

The 1909 American Cars

The 1909 American car, offered in seven tourist and roadster models by the American Motor Car Company, Indianapolis, Ind., shows not a little betterment over the very successful models of past seasons. While no departure is made from the general construction of previous models or standard practice, the manufacturers have been at pains to refine and perfect a number of small details which add to the efficiency of the car and the comfort and satisfaction of its occupants. Included among these are the oiling mechanism, spring bolt lubrication, device for eliminating side-action and vibrating which are fully described farther along in this article.

THE CHANGES.

While the 1908 models were of both 40 and 50 horse power, all the 1909 cars are of 50 horse power.

The underslung frame construction is continued for 1909 on the roadster. This car, while similar in general design to the model offered during the season, is fitted with 40 inch wheels and has a wheel base of 122 inches, 12 inches increase over the

wheels would elevate the center of gravity to a level beyond the limit of safety, and render it liable to turn turtle on rough roads, but this is not true of the underslung frame type of car. The 40-inch wheel roadster has a uniform road clearance of 12½ inches.

In essentials there is but little difference between the roadster and tourist models, but there are certain characteristics such as the underslung bodies of the runabouts which give a peculiar aspect to the cars. There is the same road clearance with the runabouts that is found in any standard car, although this may not be apparent to the eye.

THE MOTOR.

The motor design has been carefully worked out and developed with reference to the experience gained each year. One instance of this is in attaching all gears in front of the engine to the several shafts by means of flanged couplings. This preserves the strength and, to eliminate the possibility of foreign matter finding its

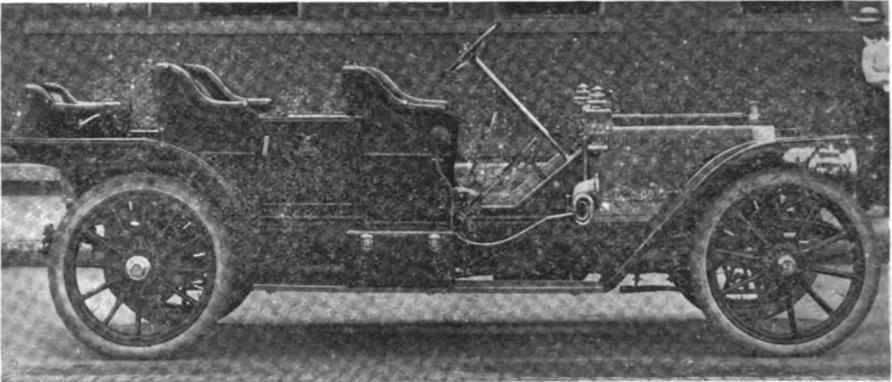


Fig. 1. The 1909 50 H. P. American Traveler with underslung frame and 40-inch wheels and 122-inch wheel base. The changes and novel features are described in the text.

regulation roadster wheel base. Lengthening the wheel base made it possible to fit a body having four semi-divided seats. The car proved itself capable of showing 65 miles an hour, fully equipped and with full complement of passengers, in this respect meeting every expectation of the manufacturer.

In providing this roadster with 40-inch wheels, the company believes it has solved the problem of meeting the popular demand for a car of markedly better riding qualities. This was conclusively proved in the trial run following the completion of this type when one of the cars was driven heavily loaded and under touring condition, 2,500 miles between Indianapolis and Boston and return, without any mechanical difficulties whatever.

In the car of ordinary assembly, 40-inch

way into the gear housing, the fan drive is placed back of the housing, obviating perforating the cover. The cam shaft has bearings between each pair of cams, these being of variable diameter, to facilitate the removal of the shaft from the crank case.

The cylinders are cast of a special grade of gray iron, liberal water spaces being provided insuring efficient cooling. A feature of the cylinder design is the large hole left in the casting at the top of the water jacket, and which serves a double purpose, the most important being the positive removal of all sand from the jackets after the cylinders are cast. This hole is closed with a polished aluminum plate, which may be removed at any time to allow thorough cleaning.

Before the final finish and after the first rough boring the cylinders are an-

nealed to remove any stresses which may exist in the casting, then left to age then given the final finish by grinding. The process of finishing the pistons is the same. The rings are of a special grade of metal which is not liable to lose its elasticity when subjected to heat, thus insuring maximum service and retention of compression. The wrist pins are of liberal size and of hardened surface, which with the combination of hard bronze bushing in the connecting rods insures a well wearing bearing.

The connecting rods are forgings of special high tensile strength alloy steel. H-section very high. The crankshaft ends with bearings of superior anti-friction metal are of liberal proportions. The crankshaft is forged from a solid steel billet, heat treated and accurately machined all over to insure absolute balance. All crankshaft bearings are finished by grinding.

The nickel steel valves are on the same side of the engine and operated from the same camshaft and are interchangeable. The valve operating push rods, rollers, etc., are hardened which insures maximum service with minimum wear. A noteworthy feature of design is the method by which

The crankcase is of a special high grade aluminum alloy of high tensile strength, the main bearings being part of the top half, the lower half being easily removed for inspection or adjustment of the connecting rods. The crankcase of the tourist engine is so designed that it completely encloses the frame from the radiator back to the fly-wheel, protecting the cylinders, carburetor, etc.

DOUBLE IGNITION.

A double system of ignition is used, with two sets of spark plugs. The current for the regular system is furnished by a Bosch true high-tension magneto, which eliminates the use of magneto coil and greatly simplifies the wiring, as the entire generating, intensifying and distributing elements are contained in the one piece of mechanism. The magneto is driven from the pump shaft, being on the same side of the motor as the pump; obviously the pump is gear driven. The magneto is very accessible and may be easily removed without disturbing the timing of the driving gears. This is a very desirable feature as it insures that the timing will not be disturbed if the magneto is removed by an inexperienced operator or mechanic.

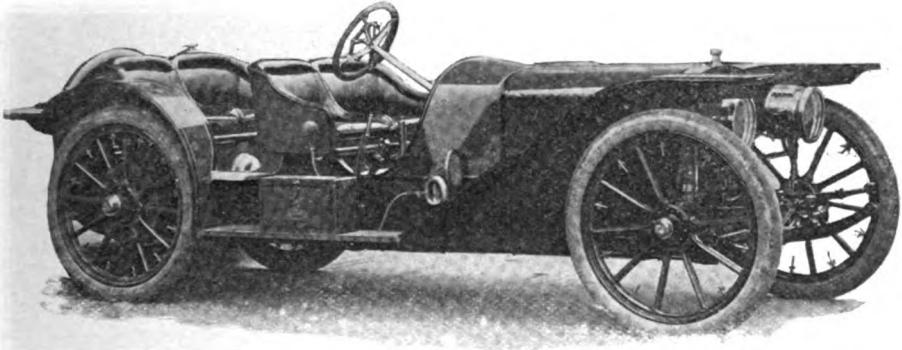


Fig. 2. The 1909 American touring car "Wayfarer." The motor is the same as in the runabout, but the body and method of suspension are different—shaft drive, sliding gears, dual ignition, special spring and brake construction are features.

the valve push rod guides are held to the crankcase by means of a yoke and one nut to each pair. The ends of the valve push rods are threaded and fitted with an adjusting and check nut, which provides for adjustment of the valves.

The inlet manifold is a one piece casting having gradual curves. The exhaust manifold is a malleable iron casting of liberal proportions, ribbed to increase the strength, and the area of the interior passage is so much larger than the area of the valve port or opening that free flow of the exhaust gases is assured.

OFFSET CRANK SHAFT.

The motor is of the offset crankshaft construction, which in effect, diminishes the side thrust of the piston in the cylinders. All of the crank shaft and connecting rod journals are made fast with four double-nutted bolts and further secured by split pins.

The emergency system consists of a four unit dash type coil, current from a storage battery being distributed to the various units by means of a four point roller contact timer which is securely fastened to an aluminum stand on the valve side of the engine. The drive is by means of a pair of helical gears, the advance being accomplished by changing the relation which these gears bear to each other instead of rotating the timer case as is common practice and which is often the cause of broken wires and loose connections at the contact terminals. As the gear relation changes the timer case remains stationary. The wiring is of the

very best the insulation being of such a character as to provide positive insulation of the high currents from either coils or magnetos. The wiring is run through fiber tubing. The terminals at the plugs are of special design and may be easily removed from the plug when the engine is in operation without danger of shock, and may be replaced without the use of tools, as a positive connection is made without binding nuts. The one system is entirely independent of the other. The car is usually run on the magneto with the storage battery and coil system as a reserve.

LUBRICATION AND WATER CIRCULATION.

The motor is lubricated by a mechanically operated six-sight feed oiler that is perfectly automatic in action, starting and stopping with the engine. It is housed under the floor boards of the tourist models and is carried on the dash in the roadster type. This supplies lubricant in predetermined quantities to each of the cylinders and to the crankshaft bearings through independent feeds, the splash system being employed in the crankcase. The adjustment of the feed is very simple and easily accomplished.

All seams in tubes are on the front and back surfaces, and are readily accessible to the soldering iron if a leak is manifested.

To facilitate the action of the radiator there is fitted a 16-inch cast aluminum fan, carried by an arm fastened to the front cylinder and which is driven from the pump shaft by a one-inch flat belt. The belt can be adjusted by loosening one cap screw and swinging the support on its journal. The artificial draft from the fan is assisted by the fan blade construction of the flywheel. The water carried is about 5½ gallons.

The carburetion is by means of an automatic, compensating, concentric jet float feed atomizing carburetor. The amount of mixture admitted to the engine is varied by a piston throttle. It is said to be reliable under all atmospheric conditions and does not easily get out of adjustment.

The muffler in both the roadster and tourist models is carried cross-wise of the frame. The muffler is constructed on the multiple unit principle, in which the exhaust gases are allowed to expand in successive chambers while traveling from one

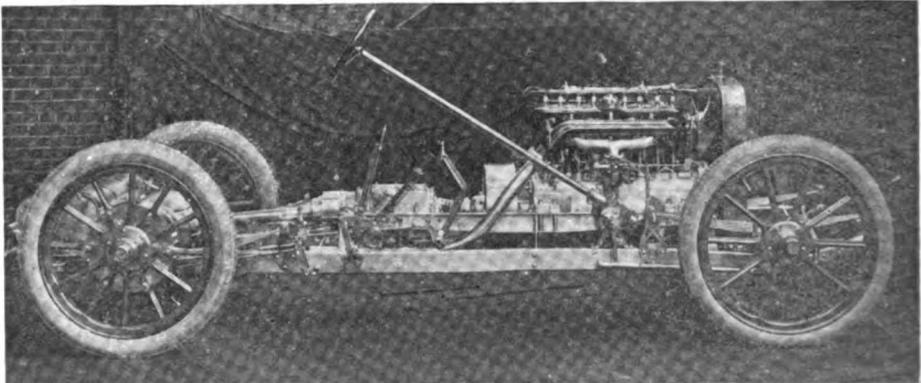


Fig. 3. Chassis of the 1909 American. This roadster frame assembly embodies a supplementary frame, which is supported by raised cross members and upon which the engine, gear set and steering gear are assembled. The central spring hangers, which locate the position of the axles, are riveted to the frame and the outer ends of the frame is supported from the springs by forged links which are in turn fastened by riveted forged heads. It is this method of frame construction and suspension which is a distinctive feature of the roadster, and which provides a low center of gravity. While this method of construction gives the appearance of but small clearance, yet the large wheels provide a minimum clearance of 10½ inches, which is considerably more than that of many cars of more conventional design.

The water circulation is by means of a gear driven centrifugal pump, which has a double water inlet, considerably increasing its capacity. The circulation pipes and manifold are of large diameter, which, with the method of distribution of the water by means of inlet ports directly under each exhaust valve pocket, the hottest part of the engine, insures that the circulation shall be diagonally up and across the cylinder, and that the cooling water shall be uniformly heated before it is discharged into the cooler. The cooling surfaces of the radiator are formed by very narrow elliptical vertical copper tubes with corrugated pins attached by the solder bath method.

end to the other. The discharge is through a long tube, which is carried to the extreme rear of the chassis. A cutout valve is fitted which provides a direct outlet to the air for the exhaust gases when desired.

THE CHANGE SPEED GEARS.

The change speed mechanism is of the four speed selective sliding gear type. The gears are of chrome nickel steel, the teeth being of large pitch and of ample face width and proportioned with a large factor of safety. A special treatment is employed which insures hard wearing surfaces with a maximum toughness and strength of the metal of the gear teeth. The shaft which carries the sliding mem-

bers has four integral milled splines, there being no keys to loosen and cause trouble. The four speed gear set embodies the details of design which have been proven and are in accordance with standard construction.

The case is of high tensile strength aluminum alloy and is made in halves, the lower portion having the arms or lugs for attaching to the frame. The shafts are of special alloy steel, are of liberal proportions, insuring against springing, and are supported by extremely large annular ball bearings which are carried by special brass retainers. Large bosses are made on the ends of the case which carry the bearings and give a very secure anchorage for the bolts which fasten the case together. The reverse gear revolves only when used, and a direct drive is obtained on the high speed. A large inspection plate is combined with the top half which makes easy inspection, cleaning and renewal of lubricant.

are made in halves being divided longitudinally and may be uncoupled by removing the bolts which hold the halves together. Either the transmission or the clutch may be removed without disturbing the rest of the mechanism. The gear case is oil tight and the gears constantly revolve in a bath of lubricant.

The tourist frame is composed of two side rails or members and three cross members of a special alloy steel of high tensile strength, channel section, 3-16 of an inch thick. The side rails have a 5-inch vertical web and a 1¼-inch horizontal web. In the rear there is a vertical rise of 2½ inches, which is necessary in order to keep the top of the frame or floor board level as near the ground as possible, but yet have sufficient clearance over the rear axle to permit of spring action. In the tourist models, the crankcase of the engine not only acts as a tie for the front of the frame, but the horizontal web of this, in addition to large gussets upon cross members, elimi-

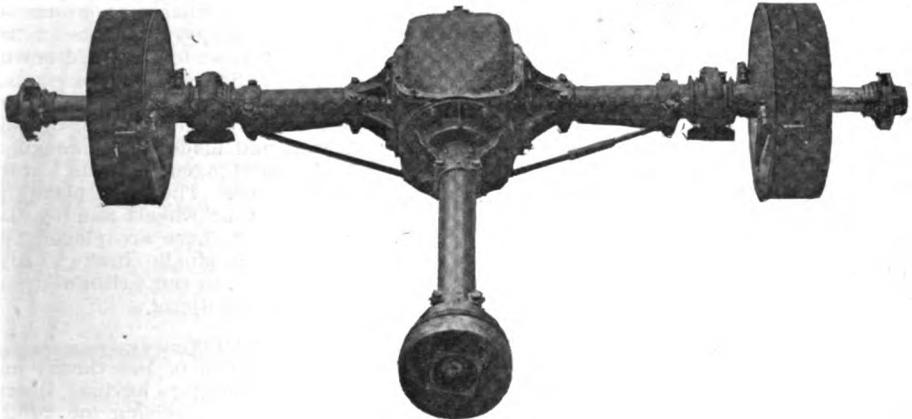


Fig. 4. The floating rear axle and propeller shaft housing of the 1909 American, showing the double set of brakes, two bands acting on each drum. The drive from the gear set is by a propeller shaft acting through a pair of bevel gears to the differential, from which the power is transmitted to each rear wheel by a floating axle or shaft, which engages the wheel hub by means of a claw coupling, the female part of which is integral with the wheel hub.

The clutch, which is of the leather faced cone type, is held into engagement by a spring which is made from ¼-inch by 1-inch stock. The spring thrust is self-contained, there being absolutely no thrust on the bearings of the motor. When the clutch is disengaged, the spring thrust is taken by a large ball thrust bearing which is fully encased and lubricated by means of a compression grease cup. The reduction of leverage in the clutch pedal is nine to one.

The drive between the clutch and transmission is through a special form of Oldham coupling having squared ends which engage with suitable square driving heads on the clutch and transmission shafts and this coupling provides for a positive transmission of the engine power and at the same time accommodates the backward and forward motion of the clutch, when engaged and disengaged. These couplings

nates any horizontal twist. All frame fittings, such as spring hangers, pressed steel running board brackets, etc., are all hot riveted.

The sheet metal apron which is fitted to the roadster model is practically flat and extends from the front of the radiator to the back of the body. There are no members projecting below this apron, and a smooth surface is presented which greatly reduces the dust nuisance caused by uneven surfaces or projections.

SPRINGS.

The springs used in these cars are made from specially selected crucible steel. It is claimed the elimination of the hole in the center of the springs where the tie bolt is usually placed, makes spring breakage unknown. All springs are two inches wide.

In the tourist, where comfort at moderate speeds is of the greatest importance,

flat half-elliptic springs, 42 inches long, are used in front, while the platform type, composed of two side half-elliptic springs 39 inches long and one inverted half-elliptic cross spring 48 inches long, is used in the rear. In developing the platform springs the centre on the side spring has been offset so as to make the front end equal in length to the rear end, plus half the length of the cross spring, which gives exactly the same spring effect and action as would be obtained from a half-elliptic spring having a total length of 67½ inches. This, together with the large wheels, gives a spring action which is very deliberate, both upon compression and recoil, and a very easy riding form of suspension.

All spring joints are lubricated by special compression grease cups, fastened into the head of each spring bolt. The method of fastening the rear end of the front spring to the frame is something distinctly new in automobile design, the toggle links ordinarily used being discarded and a device very similar to the crosshead of a steam engine is employed as illustrated in the February, 1908, Journal, page 81.

Conditions which govern the design of the spring suspension of the roadster are entirely different. The half-elliptic type has been used, the lengths being 42 inches in front and rear. The spring action is facilitated by the underslung frame construction, for when a wheel encounters an abnormal impediment there is nothing to limit the upward travel (such as the frame of the ordinary construction), but the spring tension.

AXLES AND STEERING.

The front axle is a nickel steel I-section, one-piece forging, there being no welds or joints of any kind. The steering knuckles are of liberal proportions, particularly the height between the ends into which the steering spindle bolt fastens.

A ball thrust bearing is fitted between the top of the steering knuckle and the yoke end, which eliminates much of the friction due to the dead weight of the car. The steering arms are steel drop forgings of oval section and are fitted to the steering spindles by means of taper joints and lock nuts. The spindles have a large hood or cap forged integral, which fits over the inner face of the front hub, making the bearings absolutely dust-proof. The rear axle is of the floating bevel gear drive system of chrome nickel steel.

The torsional effect applied to the rear axle, owing to the drive, is taken by a tubular housing which completely encases the propeller shaft. At the front end of this tube there is a universal joint supported by a bracket, which is also the support for the rear end of the transmission, this bracket being supported by the drop frame member. This joint is encased and packed with a non-fluid oil.

The differential housing has a large cover or inspection plate, the opening of which is sufficiently large to permit the removal of the differential without having to dismantle the axle or remove it from the chassis. The differential is of the bevel gear type, the gears being hardened, and particular attention is paid to properly taking care of the end thrust action when rounding curves.

WHEELS AND BRAKES.

All wheels used in these cars are made from A No. 1 second growth hickory, having ten 1½-inch spokes in front and twelve 1¾-inch spokes in the rear, and are 36 inches in diameter. Both front and rear are dished one-half inch. Each alternate spoke in the rear wheels is enlarged or bossed, to receive the bolts which anchor the brake drums. The wheels are fitted with ball bearings having exceptionally large diameters and ball sizes. The cars are fitted with Duplex brakes, which consists of two sets of internal expanding bands or shoes of similar size which act against the inner surface of one brake drum and are actuated by two rockers with cam ends for ordinary and emergency brakes. The brake drums are steel castings applied to the wheel spokes, of very large diameter, and made deep enough to take two similar hinged bronzed brake shoes, side by side. The best place for brakes is at the rear wheels and by this duplex arrangement there are placed two brakes inside of a single brake drum. This is the only car, to the writer's knowledge, which is so equipped.

CONTROL.

The steering gear is of the thread and nut irreversible design, having liberal bearing surfaces and provision for adjustments. In the centre of the 17-inch steering wheel there is supported a stationary quadrant upon which the spark and throttle levers operate. The spark lever advances both timer and magneto simultaneously. The only interlocking device is between the emergency or hand lever brake and clutch, as there are times when it is an advantage to hold the car while engaging the clutch, particularly when starting on steep grades; also the possibility of retarding the car without having to disengage the clutch. The regular or running brake is applied by a pedal and the clutch is disengaged by another pedal. The gear shift is by conventional methods, on the 40 horse-power models, by means of a hand lever which operates on a notched segment progressively, and on the 50 horse-power models by means of a hand lever working in the familiar H slot, a latch being provided to prevent going into the reverse inadvertently.

The gasoline tank of the Tourist is located under the front seats, supported from the frame, and has a capacity of 19

gallons, gravity feed being employed. The body may be removed without interfering with any gasoline connections. A tank 36 inches long, of oval section and with a capacity of 22 gallons, is fitted to the Roadster. The location is the extreme rear of the chassis and the contour is such as to conform with the ends of the frame members. As the tank is lower than the carburetor, pressure feed is used, the pressure being maintained automatically by a regulator fitted to the exhaust manifold. Between the tank and the carburetor there is an auxiliary tank fitted with a float controlled shut-off valve, which has a capacity of about a gallon. This relieves the carburetor of tank pressure, as the feed from this auxiliary is by gravity, and also elim-

inates immediately stoppage in case the pressure should fall.

BODIES.

The bodies are built of steel on straight lines. The bodies of the Tourist models are equipped with a double side entrance tonneau, with a door width of 21 inches. Tourist models can be had of both five and seven-passenger capacity. The former has a rumble seat also. The carriage work is of the best and the finest quality long-grained, hand-buffed enameled leather. No. 1 long curled hair, and oil tempered spiral steel springs, it is claimed, are used. The bodies of the Roadsters are of distinctive design. A rumble seat may be had, which is placed over the gasoline tank.

The Klink 1909 Models

The new models for the 1909 season of the Klink Motor Car Mfg. Co., of Dansville, N. Y., which has been building automobiles since 1906, are very similar in general lines and construction to those of 1908. However, as seems to be the order of the day, detail refinements and slight modifications have been made in several places, tending toward more quiet action,

inch bore by $4\frac{1}{4}$ -inch stroke, rated as 35 H. P. A sliding gear transmission of the selective type, providing three speeds forward and one reverse is used, the bearings being Timken rollers. The clutch is of the aluminum cone face type with cork inserts, and the drive is by means of cardan and shaft to the live rear axle. The general details of the two cars are the same with

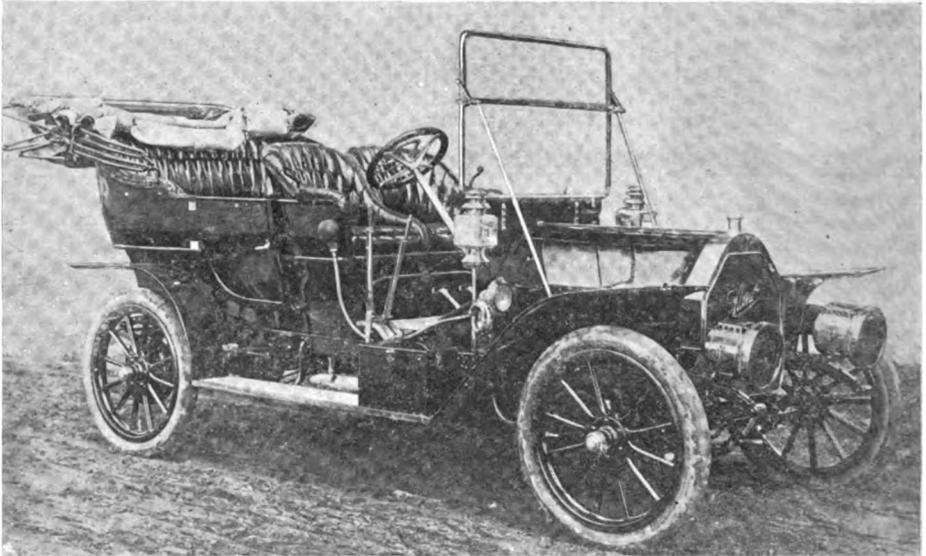


Fig. 1. 1909 Klink 5-passenger Touring Car, 35 H. P., 111-inch wheel base, 34-inch wheels. Self-contained oiling system. Selective sliding gear transmission, Timken roller bearings. Price, including magneto, \$1750.

simplicity and reliability. In spite of this fact, the cars are being placed on the market at the low figure of \$1750, including a magneto.

There are two models, both having the same type of chassis. These are known as Model 30 Touring Car and Roadster. The touring car is a five-passenger machine as shown in Fig. 1. Its power is by means of a 4-cylinder water-cooled motor of $4\frac{1}{4}$ -

the exception of the bodies. The roadster is provided with either a single or a double rumble seat, both seats and the entire back can be taken off so that the car is easily converted into a three or four passenger machine. When the back is removed a trunk or other luggage can be carried. The bodies are both of the straight line type as indicated in the illustrations. They are superbly finished, lux-