

**Auto Sales & Repair Co.**  
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**MADISON** **WISCONSIN**  
**Local Distributors**  
Phone Badger 649

# *National*

## HIGHWAY TWELVE



*Chassis Details ~ Specifications*

# The long quest for silent and flexible power ended when the National Twelve was built

**A**UTOMOBILE history is replete with achievements, but there is none as notable as the National Highway Twelve, a radical innovation in 1915 but now recognized as the acme of passenger car development.

We deem the National Twelve our masterpiece, having found that it excels in downright ability the champion stock car of America, which was also a National. And the owners of National Twelves tell us that we have rated it rightly.

We also believe that the new National Twelve, materially perfected and refined since the National Twelve of 1915 blazed the trail for multiple-cylinder progress, will outperform any genuinely stock car in the world. This sincere belief, moreover, has been substantiated by conclusive tests.

These tests have demonstrated that the National Twelve will travel the open road at fleeter speed, climb hills with greater zest and ease, cover rough country with surer comfort and less effort than cars of any previous type.

The new National Twelve, in fact, represents that consummation of flexible and silent power which the ablest of automobile engineers sought for so many years. It is the even, purring power of the airplane; power that is tremendous, unwearying, and constant, yet extremely smooth and quiet.

National Twelves are built in five different body styles—7 passenger touring car, 4 passenger sport phaeton, 4 passenger roadster, 7 passenger convertible sedan, 2 passenger speedster.

## Riding in the National Twelve is to be unmindful of the power that is speeding you along

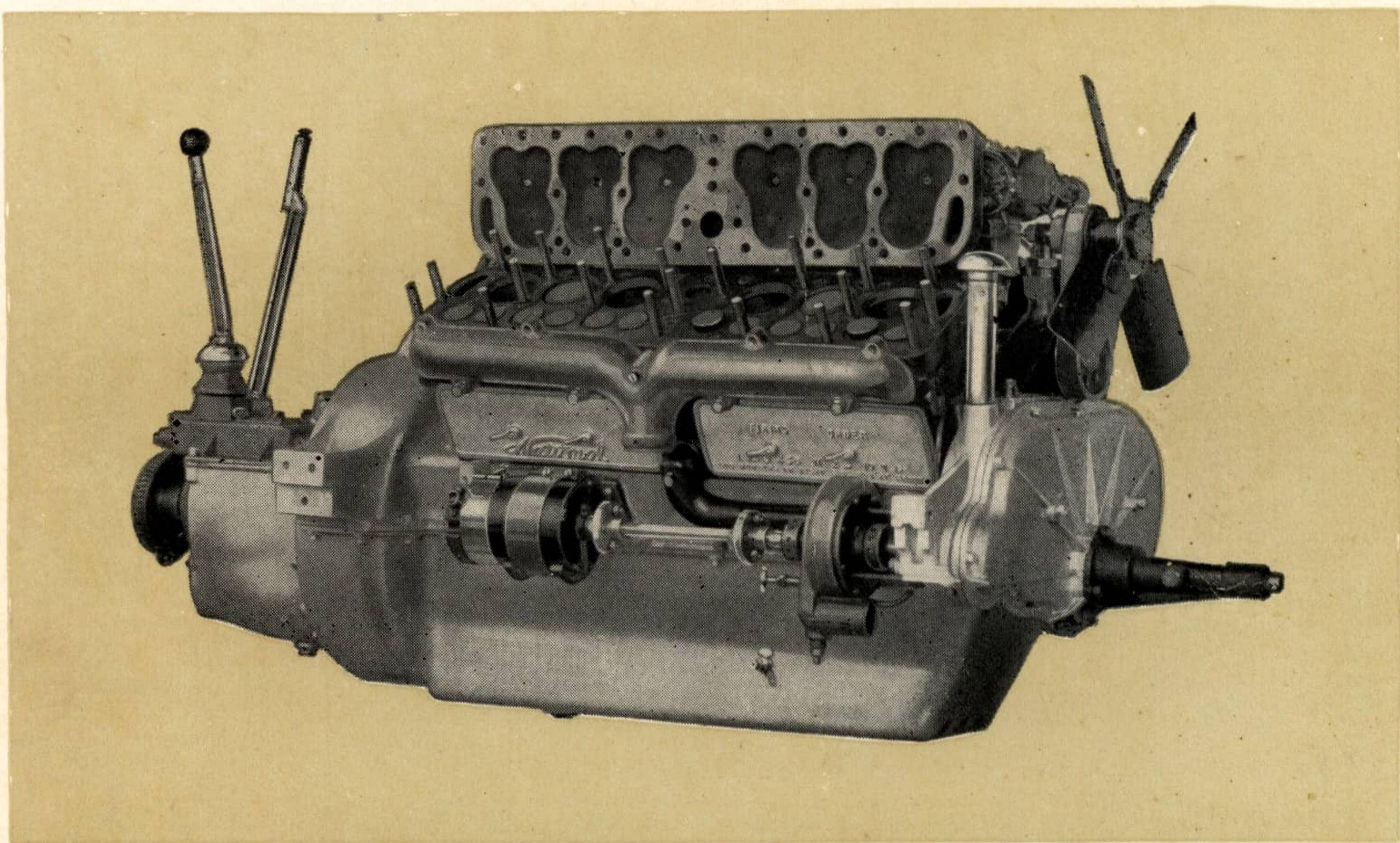
THE power of the National Highway Twelve is the power of the finely trained athlete, ever under control, making this big, spirited, resolute car as easily handled as an electric. Thus, a woman can drive it safely and with confidence, as many women do.

Ease of operation is a pronounced advantage of the National Twelve. The continuous flow of power, gained by having twelve small cylinders instead of four or six larger ones, makes combustion more perfect and practically eliminates the necessity of gear-shifting.

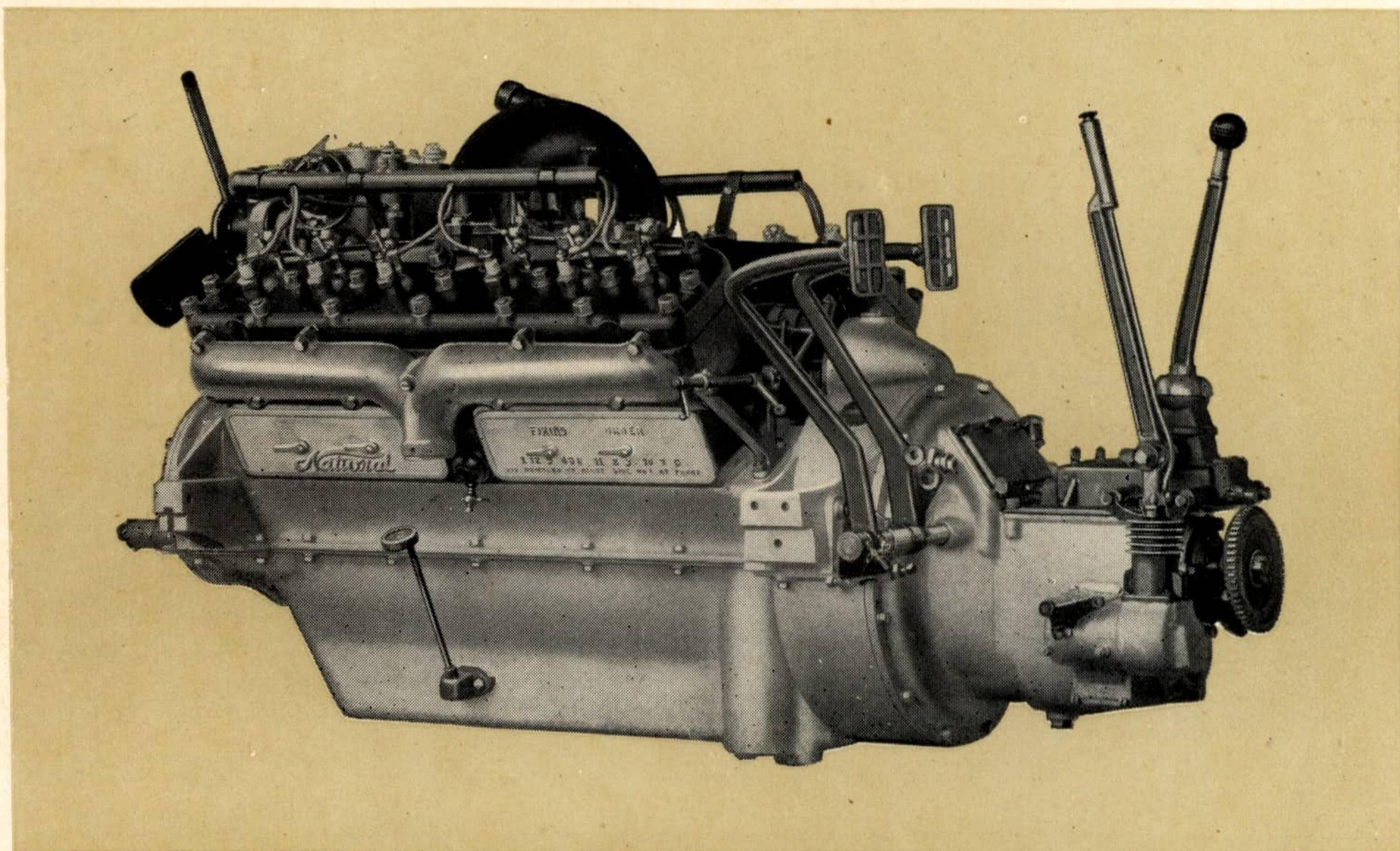
The flowing power of the National Twelve, moreover, is a vital factor in prolonging car life. There is no motor rack and strain, no punishing vibration that eventually shakes to pieces other types of engines.

And he who owns a National Twelve has power in abundance. Full seventy-seven horsepower, or any part of it, is ever at the call of the driver. This means that better than a mile-a-minute speed is always available, and quickly, with a regular stock car, either seven or four passenger.

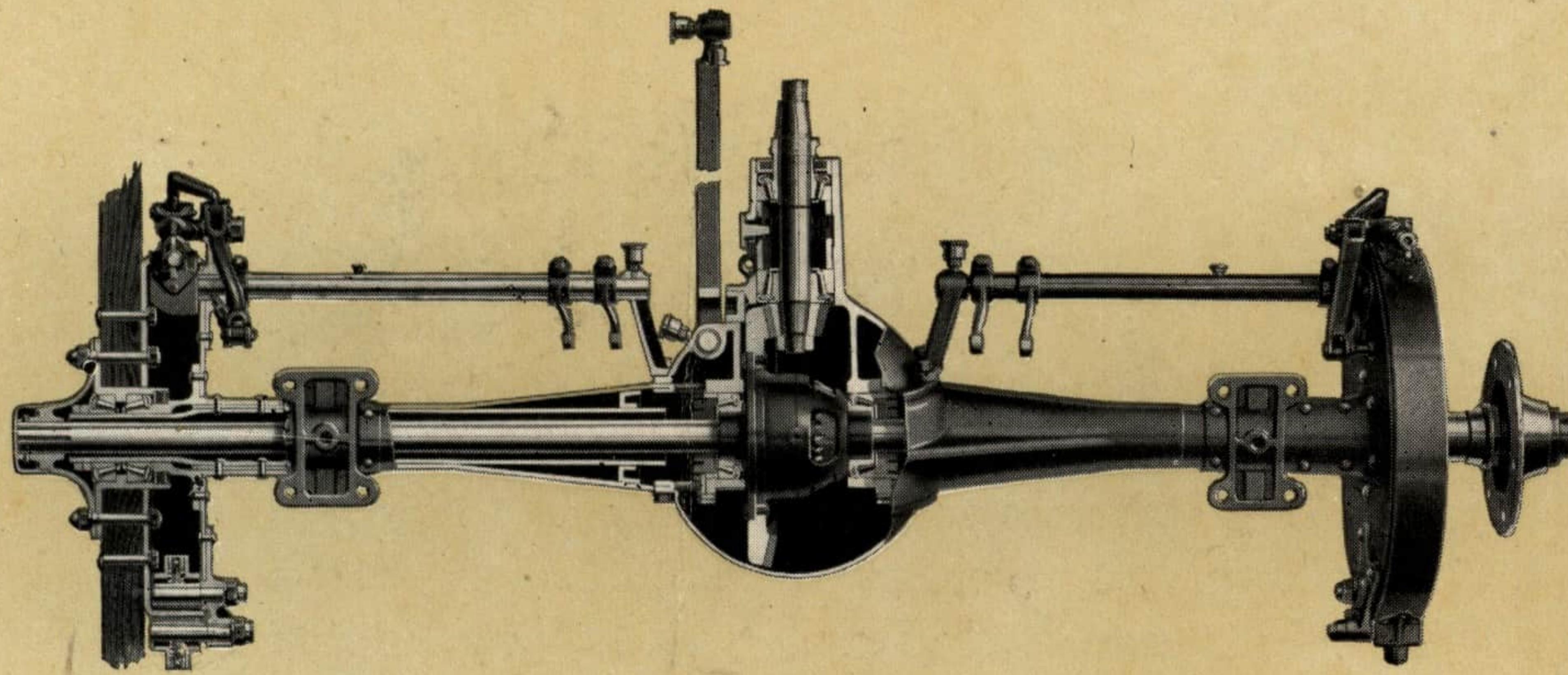
This abundant and responsive power is proportionately efficient on steep hills or in places where a "dead pull" is required. For low speeds and driving in congested traffic as well, such power is ideal. All "jerks" are eliminated by the constant, steady turning of the motor, with the result that the car can be driven on high gear very slowly without the least fear of "stalling" the engine.



Right side view of the National Twelve cylinder motor



Left side view of the National Twelve cylinder motor



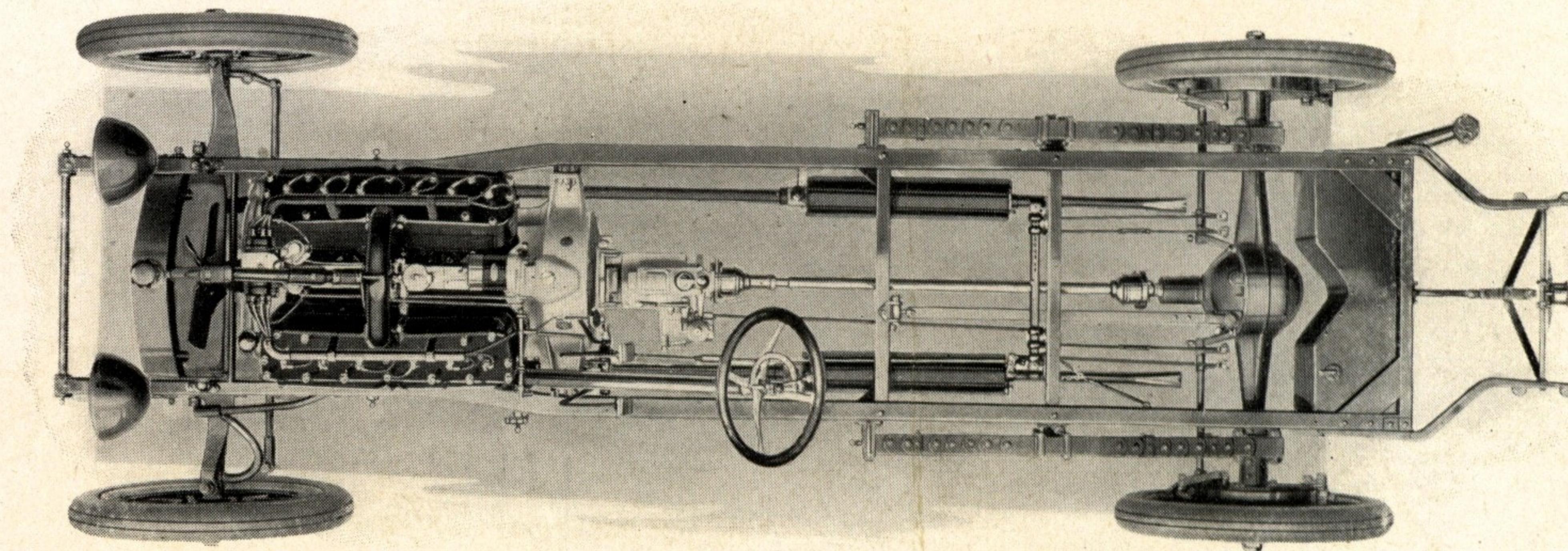
The National full-floating rear axle

THE National Twelve is economical. It develops its tremendous volume of power with remarkably low gasoline consumption. Throughout the motor are many evidences of why this Twelve does not use much gasoline in proportion to the power it gives.

The main intake manifold which connects the two-cylinder blocks is hot water jacketed. All the hot water from the cylinders goes through this manifold on its way to the radiator. Its temperature is of constant quantity, as a thermostat controls the flow of water.

The National Twelve also has an ingenious device in the intake manifold which wrings the last atom of energy from every drop of fuel.

From the cross manifold the incoming gas takes a downward course to the outside of the cylinders, then it goes into a longitudinal manifold (cast integral) which distributes the mixture to the various cylinders. It is at the intersection of the downward manifold with the lengthwise one, where the direction of the flow of gas changes, that the vaporizer is located. At this spot the hot exhaust pipe is brought in direct contact with the intake, thus forming a veritable stove. The low-grade fuel being sent along on its downward course strikes this hot spot and is immediately vaporized into efficient mixture. Every bit of fuel is used; none is wasted.



The National Twelve chassis is strong and finely balanced. Note the accessibility of the carburetor, starting motor, and ignition unit

THAT little squeak, pounding, rattle, or distracting noise so familiar to many motorists, is not present in the National chassis. Each and every part, regardless of size and functional importance, is designed for perfect co-ordination and to stand up without the least danger of overstrain. This construction is best appreciated in the second and third year of use.

Most of the little extra portion of money that you put into a National when you first buy it is for insurance. That is, the car is built with foresight. Parts are made with the idea that they are to serve and last for many seasons, and being such a substantial and well-built car, the National requires but a limited amount of repair work.

And the National has size proportionate to its abundant power. The wheelbase measures 128 inches, yet the car will turn in a 39-foot circle, an unusually short turning radius for an automobile of the National's size and power. This chassis length makes possible the use of a roomy, comfortable body.

# National Twelve Specifications

**Cylinders**—V-type construction, 12 cylinders in sets of six on each side, at an angle of 60 degrees. Cylinders set exactly opposite. L-head type, cast in two blocks of six each. Intake manifolds are integral. Cylinder heads are removable, permitting easy access for cleaning and inspection.

**Size**—Bore 2  $\frac{7}{8}$  inches; stroke 4  $\frac{3}{4}$  inches. Total piston displacement 370 cubic inches. 77 horsepower, S. A. E. rating 39.7.

**Pistons**—Pistons of gray iron are ground and lapped into cylinders. Fitted with four rings. One ring is located at bottom of piston and keeps excess oil out of cylinder.

**Connecting Rods**—Strong drop forgings, machined by experts to small but exact size, reducing reciprocating weight to the minimum. Forked ends on connecting rods to give large bearing surface and increased rigidity.

**Valves**—All valves are located on the outside of the V, and not down in the middle as in most multiple-cylinder cars. The National Twelve is as accessible as any Six. Separate camshaft is provided for each set of cylinders. This greatly simplifies manufacturing and insures perfect cams. Valve lifters are removable without tearing down the motor. Detachable cover completely encloses the valve mechanism.

**Crank Case**—Crank case is of aluminum alloy, and suspended from main frame by four strong arms, thus increasing the rigidity of the frame and reducing frame weave. Lower part of crank case is ridged, giving more cooling surface for the oil. Lower section of crank case is removable without disturbing bearings, clutch, or timing gear cover.

**Timing Gears**—Water pump and generator shaft and both camshafts are driven by quiet spiral gears. Drive for the fan and the Delco ignition is by means of a silent chain.

**Exhaust**—Each set of cylinders is provided with separate exhaust manifold, pipes, and muffler.

**Carburetor**—Rayfield carburetor supplies an even mixture to both sets of cylinders. Located in the middle of the V, where it is warmed by the cylinders and well protected.

**Ignition**—Ignition is provided by the reliable Delco system. Separate unit from the starting motor.

**Lubrication**—Positive pressure system.

**Cooling**—Cylinders are provided with ample water jackets. The water is circulated by a centrifugal pump. This pump is of the double type. It pumps a stream of water to each set of cylinders. On its way from the cylinders to the radiator, the hot water circulates around the intake manifolds. Thermostat controls the water temperature.

**Clutch and Transmission**—B and B Multiple disc (dry) clutch combined with Brown-Lipe transmission in unit power plant. We believe that the new National clutch operates better, with less pressure, and with more even and gradual engagement than any other make. Annular ball bearings throughout transmission. Three forward speeds.

**Electrical System**—Bijur two unit system. Headlights are fitted with small bulbs for dimming, also with dimming lenses. Electrical system is entirely automatic. Dynamo is separate from starter motor. Battery concealed behind running board splasher and is instantly accessible. Starter motor geared to flywheel by the Bendix drive.

**Axles**—Front Axle—I-beam, steel forgings. Large adjustable roller bearings in hubs. Ball thrust bearings at top of steering knuckles. Rear Axle—Full-floating axle, with large roller bearings, spiral ring gear and pinion. Gear ratio 4.5 to 1.

**Brakes**—Two sets, size 15 x 2 inches. Operated by foot pedal and hand lever.

**Wheels and Tires**—Wheelbase 128 inches. Tread 56 inches. Tires—size 34 x 4  $\frac{1}{2}$  inches, plain tread, straight side. Wheels—regular equipment, wood wheels fitted with demountable rims. Double tire carrier in rear provided with Yale lock. Wire wheels optional and extra charge.

**Springs**—Front—semi-elliptic, length 28 inches. Fitted with Hartford shock absorbers. Rear—National (flat) cantilever. Length 51 inches. Bronze bushed eyes on spring bolts and lubricant pockets on each spring leaf keep springs quiet. Springs fitted with oil cups.

**Gasoline System**—Eighteen-gallon tank built on the main frame in rear. Filler handily located at extreme right by the fender. Hinged cover cap. Vacuum gasoline feed.

**Fenders**—Fenders and hood are made of rigid sheet steel, carefully fitted to prevent squeaks. Leather or rubber inserts placed between all metal trimmings to do away with all noises. Radiator splash guards in front and rear of radiator and in the frame extension to keep out all mud and water.

**Control**—Left drive with levers in center. Clutch and brake pedals operate with small pressure. Corrugated rubber pads on pedals to prevent foot from slipping.

**Turning Radius**—All Highway Twelve-cylinder models will turn in a 39-foot circle.

**Body Suspension**—Low body suspension with standard road clearance. Cars "hang" to the road. The low center of gravity and the well-balanced cars are big factors of safety.

**Finish**—Painting, option of Highway blue or Highway gray. Upholstering—best grade genuine black leather. Sedan upholstery, gray motorcloth. National plaited upholstery does away with dust-catching tufting. Exposed upholstery nails or tacks are eliminated by the new National binding. Genuine hair carpet in tonneau. Instrument board of dark walnut.

**Equipment**—Top—one-man top made of "Neverleek" waterproof material. Side curtains may be arranged to open with doors, by means of a stanchion, which is quickly put in place. Ventilating and rain-vision type of windshield. Ammeter. Electric horn. Warner speedometer with 75-mile per hour gauge. Hartford shock absorbers in front. Demountable rims and one extra rim. Power tire pump mounted on transmission, accessible without raising the hood or floor boards. Double tire carrier in rear provided with Yale lock. Full complement of tools. Special pockets in left front door for small tools.

# Warranty

*(Standard warranty of the National Automobile Chamber of Commerce)*

We **Warrant** each new motor vehicle manufactured by us, whether passenger car or commercial vehicle, to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall, within ninety (90) days after delivery of such vehicle to the original purchaser, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressed in lieu of all other warranties expressed or implied, and of all other obligations or liabilities on our part, we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence, or accident, nor to any commercial vehicle made by us which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

We make no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers, or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers.

**National Motor Car and Vehicle Corporation**  
*Nineteenth Successful Year*  
**Indianapolis, Indiana**

Note—The National Motor Car and Vehicle Corporation reserves the right to make changes or improvements at any time without incurring any obligations to install same on cars previously sold.

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