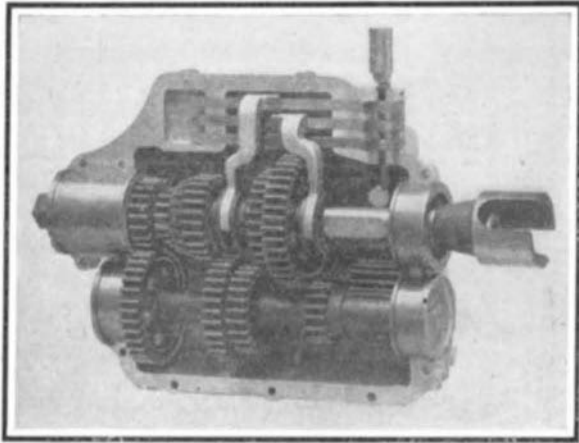


A DETACHABLE LIMOUSINE TOURING CAR.

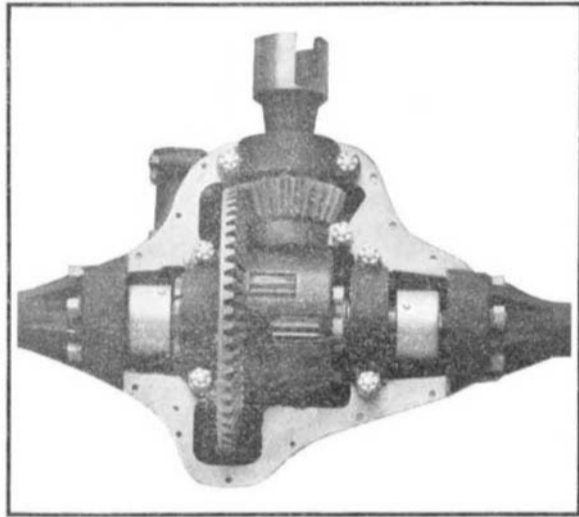
A strong, well-built touring car having a detachable limousine top and several other novel features, is that made by the Welch Motor Car Company, of Pontiac, Mich. This machine has a standard $4\frac{1}{2}$ x 5-inch four-cylinder motor, having a range of from 150 to 1,800 R. P. M., and rated at 30 to 36 horse-power. The top view of the motor, shown herewith, gives a good idea of the arrangement of the valves in the cylinder heads. The latter are made as near spherical as possible, so that the wall surface exposed to the flame is about one-third less than in the usual motor. This arrangement allows of the charge entering the cylinder quickly and in a cool condition. A full charge is drawn in and expelled from every cylinder during each two revolutions of the crankshaft. This form of cylinder and arrangement of valves is similar to that of the Fiat engine, which, it will be remembered, made such a remarkable performance in the Vanderbilt cup race last October. The burning of the charge is said to be quicker and more complete in a spherical combustion chamber, as the flame does not have to travel more than one-fourth as far as it otherwise would, in order to complete the ignition of the charge. Furthermore, the loss of power through the absorption of heat by the cooled cylinder walls is also largely cut down. On account of these facts, the makers claim 20 per cent more power than is obtainable with motors of the same size and of the usual construction. The perfect combustion of the charge and the straight exit it makes through the valve in the head eliminate all exhaust valve troubles, and make the motor particularly reliable.

The transmission used on this car has its gears always in mesh; but, by means of individual, multiple-disk clutches, no gears are running on the high speed. There are but two speeds forward and a reverse. Two multiple-disk clutches, of 150 square inches friction surface each, and a sliding jaw-clutch, are used to obtain these three speeds. All speeds are obtained with a single lever at the right of the driver, and the car can be thrown instantly from the high speed into the reverse.

A novel feature of this car is the arrangement of the pump (which is of the centrifugal type) in the center of the honeycomb radiator. The spindle of the pump projects through at the back of the radiator, and has the fan mounted upon it. A pulley on the hub of the fan is driven by a belt from a corresponding pulley on the crankshaft. The valves



The Peerless 4-Speed, Selective-Type Transmission.



The Peerless Bevel Gear Drive, Showing Spur Gear Differential with Ball Bearings and Universal Joints on Each Side.

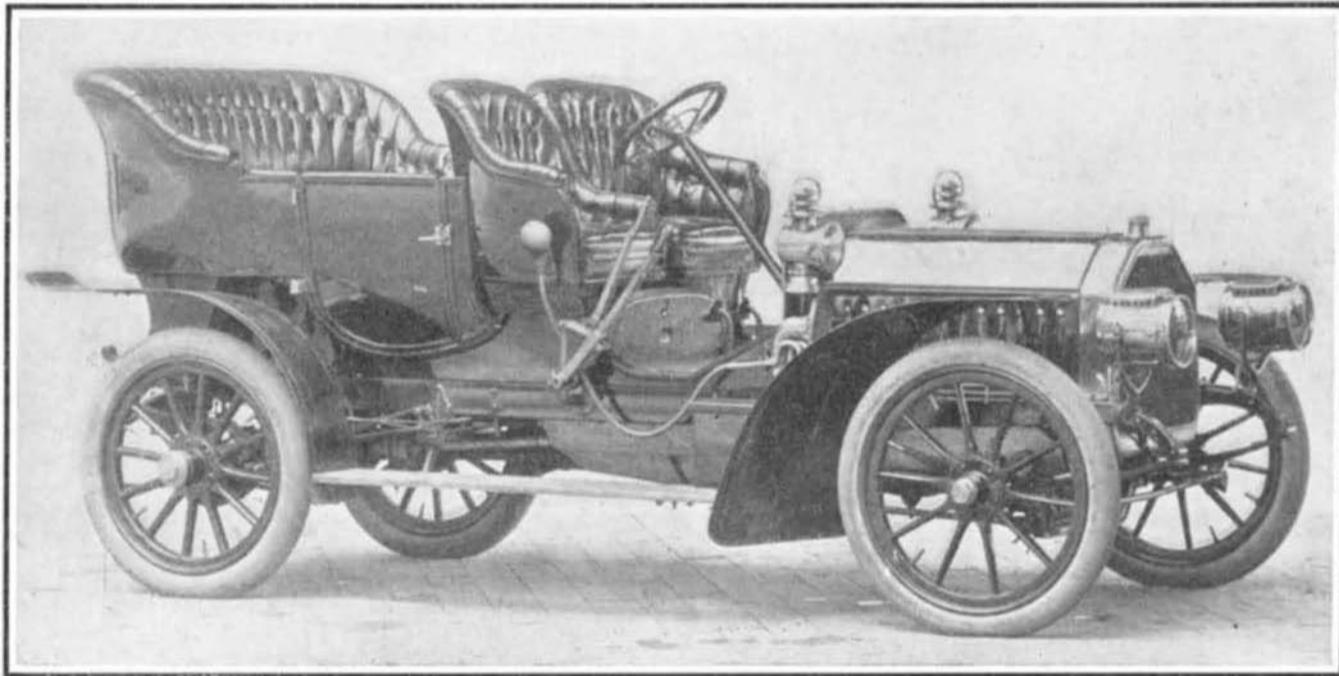
of the motor, which are set at an angle of 45 degrees, are operated by a central camshaft running over the cylinders and driven by bevel gears from the crankshaft. The timer is also located on a vertical bevel-gear-driven shaft, at the forward end of the motor. High compression is used in this engine, and is said to make it very efficient.

The radiator contains 13,500 square inches of radiating surface. It is made up of seamless brass tubing, and, although all the tubes form a solid mass, any one tube can be easily removed and replaced, if necessary. If the pump should cease to work, the radiator would still operate on the thermo-siphon principle. This car is noted for the use of plain bearings almost throughout. These are very generous in size, and are made invariably of steel on bronze, each bearing being automatically flooded with oil. A telescopic steering post is one of the novel features of this machine, and is an arrangement which adds greatly to the comfort of the driver in getting in and out of the car. The Welch machine is one of the largest and most handsomely finished American touring cars. Besides the novel features in its construction, the fact that the closed limousine top may be removed wholly or in part makes it a particularly useful car for all-year service.

THE PEERLESS 30-HORSE-POWER TOURING CAR.

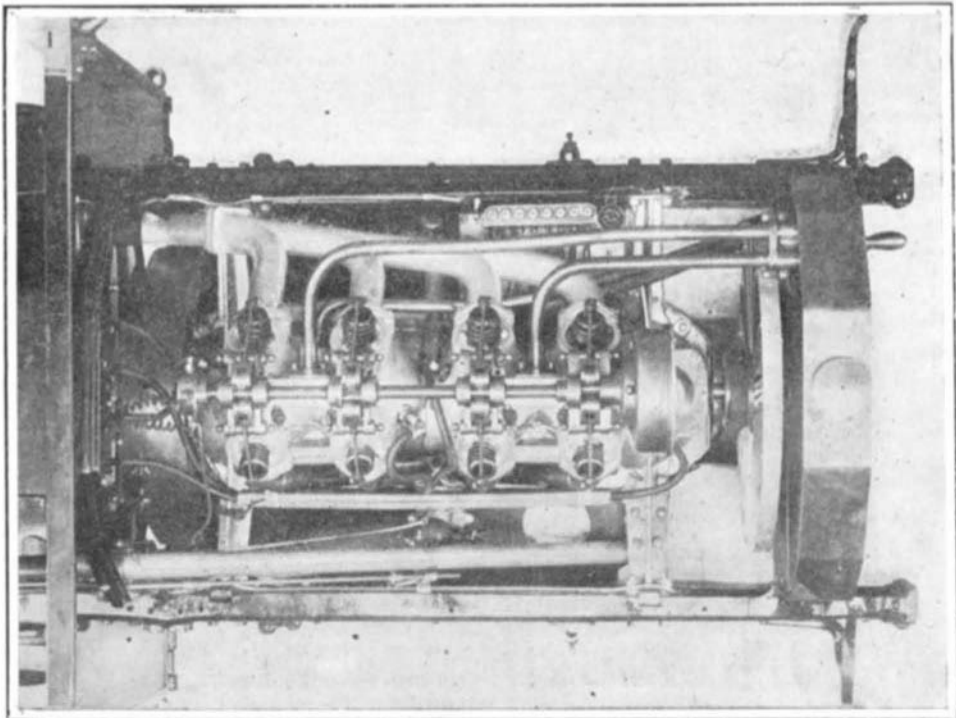
The new touring car put out by the Peerless Company, while having no very radical changes over last year's machine, has been improved in various places and brought thoroughly up to date. The cylinders of the motor are cast in pairs, with inlet and exhaust valves on either side and mechanically operated by separate camshafts. All the valves and valve springs are interchangeable. The cylinder castings are imported from France, and great care is taken in the boring and finishing of the cylinders. The bore and stroke of these cylinders are $4\frac{1}{2}$ by 5 inches, and the motor develops its full power at 1,000 R. P. M. All gears, as well as the water pump and governor, are completely incased. The motor is lubricated by the splash system, the oil being fed by a mechanical lubricator. An automatic float-foot carbureter having a water jacket supplies the gas to the engine. Ignition is by storage batteries and individual coils. The commutator is located just back of the rear cylinder, it being set at an angle of 60 degrees and driven by bevel gears from the camshaft. The commutator consists of a roller

(Continued on page 50.)



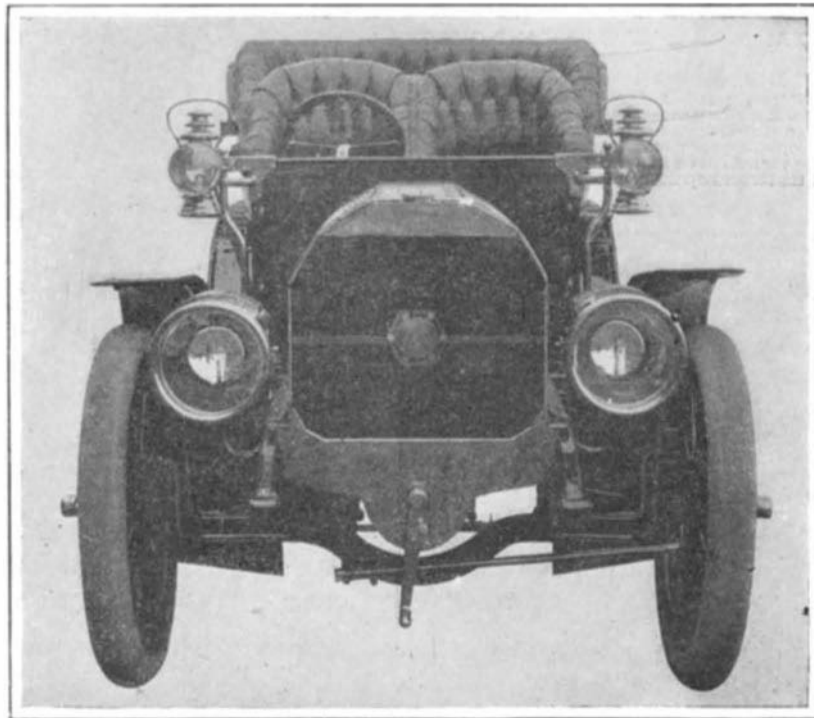
THE 1906 PEERLESS 30-35-HORSE POWER TOURING CAR HAVING SHAFT DRIVE AND 4-SPEED TRANSMISSION.

Note the complete protection of engine and transmission by means of a steel pan.



TOP VIEW OF THE WELCH $4\frac{1}{2}$ x 5, 4-CYLINDER MOTOR.

The valves set at an angle of 45 deg. in the cylinder heads and operated mechanically by rocker arms moved by a central longitudinal cam shaft, are the main features of this engine. The commutator is on the left-hand end of camshaft, the other end of which is driven by an incased bevel gear. The spark plugs are seen in the cylinder heads, the 8-feed mechanical oiler beside the upper frame, and the individual exhaust pipes and twin water pipes, as well as the belt-driven fan, are also distinctly visible. The long rod at the bottom of cut is the patent telescopic steering column.



THE 30-36-HORSE-POWER WELCH 4-CYLINDER TOURING CAR TO WHICH A LUXURIOUS LIMOUSINE TOP CAN BE ATTACHED.

Note the heavy I-beam front axle and the centrifugal water-circulating pump in the center of the radiator. The latter is a novel and distinctive feature of the Welch car.

attached to the latter. The gears are all inclosed and run in oil. The camshafts may be easily removed, and the crank bearings can be adjusted through the inspection covers in the crankcase. High-tension magneto ignition is employed, the magneto being gear-driven direct from one of the camshafts. A coil is used in connection with the magneto, and the distributor on the same directs the current to the spark plugs of the various cylinders. A metal-to-metal cone clutch running in oil is located in the flywheel of the engine.

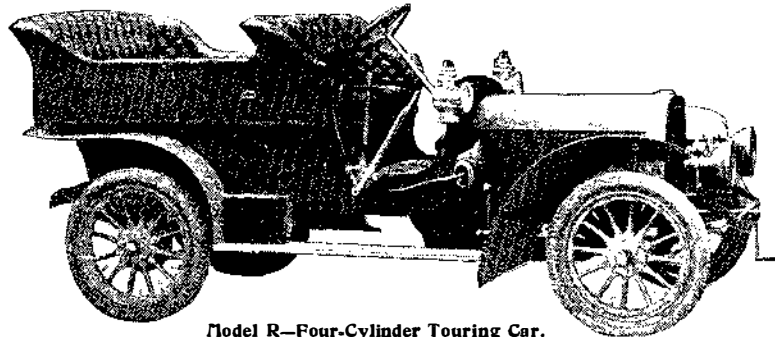
THE OLDSMOBILE TWO-CYCLE AND FOUR-CYCLE TOURING CARS.

(Continued from page 30.)

is placed between the engine and the transmission in addition to the two protected universal joints in the propeller shaft. The motor and transmission are mounted upon a sub-frame, which is suitably braced by steel plates riveted to the main pressed-steel frame. All working parts of the machine may be removed without disturbing the alinement of the crank and transmission cases. The radiator also is mounted on the sub-frame, for the purpose of doing away with excessive vibration of this delicate member. The running board and mud guards are attached by means of tapered sockets, which makes them readily removable. This is a minor distinctive feature of the new Olds car. The four-cylinder, four-cycle motor of the larger touring car also has several distinct features. In the first place, the oiling system is very complete. The oil is pumped from an oil well in the base through passages in the crankcase of the motor to all the bearings of the same. The lower half of the crankcase contains a certain amount of oil, the splash from which is used to lubricate the cylinders. The level is maintained in the base by means of holes leading to the oil well below, any overflow passing immediately into this reservoir. A positively-driven oil pump operated from the camshaft (which is hollow and also has oil forced through it for the lubrication of its bearings) circulates the oil through the passages of the crankcase. A glass bull's eye in the front of the case shows the amount of oil present at all times. In the bottom view of the chassis the oil well is seen as a long cylinder running the length of the crankcase. The water pump is also ingeniously housed in the rear end of the crankcase, where it is driven by gears. The view of the motor shows the cylinders to be cast in pairs, with all valves located on one side and mechanically operated from a single camshaft. The contact box is at the rear end of the motor on the top of a vertical shaft, driven by bevel gears from the camshaft. Jump-spark ignition with separate coils and both storage and dry batteries is used. The clutch is of the ordinary cone type, but it is equipped with a spring device which allows the load to be picked up slowly and without any jerks. The clutch cone carries a large grease cup for the lubrication of the bearing that the clutch revolves upon when it is not engaged. The exhaust and the inlet pipes of the motor can readily be removed by taking off the clamping piece held by two nuts. The valves can be removed through holes in the valve chambers, and the valve stems and their bushings can also be taken out by undoing the clamps which hold the latter in place. The crankcase bearings are supported on the upper part of the motor base, and the whole bottom half of the crankcase can be removed when it is desired to adjust these bearings. The steering gear of this touring car is very well designed and has small grease cups on all important joints, so that the wear can be minimized. All the steering connections are easily adjusted. An irreversible worm steering gear is used. The four-cylinder car has a $4\frac{1}{4} \times 4\frac{3}{4}$ -inch motor, capable of developing 26 to 28 horsepower at 1,000 R. P. M. The machine weighs about 2,000 pounds, has 106-inch wheel base, and is capable of speeds of

HAYNES

"The Car the Repairman Seldom Sees."



Model R—Four-Cylinder Touring Car.

Vertical roller-bearing engines. Cylinders cast separately, $5\frac{1}{8} \times 6$ inches, 50 H. P. An exclusive transmission that absolutely prevents stripping of gears. Positive cooling system. Individual and special lubrication. Master Clutch has metal faces and takes hold without jerking. Shaft drive. Exclusive universal joints that prevent wear on pins. Sprocket and Roller Pinion and perfect Rear Axle, all exclusive. Roller-bearings throughout. 108-inch wheel base, 54-inch tonneau, seating five people. Four to 60 miles an hour on high gear. Weight, 2,750 pounds. Price, \$3,500 f.o.b. Kokomo. Full equipment.

THE EXCLUSIVE HAYNES TRANSMISSION.

If an automobile weighing 2,750 pounds, plus the weight of five passengers, is dropped over a sheer embankment of 7 feet, the machinery will receive a shock of just the same severity as if suddenly checked by shifting from high speed gear at 30 miles per hour to middle speed gear at 15 miles per hour. In the latter case, the engine must act as a brake, and the entire machine is severely strained. With the Haynes transmission, this cannot occur. A ratchet and pawl device permits the car to coast until the speed of the car and engine are relatively equal, when the pawls engage and the engines take up the load. While making the change in speed from high to middle or from high to low, the gears are running idle, permitting the operator to shift with perfect ease and without danger of burring or stripping the gears. With all forms of transmission except the Haynes, the shock of sudden change of gears may be, and frequently is, thrown upon the machine, a thing impossible in the Haynes car and one of the reasons why Haynes cars are so long-lived and cost so little for repairs and up-keep.

This is but one of the exclusive features of the Haynes. Others are its Roller-Bearing Engines, Master Clutch, Universal Joints that do away with wear on pins, Driving Sprocket and Roller Pinion, etc. There is perfect harmony throughout its entire mechanism, which makes its cost of operation, up-keep and maintenance extremely low.

It is perfectly finished in all respects. Only the best of tested materials are used. Body is of cast aluminum and wood, designed by a leading Parisian body maker. Hand-buffed leather and gray curled hair are used in upholstery. Other exclusive features are given in our new catalogue. For prompt attention address Desk 32.

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KOKOMO, INDIANA

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Members A. L. A. M.

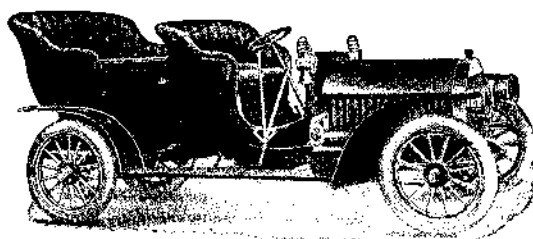
about 50 miles an hour. The lighter two-cycle car weighs only 1,700 pounds, which, with its 25-horse-power motor, should make it a very speedy and capable machine over all kinds of roads.

PEERLESS TOURING CAR.

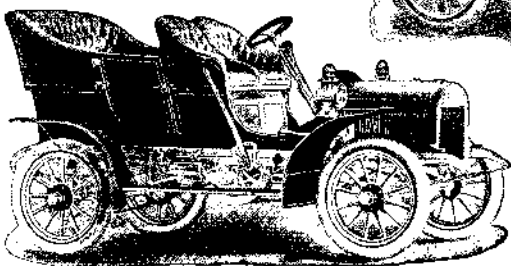
(Continued from page 31.)

running in oil, and the object of the box being set at an angle instead of vertical is to keep the roller always submerged, which does away with trouble from arcing. The radiator is constructed of flat copper tubes connecting with the surrounding water tank, which is a solid casting. The gear-driven centrifugal pump, housed in the crankcase and running in oil, forces the cooled water from the bottom of the radiator up through the water jackets. The clutch is of the internal expanding type, which has the following advantages: lack of weight, and a consequent lack of inertia, or flywheel effect, which is apt to prevent the quiet and quick shifting of the gears; ease of gripping; and an even distribution of the wear, which is taken up automatically. There is also no end-thrust with this type of clutch. A novel feature is the possibility of adjusting the distance of the pedal from the front seat to suit the length of the driver's leg. The transmission, which we illustrate, is a typical four-speed sliding gear of the selective type. Ball bearings are used throughout, and provision is made for oiling them from the gear case. As may be seen in the cut, there are two sets of sliding gears operated by two shifting forks. Two of the three bars shown operate these forks. The bars are locked by a transverse rod passing beneath them and through notches on their under surface. This locking rod (which is seen at the right-hand end) has a single notch which, when it is brought under any rod, frees it so that it can be moved back and forth by a vertical lever having a ball tip, which slips into the notch seen on the upper surface of each rod. The main shifting lever works in an H-shaped quadrant.

Wayne



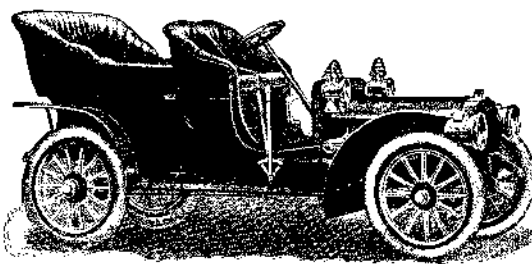
Model K is a 4-cylinder car with cylinders $4\frac{3}{4} \times 5$, cast in pairs and water cooled. Full 35 H. P. Sliding gear transmission. Three speeds forward and reverse. Equipment includes all necessary tools of the best quality, 2 side lamps, 2 acetylene head lights with generator, tail lamp and tube horn. Tires 32 x 4. Price, \$2,500.



Model H is our 2-passenger runabout, Motor 2-cylinder opposed, under hood. Cylinders $4\frac{1}{2} \times 4$, developing 14 H. P. Planetary gear transmission with DIRECT BEVEL GEAR DRIVE. The strong features of this car are extreme simplicity and accessibility. The crank case and transmission case form one casting, and the entire engine can be taken apart or assembled in half an hour. Price, \$800.

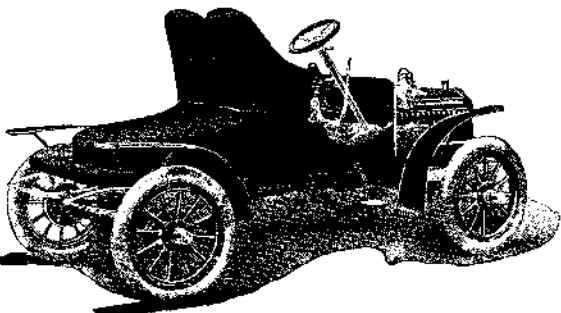
Full particulars of all these cars and the name of our nearest agent will be given if you will write

WAYNE AUTOMOBILE CO.
Dept. J. Detroit, Mich.
Member American Motor Car Manufacturers' Association



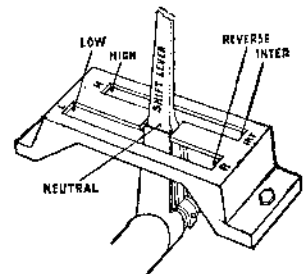
Model B, 4-cylinder, 5-passenger car, 24-28 H. P. Sliding gear transmission. Price, \$2,000.

Model C is a 20 H. P. 5-passenger car. This car has the same double opposed motor which proved so successful last season. Two seasons' use of this type of machine has proved it an ideal family car, most economical in up-keep. Planetary transmission with chain drive. Tires 30 x 3 $\frac{1}{2}$. Price, \$1,250.



The four models we offer for 1906 are the result of mature experience. They are not new and untried experiments. Each car is a distinct type of Wayne design and construction and each model has been built with a view to supplying the varied demand for high-grade machines. In the Wayne cars the automobilist will be sure to find a car suited to his needs.

Model F is a 4-cylinder car with cylinders $5\frac{1}{2} \times 5$, cast in pairs and water cooled. Seating capacity, seven people. This car has full 50 H. P. Sliding gear transmission, with Hess-Bright ball bearings throughout. Tires 34 x $4\frac{1}{2}$. Price, \$3,500.



The side movement of this lever accomplishes the selecting of one of the three rods, while the forward and backward movement shifts one or the other set of gears forward or back, as the case may be. The advantages of this type of transmission are that the operator can always change from one gear to the other without passing through any idle gears. For instance, he can pass immediately from the low speed to the fourth speed except those of the latter speed. While this is an advantage for a skilled operator, a straightforward movement is easier for the beginner, and, consequently, gears of the ordinary three-speed type are generally preferable. The Peerless bevel-gear drive is also shown. The differential is open, and two of the spur pinions can be seen through the casing. On each side of the differential are ball bearings and universal joints. The latter allow of a slight movement of the driving shafts, which extend through the tubular rear axle and drive the wheels through jaw clutches on the hubs. The wheels themselves revolve on adjustable ball bearings on the tubular axle. The universal joints mentioned make it possible to dish the wheels slightly, which adds somewhat to their strength. There is also no binding if the axle gets out of line. This rear-axle construction has always been a feature of the Peerless car. The wheel base of the new car is 107 inches, and the wheels are 34 inches in diameter. The two rear springs are connected by a transverse spring that supports the body in

the center, and makes a very easy-riding car. Besides the 30-horse-power car, a 45-horse-power model is also built.

HIGH-POWERED AMERICAN TOURING CARS.

(Continued from page 32.)

has a 104-inch wheel base, and weighs complete 2,300 pounds.

THE ROYAL 50-HORSE-POWER TOURING CAR.

The 1906 car put out by the Royal Company has practically the same chassis as the racer which made such a fine performance at the Vanderbilt cup race last October. The motor has a bore and stroke of 5 and 5½ inches, respectively. It is fitted with mechanically-operated valves on opposite sides, the cylinders being cast in pairs, and the valves being interchangeable. The bearings are bronze on the crankshaft and hardened steel at the wrist pins. They are all of sufficient surface not to require replacement more than once a year. The gears which drive the cam shaft are of fiber, uninclosed. The commutator is placed on top of the cylinders and is driven by bevel gears from the cam shaft. The centrifugal pump, which is also bevel-gear-driven and inclosed, can be seen in the view of the motor. The motor is fitted with a positive mechanical oiler which effectually lubricates all its parts. The ignition system consists of quadruple coils and storage batteries. It is of the usual jump-spark type. The radiator, of the cellular type, has a large belt-driven fan behind it. The Royal clutch is of the conical leather-faced type. It is of large diameter and has flat springs beneath the leather for the purpose of making it take hold easily. A universal joint is used between engine and transmission in addition to the usual two joints in the propeller shaft. The transmission, shown herewith, is of the sliding gear type, giving three speeds ahead and reverse with a forward and backward movement of one lever. The shafts are mounted on ball bearings and the gears are bolted to flanges made solid with the shafts, instead of being keyed or pinned. The gear case is suspended from the upper half by means of hangers, which makes it possible of removal without taking out the bolts which fasten it to the car, as by separating the two halves of the gear case, the bottom part carrying the gears can be immediately dropped. The intermediate reverse pinion is carried upon a short shaft in the upper part of the case, and when not in use is thrown out of mesh by a spring. The rear axle is of the live bevel-gear-driven type, the weight of the car being carried on the tubing which surrounds the driving axle. Roller bearings are used in the axle and wheels.

THE 50-HORSE-POWER HAYNES TOURING CAR.

Although one of the oldest automobile firms in America, the Haynes Company, of Kokomo, Ind., nevertheless obtained valuable experience in the past year with a racer built for the Vanderbilt race. This car made one of the steadiest-running performances of any in the race, and won fourth place. The 50-horse-power 1906 touring car is practically a duplicate of the racer, it having all the features which were tried out on the latter. Besides the peculiar roller bevel-gear drive employed on last year's cars, the new Haynes has an ingenious ratchet arrangement in the main driving gear of the transmission for the purpose of making it possible to jump back from high to intermediate or low speed when the car is running rapidly, without the danger of stripping the gears. This danger is a very grave one with all ordinary transmissions of the sliding type. By means of a ratchet in the main driving gear, this gear is allowed to run ahead of the driving shaft when the gears are changed from a higher to a lower speed, which ordinarily results in the car tending to drive the engine and consequently being brought up with a shock. So severe is the strain on the gears under these conditions that a 2,750-pound car carry-

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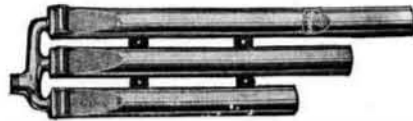


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Three Horse Power. Simplest motorcycle on the market. Agents wanted everywhere. Catalog free.
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Blow from exhaust, enabling the driver to give entire attention to the car, eliminating constant watching which mars the pleasure of an auto ride. Warm without frightening, having a clear, far sounding, musical blast. Are made of highly finished brass in three sizes. Nothing to get out of



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A MODERN GASOLINE TRUCK

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Made in Sizes 2 to 5 tons.



3-Ton Gasoline Truck.

- 4-Cylinder Vertical Engine
- Two Sets Brakes
- 3-Speed Slide Gear Transmission
- Double Chain Drive

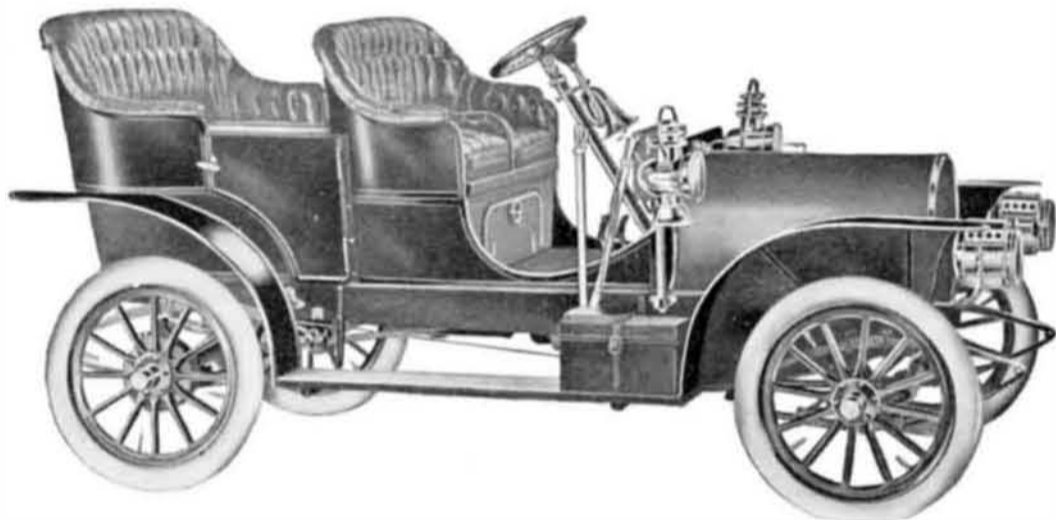
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MANUFACTURERS OF
Motor Trucks, Omnibuses, Delivery Wagons
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OFFICE AND FACTORY

70-71 Edward St., Buffalo, N. Y.

FRANKLIN



Type G, four-cylinder light car; air-cooled, shaft-drive, sliding gear transmission, 3 speeds and reverse. New and perfect disc clutch; force-feed oiler on the dash; side doors; 88-inch wheel-base; 4 passengers; 35 miles an hour; 12 Franklin horse-power; 1,400 pounds. Full head and tail-light equipment. \$1,800 f. o. b. Syracuse.

Why the astonishing fact that this light car, rated at 12 "Franklin horse-power," does more, on average roads, than any other car rated at 20 horse-power?

First: the real proportion of usable power is more than 12 to 20. Other cars are rated at the maximum horse-power of their engine, running in the shop under ideal conditions. Franklin cars are rated at the power they develop under the practical average speed on the road at 20 miles an hour.

Then: weight. Franklin air-cooling means a light engine and light construction throughout—no water or water-cooling apparatus; no heavy frame to carry them. At least 200 pounds saved on weight construction.

Then: little power lost between the engine and the rear wheels. The same engineering ability that designed and refined the marvelous motor has refined and saved

power all over the car. Other cars lose enormous amounts of power in the clutch, transmission, joints in the shaft, bevel-gear, rear axle bearings—power is lost everywhere. In the Franklin this loss is trifling. This is a matter of fact and proof, and we have gone to the bottom of it.

Then: vibration. This is of enormous importance. It uses up power to shake a car, as it uses up power to shake your fist. A rough road reduces the power of the average car 50 per cent. or more, and a very rough road often stops the car altogether. The Franklin full elliptical spring suspension, with its flexible wood-sill, takes up the vibration, leaving the working parts free to do their work.

Not one reason but a dozen; all thought out and worked out with the same thoroughness and disregard of precedent which invented the Franklin four-cylinder air-cooled motor, when all the other American makers said that four cylinders were unnecessary and that air-cooling was impossible.

Send for the Franklin 1906 catalogue—by far the handsomest motor book ever made—which tells about

- 4-cylinder 12 h. p. Runabout, \$1,400
- 4-cylinder 12 h. p. Light Car, \$1,800
- 4-cylinder 20 h. p. Car, \$2,800
- 6-cylinder 30 h. p. Car, \$4,000

Prices f. o. b. Syracuse, N. Y.

H. H. FRANKLIN MFG. COMPANY, Syracuse, N. Y., M. A. L. A. M.