

VOLVO

144 S



This is a short story about a new car.

Most imported car manufacturers plead with you to pay attention to stories about new cars every two or three years. Nowadays, Detroit auto makers ask you to do the same thing at least once a year.

Not Volvo.

Project

144 S

For the past five years, while many other auto manufacturers were scurrying around designing and bolting together five "new" cars, Volvo was quietly designing, engineering and testing just one, the 144 S.

No great rush.

On a recent visit to Volvo's assembly plant, the publisher of *Road & Track* magazine watched "the leisurely process on the assembly lines and marveled at the swarm of production engineers all over the place. Volvo isn't a frantic sort of place," he wrote.

You see, Volvo is a very conservative company. By Detroit standards it's more conservative than a one-piece bathing suit. In fact, it's even conservative among the imports.

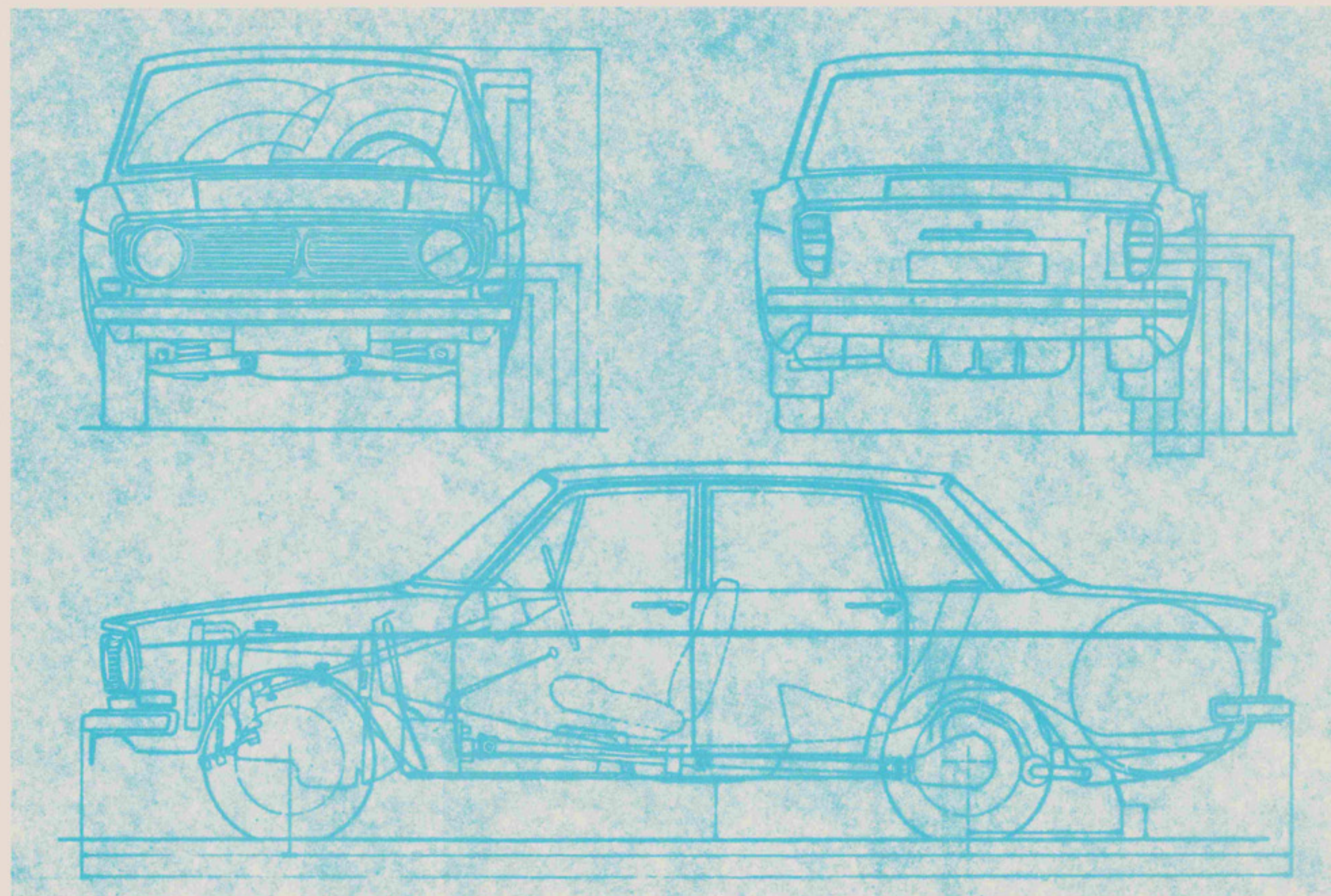
Volvo's old reliable 544 sedan, the one people said looked like a '41 Ford, holds the world's record for continuous production — 22 solid years. Longer than the Model T. Longer than the little Volkswagen Beetle.

And Volvo's familiar 122 S sedan already has been rolling off the production lines in Sweden for ten years with no sign of retirement.

Now comes a whole new car, a larger car, to take its place beside the 122 S. A car that's been five years in the making. A car that will be made for many more years than that.

It's a good car. This story should tell you why.

REAL Durability



Every automobile company says it builds durable cars. Right? It's just that some are a lot more durable than others. That's the problem.

Well, Volvo's come up with the best solution you'll find in any popular priced car in the world. By really putting its money where its mouth is, Volvo has made durability the cornerstone of its worldwide success.

Action instead of words.

You really can drive a Volvo like you hate it. You don't have to, of course, but you can.

Without tremendous durability, Volvos would be reduced to rolling piles of rattling metal in no time in Sweden. Like the Italians and the French, Swedes treat driving as a national sport. But they do their

driving under conditions exciting enough to turn French and Italian motor sportsmen green with envy.

In the first place, winter — cold, snowy, icy winter — lasts about eight months of the year in Sweden. More than 70,000 miles of roads are unpaved. And outside of towns, there isn't a speed limit sign in the whole country!

Volvos last an average of 11 years in Sweden. The company didn't make up that figure. It comes from the government controlled Swedish association of manufacturers.

Driving conditions there are almost as bad as those in international championship rallies — the world's greatest car destroyers.

Every year, automobile manufacturers enter teams of cars in these

gruelling events to publicly demonstrate (they hope) the durability and performance of their automobiles.

A World Rally Championship is the pot of gold at the end of the rally rainbow. The British Royal Automobile Club awards it annually to the car which finishes highest in the five toughest international championship rallies. Together they total 27 days and about 15,360 miles of high speed competitive driving over the worst roads in the world.

Guess what? Volvo has won the World Rally Championship two years in a row.

Real durability is a tradition at Volvo. Without it, Volvos could never stand up to Swedish driving conditions.

The 144 S is Volvo's finest example of that tradition.

"A practical no-nonsense sedan which seats four in comfort . . ."
Popular Science

"Volvo's new assembly plant just outside Gothenburg is one of the most modern in the world. There's a lot of emphasis on inspection. We saw one Ingrid Bergman type trying to drive a chisel between the joints to see if the welds would hold — and she was doing it on every car."

Popular Mechanics

Twenty-three ¼ scale models were built, changed and squashed before these frustrated craftsmen were given the go-ahead to build this full scale replica of the car that became the 144 S.

The Art of Building Cars



At 2:00 o'clock on the afternoon of June 15, 1963, a group of serious men gathered in the conference room at Volvo headquarters in Gothenburg, Sweden.

When they left that room four hours later, Volvo was committed to the biggest stake it had ever made in the automobile business.

The 144 S had been approved for production.

Between the conception of this car and the first production model, \$30,000,000 would be invested in its future.

Just what makes one car better than another? After all, most of them are made with about the same proportions of steel, glass, rubber, etc.

The secret of a good car lies in two places — the engineer's choice of materials and the production department's ability to control quality on the production line. Any supplier can show you the grey hairs he's accumulated while trying to match his product to Volvo's standards.

Volvo is nearly as proud of its world-wide reputation as a tough company to satisfy as it is of its cars' reputation for durability. Actually, one reputation isn't possible without the other.

When Volvo publicly introduces a new car, which after all is very seldom, it's big news to the press and the car-buying public. But Volvo engineers don't get excited. To them, the car is an old friend.

They've already known it intimately for a long, long time. They've nursed it through failures, through redesigns, through retesting until it finally measures all the way up to one of the toughest sets of quality standards in the entire automobile industry.

All along the road to full maturity, every car, every product improvement, gets tested and retested in Volvo's modern laboratories and on its test tracks.

Other auto makers take their work seriously too. No question about that. But Volvo has some unique advantages which translate themselves into better products.

Driving conditions, for one. Scandinavians are hard drivers, intolerant drivers. They won't tolerate cars that won't start in bitter cold. Or heaters and defrosters that can't handle their jobs. Or drive trains that can't take it

at 100 m.p.h. all day long. Or bodies that rust in three or four years. Or chassis and suspensions that can't stand up to hard driving on rotten roads.

When was the last time you started your car at 30 below? Or drove 100 m.p.h. from dawn to sunset? Or roared along dirt roads all afternoon?

Well, the 144 S is built to take all that in stride even if you never ask it to.

But Volvo's most important advantage is people. Swedes. They're raised on a tradition of quality that's unmatched anywhere else in the world. They just won't buy second rate merchandise. And they certainly won't make it.

The president of Volvo is that way. So are the vice presidents, naturally. But — not naturally at all — so are the thousands of Swedes who assemble all those parts into whole Volvos. These people really are the heart of the Volvo story. They care.

Too bad it isn't practical to fly you first to Detroit for an assembly plant tour, then to Sweden for another one. Seeing is believing, they say. But take our word for it. The contrast is convincing.

"... an extremely tough automobile."
Foreign Car Guide

"... the company has obviously made a fetish of durability."
Popular Mechanics

Volvo's component testing lab would be a great scene for a science fiction movie. Complete with appropriate sound effects, it's the perfect place for a mad scientist to conduct his diabolical experiments.

It's a good bet that this is one of the most modern, most automated testing labs in the entire automobile industry. All kinds of automated torture machines thump, bang, and groan away day and night all by themselves.

The machine in this picture is the big daddy of them all. It twists and shakes an entire car body with tremendous force. Suspensions too. Every cycle of this sadistic device is equivalent to driving into a deep pot hole at about 60 m.p.h. Wham!

When Volvo engineers finally released the 144 S for production, it was able to survive 14 continuous days and nights of this thrashing. A pot hole jolt every 12 seconds for two solid weeks adds up to 100,800.

During comparative testing, some well-known, expensive cars broke apart long before the 144 S.

You're bound to notice it anyway, so here is a good place to point out a fault in the 144 S. It proves something about Volvo's "fetish for durability."

Look at the photo on the bottom of page 12. Notice the high lip on the trunk? Makes it more inconvenient to load and unload heavy objects.

Ah, but that piece of steel also does a great job of increasing the structural strength of the 144 S body. It wasn't there in the first prototypes. Volvo engineers put it there when the pot hole machines "told" them to.

Automated Torture Chamber

"The odometer in the 144 S goes up to a million before turning back to zero . . . So many Swedes drove past the 100,000 mark and were trading cars in with 25,000 or 50,000 showing instead of 125,000 or 150,000 that Volvo dealers asked that something be done."

Popular Mechanics

Volvo vs. Rust

One way Volvo tests its cars for rust resistance is to drive them through this ditch filled with a concentrated salt solution. Repeated runs through this bath cover the entire underbody with enough salt to eat holes in metal not adequately protected by rust proofing primer and undercoating.

Many cars start rusting even before you've finished paying for them. Not Volvos. No car that lasts an average of 11 years in Sweden can rust very fast.

Most auto manufacturers have learned to do a pretty good job of preventing rust on the outside. Some good primer and a little decent paint takes care of that. But rust from the inside — that's a different story. Inside rust prevention really separates the men from the boys.

Volvo starts at the beginning — with the metal itself. Sections like the rocker panels — the ones that rust out first on other cars — are made of special hot galvanized steel. Expensive stuff, but it really resists rust.

Phosphating is the next step. Every Volvo body is dunked in an acid bath. Acid cleans the metal, then etches it all over so the paint has a rough surface to grab on to.

With all the metal nicely phosphated, Volvo bodies take another bath. This one is in a special rust-proofing primer paint. This paint is all that stands in the way of inside rust in the average car. But Volvo engineers have designed a bunch of holes into the 144 S. Sole function of these holes is to make sure the rust-proofing paint gets into every last nook and cranny of every last piece of steel.

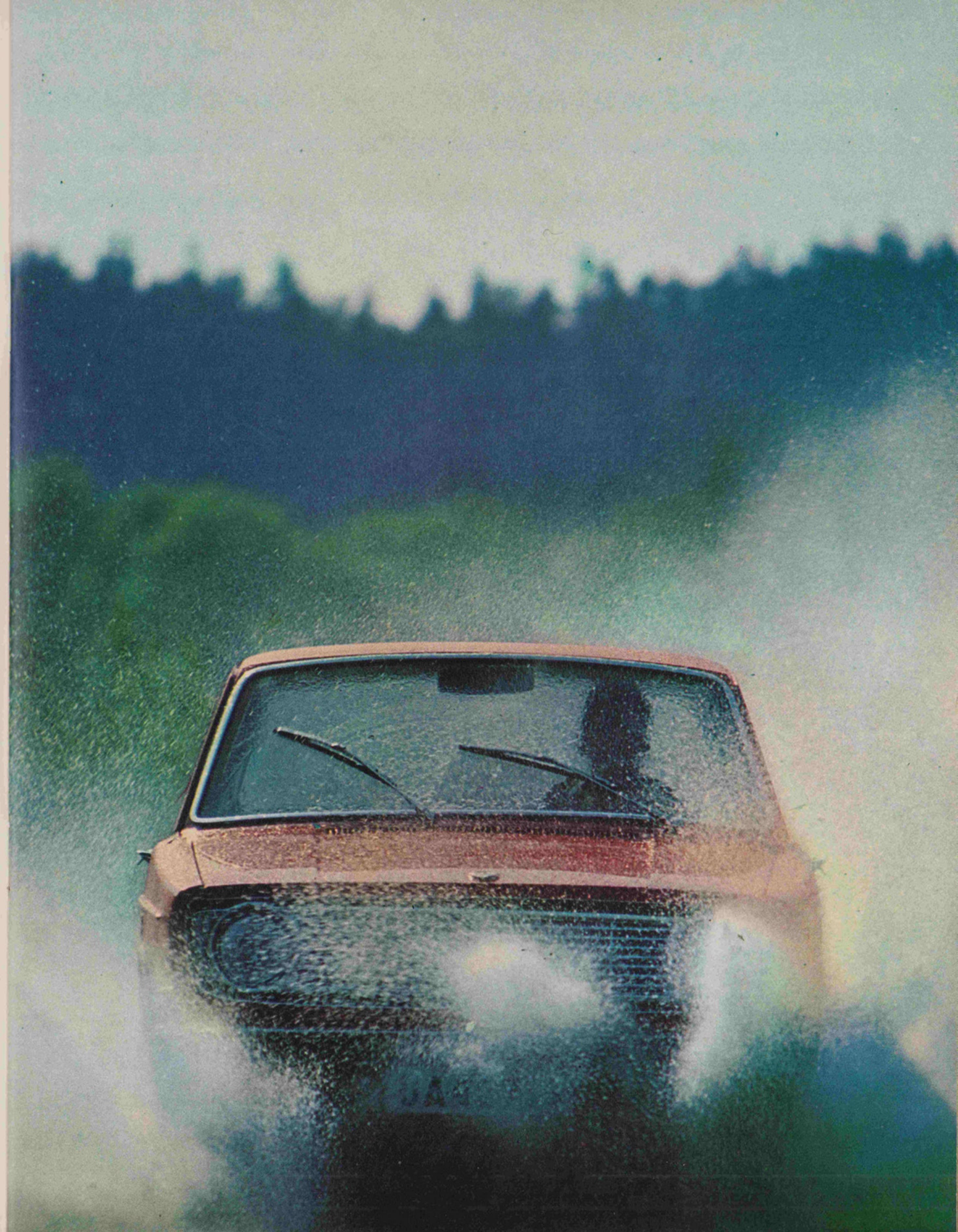
But that's not all. The 144 S also has special vents which direct a steady flow of air *through* the rocker panels. You can just plain forget about rusty rocker panels.

To finish the job right, Volvo undercoats all its cars with two different compounds. One's a permanent sealing wax. The other is the black waterproof stuff which normally costs about \$35 on other cars. This combination of superior steel, phosphating, galvanizing, rustproof primer and undercoating adds up to rust resistance second to none in the entire automobile industry. It's an important contributor to Volvo's reputation for durability.

The parts of the car you can see get first class treatment too. Two layers of primer plus three layers of top quality paint, oven baked and hand sanded, give Volvos a mirror smooth finish.

In the first place, Volvo tests a new paint for a year and a half before it ever gets near a customer's car. The lab checks it exhaustively for hardness, moisture resistance, flexibility, gloss, chemical resistance, covering ability, flow, drying time, drying temperature, filling ability, color control and boiling point. Only if the paint meets Volvo's standard 100% (and not many do) is it cleared for production.

Now, many companies finish their cars with one thick coat of paint and let it go at that. They're the cars with paint runs and "orange peel." Volvo finishes its cars with three thin coats of color — one right after the other. The result is better adhesion, greater durability, and a surface that's so tough it's like driving around in your own garage.



"The efficient utilization of space deserves a lot of applause . . . there's scads of room everywhere."

Car and Driver

"Volvo has managed to provide amazing room in the passenger compartment . . ."

Popular Mechanics

Volvo's Space Program

Did you ever stop to figure out how much time you spend in your automobile?

Well, it works out to about 12 solid days a year. Looking at it another way, that's 36 eight-hour working days. That's a lot of hours! . . . especially if it means putting up with little inconveniences and discomforts for all that time.

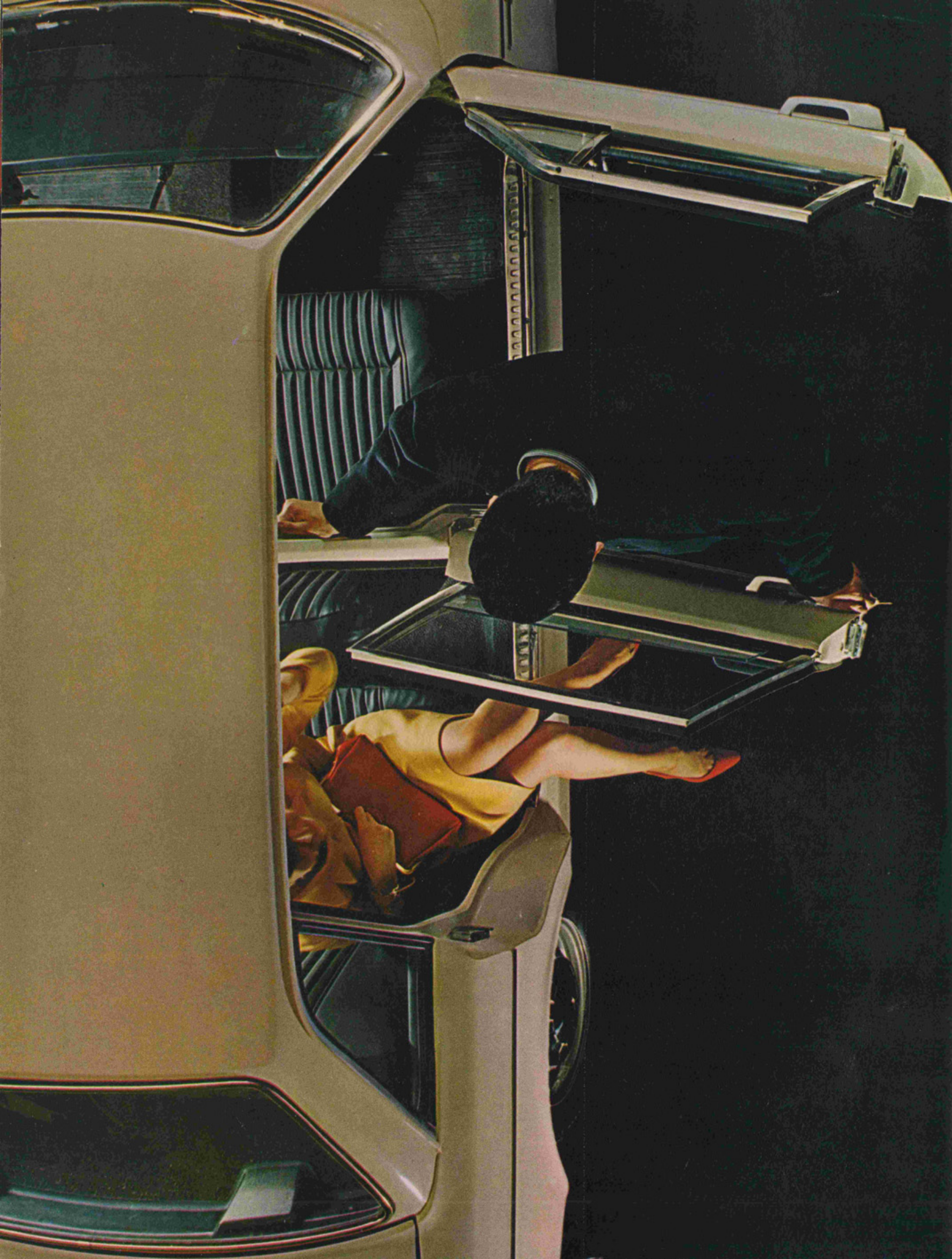
Think about that while you read what Volvo has designed into the 144 S to keep you comfortable.

Let's start with space. Volvo engineers have put an amazing amount of it inside a compact package. Knees don't put dents in the backs of the front seats. Heads don't nudge the roof liner even with hats on. Elbows don't dent ribs. Backs don't ache. No claustrophobia guaranteed.

Now there's glass area. Would you believe the 144 S has considerably more of it than a 4-door Falcon, Fairlane, Chevelle, Dart or Valiant? Well, it's true. The 144 S sets a new standard for compact car visibility.

Then there are all kinds of little things like three ashtrays, three entry and exit assist handles, a folding arm rest in the center of the rear seat and a dashboard full of instruments and buttons, all of which can be reached without a stretch — none of which fight your sight with reflections at night.

They're all set into a dashboard completely surrounded with padding that's covered with rough-textured, non-glare vinyl fabric.



"The seats are the epitome of comfort . . ."

"The seating in this sedan is as comfortable as that in any of the luxury import sedans which cost at least a thousand dollars more than this automobile."
Popular Imported Cars

". . . seats which have the driver and front seat passenger sitting prettier (and a darned sight more comfortably) than they would be in almost any other car of any other make regardless of price."
Foreign Car Guide

When a seat is designed to fit the average human, it's not much good for a 240-pound fullback or his 98-pound wife. Adjustable seats have come a long way since the days of wooden blocks.

With the introduction in 1964 of its adjustable back support, Volvo laid claim to the most versatile seat in the automobile industry. No seats have appeared which dispute that claim. *Industrial Design* magazine calls it an "orthopedic delight." "For the first time in any mass-produced chair — automotive or otherwise —," the magazine continues, "not only is there good lumbar support, but adjustments in the support can be made easily . . ."

Volvo also gets wonderful testimonials from traveling salesmen who write that, since switching to Volvo, they can drive all day with nary a pain in the back. So much for sore backs. What about the rest of you?

Well, for one thing, with the flick of a lever, Volvo seats slide back and forth nine whole inches. Other manufacturers ration this sliding to about six inches. Volvo's nine takes care of you whether you're built close to the ground or high in the sky.

And your thighs weren't forgotten either. The angle of the seat cushion is infinitely adjustable for just the right amount of support. Volvo takes care of your arms, too, whether you prefer driving hunched over the wheel or with arms outstretched like a race driver.

And even when sitting in the seat you can adjust the backrest from bolt upright to flat on the floor. That's right... an instant chaise lounge. Or

if you're really tired, a simple adjustment of the back seat turns the whole passenger compartment into a mobile hotel room complete with twin beds!

There's more. Although you'll need a few minutes and a wrench to do it, you can turn the front passenger seat all the way around. Great for card players or busy executives who want to use the rear seat for a desk.

Volvo builds two safety features into its wonder seats too. To protect rear seat passengers, the heavy steel tube frame doesn't go all the way to

the top of the backrest. A flexible steel strap supports the upholstery up there instead. This thoughtful little safety feature alone will save doctor and dentist bills for an awful lot of back seat passengers.

And here's a Volvo exclusive. The company has incorporated a special friction device into 144 S seats which is designed to minimize whiplash injuries. It takes a force of about 10 Gs to cause severe neck injuries. The back of the 144 S seat, will slip backward at 8 Gs or, in other terms, when subjected to the force of a ten mile-an-hour collision.



"... the driving position is excellent, the placement of control pedals well thought out, and the steering is on a par with anything in this class."

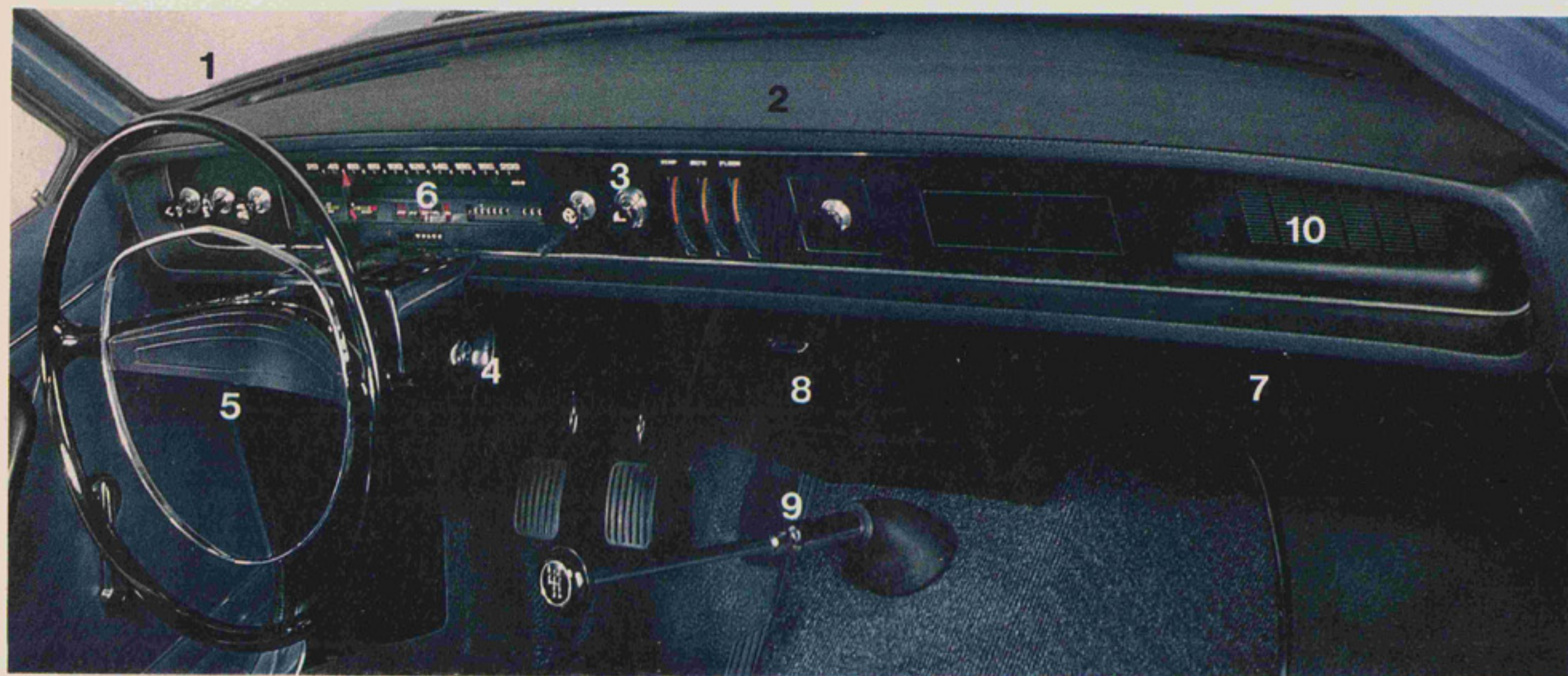
Popular Imported Cars

Here's a fast rundown on ten of the features which back up Volvo's claims about 144 S comfort:

1. Super visibility through more than 3800 square inches of high impact safety glass. 2. Instrument panel surrounded with padding. The roof, doors and sunvisors are padded too. 3. Flat, recessed control knobs are marked with little pictures to make sure you know what controls what. 4. A

steering wheel lock is combined with the ignition switch. Foolproof. Theftproof. 5. A dished steering wheel, with padded hub and bends-but-won't-break horn ring, connects to a collapsible steering column. 6. Million mile odometer (How about that?), resettable trip meter, and five warning lights including one for the handbrake and dual circuit footbrake. 7. Lockable, illuminated glove compartment that'll hold a lot more than gloves. 8. Fuses always blow in a car during blizzards or

hurricanes. Well, fuses in the 144 S are all kept nice and warm and uncorroded behind this little removeable door. 9. Direct action, all-synchromesh manual "four on the floor" transmission. If you don't think shifting gears is as much fun as it used to be, the 144 S also comes with a three speed automatic transmission that's neither dull nor hard on gas mileage. 10. Padded grab handle for nervous passengers who have yet to learn just how well a Volvo handles.



Planned Convenience

Now 23.5 cubic feet of trunk space doesn't mean much until you see what'll fit into a space that size. That's why this picture is here. Identical wheel wells are located on either side of the floor inside the rear fenders. So you can carry both snow tires with you or use the extra well as a useful place to carry tools, a special 3.8 gallon accessory gas tank or old car payment books. Then there's two gas operated cylinders that make lifting the truck lid a cinch.



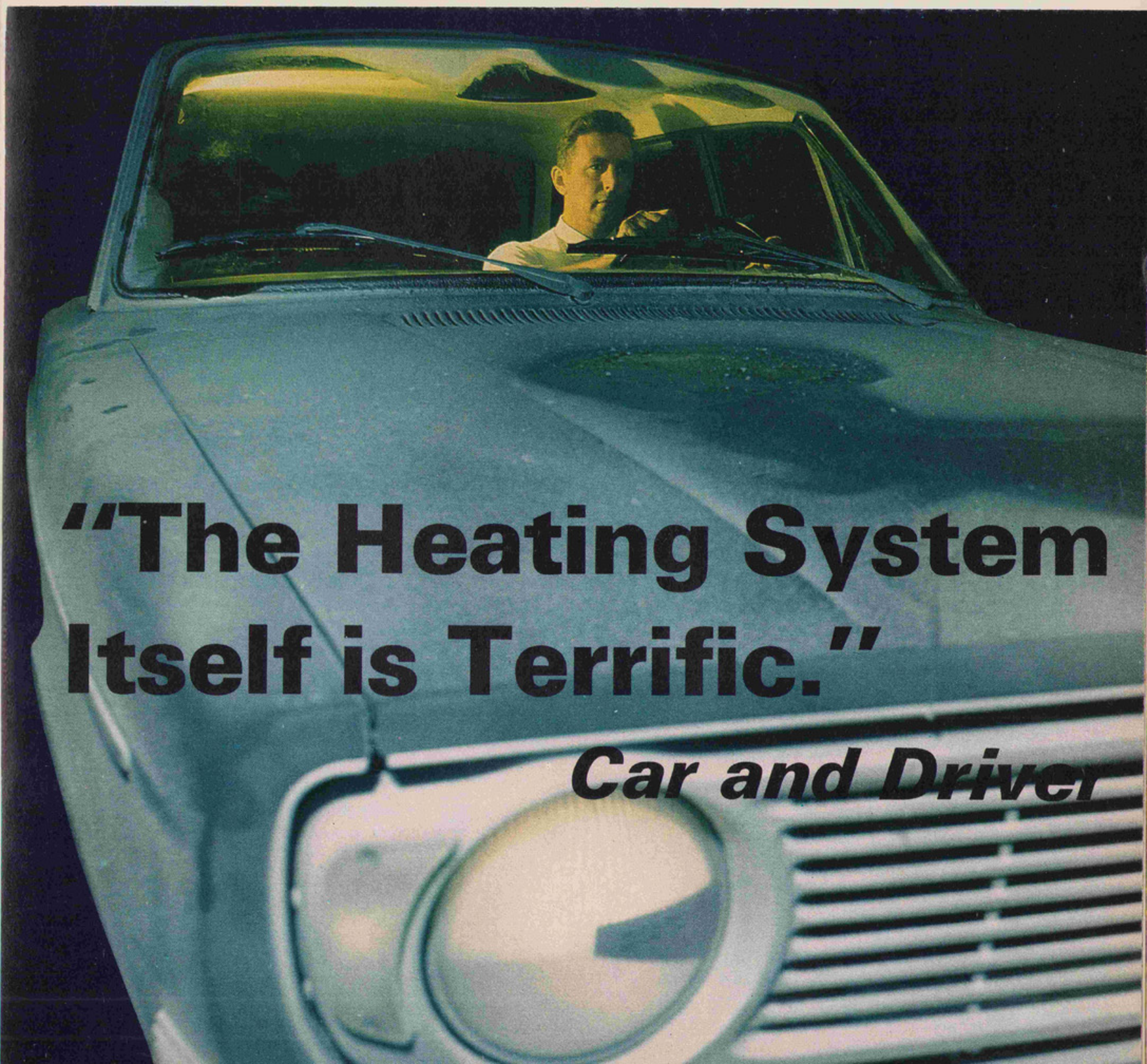
People drive Volvos in more than 80 countries. . . all kinds of people. . . on all kinds of roads. . . in all kinds of weather. Summer and winter. Blistering heat and bitter cold.

zero to 90 above without missing a beat for years and years.

No car can feel comfortable in weather like that unless a lot of smart engineers make it that way.

"Flow Through" . . . "Climate Control" . . . "Temperamatic" . . . Other manufacturers give fancy names to their heating and ventilation systems. Not Volvo. In fact, Volvo has no name for its system at all. Maybe it should simply be called "BEST."

Volvos run reliably in the 122° desert furnace in southern Mexico. They run every day in the 30 below zero freezer far north of the Arctic Circle. Even in Sweden, Volvos have to handle temperatures from 40 below



"The Heating System Itself is Terrific."

Car and Driver

"... defroster is far superior to anything offered as optional at extra cost equipment on domestic products!" *Cars*

Volvos Thrive in Cold Weather

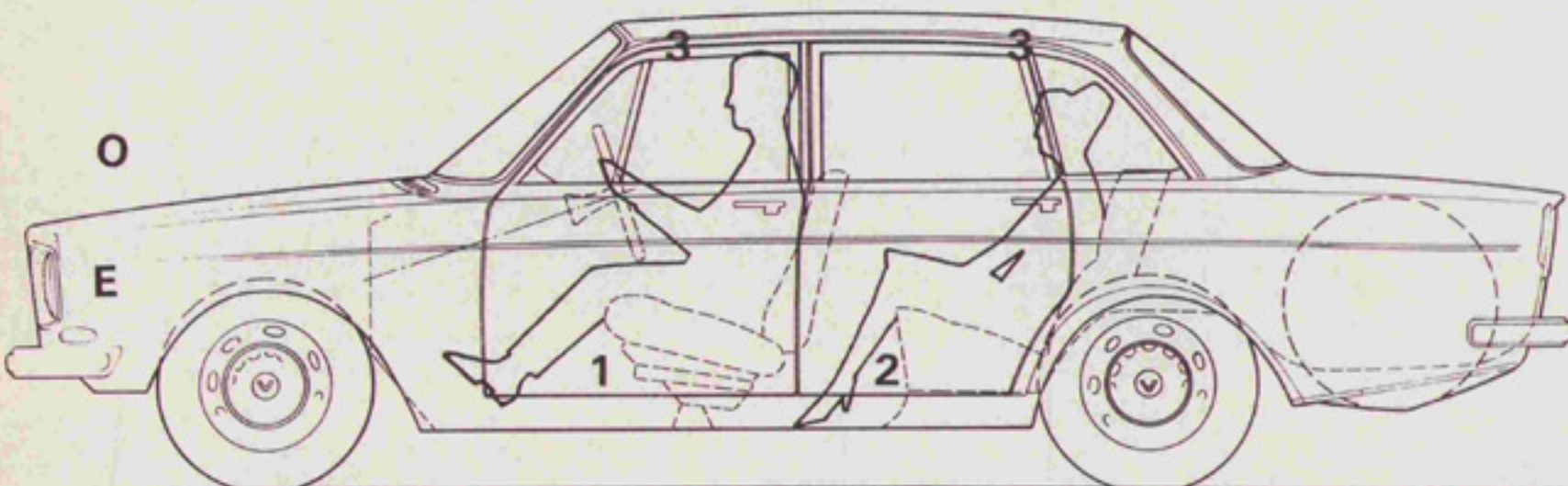
First of all, a battery's efficiency drops dramatically with the temperature. At 32°, a battery puts out only 65% of its total power. When the thermometer falls to 0° a battery's output falls to 40%.

So Volvo starts with a 12-volt electrical system, adds a 60 ampere-hour battery, an extra heavy duty generator and tops it off with a real powerhouse—a one horsepower starter that will fire up a Volvo no matter how low the temperature goes.

All this adds up to a built-in margin of electrical safety designed to handle the demands of windshield wipers and washers, radio, heater, air conditioner, stereo, headlights and for good measure, all the fog lights, spot lights and other electrical gadgets you care to install.

For those who enjoy facts and figures, this diagram details an actual engineering evaluation test of the 144 S heating system. It started at five o'clock on a typical Swedish winter morning.

- O — outside temperature
- E — engine temperature
- 1 — temperature at the driver's feet
- 2 — temperature at the rear passenger's feet
- 3 — front and rear temperature at head height



O	18°	18°	18°	18°	18°	18°	9°
E	18°	63°	106°	154°	180°	180°	180°
1	18°	43°	55°	70°	70°	72°	79°
2	18°	36°	45°	52°	61°	68°	68°
3	18°	36°	45°	52°	63°	70°	70°

The second most powerful thing in a Volvo is its heater. Although it can't literally blow you right out of the car, it sure can drive you out. The heater in a 144 S is so effective that its full capacity is needed only in extremely cold weather — about 25° below zero or less.

Plenty of heat is one thing. Distributing it properly is quite another. It's not much good having a heater which blisters the driver's feet while the poor back seat passengers freeze to death. Volvo solves this problem to perfection with infinitely variable heater controls, a powerful two-speed electric fan, special ducts to conduct heat directly into the rear passenger compartment and defrost vents that keep the whole windshield clear.

As an extra added attraction (at no extra cost), the 144 S also defrosts

its rear window. On its way back there, warm air passes through ducts along both door sills, helping to keep the floor and rocker panels dry too. Thoughtful engineering?

OK, but what about those summer days when it's hot enough to sizzle eggs on the sidewalk? Well, air-conditioning is the best answer, of course, and the 144 S is available with a custom built unit that'll keep you shivering in th Mojave desert. But a 144 S without it will still do a superior job of cooling you off.

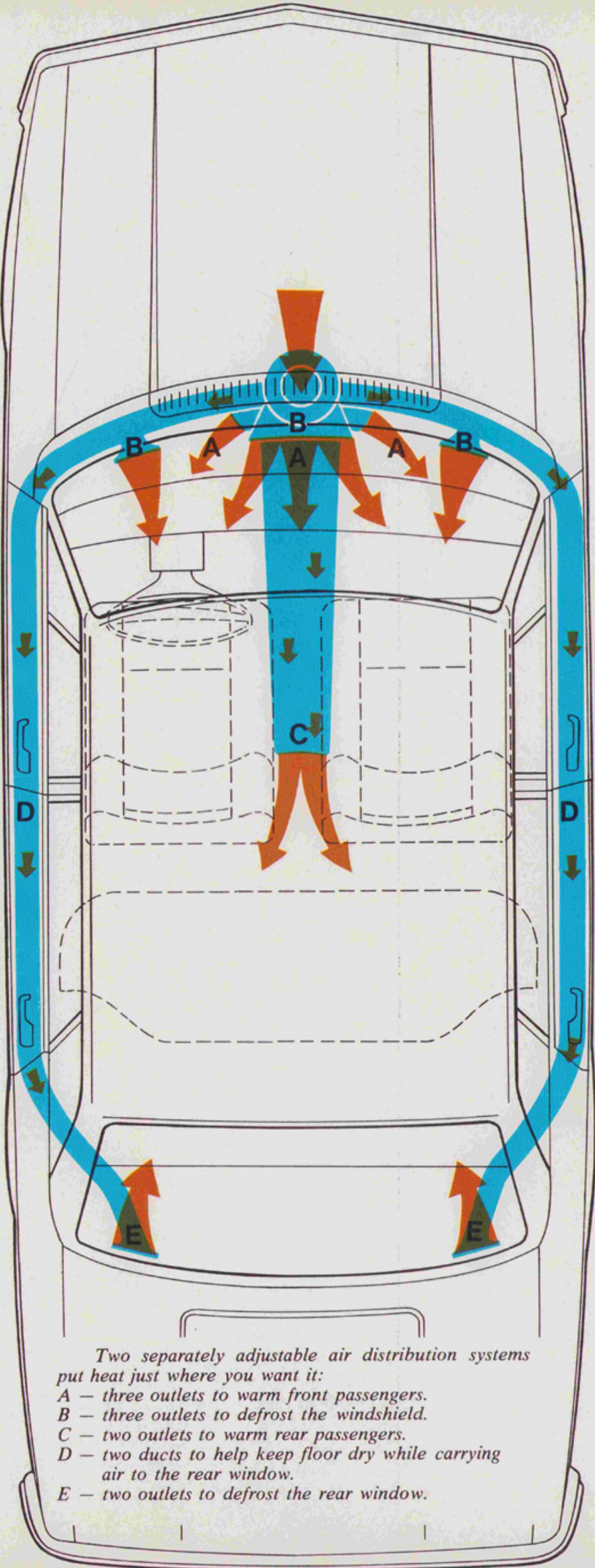
It picks up fresh air through a grille at the base of the windshield and delivers it into the passenger compartment through individually regulated vents. They're located on each side of the car beneath the dashboard, right where they do the most good.

for 15 minutes. As indicated in the drawing, temperatures were recorded in five places — outside, engine, at the driver's feet, at the passenger's feet and at head height. All windows were shut, heater fan was on and air distribution was equally divided between the floor and defroster nozzles by fully opening both the floor and defroster controls. That sets the scene.

Now for some evaluation. Notice first of all that the outside temperature dropped 9° between ten past and a quarter past five! Next take a look at the middle column of figures. It says that after only six minutes of running, the 144 S already has excellent "endurable" inside temperatures of 70° at the driver's feet, 52° at the feet of the rear passengers and the same 52° at head height.

The last column shows that rear floor temperature has jumped to 68° and warmth at head height to 70° despite the 9° drop in outside temperature.

What all this means is that the 144 S has a super heating system. Temperaturewise, it'll "take" you from Maine to Florida in 15 minutes.



Two separately adjustable air distribution systems put heat just where you want it:
A — three outlets to warm front passengers.
B — three outlets to defrost the windshield.
C — two outlets to warm rear passengers.
D — two ducts to help keep floor dry while carrying air to the rear window.
E — two outlets to defrost the rear window.



Three vertically mounted discs recessed into the dashboard control the volume, temperature and distribution of air. A fingertip is all that's required to operate these discs which have illuminated strips for easy identification at night. So day or night you can tell at a glance just how much warm air is going where.



The 144 S, you'll remember, has more glass area than any of the Detroit compacts. A superior defroster system isn't the only item put on this car to make sure you can take advantage of all that visibility.

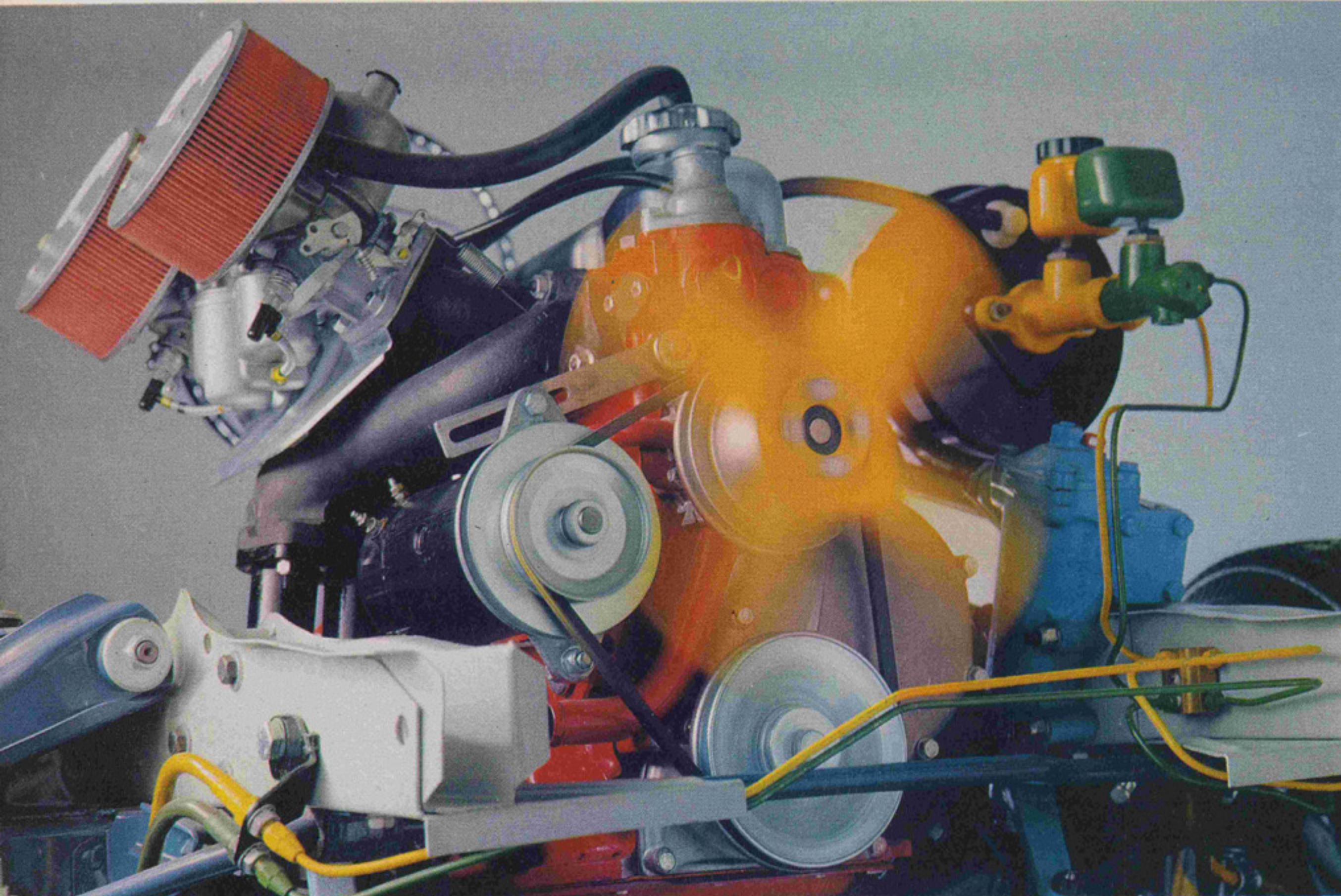
A powerful two-speed electric motor has been added to drive big 16-inch wiper blades through all the rain, snow, sleet and slush that Nature can produce.

And another little electric powerhouse hurls two streams of water against the windshield to wash away all the grit, grime, dust and mud that any vehicle ahead can splatter between you and what you want to see. Where are the spray nozzles? They're nestled beneath the cowl air intake grille out of the way of practical jokers or automatic car wash brushes. Clever?

THE VOLVO 144 S



Paradox



Automobile engines are a complicated mystery to most people, especially Volvo owners. In fact, the majority of Volvo owners have had no reason to learn about engines and couldn't care less. Owners of other cars who are engine experts probably got that way in self-defense — to protect their pocketbooks.

Volvo's B-18 engine is the best insurance you can buy against becoming an engine expert. Actually, this engine is a paradox. Introduced in 1961, it has developed into a unique combination of opposites — performance and economy. The 144 S out accelerates the other popular priced compacts in its class while getting more than 23 miles to the gallon, even with an automatic transmission. Like little economy cars.

SPORTS CAR GRAPHIC magazine calls it "one of the most, if not THE most, reliable, rugged and unbreakable car engines being built today. . ."

This tribute was written by the editor after he supervised the most punishing engine test ever conducted by his magazine. The test included an entire week of "full throttle torque and power tests plus an innumerable series of partial runs and single burst tests."

Here's the magazine's conclusion: "By week's end it became obvious that the B-18 engine can be driven incredibly hard for a very long time without ever coming apart."

It does sound like a tough test, doesn't it?

Well, it was child's play compared to the tests Volvo engines must survive at the factory before they are released for production. For example, after only three hours of running-in, engines must survive continuous full-throttle, flat-out operation for 100 straight hours.

Then there's the most miserable test of all — at a speed equivalent to 90 miles an hour for 500 hours. No pauses. That's 20 solid days — enough time to speed twice around the world.

But here's the clincher. *Every single* Volvo engine is tested at various speeds and loads for 20 minutes before it is approved for installation in a car.

Volvo doesn't take chances.

"Volvo takes a leading position in that small group of auto makers who have initiated safety features and standardized them on production cars."

Popular Science

"New package of auto safety sets the pace for Detroit."

"In its wealth of engineering features for safety, economy and performance, the 144 S includes virtually all the proposed safety standards that are giving American manufacturers sleepless nights."

Product Engineering

Let's Talk Safety...

Volvo has a basic philosophy on this subject. The company has always believed it has an obligation to its customers to build safe cars. It has spent millions of dollars proving that philosophy and millions more translating it into the cars that bear the company's name.

Here's proof. As you read this list of the top ten safety features in the 144 S, keep in mind that they all were approved early in 1964, more than one year before automotive safety became the subject of international controversy.

Three point seat belts.
Rigid passenger compartment.
Impact absorbing body sections.
Three wheel split brake system.
Rear brake pressure relief valves.

Collapsible steering column.
Interior crash padding.
Safety door locks.
Rear window defroster.
Front seat anti-whiplash device.

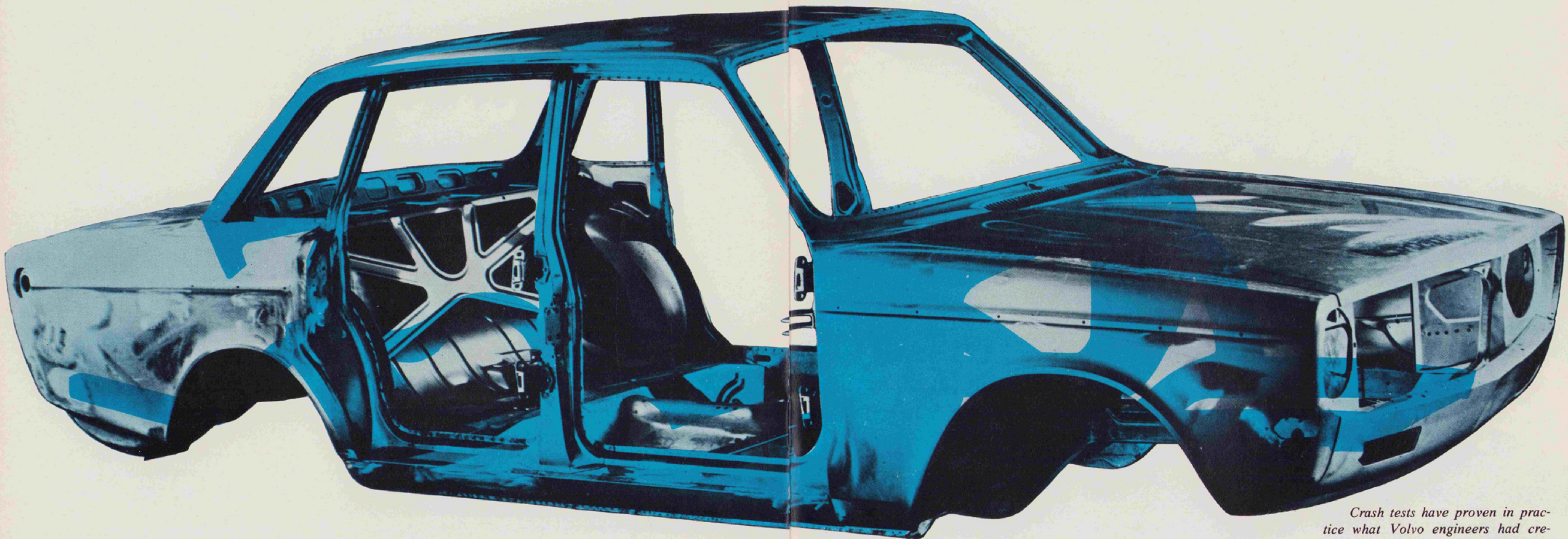
Remember too that Volvo was the first automobile manufacturer in the world to put safety belts in its cars as standard equipment. Way back in 1959. You can be sure public demand wasn't the reason. Philosophy was.

"Volvo may today be just about the safest car on the road . . ."

Popular Mechanics

"Listen, Detroit, and you might learn something about building a really safe performance car from . . . Volvo." *Cars*

...From the Ground Up



The real safety engineered into the 144 S is where it can't be seen. Most of it is hidden in this unitized body. There isn't a safer, stronger body structure in the entire automobile industry.

Six steel pillars boxed for maximum strength provide the basic structure of the 144 S passenger compartment. Each of these pillars can support twice the weight of the car. Looking at it another way, the roof of the 144 S will support twelve cars stacked on top of it. That's 15 tons.

Also contributing to maximum body strength is a minimum number of body panels. The entire sides of the 144 S, for example, are stamped from one piece of steel, ensuring greater strength, better fit and lighter weight.

Crash tests have proven in practice what Volvo engineers had created in theory — an exceptionally strong passenger compartment protected by front and rear body sections that successfully absorb large amounts of collision energy. Some styling flexibility fell by the wayside in order to achieve this muscular body, but Volvo hasn't regretted it for a minute.

Test 66144S - 21



Sept. 20, 1966—3:20 p.m. Volvo safety engineers put the finishing touches on another 144 S production prototype ready for the cement wall. Cameras are loaded, instruments are checked.

3:32—With front seats in place and safety belts installed, scarred, experienced test dummies are put in their seats.

3:49—Vehicle 66144S—21 has its front doors removed so cameras can record what happens during the crash. Struts are used to compensate for the missing doors.

4:05—With his check list complete, Volvo's chief test engineer directs the countdown as the crash car, in gear and engine running, waits to be launched toward the wall.

4:22:10—A technician with a portable remote control unit has pushed the button. Guided on a rail, the automobile accelerates on its way to destruction.

4:24—The grinding cameras have stopped. The dummies have sunk back into their seats. Water drips onto the pavement from a damaged radiator. Technicians surround vehicle 66144S-21 for the measuring which starts phase two of this test—the intensive evaluation of the results.

4:22:19—Loops of control cable fly through the air, rear tires scream against the pavement and the dummies rebound against their seats.

4:22:20—In the test control center, the even pattern of the electrocardiograph has changed into a violent whirl of leaping lines.

4:22:15—The car snaps a row of triggering threads which light photo lamps and start cameras a few feet before the impact.

4:22:18—Crash! The car hits the cement wall with a sickening roar, the front part of the body crumples but the passenger compartment stays intact as the dummies strain against their seat belts.

height. There is no chassis at all above the door sills in hard tops.

Volvo's three point belts are anchored into thick, box-shaped center door posts that are joined together across the roof with more boxed steel. It takes more than three tons of force to fail Volvo's three point system—a figure that exceeds every automotive standard in the world by far.

Volvo introduced this belt system in 1959 and it's been standard equipment ever since.

Federal safety regulations now require anchorages for three point belts in all cars and now Detroit manufacturers are offering them. But without adequate door frames for anchoring points, these belts usually are anchored way back on the rear wheel wells or in the roof.

Never mind. They're better than two point belts and far better than none at all. While you're getting ready to buy a Volvo, put them in the car you're driving now. Good practice.

Volvo knows that two factors, and only two factors, can play the vital roles in saving your life in serious collisions. They are (1), a correctly designed body package, and (2), a correctly designed safety belt.

You've already read about the tremendous strength built into the 144 S body, but what about safety belts? Volvo safety engineers get pretty emotional on this subject.

This dedicated group of men have been testing all kinds of these belts for ten years. They've accumulated file cabinets full of data on every type known to man. They've stretched them, torn them, snapped them and

shredded them. They've accumulated thousands and thousands of feet of film of belts in action on Volvo's acceleration sleds and in hundreds of crash tests at the proving grounds.

Every bit of this data, every foot of film zeros in on one conclusive fact—a properly designed three-point safety belt is by far the most effective form of crash protection. No ifs, ands or buts.

Now let's keep calling a spade a spade. Nearly every other automobile manufacturer in the world uses two point belts for two poor reasons. They don't think the public is ready for a strap across its chest, number one. And number two, most of their cars haven't got a frame member strong enough to adequately anchor the all important third point, the one that must be anchored at shoulder

"... handles extremely well..."
Science & Mechanics

"Steering is light, quick and precise. Sidebite on fast turns is better than on many sports cars."
Popular Science

You're The Boss Driving This Car

Every car should be designed to operate safely with a full load. Sure they should, but many of them don't at all.

With the tank full of gas, the trunk full of luggage and the passenger compartment full of people, many cars are downright dangerous. The whole car wallows on overloaded tires. The suspension bottoms. The steering turns "mushy." The brakes fade.

Nothing like that happens to a 144 S. They're designed to carry a full load. The margin of safety is built in. In fact, the 144 S is so strong that the warranty permits towing a load equal to 90% of the car's total weight. Try towing nearly a ton and a half behind most other cars. It's a sure way to become reluctantly friendly

with your local brake lining and transmission repair shop.

The 144 S suspension isn't exotic—no inboard disc brakes, no independent rear suspensions, no De Dion tubes — but careful engineering has developed a rugged suspension system that plants all four tires firmly on the road and keeps them there. To get into trouble with a Volvo, you've got to really try hard. Ask Volvo's world champion rally drivers. They drive circles around the world's most exotic cars on the world's worst roads.

Volvo anchors its rear axles with two rugged horizontal support arms, two torque tubes and with a transverse stabilizer thrown in for good measure. Coil springs and telescopic shock absorbers give just the right amount of bump dampening at each wheel.

An independent front suspension, a

strong front stabilizer bar and proper weight distribution combine to give Volvos superior cornering ability.

While the rest of the automobile industry has been fooling around with 13 and 14 inch wheels to make their cars look better, Volvo has stuck like glue to 15 inches. Why? This comment made at a recent Senate safety hearing sums things up pretty well:

"We deplore the regrettable practice of fitting cars with underdimensioned tires which, according to standards used by the rubber industry, are not designed to carry the weight of more than the car and the driver alone."

Safety is one reason, practicality is another. Large tires get you where you're going with fewer revolutions. Fewer tire revolutions mean less tire wear. Less engine wear, too.



"... handles like a good sports car ..."

"I was even more impressed with the way the Volvo drives than I was with its long list of safety features."

Popular Science

What's Underneath...

Here's what all the bits and pieces look like. Working together as a team, they get the job done of moving you wherever you want to go.

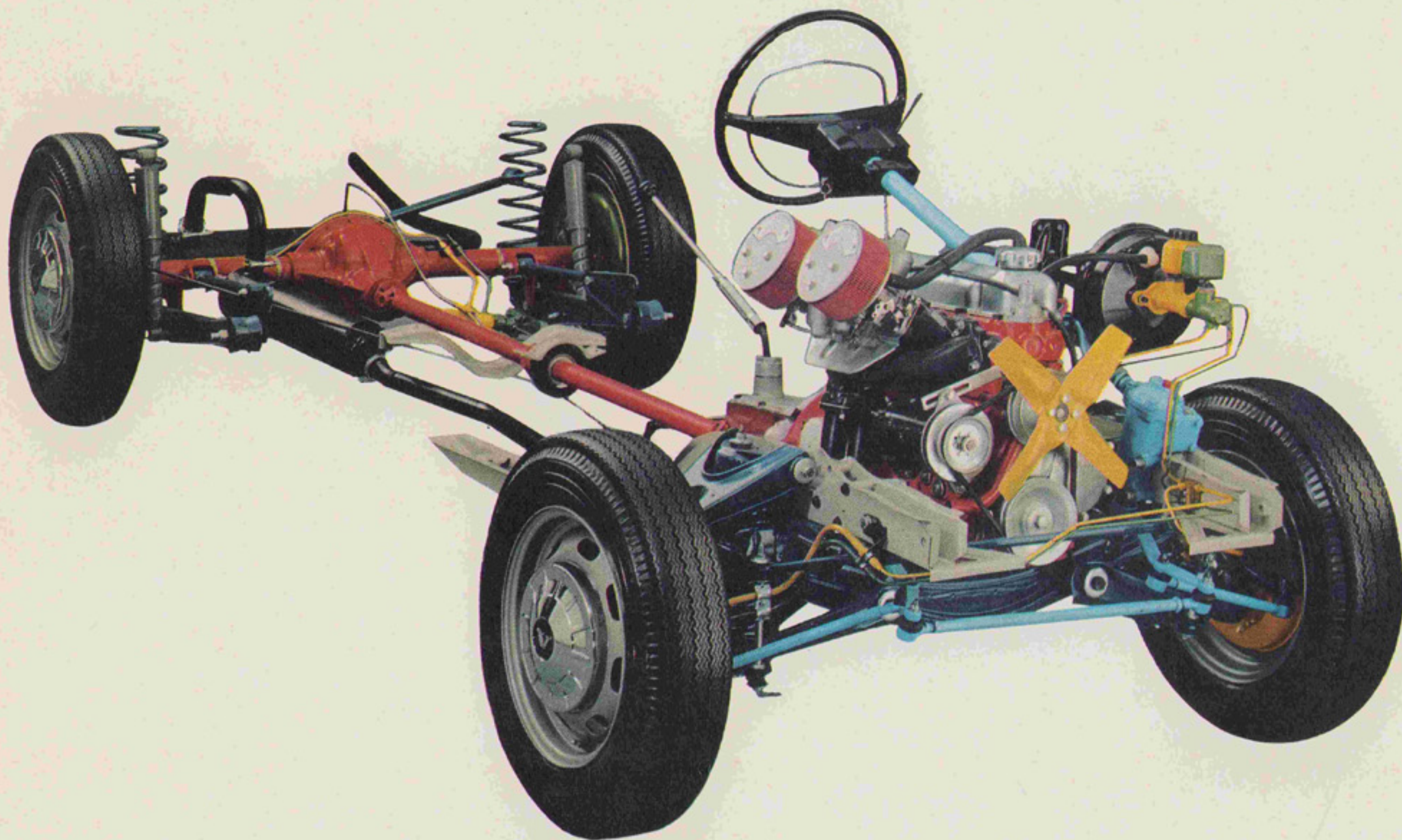
The 144 S suspension system is a careful refinement of the principles and components developed for Volvo's other cars, the 122 S and 1800 S models. The changes are small but significant.

Ideal 50/50 weight distribution and low roll centers make

the 144 S a car that won't lift its inside rear wheel even during violent cornering.

For a car this size, the 144 S has a tiny turning circle too. A mere 30 ft. 4 in. And it only takes four turns of the steering wheel to go from lock to lock.

And how about those 15 inch wheels? Mounted on them as standard equipment are wide tread, low profile, white wall tires rated to a sustained speed of 109 m.p.h.



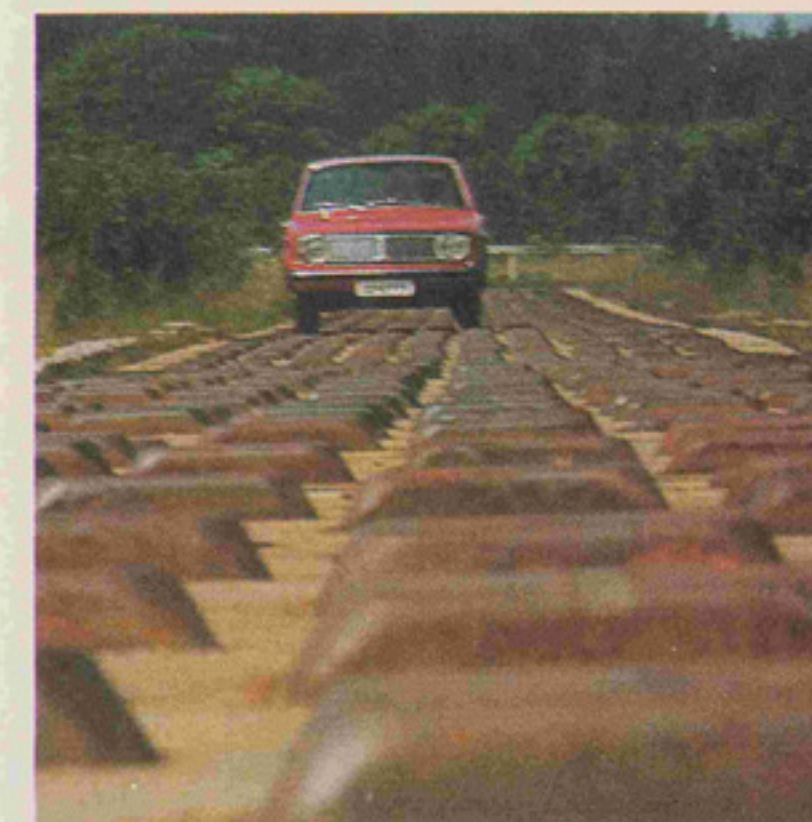
For example, a new type of rubber bushing virtually eliminates erratic action of all suspension components. This special bushing also effectively absorbs vibrations and road noise. There's a new rubber encased center bearing which eliminates driveshaft vibrations. The entire suspension system is lubricated for life too.

Take a good look at all these bits and pieces again. If you buy a 144 S, chances are you'll never have to concern yourself with them again.

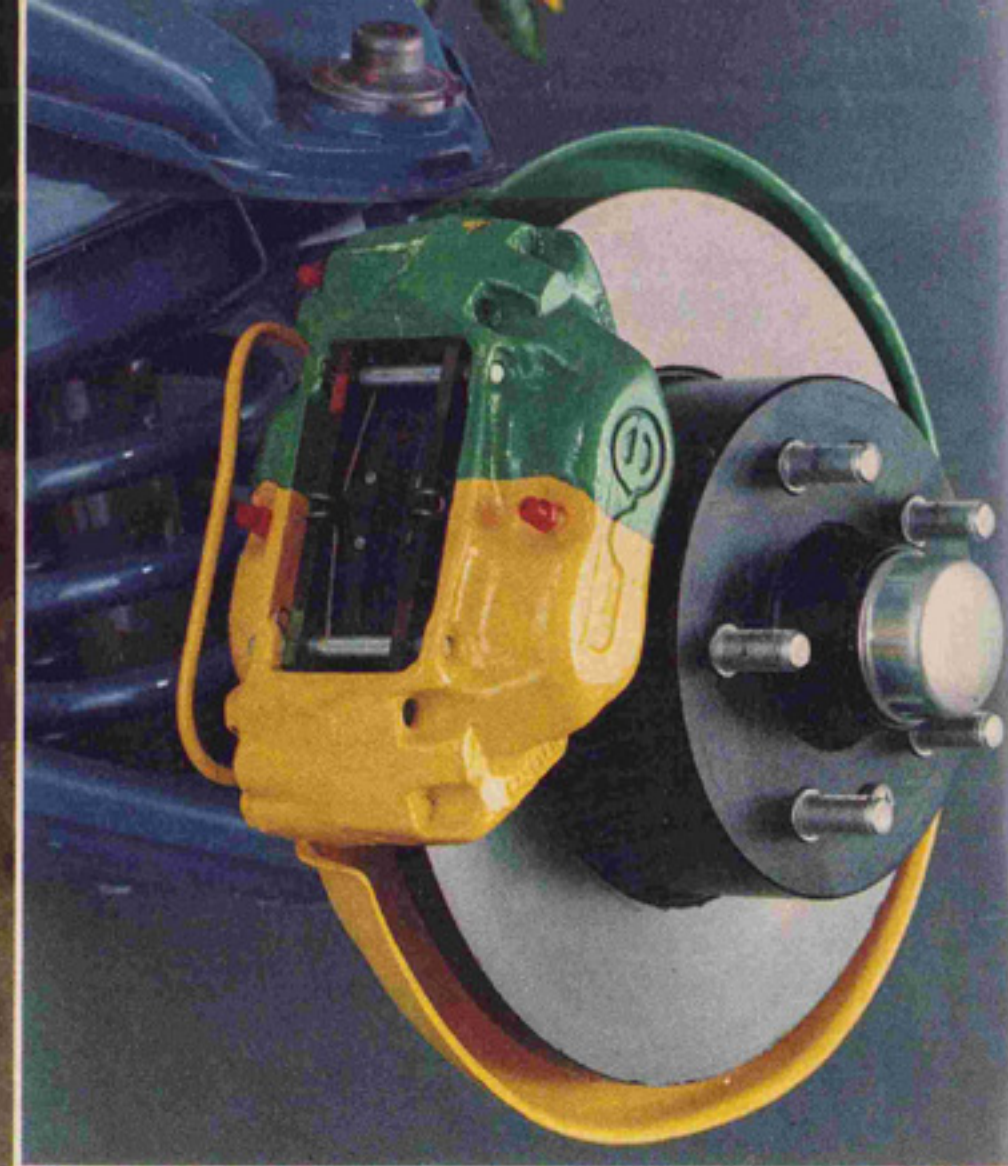


Volvo owns the worst roads in Sweden. They were made that way on purpose to torture Volvos 'til they cried for mercy. Volvo earned its worldwide reputation for durability by making its cars cry for mercy longer and louder than any other automobile on the market.

Volvo employs a team of professional motor vehicle sadists who delight in devising new ways to break the parts designed by Volvo engineers to be unbreakable. This friendly rivalry is the best thing that ever happened to Volvo owners. They know that if Volvo's professional sadists couldn't break the car at the test track, there's not much chance that they can do it on the highway.



With a swept area of 445 square inches and perfect balance, power disc brakes on all four wheels stop the 144 S right NOW. Brake pads, and even the discs themselves, can be changed in a jiffy.



"three wheel split brake system has it all over our domestic setups . . ."
Cars

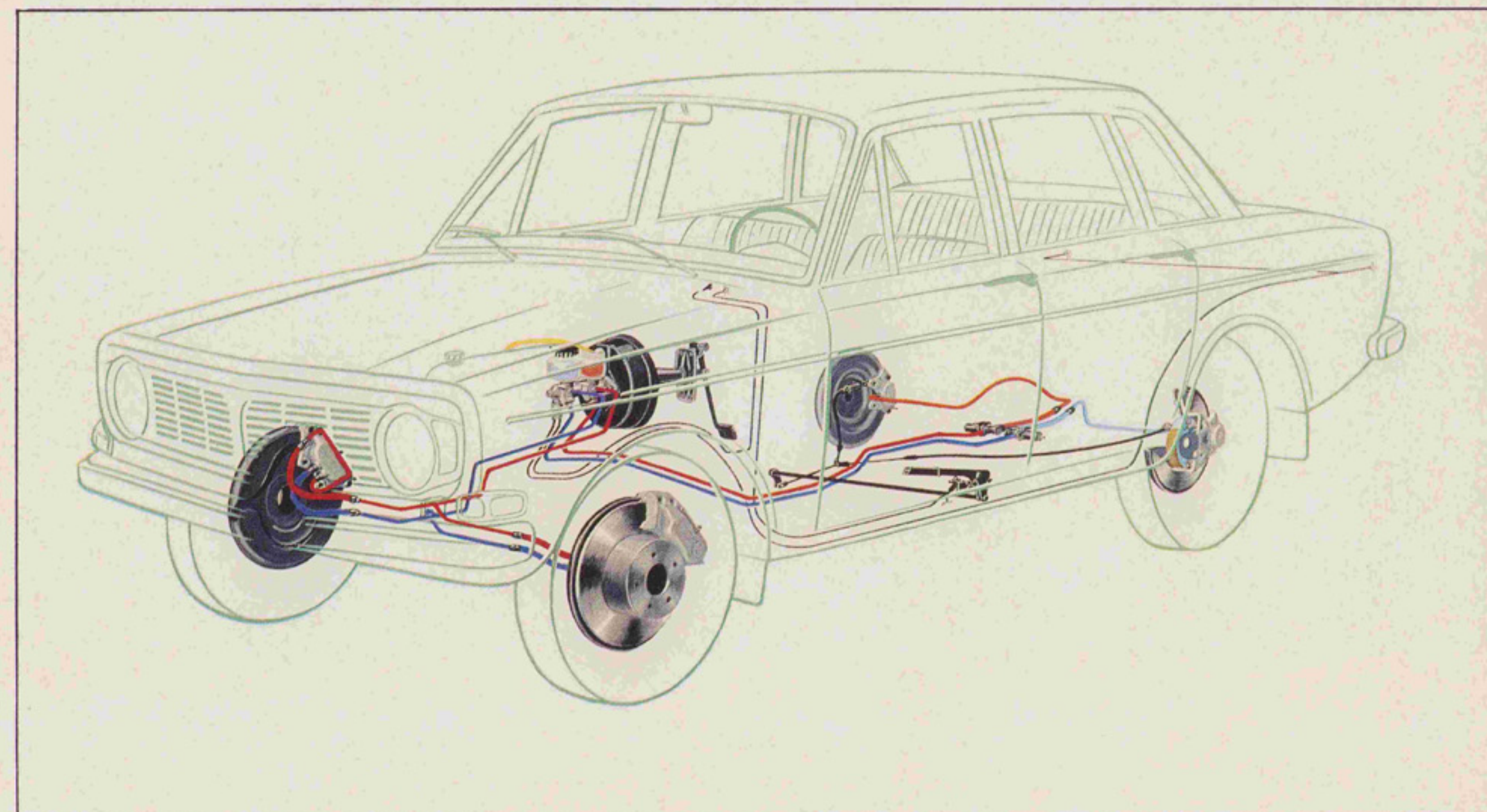
"... quite probably the best brakes in the world."

"Why can't American cars have brakes like these?"
Popular Mechanics

The dominant engineering feature of the 144 S is its brake system. The automobile editor of a well known magazine, who understandably is reluctant to be identified, summed it up nicely when he said, "There's more brilliant engineering in those brakes than there is in entire cars build in Detroit." He was impressed.

Worth noting too is the fact that this unique brake system was developed more than one year before anyone ever heard of Ralph Nader and "Unsafe At Any Speed," the book that's credited with touching off the great automobile safety controversy.

First of all, the 144 S has four wheel disc brakes. This fact alone prompted *Popular Mechanics* magazine to write: "When U.S. car makers are starting to offer disc brakes as front wheel options on high performance and sporty models, Volvo goes all the way and puts them on all four wheels of a family car."



Disc brakes require increased pedal pressure, so Volvo has added a direct acting power brake unit as standard equipment to reduce maximum pedal pressure to a comfortable 70 lbs. per square inch.

Then Volvo incorporated two special pressure relief valves to prevent rear wheel lockup, the primary reason cars screech out of control during emergency braking.

Next there's an efficient hand brake

system which features a separate little drum brake for each rear wheel.

What else? Well, there's a dashboard warning light to remind you that the hand brake is on or to alert you to damage to Volvo's exclusive *three wheel* twin brake system. That's right... the 144 S is the only automobile in the world today with twin circuit braking on three wheels — two front and one rear. Why? Good ques-

tion. Here's a table with the answer:

Brake System	Stopping Efficiency
Rear wheels only	30%
Diagonal wheels	50%
Front wheels only	70%
144 S (three wheels)	80%

With only three wheels braking, a 144 S needs just ten more yards to stop from 60 m.p.h.

Volvo Exclusive: 3 Wheel Brakes!



Not only is Volvo's three wheel system more efficient than the others, it also eliminates the hazard of control loss during heavy braking. With one circuit inoperative, a 144 S maintains complete stability even during panic stops.

This system also has three immediate warnings built into it. In addition to the dashboard warning light, both pedal travel and pedal pressure will increase noticeably if one of the two circuits should fail. But not so noticeably that a dainty lady won't have the strength to keep the pressure on. Volvo engineers have thought of that too. Check this table:

Maximum pedal pressure required, full system with power assist 70 lbs.

Maximum pressure required, full system without power assist 115 lbs.

Maximum pressure required, half system 175 lbs.

Maximum pressure that can be exerted by a dainty lady 200 lbs.

All this thoughtful engineering adds up to the most efficient, effective brake system in the automobile industry.

Car and Driver magazine puts it this way: "In the area of brakes... Volvo engineers have scored a major victory. Their system is far better than anything else currently available."



This is the end of the beginning of the 144 S story.

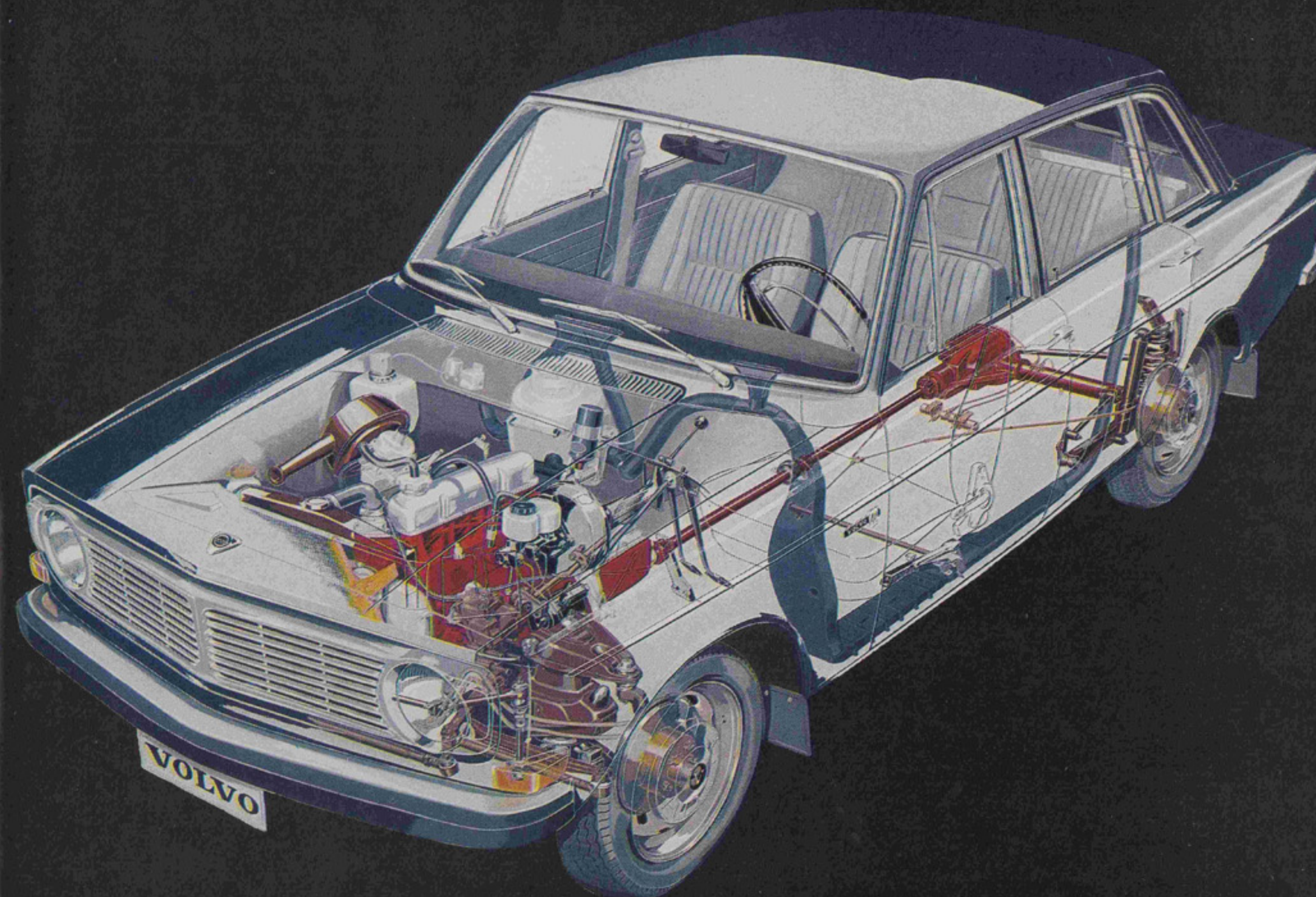
Five years of development are past. Countless decisions have been transformed into a complete automobile. \$30,000,000 has been invested to bring it from the drawing board to the production assembly line.

Well then, exactly how good a car is it?

Here's how the editors of *Road & Track* magazine answer that question:

"Volvo makes everything just a little stronger than is absolutely required, uses better materials than are absolutely required, and spends more time testing the components to their limits than is absolutely required.

The result is a car that is solid, practical, efficient and long-lived — every thing transportation really ought to be . . ."





Order # RK 144 S. Printed in Gothenburg Sweden by Wezäta AB. Enbart för spridning utomlands.

