their indoor show room, together with a Fordson, but they also utilize to the best advantage in open weather the "outdoor show room" formed by the "L" of buildings. There is always a

Fordson in the forefront, close to the sidewalk, which, they say, is a particularly good advertisement, as it attracts much attention and has been the means of inquiries and sales.

The standard Ford system of forms is used in the business, both for sales and service. The usual Ford system of bin and stock room outlay also is employed, this plan extending to tractor parts.

The value of the Ford parts stock at Landsdowne is \$25.00. An average of 140 Ford cars, 25 Ford trucks and eight Fordson tractors is carried here. Various standard brands of tires are sold by the concern.

In addition to the sales, office and stock

departments in the Ford agency at Lansdowne, there is a machine shop equipped with the usual standard devices, including running-in and burning-in machines; drill and arbor presses; lathes, sharpeners, planers, buffers, chain hoists and air compressor; also a blacksmith shop and shops for body-making and trimmings. The machine shop is in a separate stone building. The sales, stock and office building is 50 by 175 feet and the machine shop, which is also the Ford service station, is 100 by 50 feet.

The concern employs eight salesmen for Fords and Fordsons in Lansdowne and there are twelve men in the machine shop and service station, including mechanics and helpers.

The Hughes family is fortunately situated in having two private demonstration farms which they use for showing what the Fordson can do. One of these farms, five acres in extent, is in Lansdowne, directly opposite from their buildings at Wycombe street and the railroad; and the other is a seven-and-one-half-acre piece of ground in West Chester. Demonstrations, however, are not confined to the family-owned property, where considerable plowing and harrowing are done.

The salesmen and members of the corporation make many personal calls on farmers, taking along a Fordson on the special Ford tractor service truck which has a wide platform body without sides, but with wooden cleats to brace the tractor on, firmly. A pair of skids is taken along, whereby to mount the machine and let it down. Sometimes appointments are made with farmers over the telephone, to permit demonstrations on their farms. At other times the engagement is made by correspondence. The Hughes family naturally has a wide circle of acquaintance in the outlying districts of the various towns in which they do business and this has proved of great assistance in gaining prospects and making sales.

An automatic dump trailer wagon, which can be used with a Fordson tractor either in rural work, or in city work for such purposes as hauling ashes, sand, or scrap, is made by Thomas Hughes, Inc. It is said to be particularly efficacious in excavating jobs. It works on the general principles of a dump cart, but has the bulk of its weight on the rear wheels and a patent tail-board, held out by means of forks. Its capacity is two tons. The vehicle, like the Fordson, can be used with rubber-tired wheels for transportation about a city.

An original way of obtaining and listing prospects for the Hughes enterprises is the painstaking and, to the ordinary salesmanager mind, somewhat staggering methods of securing the name of every voter in each of the localities in which the concern does business.

In Lansdowne this is effected by going to the prothonotary's office and requesting the names and addresses. This is regarded as much better and more thorough than simply obtaining the State registration of motor car owners, although it necessarily takes a longer

time to winnow out the likely prospects for passenger cars, trucks and tractors.

In each case the corporation obtains not only the name and address of the voter, but information as to the property he owns and his rating. Then, after all this has been done, comes the most peculiar part of the entire transaction—books, good sized volumes, too—are printed for the corporation for its use and that of its salesmen. This is done every two years, revisions being made when necessary in the form of addenda. There are books made after this fashion on Delaware and Chester counties, for instance, and the entire city of Wilmington.

While the Hughes sales force at times has engaged in the plan of a general "doorbell campaign," to get prospects, and acknowledges that it has helped in swelling the list of sales, there is too much waste effort in it as a whole to adopt as a steady method. The entire sales force was kept intact during the recent business hesitancy, but each member understood thoroughly that he had to work harder—and he did, with gratifying results. Trade, says Thomas Hughes, vice-president, is opening up well as summer is beginning.

A handsome, two-story sales and service building has just been completed for the Hughes Ford agency in Wilmington. Here is handled a \$25,000 stock of parts and the average stock of vehicles on hand is as follows: Fifteen Ford cars and Ford trucks and seven Fordson tractors.

The Wilmington agency also has machine, paint and trim shops. The sales force here numbers eight.

In the Hughes family enterprise at West Chester, Buicks, Chevrolet cars and trucks and Oakland cars are sold. The parts stock carried here is valued at \$5,000. In Coatesville Chevrolets and Oaklands are handled, the parts allotment here being \$10,000 for the Chevrolets and \$5,000 for the Oaklands. The concern's Chevrolet territory comprises all of Chester county; the Oakland territory is Delaware and New Castle counties and the Buick territory takes in half of Chester County.

The largest general reserve stock is in the Lansdowne garage of the Hughes' family's Delaware County Motor Company. This building popularly known in Lansdowne as "the warehouse" of the company, is a large brick building, with shops on the second floor and large reserve space for bodies of various types. There is a small service station in the basement of the concern's sales building for Oaklands, next door.

Courtesy, as well as business acumen, is a strong point with Thomas Hughes, Inc., and has much to do with increasing the concern's clientele, supported by thorough going service and reliable merchandise. Lansdowne and the other places in which the corporation is engaged in business, are fruitful fields for modern methods in the automotive line, as the progress of the Hughes business has proved.



Midsummer

Midsummer! O'er the buildings tall
 Within the sultry city,
 The sun glares mercilessly down—
 Not only without pity
 But almost seeming, in delight,
 To make his gaze so horrid
 That mortals long to take their flight
 Far from a place so torrid.

Midsummer! O'er the wayside trails
 Tall, giant trees are bending
 Thick canopies through which no rays
 Of sun are ere descending—
 Their memory calls low to me
 To cease my poignant yearning
 And, in my roving, gypsy Ford,
 To them to come returning.

Midsummer! As we speed along,
 The heart grows light and merry
 And bubbles o'er with lilting song—
 In town it is contrary—
 And when the pike is left behind
 And roads grow wild and fragrant,
 The city seems a phantom-place
 And I a happy vagrant.

Midsummer! O'er a sea of flame
 The western sun is trailing—
 Faint-twinkling stars peep out on high
 As daylight slow is paling—
 The tranquil twilight shadows fall—
 Then, with their beauty blended,
 Night's brooding sky bends over all—
 Midsummer's day is ended.

Ethel Hope.

One Who Sits Low and Leaves the Cut-Out Open.

Hills? Oh, yes, I suppose so. Didn't notice 'em. The old girl just hops from one to the other on these far-away trips.

Spindle Bushing Driver.

For removing the bushings from the spindle body, a tool can be made from a piece of $\frac{1}{2}$ -inch round steel, about 6 inches long. Slot one end with a hack saw, for a couple of

inches. Take an old Ford valve and cut off the head of the valve. Then file, or grind, the end of the stem to a wedge-shape, like the end of a screwdriver.

Insert the slotted end of the steel bar into the spindle body and then, with the valve stem, spread the ends of the tool so that they will catch on the inside of the spindle body bushing. Strike on the other end of the steel bar to drive out the bushing.

J. M. WILLIAMS, Stoy, Ill.



Taking the Tractor to Work



The Fordson tractor has such a record for versatility and accomplishment that we seldom think of it as needing aid of any kind. It happens, however, that H. J. Rodgers, Ford car and Fordson tractor dealer in Waverly, Ill. believes that when he sells a tractor it deserves to be conveyed to its own

home. As a result he has devised ingenious equipment as shown in the illustrations and by means of which he quickly and easily loads the tractor and accompanying machinery on a Ford truck and trailer and carries it with ease to any part of his territory.

How We Used Our Fordson

By C. M. Baker

If every Fordson owner or every prospective buyer could get as much work out of his machine as we did last year there would be no doubt about their efficiency. I need only to relate about this work to prove the point.

We farm about 300 acres of which about 150 acres are plowed every year and sometimes every season. Last year we put out 50 acres of corn doing all the plowing and

ground cultivation with the Fordson; we plowed about 6 acres daily and as soon as all the plowing was done we went over the ground with a spring tooth harrow and a cultipacker. These same implements were used just before planting again. We also put out 10 acres of oats doing all the plowing, harrowing and drilling.

Our plowing was far from being easy—some of the land being under cultivation for the

first time. Some, of course, had never been plowed deeply before.

For the first going over of the corn ground we used a cultipacker with the Fordson. This implement stirs the top soil making a fine mulch.

After the corn was laid by we had a large hay crop to harvest. The Fordson was again brought into play to pull the hay wagons and loader. Usually a loader requires 4 horses and then does not run easily at that. Two men in the field with the Fordson and the loader could load the hay as fast as two teams and three men could unload and mow it away in the barns.

In wheat harvest it was extremely hot and the Fordson was attached to the binder. Its ability here is wonderful. With its steady pull it will take an 8-foot binder over rolling land with ease giving just the right swing to the binder to elevate the wheat without fail.

After harvest we had 50 acres of meadow land to plow for wheat. This had to be plowed before it got too hard. It took about

ten days to do this and several days to work it down but we were then done with a greater share of the fall work before we in former years were ready to begin it.

Later on we ordered several carloads of ground limestone to apply to the wheat ground. We hauled this at two tons to the load with a platform wagon pulled with the Fordson. The limestone was dumped into the wheat field temporarily and later put on the ground with a lime spreader pulled by the Fordson. The wheat was drilled in with the tractor.

We also used our Fordson for road work pulling a light scraper and also for some clearing work.

So far we have had no belt work for the Fordson, which, of course, would render it still more efficient the year around.

We contemplate next year purchasing a corn plow that can be drawn with a Fordson tractor, being operated with an extension steering lever. The use of the extension steering control will make it possible to do a lot more work and even save help in the harvest field.

The Tractor Especially Valuable in Harvesting

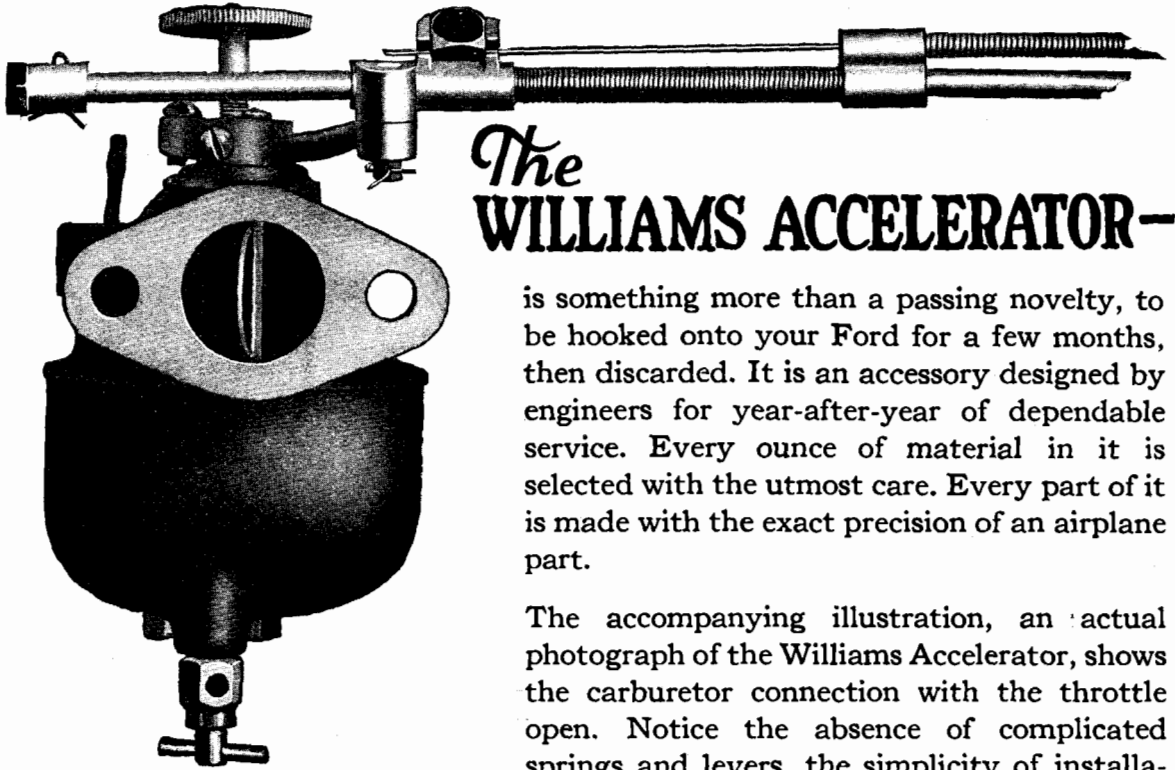
THERE is little work on the farm the tractor is better qualified to do than pulling the grain binder. Everything is in its favor in the harvest field, and for many reasons. The harvest of rye, barley, oats and wheat comes in almost the hottest time of the year. While the temperature may not be as high as it is later in the season, the air is really more humid, and in many sections harder on horses than the dry hot spells later on. Then, too, the flies are very pestiferous during the harvest season, and this, together with the hard work of pulling the binder, is decidedly hard on horse flesh.

While it is true there is room for improvement in the use of a number of binder tractor hitches now employed, especially those which are home-made, still the tractor more than fills the bill cutting grain. In the first place, tractor power is steady, and little time is required for stops except those made to oil the binder. When the grain is fit to cut, the ground usually is dry, so that there is good footing for the tractor. Another thing of importance is that the tractor can be speeded up to cut the grass faster than horses generally walk, thus enabling the farmer to assume himself that he will finish cutting his grain before it becomes over ripe. If left too long before cutting, so that it becomes too ripe, the kernels will shell out, causing a waste. Where the tractor is used the farmer

can wait until his grain becomes ripe before starting to cut. Many farmers having a large acreage to harvest with horses start early in the season before the grain is really ripe in order that they finish before the harvesting season is over.

Until very recently, grain binders, as designed to be drawn by horses, were used with the tractor. This year sees a binder especially designed and constructed for tractor use. This machine has a 10-ft. cut, being built considerably stronger than the horse binder, and is equipped with anti-friction bearings.

There are now several types of binder hitches. With one type there is no hand guiding from the binder. The binder follows the tractor and steers automatically. In the case of turning corners, the tractor is not turned at all until the sickle has completed the swath. As the sickle is passing through the last stalks of grain in the swath the tractor is quickly turned to the left. The hitch keeps the harvester in line until the tractor is again turned to the right to straighten it out on the adjacent swath. As the tractor straightens out, the grain wheel is quickly thrown backwards and in line with the next swath. If the operator is careful in turning, a square corner will be the result. An advantage in this hitch is that the tractor does not have to stop in turning a corner.



The **WILLIAMS ACCELERATOR—**

is something more than a passing novelty, to be hooked onto your Ford for a few months, then discarded. It is an accessory designed by engineers for year-after-year of dependable service. Every ounce of material in it is selected with the utmost care. Every part of it is made with the exact precision of an airplane part.

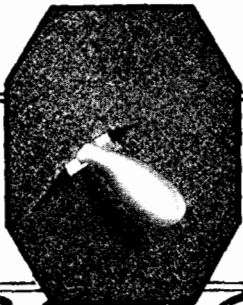
The accompanying illustration, an actual photograph of the Williams Accelerator, shows the carburetor connection with the throttle open. Notice the absence of complicated springs and levers, the simplicity of installation, the sturdy construction, the clean-cut appearance of the accelerator itself.

PRICE
At Your Dealer's
\$3
AND WORTH IT

The United States patent office has granted Williams Bros. Aircraft Corporation the sole right to manufacture a Ford foot throttle with the Williams features. Look for the word "Williams" stamped on the pedal, and on all extra parts. It is there for your protection.

*Ask your dealer to show you the
Williams Accelerator, or write
for complete information. A post
card will bring it.*

*The Williams Accelerator Pedal
Projects Through a Small
Slit in the Floor
Carpet*



**WILLIAMS BROS. AIRCRAFT
CORP. • • SAN FRANCISCO**

WILLIAMS ACCELERATOR *for FORD CARS*

Keep your Ford from Overheating Get a **Cataract** Circulating Water Pump and double the life of your motor

Here are a few recent letters from friends of ours who know the CATARACT PUMP as a money-making, money-saving investment because of actual service rendered.

A South Chicago Booster

Eli N. Pochucha, 9010 Green Bay Ave., South Chicago, Ill., writes
"Cataract is working grand. Worth every cent I paid for it. I will not do without one in the future. No overheating on the hottest days."

Keeps Radiator From Freezing

F. A. Marches, Chagrin Falls, Ohio:

"Received Cataract Pump O. K. and find it the best pump for a Ford car on the market. It is more important on a Ford car than all the rest of the accessories put together. It not only prevents what you say about overheating, etc., but in freezing climate it sure will help to keep that radiator from freezing."

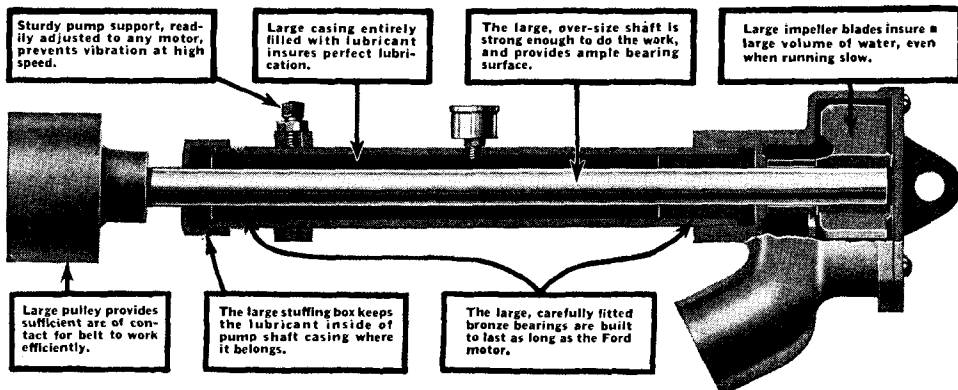
A Pennsylvanian's Best Investment

John Clark, Hanlin Station, Pa:

"I received my circulating water pump O. K. and think it is the best investment I ever made."

This Missourian Is Delighted

"I received the Cataract Pump all O. K. and gave it a fair trial. I find it is a great improvement for a car and I wouldn't take double the price I paid for it and do without it."





Put a Cataract Pump on your car and watch the motor jump. If it doesn't do ALL that we claim, after a 10-day trial, you'll get all your money back without delay. You can see the difference in your motor's performance almost instantly.

The Cataract Will Do the Work

A sturdy, good looking pump—greatest value at reasonable cost. Retail price of \$9.85 includes complete equipment.

The Cataract will prevent your motor from overheating. In cold weather it is just as valuable as in summer. It is a reliable regulator of temperature—and should be on your car the year round.

The Cataract will give your motor more snap—more pick-up—more power. It will give you greater gasoline mileage; reduce evaporation of water; prolong the life of your engine. The Cataract Pump will preserve your lubricating system; save oil; prevent valves from pitting and warping, eliminate carbon, prevent steaming. It will give new power to your Ford that you never before thought possible.

FILL OUT THE COUPON AND MAIL TODAY WITH YOUR CHECK,
OR WRITE FOR COMPLETE INFORMATION.

Some excellent territory still open to reliable dealers

**F.R.LUECK
MFG.CO.
MILWAUKEE, WIS.**

F. R. LUECK MFG. CO., Milwaukee, Wis.

Without obligation upon my part please send me booklet and full information regarding the Cataract Pump. My Ford is year.....model.

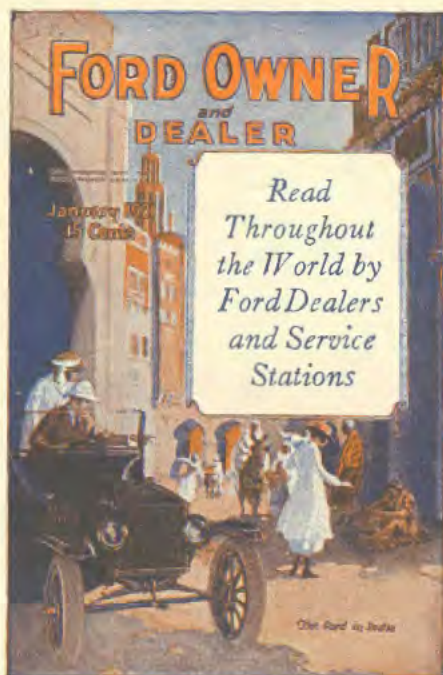
Name

Address

City and State.....

Read it for Profit

Besides thousands of car owner readers, FORD OWNER AND DEALER is recognized by Ford dealers, garage and and repair men throughout the world as a part of their business—a necessary publication that they read for profit.



What Readers Say

Here are just a few of the thousands of letters of praise received from FORD OWNER & DEALER readers:

"That book is worth \$5.00 a year—the best book on the Ford car a man can get."—Geo. N. Anderson, Cadillac, Mich.

"A regular magazine with nothing omitted that informs you about the Ford car."—James E. Blair, Gary, Ind.

"I think that the Ford Owner Magazine is the best book I ever read."—Fred J. Stolze, Phillipsburg, N. J.

"In the auto repairing business for twenty years and of all the different magazines I have read, your book beats anything I ever saw."—B. L. Robinson Amsterdam, N. Y.

"You certainly have a magazine that is interesting and valuable to dealers and repairmen. I have worked on cars since 1912 and you have shown me things I was in doubt about. I would not be without it at any price."—Chas. A. Wing, East Dedham, Mass.

If you are in any branch of the Ford car field and are not yet a subscriber, you are losing real value and money-making helps each month.

Send \$2 today for a full year's subscription. It will prove your best investment.

Ford Owner & Dealer Builds Better Business for You

FORD OWNER AND DEALER

Montgomery Building

MILWAUKEE, WIS.

HINTS

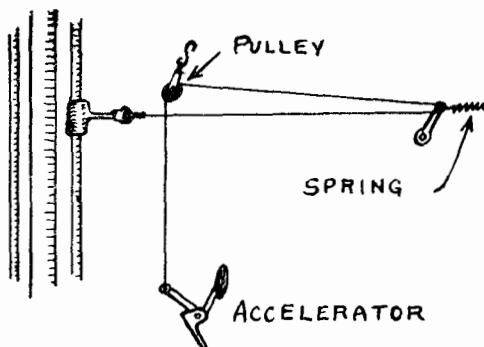


Send us rough sketch and description of any repair hint that would be of assistance to Ford owners. If acceptable, we will pay \$1 for same. Here's a chance for easy money.



PEDAL ACCELERATOR

In order to test the convenience of a foot accelerator, one can be made from a few cheap fittings as follows. Remove the carburetor pull rod, and substitute a piece of light, brass safety chain. Attach a coil spring to the throttle arm of the carburetor to pull it back to the closed position, when the tension on the pedal is released.



Attach a second piece of chain to the throttle lever, and through a pulley, attached by a couple of S-hooks to the hose clamp at the side of the cylinder block. The accelerator pedal can be placed to the left of the low-speed pedal, but in a reversed position.

G. E. MORRIS, Somerville, N. J.

REPAIR RADIATOR TUBES

Radiator tubes are frequently damaged in accidents and it is valuable to know of a rough-and-ready method of roadside repairs which will get the car home. Pry the fins up and away from the damage sections of the tube, so that leaky parts of the tubes will be accessible.

Now use cord, or common store string, and wrap it around the leaky or split tube, for a distance of half an inch or so above and below the leak. Use two or more layers, if necessary, to completely cover the leak.

Give the string a generous coating of white lead, or iron cement, such as is used for stopping leaks by plumbers and steam fitters. This forms a cheap and often quite lasting repair. Of course, one cannot easily reach the back tubes to wind them. But

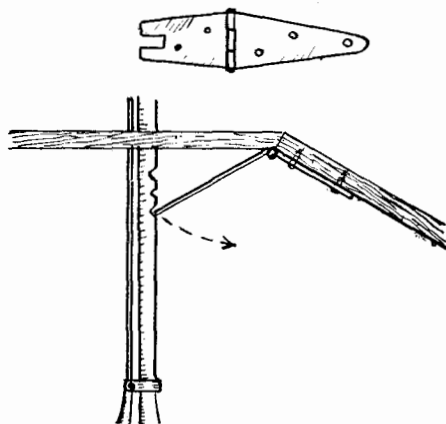
then it is the front tubes which are most often damaged in collisions. The string may be looped around with a hooked wire or shoe buttoner. And the white lead applied with a match.

MANLEY DU FRANE, Cadott, Wis.

HOLDS HAND BRAKE.

After less than ten years of service, the teeth of the ratchet sector, which retains the hand brake lever of the emergency brake, have usually worn to such an extent that the hand brake lever may slide forward, thus releasing the brake, and endangering the car.

A positive hand brake lever holder can be made from an old hinge. Cut a slot in one



end of the hinge and fasten the other end of the hinge to the sloping footboard of the car, just in front of the hand brake lever.

With a three-cornered file, cut several notches, or teeth on the front side of the hand brake lever, to prevent the edge of the hinge from slipping up when it has once engaged the hand brake lever. Tie a string, about 18 inches long, to the swinging plate of the hinge, and the other end of the string to the brake lever. When ready to release, pull the hand brake lever back a little, and kick the hinge forward.

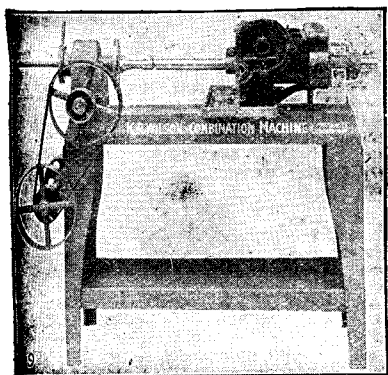
B. P. CURTIS, Lower Peach Tree, Ala.

K. R. WILSON ^{OF} BUFFALO

Originator of
SPECIAL TOOLS
 for AUTOMOBILE REPAIR SHOPS.
Save 75% on your labor costs



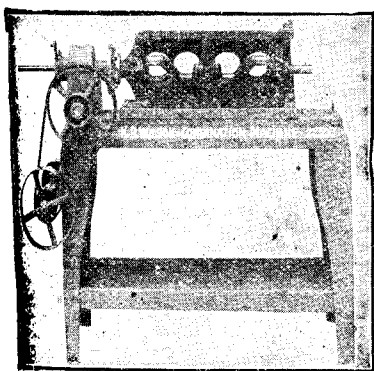
Bores the Cylinders to FIT the Pistons



CYLINDER BORING

FITTING BEARINGS

Bearings are cast with fillets. Then bored out by 3 cutter power tool to approximately .1244. Then reamed (power) to .1249 or .001 larger than Crankshaft. Running in with oil will then produce perfect bearings.



RUNNING IN

43 Minutes' Actual Time

Not Exceeding 15 Minutes Labor Cost Time.

The New K. R. Wilson Combination Machine

Bores Ford cylinders between centers any diameter. Tapered plugs on each end locate the boring bar and the heavy permanent guides (with adjustable bearing) bolted on assure accuracy.

Special micrometer furnished to set cutter and a new feature a micrometer dial directly back of the cutter permits **boring the cylinders to fit the pistons.** It's a well known fact that Ford pistons vary .003 to .005, with this feature the cylinders bored to fit with an accuracy within .001/2—**time wasting methods of filing and lapping-in are eliminated.**

The cylinder boring bar is entirely automatic, stops at the end of bore so that although the **elapsed time** consumed is **43 minutes**, the operator may during this time, assisted by the handy position of the block, grind in valves, fit up pistons and connecting rods, etc., making the actual **labor cost** time not over **15 minutes.**

This includes—Babbitting, Reboring Babbitt, Reaming Main Bearings, Running In Crank Shaft, Cylinder Boring and other necessary operations.

With the K. R. Wilson Process there are no waste motions or lost time, **every operation links with the other.** The motor block remains on the carriage—eliminating lifting and carrying.

Two-thirds of all machines shipped to date have been sold to Ford Agents who were using expensive equipment.

There's a Reason!

WRITE FOR CIRCULAR D

10-16 Lock St. **K. R. WILSON** Buffalo, N. Y.

WHAT- WHY- HOW.



Wherein Your Questions
Are Answered

Conducted by
Murray Fahnestock

DOESN'T KNOCK

Have a 1919 Ford that doesn't knock (honest it doesn't). But has a great deal of vibration at certain speeds. As long as the engine is pulling anything at all, it is all right and runs fine. But, as soon as it picks up to where I have the gas set. Oh, boy! It sure does shimmy!

Would counter balance reduce this vibration to a minimum? Would they be too heavy for the Ford crank shaft? Can they be installed through the bottom of the crank case?

Counter balances CAN be installed through the crank case lower cover door.

Vibration may be due to UNBALANCED weight, to LOOSE bearings, or to UNEVEN ignition or compression. Sometimes the bearings are loose enough to allow considerable vibration, without being sufficiently loose to cause knocks. Again, worn or loose parts, in universal joints and rear axle gears, sometimes seem to cause engine vibration.

The counter balances are designed to counter balance, in the plane of rotation, the unbalanced weights of the crank shaft—and they do this all right. But they cannot be expected to balance pistons of uneven weight, or a fly-wheel or transmission that is out of balance. These weights do not seem to be too heavy for the Ford crankshaft.

AIR LEAK

What makes the air leak in a Ford, when one turns the starting crank? I had the crank case lower cover off, to tighten the connecting rods and, when I turned the engine over, I could hear air escaping from the two rear pistons.

I took the cylinder head off and looked at the valves, but could not find anything wrong with them. The seats looked good and the valves had a good face. There is clearance between valves and tappets, so that I can put a piece of tin between them, when the valves are down.

When I had the crank case lower cover off, I took a screw driver and tried to move the cam shaft and when I did, the crank shaft moved also. When I took the old pistons out, I tried to move the crank shaft, but it was tight. I guess if I wish to find the trouble in the cam shaft, that I shall have to loosen the valve springs first.

If you heard the compression escaping when the crank case lower cover plate had been removed, it is more likely that the piston rings were at fault—rather than the valves. You can test this by pouring some heavy oil onto the pistons, and so oil-sealing the rings. If this stops the leakage, then the fault is in the pistons or rings rather than in the valves. As the pistons are comparatively new, the probable trouble lies in the rings not being correctly fitted, or in not yet being worn in to fit the cylinders.

There should not be any end-play in the crank shaft, as this tends to weaken the current from the magneto and to make starting more difficult. To eliminate crank shaft end play, it is necessary to replace the crank shaft rear main bearing cap.

You can more easily test the cam shaft for end-play, after the valve springs have been removed and the tappets held off the cam shaft by means of cotter pins or wire nails through the tappets. The new cam shaft bearings should be fitted to about .004 inch end-play—but considerably more play can exist without affecting the engine performance—though it may cause a rattle.

BEARING TROUBLE

My 1918 Ford has run about 10,000 miles, and I had no bearing trouble at all, until the last thousand miles, when the connecting rods loosened up and started to knock. I have tightened up these rods, but there is still a knock that shows when the car is running about 20 miles an hour, on good, level roads with the throttle open just enough to maintain that speed. The engine stops knocking, if the throttle is closed. It does not knock when coasting down hill, or when pulling hard.

The wrist pins seem to be in good shape. And I have looked at the connecting rod bearings several times, and tightened them a little. But as soon as the engine has run enough to limber up, the knock is there, and as at the same speed as before. I do not run for more than 10 miles per hour, for about 15 or 20 miles after taking up the bearings. And usually allow the engine to run idle very slowly for about an hour, before taking the car out on the road at all.

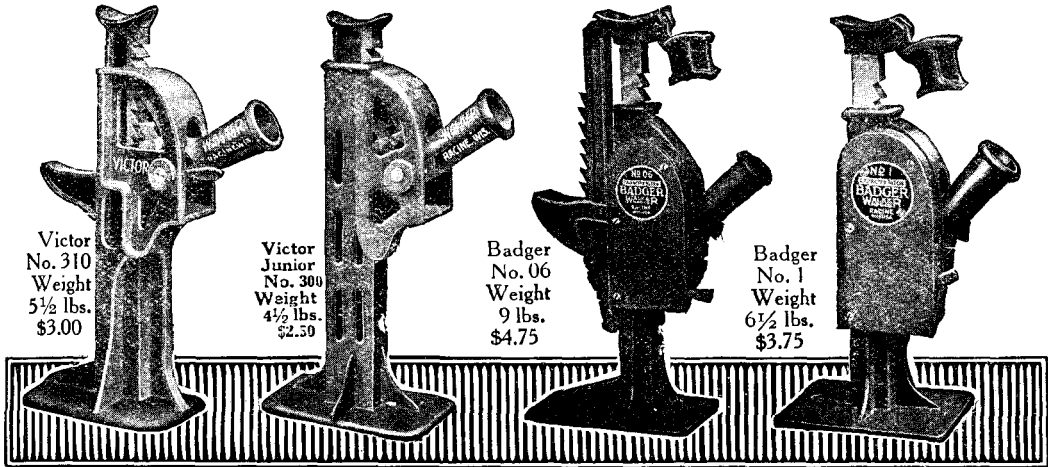
It seems most probable that the middle main bearing is a trifle loose but, fortunately, the middle main bearing can be conveniently tightened through the crank case lower door, without removing the engine from the car. This middle main bearing will only knock when the engine is under load, with the throttle partially open—all as described by you.

GREASE IN REAR AXLE

Just overhauled the rear axle, and found that the grease I had used was too heavy. This grease stood up like cheese. The thrust plates were ground out, and the studs, which hold the steel thrust washers, were also cut off. I had to drill out all those steel pins, and make new ones, out of bolts. Should these pins be tight, on the plate holes? The ones, which I secured from the Ford Agent, had 1/16 inch play, so I did not put them in.

I put the tin, in front of the inlet manifold, as described in your magazine, and it surely is a help. The February article, on 4.2-to-one gears is just right. I say "Amen."

It is not necessary that the dowel pins, which prevent the rotation of the steel thrust plates, should be a tight fit in the holes in the THRUST PLATES. However, these pins should fit securely and firmly in the AXLE HOUSING. If the pins are loose, penning the metal, around the holes in the axle housing, will so contract the holes, that the Jowel pins will be a snug fit.



Walker Jacks for Fords

CHANGING tires on clincher rims requires a jack that will "stay put." The sturdy little Ford car is not immune to tire trouble. Consequently a good jack is absolutely necessary in the tool kit.

These four Jacks have been specially designed for use with the Ford. They are light, strong and dependable. You can rely upon them to work faultlessly at all times.

Study the illustration above. Compare the four models. Note the features, the weight and the price of each and then go to your dealer and ask for the model you prefer.

WALKER BADGER JACKS

If you want the best Jack it is possible to buy for the Ford or any other car, insist upon a Walker Badger Jack. These super-quality Jacks are finished in Walker Royal Blue and are packed in individual fibre board cartons.

DEALERS—The Walker Line is complete. With it you can supply any passenger truck or garage jack demand. Walker Jacks are stocked in every Jobbing center of the United States and Canada.

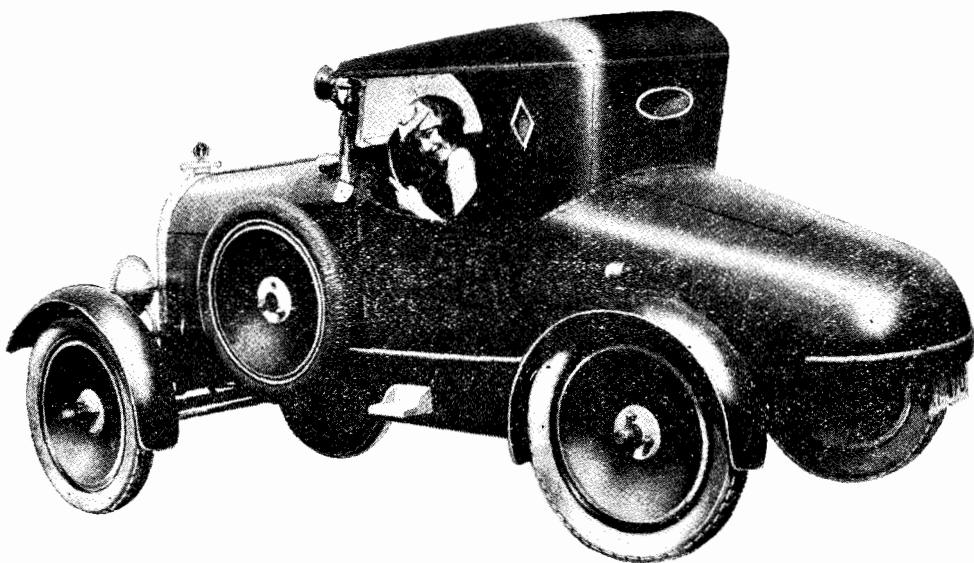
WALKER MANUFACTURING COMPANY

RACINE

Dept. 1006

WISCONSIN

When writing advertisers—Just say FORD OWNER and DEALER



NEW AND INTERESTING

The Reference Being to the Car

By James Marsdale

SOME day, when I have time, I am going to write an article on psychology. Not that there is any scarcity of such articles: Pick up most any magazine and you'll find plenty of them, telling all about the application of psychology to selling and advertising. Also, I am no authority on the subject; I would not dare become academic in my discussions. But it happens that in my rambles, I often chance upon some splendid instances of psycho-selling which might be worth telling of. Take the following case for example:

The other day I sat in a refectory in the city of Milwaukee, partaking of a limeade, the pressed and sad spirit of unwilling subjugation felt by the patrons present who had made merrily in this same "soft-drink parlor" when in halcyon days it had been popular as a dispensary of more potent beverages.

Depressed with this atmosphere I was about to leave to pay a visit to the editor of this magazine, wishing that I had a good Ford article to sell to him, when in popped my old friend, Locke, a merchandising man who always can answer those two familiar greeting interrogatives: "Whadya know?" and "What's new?"

He answers both by placing before me the photograph reproduced at the top of this page.

"Classy, what?" suggested Locke.

"She is indeed", I agreed.

He produced another one — the one of the two bathing girls.

Ain't nature wonderful?" I slanged.

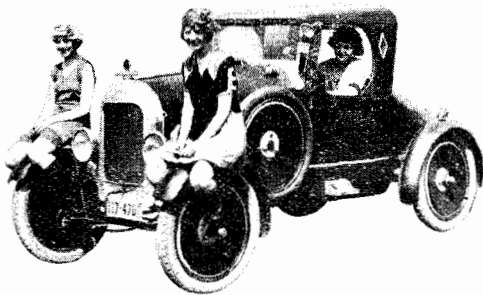
Then I hastened to inform Locke that I could spend an hour or so if he could lead me to the source of these photos and let me learn more; for an ex-reporter has a natural investigatory nature and is inclined to be sociable as well.

That is how I happened an hour later to be at the plant of the Western Body Corporation, Milwaukee, where I became acquainted with — not new lady friends — but the newest, snappiest thing in Fordom — the Murf Body for Fords, which also is shown in the accompanying illustrations.

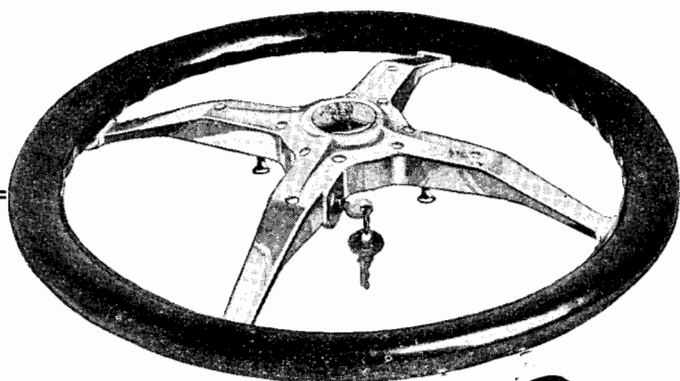
If I know Ford owners, I predict that the Murf Body is going to be popular among them in a very short time for it seems to amply measure up to my idea of the meaning of the adjective "classy."

Here are some facts regarding it which I learned and pass on to you readers:

The Murf Body is a very attractive looking job and on close inspection is found to be very complete, from the trim looking California Top down to the Distel wheels. It has a streamline hood, two doors, big luggage space in rear, polished cast aluminum radiator shell, cast aluminum frame ventilating windshield ventilator in hood, two cowl lights and latest design crown fenders. There is a roll up curtain in the top with a diamond shaped window-lette in each side. There are cast aluminum military steps and the



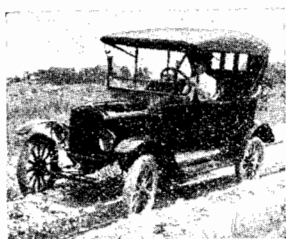
Approved by
Underwriters
Laboratories



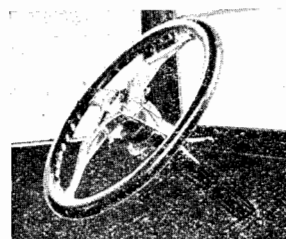
THE NEW *Lazear* LOCK WHEEL for FORDS



BAFFLES THIEVES



ADDS DRIVING EASE



**DISTINGUISHINGLY
BEAUTIFUL**

The new Lazear combines absolute theft protection, safety, and steering ease in this beautiful 17" steering wheel. Handsome, finger-grip walnut rim. Neat, highly polished, steel armor lined, aluminum spider.

No key is necessary to lock the new Lazear. Just pull down and push back the thumb knobs on the underside of spider, and the wheel spins freely on the steering post, making driving impossible. Gears in steering post in no way effected. There is no way of breaking, sawing, or chiseling into the hardened steel locking device. It is completely surrounded by theft-defying steel armor which lines the spider. The Lazear baffles the most professional thieves. The only way wheel can be set for steering is through use of the key.

Keyless locking feature eliminates any possibility of unconsciously locking wheel while driving, or of leaving key in lock on leaving car. Adds great convenience to driving at night, and when overcoat and gloves make it hard to get at keys.

Every Ford Owner needs the protection, safety and convenience of the Lazear. Write for further information.

DEALERS—Here is a real money-maker. Sells on sight. No after sale service. Write for prices.

Lazear Products Company

Dept. No. 2, 557 W. Quincy St.,

CHICAGO, ILLINOIS

doors provide easy entrance. The body is finished in Fabrikoid or paint in any color as desired.

Three persons can be comfortably seated in the Murf. The seat is substantially upholstered and finished in Fabrikoid as is the entire inside, including doors and instrument board. Altogether the Murf Body is an aristocrat and should prove a winner.

But to get back to the psychology. Like

most any other normal person, my attention was won by the attractive pictures of girlhood which the shrewd ad-man had used. Yet when I saw the car which they introduced, I became interested in its pleasing lines rather than theirs; didn't even get a name or a telephone number. And when the editor sends me a check for this article, I am going to add it to a fund which I have put aside for the purchase of a Murf Body — which is just what the ad-man wanted me to do.

Detroit News Notes

By Roy Buell,

The hand on the dial of the big barometer of the Motor Car Industry moves, up, up, up in indication of its schedule of sales and production.

This speech is figurative, of course, but it brings forcibly to the mental eye just what is happening with Ford Motor Car Company.

And how gratifying it is. There is no gainsaying and I have made this statement in previous articles—but that the Ford Motor Company's intensive activities now have a sweeping moral effect, not only as pertaining to the automobile business in general, but in many another industry—in fact to such an extent that it is difficult to properly comprehend.

Then again, this intensive and ever-increasing activity means much to the physical welfare of this "City of the Straits". Why not Fully 300,000 of its populace—more than 25 per cent—depend immediately upon this great institution for its daily bread and butter.

In round figures then here is what happened at the Ford Motor Co., during the past three months. And here, too, are the figures as to the intentions of this institution for a little time to come.

Wisely this great concern steps forward cautiously from month to month. But speaking figuratively again—on its giant shoulders many another great industry is being lifted up from the slough of depression, and turning the corner into the street of, "business normalcy".

Listen then: during the month of June the Ford Motor Company reached a production of 108,962 cars and trucks.

During April, May and June the production of Ford cars and trucks reached the grand total of 301,796—an increase of more than 80,000 pieces of rolling stock over the production for the same period a year ago.

Included in addition plans which it is understood Mr. Ford has under way is the production of aluminum at the River Rouge plant. His engineers and metallurgists, for weeks, have had on their study tables a plan by which the aluminum compounds from several furnaces may be turned into the much desired metal.

The new plan, it is understood, involves a process which does not require use of bauxite or high electrical energy. It is entirely chemi-

The July schedule called for an output of 109,000 cars and trucks, and these were turned out at the average rate of 4,360 cars daily. The schedule was fulfilled.

The total output for the second quarter of this year—April, May and June, as given above—is approximately 175,000 cars in excess of the production of the first quarter for 1921.

The total for the first half of 1921 is about 52,000 cars less than the total for the first half of 1920, the peak year of Ford production.

In addition to the announcement that the big schedule of automobile output for July was in excess of anything ever obtained before from the Ford Motor Co. comes the report from the River Rouge plant that still another product is to come forth from Mr. Ford's institutions—Viz: locomotives for his Detroit, Toledo & Iron-
ton Railroad. Contrary to anticipations from some quarters, these locomotives are to be driven by steam and not by gasoline.

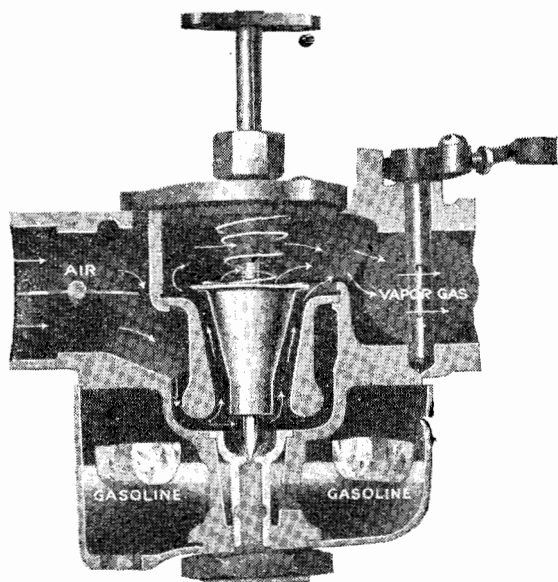
We dealt recently in one of our articles with Mr. Ford's gasoline-driven passenger car, but apparently this is as far as he intends to go along the gasoline line in the automotive power for railway rolling stock.

Another important unit under construction at River Rouge is a large railway repair shop where all locomotives of the newly acquired railroad, and those that will be built in the future, are to be repaired.

Mr. Ford is personally supervising the experimental work on improvements in existing designs. A special locomotive is being rebuilt according to Mr. Ford's ideas.

cal in its workings, and is said to be able to produce several acid bi-products in addition to aluminum.

If the River Rouge experiment should be made and proven successful, Mr. Ford will extend his efforts into other territory on a larger scale, it was understood. In case he is successful in securing the Muscle Shoals, Ala. government, it was believed he would utilize that for production of the metal by the new plan.



Sectional view of Holley Carburetor, showing Simpson Flexeco "30" installed.

Guaranteed
by the
Pyrene Mfg. Co.,
To Increase Your
Ford Mileage
30 per cent More
or Your Money
Back.

THE SIMPSON FLEXECO "30"

Sold and guaranteed by the Pyrene Manufacturing Company, makers of the famous Pyrene Fire Extinguisher, is a small device that fits inside the Model G Ford Carburetor (Holley). Can be installed by anyone in five minutes.

After exhaustive tests, in the laboratory and on the road, by engineers, expert drivers and others, the Pyrene Manufacturing Company found the results so astonishing in gasoline saving and in lessening engine vibration that it has decided to offer the Simpson Flexeco "30" to the public with an unqualified guarantee.

This Is the Guarantee: If the device does not increase your Ford mileage 30 per cent or more your money will be returned.

Engine vibration is cut down so noticeably that if the device saved no gasoline it would be well worth the small purchase price of \$3.

Free Trial Offer

Send us \$3 for a Simpson Flexeco "30." If you are not satisfied after trying it in your Ford, return it within 10 days and we will refund your money.

WE HAVE A SPECIAL PROPOSITION FOR FORD AGENTS AND AUTO ACCESSORY DEALERS

Pyrene Manufacturing Company

NEW YORK

ATLANTA CHICAGO KANSAS CITY SAN FRANCISCO



\$3.00

To
PYRENE
Mfg. Co. Inc.
17 East 9th St.,
New York City

Enclosed find money order or check for \$3, for which please send me one Simpson Flexeco "30." It is understood that if this does not meet your claims my money will be refunded upon return of the device, by parcel post prepaid, within 10 days.

Name
Street
City State

From Our French Correspondent

TO AVOID ACCIDENTS

I am sending you a good photo of the mascot for Ford Cars, which is known here as "Luckie Lizzie", together with a few words of introduction by a friend who is evidently "gone" on Lizzie. I don't want anyone to suppose I am given to disparaging the efficacy



of this article screwed on to the radiator of your Ford, but if you have already an insurance policy running I shouldn't advise letting it lapse. I am an awfully cautious buck and with this cross-eyed cocotte perched on my ear, with her dimple in her breast and another in her chin, to captivate the boys, I am not taking any risks. 'Nuff sed.

Here follows my friend's epilogue:

I've got an uncle who swears by his Luckie Lizzie—portrait attached—admitted, she's not the usual type of English beauty, but she's striking, one might almost say, unique. She appeals to Fords—Rolls Royces and such like being below her dignity—but beyond all, she has power. Since fitted uncle's life has been one dizzle round of misses. He says he simply can't dent his mud guards now (previous record 2 dents per day)—it is not to be gainsaid that Lizzie's faculty of being able to see both ways at once is of great advantage to the Ford and Owner. Her radiator cap ensures a cool head under all circumstances.

Here's Lizzie the mascot, a cheery young soul, Whose eyes tho' they cross have a humorous roll;

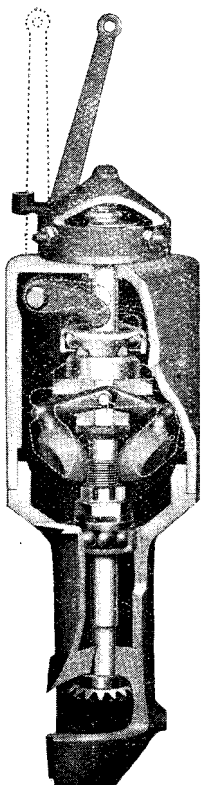
Whatever your station, whatever your call—Trust Lizzie—the luckiest Mascot of all.

SPLASH PREVENTER COMPETITION.

The Paris Journal, the "AUTO," our well known daily, has been having a "competition" in appliances for preventing pedestrians from being covered with mud by passing automobiles and trucks. Not long ago there was a new law made by which a person could sue for "damages" if inconvenienced by the vehicle which passed him. But people prefer to put up with the inconvenience rather than take the necessary trouble to haul the offender before the magistrates. Most laws in France are like that.

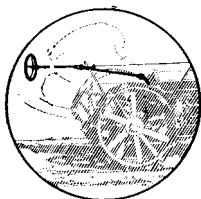
The competitions were highly instructive. "Points" were taken under twelve different headings. The cars for the principal test had to pass at full speed between white screens, about a yard on each side from the cars. The height and density of the mud splashes were measured. Another test was for running against the curb to see if damage occurred. General appearance, endurance, price, weight, and other things were also taken into consideration. In the end it was apparent that the rim of rubber fixed outside of the wheels was the most effective and convenient. There were several entries on this principle and when fixed in position the thing is so neat that people do not observe that there is any attachment. But in order that readers may grasp the idea better I have tried to make a sketch or two for the purpose. At present the "Preventers" are only placed on the outside of the wheels, but it occurs to me they would also be useful in preventing mud being thrown up onto the gears and under parts of the chassis. At first the rubber ring was made flat, but an improved form has the section of a curve. The flat form threw the mud too much against the spokes, but the curved section throws it against the mud guards above the wheels.

The **STANDARD** **GOVERNOR** for *Fordson Tractors*



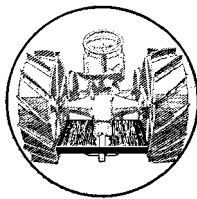
is staunchly and beautifully made, is guaranteed to the limit, and is one of the big sellers of 1921. The Governor is so designed that the slightest variation in the load will cause it automatically to open or close as desired. In designing the governor our engineers refrained from changing any of the original tractor parts, especially any of the throttle or carburetor fittings. They also kept in mind the fact that the successful governor must work both ways—open the throttle when the load is increased and close it when the load is decreased. The result of their work is not only the best governor on the market, but because of our large manufacturing volume, the least expensive. **PRICE, COMPLETE, READY TO INSTALL, \$30.00.**

Three Necessities for the Fordson



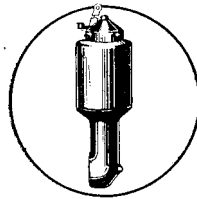
Standard Extension Drive

Installed in five minutes by anybody. Adjust to any tool. Price complete **\$25.00.**



Standard Tractor Platform

Big, roomy platform on which operator can stand, carry tools, etc. Price complete **\$20.00.**



Standard Tractor Governor

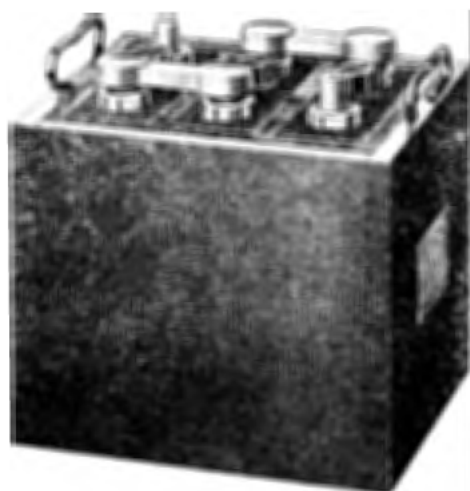
Mentioned above. Biggest seller in the tractor accessory field. Price complete **\$30.00.**

THE KOKOMO BRASS WORKS

FACTORY AND MAIN OFFICE KOKOMO, INDIANA

New York, 245 West 55th St. Chicago, 1430 Michigan Ave. Detroit, 4610 Woodward Ave.
Boston, 15 Jersey St. San Francisco, 1235 Van Ness Ave.

When writing advertisers—Just say **FORD OWNER AND DEALER.**



A QUALITY PRODUCT AT A NEW PRICE

How a Battery Manufacturer Helps Cut Car Cost

By JAMES MARSDALE

IN the loop district of Chicago is the place of business of a haberdasher, who, besides being a good businessman, is quite a student of human nature and a philosopher.

He knows the buying public thoroughly and can anticipate just what reaction any innovation or "sale" will have on patrons.

Recently I paid a visit to his store principally to enjoy a chat with him. A silk shirt sale was in progress and the prices were startlingly low.

"What's the matter with these shirts, Sam—are they seconds?" I enquired.

"Those are first quality shirts and I'm making a profit on them", advised Sam. "But you have asked the same question that everyone else has asked and will during this sale. The public is accustomed to high prices, Buyers never analyze the price tag. Try to sell them something at a reasonable figure and they become suspicious."

I realized the comment of this merchant to be most sound when recently I was glancing through the pages of the July issue of FORD OWNER AND DEALER and came upon the advertisement of the Globe Electric Company of Milwaukee. It announced a storage battery for the Ford car and which sold for twenty dollars. This was somewhat radical; quite a variation from most battery prices. Why? I was a bit incredulous. *Caveat emptor.* Surely, one product which sells for considerably less than others cannot be of the same quality.

Meditating on this question I finally decided that I would trace this case down and learn whether the price of this battery was due to

lack of scruple somewhere, or better merchandising or manufacturing methods. Accordingly I made what I endeavored to have appear as a casual visit to the Globe Electric Company—and found out.

Arriving at the plant of the company I found it to be a most carefully planned and up-to-date manufacturing establishment. At the office I was courteously received by Mr. G. M. Gardner, sales manager, who gladly granted my request to inspect the plant and conducted me through every department.

At once I realized that here was the home of a worthy product.

Every department of this well lighted, well equipped and efficiently arranged plant appeared to be in the hands of young men who seemed to be interested in their work and expert in its production. First I inspected the raw material and noted that everything was of first quality from the Goodrich hard rubber jars to the selected cedar separators, each of which was carefully candled to assure the absence of imperfection. Even the lumber for the battery boxes had to pass the inspection of experts and the conversion of this selected hard wood into lock cornered and dowelled boxes painted with acid-proof paint would do credit to work of expert cabinet makers. I followed the work of construction of the battery from the stage of the unassembled materials through every process to the charging and testing rooms and was impressed with the quality of materials here in preparation of the component parts and the completeness of the assembled unit.

DREDNAUT

SHOCK ABSORBERS

SEDAN
TOURING CAR
LIGHT DELIVERY



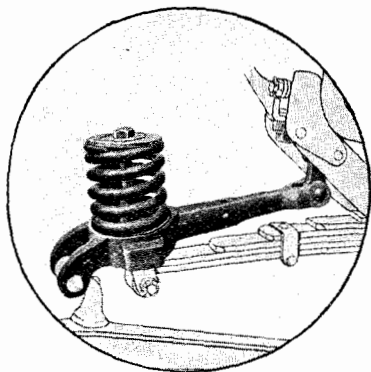
FOR ALL FORDS

COUPE
RUNABOUT
RUNABOUT DELIVERY

For the Preservation of Your Ford

Your Ford—today, perhaps, it gives you all you can expect from it in the way of performance and service. Six months or a year from now—what then? It has carried you and its load over all sorts of roads—ruts, through sand, over rocks. Its frame is shaken; the tires have suffered; the springs have weakened; you contemplate with dread the prospect of having to drive it.

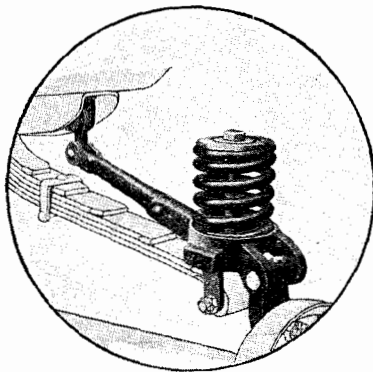
Drednaut Shock Absorbers are the "ounce of prevention" you need to keep your Ford young—whatever style or model you may have. Tried and tested in a run of over 10,500 miles on every kind of road, they will give your Ford the longer life it needs through protection from vibration and road shock.



\$18.50

Per Set

This unusually reasonable price, backed with an absolute guarantee of satisfaction or price refunded, is the cheapest insurance policy you can buy for your Ford.



Satisfaction Guaranteed or Price Refunded

Correct design, best materials and scientifically correct construction have resulted in this expression of our faith in what Drednaut will do for you. No side sway; no body roll; spring leaves protected against weakening; body fatigue eliminated and greater comfort are yours with Drednauts between you and the road. Complete descriptive circular upon request.

To the Trade: We have an interesting and attractive proposition for you. Ask us.

AUTO SPECIALTIES MANUFACTURING CO.

DEPT. 9-C

St. Joseph, Mich.

Windsor, Canada

I noted also that quantity production was made possible by the clever Ford plan to keeping the product moving continually through its several processes to completion. Surely there was every reason why this battery should cost as much as any other. I found no other way to secure the information I was seeking than to press Mr. Gardner himself.

"We have been in the battery business for many years constructing batteries for home lighting equipment", said Mr. Gardner. "We know — and anyone who knows batteries must know — that the finest kind of battery can be made and sold at the price which we ask for the Globe battery. We have studied

our production plan and through it we are able to offer the best of material and workmanship, and at the same time market this battery on a fair price policy. There is nothing startling nor radical in this. Anyone could do it if they would be content to offer a worthwhile product and accept a reasonable profit."

Had I any further belief that there were any "strings" or "catches" to this proposition they would have been removed by my further investigation which revealed that Ford owners and battery dealers are responding to this offer of a quality product at a new price and by their own reports are well satisfied.

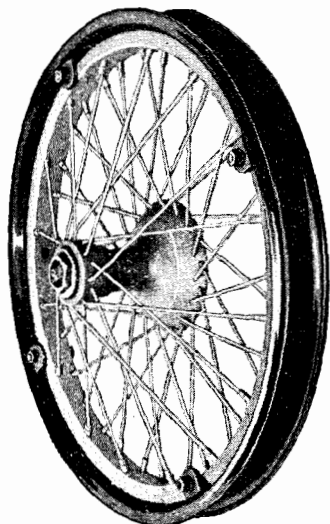
EQUIPMENT REVIEW

A monthly department in which manufacturers are given an opportunity to furnish news and views concerning accessories, equipment and ideas for the Ford car.

NEW DEMOUNTABLE WIRE WHEEL

Sometime ago, the Hayes wheel company, Jackson, brought out a new demountable wire wheel. It was tried out quietly and now that approximately 3,600 sets are in use, and due to the fact that the users have found the new wheel entirely satisfactory, the Company has given out details.

The new Hayes product is called the "Hayes demountable at the Rim" wire wheel, and is said to be much different in construction from old style wire wheel, in



that the Company has applied to its construction the same principles which have made a success of its new wood wheel.

Sometime ago, the Company perfected a wood wheel with steel felloe, which construction completely eliminated the loose wedge, using, instead, fixed lugs, securely fastened to the rim. This type of wood wheel proved so successful that it has been adopted by several of the largest producers of motor cars.

Now, Hayes engineers have applied the "Fixed-lug" construction to wire wheels, with the same success. The same kind of steel felloe is used and the same kind of demountable rim. In fact, the new Hayes wood wheel rims are perfectly interchangeable with the new wire wheel rims. The attached lugs on the wire wheels entirely do away with loosening the spokes or throwing

the wheel out of round. These make this type of wire wheel possible and perfectly successful in everyday, practical use, the manufacturer asserts. The construction is fully protected by patents.

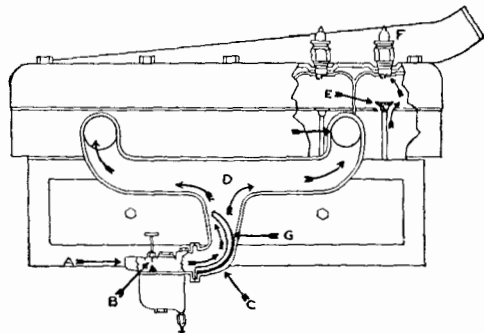
A set of the new wire wheels consist of four. The extra, or fifth, required in a set of the old type wheels, is not needed any more than with a set of wooden wheels.

The following exclusive features are claimed by the Hayes Company for its new product: in mounting the rim, the full pulling power of each lug bolt can be exerted in drawing the rim to the felloe; only one-half the number of bolts otherwise required are, therefore, needed; each lug bolt, also, becomes a driver, preventing even the slightest slippage of the rim; there are no loose lugs and misalignment of rims is impossible, which means longer life for tires.

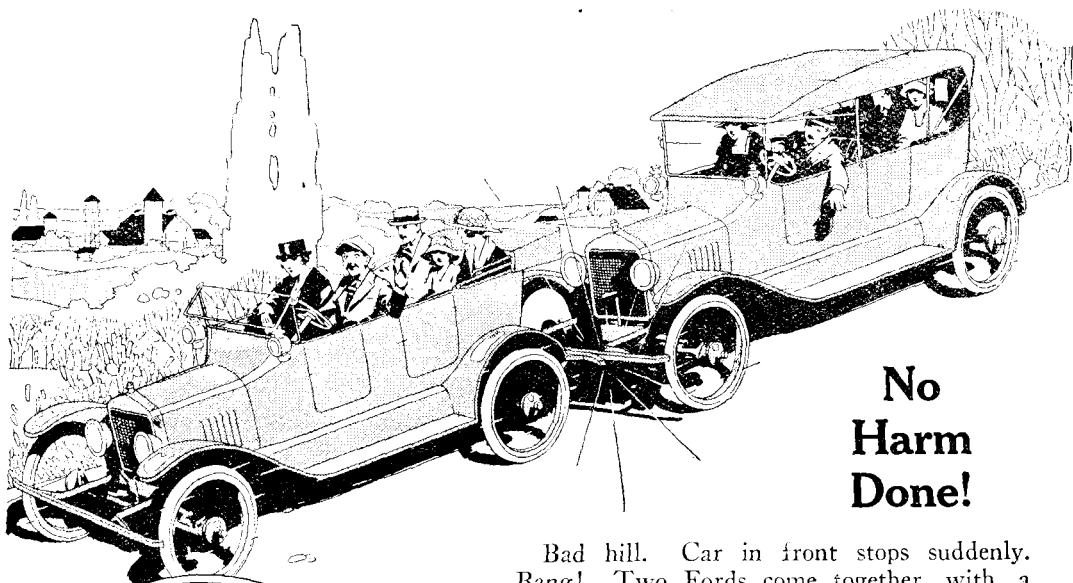
About 2,500 sets of the wheels are to be produced in July. At present the wheels can only be supplied for the Ford Cars and for the Chevrolet—490, but these will soon be available for other cars.

BAUTZ GAS EQUALIZER

Oil pumping is a very familiar trouble to every Ford owner, and carries in its wake many attendant troubles. To overcome this annoyance the Bautz gas equalizer has been placed on the market and is meeting with real success according to the Charles Wilhelm Sales Co., 100 W. Main Street, Waukesha, Wis. This device assures an



equal distribution of fuel ingredients to all cylinders resulting in perfect combustion. It prevents the fuel from mixing with the oil and consequently keeps the oil whole. The result is more even explosions, quieter running, and ends excessive wear on the first two cylinders, while carbon formation is practically eliminated. It is claimed that a considerable economy of fuel also results from the use of this device.



**No
Harm
Done!**

Bad hill. Car in front stops suddenly. Bang! Two Fords come together with a wallop. Ordinarily results would have been sad to relate—but the clink of the Dow Bumpers said—No Harm Done!

Whether bounding over hills or cautiously driving on congested thoroughfares, Dow Bumpers stand ever between your car and harm—keeping danger always at a safe distance.

Equip Your Ford With Dow Bumpers

They combine unusual strength with enough resiliency to absorb the most severe shock. The double-spring construction reduces the force of the blow to a gentle resistance.

Easily installed. Cannot joggle loose and rattle. Attached directly to the chassis and when in place become virtually a part of the frame. *Can be used effectively in conjunction with snubbers.*

Made of a fine quality of steel throughout and finished entirely in black enamel or with black enamel arms and nickel plated bumper bar.

Protect *your* car with Dow Bumpers before the accident occurs—repair bills amount to many times their cost.

At your dealer's. Or write The Dow Co., Incorporated, Louisville, Kentucky.

DOW **Double-Spring Bumpers** PATENTED
SOFTEN THE FORCE OF EVERY BLOW

NOTICE:---

In the August issue of *Ford Owner and Dealer*, through a typographical error, the list price of the *New York Uni-Coil Distributor System* was quoted as \$10.00 instead of \$18.00.

We desire to assure everyone that there has been no reduction in price.

See our regular advertisement on opposite page.

NEW YORK COIL COMPANY

338 Pearl Street, NEW YORK, N. Y.

THE HERZ HAMMERBLOW TIMER

The Herz Hammerblow Timer is built upon an entirely new principle, and is different from any other instrument meant to serve the same purpose. The contact is made between two Glasshard Tool-Steel Rods actuated by a steel cam setting on the shaft and attached exactly the same way as the Roller-assembly in common use. These Tool steel Rods of special high-class NickelSteel-Alloy are contained in a bronzehousing and are so stur-

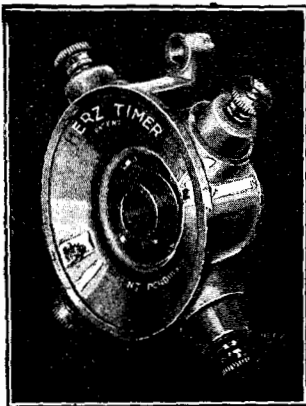
well as the contact pieces in an incredibly short time. The roller furthermore through the centrifugal pressure covers the fibre surface with a thin layer of steel particles which are checking the current only in a minor way as against the time when the roller rests on the steel surface. This is the cause of continually sticking coil-vibrators.

The Herz Hammerblow Timer creates a contact only at the exact point when needed and interrupts it suddenly after the current passes.

The Herz Hammerblow Timer is the only instrument giving exact timing at all speeds and independent of the speed.

The construction of the Herz Hammerblow Timer is exceedingly compact.

The housing of the Herz Timer is made of manganese bronze. It has four large bosses 90 degree apart, containing the tool-steel contact studs. These large round tool-steel studs which are pressed outward by the cam setting on the Timer shaft, are carefully fitted and securely imbedded in the Bronzehousing. They are pressed towards the cam by a spiral spring and guided in a steel sleeve on the upper end. These hardened and ground tool-steel surfaces stay bright and polished no matter how long the instrument is in use, there being no spark and no wear. The steelman on the timer-shaft when rotating moves the large toolsteel stud outward, the buttend of same pressing firmly against the butt of a second toolsteel-stud setting on the same axis but held insulated in the enlarged open end of the Bronzehousing. The second stud is so yieldingly held within a bronzehousing. The press-contact occurs between the buttends of these two Glasshard and ground Tool-steel surfaces.



dy that wear is entirely eliminated. These glasshard toolsteel contact surfaces are pressed against each other at the exact moment and suddenly released with the passage of the cam.

It is an intimate press-contact and a sudden Hammerblow break.

The ideal contact and the ideal break for conditions as prevailing in the ford engine.

The low tension current when interrupted in a Roller Timer creates a considerable spark, which with the usual roller or sliding contact hurls away the roller as

AN INTERESTING PRODUCT

Both car owners and men in the trade would do well to write to the Motor Products Corporation, Detroit, Mich., for complete information regarding their rain vision and ventilating windshields for Ford passenger and commercial cars. These are especially well made and have many unique features of appeal to car owners. They are sold at attractive prices and an interesting discount is made to the trade.

Modern Single Coil Distributor Ignition for the Ford Car

Supplied by the NEW YORK UNI-COIL DISTRIBUTOR IS THE ONE MOST NEEDED, LARGEST SELLING and greatest value giving device yet PRODUCED.

ABOLISHES TIMER
With All Its Accustomed Troubles,
Short Circuits, Oil Soaked Wires
Eliminates Three Coils

and the impossibility of keeping them all uniformly adjusted.

THIS IS THE ONLY SYSTEM that operates from the Ford Magneto or Battery, therefore the car may be driven regardless of batteries' condition which guarantees continuous service—even when battery is removed entirely.

It requires but one-half hour to install on any Ford from 1910 to date and will positively prove a revelation IN SMOOTHNESS, EASY STARTING, extraordinary pulling ability with an entire absence from all the troubles to which you have been accustomed.

Not an experimental unproven device,—the same principles employed in this system are used on America's highest priced cars. In use by thousands of Ford owners for the past eight years.

Furnished complete to
the smallest detail. Price **\$18.00**

Made and guaranteed by one of the
oldest Ignition Manufacturers.

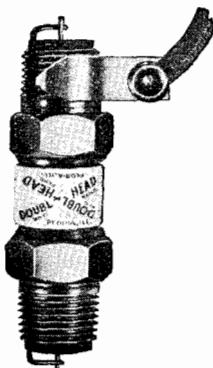
NEW YORK COIL COMPANY

338 PEARL STREET

NEW YORK CITY.

NEW DOUBLE DUTY SPARK PLUG

The Reardon Co., Inc. of Peoria, Illinois, are placing on the market a new type, combination double spark-plug and intensifier in the form of one spark-plug unit. That this new device is received with great approval by both mechanics and the driving public, is proven by its growing and wide spread demand.



Manufactured under the name of the "Double-Head" Spark Plug, this device consists of nothing more nor less than a double ended spark plug, the one end firing in the air as the other fires in the motor. This automatically acts as a spark intensifier as well as thoroughly cleaning the exposed plug end, thru sparking and strong air circulation form the fan.

These plugs are unbreakable and are guaranteed by the manufacturer to fire perfectly thru grease or oil.

Another good feature is that a glance at your plug TOPS shows exactly the sort of ignition being delivered thru coils, timer, battery or magneto.

"Double-Head" Plugs serve where ever ordinary plugs are used.

THE CATARACT PUMP

The Cataract Circulating Water Pump for Ford motors is made by the F. R. Lueck Manufacturing Company of Milwaukee.

One of the principle claims made by this Pump is that it positively prevents the motor from overheating although the Cataract is equally valuable for use in cold weather as a temperature regulator in all climates and under all conditions.

Overheating causes 90% of so-called "motor trouble", "valve trouble" and "spark plug trouble". Once let a motor overheat and much of its power, snap and flexibility is lost. This loss of power is often blamed on poor gasoline or improper carburetor adjustment, when it is really a direct result of overheating. Few owners realize that their motor is overheating until the water boils over—but this comes only after the motor has become hot enough to convert the water into steam and after more or less damage has been done.

The Cataract Pump prevents overheating. It removes the cause of 90% of "valve trouble" and "spark plug trouble". It helps to give the motor more snap, pick-up and power on the hills. It stops excessive evaporation of the water and thereby, in cold weather, prevents the loss of anti-freeze solutions. It eliminates that mysterious loss of power and flexibility which comes from overheating which is not bad enough to cause the water to boil over.

By doing away with overheating troubles, the Cataract helps to prevent warped, pitted and burnt valves—helps to do away with loss of power through pre-ignition, valve leakage and leakage past the piston rings—and eliminates the main cause of scored cylinders and pistons and burned-out rings.

The Cataract Water Pump greatly decreases the consumption of oil, which, in turn, means decreased carbon deposits, because not only will less oil reach the combustion chamber, but the motor will run on a much leaner mixture. The large oversize pump shaft runs in high duty bronze bearings, which are provided with lubrication facilities more than ample to meet all requirements. The \$9.85 retail price includes belt, cap screws extra gasket and hose connection.

THE PEERLESS CENTRIFUGAL PUMP

In our August issue we discussed water circulating pumps and unintentionally omitted mention of the Peerless centrifugal pump manufactured by Standard Auto Accessories Co., 127 S. Green Street, Chicago, Ill.

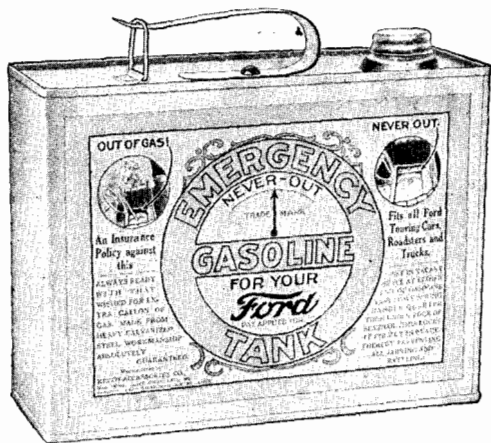
The water is drawn in near the center of the pump and thrown outward by centrifugal force. This makes a powerful efficient pump and is particularly effective when it is most needed and at all motor speeds. The Peerless is made a part of the slanting pipe, leading from the bottom of the radiator to the side of the cylinder block. It being located at the base of the radiator and cylinder block, full water circulation is had, regardless of whether your radiator is full or only partly full of water.

Years of experience has proven that grease cups cause considerable trouble. Hot water melts the grease causing the grease cup to become empty. Experimenting has been successful in enabling the packing makers to produce a graphite packing, which lubricates for an indefinite period eliminating long shafts and grease cups from the peerless. It is belted directly to the pulley on the crank shaft and fan belt pulley. Tightening the adjustment of the fan belt also tightens the tension of the pump pulley.

To install the peerless pump you need only replace the old Ford belt with a new one furnished by us. Every carton containing a Peerless has one of these belts. Remove the two crank case belts and replace them with two longer ones, also furnished by us. No brackets or other extras required. No holes to drill. Anyone can attach.

EMERGENCY GASOLINE TANK

One of the questions which the technical editor cannot answer is: Why does the gasoline supply always become exhausted at a long distance from a filling station? We never miss the gasoline till the tank runs dry and all Ford owners know the inconvenience of such an occurrence. They can be saved this inconvenience if they have been thoughtful enough to carry as part of their regular equipment The Never-Out Emergency Gasoline Tank.



The Never-Out is always ready with that wished for gallon of gas to get you home or to a filling station.

It requires No Troublesome Installation—simply set in vacant space at either end of regular gasoline tank—give spring handle a quarter turn under edge of seat bar, which locks it firmly in place and prevents any jarring or rattling. Always out of the way—yet convenient for use.

Fits all Ford Touring cars, Roadsters and Trucks. Can be used for oil as well as gasoline by simply carrying one Never-Out at each end of the regular gasoline tank.

The Never-Out is made from Heavy Galvanized Steel and guaranteed against any defects in material or workmanship. It is made to stand rough usage. The First Cost is the final cost. The price is insignificant when you consider its worth and convenience to the owner.

This is a product of the Keith Accessories Mfg. Co., Cape Girardeau, Mo. Price \$1.25 Each.

Where Does Your Brake Lining Go?

Thru heavy usage, the brake and transmission linings in the Ford become torn and ragged, and new lining must be bought regularly.

Every Ford brake lining gets to be this way in time.

The worn and torn lining cannot disappear—it must remain somewhere in the motor—so it is carried and circulated with the oil.

This is the trap of the Safety Oiling System that filters the oil, catching and holding brake lining and other waste in its teeth.

THE Safety Oiling System cleans torn brake lining and carbon deposits from the oil, furnishes forced lubrication to all parts of the motor whether the machine travels up or down hills, prevents burnt-out bearings and scored pistons and cylinders, prolongs the life of the brake lining, eliminates fouled spark plugs, gets more mileage out of the gasoline and increases the power of the motor.

It costs **\$6**

and saves its price many times over.

Torn particles of brake lining clog the $\frac{3}{8}$ " pipe which is the Ford's only means of carrying oil forward from the flywheel to the timing gears.

When the supply of oil is cut off from the front of the motor, the results are burnt-out bearings, and scored pistons and cylinders.

IF you wish your machine to last longer, and work smoother, and want assurance that the motor will not fall down under the everyday pressure of operating without oil circulation, send for a Safety Oiling System. Send today. Send \$6, and we will ship one, express prepaid, immediately. You can install it in less than 15 minutes and we will refund your money if, after using it 30 days, you are not satisfied with it.

SAFETY OILING SYSTEM

W. H. SIMON

822-824 N. BROAD ST.

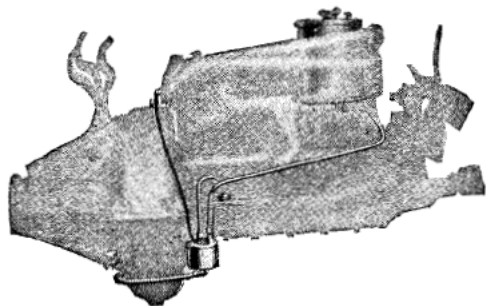
PHILADELPHIA, PA.

DEALERS: ATTENTION! Your Accessory Business can only show Big Increases as you supply WANTED Accessories. 20,000 Safety Oiling Systems sold first six months. Get in on this in your territory. Write or wire at once.

FOR BETTER LUBRICATION

The basis of efficient lubrication in the Ford Motor is the furnishing of just enough oil. This proper state of lubrication can be achieved by the Oilomatik Lubricator.

The Oilomatik is the "Watch Dog" of your oil supply. It not only holds the correct level, but should you fail to refill the reservoir, it warns you, before the level reaches the danger point, to replenish the oil supply. This feature alone is worth the price of the system.



The Oilomatik consists of an oil reservoir and a control chamber. The Oil Reservoir is a strong, neat gallon tank, mounted conveniently under the hood, where it is kept warm in any temperature. The Control Chamber is an all-metal die casting, and not only contains the float and check valve that governs the proper oil level in the motor but also a very unique Low Oil Alarm. It is easily installed being necessary only to remove and replace four cap screws and lower pet cock. No holes to bore, or defacing of car in any way.

Further information regarding this device may be had from Auto Products Mfg. Co., 341 E. Ohio Street, Chicago, Ill.

THE SURE START

The sure Start Electric Hot Spot is proving very popular because it does what its name suggests and provides a quick start of the motor in winter or summer. It is made in sizes to suit all cars having detachable manifold. By providing the instant start it reduces the strain on the starting motor and feeds the motor with real vapor instead of sprayed gasoline. It is also claimed that it permits running on a leaner mixture of fuel. It is a time saver and the manufacturers claim that it costs nothing for the reason that it soon pays for itself. It is a product of Edwin L. Wiegand Company, 422 First Avenue, Pittsburgh, Pa.

THE BIG FOUR TIMER

There must be a good reason for the popularity of the "Big Four" Timer which sells at \$2.50. One can find these reasons in the four points of interest mentioned by the manufacturers. Big Four is a wipe contact being made by means of a hardened contact washer and maintained by means of a light spring giving only a light wear. That's all there is to it, a contact washer and a light spring. Nothing to get out of order. Four universal contact surfaces on one washer wearing one by one. This washer is divided into four contact surfaces. Each surface will wear as long as the ordinary timer (from 6000 to 9000 miles). After one surface has worn, the washer is pushed back against the spring and turned to the next surface, and this is continued until all four surfaces are worn. Crescent shaped contacts, which are very desirable from an electric standpoint, for when the circular contact disk leaves the crescent shaped contact, it leaves only one point an dot on a straight line, which would be the case if the contacts were any other shape. The Big Four timer requires no oil or cleaning, as it contains no roller pins. The contact washer can tilt and accommodate itself to any position, and will work just as well with defective and worn camshaft bearings, and allows a large end play. This is a product of the Dorchester Machine & Tool Works, Inc., 70 Freeport Street, Dorchester District, Boston, 22, Mass.

NEW HUB CAP IMPROVES APPEARANCE

It is the refinement of detail that today characterizes the distinctive car. This is true to such an extent that it's surprising what a hub design may add to the appearance of a car.

One of the latest betterments introduced to help the Ford owner who is anxious that his car look more distinctive than his neighbor's is the P. C. Hub Cap, manufactured by the Parts Corporation of Indianapolis.



These Hub Caps add a touch of distinction where it is of great value. It is said that they give the effect of making the wheels and under-gear look quite a bit larger and get away from that "up in the air" effect.

Of course they may be quickly and easily removed for inspection and adjustment of the bearings, etc.

Parts Corporation Hub Caps are made of an alloy which has a permanent bright finish and has no nickel plating to wear off. A few rubs of a cloth renews the original luster at any time.

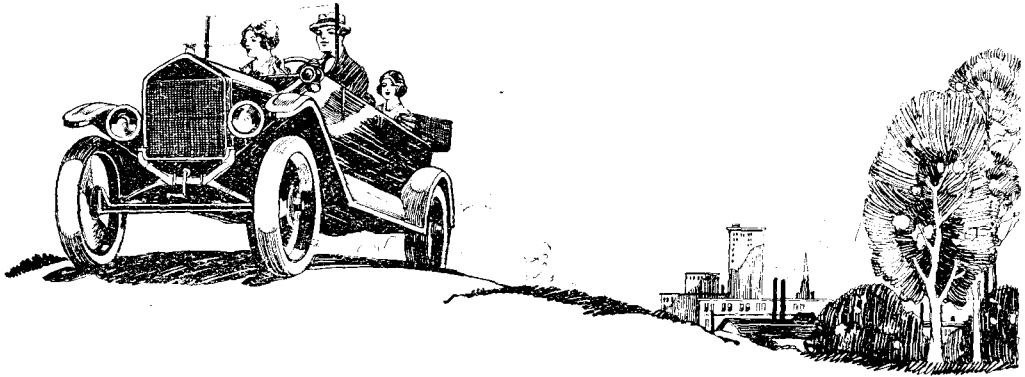
These Hub Caps, which fit the Chevrolet 490 as well as all Ford Cars, are said to be meeting with unusual popularity. They form one of the latest additions to the complete line of radiator caps as well as other accessories made by the Parts Corporation of Indianapolis for Fords and other cars.

THE HOLD-LOW

When climbing hills or descending them or driving through sand, mud or rough places it usually is necessary to hold the car in "low". Every Ford owner knows how tiresome it is to keep the pedal depressed for a considerable distance and many Ford owners are aware that this is not necessary since they have equipped their cars with the Rogers "Hold-Low". With this



device the driver can lock the car in low while ascending hills thus preventing the low band from slipping. The same thing can be done while driving down hills thereby saving break-band. It acts as a gear shift and removes the necessity of holding the foot on the pedal with the resultant foot and limb weariness. It weighs only ten ounces but is well made and simple to attach. It is a product of J. W. Ferren Company, Los Angeles, Calif.



THERE are nearly a million Ford owners who use and endorse the Bull Dog Foot Accelerator.

Five years of successful manufacturing have proven to us, and to users, that the Bull Dog Accelerator is right in every way. It is simple and strong in construction, easily installed, and requires no tinkering or attention to keep it working.



BULL DOG FOOT ACCELERATOR

The Bull Dog Accelerator is built throughout of steel parts, accurately machined and fitted. There are no flexible cables, wires or links used, to break, tangle and cause trouble.

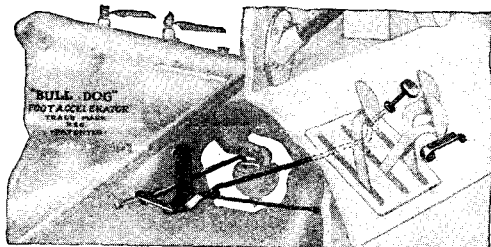
The Bull Dog Accelerator has a direct rod drive to the carburetor, permitting very close adjustment of the gas supply. The hand throttle works independently of the foot feed. A foot rest is furnished with each accelerator.

You NEED a foot throttle on your Ford, safety and comfort demand it. But be sure you get the best one—the Bull Dog. You can't buy a better one at any price. See your dealer today or order direct.

W. H. Thomas Mfg. Co.
SPENCER, IOWA
The Fulton Co., Sales Department,
Milwaukee, Wis.

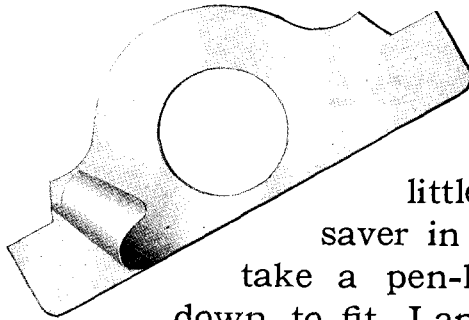
Price:

United States \$1.50 each
Foreign Countries \$1.90 each



When writing advertisers—Just say FORD OWNER and DEALER

Peel



Here's the biggest little money and time-saver in the business. Just take a pen-knife and peel it down to fit. Laminated Shims are furnished, ready-to-use for Ford crankshaft rear bearing, crankshaft front and center bearing and connecting rod, in $1/32$ or $1/64$ inch thickness.

Free Sample On Request
Address "Ford Sample Dept."

LAMINATED SHIM CO., INC.

14th Street and Governor Pl., Long Island City, N. Y.

DETROIT: Dime Bank Building.

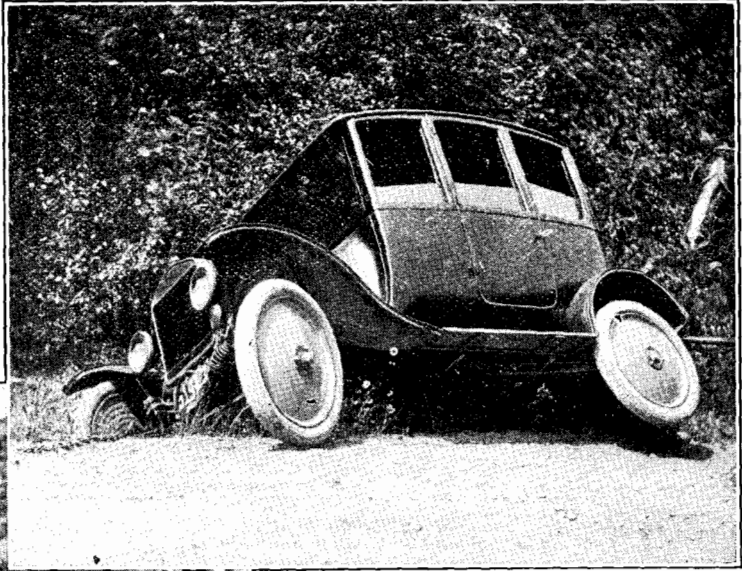
ST. LOUIS: Mazura Mfg. Co.

CHICAGO: 1118 So. Michigan Ave.

LAMINUM

When writing advertisers—Just say FORD OWNER and DEALER

HARVEY
WHEELS
"STOOD
UP"

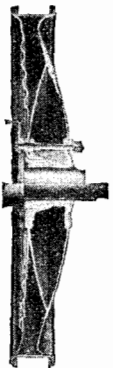


**"IF THE WHEELS
HAD BROKEN
WE WOULD HAVE
ROLLED OVER."**

(THIS IS WHAT CAR OWNER SAID)

But

HARVEY STEEL WHEELS DON'T BREAK



The HARVEY STEEL DISC WHEEL for Ford Cars is INSURANCE against bad accidents. No matter how severe the service the wheels cannot be damaged beyond usefulness — in fact the wheels on the car here shown were perfect after the accident and are being used on this sedan today without any repairs having been done to them.

While these wheels are strong they are not too heavy, and they are the only Ford wheel completely enclosed on both sides, which aids you in getting through sand or mud; also you can get at the air valve for inflating tires easily from the front of all wheels and the fifth wheel carried making tire changing easy.

The price of \$75.00 per set F. O. B. Buffalo covers everything, and any ordinary mechanic can properly attach the wheels to your car.

HARVEY RIM & WHEEL CO. Inc.

Buffalo, N. Y.
2118 Michigan Ave., Chicago, Ill.

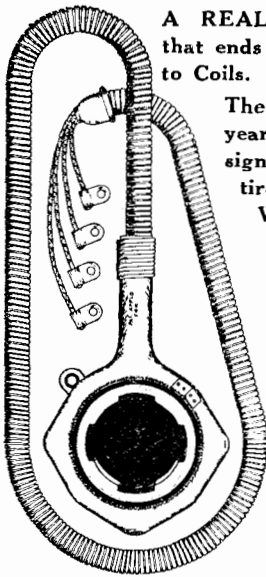
When writing advertisers—Just say FORD OWNER and DEALER

STOP Ignition Trouble!

Caused From Oil Soaked Leaky Wires.

HOW?

GET A **CHIEF** TIMER COVER AND WIRE ASSEMBLY



A REAL IGNITION GUARD that ends all trouble from Timer to Coils.

The **CHIEF** is backed by years of experience, designed by experts—is entirely insulating, Dirt, Water and Oil Proof.

Designed to fit the original Ford Timer, but will fit any of the so-called timers as well. Can be run overhead or any position to suit. Will last indefinitely regardless of the number of timers replaced on the motor.

Can be installed by anyone in a few minutes. Ask your dealer or order direct.

Price \$2.00. West of Rockies \$2.25. Canada \$3.00.

A big Money maker for Live Dealers. Write today for special terms.

CHIEF PRODUCTS COMPANY

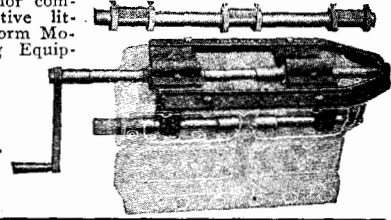
2335 S. Michigan Avenue
Dept. 6 CHICAGO

STORM MAIN BEARING TOOL

Puts new bearings in old blocks. A low priced efficient money-making tool. Simple and speedy in operation. Two sizes for Ford and Fordson.

Write today for complete descriptive literature on Storm Motor Renewing Equipment.

STORM
MFG. CO.
Minneapolis,
Minn.



AN ITEM FROM ENGLAND

It seems that our cousins in England are keeping pace with American manufacturers in devising practical items for the Ford car. Among other interesting things marketed by The Lancashire Ordnance Accessories Co., Ltd. Georges Road, Heaton Norris, Stockport, England, is the L. O. A. Economiser.

The device consists of a heating chamber of special design, heated by exhaust gas from the motor, in combination with an air-valve of peculiar construction which is interconnected with the throttle valve of the carburettor, consequently it is entirely automatic in action.

When fitted, the engine will run smoother, will pull better on hills and will take its load more quickly when started up from cold. In addition, the mileage per gallon will be considerably increased.

The L. O. A. Economiser, by heating the mixture of air, vaporized light constituents and unvaporized heavy constituents that form the mixture as it issues from the carburettor, in a scientific manner vaporizes the globules of the heavy constituents so that they mix with the air and become just as inflammable as the already vaporized light constituents, thus making the mixture homogeneous and ready to explode all at once when the spark occurs.

BEAR WHEEL ALIGNER

Properly aligned wheels are necessary for good driving and a practical way to secure this alignment is through the use of the Bear Wheel Aligner. This device gives both the dish line and tow line, almost instantly. By placing between the wheels the exact position of



each wheel shown on a dial and as adjustment are being made the dial indicates when perfect alignment has been reached. It will show up all defects in the spindles, bearings, bushings and tie rods. This is a very practical item and sells for \$8.50. It is a product of Bear Mfg. Co., Rock Island, Ill.

SEND FOR INFORMATION

Both car owners and dealers cannot fail to be interested in the unique line of lamps for the Ford car being manufactured by the Hawthorne Lamp Works, 1410 Michigan Ave., Chicago, Ill. This line of parking and side lamps is distinctive in design, efficient in service, well made and is offered in a range of styles and prices. It is claimed that big sales are being reported for these lamps.

BURD

Quick-Seating PISTON RINGS

One Piece



**Easy
To
Install**

List Prices (Subject to Trade Discount)
All diameters to 4 in. inclusive.....60c each
All diameters over 4 in. to 5 in. inclusive, 70c each

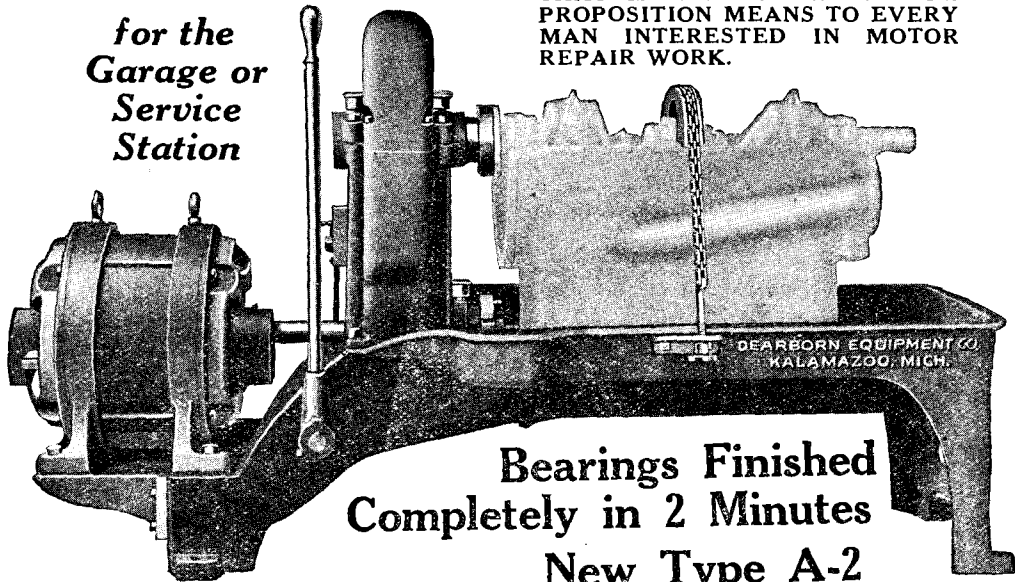
Burd High Compression Ring Co., Rockford, Illinois

When writing advertisers—Just say FORD OWNER AND DEALER.

BIG BUSINESS

*for the
Garage or
Service
Station*

THAT IS EXACTLY WHAT OUR
PROPOSITION MEANS TO EVERY
MAN INTERESTED IN MOTOR
REPAIR WORK.



**Bearings Finished
Completely in 2 Minutes
New Type A-2
Burning In and Running In
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Two New Books

If you want to do a Big,
Profitable Business, send for
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Catalog No. 10

Garage and Service Station.
Tools and Equipment.

REBORING OF CYLINDERS

A complete manual of the
latest approved methods.
Both books will be sent on
request without obligation.
Send for them today and
make money.

For Ford and Fordson Motors, is the result of
many years' experience in Designing and Build-
ing Ford Service Station Equipment.

It meets every requirement for producing the
highest grade work at the lowest cost. Can also
be adapted to other makes of motors.

Note These Features

Requires Less Power.
Surplus Cast Iron Eliminated .
Perfect Balance Reduces Vibration.
Large Oil Sump.
Less Fixtures or Loose Parts.
All Gears and Moving Parts En-
closed.
All Parts Easily Accessible.
Only 3 Supporting Fixtures Re-
quired.

Low Cost The extremely low cost of this machine is next in importance, to the
quality of its work and its low operating expense. From every point
of view it is the Biggest Money Maker on the Market.

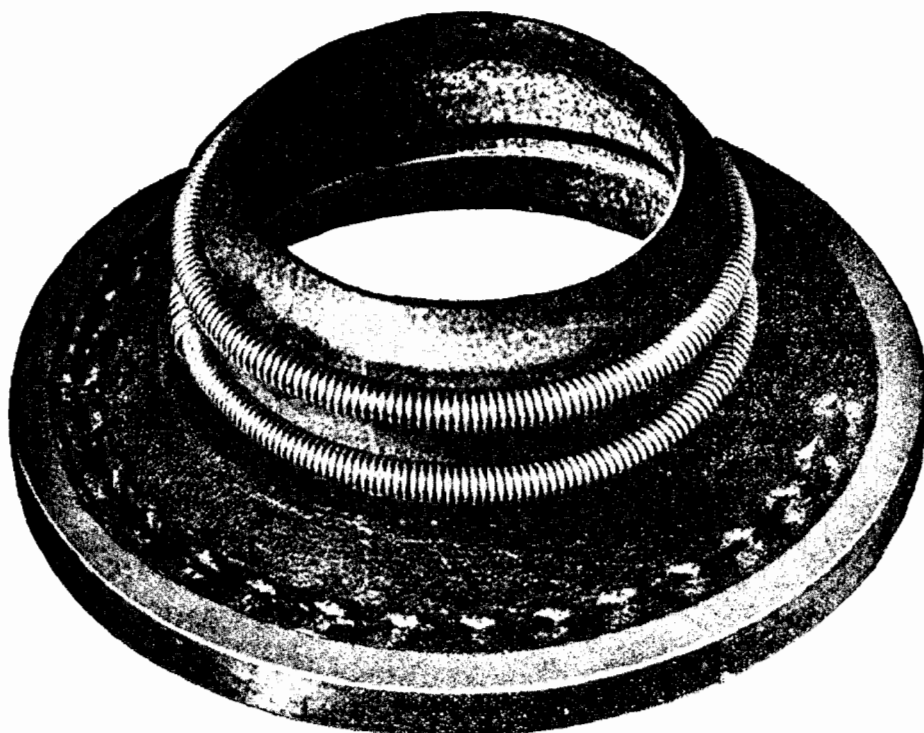
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Dearborn Equipment & Hinckley-Myers Co.

Manufacturers of Automotive Equipment
39 North Michigan Blvd., CHICAGO

WE HAVE AN ATTRACTIVE PROPOSITION FOR JOBBERS, DEALERS AND SALESMEN

C & M OIL RETAINERS



Patented April 1, 1913—Jan. 9, 1917—Jan. 14, 1919

"MADE OF LEATHER"

"THEREFORE LEAK-PROOF"

OTHER C & M PRODUCTS

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PATENTED



FORD REPAIRMEN AND AGENTS—WRITE TO US OR YOUR JOBBER

Cantrell-Miller Manufacturing Co. Inc.,

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WHY?

Do you know the four reasons why
JAFEE Radiators for Fords are always
best? If not we'd like to tell you. Just
drop us a card.

JAFEE RADIATOR CO.
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The JAFEE Radiator
"COOLS FORDS"

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CHICAGO, ILLINOIS

Please send me your
"FOUR REASONS WHY."

Name

Address

City..... State.....

Are you a dealer?.....

When writing advertisers—Just say FORD OWNER and DEALER

\$50.00

additional profit on every Ford you sell

for
Ford
Dealers

We have a special plan by which Ford Dealers are **ADDING** at least \$50 to their profits on every Ford car sold, by delivering it equipped with House Wire Wheels at a price that is very attractive to the car buyer.

Ford dealers in all sections of the country are meeting with wonderful success by following this plan. They not only make \$50 **EXTRA** profit on every Ford sold without incurring any additional selling expense, but—by reason of public interest in Wire Wheel equipment and the particularly attractive figure at which the wheels are supplied—the plan is proving exceptionally effective as a factor in **OVER-COMING** sales resistance.

With other Ford Dealers making an **EXTRA** \$50 on every Ford that they sell, can you afford not to look into this opportunity? Write today for particulars.

WIRE WHEEL CORPORATION of AMERICA

(Successors to Houk Manufacturing Company)

1700 Elmwood Avenue

Buffalo, N. Y.

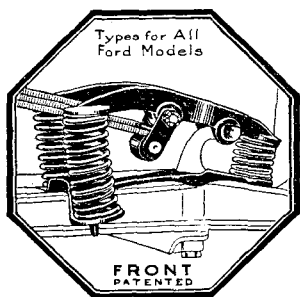
WIRE WHEELS

Five Wheels, triple spoke, detachable at hub

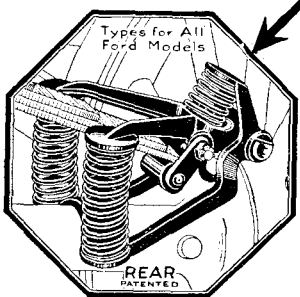
FloatAforD

SHOCK ABSORBERS

Increase Your Car's Roadability



The "third spring" checks the rebound, stops side-sway and prevents spring breakage.



Investigate FloatAforDs before you invest in any shock absorber.

Rear shocks are shipped assembled. Easily installed.

When your car hits a bad bump it floats over without any discomfort to the occupants. Easy riding, easy driving, come with FloatAforD equipment. Their individual features, "The Third Spring," full suspension, and the two coil springs, smooth out the roughest roads.

FloatAforDs keep all four wheels on the ground as the exclusive "third spring" checks all rebounds and the sidesway, giving your car greater roadability. Greater speed can be enjoyed over all kinds of roads without any added strain to the driver or the car's working mechanism.

Besides added comfort and roadability FloatAforD effects an economy that can be obtained in no other way. They absorb a great part of the wear on the mechanical parts, do away with many body squeaks and **prevent spring breakage**. Further, there is the saving of one-third in tires and fuel costs.

Made in various types for all Ford models. Sold on a guarantee. Dealers will gladly demonstrate their superiority. Thousands of sets in use prove their correct principle. If there is no dealer in your town we will ship you direct. Write us.

DEALERS—Consider this Business Opportunity. Here is an accessory that is selling NOW BECAUSE IT SAVES MONEY. Big market. 100,000 Ford cars per month. Good profits. Pronounced the best shock absorber by the most careful tests.

WRITE US FOR SALES PROPOSITION—DON'T DELAY.

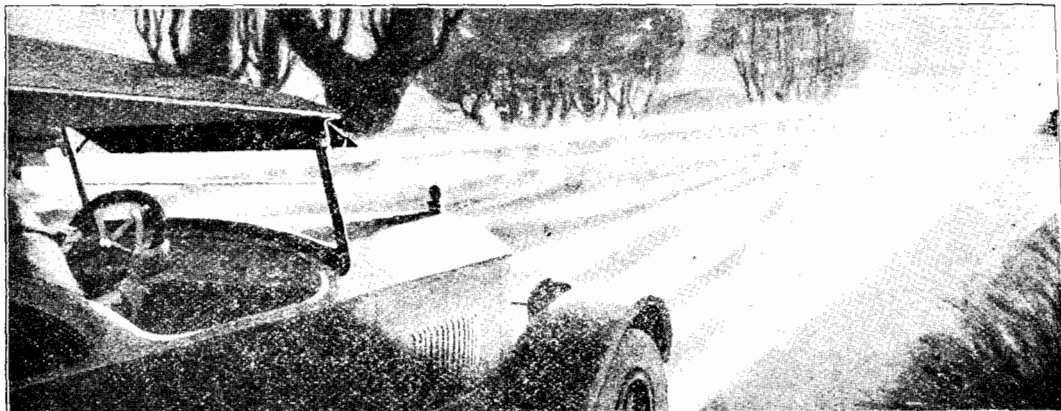
BURPEE-JOHNSON CO.

1914 Singleton St.,

Manufacturers

INDIANAPOLIS.

Canadian Office and Factory: 50 Pearl St., Toronto, Canada.



SAFETY and COMFORT

Night and Day in All Weather

It is only necessary for you to recall the many tight places you have been in because of the blinding glare of sun, street lights or headlights, for you to appreciate the value of the PRESTO VISOR. Many thousands of motorists now depend upon the PRESTO instead of "luck." The PRESTO is an attractive fitting made of black auto-top material, with handsome nickel-plated brackets. Easily adjustable to your vision—no interference with top or windshield—shields eyes and protects windshield from weather. Simple to clamp on windshield post of open Ford cars, or screws to windshield frame of closed models.

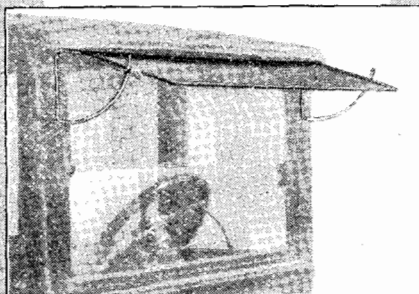
Model A—for all closed cars

Model F—for all open cars

DEALERS: The PRESTO is a quick selling accessory. Ask us for our proposition and complete details.

Presto STORM & GLARE *Visor*

Price \$7.50



West of the Rocky Mts. \$8.50

METAL SPECIALTIES MFG. CO.
338-352 N. KEDZIE AVE., CHICAGO, ILL.

When writing advertisers—Just say FORD OWNER and DEALER

Model "M" **THERMO** for Fords
CARBURETOR

Easy Starting — Good Mileage — Maximum Power

Not Because We Say So

BUT BECAUSE WE DEFINITELY PROVIDE FOR THESE RESULTS BY NEW PRINCIPLES OF CONSTRUCTION THAT ARE RADICALLY DIFFERENT FROM ALL OTHERS.

EASY STARTING — How we insure it

The Thermo Built-In Primer throws raw gasoline directly into the atomizing Chamber BEFORE the engine is turned over. An exclusive feature.

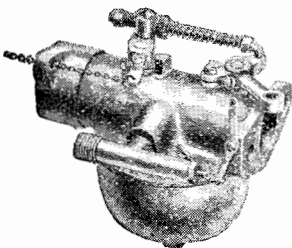
GOOD MILEAGE — Why we get it

The Thermo automatically controls the mixture by controlling the Air Velocity at all engine speeds. An absolutely new principle.

MAXIMUM POWER — When you need it

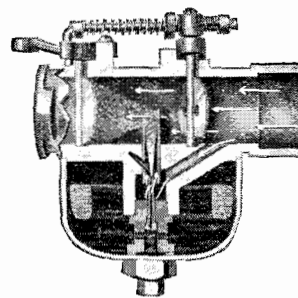
The Thermo Dash-Control enables you to richen the mixture and double your power INSTANTLY at low engine speed. Wonderful for hill climbing.

ASSEMBLY VIEW



Price
\$8.75

SECTIONAL VIEW



GUARANTEED

You are the judge.
Perfect Satisfaction
or Money Refunded.

"YOU'LL NEVER KNOW WHAT A FORD CAN DO
UNTIL YOU BUY A THERMO."

THERMO CARBURETOR COMPANY

3127 W. Harrison St. CHICAGO.

Write for book "THE COMMON SENSE OF CARBURETION." IT IS FREE

When writing advertisers—Just say FORD OWNER and DEALER

AN OIL BAFOILIZER FOR SPARK PLUGS

EVERY Ford engine, new or old, needs this vacuum gas producer. It increases power and speed and takes care of oil pumping cylinders.

The design of the **BAFOILIZER** is based on three essential elements—

VACUUM

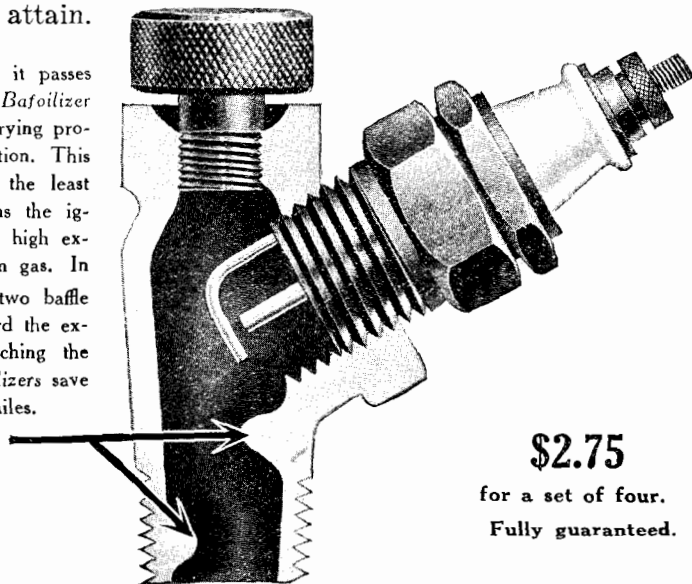
HOT SPOT

CLEAN SPARK PLUGS

A vacuum is formed in the chamber of the **Bafoilizer** at the time of the suction stroke. The action of this vacuum on the mixture as it enters the **Bafoilizer** chamber overcomes specific gravity, thereby transforming the saturated mixture into a high explosive dry gas. The **BAFOILIZER** super-heats the mixture by shooting an intense flame into the cylinder mixture, which completely ignites and consumes every particle of gas, producing the highest powered explosion possible to attain.

THE cylinder mixture as it passes the two hot spots in the *Bafoilizer* chamber is subjected to a drying process which prevents condensation. This mixture instantly fires with the least spark. This system quickens the ignition action because of the high explosive nature of the vacuum gas. In oil pumping cylinders, the two baffle plates in the *Bafoilizer* retard the excess cylinder oil from reaching the spark plug. A set of *Bafoilizers* save their cost every thousand miles.

Sent Parcel Post on
receipt of price.

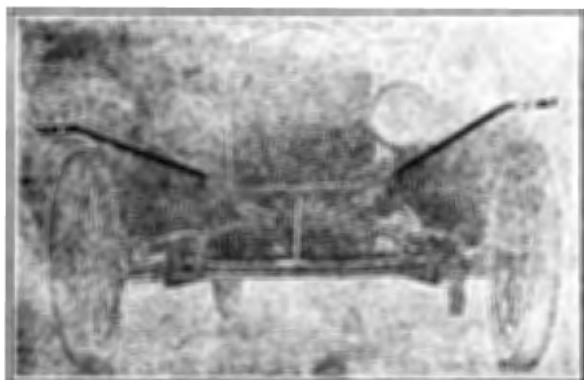


\$2.75

for a set of four.
Fully guaranteed.

THE PROTECTOMETER CO., 4043 Ravenswood Ave., CHICAGO, ILL.

LOOK AT YOUR FENDERS



(Patent Applied for)

*Are they cracking?
Are they loose?
Are they rattling?*

I-NE-DA Fender Braces will line up your fenders perfectly, will at a very small cost, prevent wobbling, rattling and undue breakage caused by vibration.

Keeps your Ford car looking trim and neat, saves you the cost of new fenders. The best article from a thoroughly practical standpoint, ever offered the car user. This is our claim.

A BRACE IN TIME SAVES NINE (FENDERS)

"NOT AN ACCESSORY, IT'S A NECESSITY."

One style fits all models pleasure cars as well as front fenders on One-Ton Truck Chassis. Easy and simple to install.



(Patent Applied for)

RETAIL PRICES

Fronts, per pair.....\$1.25

Rears, per pair..... 1.00

All prices F. O. B. Kansas City.

Attractive Dealers' and Exclusive Distributors proposition. Some good territory still open.

WIRE OR WRITE AT ONCE
TO

SALES DEPARTMENT
THE BUCKLEY MOTOR
SUPPLY

2005 East Fifteenth Street
KANSAS CITY, MISSOURI.

MANUFACTURED BY
The I-NE-DA Fender Brace Manufacturing Company
ROSEDALE, KANSAS.

The Keystone Transmission Reaming Fixture

for Reaming the Transmission Assembly in Ford Cars



Noisy transmission and short-lived transmission bands in a Ford car are in many cases due to improperly reamed bushings in the transmission assembly.

The Keystone Transmission Reaming Fixture was designed to overcome the difficulties encountered by the service man in reaming these bushings and its construction is such that only a square, accurate job can result from its use.

Pilot reamers guided in hardened adjustable bushings are used. Reamers No. 3304 and No. 3309 are of shell construction and can be renewed at small cost.

The drums are held in a taper ring drawn down by a heavy nut; and assure alignment even though the drums are badly worn.

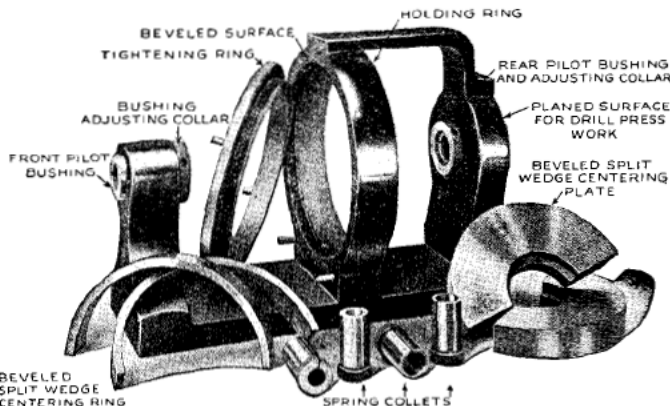
The triple gears are taken care of in a special fixture furnished with the machine and the same alignment is assured; a facing tool is furnished to take care of bushings which are too long.

Complete Equipment Consists of

- 1 Main Frame
- 1 Arbor for No. 3304 and No. 3309 Shell Reamers
- 1 No. 3304 Shell Reamer
- 1 No. 3309 Shell Reamer
- 1 No. 3314½ E-N Reamer
- 1 No. 3320-B-C—No. 3327-B Reamer
- 1 Facing Tool
- 2 Wrenches; 2 split taper rings
- 1 Triple Gear Holder
- 4 Split Collets

Shipping weight, 175 lbs.

List Price Complete.....\$125.00



KEYSTONE

REAMER & TOOL CO.

Western Sales Division
180 N. Market St. Chicago

Eastern Sales Division
30 Warren St. New York

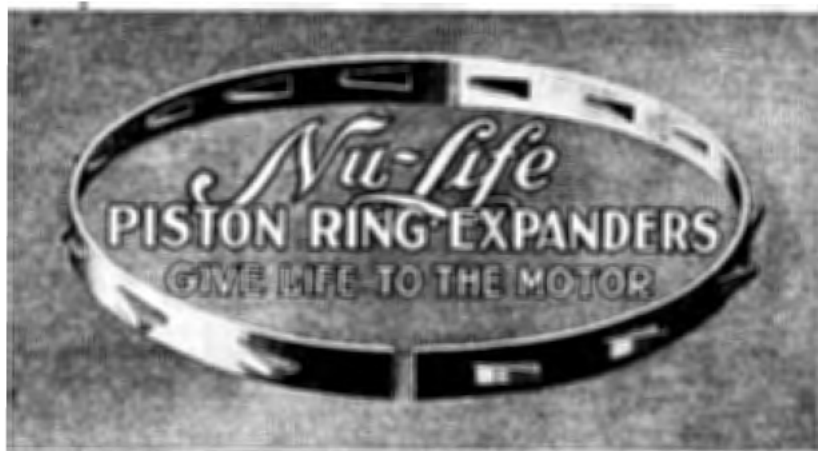
BRANCHES

Atlanta
Detroit
St. Louis
Denver
Los Angeles
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Factory: MILLERSBURG, PA.

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How Often Do Your Spark Plugs Need Cleaning



When your motor is not hitting on all cylinders do you blame the spark plugs? Spark plugs should not require cleaning more than once in six months. Oily and sooty plugs will miss fire and are a sure sign that the motor lacks compression, in other words, that the pistons are "pumping oil" which forms carbon.

FROM CANADA TO HAWAII

Milverton, Ontario,
Canada.

Have installed some "Nu-Life" Piston Ring Expanders in a motor and they sure do all you claim for them.

Buckland, Conn.

I have installed two sets of "Nu-Life" Piston Ring Expanders this summer that are giving perfect satisfaction.

Cape May, N. J.

"Nu-Life" Piston Ring Expanders perform exactly in every way needed to give a quiet and satisfactory motor overhaul. Inclosed find check for which please send me four dozen Ford size.

North Long Branch, N. J.

My 1913 Ford has much more pep and power, having installed "Nu-Life" Piston Ring Expanders in the first and third cylinders. They have worked in now and the car works smooth and powerful.

Kahului, Maui, Hawaii.
Am pleased with the expanders. Good results.

(Names and addresses
furnished on request.)

Gasoline, like powder, does not explode unless it is confined (compressed). Remember, too, that every time one cylinder fails to fire there is a jerking and racking of the entire car from the engine bearings to the rear tires. Is it any wonder that many cars are "old" before the finish is dull?

"NU-LIFE" PISTON RING EXPANDERS are placed under the piston rings. They absolutely stop oil pumping, vibration and noise, cure piston slaps and restore compression without re boring the cylinders and without using over-size pistons or rings. The only carbon that forms is a fine dust which is carried off through the exhaust.

FORD OWNERS—If your dealer cannot supply you send \$3.00 for a complete set (12 expanders).

For every type of motor. No fitting required. To obtain best results one expander should be installed under each piston ring.

Price 25c Each

In ordering specify the number wanted and the diameter and width of piston rings under which they are to be installed.

Manufactured Only by

**AMERICAN AUTO
PRODUCTS CO.**

1319 L Street, N. W.,
WASHINGTON, D. C.



HERE are a few items in the Apco line of Equipment for Ford cars, for which every Ford owner is a prospect. Write your jobber (or us) for price list.

METAL OIL GAUGE



The one successful, low priced, unbreakable, quick reading oil gauge for Fords. Metal float chamber, white ball shows height of oil. Absolutely accurate and dependable. Quickly attached. Can't get out of order. As necessary to the car as hands to the clock. List price, complete..... **75c**

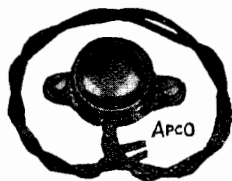
ANTI-RATTLERS

Really automatically adjusted bearings for steering and radius rods on the Ford, giving it features found on almost all other cars. Biggest selling piece of equipment for Ford cars. Every owner should have them. List price **33c** each for Radius Rod and **33c** per pair for steering rod.



HORN BUTTON

Especially handy with big steering wheel, as it extends the throttle lever. Puts horn button within reach. Simple, efficient, easily installed and once used you will wonder how you ever got along without it. List price **75c**.



CRANK CASE ARM

Makes quick, permanent repair of frequently broken Crank Case Arm on Ford. Saves time and dollars. On in a few minutes with a wrench. Does more for less money than any item on the market. Finished in black enamel, accurately drilled. List price **80c**.



APCO MFG. COMPANY

Providence, Rhode Island

Manufacturers of the Apco Shock Absorbers for Fords, Nationally advertised in the Saturday Evening Post.

PREHISTORIC FORD EXPERIENCES.

By Dr. T. B. Gullefer.

My first car was a curved dash runabout of 1901 model. With the advent of the Ford, I purchased one of the first Model A Fords. This Ford was equipped with an opposed, two-cylinder engine, placed lengthwise under the seat. It had a mechanical oiler, chain drive direct to the differential, and the radiator was partially concealed underneath the front part of the body. This car was painted a bright red, and had neither top nor windshield!

This car had a detachable tonneau, and could be used as either a two or as a five-passenger Ford. It had considerable power and speed. It was equipped with dry batteries—as magnetos were not used on any cars at that early date.

The great objection to this early car was that the brakes were located on the differential on the rear axle, and there were no hub brakes on the wheels. If, when ascending a steep grade the chain broke (as it frequently did), a cool head and an ability to steer backward landed one safely at the bottom. Otherwise, car and driver were to be found upside down in the ditch!

The Model R Ford soon came on the market, and this car was a great improvement over the earlier model. It had a four-cylinder, vertical motor placed under the hood; and plenty of power and speed. It was equipped with shaft drive and rear hub brakes and had a good top. This car was highly satisfactory in most ways when new. The great objection, to all these early automobiles was their unreliability after being used six months or so. At times, they would run like a scared rabbit—at other times, it was difficult to get them to go at all.

Now we have the Model T Ford, which I am using after 20 years of driving experience, which I consider the quintessence of perfection, and a model car for all practical purposes. And I would not exchange my present Ford for any other make of car, for reliability and economy.

THE TRACTOR ESPECIALLY VALUABLE FITTING MAIN BEARINGS

Ford repairmen and owners who do their own overhauling, wear out their patience when they adjust the center main bearing on a Ford motor block. Very seldom does the cotter pin hole in the main bearing bolt line up with the castellations on the nut when the bearing is finally tightened. This means that the nut either has to be loosened or a smaller cotter pin used, neither of which should ever be done.

Also, having the nut between the cylinders, it is rather hard to get at and practically impossible to turn, so that all of the twisting and untwisting has to be done by the bolt head, which soon wears round and will no longer take a wrench.

To overcome all of these troubles, substitute a half-inch by 20-thread stud, 7 inches long, drilled at both ends for cotter pins. Slip the stud in the bolt hole and turn a castellated

nut onto the upper end and lock with a short cotter pin.

Now it is an easy matter to hold the bearing cap on with another castellated nut on the lower end, which may be tightened without trouble. The stud and nuts will be found of advantage on the front main bearing as well. This substitution costs but a few cents and saves dollars in time and trouble.

J. SPLAN DWYER, Buffalo, N. Y.

A POSTMORTEM PANTOUM

By Lloyd McFarling

"Maybe the gas is gone?"

"Take a look at the wiring!"

"See if the switch is on!"

"Something is wrong with the firing!"

"Take a look at the wiring!"

"See if the spark-plugs are clean!"

"Something is wrong with the firing!"

"Maybe the mixture is lean."

"See if the spark-plugs are clean!"

"Perhaps the battery's dead."

"Maybe the mixture is lean"

"Maybe it's thick instead!"

"Perhaps the battery's dead."

"The mixture is lean, maybe!"

"Maybe it's thick instead."

"Why don't you look and see?"

"The mixture is lean maybe."

"Try the crank for a while."

"Why don't you look and see?"

"There isn't a phone in a mile!"

"Try the crank for awhile."

"We'll have to be towed again!"

"There isn't a phone in a mile!"

"Lord! How the neighbors will grin!"

"We'll have to be towed again."

"It'll cost us a ten dollar bill"

"Lord how the neighbors will grin!"-----

"Right at the foot of the hill!"

"It'll cost us a ten dollar bill."

"Why does it always die

"Right at the foot of the hill?"

"Why doesn't a car come by?"

"Why does it always die

"Just when you're tired and late?"

"Why doesn't a car come by?"

"Well, there's no use to wait!"

"Just when you're tired and late!"

"See if the switch is on!"

"Well there's no use to -- wait"

"Maybe the gas is gone!"



SHOCK ABSORBER

Put a set of Apco Shock Absorbers on your Ford and you'll never want to go home because Apco's put limousine riding qualities and comfort into a Ford. And how they do save springs, axles, motor, etc., going over rough roads.

Only direct suspension Shock Absorbers on the market. Absolutely prevent side sway. Easily and quickly put on.

Ask your Dealer or write us for nearest Dealer's Name

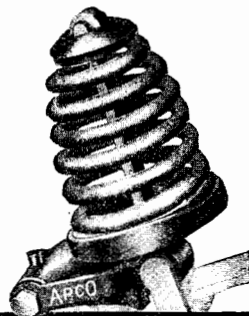
Apco Mfg. Company

Providence, Rhode Island

For All Fords

\$25.00

Including
Installation
and Service

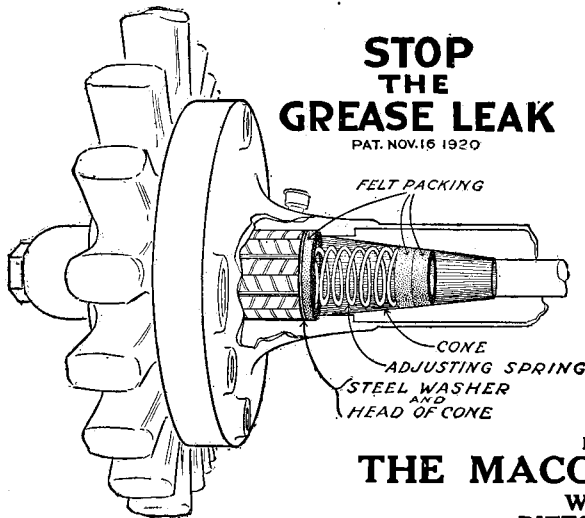


When writing advertisers—Just say FORD OWNER and DEALER

Stops the Grease Leak

R & R Automatic Grease Retainers for Ford and Chevrolet Rear Axles

Prevents loss of grease and from getting on tires, brake drums or wheels.
No special tools necessary to install. Simply remove wheel and roller bearing,



INSERT R & R Automatic Grease Retainer

and your grease troubles are over.

A spiral spring pressing a washer in a tapered cone keeps it in close contact with the axle making it impossible to leak grease. Sold under absolute money back guarantee if not satisfactory. If your garage man or dealer does not have it, send \$2.50 and a set of two will be sent you. Postage paid.

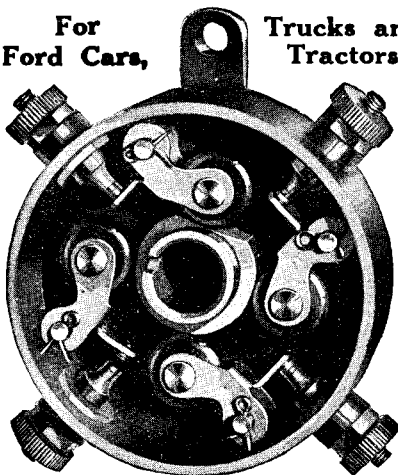
Write for exclusive territory
 Manufactured by

THE MACORVEY COMPANY

Wabash Building
 PITTSBURGH, PENNA.

Your Fansteel Timer "Beats Them All"

For Trucks and Tractors.
 Ford Cars,



Letters from all over the country bear the same indorsement "BEATS THEM ALL."

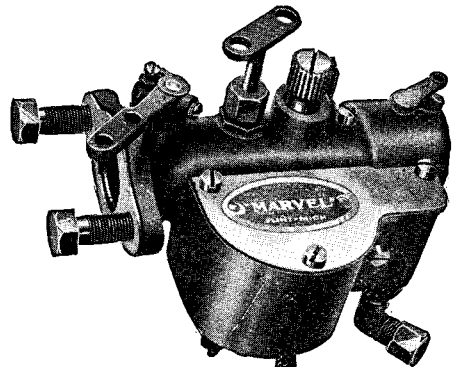
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WRITE TODAY TO

W. J. WALSH

528 MONADNOCK BLDG.

CHICAGO



THE MOST POWER AT THE LEAST COST

Real economy consists of getting the most power at the least cost. This is positively accomplished through the use of

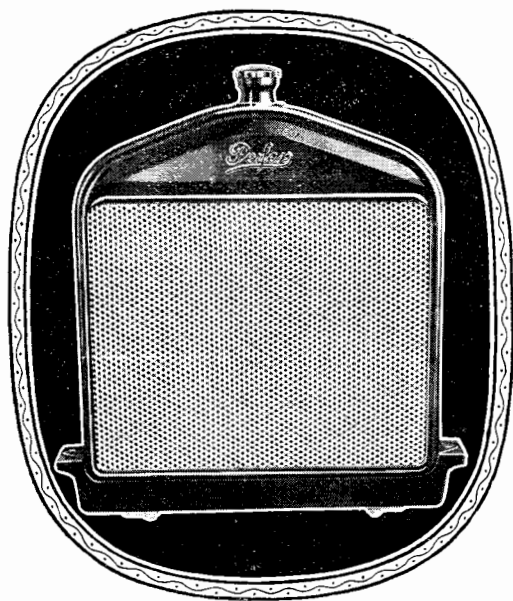
THE MARVEL CARBURETOR

The Marvel, Model N Carburetor is a horizontal type, side opening, two jet instrument, designed especially to meet the needs of Ford owners who demand a powerful and economical carburetor. Simple in design—but one moving part, the auxiliary air valve, which proportions the mixture to the demand. No excess amount of gas on the low speed needle in order to have power enough at high speeds, is necessary only sufficient gas to give proper idling and low speed performance and the high speed jet is then only called upon as the motor demand increases. Uniform carburetion at all speeds and maximum economy of fuel.

PRICED \$10.00 F.O.B. Factory. A 30 day trial—money back if not satisfactory—protects you. No extra fittings necessary.

DEALERS—Write today, seeing is believing.

MARVEL CARBURETOR COMPANY
 Flint, Michigan, U. S. A.



for Ford Cars

The New Perfex is considered the most substantial of Ford radiators. And why not? It was originally built for gruelling tractor service.

Its bronze core, patented spring bracket suspension and reinforcing plate sturdily withstand the weaving and spreading of the Ford frame. Its bronze core yields generously to expansion and contraction caused by heating and freezing. Its bronze core resists tenaciously the chemical action of lime and alkaline water.

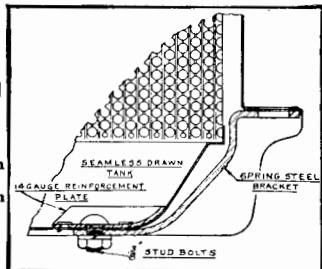
Years of specialization are back of Perfex Ford Radiators. Their special .005 bronze is formed—not drawn and thinned. The cellular air passages have no fins to catch dirt. The big water channels don't clog.

Authorities agree that Perfex Radiators outlast and out cool all others. They are priced on a competitive basis. Write for details.

Perfex Radiator Co.

Dept. J, RACINE, WIS.

PERFEX
THE PERFECT RADIATOR



Direct Factory Representatives

Chicago—Standard Motor Parts Co., 1420 South Michigan Ave
Minneapolis—Beson-Doxey Company, 600 Wilmae Bldg.
Nashville, Tenn.—Hirsig Sales Co., 908 Broadway
Boston—The Brown Supply Co., 51 Chardon St.
Man., Sask., Alta., B. C.—P. A. C. McIntyre & Co.,
311 Confederation Life Bldg., Winnipeg, Canada

ARE YOU an X-RAY SPECIALIST?

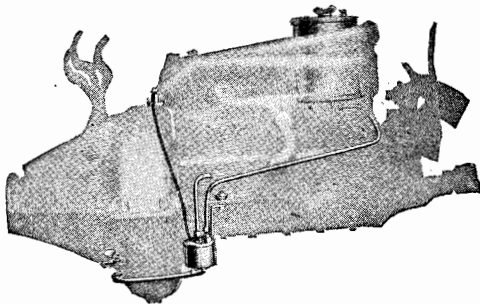
Ford Engineers tell you that in order to lubricate the Ford Motor correctly the oil **MUST** be kept **MID-WAY BETWEEN THE TWO PET COCKS**. How can you do this accurately for any definite distance—you can't, that's all there is to it, unless you have an X-ray outfit or an

OILOMATIK LUBRICATOR

The OILOMATIK feeds the oil to the motor as needed, holding it **AT ALL TIMES** at the proper level—**MID-WAY BETWEEN THE TWO PET COCKS**. You'd be surprised at the wonderful improvement this perfect lubrication makes in the operation of your motor, and the saving in oil and expensive repair bills.

Avoid Oil Extremes

Give your motor a chance. Don't go on starving and over-feeding it with oil. Proper amount of oil (no more, no less) means prolonging the life of your Ford.



ANOTHER THING—Should you fail to refill the tank, the OILOMATIK has a very **UNIQUE LOW OIL ALARM** which warns you to replenish your oil supply before the level reaches the **DANGER** point.

Live Dealers get busy. Owners send in your order for this, the most essential device for Ford cars and trucks.

PRICE \$15.00.

Auto Products Mfg. Co.

341-49 East Ohio St.,
CHICAGO, ILL.

MARTIN'S INNER TUBE BOX

**Protects the tube
from damage
of any kind**

The "spare" Inner Tube — every car should carry at least one—has never had any kind of protection that insured its fitness for use. Seldom used and carried without protection it is usually "unfit" when the emergency arises.



Box Open

The Martin Inner Tube Box eliminates this trouble. The tube is rolled and placed in the dust and grease proof box with the valve projecting, then lightly filled with air. This prevents chafing and gives positive assurance that the tube is in condition when needed.



Box Closed with
valve in place.

MARTIN'S INNER TUBE BOXES are composed of two drawn steel shells, handsomely electro-galvanized finish, making them rust-proof. Nothing to get out of order. A size for every tube.

MAILED POSTPAID UPON RECEIPT OF PRICE

Size No. 1 for 3x30 inch Tubes.....	\$1.50 each
Size No. 2 for 3½x30 and 32 inch Tubes....	1.75 each
Size No. 3 for 4x31, 32, 33, 34 inch Tubes..	2.00 each
Size No. 4 for 4½x32, 34, 35 inch Tubes....	2.25 each
Size No. 5 for 5x35 and 37 inch Tubes.....	2.50 each

Be sure to specify the size wanted.

**AN ATTRACTIVE PROPOSITION
for Dealers and Jobbers—Write!**

Manufactured by
THE MARTIN METAL MFG. CO.
Wichita, Kansas.

USE THIS COUPON

Martin Metal M'g. Co., Wichita, Kansas.

Enclosed find \$..... for which send me

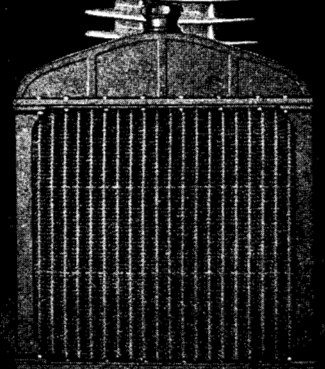
Martin's Inner Tube Boxes as follows:

Quantity..... Size No.....

Name

Address

Backbone



for

FORD TRUCKS

GENUINE heavy duty tubular truck radiator, built for Ford trucks. Multi-tube core, with only one solder seam to each "gang" of three tubes, located at rear face. *Cannot be injured by freezing.* Tanks and side columns, of cast iron, are bolted to core. Water connections cast one-piece with tanks.

G&O Radiators

Retail Price, \$45.00
Including Tax

THE G & O MFG. CO.
New Haven Conn.

Use
PLATE
Glass

Plate Glass is Right for Motor Cars

Driving a car is a precise business. A man needs a good eye to do it. And he must see through his windshield as if there were no windshield there. Plate glass is right for windshields, and body glass, too, because it is so clear that you don't see it. It hasn't any high and low spots. Its surface is even and true. It has no prisms, like common glass.

Plate glass is protection that doesn't obscure the sight. It doesn't multiply objects like swirly common glass does. It doesn't sag. You don't have breakage because you don't have to force it into place. And best of all, your customer will be so pleased with it as a replacement that he will come back for more when he has another mishap. It will pay you to install plate glass.

PLATE GLASS MANUFACTURERS of AMERICA

Nothing Else
is Like it

Genuine
PLATE GLASS



Starts Motor Instantly in Freezing Weather



WARMS AND SUPER-ATOMIZES THE GAS

Not only does the ASKE Vaporizer (electric heated) fit any car or truck and give instantaneous starting in freezing weather, but it almost doubles battery life, gives more power, lessens gas cost year around, increases mileage, simple, easy to put on, lasts for years, pays for itself in a few months.

Unconditional Refund of Purchase Price if Unsatisfactory.

A large Oil Company official test shows 21% mileage increase. Asst. Mast. Mech., International Lead Ref. Co., Chicago "... money could not buy it if unable to get another ..."

Head Mech., United Motor Service, Boston "... unqualified endorsement ..."

Splendid Dealer Proposition.

Kase Electric Company

Sherwood Bldg., DULUTH, MINN.

Get it before the annual cold weather rush.
Use the coupon. Order today.

FORD 9-21.....1921

Kase Elec. Co.

Duluth, Minn.

Ship me at once—ASKE Vaporizers, price \$10 each (\$15 Canada) C. O. D. If unsatisfactory I will return same within 30 days and you agree to refund my money at once without question.

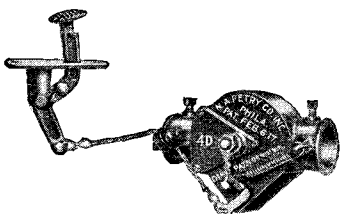
Name

St. and No.

City..... State.....

When writing advertisers—Just say FORD OWNER and DEALER

THE PETRY CUT-OUT FOR FORDS



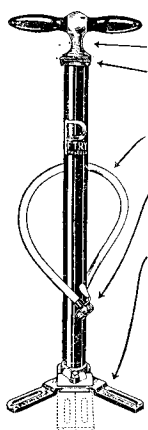
Why do particular motorists demand the Petry Cut-Out in preference to all others? Motorists find that the Petry Cut-Out is a carefully designed, well-made product, and not some castings carelessly assembled. It appeals, on sight, as a "good job." Compare it yourself with any other cut-out—and your verdict will be that it is America's Best Cut-Out and "Scientific Detector" for tuning up and locating trouble.

Expels the full exhaust to the rear, not down. Does not spatter mud and stir up dust. Positive cut-off from the muffler. Spring away from heat. Compound lever makes the strong spring action smooth and easy. Spring adjustable. Valve seat and valve machined to prevent leakage.

Sold complete with Pedal and Chain for \$4.50.

THE PETRY PUMP

America's BEST Tire Pump



Handle, shaped to fit your hand.

Handle Lock facilitates carrying or handling.

Cap, heavy cast brass with long piston rod bearing.

Hose, 5-ply, highest grade, 27" long.

Lox-on Connection, with tire valve deflating pin, considerably lessening pumping effort. Its use impractical on any pump not having an absolutely tight check valve.

Base, spreads and allows natural pumping position without losing balance—pump operated in front of, not under you. Freedom for full stroke of piston with minimum effort and maximum results. Base high-grade malleable iron, closes into space of ordinary size pump base, fastened by a Wing Nut which cannot come off.

Barrel, 17" or 20"x1½" diameter, highest grade seamless steel tubing, threaded and soldered into base. Piston, convex shape to divert oil and to give greater air pressure on leather cup washer. Brass Valve, guaranteed absolutely air-tight. These Special Features not found in any other pump. Finish, baked black enamel, with all brass parts polished and lacquered. PETRY design, quality and workmanship throughout. Guaranteed to make good. Patents applied for.

Price, \$5.00. 17" or 20" Barrel

N. A. PETRY COMPANY, Inc.

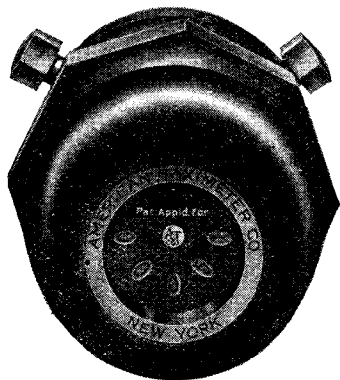
Makers of the Petry Pedal, and Ventilator.
338 N. Randolph St., Philadelphia.
Western Distributor, Norman Cowan Co.,
445-451 Rialto Bldg., San Francisco, Cal.

FORD MODEL

FITS EVERY MODEL T FORD

Simply remove a front hub cap and replace with the Dreadnaught Indestructible Hub Odometer. The Automatic Drive snaps into engagement and from that moment you get a continuous record of all travel forward or backward.

SALES AND SERVICE EVERYWHERE.



DREADNAUGHT INDESTRUCTIBLE HUB ODOMETER

With Automatic Drive

HOW much does it cost you to operate your Ford? Unless you know the mileage you can give no intelligent answer to this question. The Dreadnaught Indestructible Hub Odometer gives you an accurate record of every mile of travel throughout the life of your Ford. It goes on like a hub cap, no drilling or pinning—the Automatic drive takes care of that.

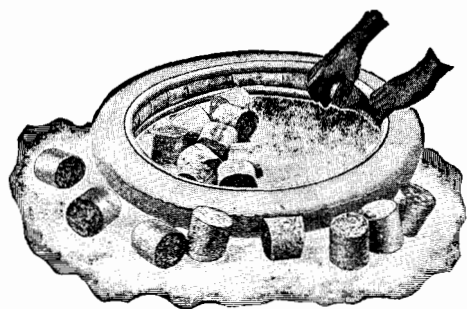
The Price is Fifteen Dollars.

AMERICAN TAXIMETER CO.

12 West 61st Street,
NEW YORK, N. Y.

Guaranteed for the life of the vehicle against leakage of grease or destruction by collision.

Special Odometer now made for Fordson Tractors—\$20.



Nationalize Your Tires and Then Forget Them

The air-filled tire is as full of trouble as it frequently is of air. "Frequently," we say, for tires are seldom in a full condition.

Blowouts, punctures, rim-cuts, tire-repair outfits, vulcanizing bills—these pleasant little possibilities accompany the pneumatic on every trip. Whether it be on pleasure or business—nothing can mar a trip so effectively as a humiliating puncture. You, of course, have never had to pull up at the side of the road, and wrestle with a stubborn new casing while your neighbor in a flivver rolled past! Oh, No!

But, It Need Never Happen Again

The National Rubber Tirefiller is a live resilient cushion of pure rubber which fits snugly in the casing and takes the place of the inner tube and air. It gives positive protection against punctures and blowouts—with the same easy riding quality of the pneumatic. Once you slip the Filler inside your casing and get it in place on the wheel, you can forget all about it—you have eliminated tire-trouble. You have made punctures as old-fashioned as the one-lunged "buggies" of '98.

Your mileage per tire is doubled. Your tire-bills are cut in two. The whole story is told in seven words: **TWICE THE SERVICE AT HALF THE COST.** Write today.

National Rubber Filler Company

222 College Street,
MIDLOTHIAN, TEXAS

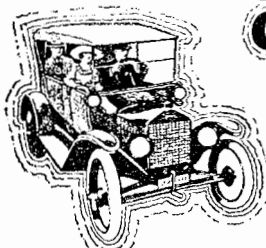
Yale Band Oiler for Fords

~ stops

Chattering

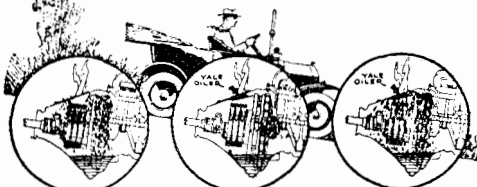
makes 11 other
improvements

for \$1



The wonderful efficiency of the Ford can be increased by the use of the *Yale Oiler*.

It perfects the lubrication system — it makes oiling of transmission bands positive. It stops chattering — keeps bands soft and durable — reduces friction — perfects the brake — keeps motor cool — stops frequent relining — more mileage on oil — makes clutch work smoothly — saves owners \$25.00 yearly — adds to life of car and driver.



Without the Yale, Note that the oil thrown up by the fly wheel fails to reach the bands

This shows the Yale quickly placed in position, ready for running the car

Descending Hills with YALE Oiler directing flood of oil to each band in proper proportion.

It is not an accessory — it is a necessity.

Any one can install the Yale in 5 minutes. A screw driver the only tool required. No fitting or replacing — once installed always in proper adjustment — simple, sane and safe. Ask Your Ford Repairman About It.

Order for
YOUR Ford TODAY
Send personal check or money order for \$1.00. If dissatisfied after trial, we refund your money.

Yale Corp. Los Angeles, Cal.

604 I. W. Hellman Building.
NEW YORK OFFICE, 600 West 186 St.

SPECIAL OFFER for DEALERS: Write

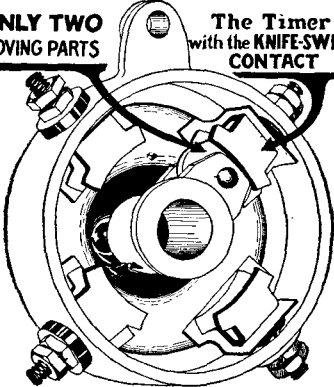
Liberal proposition backed by extensive advertising cooperation means money making opportunity for live Ford Accessory men.

DEALERS WANTED TO HANDLE THE

Colestock Synchronizer

ONLY TWO
MOVING PARTS

The Timer
with the KNIFE-SWITCH
CONTACT



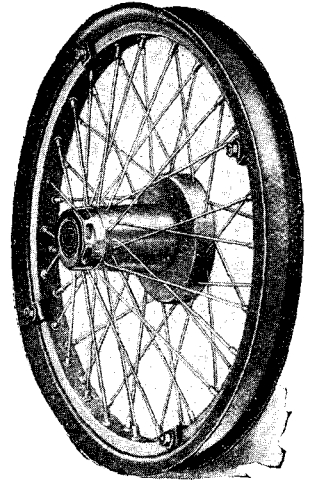
The simplified product of years of specialized experience. Full surface, knife-switch contact insures ample current carrying capacity and eliminates coil trouble. A good timer at a popular price. Good territory still open.

Colestock Manufacturing Co.

2853 Montrose Ave.

Chicago, Ill.

WIRE WHEELS FOR FORD CARS



With Kelsey No. 88 Demountable Rims
Strongest Wire Wheel Built.

Rims Are Interchangeable With
Standard Ford Rims

A set consists of four wheels and five rims, complete with hubs, brake drums, hub caps, and necessary wrenches, all ready to attach to car. Spare rim fits standard Ford Carrier.

Dealers—Write for Our Proposition

E. T. WALLING SERVICE

7173 Clayton Ave., DETROIT, MICH.

REPRESENTATIVES:

B. G. TURNER, 467 Murray Ave., Milwaukee, Wis.
J. V. Kane & Co., 258 11th St., Philadelphia, Pa.



Tires at Half Price

This direct-to-consumer plan enables you to save 50% to 60% on your tire bills. Our process of reconstruction makes our tires one of the best buys on the market today.

Brand New Standard Tube FREE With Every Tire Ordered

30x3	\$6.30	33x4	\$10.40	35x4½	\$12.65
30x3½	7.40	34x4	10.75	36x4½	14.00
32x3½	8.35	32x4½	11.50	35x5	13.85
31x4	9.60	33x4½	11.90	37x5	14.30
32x4	9.95	34x4½	12.40		

We will ship tires same day as ordered. Examine carefully and if satisfied, pay expressman. State S. S. or clincher, plain or non-skid as desired. Send \$2.00 deposit with each tire ordered. Balance C. O. D.

PEERLESS TIRE SALES CO., Dept. 541
2108 South Racine Avenue, Chicago

SPECIAL DISCOUNT

5 per cent cash discount by
sending full amount with order

16-Feet Long

GUARANTEED TOW LINE

\$2.50

MANUFACTURED BY

The Superior Manufacturing Co.

211 High Avenue

CLEVELAND, OHIO

SOLD BY MOST LEADING ACCESSORY DEALERS AND GARAGES

BATTERY-SUPPLIES

We Carry a Complete Line

Plates-Jars-Covers-Separators-etc

LEADER BATTERY EQUIPMENT CO. Inc.

320 Title Guaranty Bldg., ST. LOUIS, MO.

When writing advertisers—Just say FORD OWNER and DEALER

"MURF" Bodies for Fords

SPECIFICATIONS "IN A NUTSHELL"

A-1 Construction.

A Masterpiece of the Coach Builder's Art.

Cast Aluminum Polished Radiator Shell.

Ventilating Windshield and Ventilator in Hood.

Very Latest Design Crown Fenders.

Disteel Wheels.

California Top.

Streamline Hood.

Roomy Seat for three people.

Two Cowl Lights.

Two Roomy Doors.

Finished either in Fabrikoid or Painted any color combination.

Fabrikoid Upholstering.

Aluminum Military Steps.

Roll-up Curtain in Top, etc.

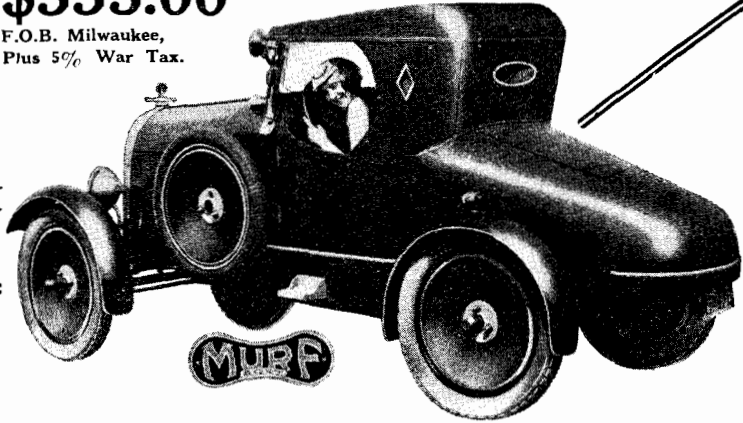
Ford owners and Ford dealers write us now for complete literature on the "MURF" Body. Ford owners will be able to buy "MURF" Bodies at their Ford dealers as soon as we can make arrangements with them to handle them. If your Ford dealer cannot supply you, send us his name and we will see that he does.

FORD DEALERS and other dealers, desirous of handling a high class line, write for our liberal discount proposition.

Complete
\$335.00

F.O.B. Milwaukee,
Plus 5% War Tax.

DEALERS AND DISTRIBUTORS WRITE.



WESTERN BODY CORP.,

1037-43 Winnebago St.
MILWAUKEE, WIS.



Champion

Dependable Spark Plugs

THE FORD MANUAL SAYS, "There is nothing to be gained by experimenting with different makes of plugs.

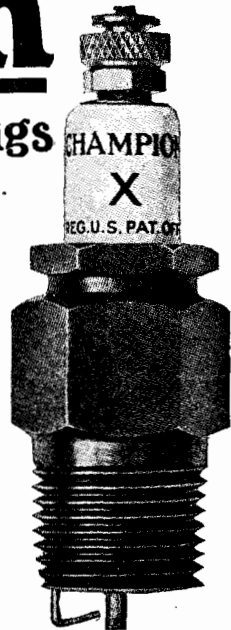
"The make of plugs with which the Ford engines are equipped when they leave the factory are best adapted to the requirements of our motor."

Champion "X" Spark Plugs are standard equipment on Ford Cars and have been since 1911.

1921 Price 75c

Champion Spark Plug Company,
Toledo, Ohio

Champion Spark Plug Company of Canada, Limited
Windsor, Ontario, Canada



When writing advertisers—Just say FORD OWNER and DEALER

Actual Size 8½ inches high, 3¼ inches in diameter, weight 3 pounds.



POSITIVE PROTECTION

The "Auto-Fyr" Extinguisher, retailing at \$3.50, including bracket, is universally conceded to be the most effective on Gasoline, Oil and Electric fires.

Simple, dependable and guaranteed non-deteriorating.

Metal construction, baked enamel finish.

A necessity in every Automobile, Garage and Home.

Price \$3.50 Postpaid

Substantial Metal Construction.

Dealers and Exclusive Agents wanted.
Attractive Discounts.

U.S. Fire Extinguisher Co., Inc.
SYRACUSE, N. Y.



WE TOP 'EM ALL

Auto Tops for All Makes and Models of Cars
Seat Covers—Dust Hoods—Fenders



Save one-half the cost of new Top by using our Slipover Coverings.

Write for our Catalog.

BUOB & SCHEU

104-112 Webster Street

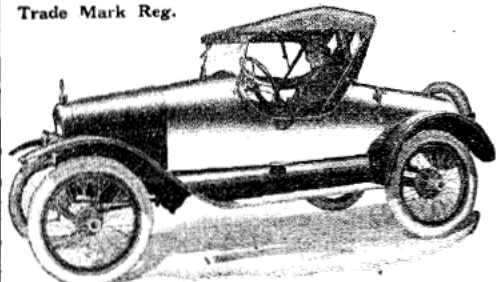
CINCINNATI, OHIO



FOSCO
FOR
FORDS
GREEN BAND
Anti-Chatter
SPEED BRINE
PAT. APPLIED FOR
STOPS THE CHATTER AND
SAVES THE BANDS
AUTOMOTIVE APPLIANCE CO. COLUMBUS OHIO

LAMCO

Trade Mark Reg.



PRICES SLASHED—WRITE IMMEDIATELY
FOR THE NEW CATALOG—JUST OFF PRESS
Lehman Mfg. Co., Inc. Cannelton, Ind.

"AUTO-COOL"

Aluminum Alloy Guaranteed Radiator Cap



35 Cents Each Patented 1 doz. on a card
for Dealers
THE AUSTIN MOTOR FITTINGS CO.
Plymouth, Conn.

When writing advertisers—Just say FORD OWNER and DEALER



It Saves Its Cost

—many times over, this Cooper Special Cut Out. Extra large valve when open allows a free exit of carbon; also detects missing spark plug, loose connection or any impending motor trouble. Tells the driver the motor's secrets. A boon for the dealer, because it is attached quickly without cutting the exhaust pipe in two, and gives complete satisfaction.

Cooper "SPECIAL" CUTOUT

Size	With Pedal No. 3	With Pedal Nos. 4 or 5
1½" (Ford size).....	\$3.00	\$3.50
1½, 1¾, 1⅞".....	3.50	4.00
2, 2½".....	4.00	4.50
2¼, 2⅜, 2½, 2⅞".....	4.50	5.00
2¾, 2⅞, 3".....	5.50	6.00

If dealer cannot supply you write direct.
Dealers, ask your jobber.

Cooper Mfg. Company

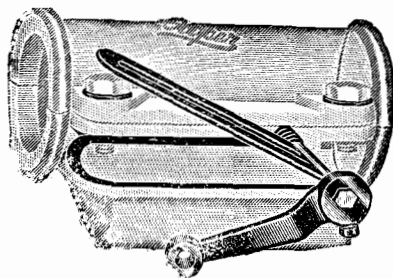
Dept. F, Marshalltown, Iowa.

THE FULTON CO.,

Sales Managers, Milwaukee, Wis.



Special Screw Type for Buick cars, valve only \$3. With pedal No. 3, \$3.50; with pedal No. 4 or 5, \$4.00.



Most Popular Signal of them All

This musical chime signal is sold by the thousands in every country under the sun where autos run. Ideal also for tractors. Its pleasing tone is a refreshing change from the usual discordant honking of the highway.

You'll Be Delighted With —→

The AERMORE Exhaust Horn

Easily attached to exhaust pipe without extra wiring or piping. Will not clog—is very durable. A size for every motor.

No. 0—17-inch Aermore, complete for cars of 40 h. p. or over.....	\$12.00
No. 1—15-inch Aermore, complete for cars of 30 h. p.	10.00
No. 2—13-inch Aermore, complete for cars of 25 h. p.	9.00
No. 3—11-inch Aermore, complete for Fords or other light cars.....	8.00

Add 50c to the above prices west of the Rocky Mountains.

In ordering give outside diameter of exhaust pipe between muffler and motor.

If your dealer cannot supply you, order direct. Dealers ask your jobber.

The Fulton Company

Dept. 11,

75th and National Avenue, Milwaukee, Wis.



When writing advertisers—Just say FORD OWNER and DEALER

INSTALL A TURNER (2 in 1) TIMER ON YOUR FORD CAR TRUCK OR TRACTOR

Stop Having Timer and Timer Wire Trouble

The simplicity, accuracy and clean cut lines of the Turner (2 in 1) Timer for Ford Cars, Trucks, and Tractors has made it the most popular Timer on the market today. After three and one-half years' use it has been universally adopted by concerns having large fleets of Ford cars and trucks, that must give 365 days of uninterrupted service each year.

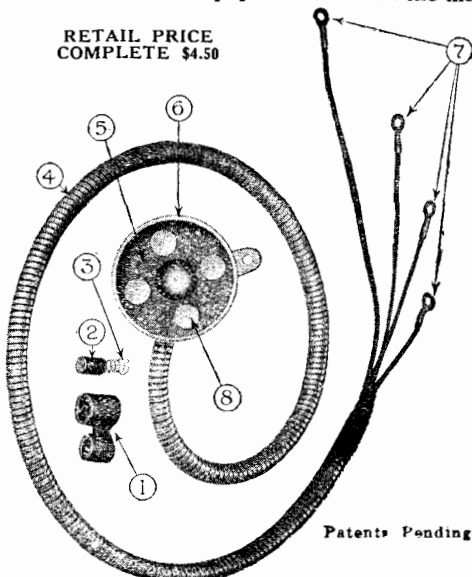
It is the right principle and nothing can possibly go wrong.

Our specially built Tractor Timer will stop your tractor timer troubles for good, a trial will cost nothing.

Dealers

VALUABLE
TERRITORY
STILL OPEN.

RETAIL PRICE
COMPLETE \$4.50



Timer and Wiring
Assembly complete
\$4.50

West of the Rockies
\$5.00

A Trial is our best opportunity to make you a Turner Booster, whether you have a Ford truck, car or tractor.

Turner Guarantee

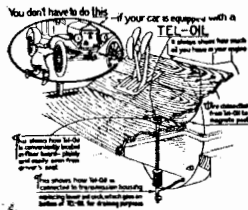
Every TURNER (2 in 1) TIMER is guaranteed for one year against defective material and workmanship, also if after using the TURNER TIMER 30 days it is not giving perfect satisfaction we will promptly refund purchase price upon return of TIMER.

The Turner Manufacturing Co., Kokomo, Ind.

PROTECT YOUR FORD ENGINE



PREVENT SCORED CYLINDERS AND BURNED BEARINGS



Durably Made--Easy to Install

Made of nickel plated, pressed steel, rust proof, with all parts tightly fitted together. Can't crack nor break, allowing oil to leak out. Built to withstand stress and strain of rough usage. Can be installed in a few minutes. Full directions accompany each TEL-OIL. No need to employ mechanic. Does not hinder removal of floor boards.

Always in Sight--Easy to Read

Illustration at left shows how TEL-OIL looks to driver. Dial sets in floor of car, immediately to right of driver's foot. Always easy for driver to see just how much oil is in engine. TEL-OIL gives a constant check on engine lubrication.

Why Pet-Cock Test is Unreliable

It is neither safe nor accurate. The oil may be just above pet-cock level and still flow when pet-cock is opened. But a few miles run exhausts the supply and then comes burned bearings,—scored cylinders,—and a \$40 or \$50 repair bill, all because you thought you had plenty of oil. Don't guess—**know!**—and the only way you can positively **know** is with a TEL-OIL. It shows the exact amount of oil all the time.

Burned bearings and scored cylinders are a constant dread to the Ford Owner. He may fill the crank-case with oil, but before he realizes, the oil has disappeared, and the engine is seriously damaged—all because he **didn't know** the oil was low.

Can't Damage Engine for Lack of Oil

TEL-OIL shows at a glance just how much oil is in the crank-case. If the oil gets too low, TEL-OIL automatically shuts off the engine before the bearings and cylinders can be damaged. This warning comes while there is still sufficient oil in crank-case to drive approximately 10 miles—enough to reach a new supply if you have no reserve supply with you.

Operates Accurately and Automatically

TEL-OIL is positive in operation, regardless of position or vibration of car. Wire shown at right connects TEL-OIL with magneto post. When indicator in dial hits the danger point, this contact stops engine. Then either put in more oil or disconnect wire until new supply of oil is put in, which automatically releases TEL-OIL contact.

How Do You Know YOUR Engine Doesn't Need Oil?



Ask your dealer, or sent prepaid on receipt of price and dealer's name. Sold on Money-Back Guarantee.

Dealers and Jobbers allowed liberal discounts on TEL-OILS. Special offer on initial order. Ask about it. Send for sample. (Sold direct where we have no dealer.)

High Grade Salesmen Wanted Excellent opportunity. Exclusive territory. Write for details and attractive sales plan.

The Lubricating Specialties Co., 809 Summit-Cherry Bldg., Toledo, Ohio

When writing advertisers—Just say FORD OWNER and DEALER

Chatterless Stops GUARANTEED

Over 150,000 Satisfied Users Since 1915

Model T

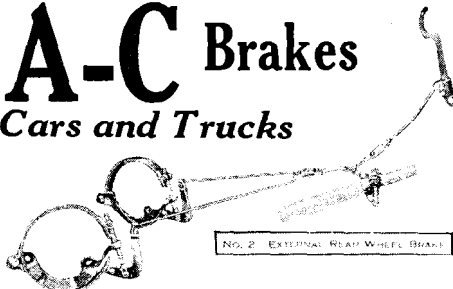
\$16.00

A-C Brakes

For Ford Cars and Trucks

Ton Truck

\$25.00



NO. 2 EXTERNAL REAR WHEEL BRAKE

A-C EXTERNAL REAR WHEEL BRAKES for Ford passenger cars and ton-trucks are guaranteed to make every stop free from chattering, jarring and noise. They also eliminate the wearing, grinding strains on transmission and rear axle.

A-C BRAKES apply the braking power direct at the rear wheels, on the original Ford brake drums, and are controlled by a strong steel equalizing cable attached to the original foot brake pedal.

Installation is very simple, requiring about one hour with no holes to bore, no change in the car's construction; and no interference with special equipment of any kind.

The chances are that your dealer carries A-C Brakes in stock. Should he not have them, write direct to us.

Sold by all automobile jobbers.

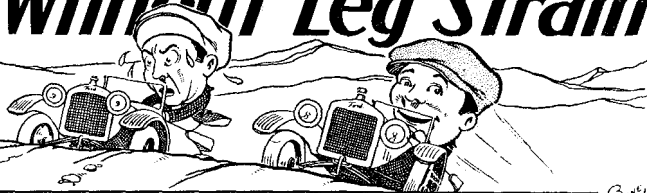
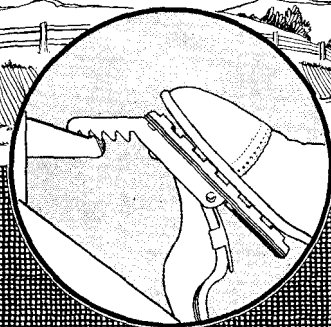
DEALERS! A-C Brakes will satisfy your customers; they will make big profits for you. Write for our discount offer today.

A-C MANUFACTURING CO.,

Manufactured by

2251-55 WEST GRAND AVE,
CHICAGO, ILLINOIS

Low Gear Without Leg Strain



A Boon to Ford Drivers

The Comfort Steady Grip—a classy, rubber-treaded rocking pedal, clamped on regular low-gear pedal. Tip the toe forward and the notches grip, holding pedal steady in low-gear while foot is removed.

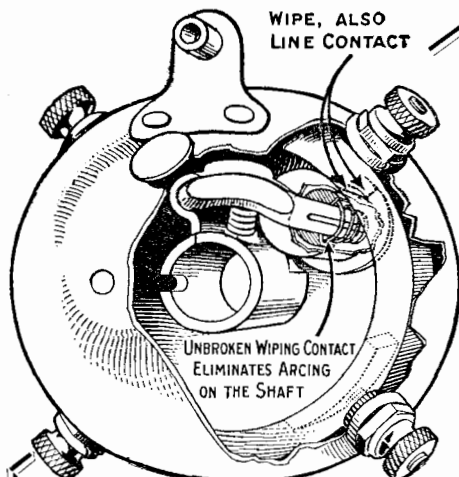
Slightest touch on rear of rocking-pedal releases grip instantly. Obviously mistake-proof. Saves brake-bands, dollars, leg strain. Comfort improvement is priceless. Any novice can attach in 3 minutes with screw driver and wrench. No holes to bore. Send \$3.25 today and be free from low-gear leg-strain. Money back if not delighted

Dealers: WRITE TODAY FOR OUR ATTRACTIVE PROFIT PROPOSITION.

THE BARSBY MFG. CO.

DENVER, COLO.

**Low Gear
GRIP
For Fords
\$3.25
PREPAID**



THE TEST

Pick out your hardest starting Ford car, one on which you have to use batteries, or you have to tow it around the block, or jack up the rear wheel, put it in high, and then spin it; one which runs all right on magneto after you get it started, but which is harder than Hades to start.

Install a **RUSH TIMER ROLLER** on this car and you will start it on magneto with a quarter turn without spinning.

We are the only timer people who invite this test and we have never fallen down on it.

A Rush Dual Contact Timer Roller Price \$1.50

Built entirely of steel. All parts hardened and nickel-plated. Eliminates all your Timer troubles.

ABSOLUTE SATISFACTION GUARANTEED OR MONEY REFUNDED.

THE HARTLAND CO., 1974 Broadway, New York

DISTRIBUTED BY

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Wm. J. Tygard,
Western Pennsylvania,
234 Shiloh St., Pittsburgh, Pa.

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Gardner Ignition Co.
Illinois—1919 S. Michigan Avenue,
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Broad Street, Philadelphia, Pa.
Young Motor Company,
147 Main Street
Springfield, Mass.



A "Hot-Spot" That Is

HOT BEFORE MOTOR STARTS

SURE START Type "A" is made in sizes to suit all cars having "detachable" manifolds. The Ford Special and 1-inch size can be operated by 4 to 6 dry cells.

Type "A" Size	For Manifolds of Inside Diameters	Price Complete
Ford Special.....		\$3.50
1	1" to 1 3/16"	\$4.00
1 1/4	1 1/4" to 1 3/8"	4.00
1 7/16	1 7/16" to 1 5/8"	4.00
1 3/4	1 3/4" to 1 7/8"	4.50
1 15/16	1 15/16" and over	5.00

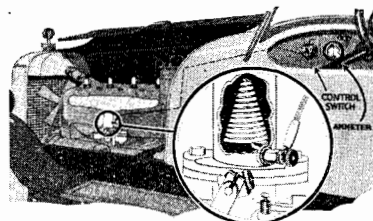
FOR SALE BY DEALERS AND GARAGE MEN.
Get Our Proposition to you. Liberal Discounts
and Sales Helps.

MOTORISTS—Install "Sure Start." PRIME WITH HEAT. That's usually what is lacking when your motor won't start. Switch off when motor is hot.

Manufactured by

EDWIN L. WIEGAND COMPANY

422 First Avenue, Pittsburgh, Pa.



Sprayed gasoline strikes heated cone which thoroughly vaporizes it.

"SURE START"

SWITCH ON A MINUTE

1. **STARTS YOUR CAR INSTANTLY**—Summer or Winter; any kind of gas.
2. **RELIEVES STRAIN ON BATTERY**—Reduces use of starting motor.
3. **INCREASES MILEAGE**—You can start and run on leaner mixture.
4. **REDUCES OIL DILUTION**—It feeds motor with real vapor, instead of sprayed gasoline.
5. **CONSTRUCTION IS SIMPLE**—No moving parts, easy to install, requires no adjustment; can't wear out.
6. **MADE IN SIX SIZES**—Ford special and 5 others.
7. **THIS DEVICE REALLY COSTS MOTORIST NOTHING**—Pays for itself by saving in battery repairs, time, gas, oil, and work.

If your dealer or garage does not stock, send us the amount and we will see you are supplied.

NO CAR STARTS SO WELL BUT WHAT "SURESTART" WILL IMPROVE IT.

When writing advertisers—Just say **FORD OWNER and DEALER**

There's Real Quality in McKinnon Radiators

McKINNON RADIATOR

The reliable radiator for all year round service. Brass core is coated with solder inside and out. No corrosion or small leaks possible.

Really cellular construction. Free circulation of water through vertical passages. Accidentally damaged cells may be replaced at any repair shop without impairing looks or efficiency of radiator. First class workmanship throughout.

McKINNON DASH CO.

(RADIATOR DIVISION)

250 Amherst St.

BUFFALO, N. Y.



1917-1920 Model
"Really Cellular"

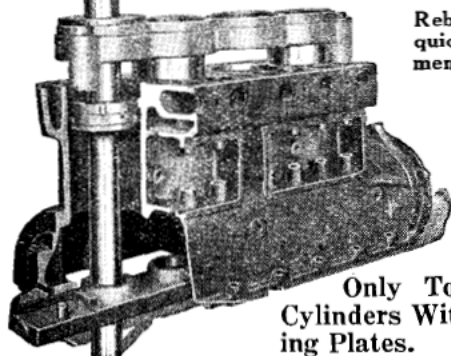
Over 1,000,000 Radiators of this type in daily use on Overlands, Buicks, Willys Knights and Oldsmobile 8's.

Patented
U. S. A. J.
June 15,
1920.
Foreign
Patents
Pending

EQUIP YOUR SHOP NOW FOR GREATER REBORING EFFICIENCY

With Less Time and Labor

Reboring jobs—with equipment to do an accurate job quickly—is highly profitable. The right kind of equipment for such work is a



CHAMPION

Reboring Tool

"The Modern Shop Necessity"

Only Tool Reboring All Four
Cylinders With One Setting of Locat-
ing Plates.

Rebores and refinishes in one operation. Rebores in true alignment with Crank-shaft Bearings. Equip your shop for greater efficiency, prestige and profit from reboring jobs.

Compact, Accurate, Simple
Moderate in Price

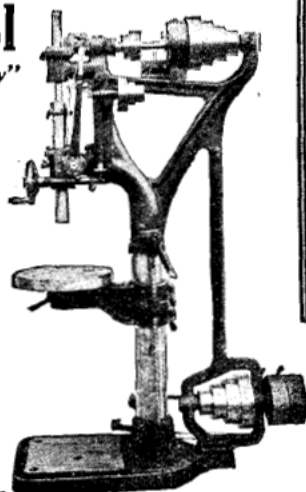
Exceptional durability makes the Champion Reboring Tool stand up under hardest usage. No need of an expert mechanic to set up or operate.

Write for full particulars, prices, etc. on both these business-getters

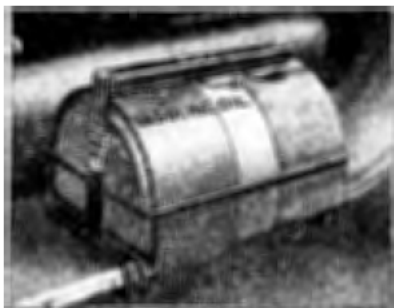
Champion Manufacturing Co.
2908-10 West Fletcher St. Philadelphia, Pa.

CHAMPION Power Feed 22 in. Drill Press

A modern, up-to-date Power Drill combining at a remarkably low price all the graduated and automatic features of highly priced Drills. Distance Spindle to Base 43"; Spindle Travel 12"; Feed .004", .012", .020". We can offer you complete outfits. Reboring Tools, and Drill Press with which you can re bore and refinish a Ford Model T Cylinder Block in 30 minutes or a Fordson Cylinder Block in 45 minutes.



When writing advertisers—Just say FORD OWNER and DEALER



No. 212 (Patented)

out of fuel supplies, against delay and inconvenience, and against costly repair bills.

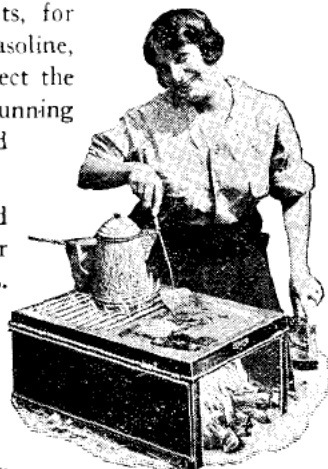
Boyco Camp Grates, Luggage Carriers, Canteens and Holders make an instant appeal to those seeking outdoor pleasures. They are quality built business-builders. Write for illustrated folder.

Ask your dealer or write us.

Boyle Manufacturing Company

5110 Santa Fe Ave.

LOS ANGELES, CAL.



*Increase Your Sales
with*

BOYCO PRODUCTS

Boyco Service Units, for carrying extra gasoline, oil and water, protect the motorist against running

NEVER-FAIL TIMER for Fords THE "LAST WORD" IN TIMER Efficiency

Install the NEVER-FAIL TIMER, and those engine troubles now blamed on coils, platinum points, spark plugs, carburetor, etc., will generally vanish into thin air. The Never-fail roller's direct thrust makes timer "missing" impossible. A fat, hot spark *always*, makes starting easy — and your Ford sings with the rhythm of an eight. Saves gas by using it — gives *all* the power in it.

NEVER-FAIL

CARBURETOR FOR FORDS

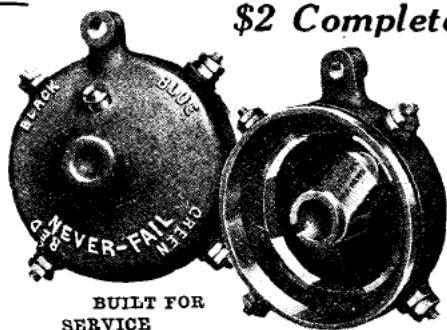
Gives more pep, power, comfort — real gas economy. High vacuum principle insures easy starting, quick, smooth acceleration and running — brings freedom from carburetor troubles.



No extras. See it at dealer's or postpaid for

\$10

\$2 Complete



BUILT FOR SERVICE

Phosphor bronze contacts — out-wear steel; non-warp fibre track, perfectly fitted; the famous NEVER-

FAIL TIMER UNIT for the roller; shell is of bronze, cast concave to eliminate wear on fan belt; each terminal plainly marked on shell with wire colors, for quick, sure installation; one hand oil cup.

Go to your dealer right now for the Never-fail Timer. **Don't accept a substitute.** If he hasn't yet stocked Never-fails, we'll send the Timer postpaid for \$2.

Never-fail Timer Unit sold separately for 50 cents. postpaid. Makes pitted, worn shells work like new — gets **DOUBLE SERVICE** from any standard shell.

AT DEALERS, OR DIRECT FROM US.

NEVER-FAIL MONEY-BACK GUARANTEE: Try the Never-fail Timer, Never-fail Timer Unit and Never-fail Carburetor for 30 days. If you are not entirely satisfied, we'll cheerfully refund your money.

NEVER-FAIL PRODUCTS CORPORATION

198 Jackson Avenue,

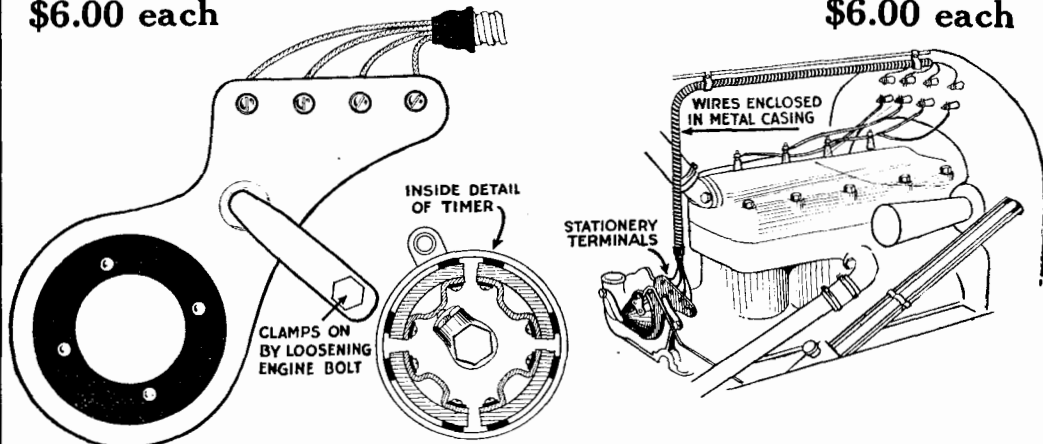
LONG ISLAND CITY, NEW YORK.

When writing advertisers—Just say FORD OWNER and DEALER

NOWURY TIMER and EXTENSION Ends Your Troubles Forever, Because It Is Scientifically Right —Mechanically Perfect

\$6.00 each

\$6.00 each



This Timer is built upon honor and so constructed that it will last longer than the car and is so guaranteed. The extension carries the wires up and out of the oil, which prevents any chance of becoming shorted. The contacts are so situated that they are dust, oil and water proof, and the Timer does not require oil. Good dealers everywhere sell this wonderful Timer. If your dealer cannot supply you write direct to us. Prompt deliveries and courteous treatment.

WORTHMORE MANUFACTURING CO., Inc.

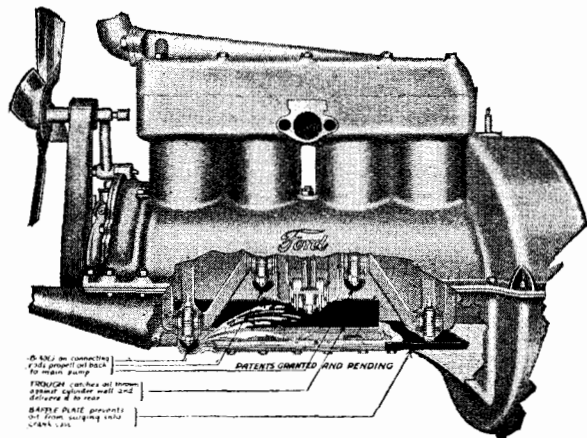
14-16 WESTERN AVENUE

MINNEAPOLIS, MINN.

JULES OIL CIRCULATOR

FOR FORDS

*Will end oil pumping
in Ford cylinders*



THE ELECTRIC MACHINE CO.

324 W. Ohio St. Indianapolis, Ind.

Sales Department
Detroit Consolidated Sales Co., 10 Warren St.,
Detroit, Michigan.
Pacific Coast Distributor
N. F. Andruss, 404 Golden Gate Ave.,
San Francisco, Cal.

We are offering an excellent proposition to dealers on this Oil Circulator. Write to us for information on territory, terms, etc.

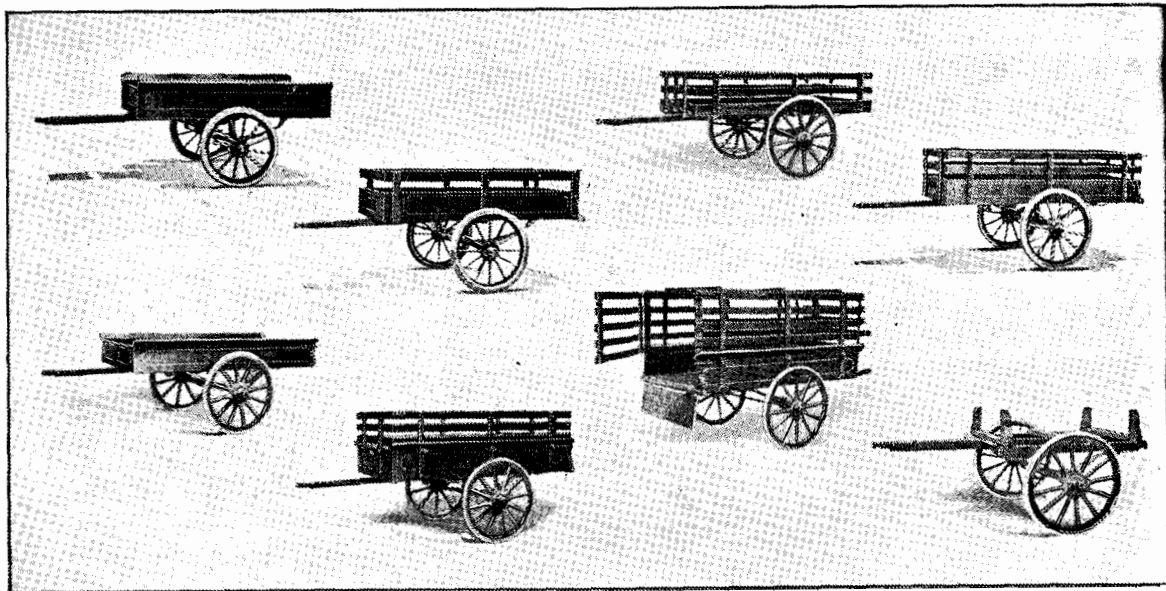
When the Ford plugs constantly foul, the engine carbonizes quickly, misses, and wastes fuel and power, it is almost certain your cylinders are pumping oil.

Clean the plugs all you want, put in new rings or rebore the cylinders and you still have no permanent cure for the trouble.

Jules Oil Circulator, which ends all your oil pumping troubles, insures clean plugs, a minimum of carbon and gives you all the power a Ford engine can deliver. This simple permanent cure costs but \$4.00. It can be attached easily by any handy man in a short time.

DON'T SEND THE MONEY.
Your mailing address and your dealers name is all that's necessary. You pay the postman when delivered. If not satisfied after ten days trial, return it to us and your money will be refunded.

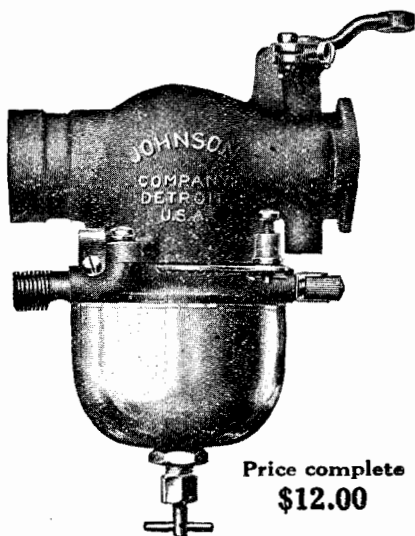
Auto Trailers at Less Than Factory Cost



Trailers Will Be Shipped Subject to Your Inspection. No Deposit Required.
Write for Circular and Complete Information.

The Miles Manufacturing Co., Jackson, Mich., U. S. A.

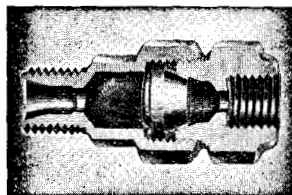
Johnson Carburetors for Ford Cars



Price complete
\$12.00

**Counts Every Drop of Gasoline.
Makes Every Drop Count.**

Strainers for Ford and Maxwell Cars.

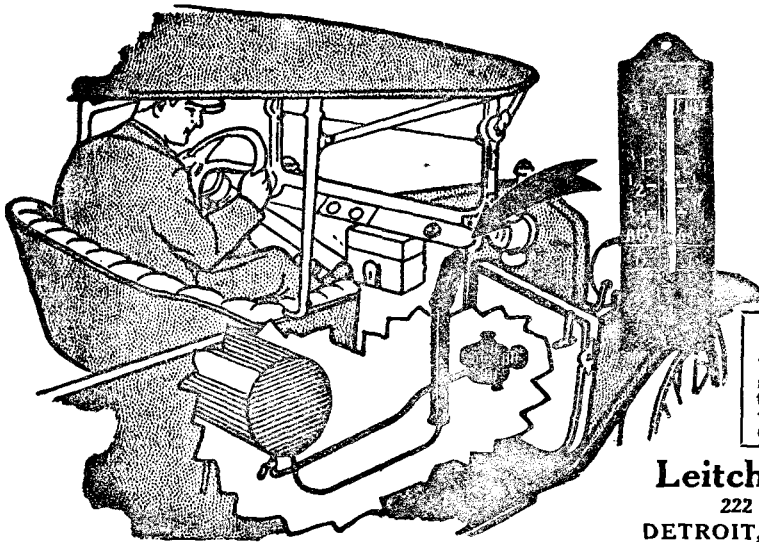


**Traps the Dirt. Fits Any Ford.
Price \$1.25**

JOHNSON COMPANY, 1909 Forest Ave. E., Detroit, Mich.

Face-to-Face Visible Gasoline Gauge

For Ford Cars! The only scientifically correct and accurate gauge on the market. Registers in plain view of driver on dashboard. One of the most remarkable conveniences ever devised for Ford cars. Sold with unconditional money back guarantee.



**No Wires—
No Spirals—
No Corks—
No Air—
No Impractical Devices**

\$3.75 Postpaid or From Your Dealer

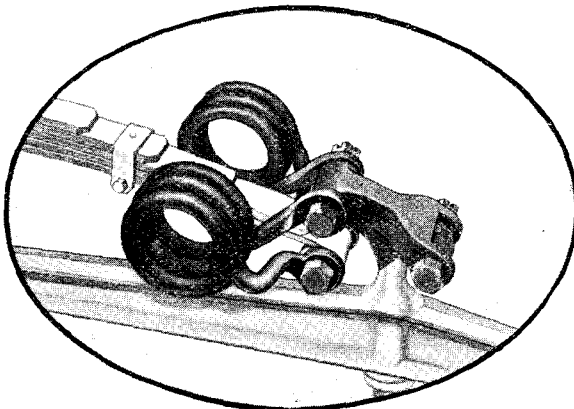
**Agents—Dealers—
Salesmen**
Write today for wholesale prices and exclusive territories. Nationally advertised. — Booklets and Circulars furnished.

Leitch-Nelson Co.
222 W. Congress
DETROIT, MICHIGAN.

We Challenge Contradiction of Our Claims GET AN EXPERT'S OPINION

We are asked every day to explain wherein our TWIN SPRING SHOCK ABSORBER differs from the SHOCK ABSORBER in general use today. The answer is easy and clear to you. The great majority of SHOCK ABSORBERS in use today are nothing more or less than a brake applied on the leaf springs, which retards their action and prevents them from doing the work for which they were intended. They REDUCE the spring capacity of your car instead of INCREASING it, as should be the case.

TWIN SPRING



SHOCK ABSORBERS For Fords

Front and Rear Set Complete \$20.00 List

The TWIN SPRING SHOCK ABSORBER is a SUPPLEMENTARY SPRING, instantaneous in its action. The principle and result obtained therefrom is entirely foreign to the so-called SHOCK ABSORBER. TWIN SPRING SHOCK ABSORBERS are FREE TO ACT in every way in conjunction with the LEAF SPRING. They not only leave the LEAF SPRING free to perform the work for which they were designed, but they assist them to perform that work. Every road shock coming from the wheels passes through the TWIN SPRING SHOCK ABSORBER (see those coils) on its way to the body of your car. The shock is transformed and reduced, the LIFE is taken out of that shock right there, and that without in any way disturbing the action of the leaf springs. Let us prove to you, Mr. Car Owner, that our statements are correct.

TWIN SPRING SHOCK ABSORBERS add to and do not detract from the lines of the car.

Write for Agent's Proposition and Prices

TWIN SPRING SALES CO.

266 Essex St.,

SALEM, MASS.

Enjoy a Smooth Running Motor

Make your driving a genuine pleasure. Have a smooth running motor at any speed. An unbalanced crankshaft causes vibration that endangers your motor. It shortens the life of your motor, decreases power, increases gasoline consumption, and boosts your repair bills. Install a set of Dunn Counterbalances and do away with vibration.

DUNN COUNTERBALANCES



cut out all vibration. They double the life of your motor, greatly increase its power, give more mileage from gasoline, and cut down expenses. Get a set from your dealer or order from us direct. Satisfaction guaranteed. Easily installed. A wrench is all you need. Get a set today.



Get More Power and Speed-- This Free Book Tells How

A complete and instructive book on prolonging the life and increasing the power, speed, and endurance of automobile motors. Explains where aeroplane and racing motors get their amazing power, and tells how the power of the above motors may be increased tremendously. Whether you drive a passenger car, truck, or are a "speed demon," you will find this book very valuable. Send a postal for it today.

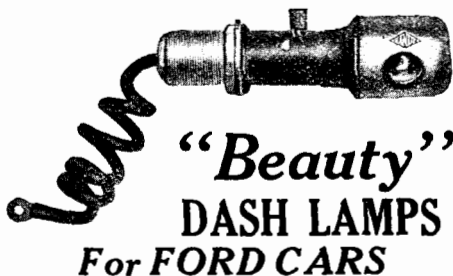
PRICES

Ford	\$ 9.00
Overland 4	10.00
Chevrolet 490	10.00
Dodge	12.00

Terms—If your dealer cannot supply you, cash with order or C. O. D.

DUNN MFG. CO.

DEPT. F. D., CLARINDA, IOWA
DUNN SALES CO., 250 W. 54th St., N. Y.



"Beauty" DASH LAMPS For FORD CARS

Latest addition to our famous "Handy" line of automobile electrical accessories.

Install in 10 Minutes

as there are no wires to cut, splice or tape.

Outfit comes in a carton, ready to put on. Simply put a hole thru the dash and connect terminal to tail light switch post. No small springs or plungers to fuss with.

No Friction or Wear, because of new positive contact switch.

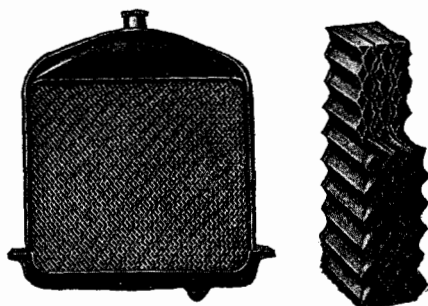
A Thing of Beauty! Bright nickel hood and black baked enamel barrel.

A quick money maker for the dealer and continual satisfaction to the car owner. You sell for \$1.25 or (usually) \$2.50 installed.

Send for our liberal discount to dealers

CHICAGO ELECTRIC MFG. CO.
2801 So. Halsted Street, CHICAGO

The "SUPERFECT" NEW TYPE OF RADIATOR for FORD CARS AT NEW PRICES!

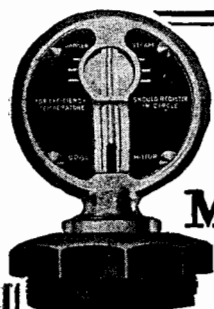


A Honey-Comb Radiator; inner unit made entirely of brass. Note improved water passage construction in cross-section. A radiator that sells on sight with a good profitable margin. Cooling efficiency guaranteed and will give service without interruption.

SALES AGENCIES GRANTED—WRITE!

SUPERIOR LAMP MFG. CO., INC.
149 W. 52nd St. 311 Halsey St.
NEW YORK CITY NEWARK, N. J.

Write for Profit-Boosting Proposition



Special Model
for the Ford
\$3.50

BOYCE MOTO-METER

"Your car
deserves one"

THE MOTO-METER CO., INC.
Long Island City New York, U. S. A.



LONGASAVER

(Patented)

GASOLINE GAUGE AND GAS SAVER FOR FORD CARS

Absolutely accurate gasoline tank gauge. Easy to inspect day or night; can be carried to light when necessary. No operative parts to stick, get out of order or collect dirt.

A loss by evaporation through vent hole, particularly during summer months, is prevented by venting through tube.

A convenient means for getting gasoline for priming, cleaning tube for patch when making road repair, or any other purpose where a small quantity of gasoline is required.

Always read gauge before filling tank to check amount of gasoline required. Sizes to fit all Ford tanks.

Price 75c by mail or at your dealers.

BARCY-NICHOLSON COMPANY
2801 West Fort St., DETROIT, MICH.

THE LIGHTS O' THE NIGHT

THE SUPREME ELECTRIC PARKING OR SIDE LAMP

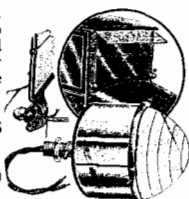


Furnished with white light to the front and ruby light to the rear as danger signal. Fits the fender or can be used in pairs as side lamps.
Full nickel-plated, each \$3
Black with nickel door, each \$2.75

THE ALADDIN ELECTRIC SIDE LAMP

For all Ford Sedans and Coupes.

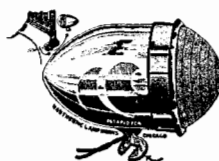
Attached in a Jiffy. Will also fit all Ford Touring or roadsters made prior to 1920.
Full nickel-plated, pr., \$5
Black with nickel door, per pair \$4.50



HAWTHORNE BULLET LAMPS FOR ALL FORD CARS

STYLE B BULLET SIDE LAMP

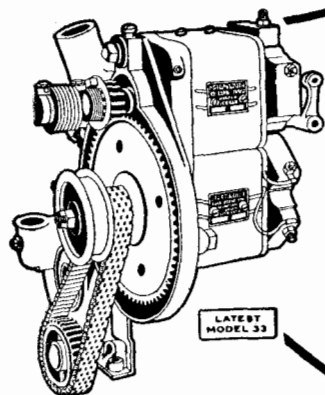
The only lamp made that will fit the 1920 and 1921 Ford Touring and roadsters without any drilling or alterations. Attached in two minutes' time.



Full nickel-plated, per pair, \$6.50.
Black with nickel door, per pair \$6.00.

For Sale by Reliable Dealers and Jobbers the World Over. If your Dealer or Jobber Cannot Supply You, Send Us Your Order. We will find your nearest Dealer or Jobber for You.

HAWTHORNE LAMP WORKS, 1410 Michigan Avenue, CHICAGO, U. S. A.



HEINZE-SPRINGFIELD Starters

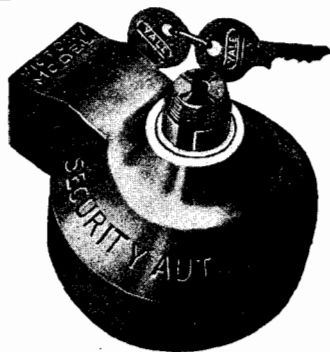
LATEST-IMPROVED-FITS ANY FORD MODEL

RIGHT now is the time to buy this well-known starting and lighting system—the best and lowest priced system on the market. A quick, sure start—bright, steady lights all the time—no cranking. Get these at a small cost. Everything complete. Installation simple. Light and starter buttons on the dash right where you want them. The Heinze-Springfield system gives you the best of service with the least expense.

Write Today for Full Details and Price.

The Service Products Co., Dept. C
SPRINGFIELD, OHIO

Western Rep.—Norman Cowan Co., 451 Rialto Building,
San Francisco, Cal.



FORD DEALERS—Do you know that there is *No Trouble Chasing* when you install Security Auto Locks?

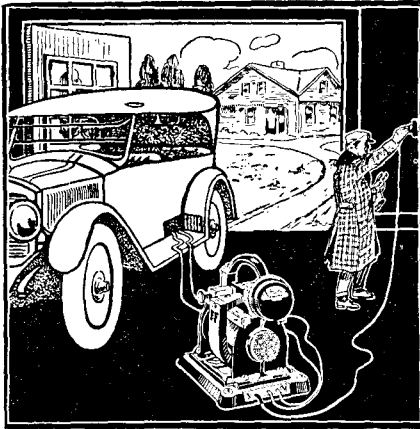
They don't get out of order. Are simplest to install.
Takes only 5 minutes.

**Absolutely Thief Proof — No Lost Motion nor Wobble
in Steering Wheel — The Security Can-
not Cause an Accident**

Original Loose Wheel Lock for Fords

This lock has been on the market since 1916 and has given satisfaction everywhere. Let us show you this splendid lock. Send us in your orders. You will be pleased. Approved by Underwriters. Insurance reduced 15%.

Security Auto Lock Co., CHICAGO, ILL.
418 N. Paulina St.



10c Charges Your Battery At Home With An F-F Battery Booster

Which is a Magnetic Rectifier for 105-125 Volt 60 Cycle Alternating Current

Leave battery right in the car. Snap clips of Charger on battery terminals. The Meter shows you just the amount of current flowing. No skill required to operate. Everything complete in one compact unit, ready to use. Automatic and fool-proof. Cannot overcharge. Carbon electrodes rectify the current and last for thousands of hours. Don't think your battery is dead and worn out, simply because it will not start your car. Buy a Booster and Fill It With Life. By Buying a Booster, You Save Money. PRE WAR PRICES

Bantam Type 6 for 6 volt battery, 6 amps. \$15	Bantam Type 12 for 12 volt battery 5 amps \$15
Type 16 charges 6 v. battery at 8 amperes. \$24	Type 112 for 12 volt battery, 6 amperes, \$24
Type 166 charges 6 v. battery at 12 amperes \$32	Type 1612 for 12 volt battery, 7 amperes, \$32
Type 1626 Combination Type charges both 6 and 12 volt batteries at 12 or 7 amperes. \$48	

The larger types are recommended for the heavier batteries or where time is limited. Shipping weight complete with AMMETER and BATTERY CLIPS, 10 to 15 lbs. Order from your dealer or send check for prompt Express shipment; include postage and insurance charges for Parcel Post Shipment or tell us to forward C. O. D. Order Now or write immediately for Free Descriptive BOOSTER Bulletin No. 14.

F-F Rotary Rectifier for Group Charging

Real Economy in first cost and in service. Charges up to 36 cells. Full Wave, Automatic, Dependable. Write immediately for Free Descriptive ROTARY Bulletin No. 14-A. Other F-F charging apparatus operates on Farm Lighting Plants & D. C. Circuits.

The France Manufacturing Co. General Offices and Works: CLEVELAND, OHIO, U. S. A. Canadian Representative: Battery Service and Sales Co., Hamilton, Ontario, Canada

The Life of Your Storage Battery

and faithful operation of the entire starting and Lighting System is directly dependent upon faithful operation of your **Generator Cutout**. New York Cut-outs for Ford cars automatically—without attention on your part keep the battery fully charged and prevent wasteful discharge.

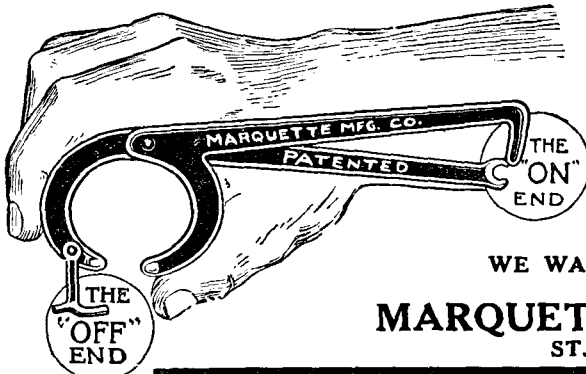
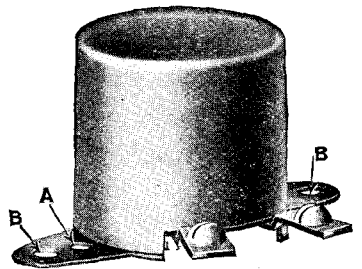
They are engineered to withstand vibration, heat and dampness and are **absolutely trouble-proof**. They are saving money and insuring satisfaction to thousands of Ford owners in all parts of the country.

Price \$2.50. Attached in two minutes.

STRICTLY
GUARANTEED

NEW YORK COIL CO.

339 Pearl Street
NEW YORK



A GRIP LIKE A GIANT HAND

The "quick action" Marquette Tire Tool "takes them off and puts them on again." Removes and puts back on all size clincher tires. We guarantee it to do the work. An attractive dealer proposition. Write at once.

WE WANT DEALERS NOW
DEPT. F.

MARQUETTE MFG. CO., Inc.
ST. PAUL, MINN.

PERFECTED
MODEL 20.
PATENTED

WOODWARD

AUXILIARY TRANSMISSIONS, GIVING

4 SPEEDS FORWARD for FORD

OVERDRIVE FOR MORE SPEED.

Completely equipped with roller bearings, running on hardened and ground surfaces both inside and outside. Large gears made from nickel chromium steel. POSITIVE lock in each position. Oil retainers, and many other special features. All materials used are the best. Every vital part is hardened, and to install on a Ford this transmission does not have to be taken apart; simply shorten the Ford driving parts with connections we can supply, bolt the WOODWARD to the rear of Ford transmission, run the rear end in again, bolt up and you're ready to go. Automobiles and Trucks costing \$5,000 have no better made transmission than these and it is only after five years of work at a great expense that we are able to say "PERFECTED MODEL 20." We are not ashamed to print our price, because it is right. No need to pay more and you would be foolish to pay less. TRANSMISSIONS, ALL TYPES, FOR CARS OR TRUCKS, \$80, with touring connections \$92.50, with Truck connections \$97.50. Remember FRONT END TYPE, OLDEST MAKERS. STOOD THE TEST.

SAN FRANCISCO

323 Van Ness Avenue.

Woodward & Rowe

CHICAGO

2125 Michigan Ave.

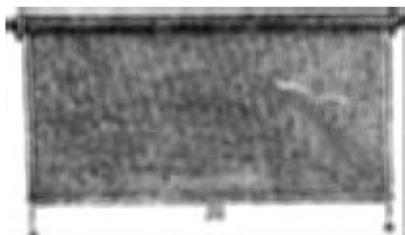
IN USE EVERYWHERE. LET US SEND YOU SOME LETTERS FROM OWNERS.

Write for descriptive circular, and address of nearest Distributor. Agents and Dists. wanted.

When writing advertisers—Just say FORD OWNER and DEALER

WINDOW CURTAINS

For
Ford Sedans and Coupes
Automatic Roller



Complete with runner cord, covered tacks and screws, ready to install. Gray mixture to match upholstery material. Plain gray if preferred.

Made for all windows, sold singly or in sets as desired.

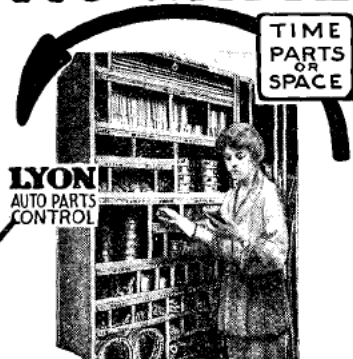
Dealers write for illustrated folder and trade discount

C. COWLES & CO.

NEW HAVEN,

CONN.

NO WASTE



Order Means Economy

with a LYON AUTO PARTS CONTROL.

Parts are carried in Parts Book Order.
Parts are carried in Assembly Order.
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Parts are carried in Their Order.
Regardless of Size.

ASK FOR OUR BULLETIN.

Lyon Metallic Manufacturing Company, Aurora, Ill.



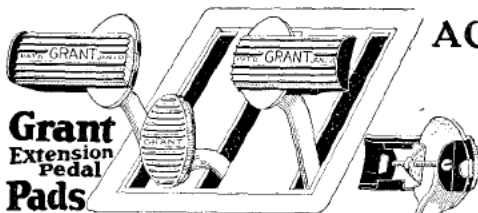
Manufacturers of

Commercial Bus and
School Bodies for
Ford Chassis

Write us for Catalog and Prices

McKay Carriage Co.

Grove City, Pa.



Grant Extension Pedal Pads

JOBBERs and DEALERs, WRITE US
Ford owners want the genuine Grant Extension Pedal Pads because they are a wonderful improvement over the old style pedals. They are a great seller that satisfy your customer every time—You won't get kicks on the Grant line. Grant pedals have special patented features, fully protected, that give dealers big advantage over all competition.

Get Our Proposition Today

ACCIDENT INSURANCE FOR FORDS \$1.00

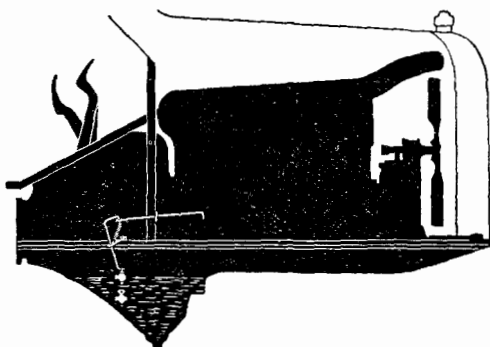
Thousands of accidents are caused by the driver's foot sliding off the narrow, slippery, worn Ford pedals at a critical moment. When you buy "GRANT" Extension Pedals (patented) you're buying the best kind of accident insurance—the kind that keeps you out of trouble. Grant Pedals are wide with a flange on the outside so your foot can't slip and heavy molded rubber pads that give you a firm, comfortable foothold.

FREE—10 days' trial: ANY FORD OWNER can put on a set of Grant Pedal Pads in three minutes—Screwdriver only tool needed. If your dealer hasn't got the genuine "GRANT" pedals send us his name and one dollar with the understanding that you get your money back if you want it.

GRANT AUTO APPLIANCE CO.

Not Incorporated. 315 S. Clinton St., Chicago, Ill.
Manufacturers of "SURETY" Pedal Pads.

When writing advertisers—Just say FORD OWNER and DEALER



DON'T STOOP!

To test the oil level of your Ford, just raise the hood and push the "NO-STOOP" oil level indicator lever. A push opens the pet-cock—A pull closes it.

This device soon pays for itself in saving time, trouble, temper and the soiling of clothes and hands.

It is quickly and easily installed. You can do it yourself in 20 minutes. Full directions with each instrument. The price is low—

\$1.50

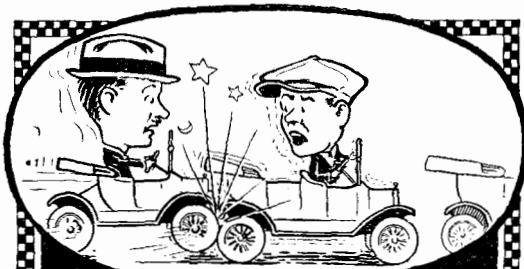
Send check or money order.

DEALERS—Write for agency information

—This is a big seller. Address

Thumb Accessory Company

SEBEWAING, MICHIGAN.



"Why don't you stop?"

"I couldn't—my transmission lining doesn't hold."

"Put in Viking—then you can stop—and you won't have any chatter!"

VIKING

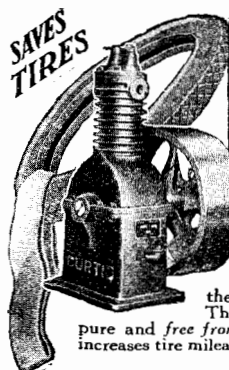
Transmission Lining—Exclusively for Fords

Sales Dept.

THE ZINKE CO., 1323 MICHIGAN BLVD.
CHICAGO, ILL.

Manufacturers

Vogt Mfg. Corp., Rochester, N. Y.
Allison & Moe, The Bronx, N. Y.



**FREE
CURTIS AIR
FREE FROM OIL**

Business Building Service

Drivers of cars appreciate the superior free-air service you can render with the Curtis Air Compressor.

They know Curtis Air—clean, pure and free from oil—preserves tubes and increases tire mileage.

Curtis Air—Free from Oil

The number of Curtis Compressors in use today is unquestionable evidence of their distinct superiority. The Curtis, with its exclusive, patented, controlled splash oiling system, is the only compressor so designed to prevent oil from being forced into the air line.

Ask Your Jobber

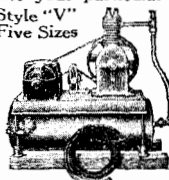
There is a style Curtis Outfit to meet your particular needs. Ask your jobber for full information, or write us, Style "V" Five Sizes

**CURTIS PNEUMATIC
MACHINERY CO.**

1639 Kienlen Ave., St. Louis, Mo.

Branch Office:

532 L Hudson Terminal,
New York City

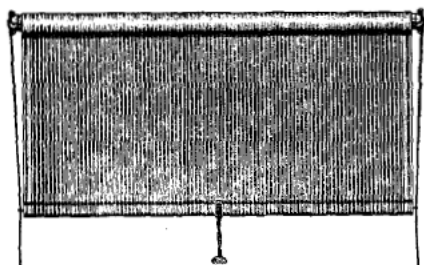


PISTON 3-A RINGS

Equipped in over 100,000
Fords in the last 2 years;
have stopped spark plugs
from getting fouled.

*Write for circular 40,
"How 3-A Stop Oil
Trouble and Hold
Compression."*

**STEEL SPRING PISTON RING
COMPANY
BROOKLYN, N. Y.**



SCHLEGEL CURTAINS

WILL GIVE THE FORD COUPE
OR SEDAN A TOUCH OF
ELEGANCE

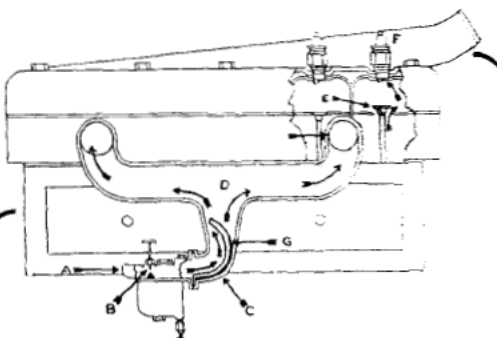
By the use of these curtains it is possible, at a reasonable price, to give your enclosed Ford the same refined appointments found on more expensive cars. The curtains will not fade, and are made from durable material that will wear as long as the upholstery. They are furnished complete, ready for immediate installation.

If your dealer cannot supply you, write us.

Schlegel Manufacturing Company
ROCHESTER, N. Y.

LIST PRICES OF SCHLEGEL CURTAINS

Rear Coupe.....	\$3.50 each
Rear Sedan.....	3.50 each
Rear Side Sedan.....	3.25 each
Sedan Set (3 Curtains).....	10.00



ELIMINATE SPARK PLUG TROUBLE WITH BAUTZ EQUALIZER **\$2.00**

For many years repairmen have wrestled with the problem of solving the reason of the so-called oil pumping Ford motors. The problem is solved. First, it is not the oil that is causing the plug to foul, but the ingredients in the gasoline, as you will note in cut.

A. Showing air passing into carburetor mixing with gasoline at spray nozzle.

B. Passing into manifold and coming in direct contact with manifold wall.

C. Causing the ingredients to collect and be drawn along the wall into the first cylinder. The heat in one cylinder is not sufficient to burn them. By distributing it equally to the four plugs it burns up. This ingredient is a conductor of electricity and causes the spark plug to short or foul. This ingredient also breaks the oil causing the cylinders and pistons to wear.

INSTALL A BAUTZ GAS EQUALIZER and eliminate first spark plug fouling and excessive wear on your front two cylinders. If you cannot get one from your dealer send us \$2.00 and we will ship direct. Absolutely guaranteed to do what we claim or money refunded.

State distributors and dealers wanted.

Write today for full particulars.

CHAS. WILHELM SALES CO.
100 W. Main St., Waukesha, Wis.

PONTIAC WINDSHIELD TOP SUPPORT for FORDS



Here is a long-looked-for device for prolonging the life of Ford Touring Car Tops. Does away with the destructive strap strain that quickly stretches the life out of the top fabric—stops rattling and swaying—eliminates danger of accidents due to top becoming unhooked on rough roads and makes a decided improvement in appearance of the top by keeping it free from sagging and wrinkling.

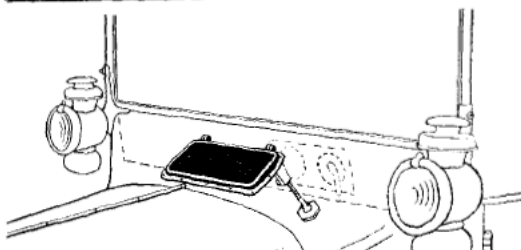
The Upright Provides an ideal place to attach mirror or spotlight.

The Pontiac Windshield Top Supports are quickly and easily installed. Only a screw driver is needed. For Touring cars only—1917 to date. Price \$2.50. If your dealer cannot supply you, we will mail you a set postpaid upon receipt of the price.

DEALERS—Here is a real accessory—a sure seller to every Ford Touring Car Owner. We will supply you direct until your jobber can do so.

WRITE FOR QUANTITY PRICES.

American Forging & Socket Co.
PONTIAC, MICHIGAN.



DID YOU EVER DRIVE A HUNDRED MILES AND COMPLAIN OF THE HEAT IN THE FRONT SEAT?

WE KNOW YOU HAVE.

National Ventilators solve the annoying problem of uneven temperature in the front of the car—conserves the energy and the temper of the driver by giving him a means of maintaining an even temperature at all times below the waist line.

WILL FIT ALL MAKES OF CARS

Made of cast aluminum. Your choice of black enamel or highly polished finish. Size of air space 3 1/4 x 9 inches.

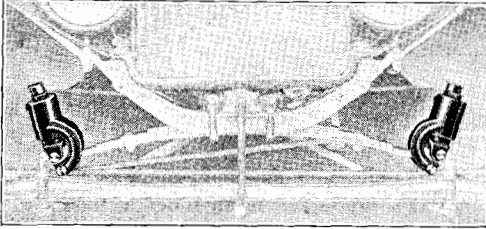
DEALERS and GARAGES can supply you with NATIONAL VENTILATORS to fit any make of car. If your dealer has not been supplied, send \$5.00 with your address and name of car.

NATIONAL ALUMINUM CO.
1905 Frederick St., RACINE, WIS.

NASH

SHOCK ABSORBERS

For Ford and Dodge Cars
Absorb all shocks and rebounds.
Eliminate all side sway.
Add appearance and distinction.



FORD MODEL

Easily and quickly installed without changing any part of car.
Best Material and Workmanship.

ABSOLUTELY GUARANTEED

List Prices: \$14.00 to \$22.00 per set.
F. O. B. Indianapolis. War Tax included.
Your jobber has them or can get them for you.

FOR DETAILED INFORMATION WRITE

Nash Shock Absorber Co.

INDIANAPOLIS, IND., U. S. A.

Use Pressure Proof Rings and permanently cure carbon and over-oiling.



Pressure Proof Piston Rings form a perfect, permanent 3-sided seal that cannot be broken.

Not an Ounce of Compression
Can Be Wasted.

Your motor will have full power,
consume less oil and fuel, will
not smoke and will be absolutely
free from carbon, always.

MANUFACTURED BY

Pressure Proof Piston Ring Co.

107 Mass. Ave., Boston, Mass.

Canada-Pressure Proof Rings, Ltd.

Sun Life Building, Sherbrooke, Que.

COOK'S Lubricant Gives You More Mileage

The economical operation of a Ford car depends upon proper lubrication.

Cook's Lubricant, when used in the differential of the Ford, gives highly satisfactory results.

Bevel, worm and spur gears when lubricated with Cook's Lubricant, are fully protected and operate silently.

Cook's Lubricant does not leak or run out and gives greater mileage.

Sold in 5, 10, 25 and 50 lb. cans and in kegs, half-barrels and barrels.

Ask your dealer—he can supply your needs—or write for bulletin giving name of your dealer.



A MARK known and respected around the world since 1868 for fair dealing, a quality product and an unexcelled service.

Adam Cook's Sons

708 Washington St.
New York



\$45

BUYS THIS
SNAPPY
SPEEDSTER

Just the graceful, racy sport car you want and you save big freight rates and one-half original cost through buying it knocked-down.

All parts cut to exact fit and accompanied by such complete, simple instructions that anyone can assemble it.

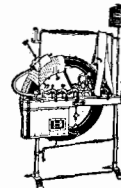
Complete with hood, Fiat radiator shell, instrument board, upholstering, metal and wood parts, bolts, screws, etc.

Car owners and dealers: Send today for complete details.

CENTRAL AUTO SUPPLY CO.
Eng. Dept. 123, Louisville, Ky.

Big Money in Tire Repairing

It's easy to make big extra profits doing tire repairing with a **SHALER Vulcanizer**. Many garages are making \$300 to \$500 every month. Requires no experienced operators—your ordinary help can quickly learn to operate it and do perfect work.

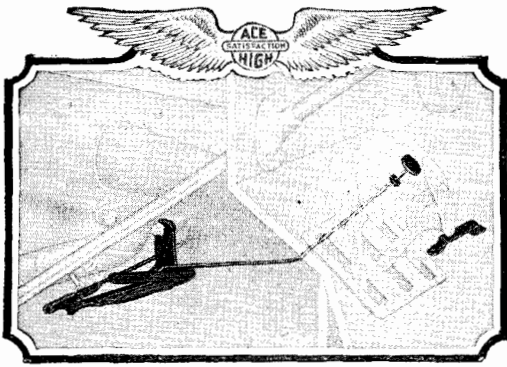


SHALER STEAM VULCANIZER

has Automatic Heat Control, and requires no regulating. Uses the Wrapped-Tread Method of repairing casings. Vulcanizes 12 casings and 200 tubes a day. Light, convenient and safe. Complete Outfit, with gas or gasoline burners, repair material, tools and full instructions, costs less than \$100.

Ask Your Jobber. Write us for complete catalog of the **SHALER** Line of Vulcanizers for tire repair shops and motorists' use.

C. A. SHALER CO., 2607 Fourth St., WAUPUN, WIS.



Smooth as Velvet Action

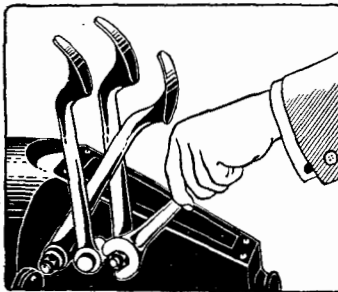
An American Ace Foot Accelerator makes your Ford purr along like a Rolls-Royce, without sticking or sputtering.

Simplicity of construction and a positive smooth action that gets smoother every day you drive your car are, making friends and boosters of all American Ace users.

Put an American Ace on your Ford. You'll find undreamed of pleasure in driving the car. All good dealers and jobbers carry American Ace Accelerators in stock. See your favorite dealer today, or order one direct. They cost \$1.90—worth twice as much

American Ace Mfg. Co.

SPENCER, IOWA.



Michon Outside Adjusters For Ford Transmission Bands

Furnishes the means for quickly adjusting brake bands from the seat. Unnecessary to remove transmission cover. Eliminates over-adjustment. Installed in a few moments. Replaces regular Ford parts. No boring or changes made in transmission casing or cover. Fits all types with or without starter.



Pat. Foreign—Domestic Pat. Pend.

A SET CONSISTS OF

- 2 Adjusting Shafts
- 2 Bearing Sleeves
- 2 Special Lock Washers
- 2 Special Milled Nuts

Size packed 8 1/2" x 1 1/2" x 1 1/2"
Weight 1 1/2 lbs.

Owners write for dealer's name.

MICHON MFG. CO.,

89 MICHON BLDG.,

PRICE PER SET
Complete
Retail **\$3**

Jobbers and Dealers
write for prop-
osition.

TOLEDO, OHIO



IN THE NEW GREER HOME STUDY COURSE IN AUTOMOTIVE ELECTRICITY

Thousands of successful garage men and their automobile mechanics owe their prosperity to the courses in automotive engineering which they learned at the famous Greer College in Chicago. Greer trained men all over the country are earning \$75 to \$100 a week and more.

To meet a growing demand from ambitious young men who cannot leave their occupations, we have prepared these thorough, practical courses for home study work. This Home Study Course is absolutely new and original; it presents automotive electricity from an entirely new angle—in simple, logical terms.

Our special introductory price for this course is \$50; later it will be \$75. As a special offer to show you how simple and practical it is, we are giving the first lesson free. Send in your name today and let us send you the trial lesson.

GREER COLLEGE OF AUTOMOTIVE

Dept. B2

ENGINEERING

2024 S. Wabash Avenue.

Chicago

METAL DOOR PANEL FOR FRONT DOOR OF THE FORD



Made from 26-gauge pressed auto body steel in imitation of a grained leather panel with binding. Space above cross brace in door is made accessible and forms a very convenient pocket.

FINE BAKED-ON BLACK ENAMEL FINISH
Saves the cost and avoids the inconvenience of constantly replacing the flimsy card door panel.

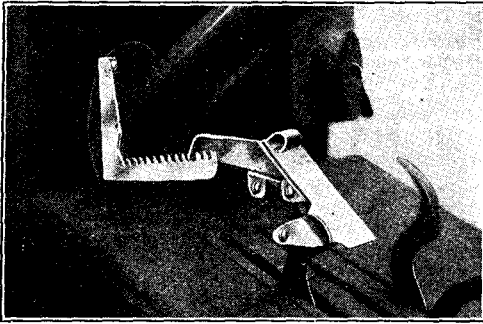
PRICE \$1.25

DEALERS: These Door Panels, packed in lots of 12, are now carried in stock by many of the leading Jobbers in automotive accessories; if unable to obtain from your Jobber, we will supply you promptly. Write for discounts.

DWYER MANUFACTURING CO.

Los Angeles.

San Francisco.



Patent applied for.
ROGERS HOLD-LOW FOR FORDS

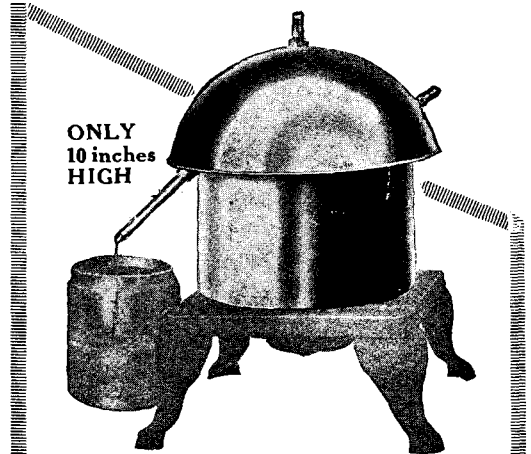
Holds the pedal in "low" position when desired. Disengages at a touch of the foot. Lock your car in low for going up hills, preventing low band from slipping. Down hill, lock it in low and brake with the compression, saving brake bands. Whenever low is needed, for more than momentary use, Hold-Low will do the work of the foot and relieve leg weariness. Does not engage unless wanted or interfere with ordinary operation of pedals—Guaranteed.

Extremely simple installation—no holes to bore. Sturdy construction.

Order today. Price \$2.50 postpaid. Dealers write

J. W. Ferren Co.

719 S. Rampart Boulevard, LOS ANGELES, CAL.



ONLY
10 inches
HIGH

BATTERY SERVICE

Can be **right** only when the water is **right**. Equip your service station to supply only

DISTILLED WATER

Distill approximately one gallon an hour—24 hours a day—every day in the year—without attention, trouble or annoyance. Use the new, efficient

CLEVELAND AUTOMATIC Water Still

Made of heavy, solid copper, highly polished—set up anywhere. Price only \$40.00.

Write today for full details and dealer discount.

CLEVELAND WATER STILL CO.
 490 Prospect Avenue, CLEVELAND, O.

SMOOTH-ON

TRADE MARK REG. U.S. PAT. OFF.

A Fast Selling Accessory



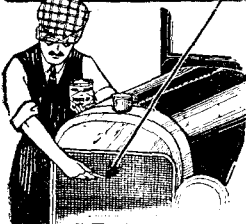
Most motorists are familiar with the merits of Smooth-On Iron Cement No. 1 for repairing leaky radiators, cracked waterjackets, cracked pumps, etc.—hence, it sells quickly.

Live, wide-awake dealers have increased their profits by pushing Smooth-On—why don't you?

Write for Our Dealer Proposition.

Garagemen—Write for our Motor and Home Repair Book-

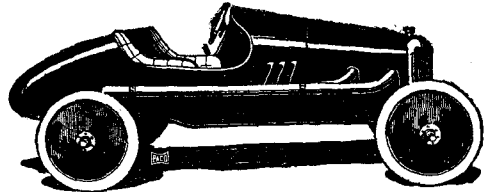
SMOOTH-ON
 for Leaky Radiators



let No. 274—it will acquaint you with the repairing qualities of Smooth-On Iron Cements.

Smooth-On
Mfg. Co.

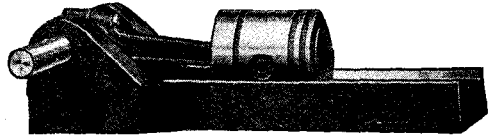
JERSEY CITY, N. J.
 U. S. A.



PACO RACING BODIES

PRICES REDUCED — WRITE

Get new, lowered price on this foreign type racing body. Fits any Ford chassis (old or new). Strong, fast, comfortable, attractive. Be our dealer in your territory. Write today. **Paco Mfg. Co., Dept. 205, Peoria, Ill.**



The Phoenix Connecting Rod Aligning Gauge eliminates expensive guess work. Quickly locates any inaccuracy of the connecting rod or misalignment of the bore in the piston head.

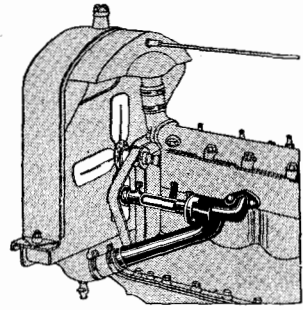
FREE FOLDER—Write us today for big free Illustrated folder showing the Gauge in action.

PHOENIX MANUFACTURING CO., Dept. C-5, Eau Claire, Wis.

PHOENIX

THE M AND K WATER PUMP

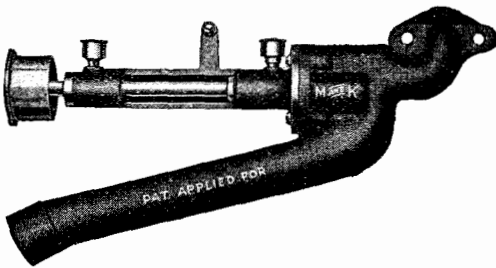
Perfect Water Circulation
for FORD Cars & Trucks



SAVE OIL Repairs

Overheating will make your motor act sluggish and lack Power

Can be installed in ten minutes. Requires no extra parts and forms an integral part of the motor the same as found on all other cars and trucks.



WILL KEEP YOUR FORD AT THE PROPER TEMPERATURE SUMMER AND WINTER AND PREVENT OVERHEATING AND FREEZING

Distributors Wanted

McDonald-Klein Distributing Co.

1604 Main St., Buffalo, N. Y.

3 MONEY MAKERS FOR BATTERY SERVICE Stations



THESE three items are from the big Canedy-Otto line of tools for garages and automobile repair shops. They are money makers. They mean fast, sure, accurate work; no breakdowns; no lost time; a good sound profit on every job. Read the descriptions; note the fine features. Write for Bulletin illustrating the line.



C-O Battery Vise

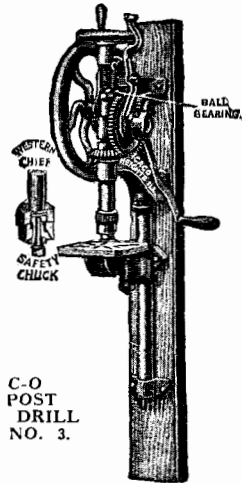
Fastens to floor; clamps battery firmly without hurting it. Takes any make; eliminates necessity of standing on battery or clamping with feet. Prevents acid damaging clothes or injuring operator.



C-O Battery Terminal Tongs

Removes battery wire taper terminal without injury when they are in corroded condition; a useful tool; drop forge steel, 17½ in. long.

Automotive Equipment



C-O POST DRILL NO. 3.

THE Canedy-Otto Post Drill No. 3, illustrated above, is one of our best models for auto repair shop or garage, with its table run up and down of 15½ in., to take care of any battery, spindle run of 3 in., and automatic self-feed. This is not a cheap babbitted drill, but a successful tool, specially adapted for your use. It is moderate in price. Drills to center of 14 in. circle; bores 0 to 1 in.; has safety chuck and ball bearing spindle.

Canedy-Otto Manufacturing Company GENERAL OFFICES AND FACTORY
CHICAGO HEIGHTS, ILL.
NEW YORK OFFICE—Grand Central Palace



YOUR tires are being just as wilfully destroyed when you run them without proper air pressure. The axe process may be faster but under-inflation is just as deadly. Don't guess at tire inflation. Adopt the one SURE method.

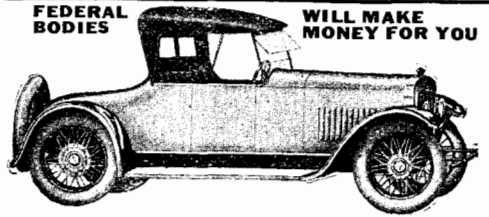
**USE A SCHRADER UNIVERSAL
TIRE PRESSURE GAUGE**
and KNOW that your tires are properly inflated. Invest \$1.50 today and watch your investment pay dividends in tire mileage.

AT ALL DEALERS EVERYWHERE.

A. SCHRADER'S SON, INC.
BROOKLYN, N. Y.
Chicago Toronto London

**FEDERAL
BODIES**

**WILL MAKE
MONEY FOR YOU**



This beautiful "FRATERNITY" Roadster body built for Fords and Chevrolets is the latest and most comfortable body constructed. Choice of colors.

THE ABOVE IS ONE OF OUR TEN DISTINCTIVE DESIGNS
DEALERS:—Write us at once for our new catalogue showing greatly reduced prices on FEDERAL Sport, Speed and Touring Bodies. Can make immediate shipments. **FORD BODIES AS LOW AS \$29.50**

Don't Pass Up This Opportunity
FEDERAL MOTOR SUPPLY CO., 2620 Michigan Ave., CHICAGO
Canadian Distributors: Auto Body Co., Toronto, Ont. Federal Auto Body Co., Campbellton, N. B.



Lap Score Marks Out of
Cylinders with

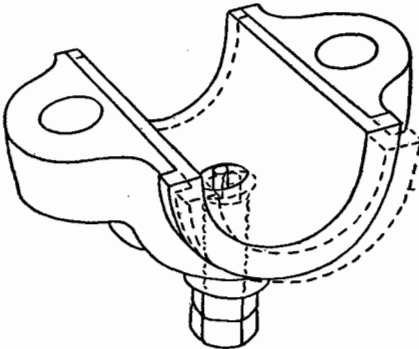
Clover Cylinder Lapping Tool
and
**Clover Valve Grinding and
Lapping Compound**

Free bulletins No. 75 and 80 tell you all about it.

WRITE FOR THEM

CLOVER MFG. COMPANY
512 Main Street Norwalk, Conn.
Branches: Chicago, San Francisco.

C-A ADJUSTABLE BEARING CAP



Patent applied for.
**FOR CENTER MAIN BEARINGS
IN FORD MOTOR**

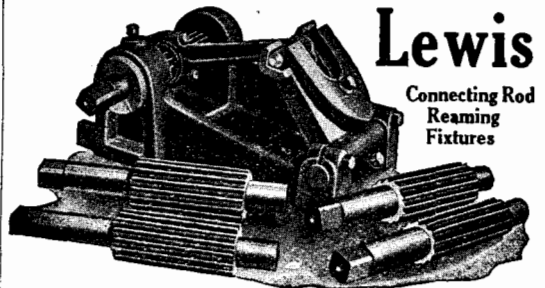
1. Positively sets magneto to get 100 per cent efficiency.
2. Easy starting, better lights, more power, less noise and heat.
3. Will take up end play in either direction.
4. Installed by any one in a few minutes, without removing motor.
5. Absolutely fully guaranteed.

PRICE \$5.00

ADJUSTABLE BEARING CO., INC.

116 S. 4th St., Terre Haute, Ind.

DEALERS and GARAGEMEN: Write for special prices. Still have some exclusive territory open.



Lewis

Connecting Rod
Reaming
Fixtures

Perfect Alignment in reaming connecting rods. It is a jig that compels correct results and eliminates guesswork and "scraping." Any ordinary mechanic can operate it. Eleven sizes, fitting 103 different motors made in the United States.



**Combination Aligning Reamer
for Ford Motors**

Will not dig, chatter or pull the babbitt. Eliminates end thrust. Saves time and gives a perfect job. Saves its cost on first five motors reamed, and earns bigger profits on "standard price" service work.

Write for complete detail and prices

LEWIS TOOL COMPANY
612 Fifth Avenue, South Minneapolis, Minn.

DORRMILLER DIFFERENTIAL

THIS positive differential for Ford and Chevrolet 490 cars does away with the necessity for chains. Automatically it prevents slipping and skidding on wet and muddy roads and insures useful power for deepest mud or heaviest sand.

It is easy to install and will outlast your car. If it does not do all that we claim for it, return it within 30 days and your money will be refunded.

Are you qualified to organize a state or district territory for the sale of the Dorr-Miller differential for Ford and Chevrolet cars? Some desirable territory is open. We will give exclusive rights to the man who is big enough to handle his own agents. It is a clean cut business proposition and can be made to pay you a substantial and permanent income.

**Toledo Automotive
Products Company**

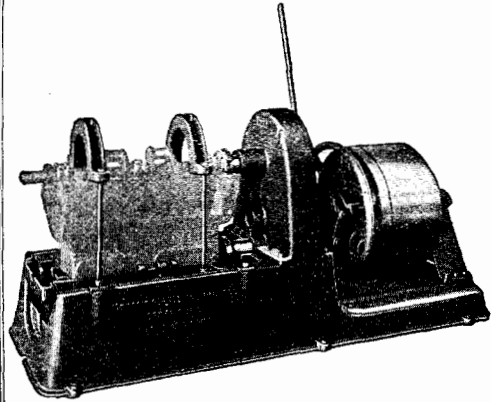
TOLEDO, OHIO.

DETROIT Burning-in Machine

Strong enough to last you as long as you are in the automobile business! This is the Burning-in Machine used in all the 39 Ford Motor Branches.

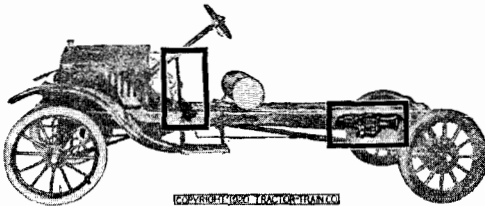
Recently reduced in price. Write for complete specifications; mention other equipment that interests you.

Detroit Garage 44 Hendrie St.,
Equipment Co. Detroit, Mich.



HERE IT IS!

"MOORE POWER" TRADE MARK



The "Moore" 4-Speed Transmission for Fords

Double the original Ford power by giving an Intermediate Speed and an Emergency Low and Reverse in addition to the regular Ford speeds and having twice the power.

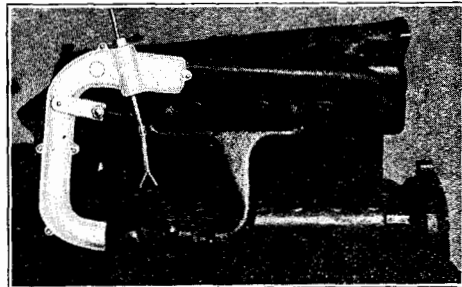
For further information, literature and prices write to the

TRACTOR-TRAIN COMPANY

Manufacturers

1346 Wall Street

LOS ANGELES, CAL.



**F. & G. AUTOMATIC FUEL-IZER
THAT CUTS GAS BILLS IN HALF.**

Facts

- The F. & G. Automatic Regulator is—
- Absolutely
- Thermostat-Automatic
- Regulated
- Indestructible
- Installed in 5 Minutes.
- A 25% Gas Saver
- A Carbon Eliminator
- An Oil Conservor
- An investment that pays for itself in a short time.

You'll burn half the gas you have been using with an F&G installed. Because you are giving your carburetor a chance, feeding it vaporized gas at 180° F., the just right temperature for complete combustion. And o boy! what that old engine will do. Power? No end of it, and a mileage record that will make them set up and listen. Here's the secret:

The F. & G. Automatic Fuel-izer shown above has an absolutely automatic thermostatic control that delivers air and gas at all times and under all operating conditions at the temperature for perfect combustion.

Installed in **SATISFACTION** Outlasts 5 Minutes. **GUARANTEED.** the car.

Hundreds of these Fuel-izers now in use and every user a booster. Get yours today. Put it on your Ford—**Use it.** If it doesn't do all claimed and satisfy you in every respect, return it and we'll gladly return the purchase price. Ask your dealer. If he cannot supply you, send direct. **PRICE \$10.**

**DEALERS
ATTENTION**

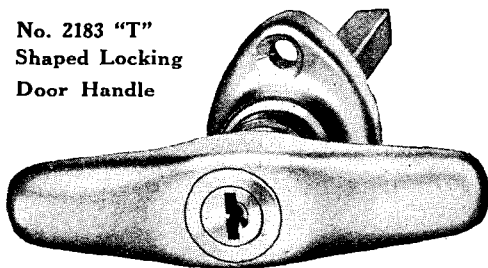
Our Dealer Proposition will interest you. Write or wire for territory rights **AT ONCE.**

B.&H.SALES CO., Dept.D, 431 S. Dearborn St., Chicago, Ill.

LOCKING DOOR HANDLES

Every Ford Closed Car Should be Equipped

No. 2183 "T"
Shaped Locking
Door Handle



Every other type of closed car can be locked. Why not the Ford? Protect wraps, robes, golf bags, etc., from theft.

The NEW BASCO T SHAPED LOCKING DOOR HANDLE furnishes the means of protecting the Ford car with a lock with a minimum expense and installation labor. Only one required for a car.

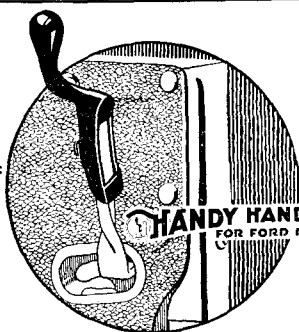
FORD DEALERS—You should sell one of these handles with every closed car you sell. Inquire of the nearest Briggs & Stratton Service Station or of your jobber. If your jobber does not handle, we can direct you to one who does.

BRIGGS & STRATTON COMPANY

MILWAUKEE



WISCONSIN



HANDY HANDLES
FOR FORD DOORS

'Atta Boy! Handy Handles do the trick. Don't kick your doors out of "kilter" to open them — Handy Handles open them smoothly and easily. You don't have to tug at the door or injure your fingers.

HANDY HANDLES fit right over the regular Ford handles—a few twists of a screw driver and they're on. Solid casting, black enameled—neat in appearance.

Three for a dollar or one for 40 cents.

Packed in a carton. At your dealer's or just pin a dollar bill to your name and address and send it to us.

RACINE SCREW WORKS
DEPT. F, RACINE, WISCONSIN

KOR-KER PRESERVES TIRES



What many autoists believed impossible has been accomplished

Tires can be made puncture proof and leak proof. For seven years and in forty different countries thousands of autoists have been enjoying the luxury of riding free from the worry or care of punctured tires by having them Korkerized.

Kor-Ker removes the bugbear of automobiling. Kor-Ker instantly and permanently heals punctures.

Kor-Ker stops slow leaks — makes tires non-porous.

Kor-Ker often gives 50% more mileage.

Kor-Ker keeps tires at normal inflation—no broken sidewalls, rim cuts, chafed beads, etc.

Kor-Ker reduces possibility of blowouts to a minimum.

Kor-Ker saves many dollars a season.

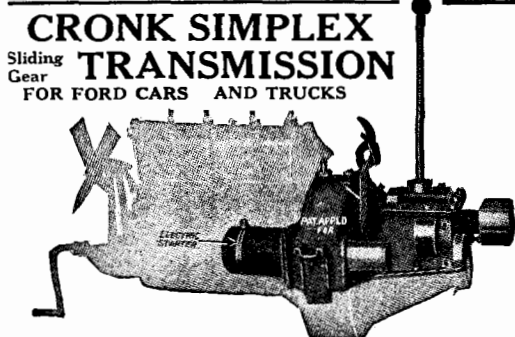
Kor-Ker saves you the delay and bother—of a puncture on the road.

Send for literature.

Correspondence invited with dealers.

ALCEMO MANUFACTURING CO.
115 Bridge St., Newark, N. J.

When writing advertisers—Just say FORD OWNER AND DEALER.

Sliding
Gear

CRONK SIMPLEX TRANSMISSION

FOR FORD CARS AND TRUCKS

You get the utmost of power, flexibility and speed and give your Ford the same control used on high-powered cars.

Saving—More Power “Big Car” Control—

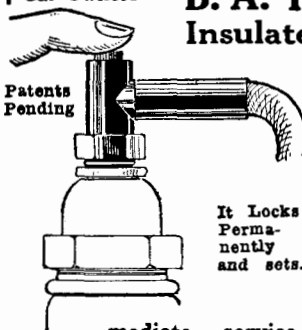
This is a Three Speed Forward, One Reverse Selective Type Sliding Gear Transmission of the most practical character. The low gear ratio is lower than the Ford low, giving more power in low speed. An intermediate is provided between low and high, and the gear ratio is the same as the Ford high. Hills and rough roads, that heat and wear a planetary transmission are taken with ease with this intermediate speed. The simple “cane shaft” makes it unnecessary to hold down the clutch pedal. It provides a wide range of power with utmost simplicity of operation.

It is strongly built and easily installed without cutting or machining. It saves its cost in preventing axle and engine wear and converts the Ford into a car of more flexible power.

If there is no agent in your vicinity,
we will sell direct. Prompt delivery.

E. D. & A. F. CRONK, INC. Utica, New York

A Friend to All
Car Owners

Patents
Pending

B. A. T. Automatic Insulated Spark Plug Terminal

IT LOCKS
permanently,
cannot pull or
vibrate out until
the push button is
pressed down
when the con-
necting plug is re-
leased. Gives im-

mediate service, saves time, no burned fingers, no shocks, no short circuits, no loose or ragged wires, no lost nuts, no annoyances of any kind. Always a tight connection giving a rich spark to the plug. Is the only sure hold-tight electrical connection between spark plugs, timers and magnetos. Increases the life of the cables. Cables can be instantly disconnected and connected while the motor is running, enabling the user to quickly find the plug not sparking. When once used, always used.

We will mail a box containing a set of four on receipt of \$1.50 to introduce them into your neighborhood. Show them to your friends. If you are not satisfied, we will return the \$1.50 on receipt of the terminals in good condition.

When ordering state the type of Spark Plug
You Are Using

We invite dealers to write for terms.

B. A. T. TERMINAL CO., 105 Vanderveer St.,
BROOKLYN, N. Y.

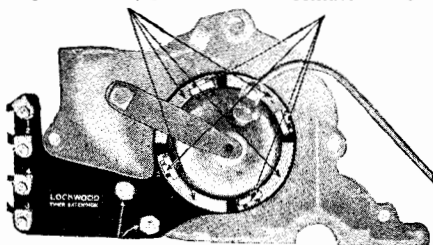
LOCKWOOD TIMER EXTENSION

FOR

Ford Cars and Trucks

Contact Plates

Contact Shoes



Bolts Holding Extension

**LOOSE WIRES ELIMINATED
IGNITION TROUBLE SOLVED
SURE SPARK
EASIER STARTING
SMOOTHER RUNNING**

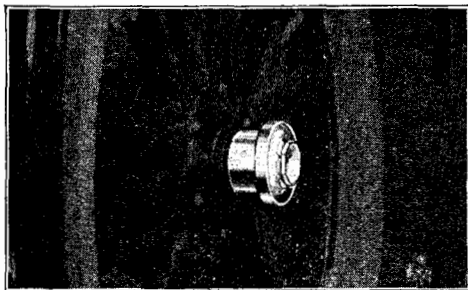
PRICE
IN U. S. A.

\$3.50

DEALERS AND AGENTS WANTED

Lockwood Products Co.

307-9 Met. Bank Bldg.
MINNEAPOLIS, MINN.



DRESS UP YOUR FORD

PARTS CORPORATION HUB CAPS add a touch of distinction where it is needed. They are made of strong non-rusting metal having a bright finish.

PRICE \$1.00 EACH, East of Denver
West of Denver \$1.10

**HIGH GRADE RADIATOR CAPS, TOO,
AT LOW PRICES.**

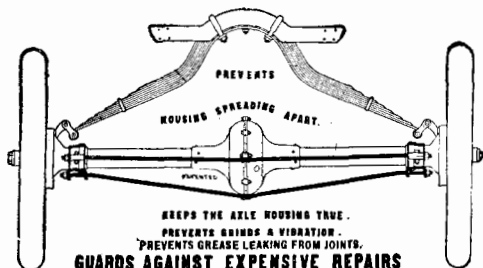
If you are a dealer and do not handle Parts Corp. Radiator Caps you are missing big profits. They have a non-rusting finish and big arms. Made for all cars. In many cases they undersell hard rubber caps.

Ford Special Size \$1.00. East of Denver.
West of Denver \$1.10

DEALERS and JOBBERS: Write for our liberal offer today. Handle this fast moving line of accessories.

MFG. BY **Parts Corp.** INDIANAPOLIS,
INDIANA

No More Rear Axle Troubles
After Applying
**THE MASTER
DOUBLE TRUSS ROD**



The Most Durable Truss Rod Made
The Truss Rod Minus Competition

Both rods counteract the effect of the jars and jolts of the road, prevent vibration, breakage, grease leaking from housing joints, etc.

The bottom rod relieves all vertical strains.
The rear rod relieves all horizontal strains.

The Master Applied Today—Saves Repair Bills Tomorrow.

Insist on the Master Double Truss Rod—thereby avoid inferior rods now flooding the market.

If your dealer cannot supply order direct.
Price \$4.50

THE MASTER PRODUCTS CO.
1142-46 Belmont Ave., Chicago.

Auto Owners WANTED!



To introduce the best automobile tires in the world. Made under our new and exclusive Internal Hydraulic Expansion Process that eliminates **Blow-Out—Stone-Bruise—Rim Cut** and enables us to sell our tires under a

10,000 MILE GUARANTEE

We want an agent in every community to use and introduce these wonderful tires at our astonishingly low prices to all motor car owners.

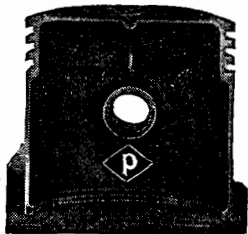
FREE TIRES for YOUR OWN CAR
to a representative in each community. Write for booklet fully describing this new process and explaining our amazing introductory offer to owner agents.

Hydro-United Tire Co.
DEPT. 191 CHICAGO OR PHILADELPHIA

BALANCED LIGHT WEIGHT FERROLYTE PISTONS (Trade Mark Reg.)

DESIGNED FOR EFFICIENCY
FORD AND OTHER MODELS

FORD
TYPE
\$16.25
(Set of
Four)
Complete



FORD
TYPE
\$14.75
(Set of
Four)
Less Rings

Note Light Sturdy Construction of Cross Section

Higher Speed—Quicker Acceleration—No Engine Vibration—Less Wear on Motor Bearings—Lower Operation and Upkeep Cost.

SIZES:

Standard, + .0025, + .005, + .031, + .033, + .062

WRITE FOR LIST OF MAKES AND PRICES
Special Discount to Jobbers, Dealers, Garages, Etc.

The Perfection Auto Parts Co.
420 Lakeside Av. N. W., CLEVELAND, O.

"Katta-Pilla" Metal and Cork Fan Belts

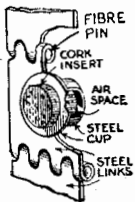


Are made of thin steel links, Fibro Pins and Corks; are noiseless—**RUN SLACK**—practically indestructible, unexpected breakage impossible; are unaffected by dirt, water, heat or oil; will not fall down, wear out, get hard, rot, break, tear, stretch or shrink.

100% EFFICIENT—100% PROTECTION
Saves Oil, Saves Gasoline, Saves Overheating,
Saves Valves, Saves Bearings,
Saves Cylinders

**Fit Any Car, Truck or
Tractor**

"Kork-Tred" Ford Transmission Lining is the original cork lining. There is nothing—"Just as Good." No other cork insert lining contains the LUBRICATION OIL CUPS. This feature is fully protected by patents and cannot be duplicated. Don't let 'em fool you with substitutes that have tapered corks which fall out. Will outwear four sets of any other kind of lining. Send for Booklet. Dealers, we have a money making proposition for you.



"Kork-Tred" Inc. 500 Fifth Ave.
Dept. 8, N. Y. City

WANTED — PRINTERS

A large Milwaukee printer changed from the closed to the open shop plan on July first, when members of the typographical union went on strike to enforce the unjust demand for the 44 hour week.

This plant is now on a PERMANENT OPEN SHOP basis and despite the strike is operating practically normal.

A few good positions are open for linotype operators and hand compositors as ADDRESS Z-101, FORD OWNER AND

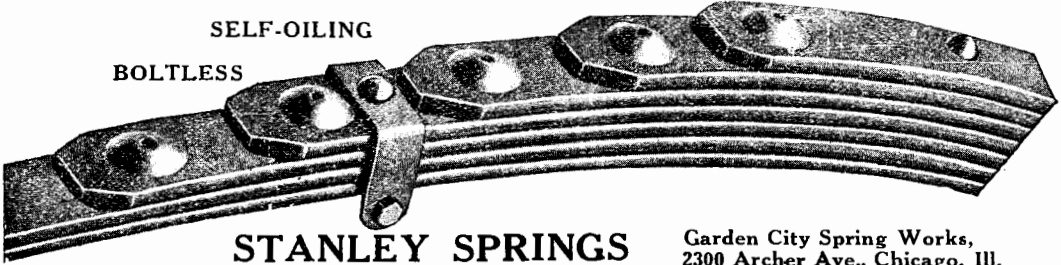
well as stone and lock-up man. Also apprentices with some experience can complete their training here under conditions that are most favorable.

If you are a printer and want to work in a shop where all conditions are desirable, send us your name, address, age, number of years printing experience, where employed during past five years and any other references you desire.

DEALER, MILWAUKEE, WISCONSIN

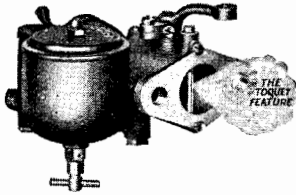
SELF-OILING

BOLTLESS



STANLEY SPRINGS

Garden City Spring Works,
2300 Archer Ave., Chicago, Ill.



QUICK SALES TOQUET CARBURETOR

Dealers everywhere report SNAPPY PROFITS in the sale of the

Ford owners know real value and they are quick to learn that the Toquet Carburetor positively does produce more power on hills—more speed on straight stretches—smoother idling through traffic—snappier pick-up—more miles per gallon of gas.

Every Toquet is absolutely guaranteed for complete satisfaction to the purchaser. We stand squarely behind it. Simple, well-made and efficient.

TOQUET CARBURETOR CORP., 1819 Broadway, N.Y. City
Car Owners, Dealers, Jobbers: Write for complete information today.

MULTI-CORD TIRES

Built for 6000 Miles Service—Standard adjustment to govern

Our dependable process of reconstruction doubles the life of the tire and represents a saving which you cannot afford to miss.

A New Standard Tube Free With Each Tire Ordered

30x3 .. \$6.80	31x4... \$10.10	32x4 1/2.. \$12.00	36x4 1/2.. \$14.00
30x3 1/2.. 7.90	32x4... 10.45	33x4 1/2.. 12.40	35x5 .. 14.35
32x3 1/2.. 8.85	33x4... 10.90	34x4 1/2.. 12.90	37x5 .. 14.80
S.S. or Clincher	34x4... 11.25	35x4 1/2.. 13.15	

Orders shipped same day received. Send \$2.00 deposit with each tire ordered, balance C. O. D. Tires shipped subject to your examination. State whether SS or CL, plain or Non-Skid is desired. All same price. By sending full amount with the order you can save 5 per cent—our special cash with order discount.

RACINE TIRE SALES CO., Dept. 1059 2108 So. Racine Ave., Chicago

AUTO SUPPLIES WHOLESALE

Wholesale ONLY



Fidelity Bodies for Fords & "Chevrolet"

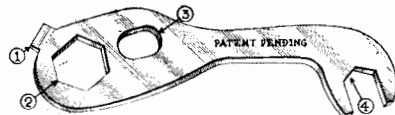
Make Money equipping old FORDS and "CHEVROLETS" with classy "FIDELITY BODIES" listed in "The Little Salesman."

FOR FORDS \$29.85 AND UP

New England Mills Co., Dept 25, 1027 W. Van Buren St., Chicago

ANNOUNCEMENT

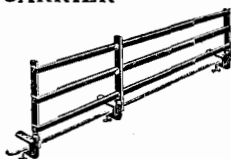
THE "4-in-1" BAND WRENCH for FORD TRANSMISSION



Key to cut: 1. Screw driver for removing transmission cover door. 2. To loosen low speed lock nut. 3. To tighten low speed adjusting screw. 4. To tighten brake and reverse. The greatest little wrench ever made for the Ford tool box. Not an accessory, but a necessity. Every Ford owner needs it—every Ford owner will buy it. Get in on the ground floor. Order now.

DEALERS AND JOBBERS WANTED.
Williams & Binns. Distributors. W. Brownsville, Pa.

When writing advertisers—Just say FORD OWNER AND DEALER.

PERFECT LUGGAGE CARRIER

You need a luggage carrier to give room in your car and at the same time carry everything you want.

THE PERFECT LUGGAGE CARRIER folds when not in use holds the packages securely, looks well and is the most durable carrier made. Fits any car. Four feet long, eight feet when fully extended. Strong steel bars and malleable iron fittings make this a carrier that will give you service for many years. Send \$2.50 for one and you'll be satisfied with your purchase—canvas covering \$1.50 extra.

WM. E. PRATT MFG. CO., 190 N. State St., Chicago, Ill.

**The
Jennings Governor
for the
Fordson Tractor
The Jennings Engineering
Company**
504 Butler Building, DETROIT, MICH.



High Grade Mailing Lists, Multi-graphing, Accurate Filling-In, Addressing, Enclosing, Mailing.
NEVADA, IOWA

STOP YOUR ENGINE TROUBLES WITH A CAMCO TURBINE Pump Cooler

Weights 3½ pounds, is solid aluminum, 9 ins. long, 2½" in diameter, with bronze bearings and stuffing box, self-lubricating which makes it practically indestructible and foolproof, uses regular Ford belt. Can be attached with a wrench and a screw-driver in five minutes by a novice.

**CAMCO PREVENTS OVERHEATING
AND FREEZING**

**Consolidated Accessories
Mfg. Corp.** FREDERICK, MARYLAND,
U. S. A.

DEALERS

THE DIAMOND "G" ATTACHMENT FOR FORD HORNS

Can be easily and quickly attached to any Ford car that has push button on steering post. An accessory that sells on sight. Enables the driver to "Keep his hands on the wheel." Dealers and jobbers, write for attractive offer.

Sample \$1.50, postpaid. Write today.

A. GILBERT & SONS BRASS FOUNDRY CO.
4015 Forest Park Blvd., ST. LOUIS, MO.

\$1.50
POST PAID



FOR
FORD
SEDAN

Carpet Mats FOR FORD CARS

Made of especially constructed auto carpet. Edges substantially bound with fabric leather. Neutral gray color.

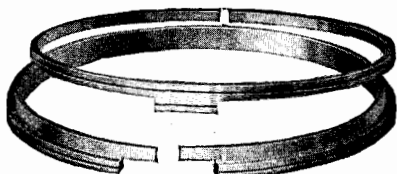
DEALERS, JOBBERS, OWNERS, write for complete catalog
Liberal trade discounts.

F. O. 1481—Touring or Runabout.....	\$2.75
F. O. 1483—Coupelet.....	3.25
F. O. 1482—Touring Tonneau.....	2.25
F. O. 1434—Sedan, complete.....	5.95

NATHAN NOVELTY MFG COMPANY.
55 Fifth Avenue, Dept. F. O., NEW YORK

ACKNOWLEDGED THE WORLD'S BEST
INGRAM'S

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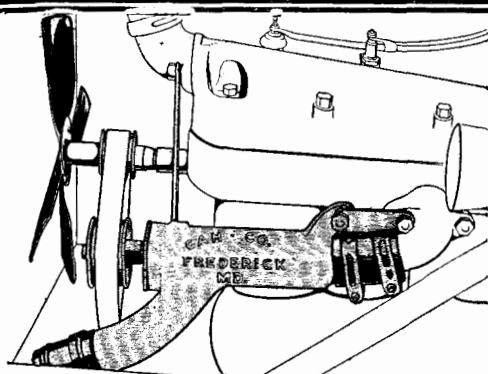


P
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WE ACTUALLY DO what the others promise and enough more to make your choice INGRAM Lip-Lock Piston Rings. "A square deal all round." Make us prove it. Hearty Co-operation with Dealers and Users is Our Watchword. Write—wire—phone.

INGRAM MOTOR COMPANY
Executive Offices 2 Rector St., N. Y. City.



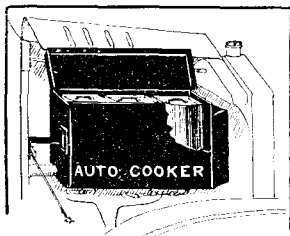
NABOB SNUBBERS

Makes the Ford best on market for smooth riding. Pronounced a "WONDER."

Any one can attach them in a few minutes. Only SNUBBERS on the market that do not necessitate change of shackle or removal of shackle bolt. Saves 20 to 25 per cent gas.

Set \$12.00 Money refunded if not satisfactory after ten days' trial. Local Distributors Wanted. **Mart Supply Co.** 337 W. Madison St., Chicago, Ill.

Home Cooked Meals for Tourists

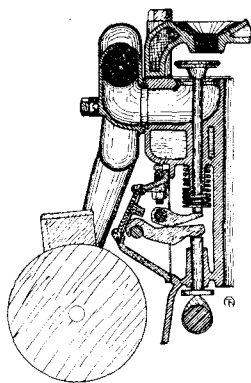


Campers, picnickers, wherever you are. The Auto Cooker is quickly attached to any Ford motor and efficiently COOKS meats, vegetables, etc. by engine heat while you travel. Substantially made from iron and aluminum. Fully \$6 guaranteed. Price

DEALERS—AGENTS—We have a very profitable proposition for you. Write for it today—NOW.

THE AUTO COOKER CO.

97 Glendale Park ROCHESTER, N. Y.



JUST TWO LEVERS

That's All

BUT THEY INCREASE THE VALVE CAPACITY 100%. That Is Important.

Standard Ford cars equipped with the

MULTI-LIFT

Go 55 miles per hour. Throttle to 3 miles per hour in high. Do not boil the water. And have reserve power for every emergency.

GET THE RIGHT OF WAY. CIRCULAR ON REQUEST. **GEORGE RILEY & CO.**

1007 N. Main Street LOS ANGELES, CAL.

DOUBL-HEAD Spark Plug



Wonderful new invention—two spark plugs in one—the only one made. One end automatically cleans itself while other end is firing. Exposed end acts as intensifier; and shows at a glance if plug is sparking. Fires through oil or grease. Unbreakable. Guaranteed.

Double Head Spark Plug \$1.50

If your dealer cannot supply you send \$1.50 each. Order complete set AT ONCE and do away with spark plug trouble and expense. All Sizes for All Motors. Order Today.

BULL DOG WOOD LINERS

for Ford Cars and Trucks. Guaranteed to outwear 3 sets of ordinary liners. "Bull Dogs" save installation charges and continuous adjustments. "Bull Dogs" stop the drum smoothly, grip tight and hold. Over 150,000 in daily use. Now being adopted by Ford Service Stations.

Set of Three, \$3.00.

If your dealer is out of "Bull Dog" Wood Transmission Liners send \$3.00 for complete set. Jobbers and Dealers—Your territory may still be open. Write for all facts today.

REARDON MFG. CO. 306 1st St., Peoria, Ill.



TRUCK TYPE

LOW REVERSE BRAKE

SNAPPY ABC BODIES

TRADE MARK

NINE STOCK MODELS FOR BOTH THE FORD AND CHEVROLET DEALERS WANTED AS LOW AS \$28.00 FOR FORDS



Would You Believe This to Be a Ford?

Touring, Roadster, Speedster and Sport Bodies Dealers Equipping old second-hand Fords and Chevrolets with ABC Bodies you can make as high as 100% profit. Send for illustrated catalog No. 15 describing ABC Bodies.

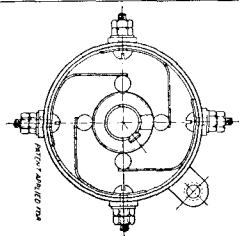
AUTOMOTIVE BODY COMPANY

Dept. F7. 549 W. Washington Blvd., Chicago, Ill.

ROSE TIRE PUMPS

The nation's best sellers. For years they have built their popularity on EASY TIRE PUMPING. You should sell them. Get our proposition. Ask about Rose Taper Nozzle Grease Guns, too.

Frank Rose Mfg. Co., Hastings, Nebr.



Indianapolis TIMER \$2.75

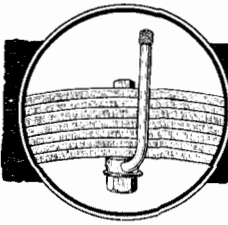
for EASY STARTING, DURABILITY, MORE PEP SAVER OF GAS.

Retails at \$2.75

Money Back in 30 days if not satisfactory.

VALUABLE TERRITORY OPEN FOR AGENTS, DEALERS and JOBBERS **Indianapolis Timer Co.**

INDIANAPOLIS, IND.



HIRST INTERNAL SPRING LUBRICATOR

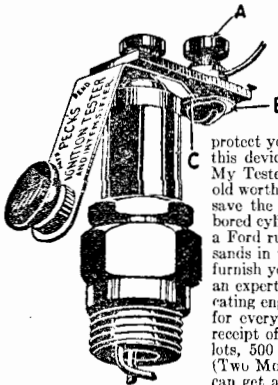
Ford Dealers ARE OUR Distributors

Hirst Internal Spring Lubricators for Fords are sold **exclusively** through Ford dealers.

Fit new and old type spring clip. Price \$2.50 complete set.

Investigate our special proposition to Ford dealers. Send in your sample order.

F. G. HIRST, 13th and Wallace Sts., Philadelphia, Pa.



No Free Samples

\$1.00 Worth of my Testers FREE! I make this offer to prove to you that I have the most wonderful invention and quick seller ever placed on the market. Every customer is a booster for you, and I will protect you on all resales. Do not confuse this device with so-called intensifiers, etc. My Tester and Transformer will make an old worthless car run like a new car. It will save the cost of new piston rings and rebored cylinders. Fitted with my invention, a Ford runs like a 12-cylinder car. Thousands in use. Every customer satisfied. I furnish you advertising matter that makes an expert of an amateur in tracing and locating engine troubles. You make a dollar for every 10c invested. Samples sent on receipt of 10c to cover postage. Quantity lots, 500 for \$25.00, and 500 for \$37.50. (Two Models.) Owner-agents and dealers can get a set of 4 for 50 cents by sending this ad, which is good for \$1.50. \$30 worth sent post paid on receipt of \$6.

Charles H. Peck, Pioneer Automobile Man
2154 N. Carlisle St., **PHILADELPHIA, PA.**



Don't Be a Mutt

You don't need to pay a big, fancy price for a good spark plug any longer. **Get a**

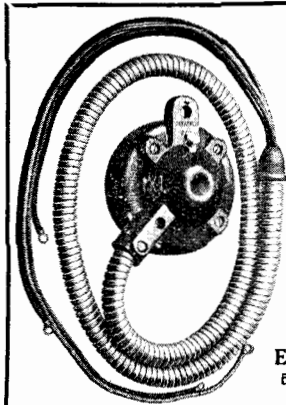
Little Jeff

They sell at **Fifty-five Cents** retail for...

Besides giving you the best plug for a lot less money, we send free with every Little Jeff Plug one Little Jeff Plug Cleaner. This simple and ingenious new invention enables you to clean a set of plugs in two minutes. We will send one Little Jeff Plug Cleaner FREE to anyone upon receipt of a five cent stamp to cover cost of packing and mailing.

Write us today for booklet and prices

GENERAL ACCESSORIES CORPORATION, Chicago



—IXL— SHORT PROOF IGNITION SYSTEM

Absolutely eliminates all ignition trouble both inside the timer and out, outfit includes

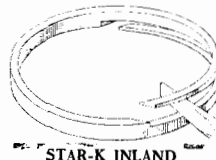
Genuine BAKELITE Timer Case

Timer mechanism, and armored cable to carry wires from coil box to timer.

Price Complete \$5.00

Write us today for full details

Eclipse Specialties Mfg. Co.
547 Washington Blvd,
CHICAGO



STAR-K INLAND SPIRAL-CUT PISTON RING

Highest grade. One piece, spirally cut, special heat treated. They "follow the wear" by uncoiling like a spring against cylinder walls with equal tension all around.

**Stark Inland
Machine Works**



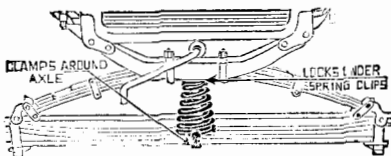
STAR-K OILESS QUICK SEATING PISTON RING

Stop oil pumping with this great popular priced ring. Has two oil grooves—one in middle for lubrication; one on lower shoulder to scrape down excess oil.

Velvet finish makes it "quick seating."

E148

St. Louis, Mo.



ARG AUXILIARY SPRING

A combination shock absorber and spring protector that prevents breaking front springs and fender irons cutting tires. Price only \$5.00.

Quickly and Easily Installed.

Sales Dept.
JESSOP & THOMPSON, 1421 S. Michigan Ave.,
Chicago, Ill.

Manufactured by **ARG Auxiliary Spring Co.**
Birmingham, Ala.

16,000 Miles without a Puncture

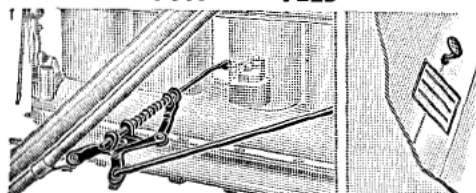


Wonderful invention. Insyde Tyres—Inner Armor for automobile tires. Positively prevent punctures and blowouts. Guaranteed to give double tire mileage, any tire—old or new. **Over 100,000 Satisfied Customers** Easily applied without tools. Just slip inside casing before replacing tube. Will not heat or pinch. Use over and over again. Old worn-out casings will give 3 to 5,000 miles more service. Low priced. Agents wanted in every county.

American Accessories Co., B-1937 Cincinnati, O.

RED-I-FIT

FOOT FEED



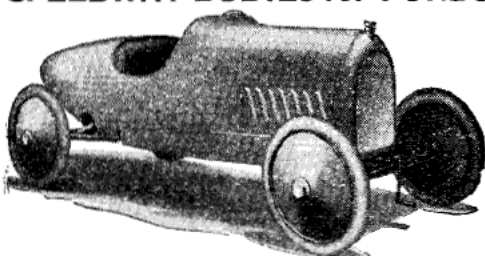
ACCELERATORS WORK ALL THE TIME
The extremely long life and unfailing service rendered so consistently is entirely due to their simple, but correct mechanical principle.

GIVES THAT EASY AND POSITIVE MOTION

Installed by Two Cotter Pins

FITS ALL FORD CARS

HEATON-AULT, 6247 Greenwood Ave., Chicago.

SPEEDWAY BODIES for FORDS

AND UNDERSLUNG PARTS.

MORTON & BRETT

INDIANAPOLIS, IND.

Normal position
facing forward

**RADIATOR SAFETY FUNNEL CAP**

A Stationary Filler Cap. A Radiator Cooler. A Practical Funnel. A Reliable Overheat Meter. Good Looking. Sure.

Cooling position partly open.

Cast Aluminum Highly Polished

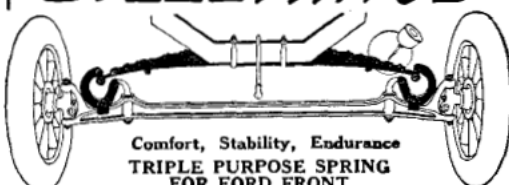
\$3.75 Prepaid

Send for Circulars

RADIATOR

FUNNEL CAP CO.

3852 Grand Boulevard, CHICAGO

**STEEL WINGS**

Comfort, Stability, Endurance
**TRIPLE PURPOSE SPRING
FOR FORD FRONT**

Guaranteed for the Life of Your Ford
Eliminates All Necessity for Other Shock Absorbers

STEEL WINGS CO.

Room 421-417 South Dearborn St., CHICAGO, ILL.

**NO MORE LOOSE CONNECTING
RODS IN FORD CAR**

KIL-NOCK

***Stops That Knock in Your
Ford Motor***

We guarantee KIL-NOCK as represented, or Money Back.

Price per set. **\$10.00**

DISTRIBUTORS AND DEALERS—WRITE
FOR OUR PROPOSITION. THIS IS
A REAL SELLER.

KIL-NOCK COMPANY

DAVENPORT, IOWA, U. S. A.

BRECO

Underslinging Irons

FOR FORDS

FIAT TYPE

RADIATOR SHELLS

RADIUS ROD

EXTENSIONS

Get our letter of instructions for underslinging cars

BREEDEN & COLE

149 11th Street, SAN FRANCISCO, CAL.

MAKES ANY FORD a Delivery Truck

YOU can convert your Ford into a practical delivery car chassis with 96 or 108 inches loading space back of driver's seat with the

HAY-DEE EXTENSION

A hammer and wrench—all that is needed.
PRACTICAL AND ECONOMICAL.

15-inch.....\$65 — 115-inch wheel base

30-inch.....\$70 — 130-inch wheel base

DEALERS: Write for real profits.

A. J. Diefenderfer Corp.

410 West 52nd St., NEW YORK CITY.

Does your Ford overheat?

You can eliminate ordinary overheating, and stop waste of gas and oil if you equip your Ford with the

Ospeco Water Pump

for Ford Cars

The Ospeco sells for \$15.00, complete, ready to install. Write for full description.

Manufactured and guaranteed by
Michigan Auto Products Company

Detroit, Michigan

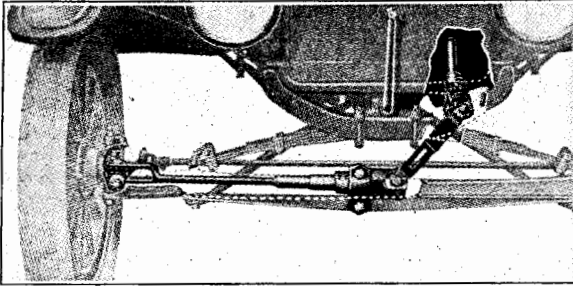
Sold by

Crawford-Lewis Corporation

6553 Woodward Ave.

Detroit, Mich.

(4)



ONE INSTALLED IN A COMMUNITY ADVERTISES ITSELF.

Fine Seller for Dealers and Agents. Write for information.

THE HANSEN-DENNETT-WINNER CO., Port Washington, Wisconsin.

PROTECT YOUR LIFE BY INSTALLING AN E-Z STEER ON YOUR FORD

This new device has proved a godsend to Ford owners, and once installed you will never drive without it.

**DRIVE WITH COMFORT
and SAFETY**

With the E-Z STEER there is no danger of "turning turtle" or "jumping off the road" when striking ruts, stones or sand.

You may drive with perfect safety with one hand. Long drives may be made without fatigue to driver.

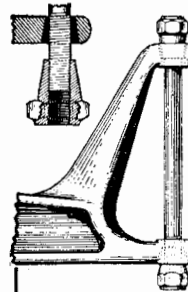
SALES MADE WITHOUT EFFORT.

183-W COIL TESTER

*A Quick, Easy and
Infallible Test for the
Coils of Ford Cars.*

Every garage should be provided with this time-saver. It makes a testing job a matter of a few seconds. Pays for itself in one day's use. Ask for folder and terms.

Ballman-Whitten Mfg. Co.
7421 Manchester Ave.
ST. LOUIS, MO.
*Manufacturers Of
B-W Ammeters.*



**STOP THAT WOBBLING AND
RATTLE BY USING THE
PRACTICAL LITTLE GIANT STEERING
KNUCKLE TAKE-UP
SPINDLE BOLT.**

This bolt can be put on any Ford or Chevrolet No. 490 axle by any workman. It is made to take up all play that is worn in a Ford or Chevrolet No. 490 axle. By tightening the nut it tightens the head of the bolt as well as the nut. This bolt is made of good steel. There is an oil hole for grease cup, nut to key with a cotter pin.

Price to dealers \$1.80 the pair.
Retail at \$2.50. No experience
necessary to install these bolts.

All one needs is a reamer, which we furnish for \$2.00. Prices to Jobbers made known on request.
THE LITTLE GIANT MFG. COMPANY

212 N. Elm Street.

IOLA, KANSAS.

TIRE SAVING

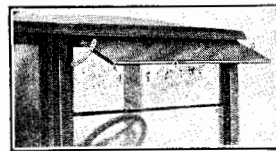
Ford owners have at last found real tire economy in the new 1921 type

ARMSTRONG 30 by 3½ R. C. N. S. CORD TIRE

This is full oversize, extra heavy shoulders. The handsomest and strongest tire of this size ever built. Guaranteed for 8,000 miles and good for double that.

DEALERS: We have an unusual proposition on a real seller among dealers for Fords. Write us today.

THE ARMSTRONG RUBBER CO., Inc.
Sales Office, 4 W. 61st St. NEW YORK CITY



Patented Nov. 30th, 1920.

RAIN-SUN

(Trade Mark)

VISION SHIELD with the RAIN GROOVE
Made of auto body steel. Finished in black enamel outside, velvet green beneath. Adjustable to any angle.

Price Anywhere in U. S. \$8.50

Ask your dealer or write

RAIN-SUN VISION SHIELD COMPANY
904 West Pico St., Los Angeles, Cal.

WATERLIET Spiral REAMERS

FOR FORD AUTOMOBILES
SAVE THEIR COST ON THE FIRST JOB.
"They will not chatter."



No. 3052X—Valve Stem Bearing Reamer, 1/64" oversize. When the valve stem holes become so worn that the old valve will not seat properly, use our No. 3052X SPIRAL Reamer to ream out the bearing 1/64" oversize and use valves with oversize stems. All the old power will have returned.

We make a special SPIRAL REAMER for every bearing and bushing on a Ford. Try your Jobber first and if he cannot furnish WATERLIET SPIRAL REAMERS, write us for booklet and price list.

WATERLIET TOOL CO., Inc., Albany, N. Y.

REYNOLDS SPRING CO.

RED DIAMOND CUSHIONS FOR FORD CARS

A Perfected Product for Particular People

Made by the largest exclusive Cushion Spring Factory in America and the most comfortable and durable cushions ever built by anybody.

Sold through regular channels only

**MANUFACTURERS
REYNOLDS SPRING
COMPANY
JACKSON, MICH.**

**SALES DEPT.
THE ZINKE CO.
1323 Michigan Ave.
CHICAGO, ILL.**

CLASSIFIED ADVERTISEMENTS

Advertisements inserted under this classification for 7c per word; name and address must be counted; no order for less than \$1.50. Cash must accompany order. Advertising copy due by the 10th of the month preceding date of issue. Write for Classified rates on twelve-time contracts. This advertising gets big results.

Agents! Dealers! A Seller!

Every Ford owner is a sure sale after one demonstration of the

"Ever-Ready" Multiple Adjustable Intensifier and Spark Plug Tester.

Assures a "live" spark and better motor action. Tells at a glance if anything is wrong with plugs, and which one. A sure seller. 100 per cent profit—and no risk. If they fail to sell we will refund your money.

GET STARTED. SEND TODAY FOR PARTICULARS

Rowe Manufacturing Co.

1011 Chestnut Street
PHILADELPHIA, PA.

Save the Middleman's Profit

Strong, durable oversized Tires built in Ford sizes only, and sold direct from us to you. No middle man.

30x3 N. S. Road Clutch..... \$ 6.75
30x3½ N. S. Road Clutch..... 8.50
31x4 N. S. Commercial..... 10.75

These tires are massive in appearance smooth in riding and wear like iron.

Fully guaranteed against defects in workmanship and material.

Shipped C. O. D. from

BERKELEY DISTRIBUTING CO.

3306 Atlantic Ave., Atlantic City, N. J.

Try one and you'll buy a set.

Headquarters speed and sport bodies and other high-grade specialties for Ford. Special Introductory Offer; while they last; subject to prior sale; only one of each item to customer:

	Regular.	Spec.
Sight Feed Oilers.....	\$ 7.50	\$2.25
3:1 Bevel Gears.....	16.50	8.65
Underslung Fixtures.....	20.00	11.95
New Simms Magneto, 4-cyl.....	55.00	19.00
Wire Wheels (set 5).....	85.00	53.95
16-Valve Cylinder Head.....	140.00	96.50
4-Speeds Transmission.....	100.00	69.00

Terms: 50 per cent with order, balance upon delivery. Satisfaction or Money Back Guarantee. M. S. Ford Speed & Power Equipment Manufacturers, 250 West 54th St., New York.

Peejay step-cut piston rings for automobile, tractor truck and marine engines. Guaranteed to do everything a piston ring can do. Two to four and one-half inch diameter, fifty cents. Special set of twelve for Ford \$4.50. Phil. Jacobs, Distributor, Portsmouth, Ohio.

Wanted—Salesmen who call on Ford Dealers, Service Stations, Garages, Jobbers and Accessory Stores. Can earn a neat sum each month without interfering with their regular work. Write for particulars.—Ford Owner and Dealer Magazine, Dept. C., Montgomery Bldg., Milwaukee, Wis.

Business Opportunity

I wish to retire and am offering a real opportunity in

The Sale of My AUTOMOBILE INTERESTS

Includes lot 60x200 feet, brick building 60x100 feet, one and a half stories, no posts, addition at either end. Splendid construction. Building and lot worth \$15,000; inventory of stock \$20,000.

Have Ford contract and local branch willing to arrange with suitable parties. Have already sold practically entire year's contract of cars and business growing steadily.

A bargain for reliable person

WRITE AT ONCE

Address S. D., care of

Ford Owner and Dealer

MILWAUKEE, WIS.

Attention—Ford car and tractor owners—Tractor top with back cushion curtains, all round, \$49.50. Ford one man tops complete with curtains, \$42 and up. Topping outfit roof quarters and back curtain, \$7.75 and up. Back curtains, \$2.90 and up. Side curtains, \$10.50. Five piece artificial lace door coverings and panels, \$3.00. Seat covers, \$7.50 and up. Twin front seat cushions, \$10.50. Single front seat cushions, \$8.00; Rear seat cushions, \$8.50. Back upholstery ready to tack in—Front seat back, \$10.00; rear seat back, \$11.00. Our entire line includes all makes of cars. Motor boats and motorcycles. We also re-cover tops sent to factory. Samples, material and prices upon request. Atlantic Auto & Body Works, 136 Jamaica Ave., Brooklyn, N. Y.

AUTOMOBILE OWNERS: Why pay big prices for puncture and blowout repairs. Our all rubber self-vulcanizing patch welds permanently. Easily applied—no delay—tire or tube ready for immediate use. Quantity sufficient for 50 or more punctures, cleaning fluid and buffer complete. Regular price \$1.00. Send us your dealers name and address with \$1.00 for two full size outfits. Iron-Clad Labs., Inc., 416 Carroll St., New Orleans, La.

SALESMEN—If you call on Ford Dealers, Service Stations, Garage, Jobbers or Accessory Dealers, we have a proposition that should net you not less than \$300.00 per month extra. Write us at once. Gardner Auto Products, 23-25 W. Hancock Ave., Detroit, Mich.

WANTED—Men with Ford cars to sell STOKES CARBURETORS. Exclusive territory given. Write for particulars. Stokes Carburetor Co., Inc., 384-6 East 133 St., N. Y. City.

PATENTS—Write for Illustrated Guide Book and Evidence of Conception Blank. Send model or sketch and description for our free opinion of its patentable nature. Highest references. Prompt service. Reasonable terms. Victor J. Evans & Co., 627 Ninth, Washington, D. C.

Patents—Prompt and efficient service personally rendered. Twenty years' experience. Reasonable charges. Leech & Co., 307 National Savings and Trust Bldg., Washington, D. C.

Classified Advertisements—Continued

Genuine Wilmo Hot Spot Manifold for Fords, \$2.50 F. O. B. Houston, via express; cash with order. **The Way Company, Houston, Texas.**

REMOVE THE CYLINDER—Insert piston. No grinding, no lapping. Our \$20 Ford Cylinder Re-boring Tool leaves the cylinder absolutely smooth all ready for the piston. Simple, easy, rapid, accurate. Request circular. **Goruse Company, Elmira, N. Y.**

"INVENTORS—Don't lose your rights to patent protection. Send for blank form 'Evidence of Conception' to be signed and witnessed and information bulletin 'How to Establish Your Rights.' Both are free and very desirable to proper patent procedure. **Lawrence and Allwine, 238 Ouray Building, Washington, D. C.**

AGENTS make big money selling our all rubber self-vulcanizing patch for tires and tubes. Large orders from accessory dealers. Exclusive territory to right party. Send \$1.00 for complete outfit and instructions. **Iron-Clad Labs., 416 Carroll St., New Orleans, La.**

Salesmen—To sell our Carbon Remover, Radinor Cement, Polish and other products to automobile owners and accessory dealers. Big commissions and a wonderful opportunity for hustlers. **Bush Chemical Company, St. Louis, Mo.**

Accessory Dealer, 100 Per Cent Profit on Cost. Send name and address. We'll send you proposition, which gives you 100 per cent profit on cost, and our 50c size free, postage prepaid. No obligation to buy. **NoXal Co., 1238 Belmont Ave., Philadelphia, Pa.** Mention Ford Owner.

Sunlight for Fords. Handy light switch that fits on steering post. 100% more light and dimmer to comply with all laws. Price \$3.50. Agents wanted in every town and county. 100% profit. Best seller on market. **Sunlight System Co., P. O. Box 394, Chicago, Ill.**

PATENTS—Send for free book. Contains valuable information for inventors. Send sketch of your invention for Free Opinion of its patentable nature. Prompt Service. (Twenty years experience). **Talbert & Talbert, 447 Talbert Bldg., Washington, D. C.**

Wanted—Men with Ford cars to travel over your State establishing Agencies for the Gardner Carburetor. Write us at once. **Gardner Auto Products, 40-51 Hancock Ave., W. Detroit, Mich.**

AGENTS—\$250 worth Self-Selling Auto Devices quickly made from \$10 worth of material. No experience or tools required. Fast seller. Agents or Mail Order. Investigate. **Exchange System, Cullom, Illinois.**

SYSTEMATIZE YOUR AUTO REPAIR SHOP—Bin Label Cards for Ford Auto, Ford Starter, Ford One-Ton Truck and Fordson Tractor Parts. Sheet Metal Card Holders, Auto Stock Forms, Job Repair Tickets, Time Sheets, Requisition Blanks, Order Books, Cash Sales Slips, Repair Tags. Send for free samples and free booklets: How To Systematize the Auto Stock Room and Build Bin Racks; Perpetual Stock Inventories, and Book-keeping Hints for the Auto Dealer. **Haddon Bin Label Co., Haddon Heights, N. J.**

DON'T BREAK YOUR ARM cranking your Ford. Get a Miller Starter for \$5.75, postpaid, try it, then get an agency and sell to your neighbors and make money. **H. A. MILLER, Mfr., Memphis, Missouri.**

SALESMEN

Preferably car owner, calling on garages, service stations, and repairmen, to sell nationally advertised Piston Ring. (See ad on page 148). Liberal Commissions.

STEEL SPRING PISTON RING COMPANY, Brooklyn, New York

INSTANT-MEND-A-TUBE—Agents wanted in every town. Send One Dollar for two One Dollar packages, sell friends, neighbors. **Instant Mend-A-Tube Co., 940 So. Grand, Los Angeles, Calif.**

CALIFORNIA ROLLER BEARING SHOCK ABSORBERS, \$6.87 complete set to Ford car owners who later act as Agents. Money back guarantee. Regular price \$13.75. **Atlas T. & T. Co., 940 So. Grand, Los Angeles.**

SALESMEN calling on garages, Ford and accessory dealers. Make nice profit selling new Ford "necessity," not accessory. No competition. **H. G. Rose, Catesby, Oklahoma.**

SALESMEN with Ford Cars to demonstrate and sell Cleveland Motor Supports. Applied in thirty minutes. Permanently repairs or prevents broken Crank Case Arms on any Ford. Good profits. Write for proposition. **Cleveland Motor Support Co., 7610 Decker Ave., Cleveland, Ohio.**

Late model genuine "Hot Spot" Wilmo manifold for Ford cars. Check for \$3.75 gets immediate shipment. **United Supply Company, Dallas, Texas.**

Ford Owners—We have for immediate shipment Ford one man top, 3 side curtains on each side with large celluloid lights, 2 oval nickel frame plate glass lights in rear and windshield attachments; built with 32 oz. Ford rubber, \$26.50, or drab back long grain auto leather, \$27.50, or best grade double texture, \$31.50, ready to set right on car; no work to be done by mechanic. Recovers made up for your old top—Ford rubber \$6.75, drab back auto leather \$7.00, double texture \$8.00; with 2 plate glass in back curtain. Complete set side curtains \$9.50, back curtain of rubber \$2.75, of auto leather and 2 plate glass \$3.75, double texture and 2 plate glass \$4.50. All goods shipped C. O. D. with distinct understanding that we guarantee a perfect fit and all goods to be first class. We use no second grade material and we will be glad to refund the price of any article you are not perfectly satisfied with. Seat covers for Fords, \$7.50 to \$18.00. Seat covers and topings and side curtains for all makes of cars. Write for samples. **Atlantic Auto Top Co., 3310 Atlantic Ave., Atlantic City, N. J.**

Perfect Running Board Pump. Clamps on running board or use as foot pump. Long hose reaches all tires. Easy pump for ladies. Regular price \$4.50; \$1.75 prepaid east of Denver. **Pratt Mfg. Co., Joliet, Ill.**

Agents—Every automobile owner wants gold initials on his car; transfer them yourself or sell complete sets; profit \$1.40 on \$1.50 job; great money maker, quick business starter. Write to-day enclosing 15c stamps for sample assortment and agency. **Transfer Monogram Co., Long Branch, N. J.**

Fords run 34 miles per gallon on cheapest gasoline or half kerosene, using our 1921 carburetor. Increased power; styles for all motors; attach yourself. Money back guarantee; 30 days' trial. Big profits to agents. **Air Friction Carburetor Co., 1510 Madison St., Dayton, Ohio.**

ACCESSORY MANUFACTURERS ATTENTION Leaving Massachusetts over the road this fall for Florida in a 1921 starter-equipped Ford Touring Car. What proposition have you in the Accessory line to sell en route?

**C. E. MILKOWAIT
45 Pope St., Atlantic, Mass.**

Agents—New Invention, Positive everlasting air check valve. Sample to ½ inch \$5.00. **S. & W. Mfg. Co., Everett, Wash.**

FORDS RUN COOL—Our agents are clearing from one to three hundred dollars per week selling the Celebrated "POLAR BEAR" Circulating Pump to Ford Owners, Garages, Dealers and Sub-Agents. This Pump is guaranteed for five years, but with proper lubrication will last the life of the car. It is a fac-simile of the pump used on Liberty Motors in government service. Exclusive territory assigned to men who can finance themselves. Write for particulars. **Auto Equipment Sales Co., 225 Market St., San Francisco.**

AGENTS — \$15 a Day 10 Sales

An exceptional opportunity selling our "Nu-Life" Piston Ring Expanders (see page 41). Every dealer, repairman, garageman and auto owner a live prospect. Write for free sample and agents' proposition.

**American Auto Products Co.
1319 L St., N. W., Washington, D. C.**

Classified Advertisements—Continued

HILLS ILLUMINATED OIL GAUGE FOR FORD CARS

Just snap the switch and read the gauge, always ready, day or night.
Not affected by grease or dirt.
No changes necessary to install, do it yourself.
A real gauge for your Ford car and Fordson Tractor.

Complete with Gauge, socket, bulb, wire and switch ready to install, \$2.50.

G. L. HILLS CO., FRANKLIN, ILL.

Information on request

FORD OWNERS

Improve your spare time selling APCO Shock Absorbers for Ford Cars. The most widely advertised shock absorber on the market and the only one using drop forgings, hardened steel bushings. See advertising in Saturday Evening Post July 30th, August 27th, September 24th, October 22nd. Sells for a little more than any other but worth twice as much. Unless you can make twenty dollars a day selling them we are not interested in hearing from you. Ten demonstrations averages nine sales. Sample set at special price. Write for proposition now.

APCO MFG. CO., Owen Street, Providence, R. I.

AUTO OWNERS—Do you want the best tire pump made? Get the Never Leak. Has a regular piston and three piston rings, no leather plungers to dry or wear out. For particulars write to Joe Martin, Westfield, Iowa.

Salesmen wanted—for A. U. W. Spring Lubricator Cover for Fords. Easy seller. Send for attractive offer. List price Six Dollars for set of four for front and rear springs. Postage prepaid. Harrison and Hall, Manufacturers Agents, 2843 St. Paul St. Baltimore, Md.

For Sale—Rockway Starter. Good as new. Have sold my car. First money order for \$18.00 gets it. C. A. Haight, 369 Clifton Place, Brooklyn, N. Y.

NOTICE

Ford Special Cushion Cable Auto Tow Line sent direct on receipt of \$1.00. Only a limited number will be sold at this price. Detroit Auto Tow Line Co., 1236 John R St., Detroit, Mich.

"Worth hundreds of dollars to every car owner; worth thousands to manufacturers and garages—Formulas, 17 different auto necessities for \$1.00; Descriptive circular FREE. Eureka Supply Co., Wheeling, W. Va."

ATTENTION MANUFACTURERS

New Ford Transmission Band, Automatic self-locking detachable lug, requires only few moments to put in new linings. Patent Pending. Will lease on royalty. Write me for particulars, models, etc.

L. F. CREUNLEY

La Follette, R. D. 3, Tenn.

AGENTS WANTED

We have a proposition for Salesmen who are calling on Ford Dealers. The article we are selling is new, simple and has no competition. We sold 26 out of 27 Ford Dealers in Washington, Baltimore and Philadelphia. If you are looking for a side line this will pay you well, you can show the article and take an order in three minutes, no investment required, you take orders we fill direct by parcel post and pay commission weekly or as desired, write for further particulars.

R. J. LOOCK & CO.

539 Cumberland St.

Baltimore, Md.

AGENTS WANTED

TOWLINES sixteen feet long with hooks. Small enough for tool box. Replaced if broken within year. \$2.50 delivered. Agents price \$15.00 dozen. Sample \$1.50. Order sample today. Will buy back any you don't sell. The Superior Manufacturing Co. Penn-Lillis Building, Cleveland, Ohio.

"DROP FORGINGS"

for all Ford parts. Prompt deliveries.

WOONSOCKET WAGON MFG. COMPANY

Drop Forge Department

Woonsocket, R. I.

INSYDE TYRES inner armor for automobile tires. Positively prevent punctures and blow-outs. Guaranteed double tire mileage. Any tire. Enormous demand. Low priced. Write for particulars. Agents wanted. AMERICAN ACCESSORIES CO., B-731, Cincinnati, Ohio.

SALESMEN—AN EXCEPTIONAL OPPORTUNITY. Manufacturer of fast selling, well advertised automobile tools and accessories desires a few more salesmen on a commission basis. A straight business proposition making over \$100 a week for other salesmen. State territory now traveled, references and line now selling in first letter. Dept. F., Tribune Engineering Co., N. Y.

GO AND COME BACK AGAIN

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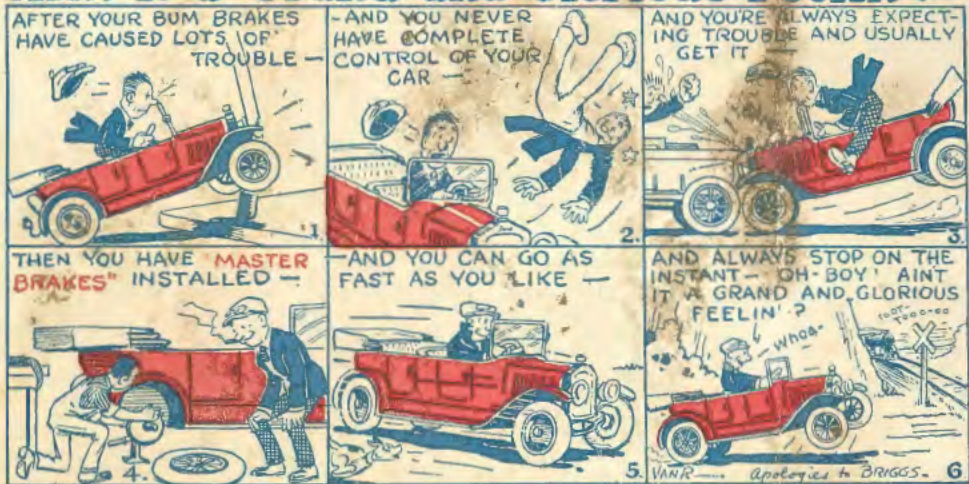
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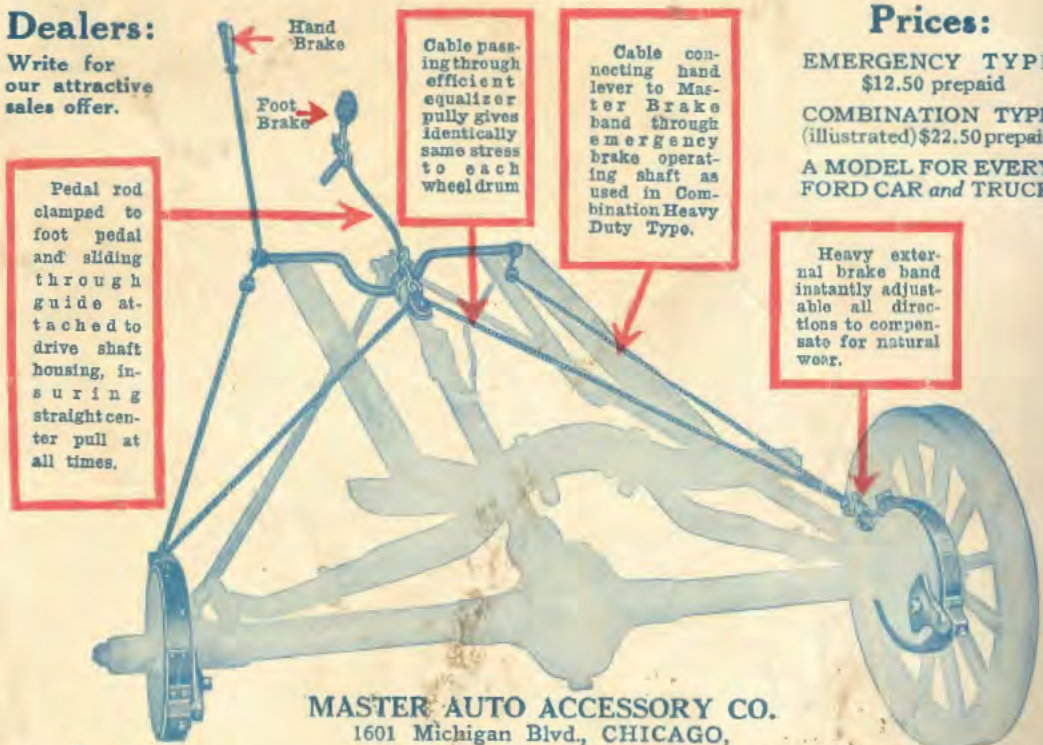
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