1905 THREE CYLINDER, SIDE ENTRANCE THOMAS CAR

One of the pronounced successes of the present season in the automobile world is the Thomas three-cylinder touring car, manufactured by the E. R. Thomas Motor Car Co., Buffalo, N. Y. The three-cylinder car has been considered a doubtful quantity by many Americans, but the daily performances of the well-known Thomas Flyer has allayed nearly all of these fears. Besides the Thomas car having proven that a three-cylinder machine can be run with practically as little vibration as a four-cylinder one, it has also shown that the materials used were the best in every respect that could be obtained. In the entire year not a single inherent defect of material, workmanship or design has developed, which is doubtless due to the reserve strength in every part, the numerous lubricating devices, large bearings, chain oilers, anti-friction devices and good workmanship.

The following road record speaks for itself. During the season not a chain, motor, connecting rod, 2 to 1 gear, driving gear, sprocket, differential gear or steering knuckle gave trouble. The transmission, chain oilers and frame proved themselves efficient in every respect.

It is owing to this commendable performance that so few changes have been made in the 1905 models that are now on the market. Besides the three-cylinder cars, this firm will place a 40-h. p. four-cylinder car on the market, which, it is expected, will share equal successes with the present car. This four-cylinder model will simply be another cylinder added to the three-cylinder one, together with the necessary additional changes that must accompany such a change. The present article deals only with the 1905 three-cylinder car.

New Features.

The most apparent change is the side entrance tonneau and the different body design. The latter is so unique in many regards that Mr. E. R. Thomas, the designer, has applied for a patent covering it. Special attention has been given to the designing of the curves and upholstering to make it fit the form needed for long touring. The seats are wider and have higher backs, and the side entrance enables passengers to enter from the curb.

The height and curves of the tonneau body do the same work as a dust shield over the back of the car, so that the usual clouds of dust are deflected backwards, instead of rolling into the tonneau. This makes it possible for the tonneau occupants to be as free from dust in a 100-mile run as are the front seat ones.

What will be gladly welcomed by many is the great amount of storage space provided by this car. Every available space has been converted into cabinet lockers, making the carrying of all tools, spare tire, suit cases and other baggage a simple matter without the general disfigurement of the car or the inconvenience of the passengers. Under the tonneau seat, and accessible by lifting cushions, is a space measuring 36 inches long, 10 inches wide and 12 inches deep. In the tonneau immediately behind the front seat is a space in which two suit cases can be placed; or if desired, the space can be filled with drawers, shelves, lockers, etc. This space is closed by a panel door with lock. The space measures 27 inches wide, 25 inches high and 6½ inches deep. At the rear of the car, and shown in one of the illustrations, are two storage compartments. The upper one is a tire box, which has room for a spare outer cover, an inner tube and repair kit. Beneath this is another for accommodating long pump, oilers, large tools, waste and other necessaries. Both of these boxes are secured by locker doors hinging to drop down when opened. On the dash are two convenient lockers that can be best understood by a reference to the illustration of them. The one on the left is for tools, and has loops

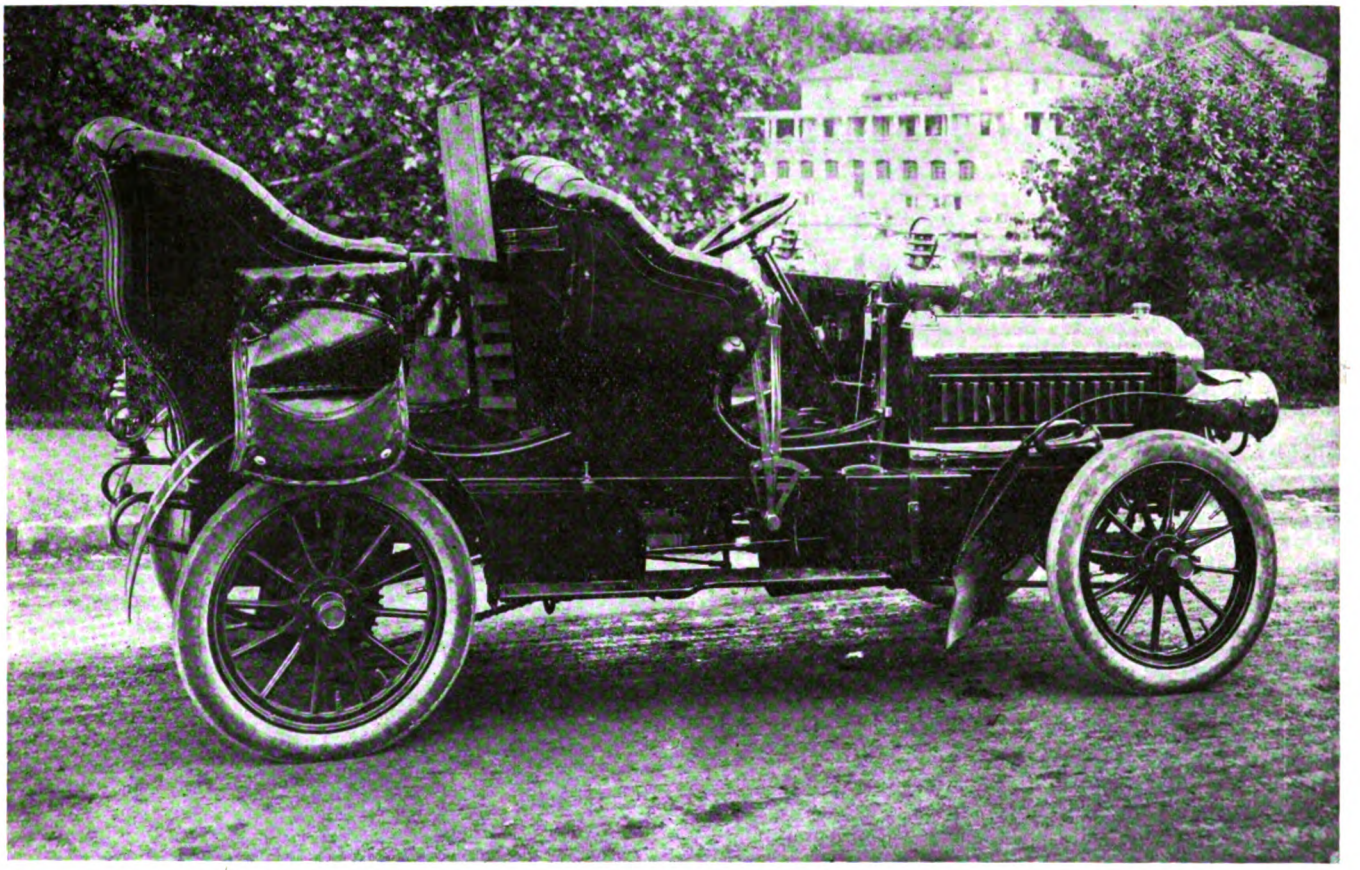


Fig. 1.
Thomas three-cylinder 1905 car, with side entrance tonneau. This illustration shows the baggage apartment in rear of the front seats and also those in the tonneau doors.

for oilers, screw-drivers, pliers, wire-cutters, wrenches, etc. That on the right will hold spare parts, such as inlet valves, spark plugs, wires, connections and springs. In either tonneau doors are pockets, covered by flaps, and there also is an umbrella case, in which can be carried canes, wraps, etc.

The increasing of the motor bore one-half inch, making the present cylinder measurements 5x5½ inches, the use of a positive forced feed oiling system for the crank case, the suspending of the crank shaft so that it can be removed without interfering with the wiring valves, etc., and the general increasing of the crank shaft and all its bearings, comprise the alterations made in the motor. In the electric department may be noticed the placing of the commutator on the dash, a change welcomed by all users of the car; the substitution of a single coil for the three cylinders instead of the triple coil, and the shortening of the wiring of the motor.

The transmission gear case, giving three speeds and a reverse, has been placed nearer the rear of the car, which allows of shortening the double chain drive to the drive wheels. Within the gear case not an alteration has been made, save that the shafts have a slightly increased diameter. The operating levers at the driver's right move in the opposite direction this year, being pulled towards the seat for higher speeds and the reverse, and the emergency brake lever is drawn towards the rear when applied.

The using of side entrances necessitated a 98-inch wheel base. Other features of this model are longer and stronger springs, 56½-inch tread, interchangeable sprockets, Whitlock radiator, float feed carburetter, canopy or Cape Hood tops, and stronger steering gear.

The three-cylinder 30-h. p. car weighs 2,300 pounds, and is listed at $2,750, or $2,950 with canopy top. The four cylinder model will weigh 2,400 pounds, and will sell for $3,000, and with top $3,200.

Chassis.

A careful examination of the two chassis illustrations will give a good idea of the car design. In the plan view can be seen the carburetter, D; induction pipes; separately cast cylinders, C, C, C; inlet valves, D^2, D^3, D^4; water pipes,

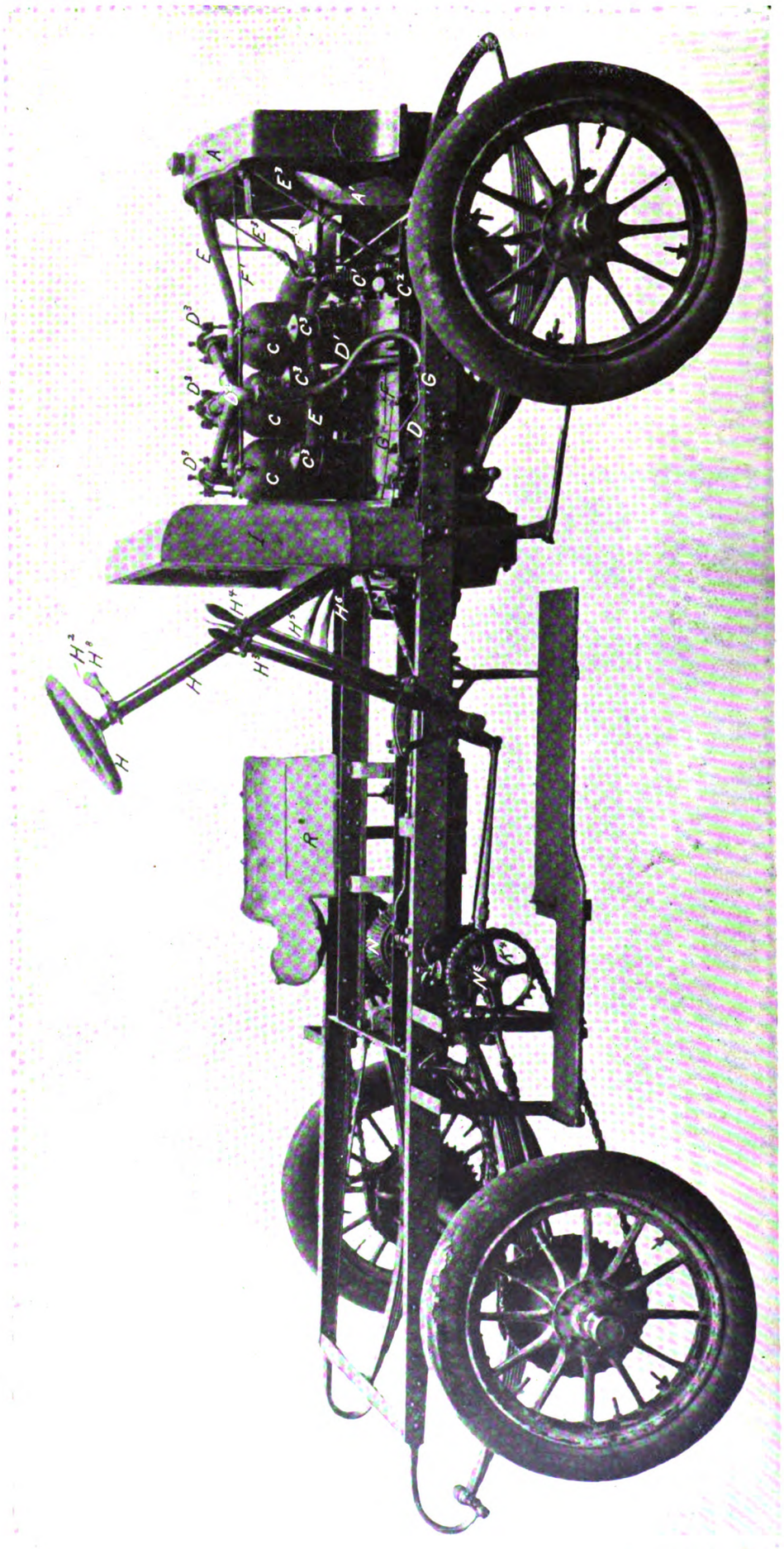


Fig. 2. Thomas Car: View of right side of Chassis. For key to letters of illustration, see reading matter.

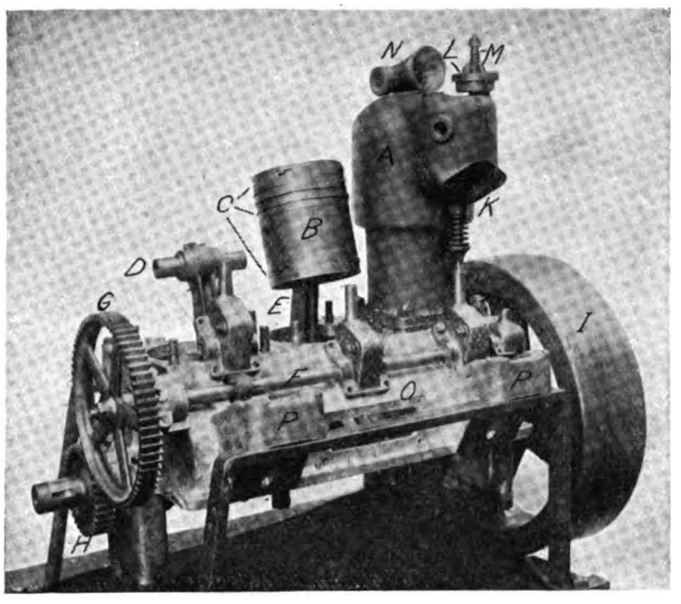


Fig. 3.
Thomas Car: The three-cylinder motor, with water jackets removed from two of the cylinders.

E. and E^1; compression relief rod, F^1; fan, A^1; cam gear wheel, C^1; pump gear wheel, C^2, and dashboard, I. On the rear of the latter is the coil, J; commutator, J^1, and forced feed oiler. The metal leather-faced clutch is shown at K, and on the rear half of the chassis are the operating levers, brakes and transmitting rods and pinions.

The hand levers, foot pedals and steering column are well clustered around the driver at the right. The transmission gear case is removed, exposing all the pinions and making it possible for any reader to follow how each change in the speeds is accomplished. The peculiarly shaped steps are owing to the side entrance tonneau, which is made possible by the long wheel base. The muffler is hidden beneath the cover, R, of the gear case.

Frame.

The main frame, of channel steel, is rectangular in shape, and is heavily reinforced throughout. It has four cross members, in the following positions: one at the rear, a second behind the transmission gear case, one at the front, and the fourth beneath the radiator. The motor and transmission are supported on a inner angle steel frame that extends from the front axle to the counter shaft. This is reinforced at many places and is well stayed to the side pieces of the main frame. The use of this framing scheme is the more careful and accurate alignment of all generating and transmitting parts of the chassis. In connection with the frame are four extra-strong semi-elliptical springs. These latter are not only longer and wider than those previously used, but are made of specially prepared material.

Motor.

A reference to Fig. 4 will convey a general idea of the 1905 three-cinder motor. In this illustration one cylinder, at the right, is shown with the water-jacket and valves attached. The center cylinder jacket is removed, revealing the piston cup, rings, and connecting rod, and in the third, or left cylinder, only the wrist pin, D, and the connecting rod are shown. This motor differs from last year's in that the bore is one-half inch greater, the bore and stroke now being 5 and 5½ inches respectively. The making of the bore and stroke more nearly the same tends to reduce vibration, giving an easier running motor. The bearings throughout have been increased from a quarter to three-eight inches in places, and are as follows: Crank shaft bearing on the flywheel side, 4x2 inches; on the opposite side, 3 11-16x2 inches; two center ones, 2¼x2 inches, and wrist pin, 1⅞x2⅛ inches. The aim in this general increase has been to promote ease and steadiness in motion and to increase strength and rigidity. A feature of this year's motor consists in suspending the crank shaft in the crank case, rather than embedding it in the same, a change which permits of the bodily removal of the same from beneath, without interfering with the cylinders, induction or exhaust pipes, or wiring system. The water-jacket, A, fully encases the cylinder walls and valve chamber, and at K is shown the mechanical exhaust valve, operated from the cam shaft, F. Directly above is the inlet valve, shown dissembled. The valve spring, M, is of sufficient strength and elasticity for long wear, and the valve seat, L, rests in the cylinder wall. N is the valve cover, to which is attached the fuel pipe from the carburetter This cover is secured differently than last year, there being a small thumb screw on top of the yoke in place of the large screw nut employed. The piston cup, B, besides being turned as nearly true as possible, has four compression rings at the top, and one compression and lubrication one at the bottom, all of which are indicated by C. These rings have lapped joints, with unions placed at different points on the circumference of the cup, so that gas leaking is minimized. The connecting rod, E, is slightly increased in size, and the wrist pin, D, with its ample bearing surfaces, is carefully ground and trued.

The gear, H, on the crank shaft drives direct into the large cam gear, G, on the cam shaft, F, which operates the three exhaust valves. These gears are somewhat larger and heavier than those used in this year's car. At P, P are shown the supporting arms, and at O is an inspection door on the crank case.

Forced sight feed lubrication for the crank case is new in this model, the McCanna oiler being employed in place of the pressure from the exhaust. This oiler, located on the dash, is in constant view, and by it oiling neglects are eliminated.

In Fig. 5 of the chassis will be noticed three individual oilers, C^3, C^3, C^3, which are used only in testing the cars out at the factory before the body and mechanical oilers are attached. These individual cups are removed as soon as the McCannas are in place. The two outside crank shaft bearings are equipped with chain oilers, and two inner ones between the crank throws are plain ones. The chain oiler is a simple, ingenious device. Beneath the crank shaft in the center of the bearing is a deep oil reservoir, with capacity for many thousands of miles. Over the crank shaft runs a continuous link chain that passes through the oil, and so constantly carries oil onto the shaft when the motor is running. From this chain the lubricating fluid extends in both directons to the ends of the bearing. This is a positive device, the noiseless chain never failing to raise sufficient oil at all times.

Other features of this motor are aluminum crank case, superior white bronze bearings, boxes, cranks set at 120 degrees, cast-steel connecting rods, no gaskets, the use of carefully machined parts, and the best materials in every unit of the construction. From this it can be seen that this model differs from last year's not in new principles, but rather in a general strengthening throughout, and in the more accurate finishing of the component parts. The valve puppets are forged from high-grade nickel steel.

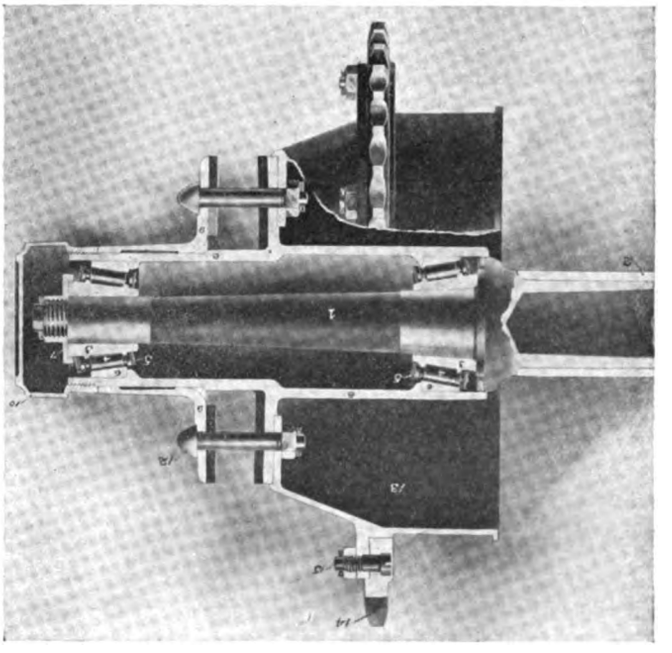


Fig. 4.
Thomas Car: Vertical section of bearings on driving wheel. For key to numbers on illustration, see "Bearings."

Carburetter.

The float feed carburetter, D, supplies the mixture for the three cylinders. As shown in the plan view of the chassis it consists of two circular chambers, that nearer the dash containing the float, and the forward one being the mixing chamber with the control valves. From the latter chamber a single pipe leads upwards to the three way elbow, D^2, from which individual pipes lead to where the automatic inlet valves are as marked, D^3, D^3, D^3. This piping has shortness and simplicity as a leading characteristic. The tubes are of large bore, and the distance from the carburetter to the three inlet valves is practically the same. This means an equal amount of mixture in each cylinder, even explosions and steady movement. The carburetter control can be explained by the rods, G and G^1, and the levers, H^2, and H^8, on the steering column. The rod, G, is operated by the lever H^8, and regulates the air supply to the carburetter. By pushing H^8 forward the rod, G, is drawn back, which allows more air to enter. The opposite movement of H^8 cuts off the air supply to the mixing chamber. The rod, G^1, is the throttle which regulates the amount of mixture admitted to the inlet valves. G^1 can be drawn towards the dash by pressing the foot lever, H^7, which has the effect of cutting off the mixture supply and so retarding the engine. The lever, H^2, on the steering column is the spark advancer, which is pushed forward to advance, and backward to retard the spark. On last year's car the Holly carburetter was generally used and gave good results and in all probability it will be the one attached to the 1905 machines. It is of the large type, well constructed and is supported on the inside member of the frame at the right side of the crank case.

Electrical System.

Simplicity and accessibility are very noticeable in the changes in the electric system. The commutator located on the inside of the dash is perfectly protected from mud, dirt, stones, etc., and can be examined at any time. On last year's cars it was at the front of the motor, and was the one inaccessible part of the car. It is gear and rod driven from the crank shaft. From a gear on the latter, a vertical rod leads up in front of the dash. This rod, with pinions

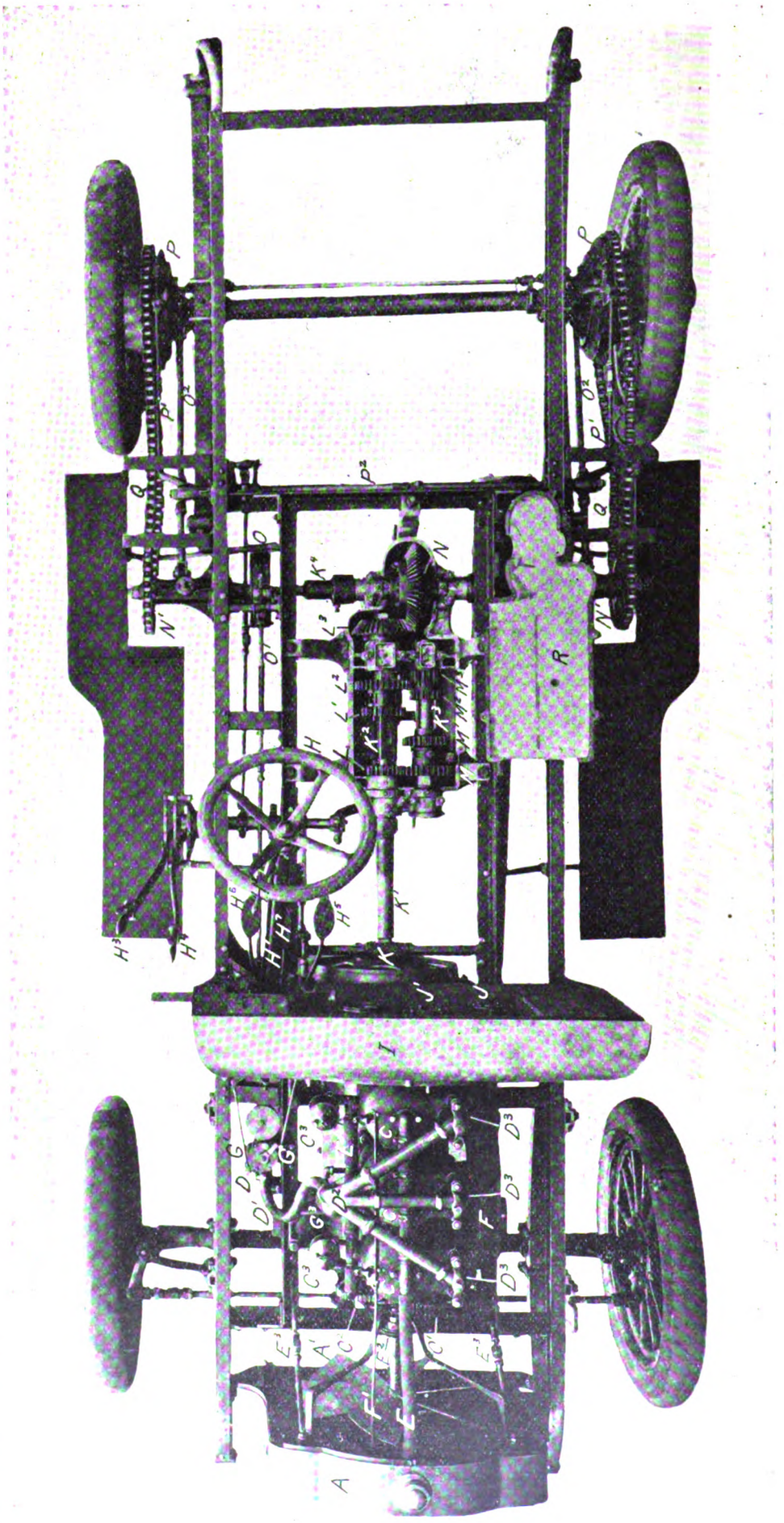


Fig. 5.
Thomas Car: Plan view of Chassis as seen from above. For key to letters on illustration, see reading matter.

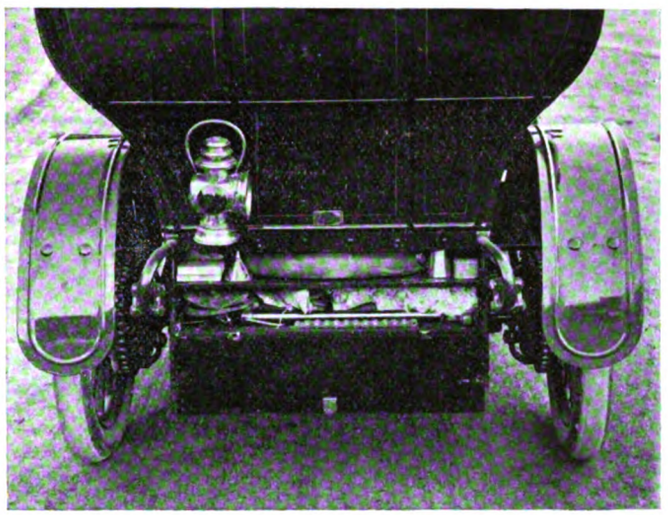


Fig. 6.
Thomas Car: Rear view of car, showing two storage compartments under tonneau floor.

on either ends, operates the commutator. Instead of the triple spark coil employed on 1904 models, a single coil one placed in the dash does for the three cylinders. This results in a simplifying of the wiring system. The sparking plugs are not changed, but 1905 plugs will be used on all cars.

Water Cooling.

In the cooling of the cylinders and valve chambers, a combined 1905 Whitlock cellular radiator and tank, a gear-driven water pump, and a belt-driven fan are used. The radiator is strongly supported on the side members of the frame that project so far beyond the front axle. This radiator is supported by two oblique brace rods, E^3, E^3, that are attached to the steel frame. The pump driven by the gear C_2 from the crank shaft gear is of the positive centrifugal type, and during the present season has given exceptional satisfaction.

The water leaves the radiator, A, at the bottom and is pumped to the cylinder jackets through the pipe, E^1, at the right side of the motor and shown in the side view of the chassis. After circulating through each of the water jackets, it passes out of the cylinder head and through the pipe, E, and returns to the top of the radiator. This water system is conspicuous by the little amount of tubing used and the simplicity of its arrangement. All joints are well made, and leaky pipes rarely occur. The propeller fan, A^1, driven by the circular belt, E^2, is rigidly supported and the round belt drive to the crank shaft is very positive. Extending from the top of the cylinders and through the radiator is the compression relief rod, F^1, which is operated by a button on the front end immediately in front of the radiator. This arrangement makes it easy to release the compression when cranking the engine.

Transmission Gear.

In the plan illustration of the chassis is shown an internal view of the transmission gear case, containing the sliding gears, and counter shaft pinion. This gear case and gears are practicaliy the same as those used heretofore. The gears are heavily toothed, with broad faces, which means that stripping is an impossibility. The shaft, K^1, leads from the clutch, K, and has the gear pinion, L, rigidly keyed to it. The squared shaft, K^2, while in line with K^1, is a different one entirely, K^1 ending in the pinion, L, and K^2 having its end bearing also beneath the pinion, L, thus it must be grasped at the start that when K is being revolved from the engine, K_2 remains stationary. The power from the motor is then communicated through the shaft K^1 to the pinion, L, then to the gear M, which meshes with it and is keyed to the shaft, K_3. With the shaft K_3 revolves the gears on it, and when they are made to mesh with the gears L^1 and L^2 on the shaft K^2, the shaft K_2 revolves and with it the bevel gear, L^3, which meshes with the gear N, on the counter shaft K^4, which carries the sprockets N^1, N^1, and so drives to the rear wheels, through the chains, Q_1, Q.

To get the direct drive the gear L^1 is pushed towards the motor until it locks with the pinion L, thus locking the shafts, K^1 and K^2, and making the drive direct along these shafts to the gear L^3, and thence through N and N^1 to the drive wheels. The locking of the gears L^1 and L is made possible by interlocking teeth on the insides of each gear which can be seen close to the square shaft, K^2. At the time that L^1 is moved forward and locked with L, the gear M is also slipped forward so that it is out of mesh with L. This leaves the shaft K_3 and its gears, M, M^1, M^2 and M^3 all at rest when the car is running on the direct drive. To get the medium speed L^1 is meshed with M^1, and the drive is through L to M, to shaft K^3, and gear M^1 to gear L^1, and shaft K^2, then to gear N, and to rear wheels. For the low speed, L^2 is slid forward into mesh with M^2, and the drive is as before. The reverse is obtained by sliding L^2 slightly to the rear so that it meshes with an idle pinion that is located on a separate shaft below the shaft K^3. This idler is in constant mesh with M^3, and consequently being interposed between M^3 and L^2, gives the latter an opposite movement.

All of these sliding pinions are operated by the single lever, H^3, whose forward position is the neutral one. From this the first notch back gives first speed, second notch gives medium speed, third gives direct drive on the high speed and the fourth gives the reverse. It will be noticed that to increase speeds the lever is drawn to the operator, being near his side on the high and reverse speeds. On the 1904 car this movement was reversed, the neutral being that nearest the seat and the reverse that nearest the dash. The advantages of this year's arrangement admits of easier control of H^3, when on the high speed, as it is nearer the seat.

The transmission case is surrounded by three universal joints, which allow for any frame irregularities. These are located, one on the shaft K^1, and one on either side of the countershaft bevel gear pinion bearings. The pinions in the transmission case run in an oil bath and the four end bearings are of the chain type as used in the motor. The remaining two are of the plain type. A substantial cut channel steel frame, such as was used on the old cars, supports the entire transmission case and motor.

Brakes.

Three brakes comprise the brake system, all of which are of sufficient strength to suddenly slow up the car if travelling at fast speed. In connection with these brakes is a safety device on each rear hub for hill climbing work. It consists of a sprag that renders running backwards impossible, even if all brakes refused to work.

The differential brake on the countershaft, K^4, is seen marked O. It is of the usual pedal operated type and through the rod, O^1, connects with the foot lever, H^6, at the driver's feet. When this brake is applied the lever motion at once releases the clutch. On each rear hub are two solid band brakes that are controlled by the lever, H_4, through the rods, O^2. D^2, and P^2. The lever H_4, known as the emergency brake lever, performs in a single movement a variety of quite different operations. By pulling it towards the seat the rear hub brakes are applied, the differential brake is applied, the clutch is thrown out, and the throttle is thrown off, thus retarding the engine. This lever, while rarely used, is none the less a most commendable one and by it the amateur can avoid collisions or other street accidents. The front pedal, H^5, throws out the clutch.

(Continued on page 329.)

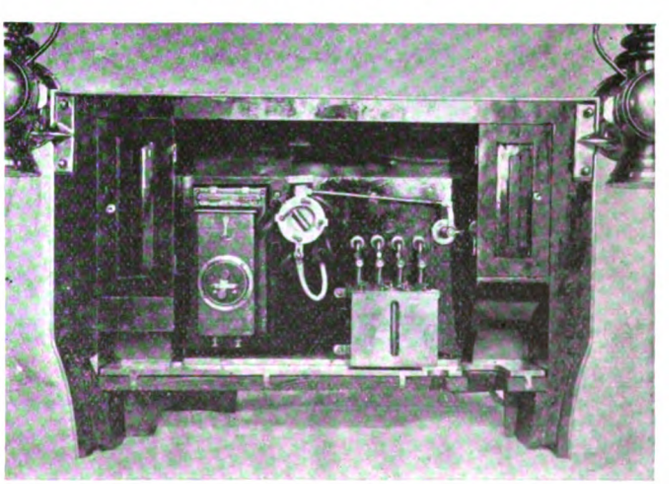


Fig. 7.
Thomas Car: The dash is of hollow design and contains two storage cabinets, commutator, coil and force feed oiler.

MR. AND MRS. THOMAS IN THE 1905 MODEL T

THOMAS THREE-CYLINDER TOURING CAR

THREE-CYLINDER THOMAS CAR.

(Continued from page 328.)

Bearings.

Fig. 4 shows the wheel bearings used. At 1 is the slightly tapering drop forged axle stub, and 2 is the tubulary axle. The bearing cones can be seen at 3 3, against which work the bearing rollers, 4, with the cage, 5; 6 is the sleeve. At the outer end is 7, an adjusting nut for taking up the wear, which can be reached by simply removing the hub cap 10. At 14 is the chain sprocket, and it can at once be seen that the chain's pull is between the outer and inner bearings, instead of inside of the inner ones as in so many wheels. This does away with side strain and promotes ease in running; 8 is the hub sheel of the wheel and 9 the flange for the spokes; 12 is a clamp bolt. The use of dust-proof roller bearings on the four axles, and the two sprockets, all of which are easily adjustable, has proven successful in the present model and will not be altered. On the countershaft the Hyatt spiral bearings will be again used. In many cars these bearings have run the entire season without adjustment or examination. They are lubricated from a pressure grease cup on the shaft bearing.

Steering Gear.

The steering wheel, H, mounted on the rigid column H, has not been changed in the new model. On the base of this column is a worm with a very heavy thread, that meshes in a heavily toothed segment, on the axle of which is a lever that communicates with the rods leading to the steering knuckles. This entire mechanism has been considerably strengthened so that accidents resulting from defective steering apparatus are done away with. The steering wheel works easily, and for a short turn has a great turning effect on the pilot wheel.

Mercedes Palace in New York.

Louis J. Halle, of Allen, Halle & Co., 69 Wall street, New York, sole American representatives of the Mercedes motor cars, has made a recent trip to Chicago, Ill., and St. Louis, Mo., with a view of establishing quarters in Chicago for the Mercedes cars. Mr. Halle informed the AUTOMOBILE REVIEW that they are making preparations to build a handsome auto headquarters or palace in New York, after the style of the big Parisian Automobile palaces as they are termed in the French capital. This new building will have all such conveniences as large reception rooms, libraries, recreation rooms, etc.

Advantages of Motorcycle Riding.

A trade contemporary in speaking of the advantages of riding a motorcycle says: "Recent races and endurance trips prove that American motorcycles have a remarkable radius of speed. They can be driven by the slightest touch of the finger from four to thirty miles per hour. The control is so perfect that the machine when running at its highest speed can be stopped within its own length. The average horse and wagon driven at a similar speed cannot be stopped under many times its own length. This illustrates in a forcible way the ease of control and comparative safety of our motor bicycles over a horse drawn vehicle.

Used intelligently the percentage of cost for operating, outside of gasoline and oil, should be of so small an amount as to be not worthy of consideration; practically no greater than the amount expended on any high grade bicycle.

Aside of a little flyer that will go at the will of the rider where no automobile can or dare follow, at the speed of the wind or a gentle pace, up or down hill, and at all times under control of the slightest touch—is a joy, an exquisite pleasure.

The motorcycle with its real advantages of lightness, speed, single tracking, convenience of storage, low initial cost, and small operating expenses places the pleasure of motoring within the reach of a vast multitude that would otherwise be debarred from its enjoyment."

Mr. A. S. Thompson.

Mr. A. S. Thompson, whose photograph we show on this page, is head of the automobile department of Rothschild & Co., Chicago, Ill. This firm has this season handled the Cleveland tonneau car, and under Mr. Thompson's judicious

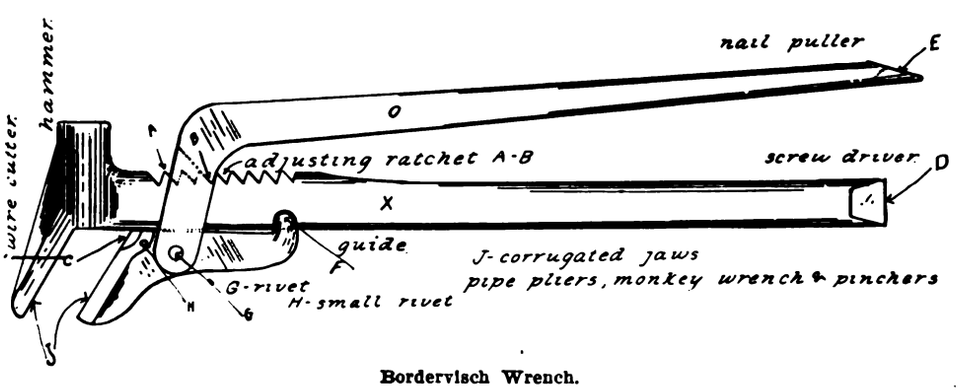
salesmanship and management this line of cars has been sold out. It is somewhat unique for a department store to handle automobiles, but Rothschild & Co. have shown that it can be successfully done.

Record-Breaking Tournament at Ormond Begins Nov. 14.

The week of record-breaking trials on the Ormond-Daytona beach, Florida, will begin on November 14, instead of on the 7th as originally planned. There will be classes for every style of automobile on the market from the diminutive runabout to the ponderous road locomotives, and a startling array of new figures is certain to be on the record book after the tournament is over. W. J. Morgan, the originator and successful manager of the tournament, is now planning for a big road race to be held in Cuba, and he may also decide to promote other meets in the South during the winter months.

Bordervisch Wrench.

Ed. Bordervisch & Co., Dayton, Ohio, has on the market a new combination wrench for automobiles that has a good future before it. The illustration gives a good idea of the usefulness and versatility of this wrench. It does duty for a pair of pinchers, pipe plicers, monkey wrench, hammer, nail puller and wire cutter. The wrench may be taken apart so that each part may be used separately. It is a most useful accessory and conveniences the automobilists, as it simplifies the carrying of tools.



Bordervisch Wrench.