LITTLE THINGS DONE RIGHT ON

The Thomas Flyer

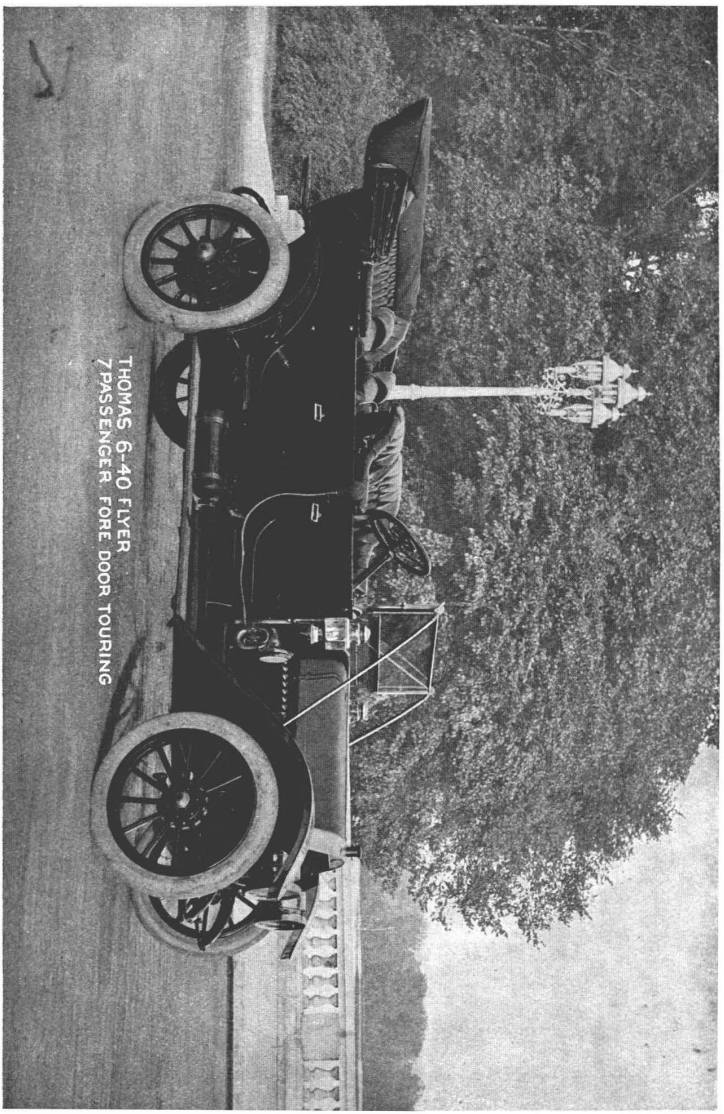
ALSO
SOME QUALITY
THAT CANNOT
••BE SEEN••

A BOOKLET

BY THE
ENGINEERING DEPARTMENT
IN WHICH SOME INTERESTING
MECHANICAL INFORMATION
CAN BE FOUND

1911

E. R. THOMAS MOTOR CO.
BUFFALO, N. Y.
BOSTON NEW YORK CHICAGO
LICENSED UNDER THE SELDEN PATENT


THOMAS 6-40 FLYER
7 PASSENGER FORE DOOR TOURING

SOME BIG FEATURES

BEFORE DESCRIBING THE "LITTLE THINGS DONE RIGHT"

The Advantage of Long Stroke

YOU have seen two men walking along the street, one, a big fellow who makes his four or five miles an hour with an easy swinging stride and apparently without effort. With him you have seen the little nervous man exerting himself tremendously to keep the other's pace.

The Long Stroke Motor does its work easily. It has the effortless action of the big man. The short stroke motor tries to make up by intense activity, in making many revolutions, what it lacks in design.

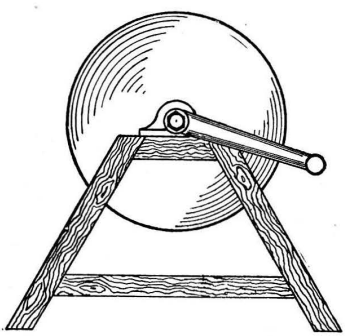
The Long Stroke Motor makes fewer revolutions in going a mile than a motor of short stroke, for, with two motors, one of $5\frac{1}{2}$-inch stroke, the other of 4-inch stroke and with *equal car* and *piston* speeds, the 4-inch stroke motor will make 37 per cent. more revolutions than the $5\frac{1}{2}$-inch stroke motor. As an illustration: When the piston of an "M" car is traveling at 1000 feet a minute, piston speed, and the rear axle gear is 3 to 1, then the motor makes 1092 revolutions per minute. When a car having a motor of 4-inch stroke is going at the same speed, the motor is making 1500 revolutions per minute and the gear has to be 4.12 to 1 to permit the engine's running at the 1000 feet a minute speed.

SOME BIG FEATURES

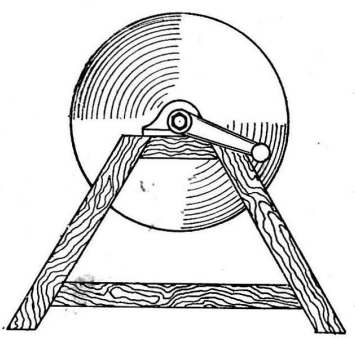
BEFORE DESCRIBING THE "LITTLE THINGS DONE RIGHT"

Long Stroke

In a long stroke motor the matter of leverage enters. When an explosion takes place over a $4\frac{1}{4}$-inch piston the downward pressure is about 5000 pounds or two and one-half tons. When the connecting rod is at right angles to the crank this pressure is about 2000 pounds. Here we have an action which may best be illustrated by two grindstones of equal diameter, one having a short crank, and the other a long one. Any one knows that for an equal push on both handles the long cranked grindstone will grind better than the other one.



"LONG STROKE"



"SHORT STROKE"

SOME BIG FEATURES

BEFORE DESCRIBING THE "LITTLE THINGS DONE RIGHT"

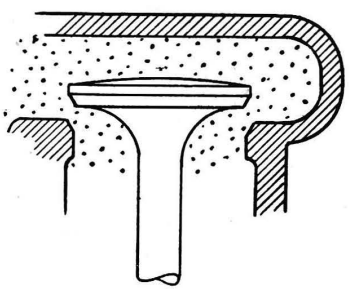
Large Valves

LARGE valves are to a motor what ample exits are to a crowded theatre in a fire panic.

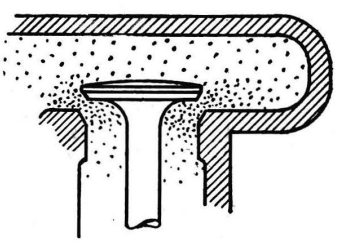
If the gas is choked by small valves on its way to the cylinder only a part of the gas enters that would otherwise get in, hence small valves decrease power. The "M" valves have an opening of $2\frac{1}{8}$ inches, which is half of the piston diameter. They measure $2\frac{5}{16}$ inches across the head.

The cuts illustrate roughly the crowding of the gas where small valves are used, as compared with the free entrance of gas with large valves.

The practical result has been that the "M" motor, which is 43.3 horse power by the A. L. A. M. rating, has actually developed on brake test at high engine speeds as much as 66 horse power. A rather remarkable performance.



LARGE VALVE
NO CROWDING OF THE GAS
FULL CHARGES TAKEN, IN



SMALL VALVE
WHATEVER GAS IS ABLE TO
SQUEEZE BY THE VALVE GETS IN

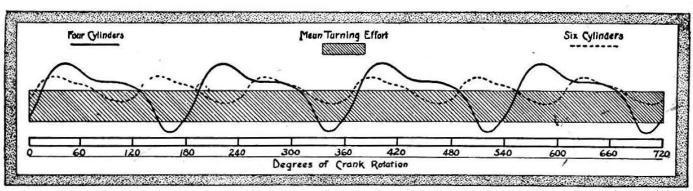
SOME BIG FEATURES
BEFORE DESCRIBING THE "LITTLE THINGS DONE RIGHT"

Six Cylinder Flexibility

YOU have probably seen sailors pulling at a rope, in the "all together" "Heave Ho!" fashion. Imagine yourself being in a passenger elevator which was hauled up in little jumps after the "Heave Ho!" fashion. In the sailors' pulling there is an *interval between efforts*.

In a *four* cylinder motor, one cylinder has *done* pulling, before another one takes up the work. In the *six* there is *no interval between efforts*. The power is continuous. A fresh cylinder is pulling *before* the old one gives up its work.

The diagram, from "Motor" illustrates the point. The best illustration is a demonstration.



Turning effort diagrams for four- and six-cylinder engines of the same total piston displacement.
It will be seen that the maximum turning moment, measured above the lower line of the shaded section, is much greater in the case of the four than in the six, and also that there are short periods of negative turning effort with the four. These great fluctuations are absent in the six.

LITTLE THINGS DONE RIGHT

LITTLE THINGS ON THOMAS CARS WHICH ARE NOT AT ONCE APPARENT TO THE CASUAL OBSERVER, BUT ON WHICH MUCH TIME AND MONEY ARE SPENT, TO THE END THAT THE SATISFACTION WHICH COMES FROM GOOD DESIGN, GOOD WORKMANSHIP, AND PAINSTAKING ATTENTION TO DETAIL, MAY BE WITH ALL THOMAS OWNERS.

QUALITY

THE difference between a high grade car and "the other kind" is *quality*. Much of this quality cannot be seen — but it is made manifest by performance, and by durability.

A few coats of paint make a spring of chrome-vanadium steel that has received a double heat treatment look just the same as a carbon steel spring of the "buggy" grade. The chrome-vanadium spring will last as long as the car lasts, but the cheap spring will break long before the car is old, and just how many replacements will be necessary no one knows because the cheap springs are not uniform; one is unlike another in quality.

It has been truly said that *the most expensive things in this world are those we get for nothing*. Were Solomon alive to-day, he would buy a Thomas.

LITTLE THINGS DONE RIGHT

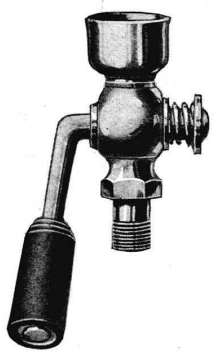
Chrome-Vanadium Springs

THOMAS springs are of chrome-vanadium steel, tempered and drawn in a bath of molten lead. No cheap carbon steel springs are used. The advantage of this high grade spring steel is that it will stand from five to ten times the number of shocks that the carbon steel spring will stand without breaking. We could make our springs of carbon steel for one-third to one-fourth the price we are now paying.

Water Jacketed Carburetor

TO really feed the engine with a gas instead of with drops of gasoline in air, the carburetor is furnished with a hot water jacket, and the copper tube carrying the hot water down to the carburetor is $\frac{3}{8}$ inches in diameter, so that the carburetor will be really hot in cold weather and so vaporize its gasoline. This water line is provided with a stop cock, and in hot weather the flow can be cut off.

The priming cups are made with fibre handles to prevent the driver from burning his fingers.

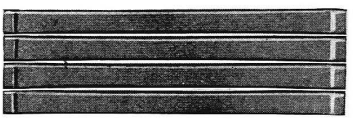


THE PRIMING CUP WITH THE COOL HANDLE

LITTLE THINGS DONE RIGHT

Cellular Radiator

The radiator is made of thousands of small *copper* tubes (copper is, next to silver, the best conductor of heat) individually produced and finally assembled. A leak in this radiator is repaired with more ease than in any other type. The water pipe is two and one-eighth inches in diameter; and the hose used in making connections is not common garden hose, but is made especially for hot water service.



RADIATOR TUBES SHOWING WATER SPACES

Neat Housing For Wiring

The high tension wires which go to the spark plugs are furnished by Bosch. The wire housing is designed to give these wires a neat, mechanical protection. It has been tested for condenser capacity by Bosch, and pronounced electrically right.

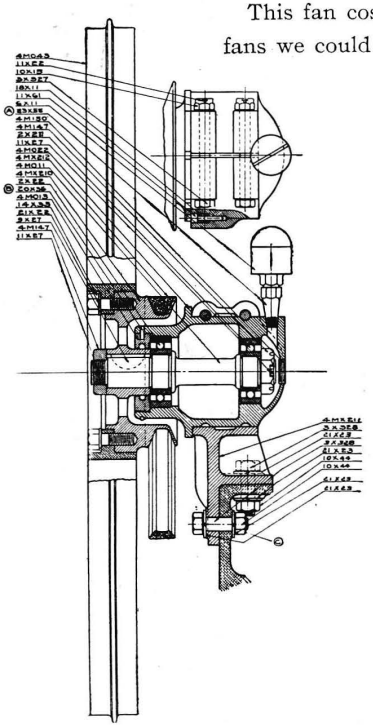
HIGH TENSION WIRE HOUSING

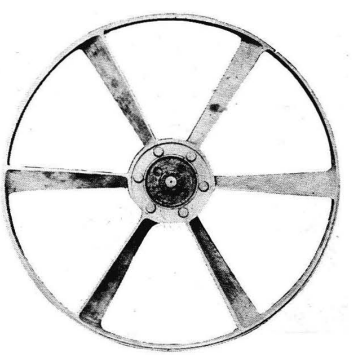
LITTLE THINGS DONE RIGHT

High Grade Fan

The fan is of cast aluminum with a protection rim around the entire outside. This fan has true helicoidal blades, and is carried on imported annular ball bearings. The fans of many cars are cheap stampings, without a protection rim and are frequently carried on plain bearings which need constant lubrication and attention. Even the fan belt which drives the fan has been carefully selected and is made of a "mineral tanned" leather which is not affected by water.

This fan costs us three times as much as some stock fans we could buy.





A FAN WHICH IS AS CAREFULLY DESIGNED AS THE PROPELLER OF AN OCEAN LINER

LITTLE THINGS DONE RIGHT

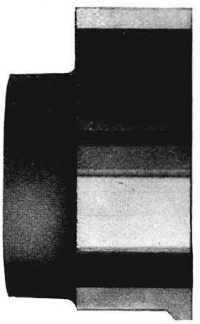
Perfect Cams

The cams which operate the valves, not only are milled, but are afterward hardened and ground to exact size on a special fixture made for a grinding machine. A wonderfully exact job.

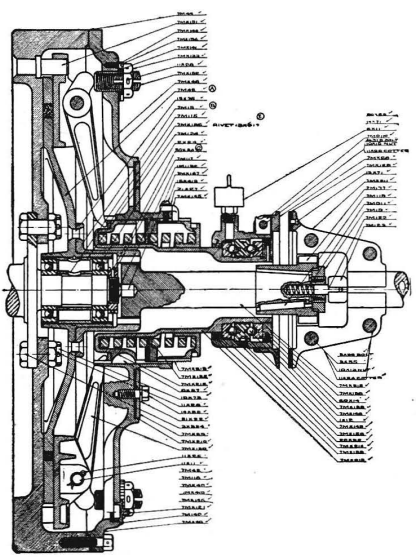
The engine gears are cut helical to reduce noise to a minimum.

The valves are not made of plain carbon steel but of a nickel steel adapted for this purpose. The nickel steel does not warp, and lose its shape.

The clutch thrust bearing, instead of being a plain bearing, needing frequent oiling, is a ball thrust bearing requiring the minimum of lubrication.



THE CAM
WITH MIRROR FINISH



A CLUTCH WHICH WILL STAND NOT ONLY USE BUT ABUSE
(Patented)

ONE OF THE ENGINE GEARS

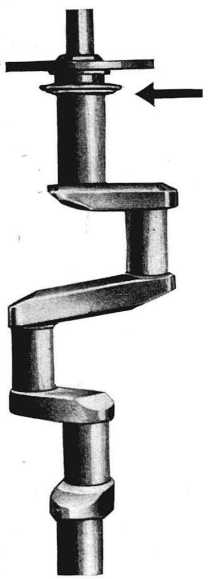
LITTLE THINGS DONE RIGHT

Forged Steel Fly-wheel

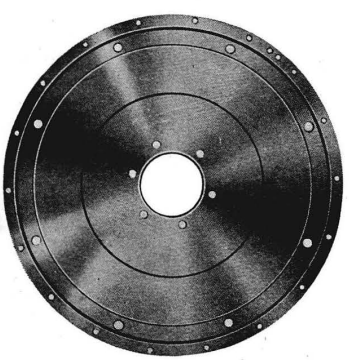
The rear end of the crank shaft is provided with an "oil slinger" to prevent all oil leakage at this point.

The fly-wheel instead of being made of cast iron is made of *forged steel*. It is well to note in this connection that the railroads will not draw trains at over 45 miles an hour when the cars have cast iron wheels. The Twentieth Century Limited runs on steel wheels. When a cast iron fly-wheel bursts it usually passes through at least two floors of a building, or one brick wall.

No fly-wheel accidents, or fly-wheel accident damage suits are possible with the Thomas "M."



THE ROUGH FORGING OF THE FLY-WHEEL



THE FINISHED FLY-WHEEL TURNED TRUE, AND BALANCED BOTH STATICALLY AND DYNAMICALLY

THE RUNNING BALANCE IS PERFECT

LITTLE THINGS DONE RIGHT

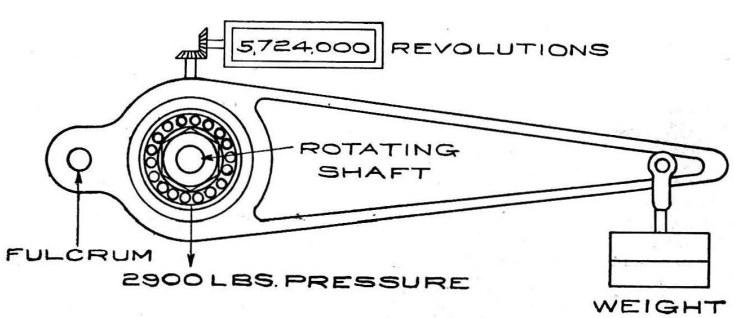
Gasoline Line

A reserve supply of gasoline is provided so that the motorist will not find himself suddenly without gasoline "miles from nowhere." An efficient strainer and sediment well is provided on the gasoline line, and the gasoline pipes are all made of copper. The gasoline pipe joints are formed by small unions of excellent design that may be disconnected again and again without damage; a "quality" job. In many cases, automobiles are provided with connections that will wear properly the first two or three times, but will leak thereafter.

GASOLINE LINE UNION

Ball Bearings of the Highest Quality

The transmission is provided with nickel steel gears, instead of the less durable and less expensive carbon steel gears; and the ball bearings used therein are imported. These bearings are selected without regard to cost, the selection having been the result of months of work with the ball bearing testing machine. In a car of "the other kind" bearings are usually selected on price as qualification. In testing two makes of bearings a bearing of one make went 50,000 revolutions before failing under double its rated load, while a bearing of another make of the same size and under the same load went 24,000,000 revolutions. The good bearing was 4800 per cent. better than the other.



THE BALL BEARING TESTING MACHINE

LITTLE THINGS DONE RIGHT

The Three-Disc Clutch

The clutch will stand tremendous abuse, and has the great advantage of an easy engagement which gives the smooth starting of an all-Pullman train. The Thomas patent three-disc clutch is much more expensive than the cone clutch so often found, and it costs more because it is worth more. The steering gear has spark and throttle control on top of the wheel; and the teeth of the sector for holding the spark and throttle levers in any position are covered by sheet metal protectors, so that the hands are never cut in slipping from the levers.

Simple Gear Shifting

The gear shifting is by selective rocking movement and can be done just as well in absolute darkness as in full daylight.

PROTECTION FROM THE SAW TEETH OF THE SEGMENT

THE SOLID BRASS HANDLE ON GEAR SHIFT AND BRAKE LEVERS

The handles on both the brake and gear shift levers are of solid brass, while the levers themselves are of drop forged steel. This construction results in durability and gives handles that are not only brass plated but are brass all the way through.

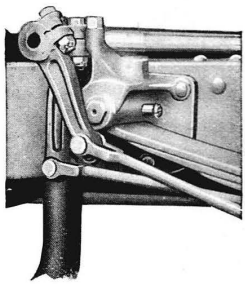
LITTLE THINGS DONE RIGHT

The spring clips are forged of nickel steel to make secure attachments of the axles to the springs. The ends of the springs are all provided with oilers, so that there is no excuse for the disagreeable squeaking that is sometimes heard in service when springs are not thus provided.

A rear axle of the full floating type is used in this car, since this is regarded as the best type of rear axle design. A semi-floating type of axle would be much less expensive but rather archaic. The entire car with the exception of the motor runs on ball or roller bearings. One need only try to push it unaided along the floor to find how beautifully frictionless the mechanism is.

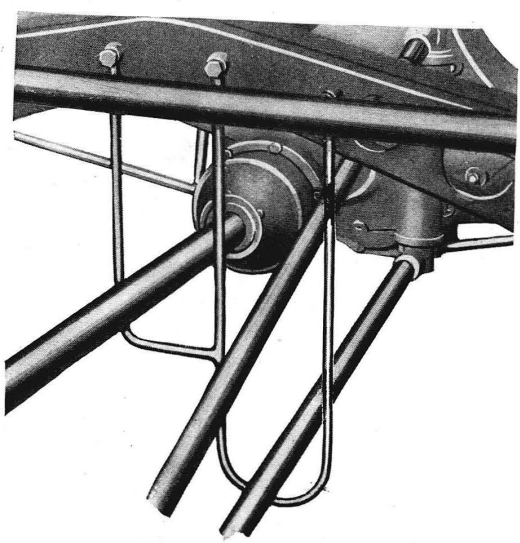
A safety loop is used to catch the driving shaft or torque member in case any accident should drop the front end. This is important, since such accidents are usually fatal.

Full-Floating Rear Axle



SHOWING ONE OF THE SPRING OILERS

The All-Important Safety Loop



THE "SAFETY LOOP" WHICH PREVENTS FATAL ACCIDENTS

LITTLE THINGS DONE RIGHT

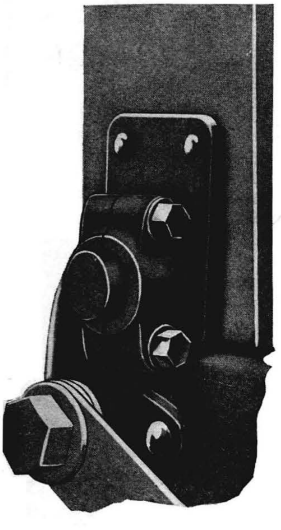
Two Sets of Ignition

Two complete and high grade sets of ignition are supplied — the Bosch DR 6 magneto and the Atwater-Kent timer. In most cars, if, for any reason, it is desirable to change the magneto timing, the magneto gear shaft has to be removed and the gears moved forward one tooth. This result in about a day's work. In the Thomas Model "M" a neat adjustment by cone clutch has been provided so that the magneto may be as delicately set as is necessary without removing any coverings whatsoever.

THE RADIATOR CAP

MAGNETO ADJUSTMENT

The radiator is mounted in ball and socket joints so that the traveling of the car over uneven ground does not tend to cause leaks. The radiator cap is covered with hard rubber to prevent burning of the hands, when it is necessary for any reason to unscrew this cap.

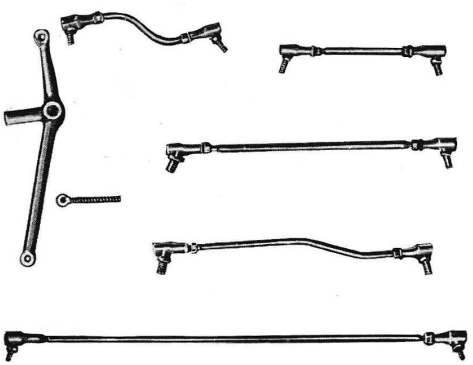


THE BALL AND SOCKET JOINT THAT RELIEVES THE RADIATOR OF TWISTING STRAINS AND SO PREVENTS LEAKAGE

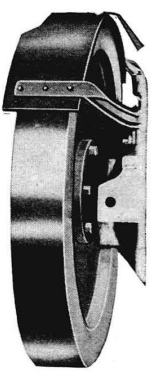
LITTLE THINGS DONE RIGHT

Ball and Socket Control Connection

The connections to all of the minor controls, such as spark and throttle, are made by small ball and socket joints, especially designed for the purpose. These joints are adjustable to $\frac{1}{360}$ of an inch, so that wear may be taken up, and the disagreeable looseness of feeling found on so many cars may be prevented.



CONTROL RODS WITH BALL AND SOCKET JOINTS



FLY-WHEEL OIL GUARD

Compression Relief

The engine is provided with compression relief which permits of easy starting. The fly-wheel is provided with an oil guard to prevent any oil from being thrown up against the floor boards. The fly-wheel is properly stamped to assist in registering valve timing. An indicator is placed on the crank case to assist in timing.

Adjustable Steering Gear

The steering gear is adjustable for wear, which is quite an unusual feature.

LITTLE THINGS DONE RIGHT

An Oil Can Holder That Will Last

An oil can holder that will last indefinitely is placed on top of the oiler itself. On many cars will be found cheap, stamped oil can holders which will stand service about ten times. The oiler itself is provided with a plunger so that oil may be ejected when the oiler is held pointing upward. After searching everywhere an oiler was found which would perform this unusual feat.

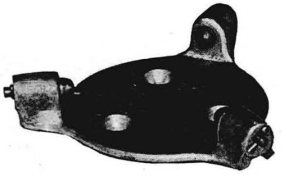
The Best Upholstery

We could buy our leather for 25 per cent. less than we pay for it and we could have it machine buffed instead of hand buffed, but we don't, for it is not as good.

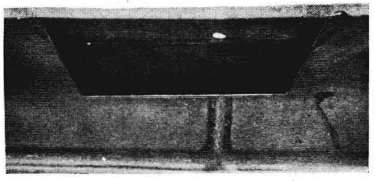
If we were easily satisfied, we could buy our small spiral springs for one-third their present cost.

We pay 25 per cent. more for steel castings and 250 per cent. more for engine bearings than we would if we were looking for something cheap. There is hardly a single piece on the whole car that would not cost us less if we were willing to sacrifice quality.

All of these features have cost money in engineering ability, and in manufacture. They have been done with the sole idea of building the best that could be built. The Model "M" car to-day is the highest grade car to be had in this country at any price. It is absolutely without a peer in its class. From the long stroke motor to low pressure muffler, every detail has been carefully worked out for the benefit of the man who drives.



AN OIL CAN HOLDER MADE TO LAST AS LONG AS THE CAR



REAL FIRE PROTECTION
A SEPARATE CATCH PAN AND DRAIN UNDER THE CARBURETOR

MECHANICAL FEATURES

Advantage of Long Stroke

THE "Four Inch Race" stirred up all Europe over the possibilities of the long stroke engine. The *new "long stroke"* will without question be the popular thing for 1911.

The advantage of the long stroke engine is that it *does not* have to *revolve so fast* to *deliver its power*. This can be illustrated by an example. The A. L. A. M. ratings of engine horse power are all given on the basis of a thousand feet a minute piston speed. The motor of four inch stroke would, in order to develop its A. L. A. M. rating, have to run at a speed of 1500 revolutions per minute. The *short stroke motor* in this case *runs at 37 per cent. higher speed* than the long stroke motor.

Another comparison can here be made. To drive the car at 30 miles an hour, the Model "M" *long stroke* motor *makes* 840 *revolutions per minute*, while the motor with the *four inch stroke* to give the same power would have to turn 1155 *times per minute*. When it is considered that to make a complete revolution, the piston has to be started from the upper dead center, stopped at the lower dead center, started from the lower dead center and stopped at the upper dead center, it will be seen that *fewer reversals* of the piston have to be made *with the long* than *with the short stroke* motor.

In other words, the *long stroke motor* will *wear* for a *longer* time than a *short stroke motor*. The *long stroke* motor *costs* much *more* to *manufacture*, since the cylinders are longer, the connecting rods are longer and the crank case is much larger in diameter, so that a number of *manufacturers* will *not* use the long stroke on account of *increased expense* to themselves.

Gas Passages

IN designing the Model "M" motor, advantage was taken of the very latest foreign practice regarding smooth gas passages and large valves. The actual diameter of the opening, in the clear, which carries the gas to the cylinders is $2\frac{1}{8}$ inches, which is *exactly half* the diameter of

the piston. The valve measures $2\frac{5}{16}$ inches across the head.

In order to provide for continuous running without local overheating, the *valve seats* have been *completely water jacketed*. The *valve stems* are also well *water jacketed*.

This *complete water jacketing prevents deformation* of either the valve seat or of the cylinder at the top of the bore. The necessity of large, smooth gas passages will be appreciated when it is stated that the gases travel through these passages at a rate of speed approximately three-quarters of a mile a minute.

The pistons are $5\frac{1}{2}$ inches long and are provided with four narrow rings.

The connecting rod is made $\frac{3}{4}$ of an inch longer than twice the stroke of the motor. Twice the stroke is usual.

The Bearings

THE user is always interested in the bearings. The bearings of the Model "M" have been made exceptionally large. The crank shaft is $1\frac{7}{8}$ inches in diameter, and is provided with four bearings. The total projected bearing area on the Model "M" crank shaft is 52.6 square inches, which is 30 per cent. greater than any engine which we have previously made.

This large factor of safety in bearings was allowed in spite of the fact that the New York-Paris car made its entire trip without an adjustment of an engine bearing.

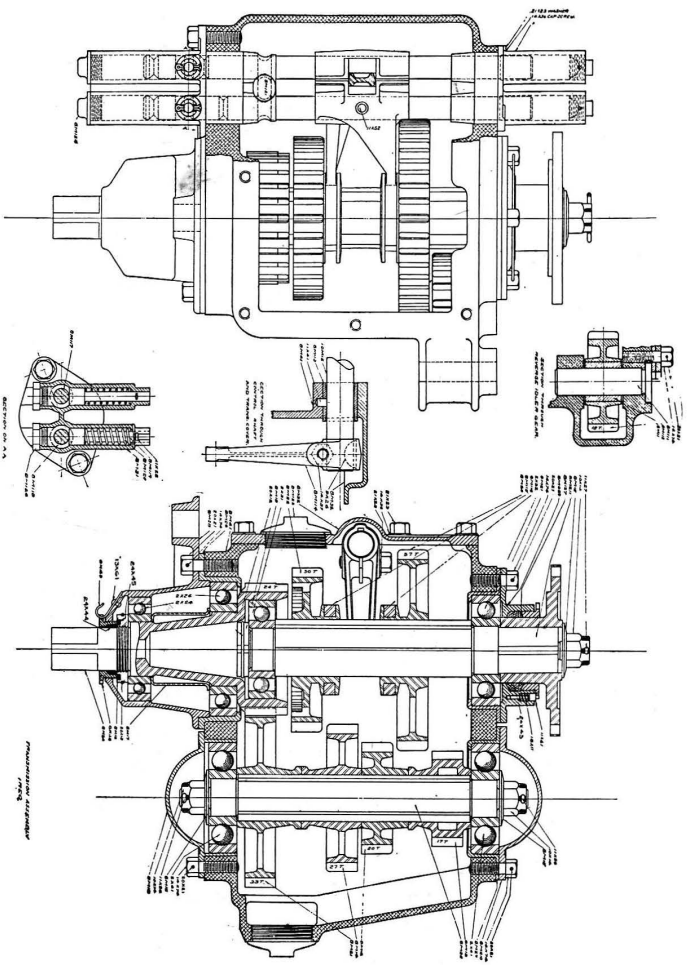
The bearings on the cam shaft give support almost to the point where the cams themselves are attached. Each cam shaft has bearings of 11.3 square inches projected area.

Plain bearings are used throughout the motor

Bushings of a high grade of babbitt are used on the crank shaft and on the big ends of the connecting rods. These bushings are easily renewed and are absolutely interchangeable.

The cam shaft bearings are of a bearing bronze which has been found to give good service for this use.

MECHANICAL FEATURES



"M" TRANSMISSION

MECHANICAL FEATURES

The Materials

THE materials used in the entire motor are the best that can be obtained.

The crank shaft is of a high grade of nickel steel and is heat treated by a drop forge company which has made a specialty of crank shaft manufacture for the past six years.

The connecting rods are of heat treated steel with the harmful elements of sulphur and phosphorus kept below four one-hundredths of one per cent.

Special piston ring iron is used for the rings.

The cam shafts are of nickel steel.

The gears are of steel and iron.

The connecting rod bolts are of nickel steel.

The fly-wheel is not of cast iron, as is usually the case, but of forged steel.

A fly-wheel accident will be impossible on the Model "M."

Quietness

THE question of quietness has received more attention than almost any other, since, other things being about equal, a quiet car is a quick selling car for the dealer.

With the phonendoscope, a nice little surgical device, the motor has been thoroughly investigated to see just where noise was caused in its operation. The Thomas Company is, we believe, the only company which has made use of this clever instrument.

To secure quietness on the Model "M" motor, we have gone to the expensive helical gear, which is in effect a gear with a "twisted" tooth. The experience of the past year has been of great value in indicating how a quiet helical gear should be made.

The valve stem clearance has been reduced about 50 per cent. by means of more accurate workmanship.

While a number of motors are quiet when originally purchased, this quietness, which in many cases is secured by the use of fibre gears, is of short duration.

MECHANICAL FEATURES

Workmanship

THE workmanship on the Model "M" motor is of the first quality.

The inspection has during the past year improved at least 100 per cent.

The drawings have also improved quite as much. A drawing now states, not only the diameter, let us say, of the piston in thousandths of an inch, but gives the allowable variations from this exact diameter; and the inspection department examines with micrometers, or micrometer fixtures, all of the engine parts. Some of the micrometer fixtures used, for example, in measuring the cylinders are of so excellent a character that they have been described at length in the "American Machinist." Cylinders are measured to one-half of one-thousandth of an inch.

Balance

THE necessity of balancing all rotating or reciprocating parts is often overlooked in cars of medium price.

In the Model "M" the pistons that enter the construction of any one motor are of the same weight.

The crank shafts are also balanced, while, of course, the fly-wheel receives the most careful attention.

In the balancing of the rotating and reciprocating parts, most automobile manufacturing concerns stop.

In the Model "M," however, the compression space of each cylinder is also measured, so that an engine is assembled with *equal compression spaces* in *all* of the cylinders.

Uniform compressions result in *uniform explosions* and the motor runs *free from vibration.*

An infinite capacity for taking pains is to-day the spirit dominant in the Thomas plant.

Clutch

THE patented Thomas three-disc clutch has been found to give excellent results in the past and is therefore used on the 1911 product. The Model "M" clutch, however, marks a step in advance over anything that has gone before. The clutch disc is carried on two

imported annular ball bearings so that a scarcity of lubricant will not cause dragging.

Few realize the manner in which the frame actually twists in service.

The preserving of a permanent, correct alignment between various power transmission elements on an automobile is practically impossible.

To make the "M" car right in this, and every particular, expense has not been spared. Between the clutch and the transmission are *two* universal joints of the internal gear type, which has been found to give such wonderful service on motor trucks where all other forms of joints failed.

The new clutch has all of the good features of the clutch previously used in that it is provided with cork inserts and has double adjustment.

One detail to be mentioned in this particular is that the clutch operation has been made much easier by cranking the cross clutch shaft, so that less foot pressure is required.

Transmission

THE transmission is, without much question, the most carefully designed gear box in any car of present make. Complete, it weighs 82 pounds, which is less than two pounds per horse power.

This transmission design has been a result of experience plus careful mathematics.

Not one of the imported annular bearings is overloaded, even when the wheels are slipped with full passenger load in the car.

Most transmissions are designed without the use of stress diagrams obtained by the methods of "graphical statics of mechanism."

There was as much work on the mathematical calculations of the "M" transmission as there was on its actual design. The transmission was designed to secure very short shafts and so have great rigidity.

The annular bearings of the countershaft are but $8\frac{7}{16}$ inches center to center.

MECHANICAL FEATURES

Six annular bearings are used in the transmission.

The gears are of nickel steel, heat treated by pack hardening in bone, allowing them to cool in the pot, reheating to between 1375° and 1425° and finally quenching in oil.

Rear Axle

THE rear axle is made by Timken. Its casing is of pressed steel.

Timken roller bearings are used throughout. The gears are four-pitch with three to one ratio. One of these axles has been used experimentally on a heavy car of much greater horse power. It has shown no signs of weakness in this service.

The front axle is made of nickel steel as are also the steering arms.

Springs

THE springs are of chrome-vanadium steel and the question of price did not enter into their selection. To them is partially attributable the wonderful riding qualities.

Electrical System

THE electrical system is likewise the best obtainable. The Bosch DR-6 magneto furnishes current for one set of plugs, while the very successful Atwater-Kent Unisparker supplies the current for the second set.

Engine Piping

THE engine piping is of drawn brass tubing and represents the best of the coppersmith's work.

Details

IT is usually the little things that mark the good car. Among the little things should be mentioned the new ball and socket joint for operating the magneto, carburetor and other minor controls.

This joint was most carefully developed after weeks of work. It is adjustable to $\frac{1}{360}$ of an inch.

The wiring has been carried in carefully designed housings.

The tool equipment has been obtained from the best

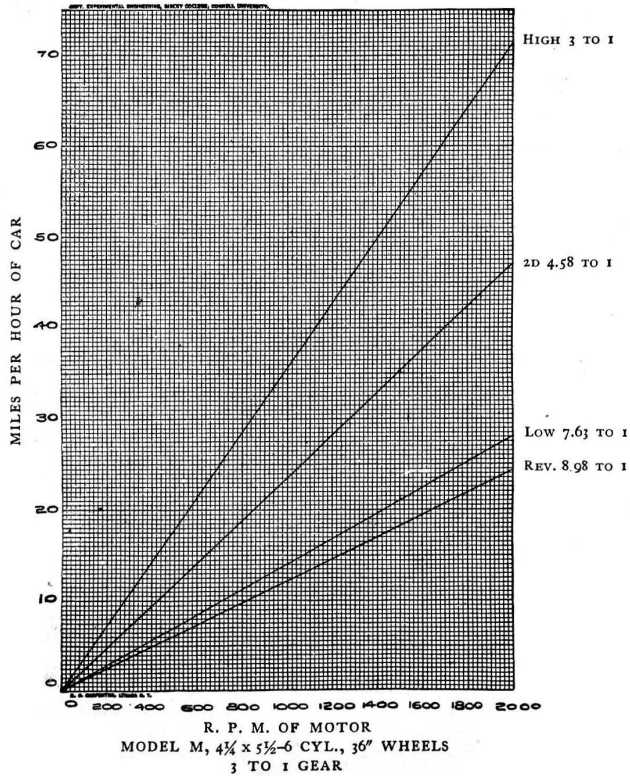
makers of wrenches, hammers, and other small parts in America.

The fenders and running board apron absolutely prevent any mud from splashing on the passengers.

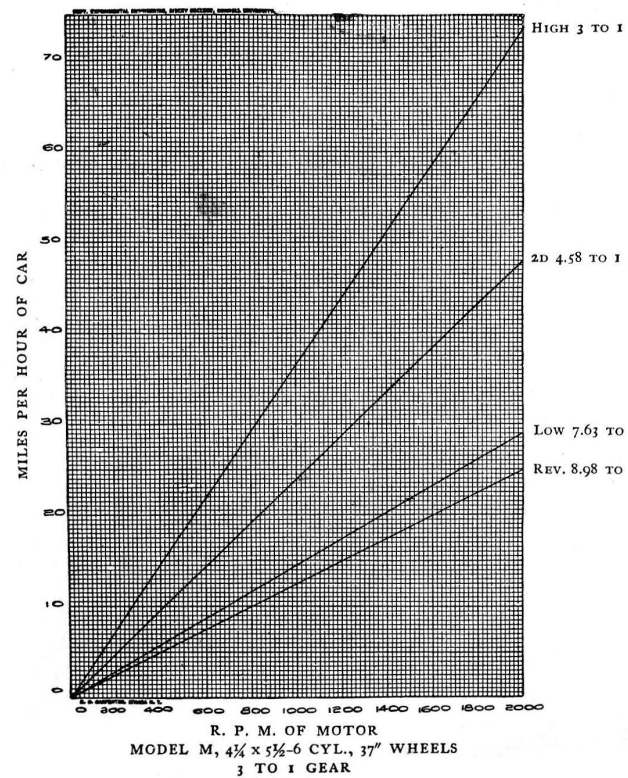
Few other makers of automobiles spend half the time or half the money in taking care of the details in fender construction.

Both in general design and in infinite attention to detail, the 1911 Model "M" is the peer of any car in the world's market to-day.

To find motor speed for any car speed, read vertically on left the car speed; keep along the horizontal line of car speed until the proper diagonal line is intersected, then from intersection read vertically down to corresponding engine speed. Each small space to the right reads twenty revolutions per minute.

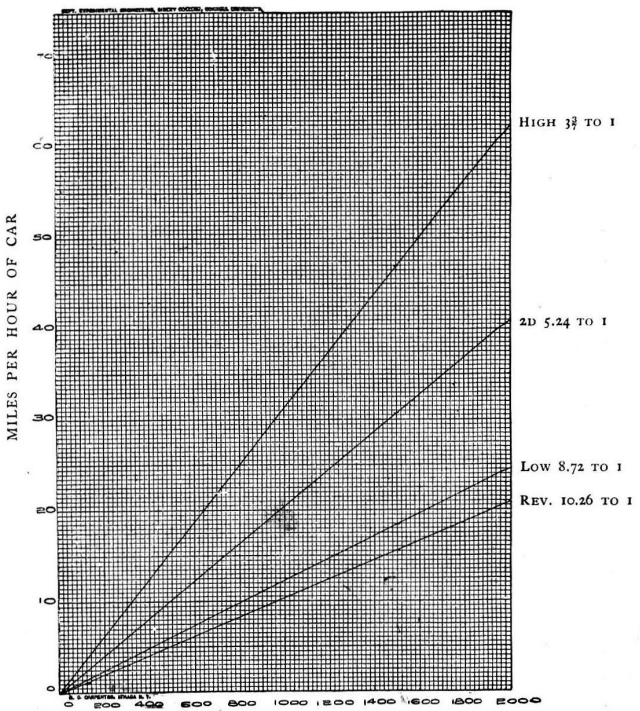


R. P. M. OF MOTOR
MODEL M, 4¼ x 5½-6 CYL., 36″ WHEELS
3 TO 1 GEAR

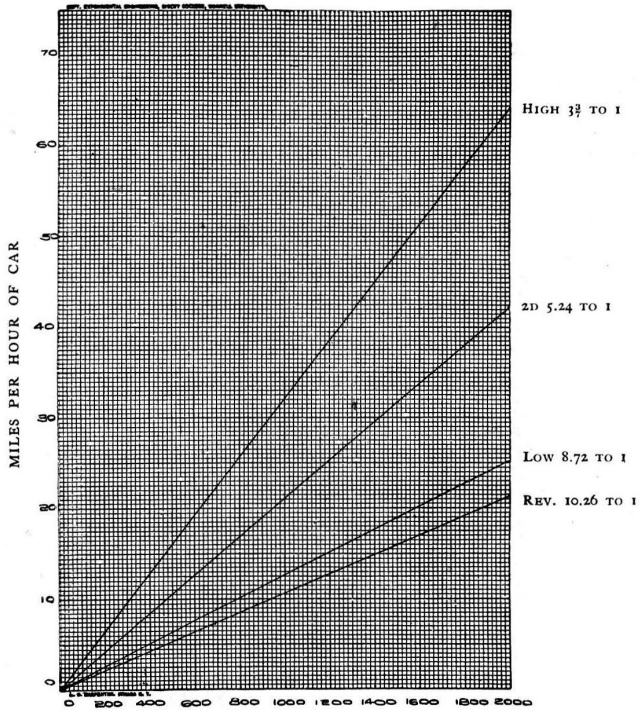


R. P. M. OF MOTOR
MODEL M, 4¼ x 5½-6 CYL., 37″ WHEELS
3 TO 1 GEAR

Example: Take chart showing 37″ rear tires and $3\frac{3}{7}$: 1 gear. Car speed, say, thirty miles per hour. On the horizontal line numbered 30, read to right until the diagonal marked "high" is intersected. From intersection read down to line "R. P. M. of Motor." The engine speed will be found to be 930 revolutions per minute. Thirty miles per hour on second speed gear would call for an engine speed of 1420 R. P. M.



R. P. M. OF MOTOR
MODEL M, 4¼ × 5½-6 CYL., 36″ WHEELS
$3\frac{3}{7}$ TO 1 GEAR



R. P. M. OF MOTOR
MODEL M, 4¼ × 5½-6 CYL., 37″ WHEELS
$3\frac{3}{7}$ TO 1 GEAR