

National

HIGHWAY
TWELVE

THE REID MOTOR CO.,

DISTRIBUTORS

278 MAIN STREET,

HARTFORD, - - - CONN.

1916

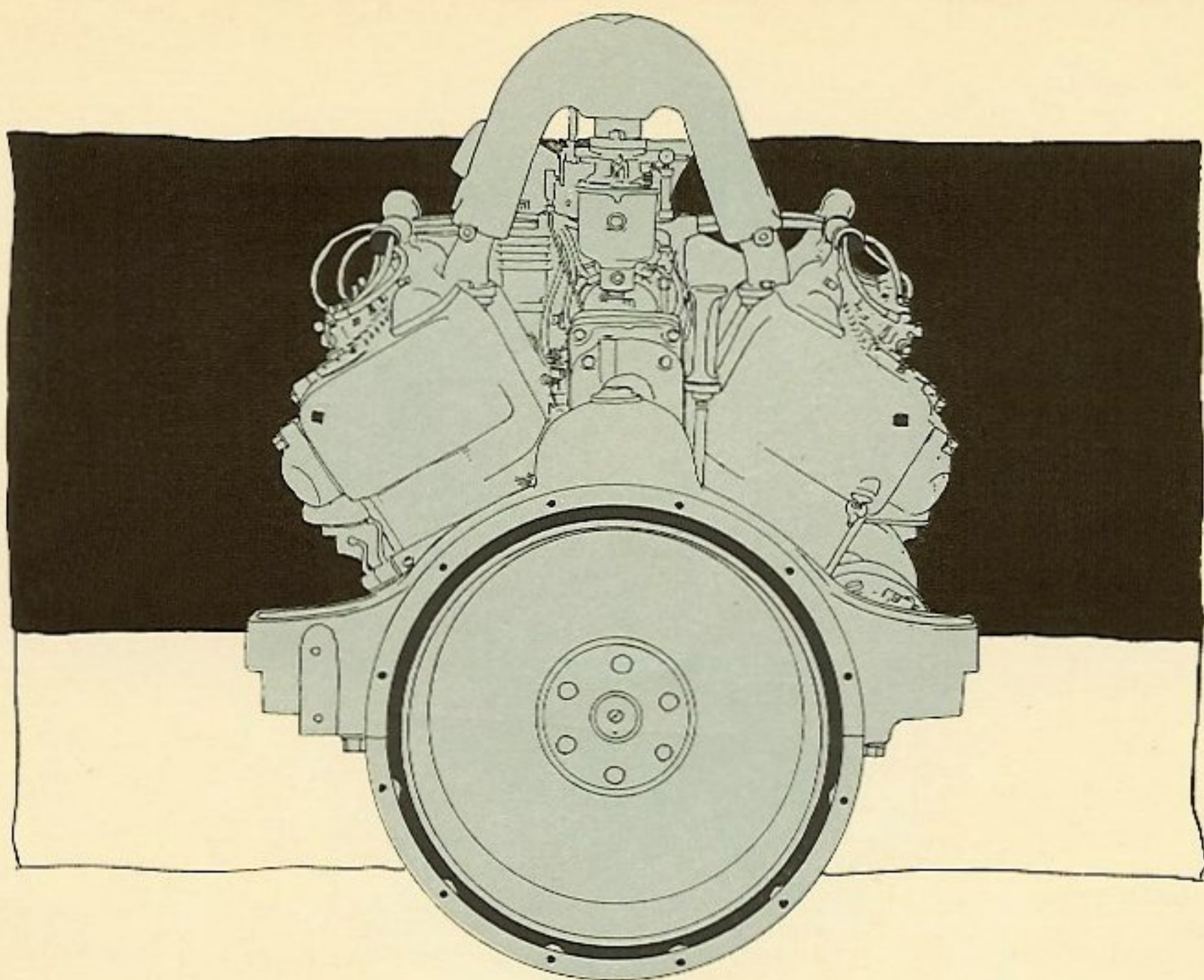


National
HIGHWAY
TWELVE



NATIONAL MOTOR VEHICLE CO.
INDIANAPOLIS, INDIANA, U.S.A.

SIXTEENTH YEAR



THE
NATIONAL
HIGHWAY 12
MOTOR

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NATIONAL HIGHWAY 12

THE pressure of steam is constant and even. It never lets up. The power of gasoline is explosive and intermittent. Automobile engineers have tried for a long time to find some way to take the intermissions out of gasoline. They have tried to find some way to keep gasoline from letting up. They have wanted for years to make a smooth, even, flexible power out of gasoline—a power that would flow instead of throb, and a power that would not tear up the machinery by which it was created.

In the National Highway Twelve this ideal has been attained.

The ideal is fairly well attained in the six-cylinder car, but there are several reasons why the twelve is better than the six.

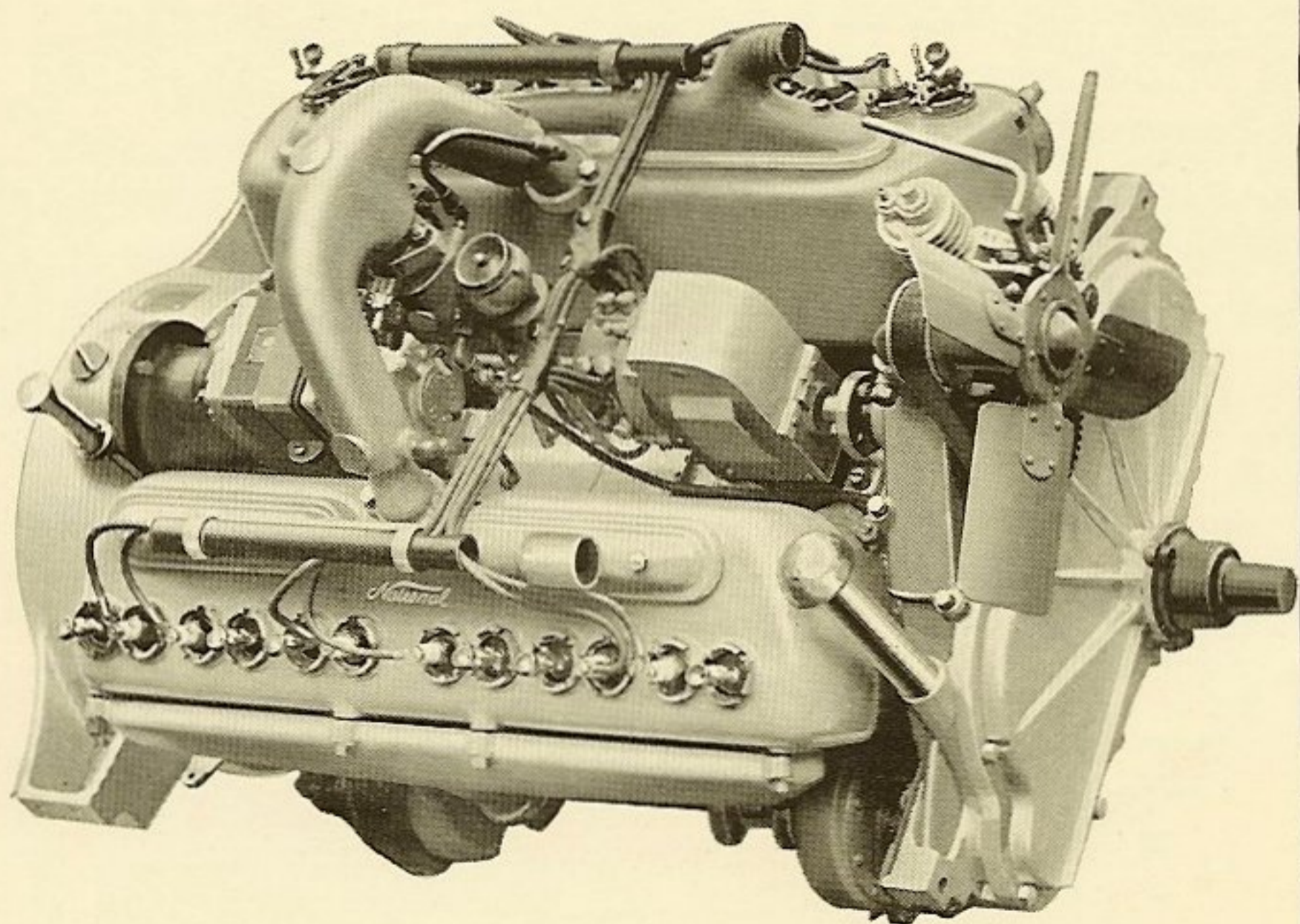
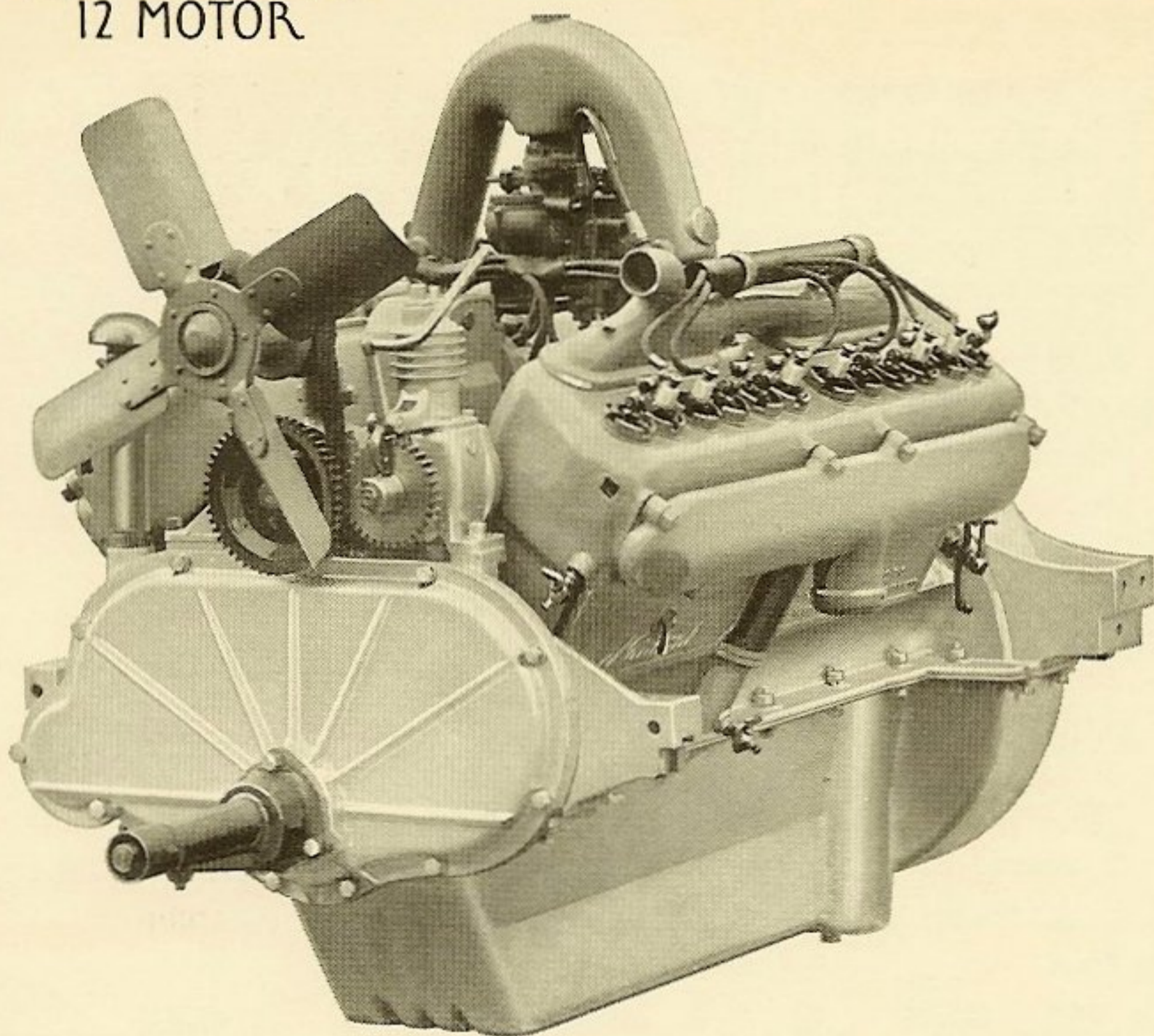
The crank shaft of the six-cylinder motor gets three propulsions every time it turns over—three shoves to every revolution. This seemingly would give a smooth flow of power, and it would if it were not for one thing. The cylinders of a six-cylinder motor are large. They have to be large in order to manufacture a good volume of power. When one of these cylinders gives the crank shaft a shove it is a very vigorous shove.

The twelve motor gives its crank shaft six shoves to every revolution instead of three. The twelve-cylinder motor exerts its power at practically every angle around its crank shaft. The balance of power application becomes almost perfect. The cylinders are smaller than in the six, so that the explosions are less terrific.

There is more brain work in the twelve and less brute force. The application of power is "persuasive" instead of violent. The action is much like the action of a steam turbine. The ideal of the engineers has been realized.

This more constant application of power eliminates

THE NATIONAL 12 MOTOR



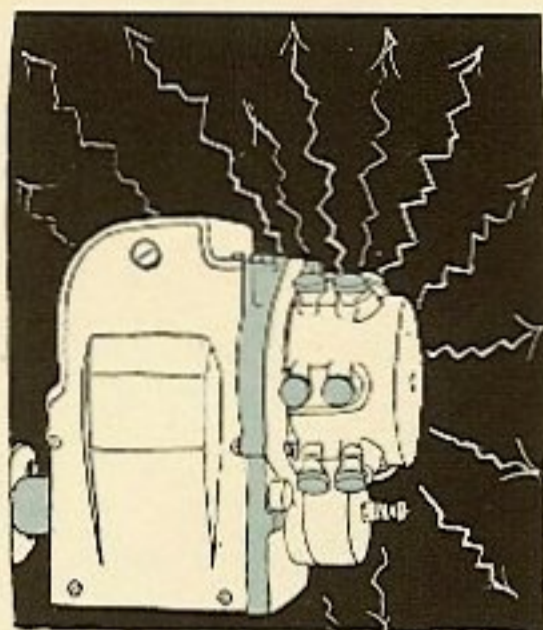
THE NATIONAL TWELVE IS THE MOST ACCESSIBLE OF MULTIPLE CYLINDER MOTORS. VALVES ARE ON THE OUTSIDE OF THE "V" AND NOT DOWN IN THE MIDDLE. THE CARBURETOR, MAGNETO, STARTER ARE BETWEEN THE CYLINDERS, ON TOP, WHERE THEY ARE EASILY REACHED

vibration in the National Twelve motor. It is possible, therefore, to construct the motor of lighter materials — aluminum pistons, etc. The total weight of the National Twelve motor is less than that of a six-cylinder motor of equal piston displacement.

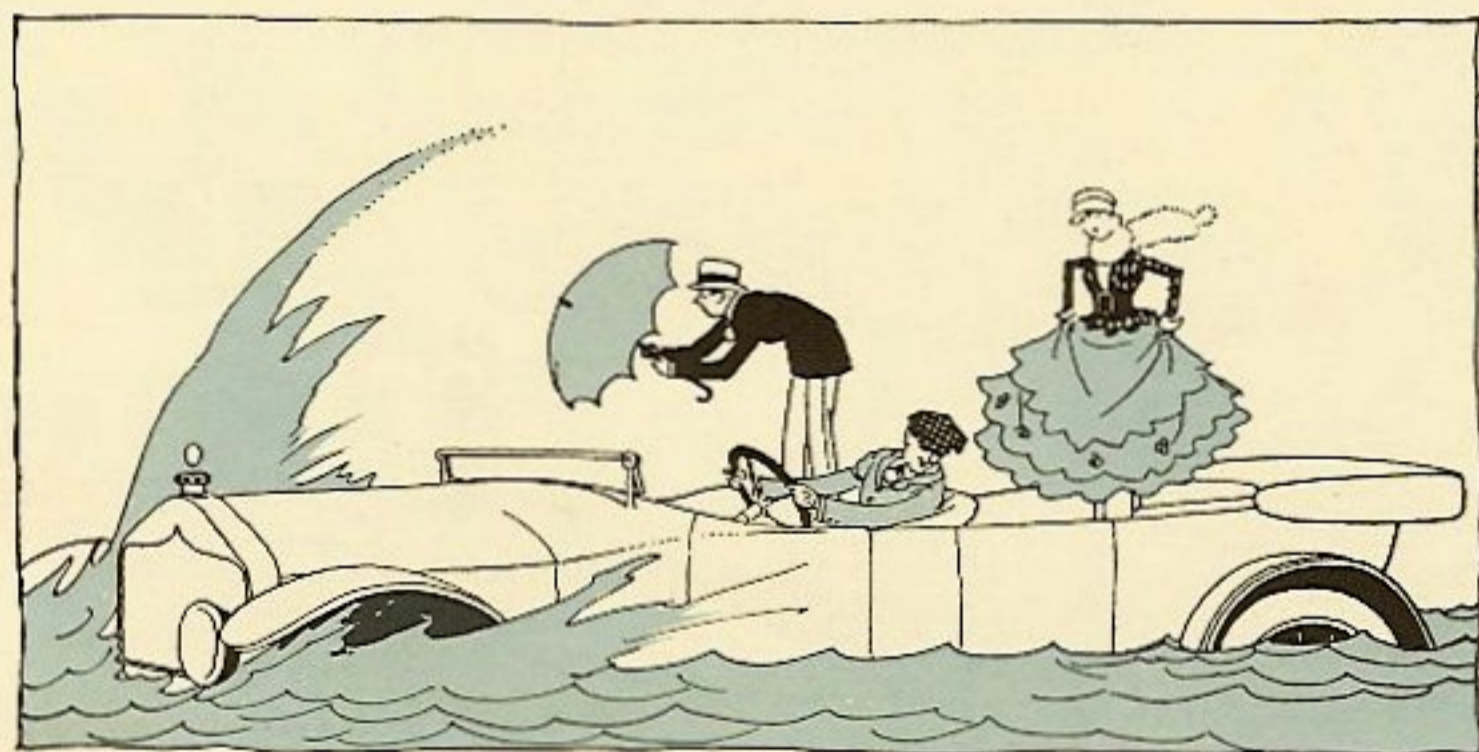
Automobiles heretofore have been their own worst enemies. In the National Highway Twelve self-destructiveness of motor cars comes to an end. A vibrationless motor not only means a long-lived motor; it means a long-lived car. The owner of the National Highway Twelve need charge very little to annual depreciation. National Highway Twelves are going to last much longer than cars have lasted in the past.

This one fact of economy assures the National Highway Twelve of future popularity. Every experienced motorist knows the importance of depreciation as an item of expense in connection with an automobile.

The National Twelve motor develops 70 horsepower without any evidence of being forced. The cylinders are placed in two rows of six each, at an angle of 60 degrees,

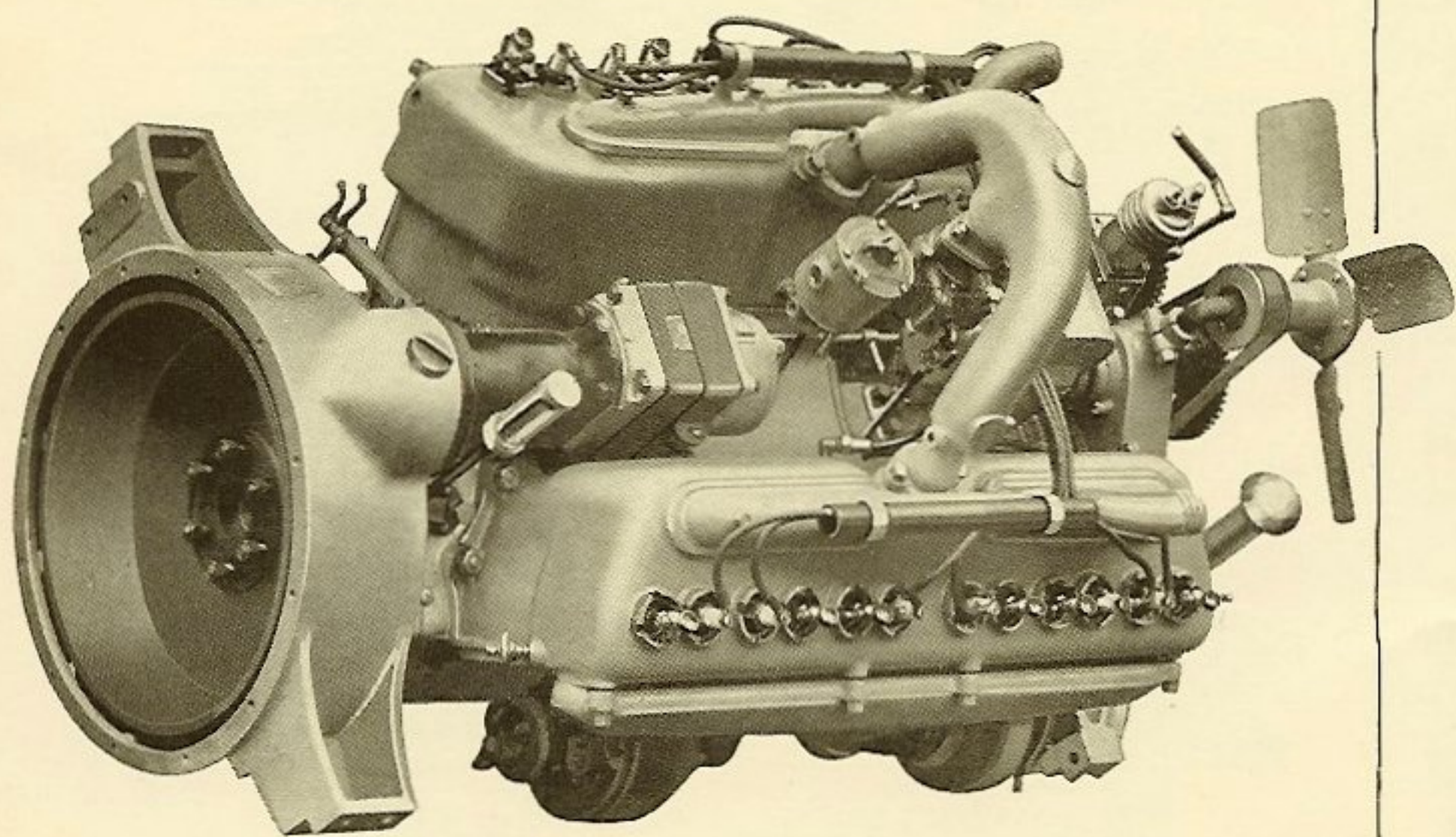
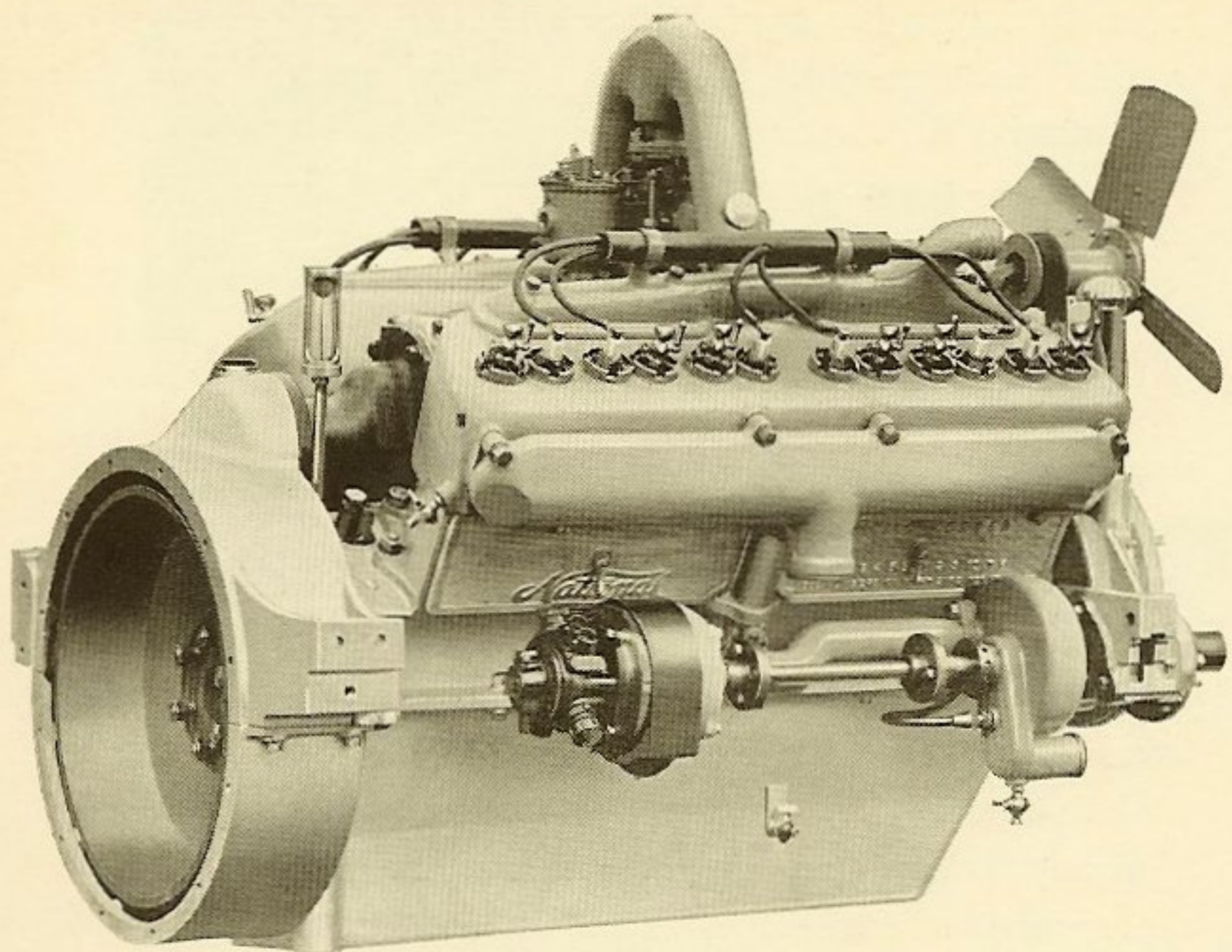


NATIONAL 12 IS FIRST
MULTIPLE CYLINDER CAR
WITH MAGNETO IGNITION



THE NATIONAL HIGHWAY TWELVE CARBURETOR IS UP HIGH AND DRY
IN THE TRENCH FORMED BY THE TWO ROWS OF WARM CYLINDERS

THE NATIONAL
12 MOTOR



THE NATIONAL TWELVE IS REALLY TWO STURDY SIXES MERGED PERFECTLY INTO ONE "V" UNIT. THE CYLINDER BLOCKS ARE AT AN ANGLE OF SIXTY DEGREES, WHICH PERMITS NARROW FRAME AND SHORT TURNING RADIUS. ONE CARBURETOR SUPPLIES BOTH ROWS OF CYLINDERS

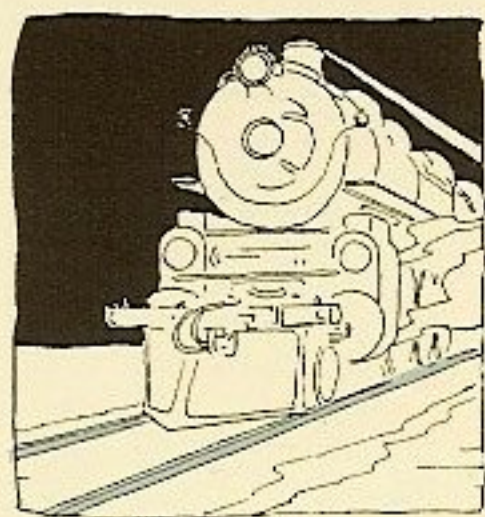
which is considerably nearer to perpendicular than the angle of eight-cylinder motors. The twelve motor may be placed under a hood as short as that of the six, and in a frame of the same width.

The cylinders are $2\frac{3}{4} \times 4\frac{3}{4}$.

The National Twelve is the most accessible of all "V" type motors, the valves being on the outside of the "V" instead of down in the middle, as in most multiple cylinder cars. The National Twelve is as accessible as any four or six.

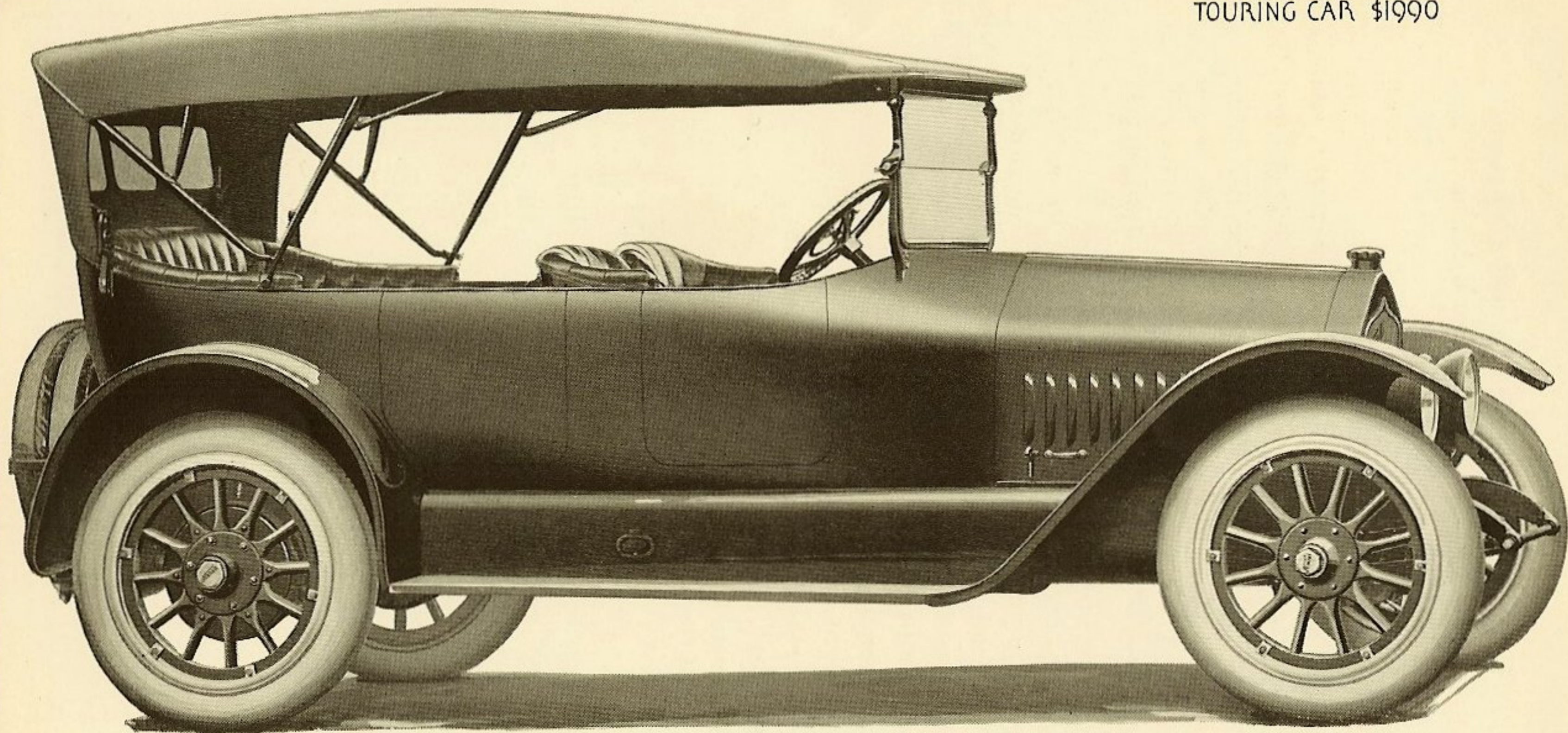
One carburetor supplies an even mixture to both sets of cylinders. It is located in the middle of the "V" in the way of nothing, and is as easily reached as the radiator cap of the car. In its position between the sides of the "V" it stands high, dry and warm at all times.

Ignition for the National Highway Twelve is furnished by a high-tension magneto. Magneto ignition has been generally admitted to be superior to any other type, but until this time all motor cars of more than six cylinders have depended upon batteries altogether. The National Twelve is the first car of more than six cylinders to use magneto ignition.



THE POWER OF THE
NATIONAL 12 IS AS
STEADY AS STEAM

THE NATIONAL
HIGHWAY 12
TOURING CAR \$1990



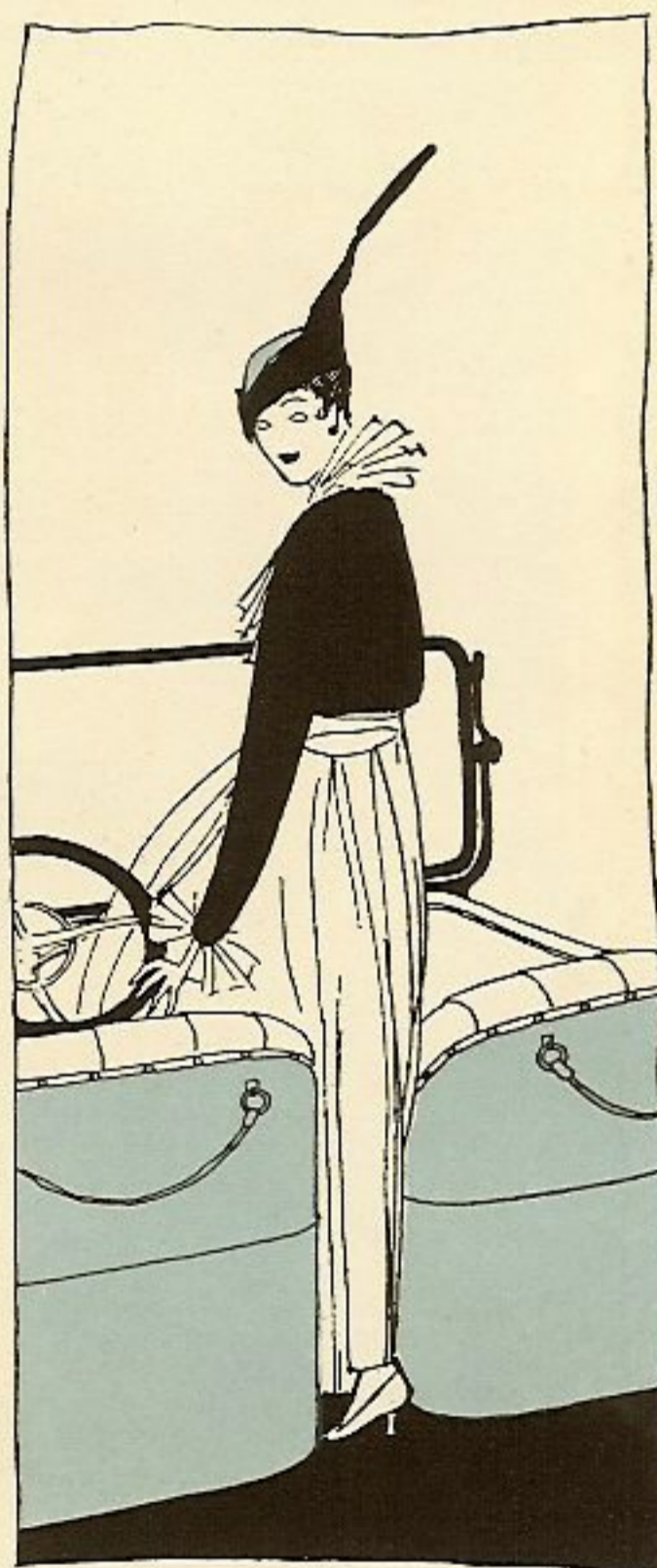
12 TOURING CAR

There are millions of automobiles that look pretty much the same. You can take the first ten cars of which you think, in the "thousand-dollar" class, for instance, and the difference in their appearance will be minor. And any one car that you think of will be different from year to year. There are very few automobiles that have a consistent, lasting, recognizable personality. Automobiles are much like people in this respect: there are lots of them and very few that stand out.

The National car acquired the keynote of its character in its early racing days. Every individual National car is somewhat reminiscent of the race track. The lines of this latest National Highway Twelve are lines that bespeak good, blue-blooded breeding. They give to the National car a look of strength and cleanliness and aggressiveness that no other car begins to possess.

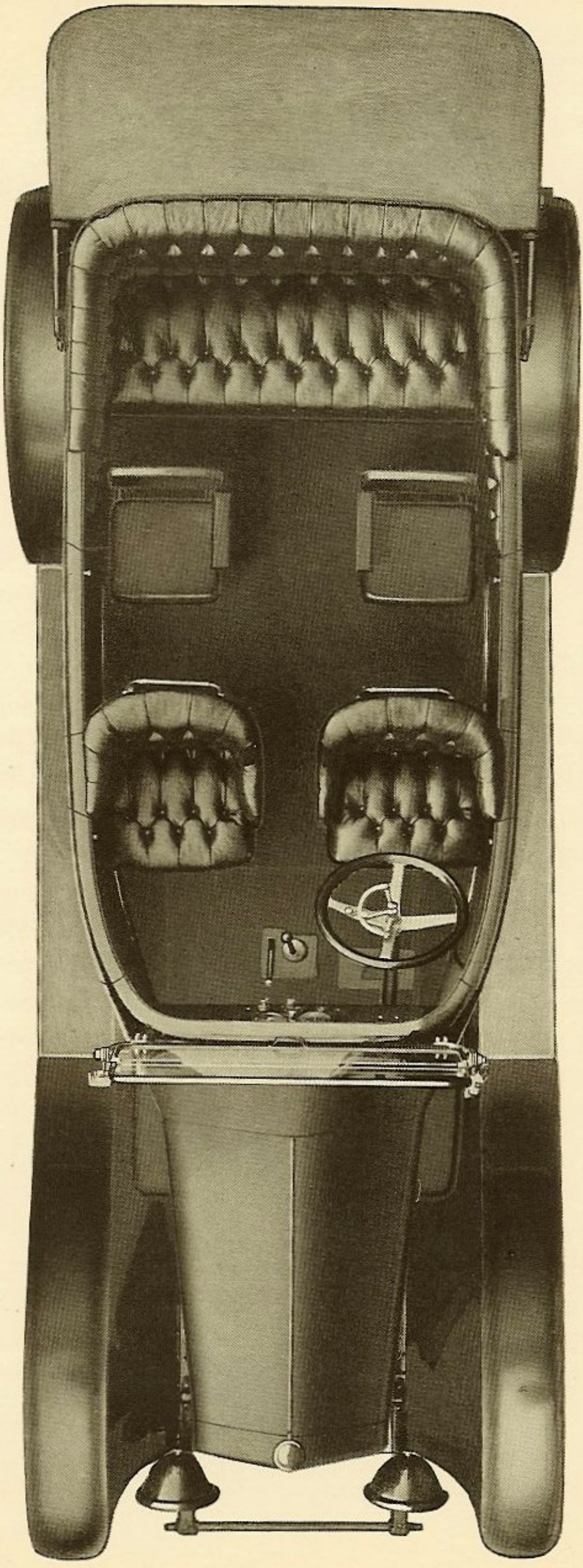
There are other high-class cars, to be sure, but in none of them is correct, thoughtful design combined with unmistakable evidence of a fighting ancestry. It might be said that the National seems not only aristocratic, but *athletic*.

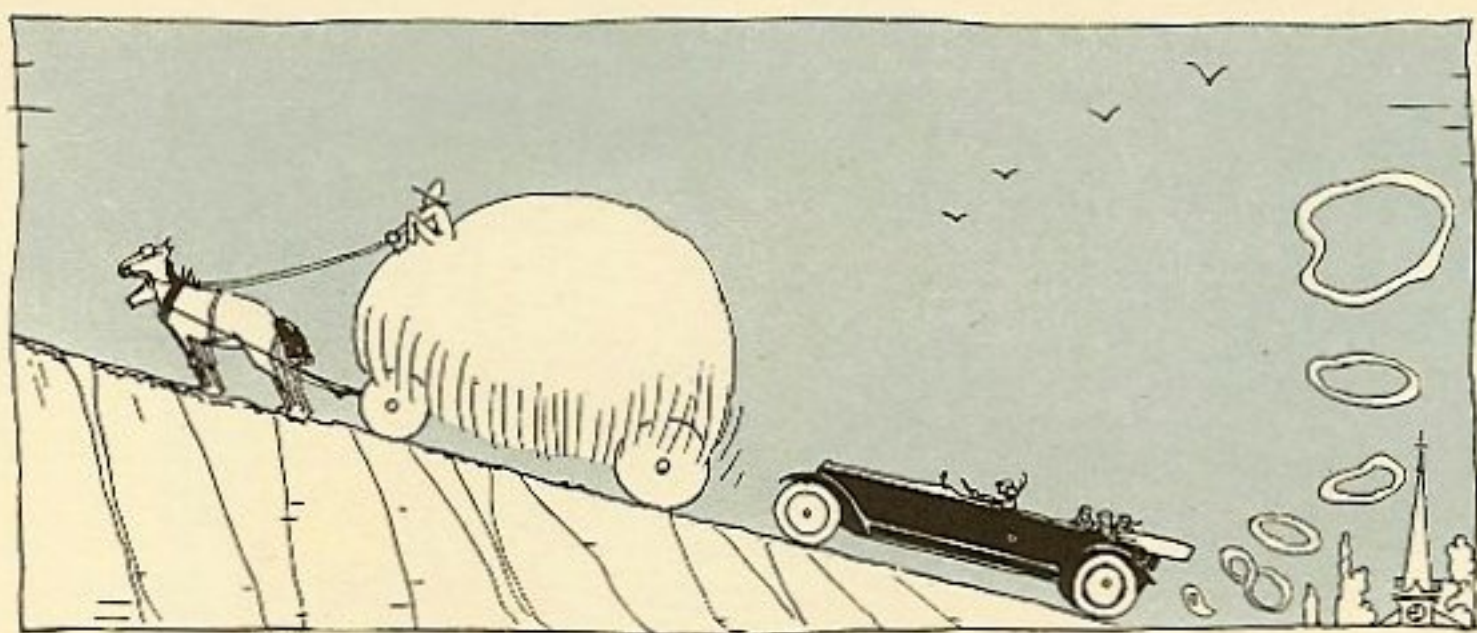
The National Highway Twelve has many desirable conveniences, some of which



AISLEWAY FRONT SEATS
ALLOW PASSENGERS TO
CHANGE SEATS EASILY

THE NATIONAL
HIGHWAY 12
TOURING CAR
INTERIOR





YOU CAN THROTTLE THE NATIONAL TWELVE DOWN LOW
ON A STEEP GRADE WITHOUT STALLING THE MOTOR

are found in many high-grade cars at this time and some of which are exclusive with the National company. Aisle-way front seats, which the National company has used for three years, throw the car into one comfortable, livable room, provide a separate seat for the driver, afford perfect ventilation for the front and rear apartments, and make the "one-man top" true to its name.

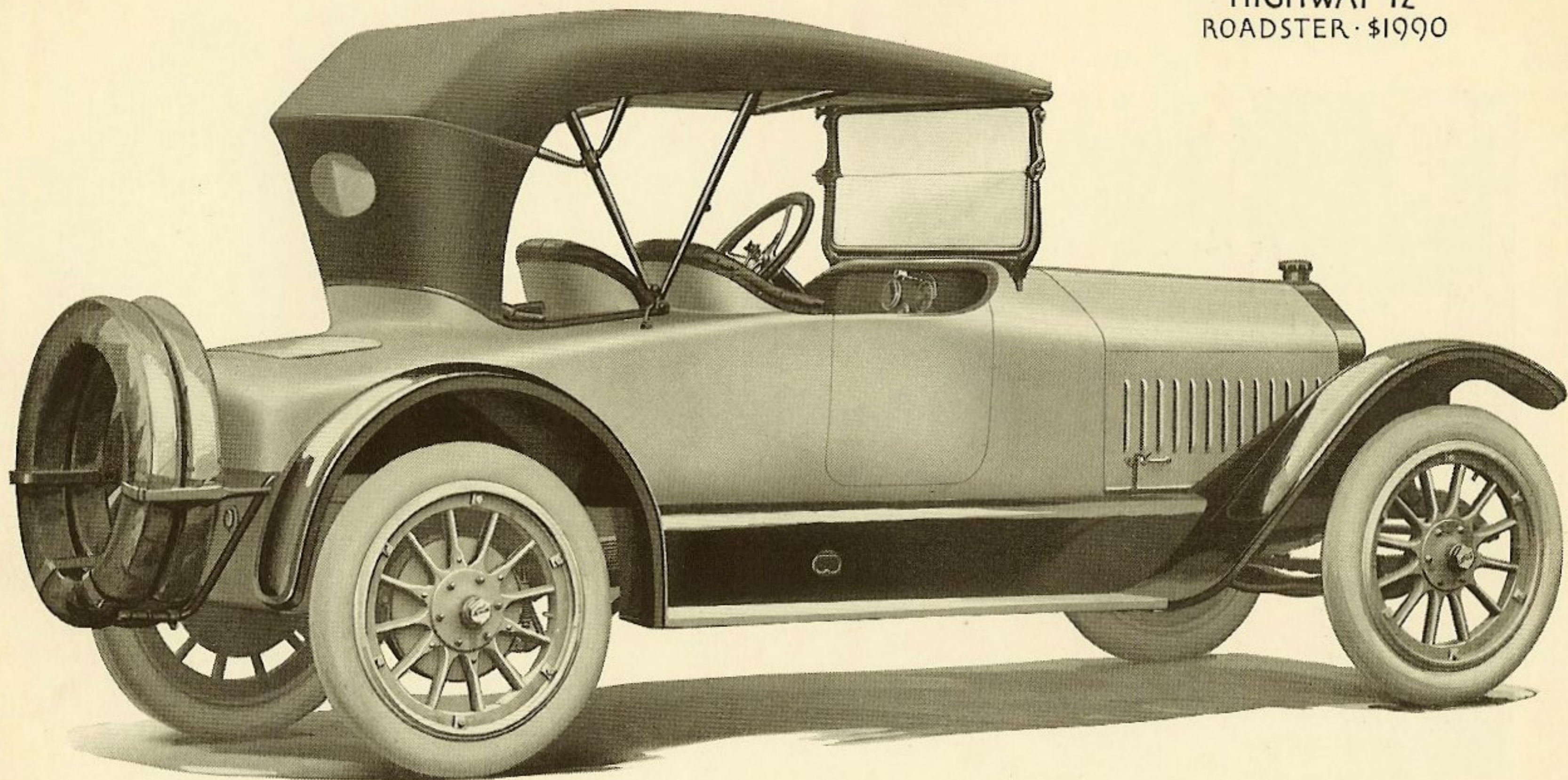
The car is supplied, if desired, with two extra folding arm-chairs at a slight additional cost. Though the car, with the auxiliary seats, is called a six-passenger car, the rear tonneau seat will carry three, so that in emergency there is really a seven-passenger capacity.

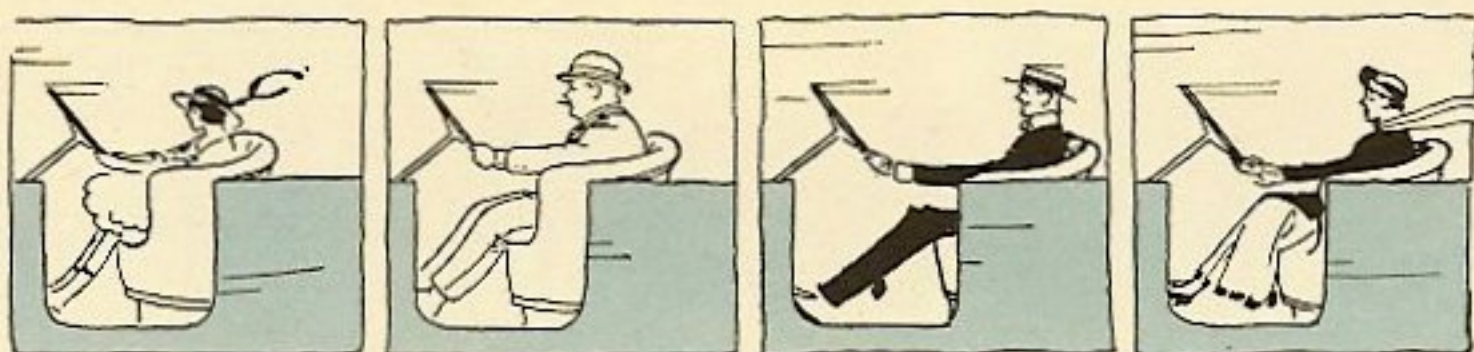
12 ROADSTER

In the National Highway Twelve roadster the racing strain of National cars is even more evident than in the touring car. The roadster is usually a man's car, so National designers have not held back in their desire to build a car with an appearance of vigor. The Twelve roadster will remind you of the National car which holds the World's Stock Car Championship. The lines are indeed different, but the fighting look is there.

This is a car that will not lag at the getaway, and a car that will eat any roadway with a ferocity to suit any man.

THE NATIONAL
HIGHWAY 12
ROADSTER · \$1990





THE NATIONAL HAS AN ADJUSTABLE FRONT SEAT FOR THE DRIVER WHICH MOVES FORWARD AND BACK TO FIT LONG AND SHORT PEOPLE

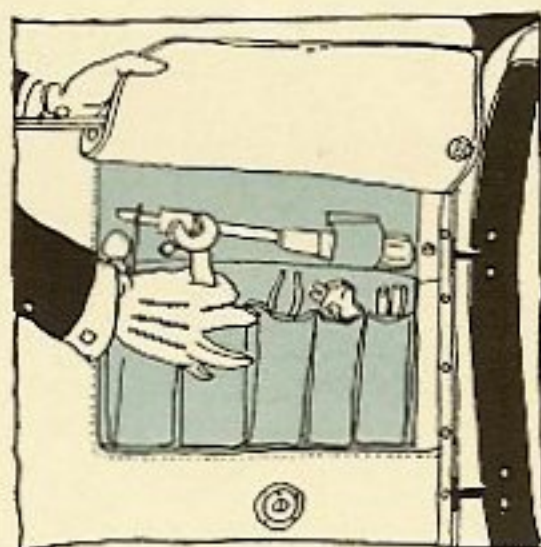
The motor delivers fully 70 horsepower when you let it out, though it may be throttled down to a snail's pace—such is the versatility of the twelve motor.

It is a car with "pep," power and pugnacity.

The arrangement is unusual. Commodious seats are provided for three or four people, with the top extending over all. There is a big trunk-like compartment in the rear, for touring convenience.

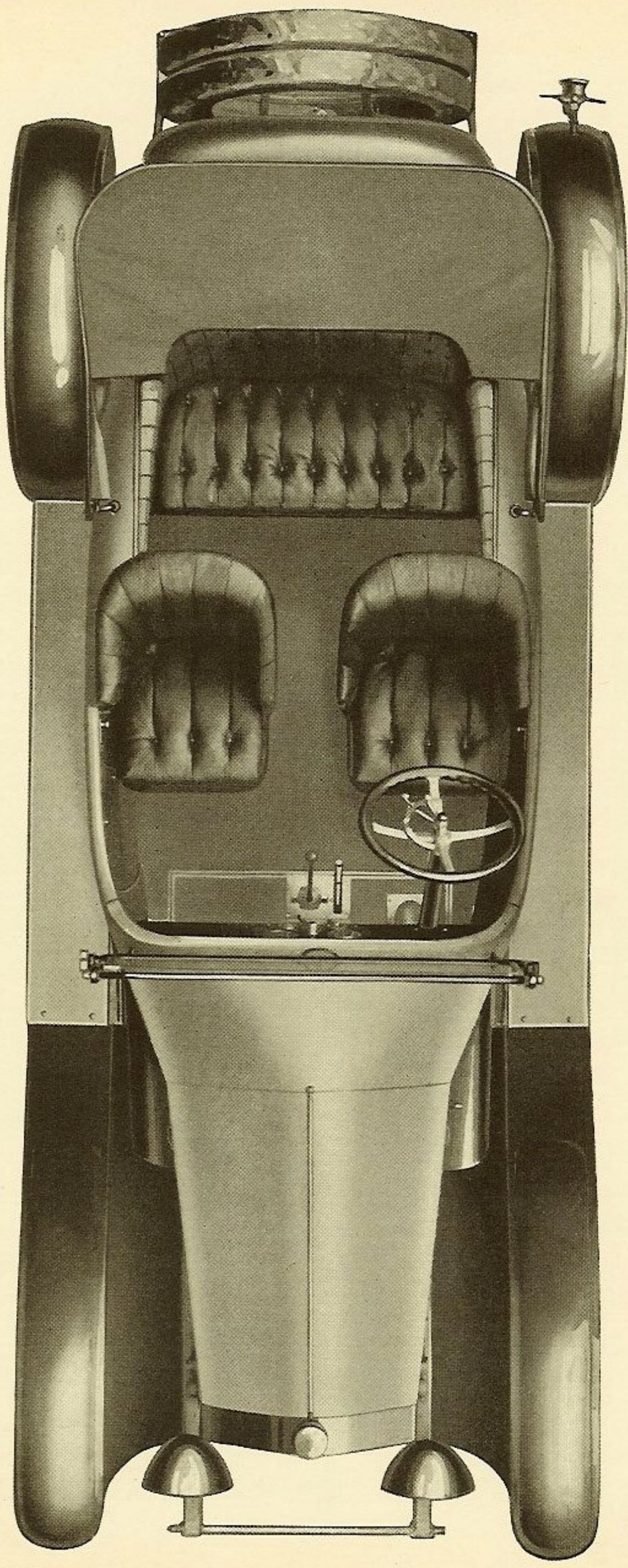
National cars were about the first to use cantilever springs in this country, and to-day the National company stands very far in advance of most motor car companies in its application of the cantilever spring principle. The National follows the foreign practice of using an extra long cantilever spring and having it practically horizontal.

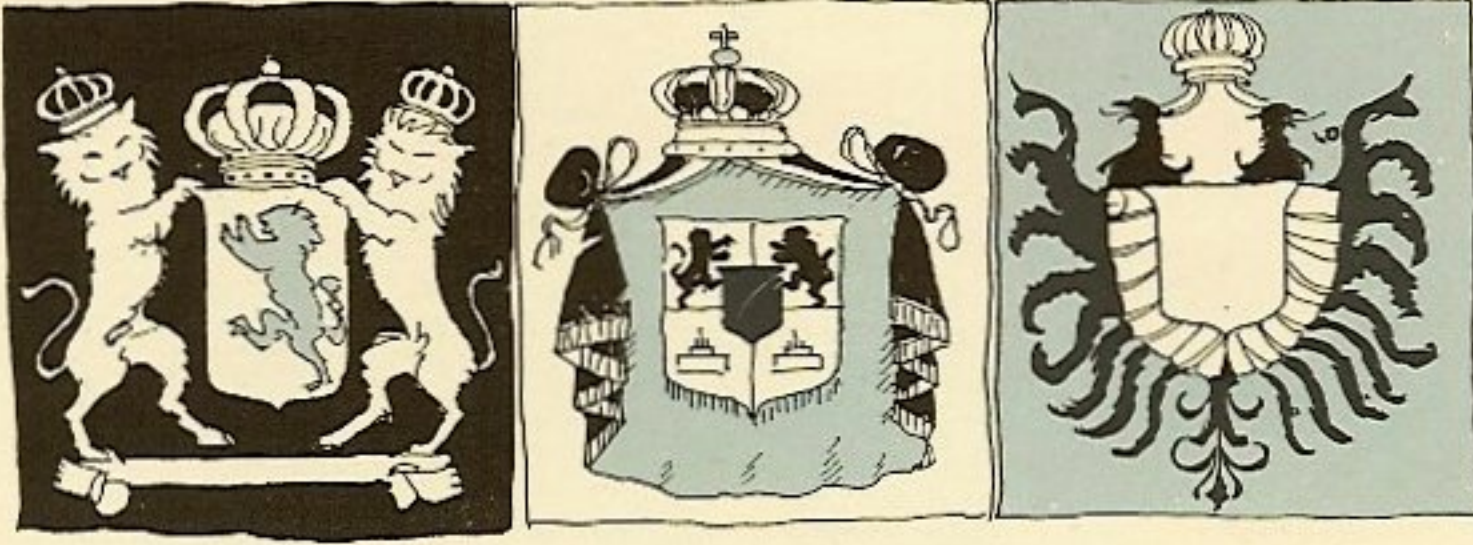
All National models are extraordinary in their comfort.



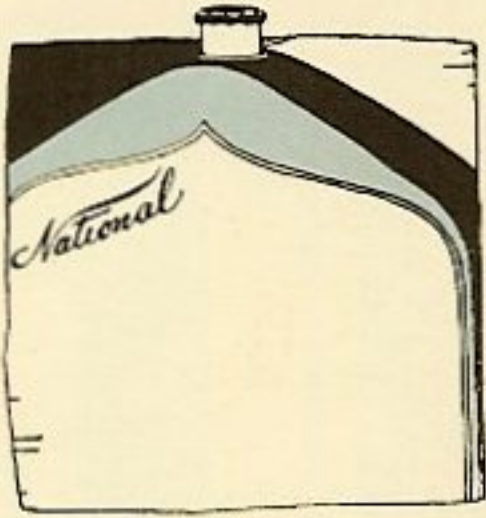
PIGEON HOLE POCKETS FOR TOOLS IN THE FRONT DOOR

THE NATIONAL
HIGHWAY 12
ROADSTER-INTERIOR





THE MEANING OF A RADIATOR



The National radiator is a symbol. It is full of story and significance, just as the coat-of-arms of a nation or the escutcheon of a good old family is full of meaning. Many years ago the National company adopted a distinctive radiator design so that in time it would come to mean something to the people.

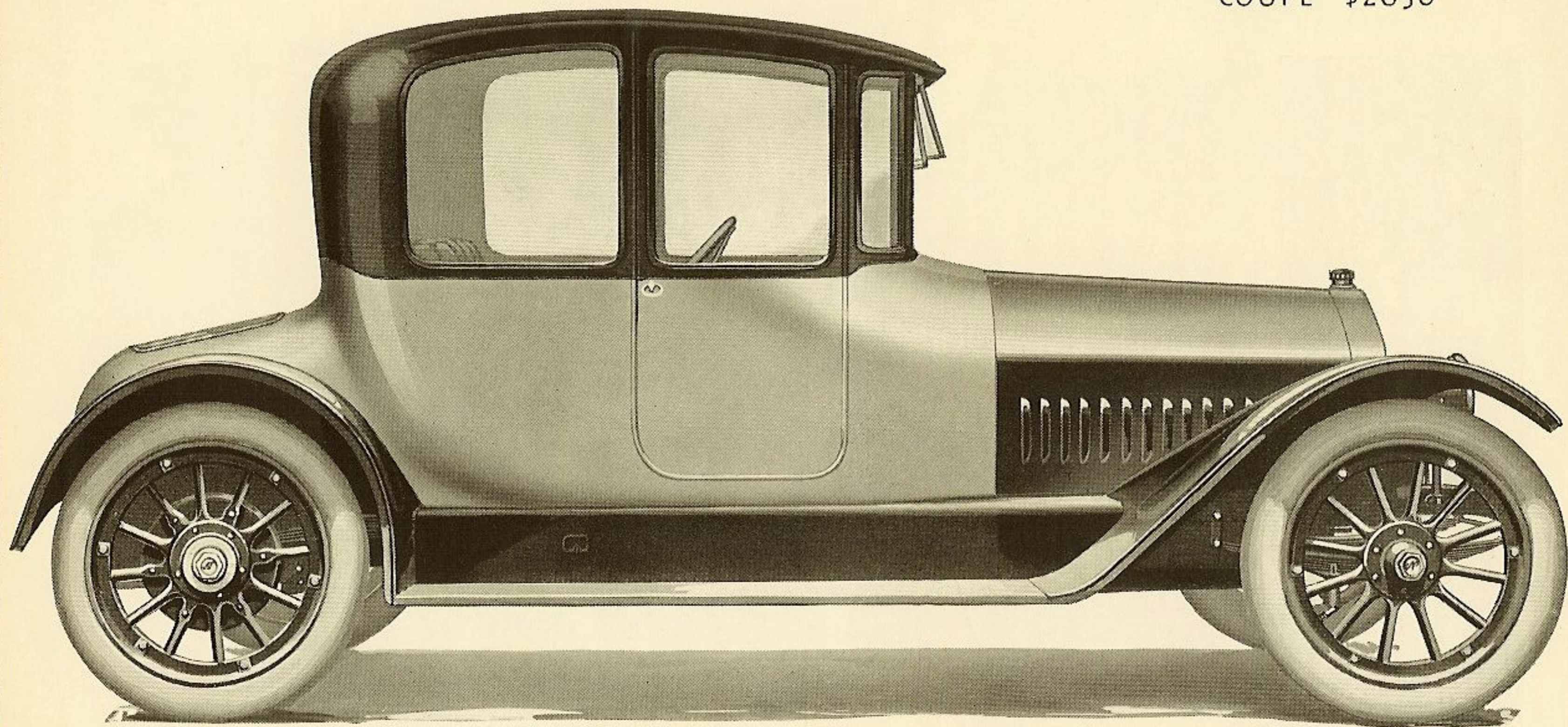
You can tell a National radiator coming down the street a block away. The front of the National radiator is like the front of no other radiator in the world.

And this is what it means :

The National Motor Vehicle Company has been building motor cars for over fifteen years. This makes it a pioneer in the automobile field. Remember the automobile industry is still in comparative infancy. The National company was one of the first to start.

All of this time the ownership and management of the National company have remained the same. Many of the department heads and factory foremen have been with the company since the beginning. The National company is almost old enough to have a right to a family seal—

THE NATIONAL
HIGHWAY 12
COUPE \$2650

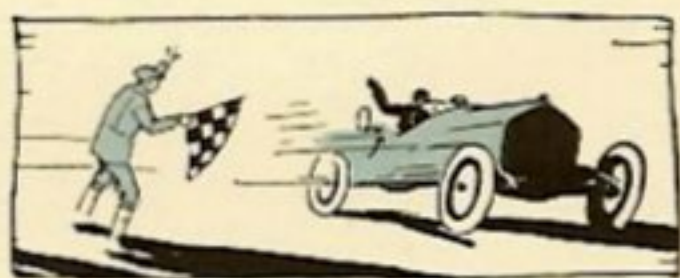


as automobile companies go. The National company is a big, reliable, steady organization with a large, modern, well-equipped factory. It is a company financially strong, operated under consistent and conservative policies, and enjoying a high credit rating.

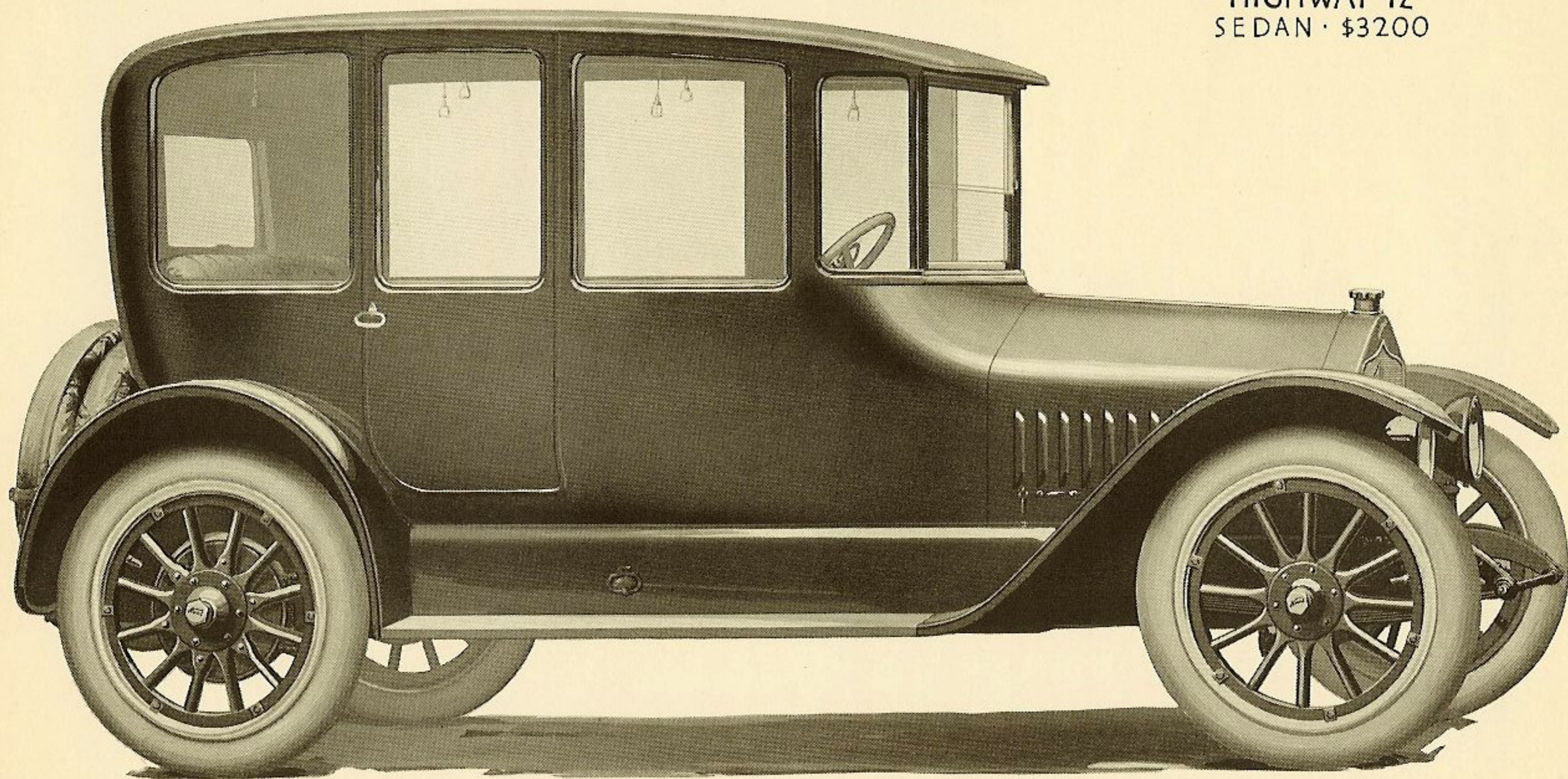
The business man who takes the "manufacturer behind the car" into consideration when making his purchase will be made comfortable in his selection of a National by his knowledge of the strong solidity of the National company. It will assure him of the manufacturer's continuous concern in regard to the operation of his car.

The development of the National car has been slow and scientific. No sporadic, mushroom improvements are made overnight for the mere sake of sales impetus. The same conservatism that pervades the business administration of the National company prevails throughout the National factory.

That is what the National radiator means. It means family pride and business pride out at the National factory. It is a symbol of success.



THE NATIONAL
HIGHWAY 12
SEDAN • \$3200



SPECIFICATIONS

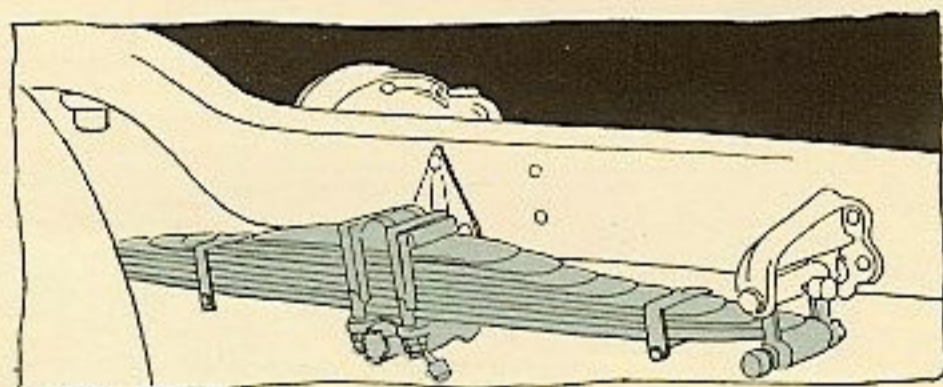
MOTOR—The National twelve-cylinder motor was designed and developed and is built in the National factory. The National Company built the first "stock" American-made six-cylinder cars, also the World's Stock Champion four-cylinder motors. The National twelve-cylinder motor is "V" type, with six cylinders en bloc on each side. Cylinders are placed at an angle of 60 degrees, which permits a narrow frame and short hood. The bore is $2\frac{3}{4}$ inches, the stroke $4\frac{3}{4}$ inches, giving a piston displacement of 338 cubic inches. Full 70 horsepower, or any part of it, is developed without vibration or strain.

By having two sets of six cylinders operating on the one crank shaft, there are twice the number of power impulses per revolution. This design gives a wonderful range of acceleration, combined with an almost complete absence of vibration at all speeds. The result is due not only to the continuous flow of power from twelve cylinders, but also to the small bore of the cylinders and the use of special aluminum alloy pistons with light connecting rods.

Another important advantage of the National Highway Twelve motor is the fact that there is so much less wear on the bearings. The smaller and more frequent applications of power have far less effect on the bearing surfaces and on the entire mechanism than in case of fewer cylinders with impulses of greater force.

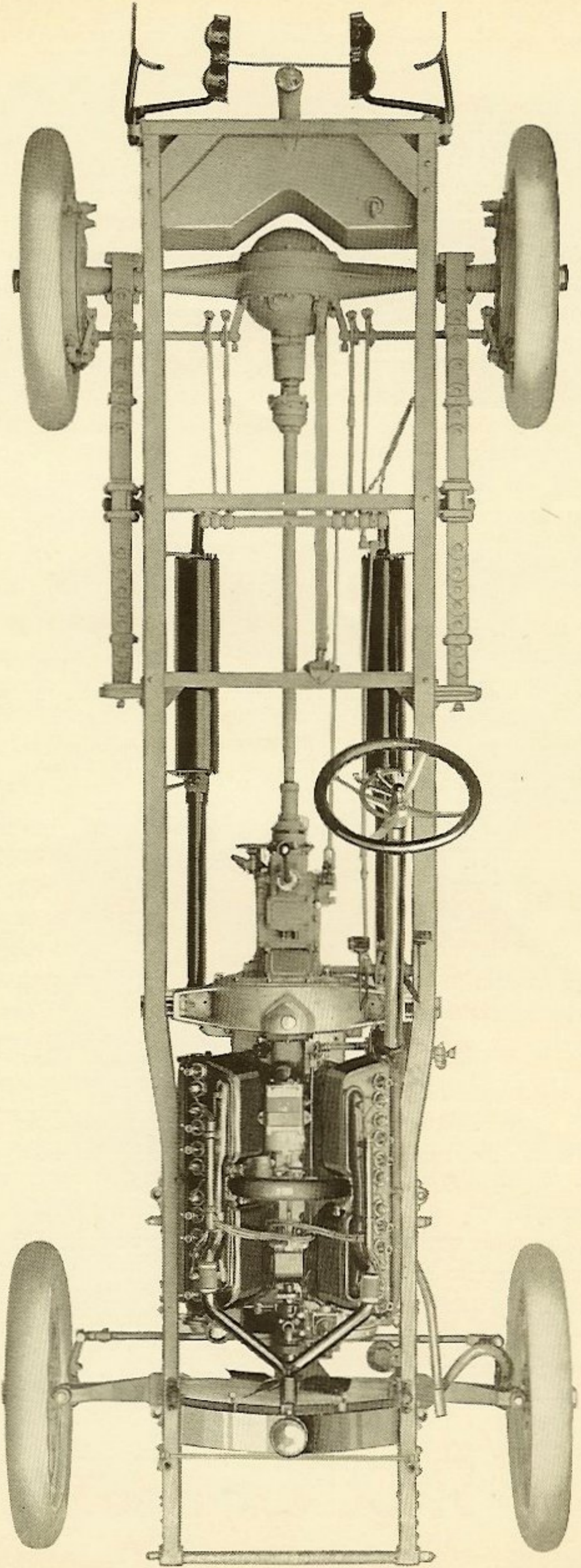
The pistons are made of aluminum alloy, and fitted with three rings; the connecting rods are drop forged and carefully machined. Thus the weight of all the reciprocating parts has been reduced to a minimum. Connecting rod bearings of opposite cylinders are placed side by side on the crank shaft. This insures perfect lubrication and permits easy bearing adjustment.

The crank shaft is of large diameter, so as to hold



THE NATIONAL FLAT CANTILEVER
SPRING MAKES THE CAR RIDE EASY

THE NATIONAL
HIGHWAY 12
CHASSIS



SPECIFICATIONS—*Continued*

everything rigid. It is supported by three large main bearings. The center of the crank shaft is drilled with oil leads to the connecting rod bearings.

With the National Highway Twelve motor the matter of accessibility, the main objection to other "V" type motors, has been properly taken care of.

All valves are located on the outside of the cylinder blocks and are therefore as accessible as the valve of any Six. Two cam shafts are provided, one for each set of cylinders. The valves being on the outside, there is plenty of room between the cylinder blocks for the permanent accessories, such as the magneto, the carburetor and the starting motor. Any one of these units can be easily reached without disturbing any other part.

The design of the National Twelve motor allows a short crank case. It is supported from the frame by four strong arms, which increases sturdiness and reduces frame weave. The bottom of the crank case, which holds the oil, is ribbed to facilitate the cooling of the oil. The lower section of the crank case may be easily removed without disturbing the bearings.

The timing gears are helical cut to insure quietness. The magneto drive is by a silent chain.

Each block of cylinders has a separate exhaust manifold, pipe and muffler.

LUBRICATION—National Twelve lubrication is by a positive high pressure feed system, which forces the oil through the hollow crank shaft to each of the main bearings and to the connecting rod ends on crank shaft. Separate leads pass to the cam shaft bearings and to the timing gears in front.

All motor bearings are supplied with oil under a 15- to 25-pound pressure for normal running—the pressure increasing with the power requirements. A gauge on dash shows at all times the correct operation of all oiling.

CARBURETOR — One automatic carburetor supplies both cylinder blocks. It is located between the cylinders at the highest point of the motor, where it is kept dry and warm. Gas passes through one manifold to both cylinder

SPECIFICATIONS—*Continued*

blocks, and is then distributed to individual cylinders through a manifold cast integral with the cylinders. Manifolds are hot-water jacketed.

Gasoline feed by vacuum system from 17-gallon tank on rear of car. Tank is securely supported from main frame, making it unnecessary to disturb occupants of front seat when taking on supplies.

IGNITION—The National Twelve is the first motor of more than six cylinders to offer high-tension magneto ignition. A high-tension magneto is located between the cylinder blocks, high and dry at all times. The magneto is entirely independent of all battery connections, making it the most reliable of all ignition methods.

Magneto ignition is generally conceded to be the best for a motor car, but until the advent of the National Twelve cars of more than six cylinders have been at the complete mercy of batteries for their spark.

CONTROL—Left side drive and center control. Enter car from either side. All switches on dash within easy reach. Starter button on board.

CLUTCH AND TRANSMISSION—The clutch is an aluminum cone, faced with durable material, operating in fly-wheel of motor.

Transmission is of unit construction, combined with clutch and motor. It is the selective type, with three forward speeds and reverse,—annular ball bearings throughout.

ELECTRICAL SYSTEM—*Lights*—Controlled by one switch on the dash. The two powerful headlights are also fitted with small bulbs. Lighting system is entirely automatic. Westinghouse system. Dynamo is separate from starter motor, eliminating possibilities of troublesome "shorts." Battery is concealed behind running board splasher and is accessible by means of easily removed cover.

Starter—Westinghouse system of separate units. Built and guaranteed by the well-known Westinghouse company. Starter motor located on top of engine and very accessible. Starting is effected by a small but powerful electric motor geared to the fly-wheel. Ammeter on dash.

SPECIFICATIONS—Continued

AXLES AND BRAKES—*Front*—I-beam, one-piece steel forging. Large adjustable roller bearings in hubs. Ball, thrust bearing at top of steering knuckles. *Rear*—Full-floating axle, with large roller bearings. Driving pinion and ring gear have spiral cut teeth. These helical bevel gears are silent.

Drive—From motor to rear axle by straight line tubular shaft. Strong torsion member relieves shaft from strains.

Brakes—National brakes stop car gently without jerks or noise. Service brakes easily operated by foot pedal. Contract on rear wheel drums. Size, 15 x 2. Emergency brakes (internal expanding) are instantly applied by convenient hand lever.

WHEELS, FRAME AND SPRINGS—*Wheelbase*—128 inches. *Tires*—Size, 36 x 4½ (34 x 4½ optional). Option of Firestone, U. S. or Goodrich. *Rims*—Firestone demountable (Q. D.) rims. Extra rim included.

Frame—Pressed steel, five-inch channel section. Well braced and strong. Curved up over rear axle to allow low suspension of body. Frame narrowed in front to permit a short turning radius of thirty-five feet.

Springs—*Front*. Semi-elliptic, length 38 inches. Fitted with Hartford shock absorbers. *Rear*. National (flat) cantilever, giving soft-riding qualities. Length 51 inches. Each spring leaf is provided with special lubricant pocket which keeps the springs quiet.

EQUIPMENT—*Top*—One-man top made of "Never-leek" waterproof material, fitted with Jiffy curtains. Ventilating and rain-vision type of windshield. Speedometer (Stewart) driven from drive shaft. Horn, underhood type of electric horn, large button in center of steering wheel. Tire pump mounted on motor, long tube to reach all tires. Tire carrier (for two tires) in rear. Gasoline gauge on tank. Full complement of tools, carried in specially fitted pocket located in the front door.

COLOR—Standard color for all models is National (very dark) blue body and wheels. All metal parts black enameled and nicked. Only highest grade genuine leather (black) used throughout for upholstery.

PRICES

National Highway Twelve Touring Car	\$1990
National Highway Twelve Touring Car with two extra folding chairs	2020
National Highway Twelve Roadster	1990
National Highway Twelve Coupe	2650
National Highway Twelve Sedan	3200

All National Cars Are Priced and Sold f.o.b. Indianapolis
Prices Include All Equipment

WARRANTY

We Warrant all motor vehicles manufactured by us (except tires, ignition apparatus and trade accessories, such as lamps, tops, windshields, gas generators, speedometers, tools, etc.) against defects in materials and workmanship for six months from date of shipment from our factory. Should any part so warranted be found defective in materials or workmanship within said period, our entire liability of any kind is limited to making good said part at our factory, without additional compensation, provided that the purchaser shall send us the part alleged to be defective, carrier's charges prepaid.

We reserve the right to disclaim responsibility in connection with any motor vehicle manufactured by us if it has been altered or repaired outside of our factory, and we assume no responsibility whatever for repairs, replacements or other damages occasioned by misuse, negligence or accident. We do not make or authorize any warranty beyond that expressed above.

NATIONAL MOTOR VEHICLE COMPANY

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W. U. T. Code A B C Code (5th Edition)

