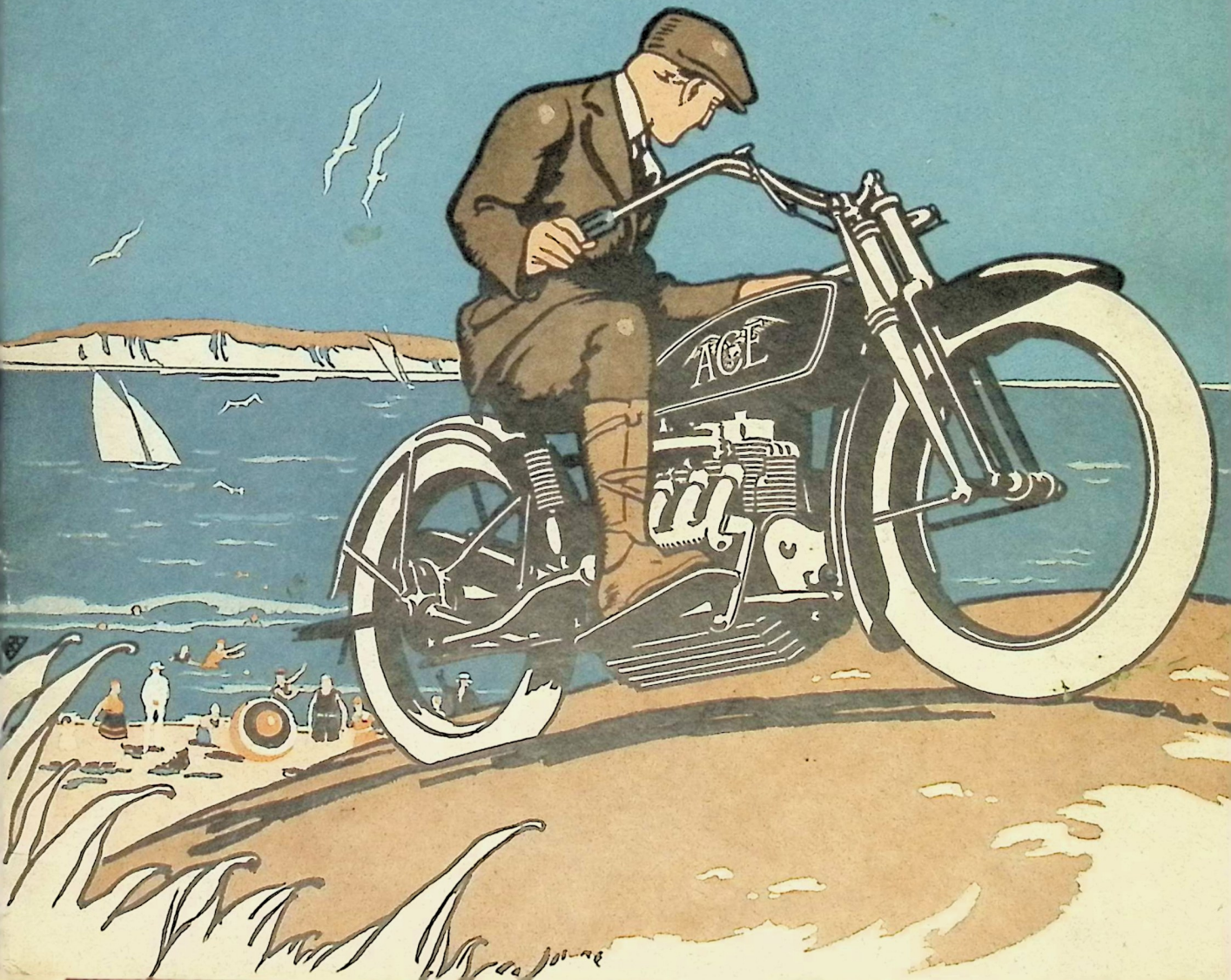
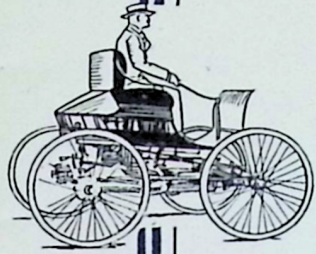


# ACE







## The Four Cylinder Motorcycle

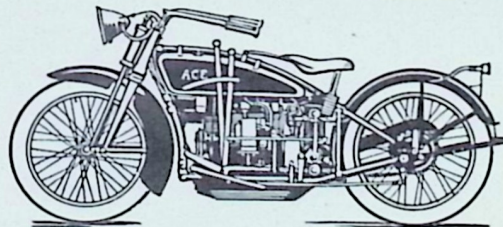
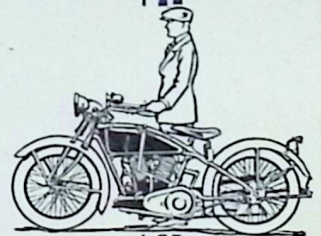
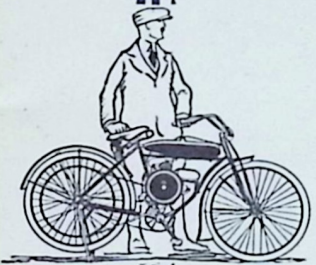


*THE day of the "four" is at hand. The past history and more recent developments in the motorcycle field proclaim this fact in terms that are undeniable.*

*Many of us saw the birth of the single cylinder, and later its withdrawal to give place to the "twin." In like manner most of us recall the appearance of the "twin." For years the two cylinder has held sway, answering, in a commendable manner, the motorcycle requirements of the day.*

*But time is inexorable with machines as with man. The human craves advancement—improvement. For the same reason that the "twin" replaced the single, so is the "four" replacing the "twin."*

*This development is not the work of designers or manufacturers; rather it is the answer to the incessant cry of the motorcycle rider for more controllable power—more comfortable speed.*



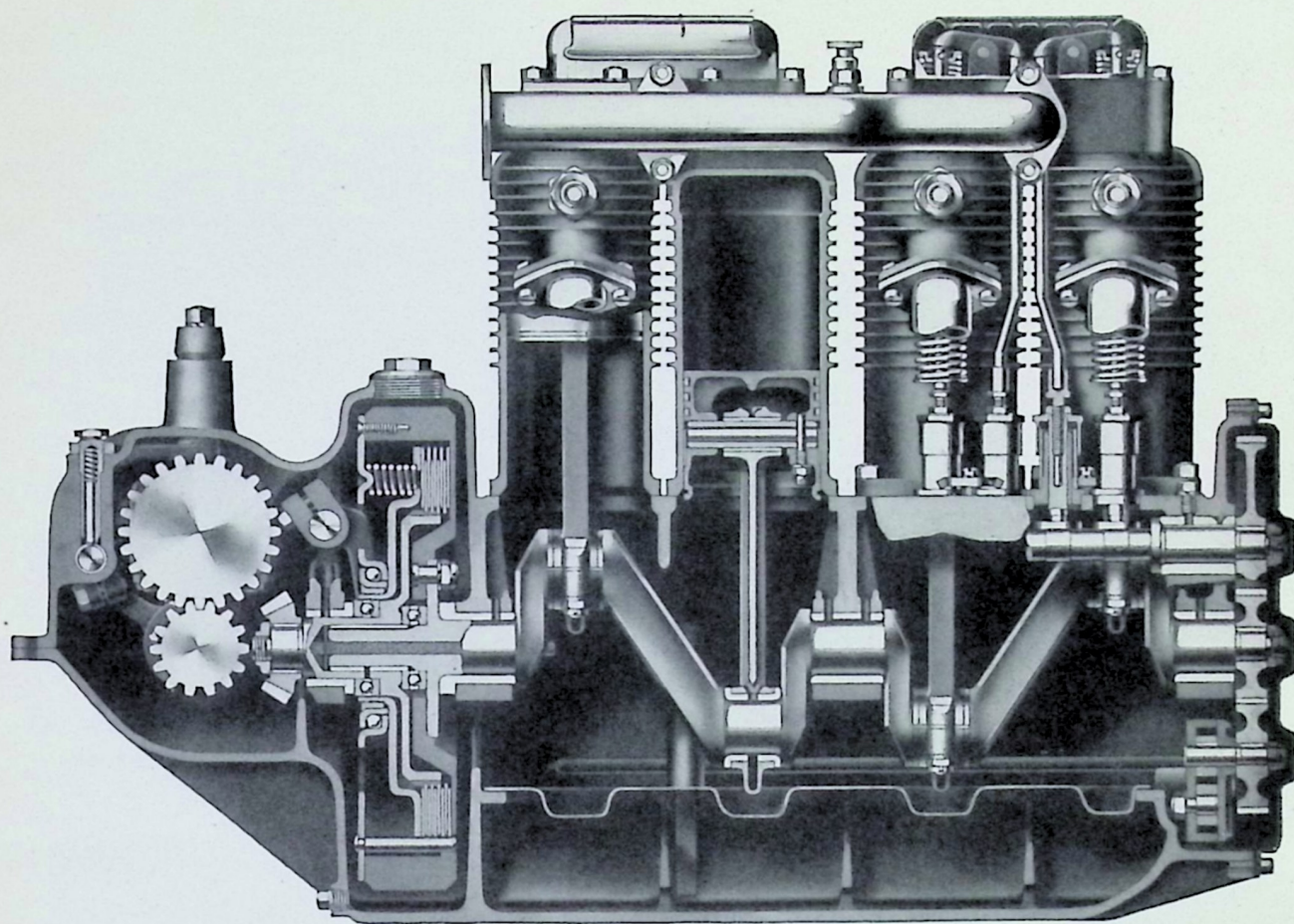
## *The ACE* Four-Cylinder Motorcycle

**S**LIGHTLY more than two years ago the Ace Four-Cylinder Motorcycle made its bow to the public. Immediately it attracted world-wide attention. The very appearance of the new machine told a story at once eloquent and convincing. In the graceful lines—in the deft design—of that wonderful mount, the motorcycle world at once recognized the hand of the master designer, W. G. Henderson.

For two years the Ace, like any new product, has been on trial. To test its strength it has been ridden across railroad ties; for speed it has been pitted against the fastest motorcycles in the world; to gauge its power it has been urged up the mountain-sides; across the continent—yes, across two continents—it has been driven to test its endurance.

The verdict, from the skeptic and the enthusiast alike, has been unanimous. In appearance, alone; in comfort and silence of operation, unequaled; in strength, durability, and flexibility, unmatched; in power and speed, unsurpassed. In the eyes of the riding public the Ace was recognized as the nearest approach to perfection yet attained in motorcycle manufacture.

The 1922 Ace embodies several refinements—changes in detail only—calculated to increase the already high efficiency of the machine. Chief among these improvements is the redesigning of the intake manifold. This change, in effecting a more direct and more centralized flow of gas, has resulted in bringing out in all its fullness the latent world of power and speed built into the Ace engine in the beginning.



### CRANKSHAFT

The crankshaft is a case-hardened drop forging, ground and polished to a high finish. It is mounted in three bearings of generous proportions. The front bearing is  $1\frac{1}{4}$ " long; center bearing,  $1\frac{1}{2}$ ", and the rear bearing,  $1\frac{1}{2}$ ". Each bearing is  $1\frac{1}{8}$ " in diameter. The big end bearings of the connecting rods are  $1\frac{1}{8}$ " in diameter and  $1\frac{1}{8}$ " long. All bearings are of bronze, lined with babbitt. Connecting rods are of the I-beam construction.

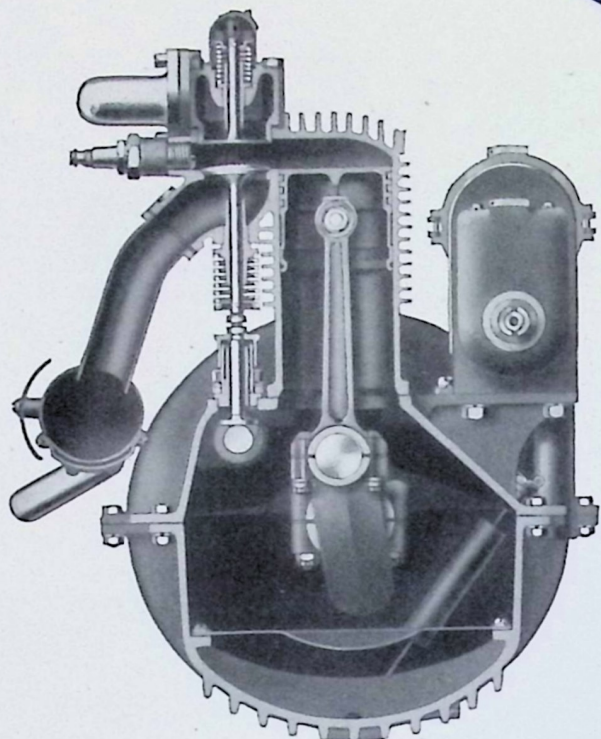
### CRANKCASE

The crankcase is aluminum, cast in two parts. The bottom of the crankcase is ribbed longitudinally on the outside and crosswise on the inside. These ribs answer a double purpose, serving to protect the machine against injuries from rocks or projections, and at the same time keeping the oil in the sump cool. Three drain plugs are pro-

vided, placed in horizontal positions, where they cannot be broken off. One drains the crankcase from the rear, another from the side, while the third drains the gear case, which is cast integral with the crankcase.

### CLUTCH

The clutch assembly is extremely strong and simple. The clutch proper, contained in the fly-wheel, is of the steel disc type. Being exposed in the transmission case, it runs in a constant bath of oil. There are three large inner and four large outer discs, providing sixteen working surfaces. Three sets of large chromium steel ball bearings carry the thrust strains. Sixteen compression springs are arranged around the rear of the clutch plates, insuring a firm, even pressure. The working strains are thus evenly distributed, making the stress on any part comparatively light and rendering breaking practically impossible.



### VALVES

The valve arrangement, with inlet directly over exhaust, provides a compact combustion chamber, which, in preventing a spread-out charge, makes possible quick ignition and the consequent snappy, positive action of the motor. The spark-plug points are well within the inlet chamber, where they are constantly swept by the incoming charge.

The valves are large, being  $1\frac{1}{2}$ " in diameter, and have a lift of  $\frac{1}{4}$ ". The valve cages are separate castings made in pairs, each cage being fastened to two cylinders. Each valve cage has one intake passage, an arrangement which simplifies the construction and facilitates the handling of fresh gases.

### Valve Mechanism

Above each cage are located the rocker arms. The arms work on a hardened steel pivot pin, centered between each pair. The pivot pins are mounted in replaceable supports, so that in case pin works loose it is only a matter of inserting a new support. Inlet and exhaust valve tappet guides are of generous proportions and provided with efficient oil-returning devices, which contribute greatly to the cleanliness of the motor.

### Valve Bonnets

The complete intake valve mechanism is enclosed within pressed steel bonnets. The valve

bonnets are a most desirable feature, since they exclude absolutely the dust and dirt which otherwise would combine with the oil, forming a grinding compound and playing havoc with the valve parts. Each bonnet is equipped with a spring snap lid on the front side, covering a long slot in the bonnet. Upon lifting the lid with the fingers, the gap between the inlet valve and rocker arm can readily be inspected and the rocker pins generously oiled.

### STARTER AND TRANSMISSION

The starting device is in itself an example of the scientific simplicity of the Ace Motorcycle as a whole. Though not unusual as regards type, it is so constructed as to be exceptionally strong and positive in action.

#### Engagement

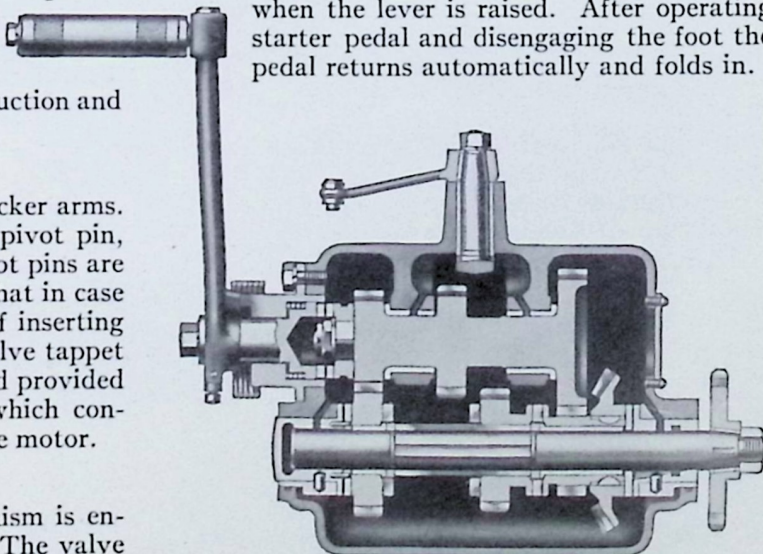
Engagement is secured by means of eight ratchet teeth integral with the end of the driving shaft. The driving shaft is supported in a double bearing, both shaft and bearing being hardened and highly ground.

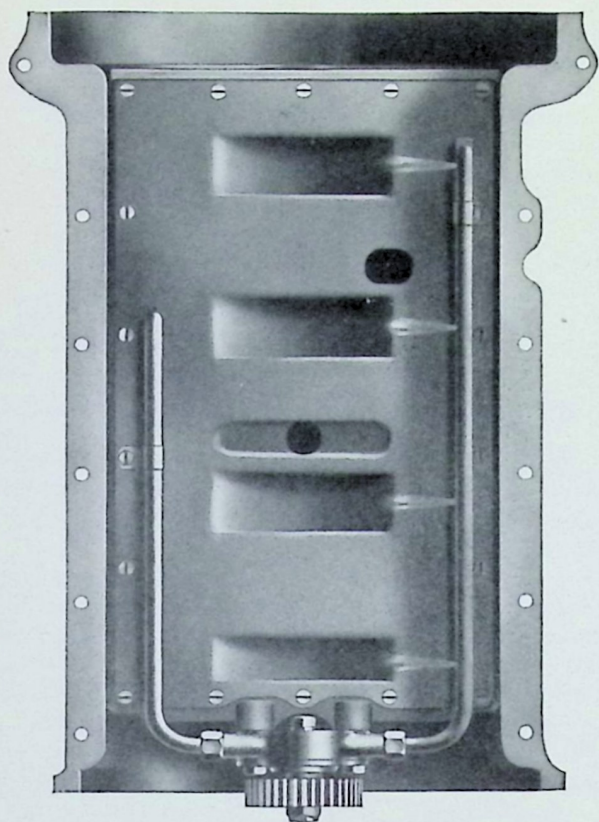
#### Ratchet Teeth

A particularly noteworthy feature of the Ace starter is the ratchet teeth. They are sloped inward on their working surfaces at an angle of 12 degrees, so that their engagement is always positive, eliminating entirely any possibility of slipping or breaking.

#### Operation

A four-coil spring forces the teeth into mesh on the first downward stroke of the crank-lever. A cam on the outside of the case draws them apart when the lever is raised. After operating starter pedal and disengaging the foot the pedal returns automatically and folds in.





## LUBRICATION

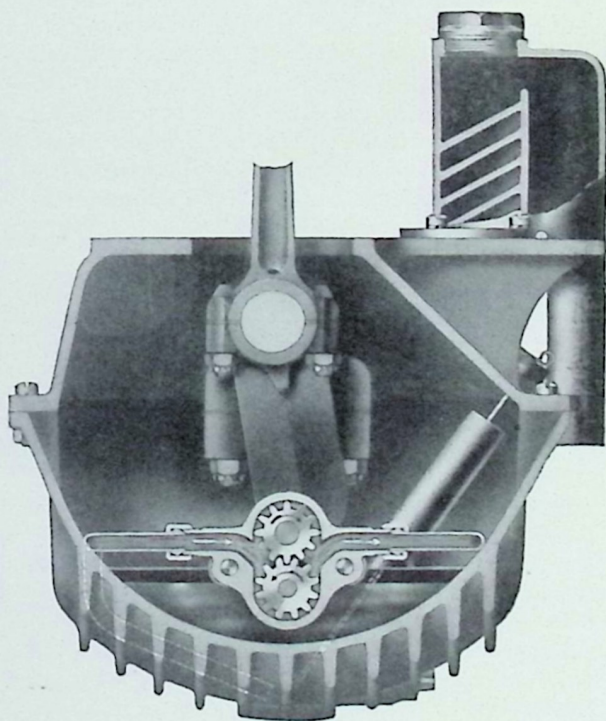
Lubrication is by the splash system, similar to that employed on automobiles. All oil is contained in the sump at bottom of crankcase. A false bottom in the crankcase made of pressed steel is indented below each connecting rod. These indentations or cups are kept constantly filled with oil by means of a gear pump driven by the timing gears. Each connecting rod is provided at the lower end with a scoop which picks up a supply of oil on the downward stroke and sprays all moving parts as the connecting rod ascends. Lubrication of the main bearings is accomplished by means of a large oil cup formed in the casting with holes to lead the oil by gravity to the bearing surface. A counter-sink in the upper end of the connecting rod, with drilled passage, oils the wrist-pin. Timing gears and transmission are lubricated by constant splash from the crankcase. The valve mechanism is oiled by raising the snap cover on side of valve bonnets and spraying parts with the priming gun. After all working parts have been surfaced with oil, the superfluous oil is returned to the crankcase by means of an outlet in the center of the oil pan. The capacity of the oil sump is two and one-half quarts.

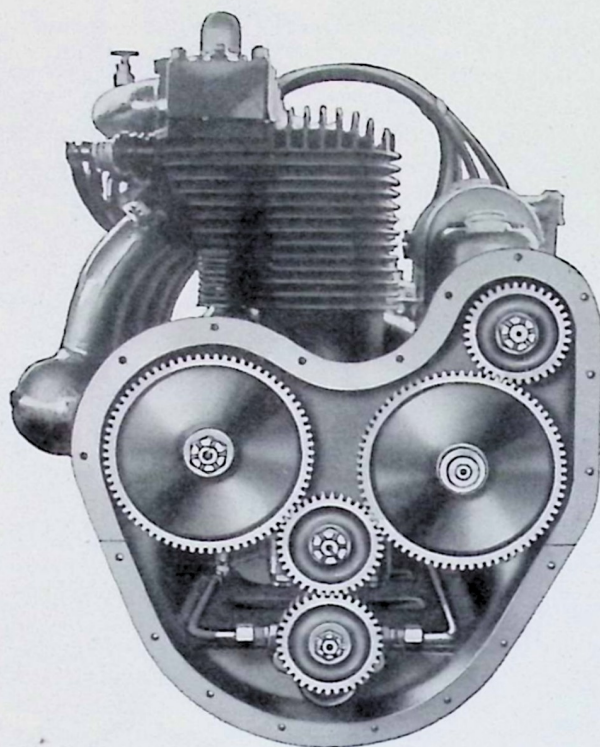
## OIL GAUGE AND BREATHER

The oil gauge consists of a notched rod, which dips down into the sump. The end of this rod is provided with cap attachment, and the rod itself may be withdrawn in an instant, disclosing on its notched surface the level of the oil in the sump. To the left of the crankcase is bolted the breather. This consists of a filler, a baffling device for preventing oil being forced out of motor, and a long air pipe extending well down along the crankcase.

## COMPLETE, PRACTICAL, CLEAN

The practicability of this system, used for years on the automobile, is beyond question. Its improvement over the old systems is evident to every rider of a two-wheeler. The perfect, uniform lubrication of all working surfaces, the elimination of oil tank and all outside oil connections, the absence of small oil passages, with constant danger of clogging the system, make for an efficiency, a cleanliness, long looked for by the motorcycle rider.





### TIMING GEARS

The outstanding features of the Ace timing gears are simplicity and perfect workmanship. Every one of these gears is cut on a Fellows Gear Shaper, the teeth being generated. The two large gears, the cam-shaft gear and the idler gear, are drop forgings; the other gears are of cold rolled steel case hardened. The large drop forged gears are heat treated for toughness and wearing quality.

The result of this wonderful simplicity, this watch-like precision, is a uniformity of construction that absolutely insures perfect, positive meshing at all times. Then, too, these finely formed gears, meshing perfectly and running in a constant bath of oil, make for a quietness of operation that is almost unbelievable.

Another feature that the rider will welcome is the easy access to the entire gear mechanism. Without disturbing the motor in the frame, the gear cover can be easily removed, exposing the whole works. Silent, simple, sure, the Ace timing gears are another example of the painstaking precision that marks every operation of manufacture in the construction of the Ace Motorcycle.

### MANIFOLDS

The intake manifold is made in one piece, but has two compartments: one, the gas chamber from which the fuel is fed directly to the two valve intakes; the other, the pipe leading from carburetor. Hot air is supplied to carburetor by means of a pipe leading fresh air through the hot flames of the exhaust manifold up into the carburetor chamber.

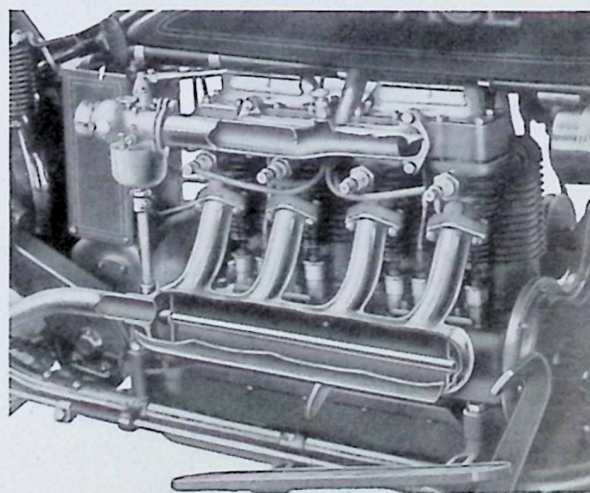
### HOT SPOT

The inlet manifold is equipped with an auxiliary heating device in the form of two small copper stampings. The stampings extend from the inlet manifold web to the rear of the valve cage, thus conveying the heat of the valve cage to the manifold. Copper being an excellent conductor, the heat is quickly transferred into the manifold casting.

In preventing condensation of the gas after entering the intake manifold, the Hot Spot facilitates vaporization. This results in not only more power from a given amount of gas, but also in the elimination of unburnt fuel or carbon with its attendant bad effects on engine and parts.

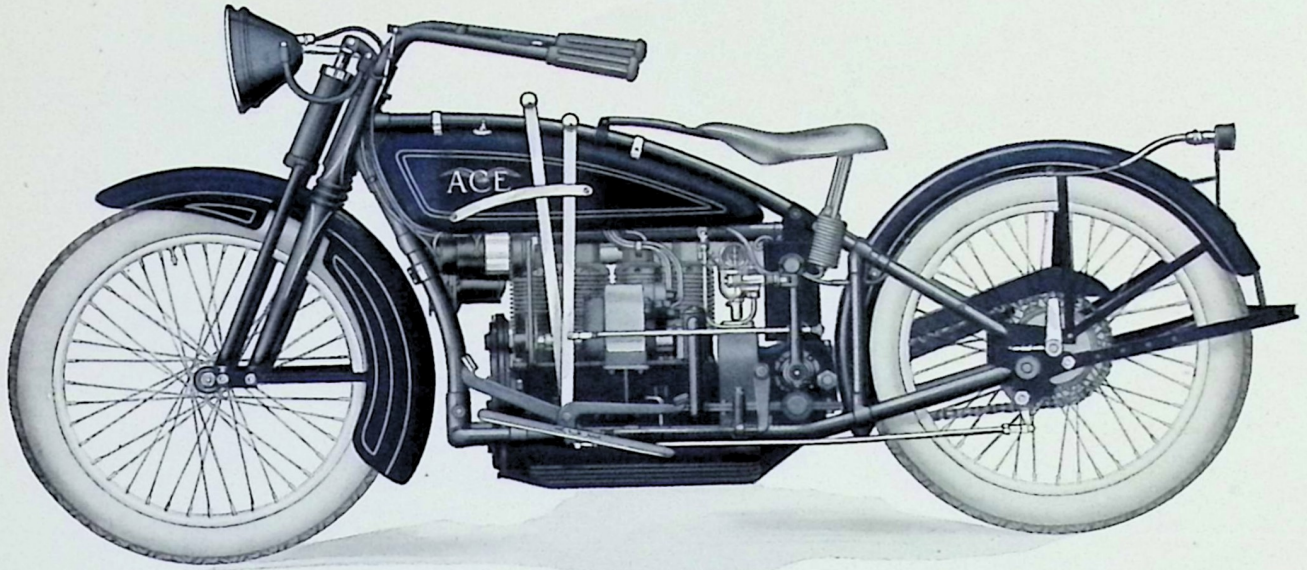
### DISTRIBUTION OF GAS

In order to insure an equal amount of gas reaching each cylinder, the fuel feed pipe leading from carburetor enters directly in center of manifold proper. The cylinders are set in pairs, there being two gas inlets, one to each valve cage. Consequently, on entering the central point of manifold the gas travels equal distances to each intake, resulting in an absolutely equal distribution to each cylinder.



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ACE



## ELECTRICAL SYSTEM

Following out the principle of completeness characteristic of the Ace, the electrical system employed is absolutely the best that money can buy—best from the standpoint not only of quality of parts, but also of simplicity of construction and operation.

The Ace electrical system is made up of two units—one for ignition and the other for lighting and horning. The equipment comprises Splitdorf generator, Wico wet battery, Simms magneto, head and tail lamps, and Klaxon motor-driven horn.

### Ignition

Ignition is secured by means of the Simms magneto, known throughout the world for its reliability. The weather-proof magneto is located within the line of the gear shift rod, entirely out of the way and well protected from road splash.

### Battery

Electric current for lighting and horning is supplied by a storage battery. This battery is in turn kept charged by an automatic generator operated direct from the motor and entirely independent of the magneto. The battery is mounted in a substantial box suspended from the frame directly under the saddle. This location is ideal, inasmuch as it evenly distributes the weight of the battery and at the same time makes it readily accessible—it being possible to remove the lid and draw out the box for filling without removing the terminals.

### Generator

The Splitdorf generator needs no introduction to the motorcycle rider. The drive is composed of two black fiber sheave wheels and a round leather belt. In order to facilitate assembling, the large sheave wheel is split and clamped to magneto shaft by means of filister head screws. The generator is mounted well forward just in front of cylinders underneath the tank, where it is high and dry and well away from heat of the motor.

### Horn

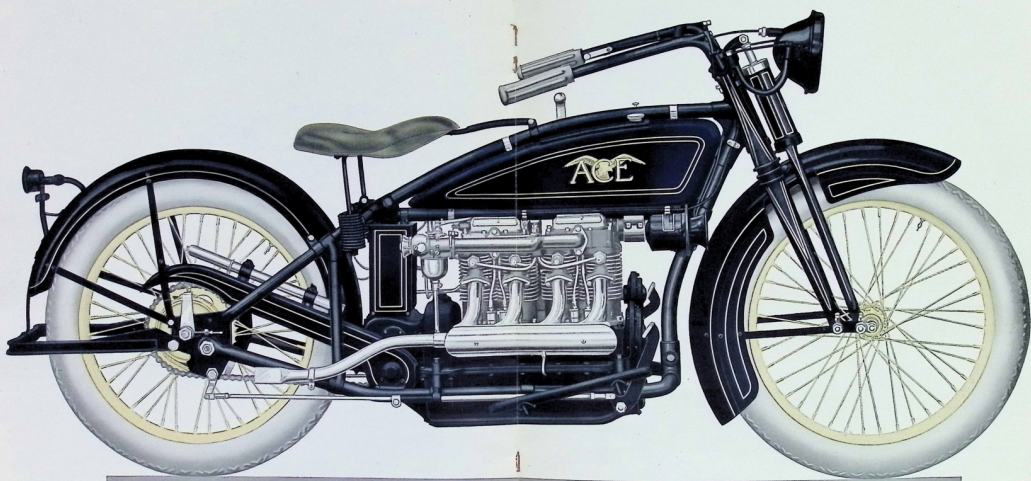
The horn is the well-known Klaxon, motor driven. It is located under tank opposite the generator, affording a balanced appearance and an even distribution of weight. Horn bracket is securely clamped to frame, and the horn button is fastened to handle-bar in a convenient position just ahead of the left grip.

### Lights

Headlight is nicely formed, adding to the general good lines of the machine. It is mounted on two cold-rolled steel brackets, bolted to lugs provided on handle-bar forging. The lamp is stabilized by means of two braces extending from lamp to bars. Headlight is fitted with 20-candle-power bulb, and tail light with 2-candle-power bulb. Both lights may be operated singly or together from a switch conveniently mounted on the side of battery box.



ACE FOUR-CYLINDER MOTORCYCLE



"THE FINEST THING ON TWO WHEELS"

[EIGHT]

[NINE]



### FRONT FORK

A glance at the construction of the front fork will give you an idea of the superstrength and ideal construction of this all-important member. The fork stem is mounted in unusually large chromium steel ball bearings with cups set in the frame head.

Springing is obtained by means of a compression and recoil spring enclosed in the plunger cylinder. These specially designed springs are the result of exhaustive tests, and assure a firm but smooth action. The auxiliary fork—mounted on strong rocker arms to rear of front axle—receives the road shock, which is taken up by the compression spring in bottom of plunger cylinder.

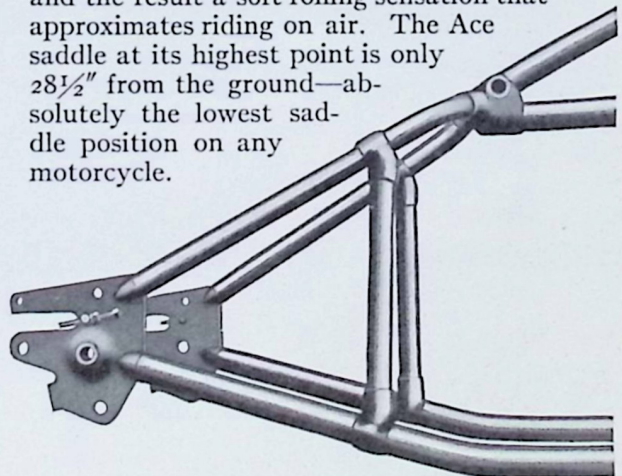
The rebound is absorbed by the recoil spring in upper end of cylinder. The fork proper, resting on rear end of rocker arms and connected at top with plunger arm, is completely insulated from any direct road shock—a construction which insures a smooth, rolling sensation at any rate of speed.

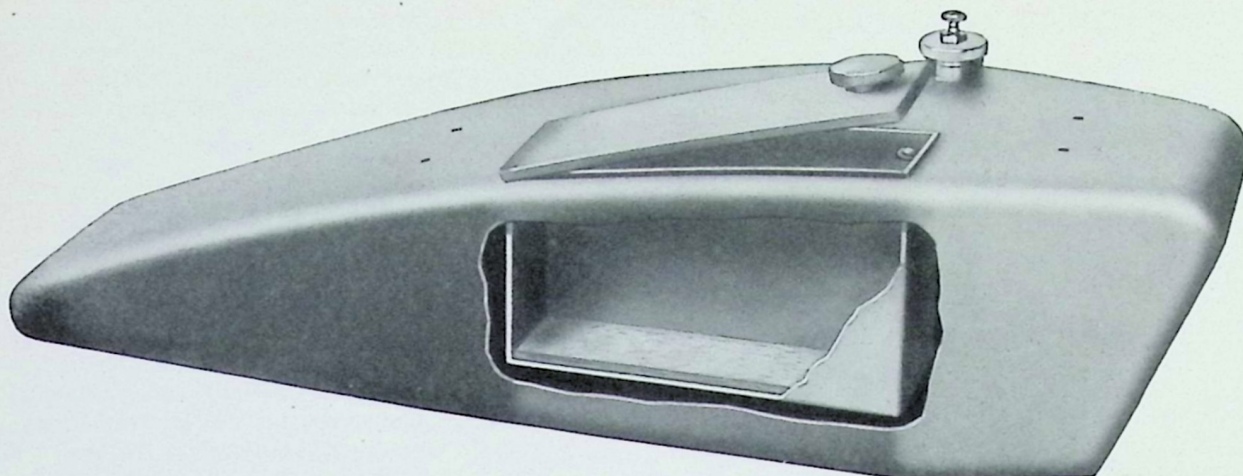
### FRAME

The well-set-up appearance of the Ace frame suggests at a glance its sturdy construction. Note particularly the exceptional diameter of the front drop bar. This bar, a point subjected to continuous strain, is of  $1\frac{3}{8}$ " 11-gauge steel tubing amplified to withstand any degree of strain placed upon it. To further insure against breaking at this most important point, a reinforcement of heavy gauge steel tubing is pressed into the front drop bar. To the rear of the saddle, joining the rear fork and cradle bar, are two steel trusses. These trusses not only strengthen the frame tremendously, but they stabilize the motor, preventing a vibrating action between the motor and the frame. Parts, such as fork head and joints, are all of steel drop forgings, giving to the frame as a whole exceptional durability without incorporating excessive weight.

### SADDLE

The Ace saddle is of special construction, hygienically designed to fit the pelvic bone. The pivot being well forward on the frame, the arm is consequently long, thus giving the nose as well as the rear of the saddle resilient action. A triangular shaped steel wire reinforces the base of the saddle, insuring absolutely against breaking, and at the same time preserving the resiliency of the seat. The seat is mounted on what we consider an ideal spring construction. The spring coils, large and strong, in their natural position, instead of being closely wound, are separated slightly from one another. This arrangement makes bottoming impossible and minimizes rebound by taking up the recoil in the gradual closing of the "broken-down" spring coils. The construction is extremely simple, and the result a soft rolling sensation that approximates riding on air. The Ace saddle at its highest point is only  $28\frac{1}{2}$ " from the ground—absolutely the lowest saddle position on any motorcycle.





### TANK AND TOOL BOX

An attractive feature of the Ace is the stream line tapered tank. The elimination of tool box on top of tank gives a rolling, unbroken line, which, with the tapering sides, makes for a degree of grace that adds wonderfully to the general appearance of the machine. Tank is  $8\frac{1}{2}$ " wide,  $26\frac{1}{2}$ " long, and has a capacity of approximately four gallons.

This beauty of line is, moreover, augmented by a feature of convenience—the arrangement of the tool box inside the tank. The tool box is made of extra heavy steel tin plate, making it exceptionally durable. In the bottom of the tool compartment is a thick cushion of felt. This design seems to answer admirably the location of that heretofore ungainly box, inasmuch as this new arrangement affords a most practicable, durable and readily accessible tool compartment—'way out of sight, yet right within reach.

### GUARDS

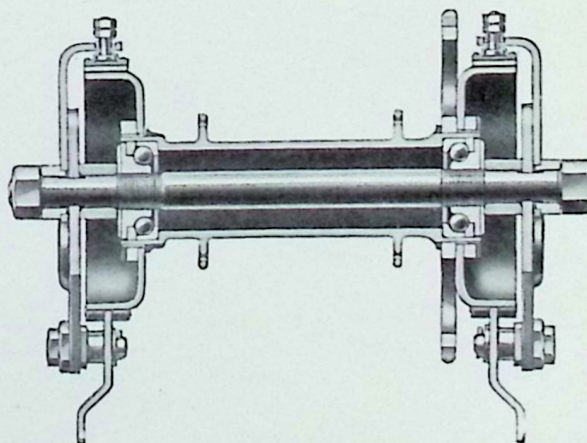
The guards on the Ace have been designed to afford the rider the greatest degree of protection without offering too great resistance to the wind. Particularly noteworthy is the construction of the front guard. On this guard the side plate in front of fork drops inward and down to carry the water into the wheel rather than onto the rider's feet. The rear portion of the front guard is made to slope outward, to give fullest protection against mud, dust, and water from the wheel.

Rear guard can be tilted forward to allow easy removal of rear wheel. Both front and rear guards are of full crown construction.

### BRAKES

The auto type system of braking on the Ace is a feature worked out with the safety of the rider in view. Instead of one brake with inside and outside action, the Ace employs two distinct auto type brakes contracting externally and operating independently—one on each side of the rear hub. The service brake is operated from pedal conveniently located adjacent to right foot rest. The emergency is controlled by a heel lever, located close to left foot rest.

Either brake may be effectively and conveniently operated without removing entire foot from rest. Balls, cups, and cones are of chromium steel. Drums are of generous diameter; bands are efficiently lined with the best grade asbestos, tending to give the brakes unusually long wearing qualities, thus offering a double safeguard to the rider.



## POWER AND SPEED

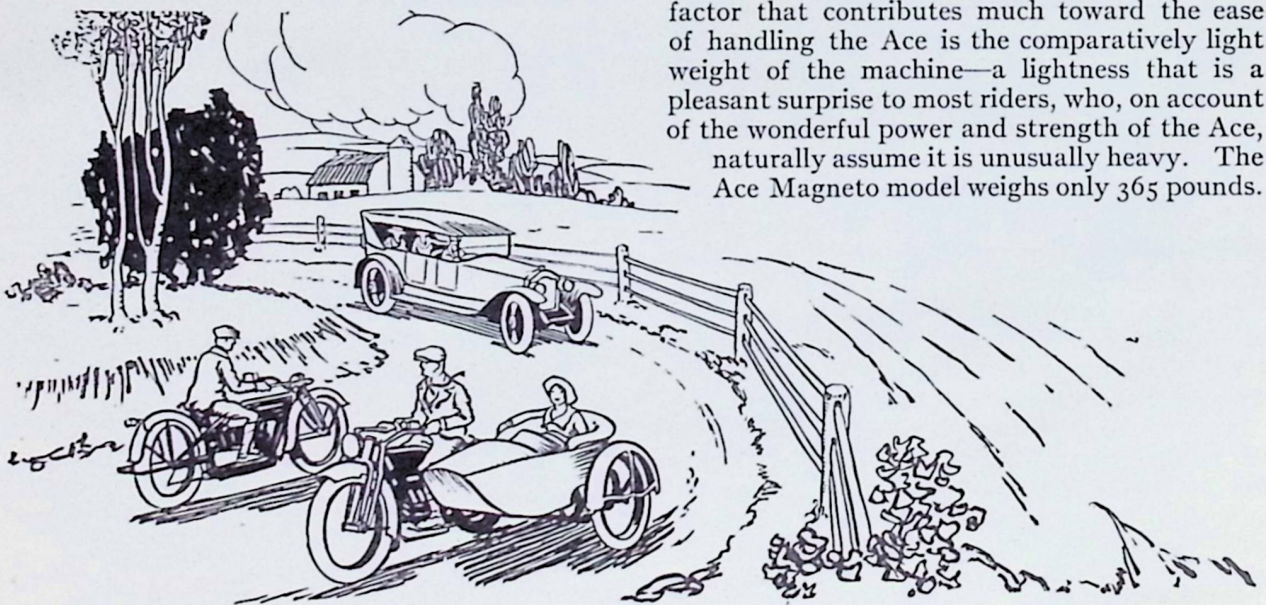
The 1922 Ace with improved intake manifold has an abundance of power and speed. Anyone who will follow the construction of the Ace engine cannot fail to recognize in it at every angle those things that are so important when there is a steep grade ahead or a speed record to break—

An exclusive preheating device to prepare the fuel for perfect combustion; larger valves to insure ample gas and air supply; compact combustion chamber with spark-plug firing in the center of fresh gas to give snappy ignition; a case-hardened, smooth-surfaced crankshaft to minimize friction, and a long connecting rod which, in reducing the angularity of thrust, adds wonderfully to the driving power that reaches the wheels.

Power and speed have been built into every square inch of the Ace motor, and its performance is proving to be a revelation to the motorcycle rider.

## COMFORT

The cozy comfort of the Ace is due in great part, of course, to the smooth-running, low-hung motor, reducing vibration to a minimum and at the same time stabilizing the machine. The extremely low saddle position—highest point, 28½" from ground—and the big, hygienic, form-fitting saddle mounted on long, loosely wound springs, add wonderfully to the rider's comfort. The fork, the last word in soft resilient action, is so



constructed as to take up the road shocks before they reach the frame proper, and the large 3½" tires and deep, velvety footmats add the last touch to the smoothest running motorcycle ever built.

## CLEANLINESS AND SILENCE

Without oil tank and outside connections—with all moving parts enclosed, with guards specially designed to protect the rider from splash and drip—the Ace affords a cleanliness heretofore unknown to motorcycling. The welcome silence of the Ace is in part due to the fact that motor, clutch, and gears are completely enclosed in one unit, with all working parts running in a uniform bath of oil. Likewise, the inlet valve rockers are encased. Then, too, in contrast to the loud chug of the two-cylinder motor, the four cylinders of the Ace emit a rhythmic purr altogether pleasing to the ear.

## EASE OF HANDLING

The surprising ease with which the Ace may be handled is due principally to the wonderful balance of the machine. This balance is in turn the result, mainly, of the low center of gravity which four-cylinder design makes possible. This low-hung weight, harmoniously united with low, forward saddle position and proper distribution of weight between the wheels, causes the Ace to hug the road so steadily and steer so surely at high speed or where the going is rough. Another factor that contributes much toward the ease of handling the Ace is the comparatively light weight of the machine—a lightness that is a pleasant surprise to most riders, who, on account of the wonderful power and strength of the Ace, naturally assume it is unusually heavy. The Ace Magneto model weighs only 365 pounds.

## DURABILITY

The lines of the Ace frame suggest, to some extent, its Herculean strength. The  $1\frac{3}{8}$ " front drop bar and the reinforcing truss bars in the rear form a reserve of frame strength that will withstand the most severe test. The solid head forging, with the double fork working on exceptionally large chromium steel ball bearings, furnishes a wealth of strength at this all-important point. A large *hardened carbonized* double heat-treated crankshaft; *bronze babbitt-lined* bearings; an oil cup over each bearing to prolong its life; chromium steel balls throughout; close-grained cylinders with long connecting rod to reduce friction on cylinder walls; transmission gears  $3\frac{1}{2}\%$  nickel steel—all important parts of the engine, such as crankshaft, wrist-pins, and bearings large but not out of proportion—make the Ace a combination of strength and durability yet to be equaled in a motorcycle.

## FLEXIBILITY

More flexibility is, of course, expected in a four-cylinder than in a twin. And when you consider the exclusive refinements built into and around the four perfect cylinders of the Ace, you can form some idea of the degree of flexibility incorporated in this marvelous machine. A number of things contribute to the wonderful flexibility of the Ace, chief of which are the four perfectly tuned impulses of the Ace engine; the Hot Spot attachment, which in properly vaporizing the gas, delivers into the cylinders a fuel ready for duty; and a compact combustion chamber, insuring instant ignition and the consequent snappy responsive action of the motor.

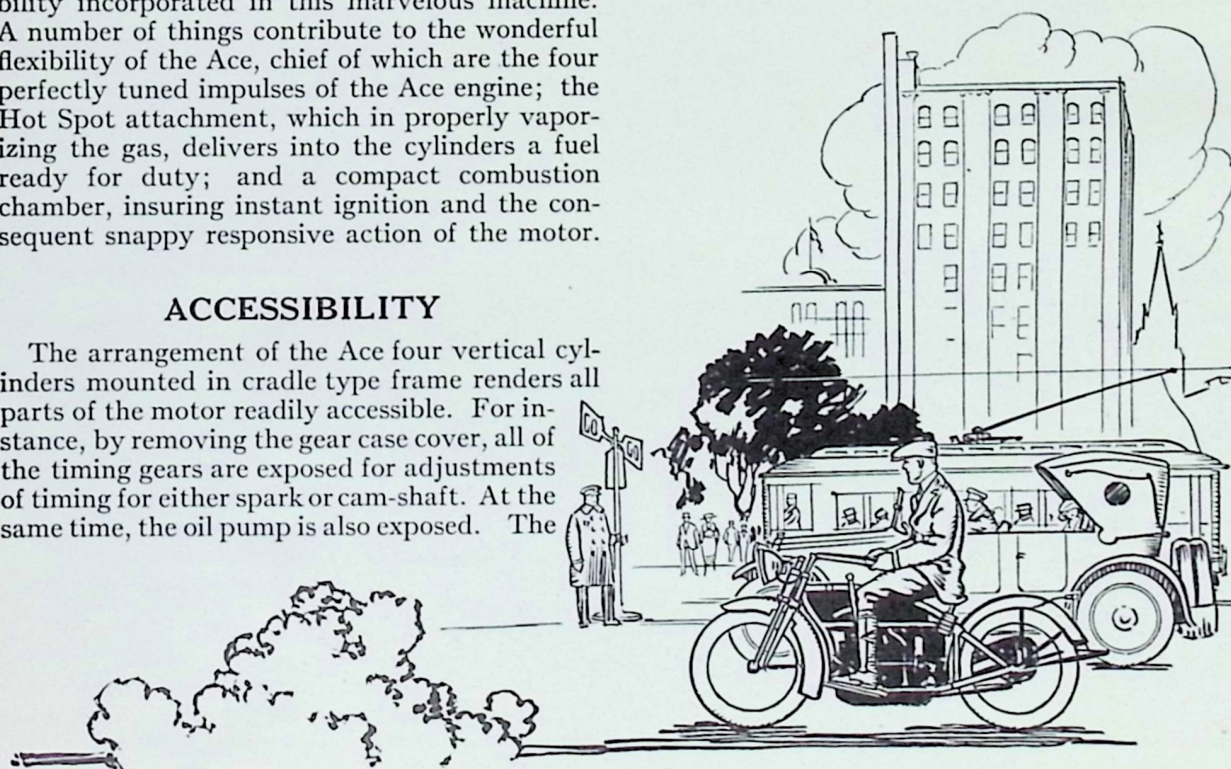
## ACCESSIBILITY

The arrangement of the Ace four vertical cylinders mounted in cradle type frame renders all parts of the motor readily accessible. For instance, by removing the gear case cover, all of the timing gears are exposed for adjustments of timing for either spark or cam-shaft. At the same time, the oil pump is also exposed. The

carburetor is mounted in a position where all adjustments can be made by the rider while in the saddle. Tappets can be adjusted without removing muffler, and the lifting of the inlet rocker bonnet covers permits full inspection of the inlet gaps. By removing tank from machine, the inlet cages can be lifted off for grinding inlet and exhaust valves. In like manner, the cylinders can be taken out without disturbing motor. The Ace is certainly designed with the convenience of the rider in view.

## BEAUTY

A glance at the Ace discloses a grace of line, a beauty of finish, that has never before been even approached in a motorcycle. The squarely set compact motor, with equipment evenly distributed, the sweeping stream line of upper bar, unbroken by ungainly tool box, catch the eye immediately. And that most attractive color combination of Packard blue with cream wheels makes the Ace a delight to behold and gives an indication of the quality within the machine. The Ace is admittedly the most beautiful motorcycle in the world.



## SPECIFICATIONS

- MOTOR**—Four-cylinder, four cycle, unit power plant. 2.7" bore; 3.25" stroke. Displacement, 75 cu. in. 20 H.P.
- CYLINDERS**—F-head type, one piece casting of high-grade gray iron. Spark-plug inside of valve pocket where spark points are always in center of fresh gas, thus insuring quick and thorough combustion with no chance of fouling.
- PISTONS**—Close grained gray iron, well ribbed for strength. Oil returns provided. Two rings to each piston, ground to fit on three sides.
- LUBRICATION**—Auto type level splash system, operated by gear pump, insuring constant lubrication at all times, the amount of oil supplied varying with the speed of motor. All oil is carried in the base, the oil filler being at top of breather, in easily accessible position. All parts enclosed and proof against leakage. Four outlet oil pipes pour a constant stream of oil into each splash cup, insuring thorough lubrication whether climbing long steep grades or running at top speed.
- IGNITION**—Simms high tension magneto; armored, water-proofed, on both regular and electric models. Ignition wires encased in black fiber tube to protect them from the heat of the exhaust ports.
- INLET MANIFOLD**—One piece casting with two outlets, one to each valve cage, entered in center of cage. Main gas supply entered in center between cages, giving equal distribution. Main gas channel runs straight back to carburetor with no sharp turns. Priming cup for starting in cold weather.
- CARBURETOR**—1" Schebler. Solid cam type with three adjustments, needle valve, air valve, and high-speed cam. "Pull Out" choking device for starting placed in convenient position, giving access to all adjustments while riding.
- HEATING DEVICES**—Hot air supplied from long tube carried through muffler. Inlet manifold hot spot provided by use of copper stamping connecting rear of valve cage to manifold.
- STARTER**—Step starter with engaging mechanism completely enclosed. Dogs of ratchet type made with flat face tooth to prevent chipping. Lever of large drop forging. Pedal tubular. Movement backward and down. Spring provided that returns crank and pedal to original position. Pedal folds back in line with machine.
- MUFFLER**—Extra large expanding chamber. No inner walls or baffle plates to cause back pressure. Chamber diameter, 2½". Exhaust pipes leading from cylinders to muffler, 1¼" diameter and curved toward rear. When cutout is closed there is practically no exhaust noise at all; when open, the exhaust produces a deep full rumbling.
- CLUTCH**—Multiple steel disc, 9 plates, built into fly-wheel and running in oil. Clutch has extra large area of friction surface and there are 14 large springs, 5⁄8" in diameter, making strain on any spring negligible. Clutch controlled either by hand lever at left of tank or by left foot lever. A decidedly improved type of clutch that absolutely eliminates all adjustment.
- TRANSMISSION**—Three-speed progressive type. Gears of hardened nickel-steel; 8-10 pitch, stub tooth, 5⁄8" face. Gear shifting locking mechanism is contained inside crankcase and is so made that locks on operating lever quadrants are unnecessary.
- FRAME**—Cradle type, made of 1¼", 13-gauge seamless steel tubing. Front bar 1⅜", 11 gauge. Powerful reinforcement inside of front bar. Head frame and fittings of solid drop forgings. A notable feature of the Ace frame is the reinforcing brace bars running from rear fork crown to cradle bar. This feature does away with all strain on rear fork connections and adds wonderfully to the general strength of the machine.
- FRONT FORKS**—Doublefork type with straight sides. Springs and plunger completely enclosed and packed with grease. Rocker arms are so designed that they absorb the slightest and heaviest shocks, the movement of the forks being backward and upward. Rockers are supplied with hardened steel bushings. Studs are also hardened and of large diameter, giving the fork unusual strength at the point where the shocks are directly received.
- HANDLE-BARS**—1⅝" diameter; cross-brace type. Side bars slant outward and down to give a natural, comfortable position for wrists and arms.
- GRIP CONTROL**—Right grip controls the throttle; left grip controls the spark. This control mechanism is simple and positive, preventing the slightest lost motion in action of spark or throttle and affords just enough friction to keep throttle always in position when hands are removed from bars.
- VALVES**—Inlet and exhaust valves 1½" diameter. Inlet valve 30° seat; exhaust 45°. Intake and exhaust valve tappets easily adjusted without removing tappets from base. Oil returns provided so that tappet is thoroughly lubricated. Oil is trapped in tube and returned to base.
- CRANKCASE**—Upper half heavily webbed throughout to insure strength. Front of case where gear cover attaches is very heavily flanged, insuring plenty of thread to prevent stripping. Lower half generously webbed inside and out to reinforce and insure against damage from road shocks.
- BEARINGS**—Crankshaft, connecting rod and countershaft bearings are of the well-known bronze, babbitt-lined type. Crankshaft bearings 1⅝" diameter. Front bearing 1¼" long; center 1½" long; rear 1½" long. Clutch bearing 1¼" diameter and 1⅝" long. Pilot bushing, ¾" diameter, 1½" long. Connecting rod bearings 1⅝" diameter, 1⅝" long.
- GUARDS**—Full crown guards of cold rolled steel 5⅝" wide. Generous clearance provided between tires and guards to allow use of tire chains. Front guard has specially designed side plates to protect rider's feet against splash. Rear guard may be tilted forward to permit easy removal of wheel.
- GASOLINE TANK**—Of 3-piece pressed steel construction. Beveled front and rear; all corners rounded. Capacity, 3¾ gallons. Tank is provided with an efficient gasoline strainer and sediment trap.
- TOOL BOX**—Contained inside gasoline tank, completely out of sight. Lid hinged at rear, opens upward. Tool compartments are deep and narrow, with bottom well padded. Material used is extra strong. Tool box absolutely waterproof.
- HUBS**—Rear hub—one piece steel shell. Ball bearings, cups and cones of chromium steel. Balls 7⁄16" in diameter; axle 7⁄8" diameter; 4¼" between spoke flanges, made extra large in view of side-car use. Front hub—one piece steel shell with removable cups. Cones and cups of chromium steel. Axle ½" diameter; balls 3⁄8".
- BRAKES**—Two powerful external band brakes, one on each side of hub, providing at all times an equally powerful brake for emergency or regular braking. Both brakes are double acting, being just as efficient when machine is moving backward as when going forward. Regular brake is operated by right lever; emergency by left heel. Note particularly that there are two distinct brakes with two independent actions, all parts of each brake interchangeable.
- CHAINS**—Duckworth latest heavy type; 5⁄8" pitch, 3⁄8" wide.
- WHEELS**—27" diameter, 40 spokes, front and rear; heaviest type motorcycle wheel made. Front wheel supplied with slip axle for easy removal. Wheelbase, 59".
- SADDLE**—Special hygienic model formed to fit pelvic bone. Extra long horn, giving action to nose as well as rear. Ventilation holes in center. Springs designed to prevent recoil. Total action of saddle 3½". Maximum height from ground 29". Leather, dark tan; springs black.
- TIRES**—27" x 3¼", Firestone Non-Skid, mounted on "CC" heavy steel rims.
- STAND**—"U"-shaped stand with extra long side braces to prevent bending. Special spring washers provided to prevent rattling. Stand is attached independently of rear axle.
- FOOTBOARDS**—Folding type steel plates with drop-forged arms. Rubber mats deeply corrugated to give firm hold and resiliency.
- COLOR**—Packard blue with gold striping and cream wheels.

## Ace Guarantee

1. All Ace Motorcycles are warranted against imperfections in workmanship and material, and any part proving defective within ninety days from date of the original sale by dealer, when sent to us transportation charges prepaid, will be replaced free of charge subject to our inspection and decision, and provided, also, that the owner has filed with this office the registration card furnished with each motorcycle. Any part sent to the factory for replacement must be sent through the dealer from whom the machine was purchased.

2. Liability for damage on account of defective parts extends only to replacements of such defective parts.

3. When machines, or assembled parts, are sent to us, in which defective parts are to be replaced, a reasonable charge for labor will be made.

4. Wear, misuse, abuse, or negligence is not guaranteed against.

5. When sending in parts for replacement, customer must tag same with his name and address.

6. A letter giving full and detailed particulars must be sent to us in each case, giving the engine number to avoid delay in identifying the consignment.

7. This guarantee is not operative when parts manufactured by other than this company are inserted or used for repairs.

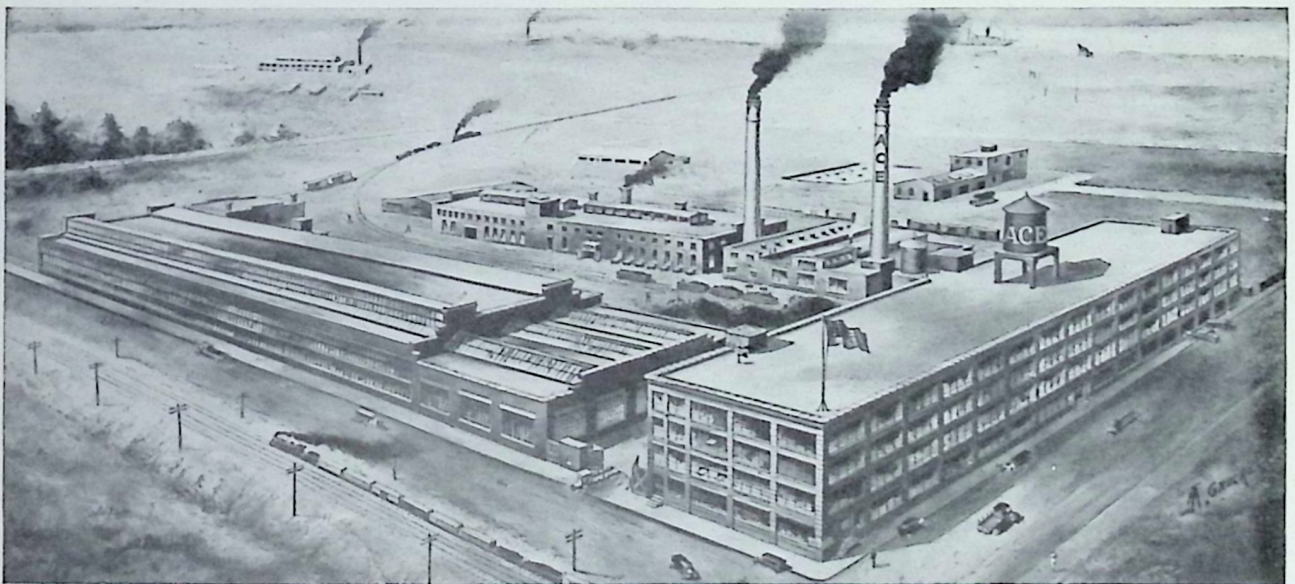
8. Alteration of our construction in any way whatsoever, or use of devices not approved by us, terminates this guarantee.

9. We do not guarantee any parts of equipment or specialties not of our own manufacture, such as tires, magnetos, saddles, etc., as these parts are guaranteed by their respective manufacturers, and should they develop defects, should be sent direct to them.

10. Purchaser accepts the provisions hereof upon purchase of motorcycle and agrees to rely solely thereon.

Every Ace Motorcycle sold by other than our recognized dealers is sold without our guarantee, unless otherwise provided.

All prices are F. O. B. factory.



ACE MOTOR CORPORATION, PHILADELPHIA, PA., U. S. A.

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**A MASTERPIECE**  
*is never the result of accident. It is invariably the product of an idea conscientiously worked out by master hands in accordance with an ideal*

**ACE MOTOR CORPORATION**

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