The Thomas 1905 Touring Car

HUGH DOLNAR.

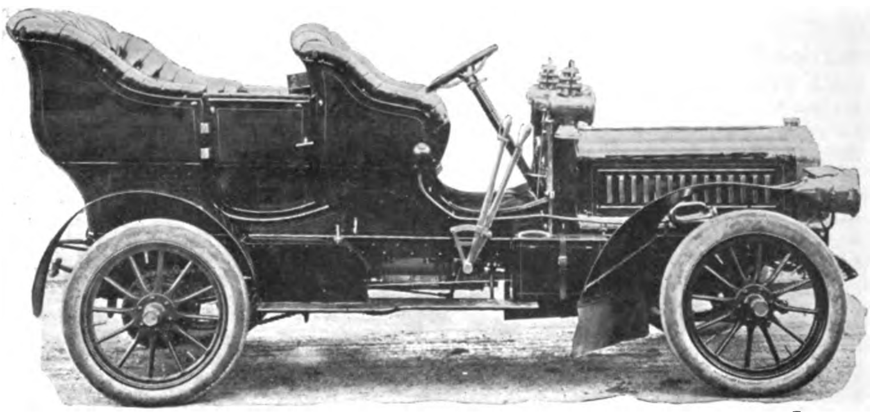
The E. R. Thomas Motor Company, 1192-1202 and 1413-19 Niagara Street, made its entry into the field of automobile construction in Canada in 1899, in 1900 moving to Buffalo, the first deliveries being tricycles, quadricycles and three-wheeled air-cooled-motor automobiles In 1902 they began the construction of runabouts and light tonneaus.

The E. R. Thomas Motor Company were perhaps the first American manufacturers to construct vertical automobile motors on a commercial scale, but they did not adopt the design of automobile motors in front until 1903, when the management clearly perceived the trend of the market, and, notwithstanding the success of its single-cylinder cars, abandoned their production in 1904, appearing at the shows with a new touring car, three vertical cylinders, 4½x5½ ins. stroke, placed under a hood in front.

A considerable number of these cars were sold in 1904, giving great satisfaction, and although the 1904 Thomas three-cylinder car was an unqualified success, two new models have been produced for 1905, one four-cylinder 5x5½ ins. and another, very large model, six cylinders, 5x5½. Both these models, four and six cylinders, will be regularly produced, the smaller car, four cylinders, being, of course, expected to be sold in much the greater numbers. The four-cylinder Thomas 1905 model is here illustrated and described.

THOMAS 1905 4-CYLINDER CAR.

The Thomas "Flyer" touring car, 1905 model, wheel base 106 inches, wheels 34 front and rear, tires 4½ rear, 4 ins. in front, motor 4 cylinders 5x5½ ins., sliding gear speed change, three speeds forward and reverse, direct on high speed, bevel gear to balance counter-shaft and side chains to the rear wheels, weight about 2,500 lbs., price $3,000.



The Thomas 1905 Flyer 4-cylinder car, wheel base 106 inches, wheels 34, front and rear; tires 4½ rear, 4 ins. front; 4 cylinders, 5x5½ ins.; sliding gear speed change, three speeds forward and reverse, direct on high speed, bevel gear to balance counter-shaft and side chains to rear wheels; weight, 2,500 lbs.; price, $3,000.00.

SPECIAL POINTS OF THOMAS 1905 CARS.

Thomas abandons the 3-cylinder car-motor and adopts 4 cylinders as ordinary practice, with 6-cylinders for his supreme effect—very notable decisions when following a 3-cylinder success.

Direct driving, as opposed to the side-shaft drive on all speeds, and the example here described is very good and very simple, and will be attentively considered by all students of car design.

A peculiar throttle handling, locked, is shown, which makes the hand regulated spark position govern the car rate of speed, the charge admission remaining uniform and burning a fixed quantity of fuel either earlier to obtain more power and so drive the car faster, or later to give less power and make the car go slower. The Thomas locked throttle is very convenient for the driver, and is said to be not wasteful of fuel in practice, no matter what it may be in theory, and the locked throttle unquestionably controls car-power perfectly.

The rear-wheel hub-ratchet-and-pawl hold-back, an original feature loudly approved by its users. A careful using of all available car body space for miscellaneous stowage. Thomas has given great attention to body and locker design. This is a direction in which much remains to be done, and the car body locker and storage improvements designed by Thomas will be studied very carefully by the trade.

THE MOTOR.

The four cylinders are single units, heads and water jackets integral, the water jacket covering the piston displacement. The cylinder bore is finished by boring and grinding parallel. The cylinders are held to the alum-

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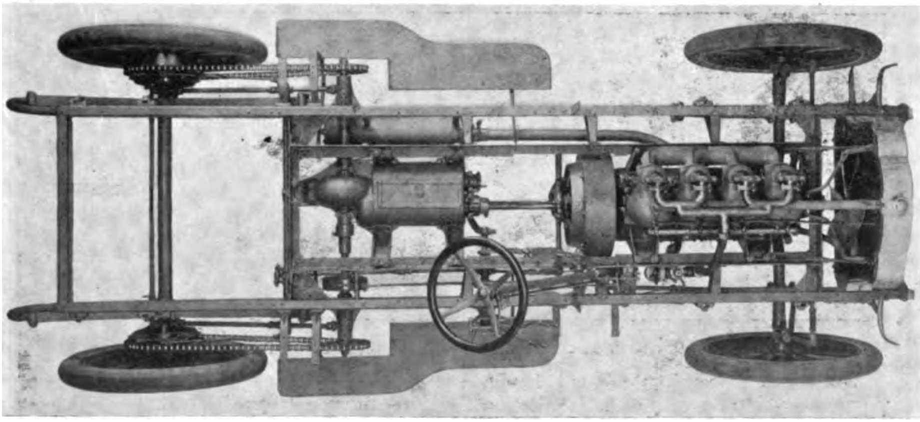


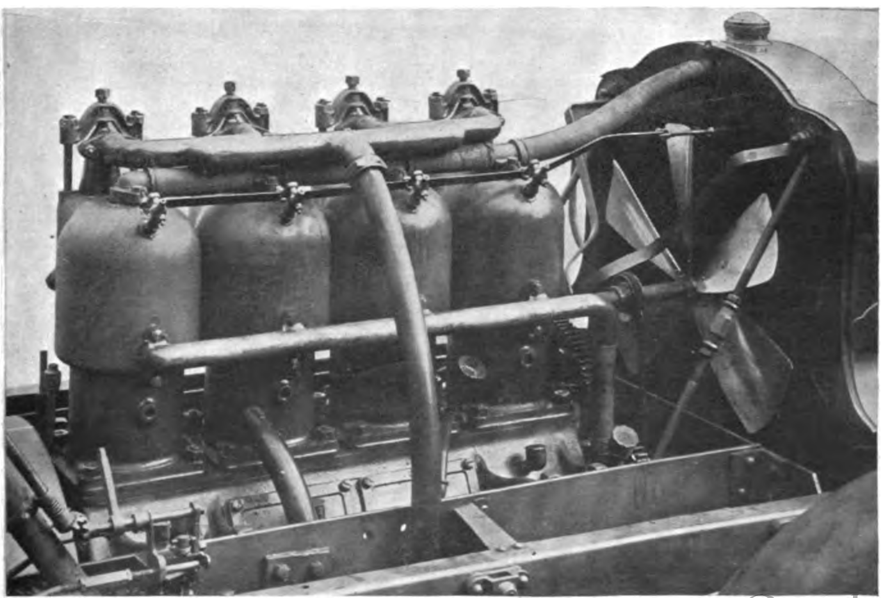
Thomas 1905 Flyer—Plan of Chassis.

inum crank box by four studs, ends ¾ and ⅝ diameter, ¾ end threaded into the crank box. The bronze flared inlet bends, secured by studs, yokes and pressure screws, are bends of the admission pipe, and contain the down-hanging automatic admission valves, ports 1⅞ diameter, the valves dropping into the compression chamber and lifting to close. Admission valve heads are 2⅛ diameter and close on detached seats of hard grey iron, ground seats in cylinder. The mechanically operated exhaust valves, parts 1⅝ diameter, are placed directly below the intake valves, seated in the cylinder casting, exhaust valve heads 1⅞ diameter, are of nickel steel

The valve stems and heads are integral, nickel steel, stem-ends of both morticed to take notched keys, and both stem-ends are hardened. The spring washers, flanged, are retained by the springs and notched keys. The valve lifters are short, hard cylinders ½ in. diameter, with rounded lower ends, resting rounded abutments over the cam rollers, carried in hinged arms enclosed in bronze casings open to the crank splash. The exhaust stem-guides are grey iron, threaded into the cylinder castings.

The cams are separate from the cam-shaft, taper pinned, pins riveted, cams case-hardened. The cam-shaft gear is rawhide, driven by a steel pinion on the crank-shaft.

The pistons are of hard grey iron, with five rings each; pistons 6 ins. long, four rings on top, one ring near the bottom. The rings are eccentric, turned and ground under compression, ground on sides, ¼ in. wide, grey iron, flat laps, pinned to prevent turning. The pistons are true cylinders, ground 5-1000th under



Thomas Flyer Motor—Water side, showing all details on that side of the car.

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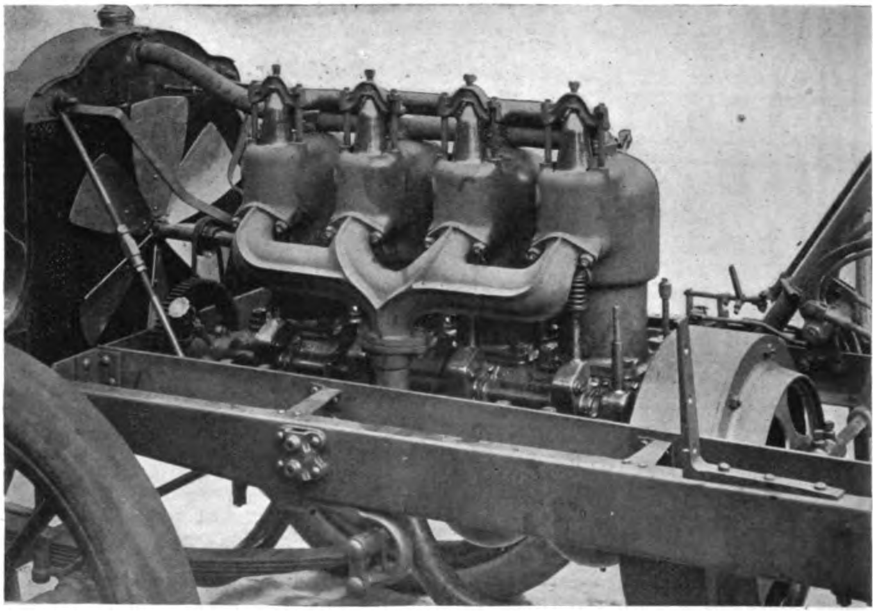


Thomas 1905 Flyer Motor, valve side. The inlet valves are automatic.

the cylinder diameter, to drop through cold. The piston pins, 1 in. diameter, are hardened and ground, hollow, hole ½ diameter clear through. The pins are held with tit screws tapped into the piston hubs, tits entering holes in pin-walls; the pins are a close fit in the pistons.

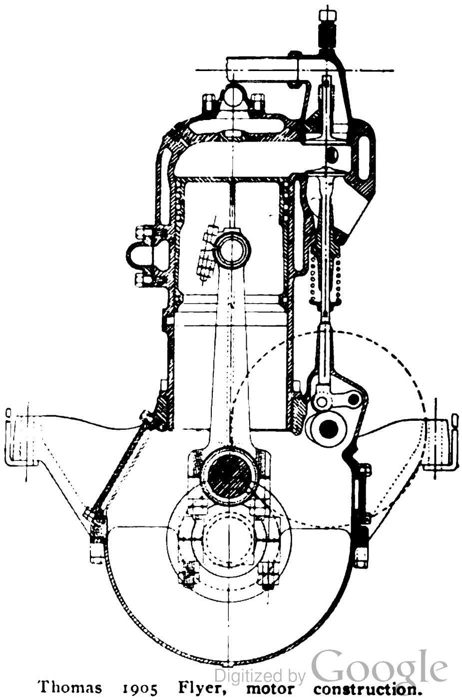
The rods are H-section steel castings, the web standing with the crank shaft instead of across it. as is more commonly the case. The top end of the rod is split and fitted with a pinching screw and a split bronze bush, 2¼ in. long. The lower end is lined with "wnite bronze," probably about 95 copper and 1-tin, the cap is a steel casting, also "white bronze" lined, secured with 7-16 studs, nuts, castellated check-nuts and split-pins. This white bronze lining is pened, reamed and scraped to fit, before and after running on the testing stand. The motors are passed on the stand at 30 H. P. for 900 R. P. M., Prony brake, often showing as high as 33 H. P. and at 40 H. P. for 1,200 R. P. M.

The crank-shafts are first bent from rectangular bars, then drop forged, milled, turned and finished by grinding, both wrists and journals, 2 ins. diameter shaft journals, and 1⅞ diameter wrists. The crank-arms are all 15-16 thick. The crank-shaft has 5 bearings, the three inside the crank box being 2 ins. diameter x 2¼ long; the fly wheel end bearing is 4 ins. long and the front end bearing is 3 11-16.

The engine base is an aluminum casting, same as the oil basin. The bearings are white bronze, poured directly into seats, flanged, in the aluminum casting. The caps are the same, not steel strap reinforced, very heavy on under side, retained with ½ in. studs with two hexagon nuts, bottom nut castellated, with split pin. The oil basin may be removed without disturbing anything else, and the motor assembles and disassembles from underneath.

LUBRICATION.

The end shaft bearings have chain oilers with individual oil wells. 1ne three inside bearings are splash oiled through catch-holes



Thomas 1905 Flyer, motor construction.

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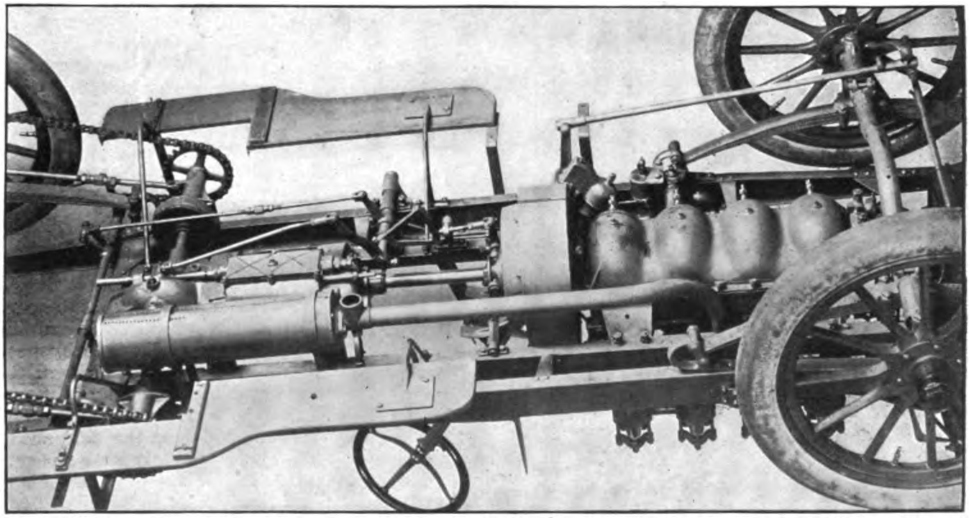
in the top bearings, and the piston-pins and crank wrists are also oiled through and by top catch holes. Each crank has an individual oil basin, the ribs being carried up to the center. This avoids oil surface variations up hill and down hill. Each separate oil compartment of the base is fitted with an individual bronze filling cup, screw capped, placed on the plain side of the cylinder.

THE CARBURETOR.

This is a Thomas construction, float feed, having an automatic variation corresponding to engine speed increase, not here described in detail.

The gasoline tank is rectangular, sheet brass, braced inside, screw filling cap, capacity about 17 gallons. The exit from the tank to the carburetor is through a peculiar water and dirt trap, which effectually separates the heavier water, if present, from the gasoline, and the water can be drawn off through a cock at the bottom.



Thomas 1905 Flyer, oblique view of under side of middle part of the chassis.

THE IGNITION.

Jump spark plugs are supplied with high tension current from one coil for all four cylinders, the commutator being peculiar, four spring contacts, tool-steel and hardened, are successively impinged by a hardened steel pin carried by the commutator shaft, driven even turns by chain and sprockets from the cam shaft, so as to deliver current to the single coil in time for each spark; the coil terminal connects with a brass ring seated in an insulating sleeve, surrounding the commutator shaft, which carries a lengthwise brass conductor mounted on an insulation arm fixed to the commutator shaft. This revolving lengthwise conductor delivers high tension current from the coil to four brass conductors, set 90 degrees apart in the hard rubber insulating sleeve, and these four final contacts are wired to the spark plugs. There is one inch jump space between the high current receivers in the insulation sleeve. This enables one coil to do the work of the four needed where each plug is fitted with its individual coil, saving cost and weight, and also has the great merit of supplying precisely the same quantity and intensity of high tension current to each of the four spark plugs, a condition difficult to obtain with individual coils, which must be individually regulated to exact similarity of performance, to make each plug have precisely the same charge—firing effect. The single coil also dispenses with three-quarters of the total number of separate wires required for individual coils, Again, the one-inch spark gaps inside the insulation sleeve act as safeguards against breaking down the coil by over pressure of the current, as when the tension becomes dangerously high the current will jump the inch gap and relieve the coil without damage. This is the best form of single coil distributor known to the Thomas Company and one of these high tension current distributing commutators has 7,000 miles of road work to its credit, without any apparent deterioration. The insulation sleeve of this double distribution commutator is about 2½ ins. long and 2½ ins. diameter, and these dimensions permit it to be commodiously housed in the recessed front board, described later. Altogether, this peculiar commutator appears to possess decided advantages, and to be likely to come into general use.

THE FLY WHEEL AND CLUTCH.

The fly-wheel, grey iron, 18 ins. diameter x 4¾ ins. face, weight about 140 lbs., is fitted up on the tempered crank shaft end to an integral flange 4¼ ins. diameter, and fixed by a key in the taper, and six ⅝ hexagon head bolts with castellated nuts and split-pins through the fly-wheel hub and the crank-shaft flange.

The coned female clutch member is reversed, small end to rear, is separate, and bolted to fly-wheel rim with eight studs ⅝ diameter, with nuts and split-pins. The

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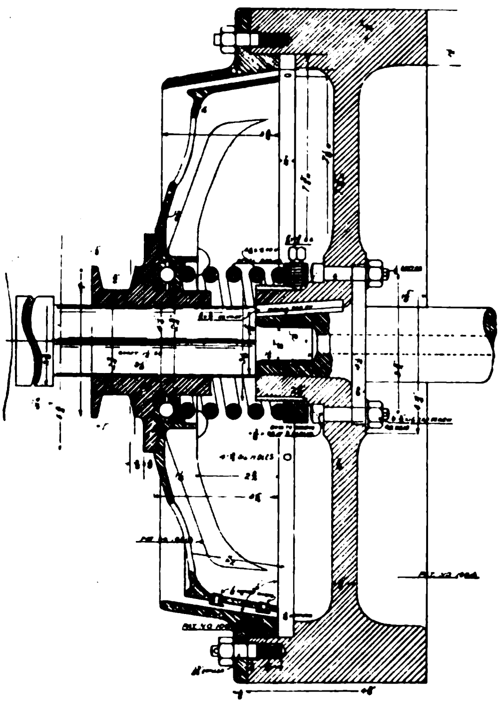


Thomas 1905 clutch and fly-wheel construction.

clutch-angle is 7 degrees, the male face-engagement is 2½ ins. and the female internal face is 3⅛ ins. wide, giving ⅝ wear-change of the male clutch-engagement position. The spring thrust is internally resisted, an adjusting nut on the fly-wheel hub forcing the spring against a ball-bearing, resting against the flange of the square-eyed steel hub to which the aluminum body of the leather-faced male clutch-member is hot riveted with six rivets. The leather facing is secured by two rows of copper rivets, heads counter-sunk half way in the leather, the clutch hub-eye is 1½ ins. square broached.

THE CHANGE GEAR.

The line-shaft is squared to fit the clutch hub-eye, and has a forward journal entering a bronze hub bearing forced into a seat bored in the rear end of the crank-shaft, lubricated by a central crank-shaft hole from the crank splash.

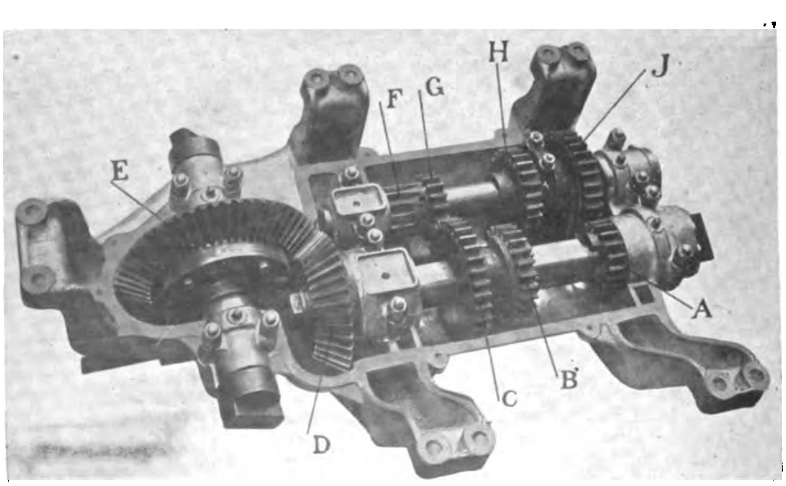
The sliding clutch-member is worked by a fork fitted with conical hard rollers, engaging a flaring groove in the clutch hub, which is soft.

The squared shaft is the front member of the line-shaft, to which it is coupled by a tongue and groove and surrounding sleeve, slipped over the ends of the meeting shafts, which are round at the juncture, and this sleeve is secured by one screw to complete the easily separable coupling.

The gear-box is aluminum, with holding lugs ribbed as shown in the illustration, all plain bearings, "white bronze" poured directly into flanged pockets in the casing casting, with individual caps, same construction, retained by 7-16 studs with nuts and split pins. The case-cap is a cover only, with a capped hand-hole in the top, about 4 ins. square. The hand-hole cap and the whole case-cap may be individually removed.

This change gear is patented to Thomas and is believed to be unique.

The two illustrations show the Thomas direct drive in its "high-speed" and "low-speed" engagements; in the low-speed the drive is through the side-shaft, and in the high-speed the drive is direct, the side-shaft standing still. The engagements are all made by positive actions, without the aid of springs, the one spring in the combination being light and merely strong enough to retain the side-shaft sliding-pinion, J, which drives the side shaft, in engagement, and acts merely as a preventive of accidental displacement, there being no normal displacing effect inflencing J to disengagement.



Thomas 1905 Flyer direct drive sliding gear change. Shown in low forward speed engagement.

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All the speed-changes are effected by sliding the change-rod L, to rear or to front; L is moved by the speed-change lever, notched-quadrant and spring-latch retained. The change-rod is locked against movement by an interlock with the clutch, which must be pedal-released before the change-lever or change-rod can be moved, hence all gears must be free to rotate into engaging position when gear change is attempted.

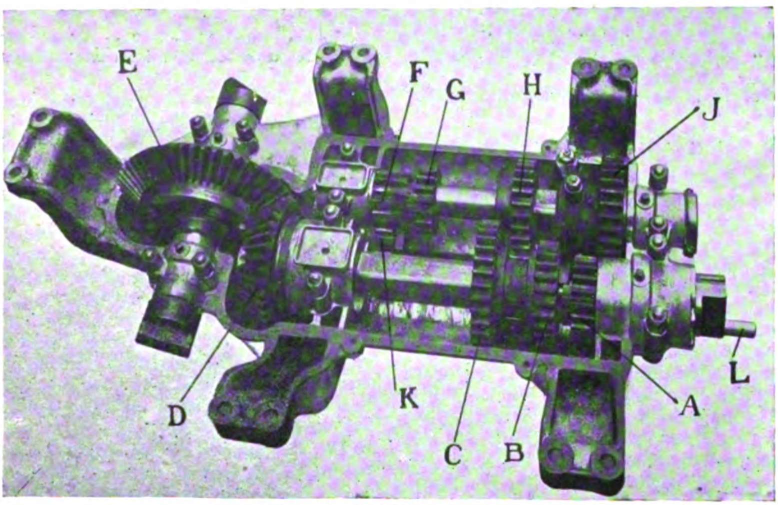
The spur gearing of this action is all case-hardened. The bevel gears D and E, to the counter shaft are steel, soft.

Pinion A is integral with the short shaft, which is clutched to the squared shaft on which the male clutch-member slides. This short shaft is bored and bronze-bushed at its left end, and takes the right-end-journal of the squared line shaft on which the integral gears B and C slide, as forced by a fork carried on the left end of the change-rod L. The bevel pinion is fixed to the left end of the line-shaft by keying on a taper seat, and held up by a hexagon nut secured by a driven through-pin, tapered and riveted. F and G are integral with the side-shaft, and F engages K, the reversing pinion. H is keyed to the side-shaft. J slides on a squared part of the side-shaft, and is placed in two positions by a horizontal fork on a vertical rocker at the rear. This vertical rocker is worked by a horizontal sector, not visible, fixed to its lower end, which is sometimes engaged by a rack fixed to and moving with the change-rod, and J is engaged with A to drive the side-shaft, and disengaged when the side-shaft stands still, (see high speed engagement), in which J is shown at the left of A, and C and B are also disengaged, the line-shaft driving the bevel pinion D only, effectively. The left end of A carries four integral clutch jaws, which engage four similar jaws integral with B, formed on its front, right-hand side. This clutch drives the line-shaft on the direct drive.

In the illustration showing the low forward speed, A driving J, G driving C, and C driving the squared line-shaft on which it slides.

To change from high-speed to low-forward-speed the change rod L must first be unlocked by a pedal action which disengages the clutch; the change-rod is then moved to the left, its fork carrying C and B with it to the left, and the rack fixed to L turning the vertical rocker so that its top fork slides J to the left, into engagement with A, and at the same time B is engaged with H. B and H and J and A completing engagement at the same time, and at this time the rack drops its engagement with the rocker-sector which is spring-held to the left against a stop-pin. The sector has a long abutment-tooth at its right toothed-extreme, impinged by the rack-end in movement to the right to ensure rack and sector re-engagement. The gears A and J after being once placed in full engagement remain in that position, causing the side-shaft to partake of the movement A, until A and J are disengaged by the movement of L to the right. As the rack leaves the rocker-actuating sector when the medium speed engagement is completed, the change slide may be moved still to the left, causing C to engage G, thus giving the low speed, or by the extreme movement to left engaging C with K for reversing.

To return from reverse to high speed gear, L is moved to right, causing the rack carried by L to strike the rocker-sector abutment-tooth, and so force the rack and sector-teeth to engage and work the fork which actuates J, continued movement of the change slide, L, to right, completely disengages J from A, and, finally, extreme right-hand position of L places the co-acting clutch members of A and B in full engagement so that the line-shaft partakes of the movement of A, while the side shaft stands still and only the bevel gears, D and E, are in engagement.



Thomas 1905 Flyer. Change gear in high-speed engagement, drive direct, side shaft wholly disengaged and standing still. Described in the text.

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The gear-box basin is filled with oil, and the gear-splash oils the journals through catch holes in the top boxes. The right-hand end of the line-shaft has its bearing in the brass bush driven into A, which is oiled by a duct from the oiler-chain recess to a ring groove in the journal A, whence cross-ducts are drilled through to meet the first journal of the line-shaft.

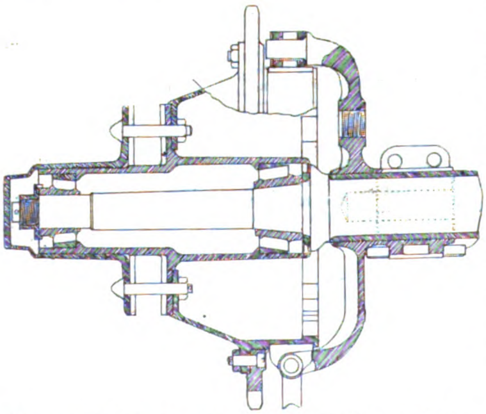
THE COUNTER SHAFT.

This is two short ends of shafting, 1 3-16 ins. diameter, connected by a balance-gear inside the bevel gear hub which drives them, and having tongued coupling ends, which engage the similar ends of the 1 3-16 sprocket-shafts, carried on Hyatt roller bearings in steel casting sleeves, flanged, one sleeve riveted to each of the frame-sides. The 26-tooth sprockets are fixed to the shafts by taper seats, keyed, and held up with nut, lock-nut and pin. The chain adjustment is by strut rods, flat joints to spring perches, and also to the counter-shaft sleeves, and fitted in the strut length with a right-and-left-thread sleeve, with check-nuts, for length adjustment.

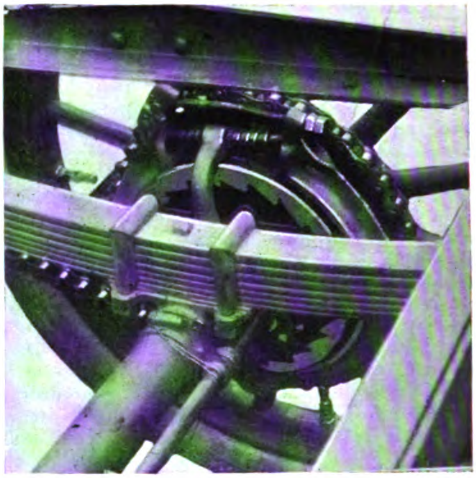
The muffler is of the three concentric shell type.

THE REAR AXLE AND SAFETY RATCHET.

This is a Thomas construction, straight cold-drawn tube, 2¼ ins. out diameter x 1¾ inside, spring perches split, clamped with pinching screws, and positions fixed with dowel pins. This sleeve extends to within ⅝ of the wheel hubs, which are steel castings, large enough inside to take Timken roller bearings and flanged and fitted outside to the spoke flange outwardly, and to the brake drum, containing the peculiar ratchet known as "The Thomas Safety Device," inwardly. The sprockets, thirty-two teeth, 1¼ ins. pitch, for standard roller chain ½ in. wide, is recessed to fit a flange, 11 ins. diameter, and secured with eight bolts ⅜ diameter. This sprocket plane is well outside of the outside end of the inner Timken bearing, so that the chain pull is between the bearings instead of being on the inside of the end one, as is customary.



Thomas 1905 Flyer, rear hub construction, vertical section of assembly.



Thomas 1905 Flyer. Rear wheel hub, brake drum, brake shoes, and internal "safety ratchet,"

The brake-spider has two arms, and the hub is split and pinched and doweled to the axle tube, close outside the spring perch. This brake spider also supports the pawl which coacts with the "safety ratchet."

The stub-axle is a steel forging, which enters the axle tube four inches and is brazed in, extending inward beyond the spring perch. This axle is fitted to take the Timken bearings, and the outside nut which retains the Timken bearing is covered by the usual brass cap, screwed on the outer hub-end. The wheel-tread is middle way between the hub bearings. The illustration shows this simple, secure and substantial hub and axle construction, in detail.

The peculiar E. R. Thomas "Safety Ratchet" consists of a heavy internal ratchet ½ in. in face, cast integral with the brake and sprocket drum; the coacting pawl, pivoted to the brake spider, is hand operated from a lever placed on the right edge of the front board, to which the pawl is connected by a wire cable. The bell-crank on the brake-spider has a spring and rod connection with the pawl, so that when the pawl is dropped into the ratchet the pawl can lift to permit the forward movement of the car, but will prevent the running of the car backward except by sliding the wheels on the road surface. The same effect, in this one particular, could be gained by a brake which would hold the wheel. The safety ratchet has, however, other powers than the mere holding of the wheel from backward movement, gained by the freedom of the wheel to run forward, although prevented from turning backward; on a slippery hill the driver can advance his car by flywheel effect, throwing in the clutch when the motor is up to speed, and "jumping" the car as far as may be, unclutching the motor, getting speed again and repeating the operation. The ratchet-tooth stands for about 4 ins. of wheel-tread circumference, which is the greatest distance the car can

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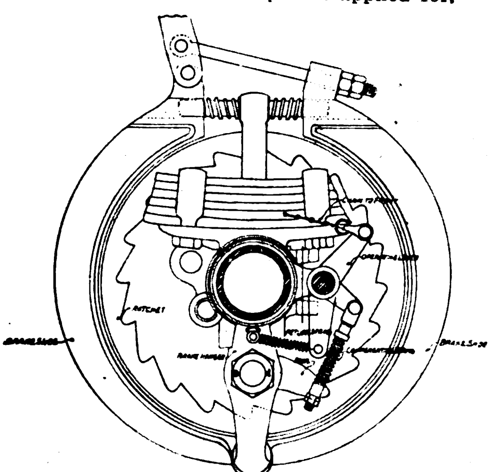
possibly run backward before the pawls will stop the rear wheels. Again, when the driver has reason to doubt the ability of the car to climb a grade he can drop the pawl in, and if the motor stops the pawls will prevent the car from running away down hill. While this safety ratchet does not duplicate the performance of the "sprag," often fitted to heavy cars, and is only effective through the tire adhesion to the road surface, it is thoroughly effective as a hold-back, and has been received with great favor by many purchasers who work over hilly roads, as the pawl can be dropped in at the outset of any doubtful climb, and if not needed does nothing except click and give the driver a sense of security, if the car makes the run up; if the car does not make the rise, the safety ratchet, of course, prevents a down-hill runaway by stopping the wheels before the car has gone any distance.

This safety ratchet is "patent applied for,"



Thomas 1905 Flyer, "Safety Device," and brake, hubs and shoe.

and is a distinctive feature of the E. R. Thomas cars.

THE FRONT AXLE.

This is also a Thomas construction, steel tubing, 2 ins. out diameter, ⅝ walls, bent down in the middle as shown. The spring perches, steel-castings, are split, fitted with pinch screws, and doweled. The yokes are steel drop forgings brazed on the outside of the tube, bushed with hard bushings to take ¾ ins. diameter tempered and ground tool-steel knuckle-pins. The front wheels are carried on Timken bearings, usual construction, capped as are the rear wheel hubs.

THE CHASSIS FRAME.

The pressed steel sides, 3-16 thick, are 4¼ ins. greatest width, tapered, with drop forged spring-hangers, offset eyes at rear. The cross-girts and sub-frame are angle steel 3½x 1½x¼, corners reinforced with angles all hot riveted. The sub-frame is flush on top with the chassis frame, 3½ ins., member on top, horizontal three distance-pieces, pressed steel, flanged at both ends, are placed on each side of the sub-frame and riveted thereto, and also to the chassis frame sides, thus adding the vertical stress resistance of the side frames to that of the sub-frame members.

The chassis frame members are tapered on the undersides, leaving the whole structure flat and straight on top, 33 ins. wide all through.

The front springs, 39 ins. long, are under the parallel chassis frame sides; the rear springs, 43 ins. long, are outside the chassis frame, all springs 2 ins. wide, 6 leaves in rear, 5 leaves in front, varied according to style and car-body and equipment.

THE STEERING GEAR.

This is a quadruple worm, hard-taper-key-and-nut held to the lower end of the 1 in. steering shaft, carried in the fixed steering post, 1½ ins. outside diameter. The worm gear sector is soft steel mounted in screw-adusted boxes, adjustment b to sliding the sector towards the worm. The steering-arm is globe-ended. The axle steering-arms lead forward, and are connected by an adjustable-length parallel-rod, right-and-left-threaded sleeve adjustment, secured by check-nuts.

THE BRAKES.

There are two outside vertical levers on the right, both retained by quadrants passed through mortices in the levers, and having the latch-keeping notches on the unuer-side. The outside lever works the speed change and has five notches, one for "all gears out," and one for each of the four operative gear-changes. This lever works a rock shaft, one of the two arms of which is connected to the gear-change slide, and the other to the clutch-disengaging rocker, in such a way that disengaging the clutch unlocks the gear change sliding bar, which may then be moved by continued movement of the speed-change lever.

The inside one of these two levers, each of which has a grip bell-crank for working its own retaining latch, operates the two hinged exterior brake-shoes, leather faced, which close on the hub-brake drums; applying the brakes disengages the clutch, and also drops the throttle to smallest charge admission.

The ordinary brake is pedal-applied to a Raymond double-acting brake-drum on the right-hand counter-shaft, first releasing the clutch and dropping the throttle to low charge admission, as before.

THE THROTTLE RETENTION.

The throttle is a rocking internal-sleeve-valve, automatically ratchet-retained wherever placed by the pedal which regulates the mixture supply to the cylinders.

A plunger worked by a rocker connected to both brake actions releases the throttle-retaining pawl whenever the brakes are applied, so that the motor speed drops to low rate. This throttle ratchet is not affected by the action of the change gear lever, though, like the brake levers, it disengages the clutch; consequently, speed-changing does not affect the cylinder charge-supply. After the brakes are applied the throttle can be opened and held open by the foot on the throttle pedal, but will not be automatically retained until after the brake or brakes are released. This

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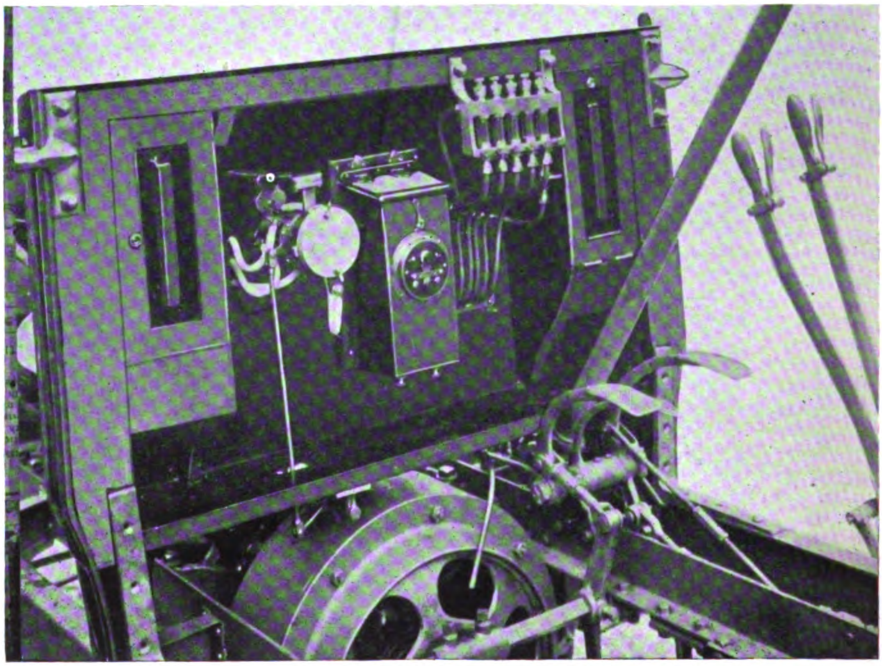
prevents the driver from locking the throttle open while the brake is on, and also permits him to set the throttle to a maximum-charge delivery when the brakes are off, and have this adjustment retained without keeping his foot on the pedal, the rate regulation being, in this case, regulated by the spark advance: that is to say, while the charge volume remains constant, as fixed by throttle position, speed rate variations are made by advancing or retarding the spark.

The spark control is by a horizontally swinging ratchet-sector-retained bronze-lever, mounted close under the steering wheel and worked by the driver's fingers without taking his hand from the wheel. The spark-time

This form of front-board has very decided advantages in the way of providing a safe and convenient housing for parts that must always be decidedly in the way when placed on the flat front-board, and also of concealing them to a considerable extent, and so giving a better appearance to the forward part of the car. The tool and oil-can lockers, with locked doors, give a better place for these indispensables than has been before found, and this recessed front board, made of metal, light, strong, useful and of pleasing outline, will undoubtedly come into very general use on cars making any pretentions to elegance.

The hood is made of two similar halves hinged to a common rod on top in the middle,



Thomas sheet steel front board built up, recessed 6 ins. deep; tool-lockers on each side of board; the double-distribution commutator is seen in the recess at the left; single-coil box in the middle, sight-feed 5-lead oiler, mainly inside of board at right. The control is clearly shown, brake pedals on each side of the smaller throttle pedal. The squared clutch rocker, squared, and clutch construction are quite clearly shown.

regulation is by a vertical rocker, having a small bronze bevel-gear at its lower end, meshing with a similar gear on a horizontal rocker, carrying an arm and rod to rock the double-acting distributor shell, located in the front-board cavity, as before described.

THE RECESSED FRONT BOARD.

This is a built-up sheet-steel structure, brazed, smooth outside surfaces, 6 ins. deep, opening to the rear. Tool-lockers with locked doors and inside shelves, and a wrench-board, with a hand oil-can stand in the left-hand locker, are placed in the ends of this recessed front board; the middle space houses the four-oil-lead sight-feed oiler, the coil-box and the commutator.

A drip-pan underneath this board collects any oil that may drop down and so keeps the mat clean.

which are retained when closed by winged-nuts and hinged screws. The hood has ventilated sides, is brass trimmed, and is of pleasing form.

THE RADIATOR AND FAN.

The radiator is of the cellular type, the fan is on ball-bearings, round-belt driven 2½-to-3 to 1, from the crank-shaft, expanding-pulley belt-tightening, which is the first application of the expanding-pulley to this purpose known. The water circulation is by a two-gear pump natural lines of water travel, pump to bottom of water jackets, top of water jackets to top of the radiator and from bottom of the radiator to the pump. The pump is driven by a gear meshing with the crank-shaft cam-driving gear. The three gears, cam shaft gear, pump gear and crank-shaft gear, are all housed and protected by an

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aluminum casing in three sections outside of the crank box, in front.

FOOT BOARD PEDALS.

That at the left disengages the clutch, a small one in the middle works the throttle, while the large one at the right works the ordinary brake. The muffler cut-out is a plug-pedal worked by the driver's left heel. The front floor-board is removable, exposing the clutch and brake working members.

BODY DESIGN.

The body is the exclusive design of Mr. E. R. Thomas, and was described fully in our October number. It has creditable points of artistic lines, comfort and convenience which we will again briefly outline.

Special attention is given to planning the curves of the upholstering to fit the form, and so make the seats comfortable for long touring. Seats are wide and backs high.

Under tonneau seat and accessible by lifting cushions, is a space measuring in the clear 36 in. x 10 in. wide and 12 in. deep.

In tonneau, back of the forward seats is a space in which can be placed two suit-cases or it can be arranged in any desired way with drawers, shelves, lockers, etc. This space is closed in by a panel door with lock, it measures in the clear 27 ins. wide by 25 ins. high by 6½ ins. deep.

On the top of the baggage room is a rack 2¼ ins. high, 4 ins. long and 3 ins. wide in its widest place. In this can be placed canes, umbrellas, light wraps, etc.

In either door is a pocket in the upholstering and covered over securely by a flap, measuring 8 ins. high by 14 ins. long by 2 ins. deep.

Two thin pockets are made in the upholstering inside tonneau on either side in front of the seat. They will be found handy for many purposes, measurements 7 ins. by 8 ins, and in addition to these the two dashboard lockers previously mentioned.

This is the first example of careful utilization of body-space that has come under the writer's observation and it adds so much to the real value of the car to its user that it will no doubt direct the attention of all makers of fine cars to possible advances in this direction.

ON THE ROAD.

Although the Thomas 1905 4-cylinder "Flyer" is going through the shops regularly, and being shipped to purchasers every day, there are no Thomas 1905 cars at the works, because they are delivered to purchasers as fast as they are approved by the final tester, and the writer had only one opportunity to ride in a finished Thomas 4-cylinder car, and that was for a 40-minute spin over the good streets of Buffalo with two prospective buyers and the sales manager in the tonneau, and the writer in the front with the driver, and these circumstances precluded the possibility of anything in the way of hard work and "all-points" driving. This "demonstration" run was made about 2.30 P. M., Nov. 2, and was followed by a run from 4.30 to 6.30 P. M., from the Thomas shops on Niagara Street out to the river road, up to Tonawanda and from Tonawanda back to the shops on the boulevard, with Schultz, Thomas' chief draftsman, driving, and one other passenger. This ride was made in a new car, under test, with no body, tester's seats only, and no lamps, though most of the run was in the dark and over unlighted or very badly lighted roads, so that the writer, at least, was extremely glad to return, all in one piece, to the Niagara Street shops.

Schults is perfectly familiar with the 4-cylinder Thomas car, and handles it extremely well, and drives fast whether he can see the road or not, and as this was a family party, with no secrets from each other, the car was put through its paces with no favor shown, and responded creditably in every function.

The Thomas direct drive is very simple, very light for the power transmitted, and handles better than many other sliding gears in making changes. All engagements were effected readily and certainly, and the change most often made, that from high gear to forward intermediate speed, is always made silently, both up and down, and the tooth-rubbing, which is extremely offensive to the writer, was very slight in the other engagements.

The brakes are very powerful, and slide the rear wheels easily, and the car was under perfect control at all times by the spark, running on the low fuel charge as fixed by the minimum throttle opening, which was more than enough for speed on all fairly good roads. The route covered very few hills—none worth mentioning. With the slack cylinder charge the open muffler gave no exhaust sounds, showing the charge to be promptly fired and expanded down to atmosphere pressure before the exhaust valves opened, which is the ideal gas-engine performance.

The locked throttle is very convenient indeed. The throttle pedal, the small pedal between the two large brake pedals, can be depressed to any point up to maximum charge supply, and is held at any point by a fine-toothed retaining ratchet, the car-speed, of course, increasing as the charge volume is augmented, spark unchanged. A very slight depression of either brake pedal releases the throttle pedal, which at once rises to minimum throttle opening, placing the car on lowest fuel supply.

The car is very still, silencing perfect, and the locked-throttle and spark speed-control make easy work for the driver, who has both feet free.

Percy F. Megargel, of Rochester, N. Y., who ran the cycle and automobile exhibition in that city last March and later drove the Elmore "Pathfinder" six thousand miles through eleven States, has signed with the E. R. Thomas Motor Company, of Buffalo, N. Y., as advertising manager. Mr. Megargel, from 1898 to 1902, edited and published the cycling magazine "Sidepaths" at Rochester.

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