



ACE
III

Added Refinements Embodied in 1925 Models

NEW MANIFOLD

It gives ideal gas distribution and the distributing chambers are located so that the manifold requires no hot spot and vaporizes the raw gas to the extent of giving approximately 30 per cent more miles per gallon of gas, more horsepower and a more even pull, especially at low speeds.

NEW SADDLE POSITION

New Saddle Horn and new saddle spring support, giving more comfortable riding and three inches more saddle action with the lowest of low saddle positions.

FRONT FORKS

The length of the forks in their relation to one another have been changed to give easier steering and road action.

CHAIN ADJUSTING

New greatly increased chain adjusting screw and chain adjusting screw boss, giving easy and positive chain adjustment.

BRAKE MECHANISM

Brake lining increased in thickness, giving longer life.
Brake levers increased in strength and position, giving greater leverage on brake.

REAR STAND

Rear stand bracket increased in strength, assuring a substantial rear stand.

BATTERY BOX

A change has been made in the Battery Box so that by turning a thumb screw, the lid can be removed, leaving the battery accessible for removing or adding water. The bottom of the box is also made more substantial by reinforcement.

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THE value of service which any good motorcycle should render, the Ace adds an intensified satisfaction through the greater scope and wider range of performance gained by exceptional development of **four-cylinder** design. The fleetness and power of the Ace motor make the rider master of time and distance. The benefits and pleasures of the great outdoors both far and near are at his command—the country club, golf links, tennis court, baseball diamond or swimming pool for a few hours' recreation in the afternoon; quiet out-of-the-way streams or secluded lakes where fishing is really good, or woods and fields where game abounds, for week-end trips with rod or gun; or the majestic mountains, the unfrequented wilderness, the seashore, or other scenes a thousand miles away that beckon when vacation time gives opportunity to travel afar and see new sights and strange localities.

The Ace is so economical to operate that expense of any trip becomes negligible (total running costs average less than a cent per mile).

Its steadfast dependability insures the prompt and satisfactory performance of every undertaking. Its capability under changing conditions and varied requirements insures success in unexpected emergencies and trying circumstances. It will go anywhere that wheels can travel, is ready at a moment's notice, and never grows weary.

The critical observer notes in the Ace motorcycle a finished relationship of lines and uniform harmony of proportion such as only time and experience can evolve. For this machine is the product of **ten years' experience** in manufacturing **four-cylinder** motorcycles by Mr. W. G. Henderson, designer of the Ace and pioneer in this field.

Ten years in which all his efforts were concentrated toward the perfection of this one type. Ten years of building and studying and riding four-cylinder motorcycles. Ten years in which motorcycle riders all over the world have proved the value of his ideas by actual experience that has established the supremacy of four-cylinder power beyond question.

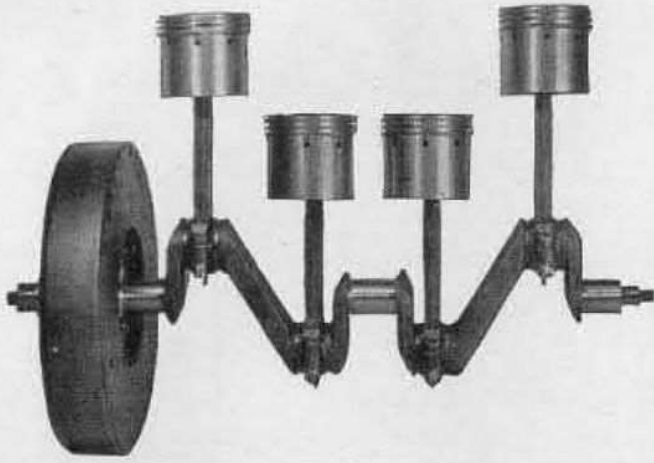
Mr. Henderson was engaged continuously in manufacturing four-cylinder motorcycles from 1911 until his unfortunate death in December, 1922, and had a specialized knowledge and expert grasp of this subject that only such practical experience

could produce. The benefits of his extensive research and exhaustive labor with power plants of this type are concentrated at their highest worth in the new four-cylinder Ace—the masterpiece of a master engineer.

Note how each detail shows the perfection of a finished product.

A single brief experience with the new Ace is sufficient to demonstrate the supremacy of four-cylinder power. Its fluid smoothness is an unwearying delight. Its dignified silence of operation is a source of pride in any company. Its instant acceleration and quick pick-up, which have proved of such practical value in





Drop-forged connecting rod of Ace motor with flywheel, connecting rods and pistons assembled. Crankshaft heat-treated and case hardened $\frac{1}{16}$ inch deep all over, giving great strength and toughness to withstand the hardest kind of service. All bearings hardened and ground with great accuracy.

motorcycle police service, arouse enthusiastic appreciation in the ordinary private owner as well.

With the four-cylinder Ace, the rider learns to drive almost entirely by throttle, for its power is so flexible and answers so readily to every twitch of the grip, that use of clutch or gearshift is called for much less frequently than when driving the older and less advanced types of motors.

Its beauty of line and handsome appearance win warm admiration.

The low-hung weight of the four-cylinder motor results in exceptional balance that makes the machine surprisingly easy to handle and responsive to control. Steady, sure and safe at high speeds or when negotiating rough or slippery surfaces. Practical proof of the value of its wonderful riding qualities was supplied by the success of the Ace in the foremost endurance runs of the season, when it won such signal success in spite of the difficulties imposed by rainstorms, wet highways, treacherous clay mud and rough, rutted roads.

Wear is noticeably reduced by the absence of jerk and jar. Drive chains last longer and give far more satisfactory service on this four-cylinder machine because the pull is so

smooth and uniform. For the same reason, Ace riders find that tires wear longer, while minor mechanical difficulties, such as loosening of fittings and parts shaking out of proper adjustment, are practically done away with by eliminating vibration.

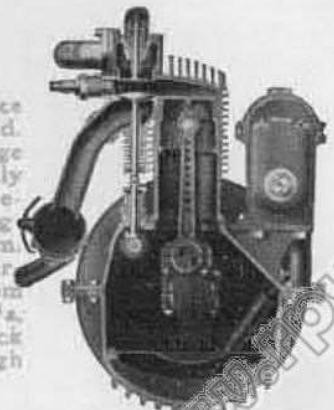
The student of design notes the extreme simplicity of this motor. The crankshaft, for instance, is a one-piece steel drop forging, which insures permanent alignment and effects accurate reassembly when overhauled after long service. This forging is case-hardened $\frac{1}{16}$ -inch deep all over and the bearings are ground to finish, which combines rugged strength and long wearing qualities. This type of crankshaft is so expensive to produce that its use is generally found only in high-priced multiple-cylinder cars, but is so important in insuring service that it is used on all Ace motorcycle engines.

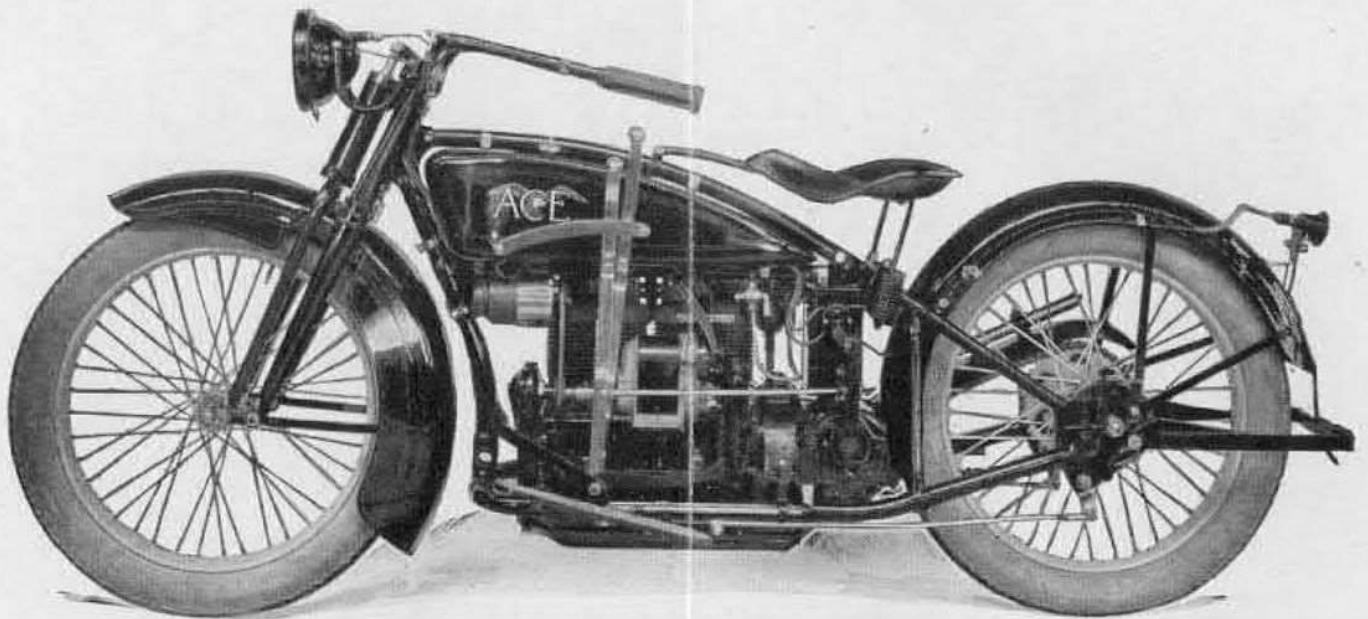
The connecting rods are also steel drop forgings, drilled for lightness, carefully heat-treated and quenched in oil.

Because of its simplicity the Ace is readily accessible. The cylinders can be removed for cleaning out carbon without taking the motor out of the frame. The lower half of the motor base can also be removed to expose the crankshaft, lower connecting rod bearings and transmission, without dismounting motor from frame.

By removing the gearcase cover the ignition-timing gears, the cam gear and oil pump are open for inspection.

Sectional view of Ace motor as seen from end. All bearings of large size and thoroughly lubricated by the dependable circulating splash oiling system. Gas passages of generous size and free from sharp turns or bends, so as to insure quick flow of gases and high efficiency.



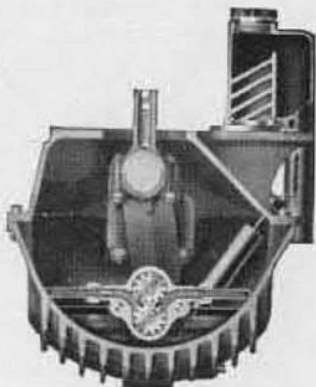


Left side of standard electrically-equipped Ace motorcycle. Gear-shift and clutch hand levers shown at left side of tank. Kick foot lever located beside left footboard. Service brake operated by foot lever beside right footboard; emergency brake by lever operated by heel of left foot. Current for lights and horn produced by generator mounted on frame below left side of tank, and stored in battery mounted under the saddle. Bucket seat of new design.

Exhaust tappets can be adjusted accurately without removing the muffler, and the inlet rockers can be oiled and adjusted by simply lifting the snap cover of the bonnet over them.

Valve cages can be removed to allow inlet or exhaust valves to be ground without dismounting cylinders or taking engine out of frame.

In every detail the



Cutaway view showing positive mechanical oil pump, insuring circulation of oil to maintain proper level in splash cups at all times.

Oil gauge for determining amount of oil in motor base is set at right side of crank case.

convenience and utility of the rider has been the guiding consideration, with every care taken to insure ease and certainty of inspection and adjustment, economy in repairs, and satisfaction in constant

service. The Ace engineering staff has borne in mind that repairs on motorcycles are often made by non-expert mechanics who do not understand motorcycles. Each part is therefore designed with utmost simplicity to insure its being correctly reassembled or adjusted if taken apart by an unskilled repair man or rider.

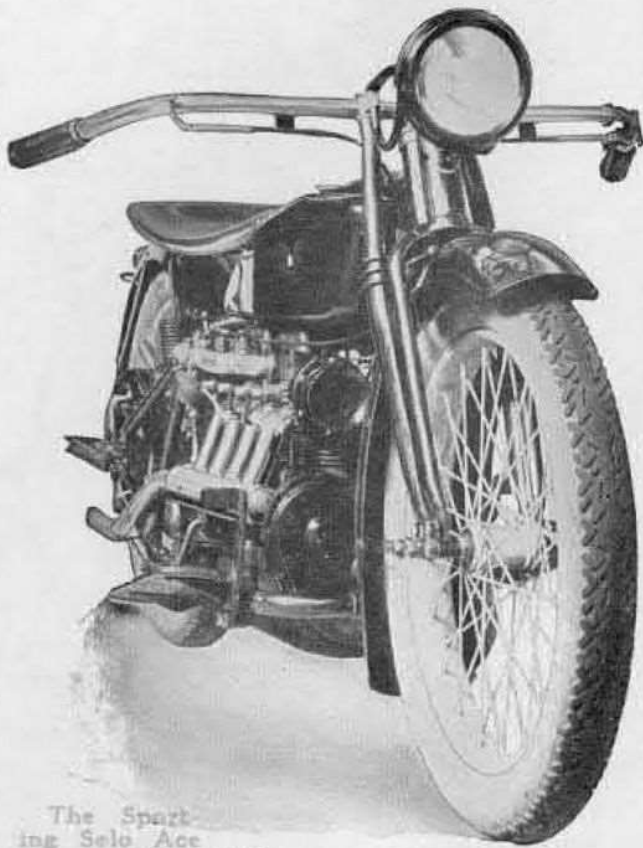
The cleanliness of this type of motor wins approval from the fastidious. Its design keeps all the oil on the inside of the engine, where it belongs, and presents no joints or openings through which it can leak to gather dirt and cause unsightly appearance.

With an Ace the motorcyclist can ride well dressed, secure in the knowledge that his clothes will not be soiled by the machine—a fact which appeals particularly to the critical class of riders who take pride in appearing at their best wherever they go.

Ace quality is of vital importance to the rider because it assures consistent practical service. Selected



Camshaft of the Ace motor. The accuracy and precision with which these cams are ground to exact size and shape makes possible the smoothness and silence of running of this engine and is of great importance in insuring high efficiency.



The Sporting Solo Ace motorcycle, showing wide nickel-plated sport handlebars and other new features that distinguish this machine. Low, beautifully balanced, with a torrent of power and speed ready at a touch of the throttle grip, the Sporting Solo model delights the seasoned sportsman and the red-blooded rider who loves the thrill of solo riding for the sheer joy of its liveliness and vim.

and tested high-duty steels and special alloys provide exceptional strength and durability. Accurate fitting, painstaking workmanship and close inspection make sure of smooth and efficient operation. Perfection of detail with large bearing surfaces, careful hardening and scientific lubrication mean minimum friction, minimum wear and long, satisfying usefulness.

Ace quality is evolved by excellence of materials and conscientious skill in manufacturing that produce such pleasing effectiveness in daily road riding.

The beauty of line and proportion that distinguish the Ace, is the natural accompaniment of its perfected development and refinement. The rider is justified in feeling proud of his handsome machine, for its attractive outer appearance is the expression of built-in qualities that only careful study, conscientious work and long experience can produce.

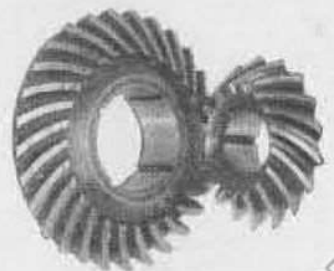
SPORTING SOLO MODEL

The dyed-in-the-wool motorcyclist who uses a solo mount for sheer enjoyment and who loves the sport for its liveliness and vim, was given the center of the stage by W. G. Henderson and his associates who designed the new Ace Sporting Solo Model. The solo rider comes into his own.

For this new machine, as its name implies, is built from hub to hub as a light, competent, swift and easy-handling outfit which will give the rider the utmost of that sense of freedom and power that is found in no other form of recreation.

This is the first instance of a "solo sport model" being an accented and emphasized super-edition of the standard machine rather than a smaller and less powerful type. The power plant of this new outfit has been in course of development by the factory's experimental department for a long time, and its performance is the basis of the exclamation points of surprise and admiration that garnish the comments of the rider after his first trial trip on the Sporting Solo.

The Sporting Solo motor is a high-powered high-compression engine designed and built especially to produce unusual power and speed. It is regularly fitted with aluminum alloy pistons that are extremely light and perfectly balanced.



Spiral bevel gears in Ace transmission. This use of spiral gears makes possible unusual silence of operation and pleasing smoothness.

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The pistons are carefully fitted to the cylinders for free action, the amount of clearance allowed being just right to give perfect freedom and absence of friction. The connecting rods are, of course, drilled for lightness.

Lubrication is by the constant-level circulating splash system that has been worked out so successfully by Ace engineers and that has proved so satisfactory for sustained fast riding.

Other details of the new motor have been worked out with equal care to insure the top notch of pep, power and flexibility. The valves stand up under the hammering of their rapid action at high speed. The cams give just the right acceleration and height of lift to give swift and free motion of gases, with thorough scavenging of cylinders and a full charge of new, fresh gas for the next explosion. All bearings are ample in size, thoroughly lubricated and free from undue friction.

While the Sporting Solo high-compression engine fairly brims with power and speed when called on, it retains in full measure the steady pulling power at low speed, flexibility of control and ease of throttling-down that are characteristic of the standard model. The greater power developed permits the use of a somewhat higher gear than of the regular model.

The acceleration of this motor when the throttle is snapped open is a revelation. The machine fairly leaps forward in a space-devouring bound that ripples an electric thrill of delight through the fibres of even the most experienced and case-hardened road veterans—it gives a sensation of mastery over a live thing of enormous power, with giant energy under perfect command and ready to respond to your slightest wish.

The difference in riding position is notable at first glance. The handlebars of the Sporting Solo are wider than the standard model, also somewhat shorter and lower—what would be termed a semi-dropped or Speedster position similar to the English "T. T." or the type of handlebar used in some of the big road races in this country—and are heavily nickel-plated on copper.

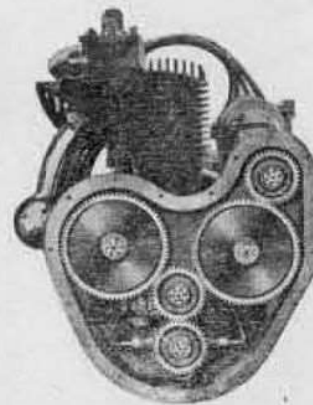
The saddle is a new pattern produced especially for the Sporting Solo Ace. The saddle is scientifically formed and holds the rider securely in position for fast riding on the road. A specially-designed spring system is provided, incorporating an inner coil spring which softens the action and absorbs road shocks with exceptional efficiency.



Illustrating the low, comfortable riding position that gives such excellent balance and ease of handling under all conditions with the Sporting Solo Ace motorcycle.

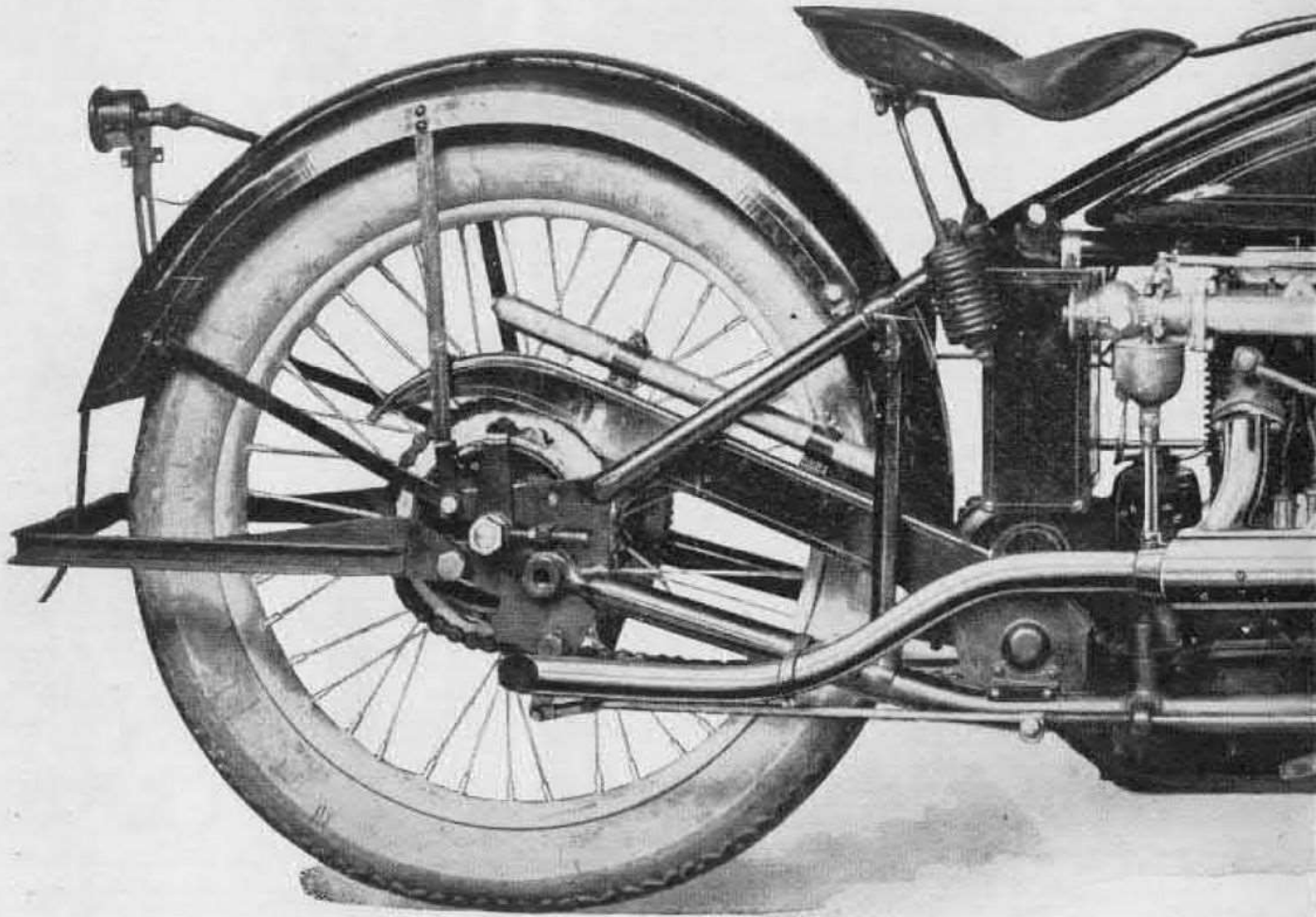
The new double-spring arrangement of the Ace saddle provides the extra power that is needed to take care of the jolts received when pounding over rough roads at high speed, yet its flexibility makes it effective for little vibrations such as occur in driving on brick or cobblestone pavement. The smooth action of this saddle is very pleasing in open-country traveling, as the soft, even cushioning of the new suspension absorbs the jolts and avoids rebound with uniform efficiency that is a symphony of comfort.

The effect of this new saddle is particularly pleasing



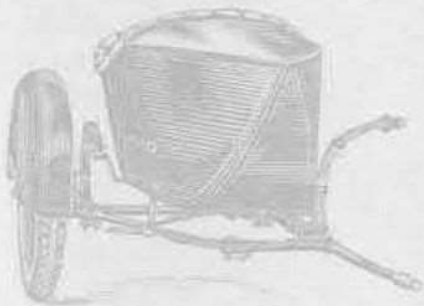
Forward end of Ace motor with gearcase cover removed exposing timing gears and oil pump.

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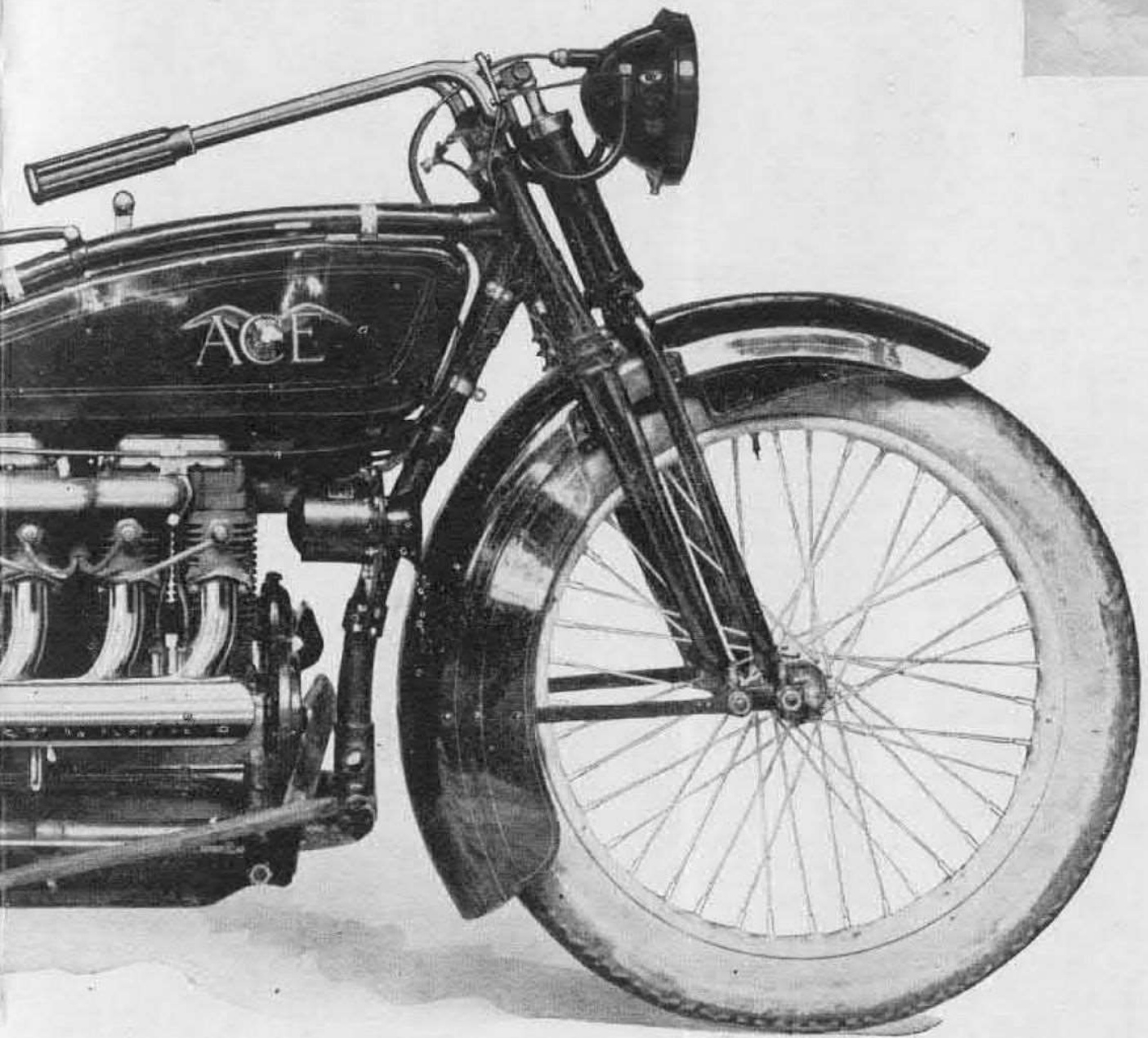


With complete
electrical
equipment

\$4



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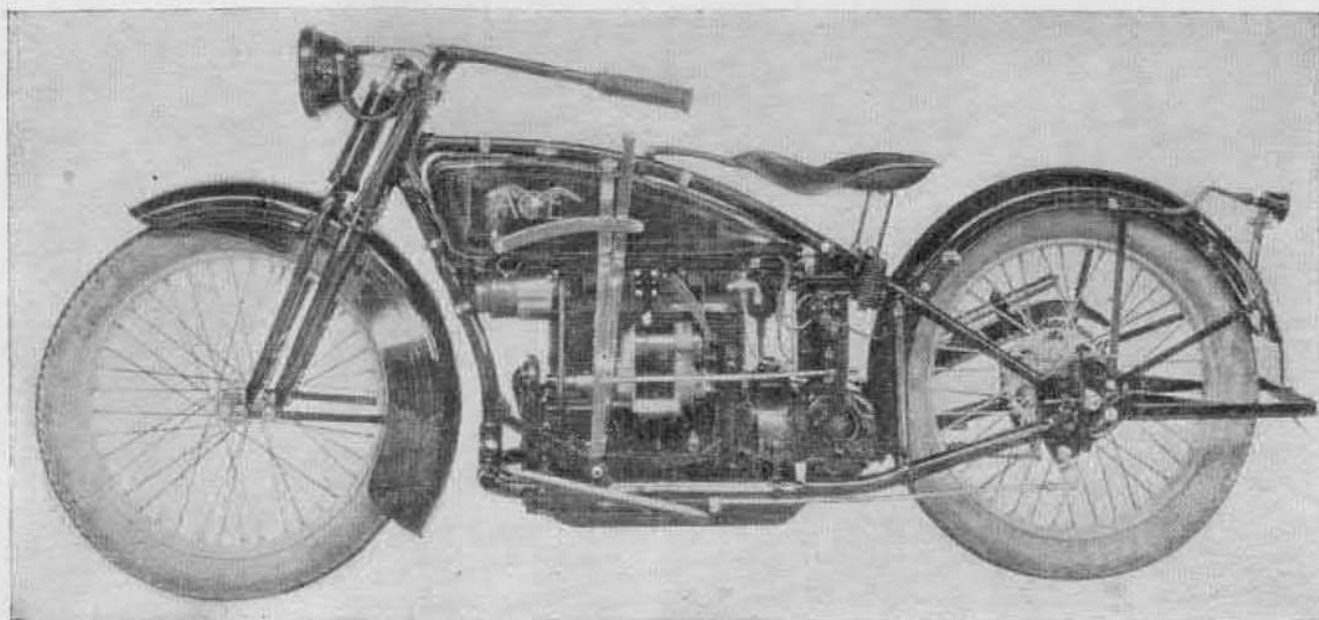


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F. O. B. Factory
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Left side of Ace Sporting Solo Model. Low, perfectly balanced, compact. New high-speed high-compression motor with aluminum pistons—powerful, lively, instantly responsive.

to the eye in its harmony with the lines and composition of the rest of the machine. The curve of the saddle top and pommel blends into the sweep of the top tube and tank of the motorcycle, giving an impression of unity and capability that inspires confidence. The saddle is of black leather, which sets off the dark blue enamel of the machine effectively.

The saddle position is exceptionally low, the top surface of the seat being only $27\frac{1}{2}$ inches above the ground. This low position combines with the shape of the seat to produce remarkable steadiness and security at high speeds—the rider feels safe and confident even on bad roads, for there is no slipping about or bouncing, and the machine holds to its straight line and hugs the roads in a way that gives joy to the rider who likes to open 'em up.

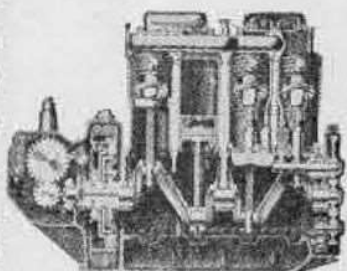
The position of the wide nickel-plated handlebars gives just that slight forward inclination that experience has demonstrated to be best for both comfort and control at high speed. The English motorcyclist has learned the value of this position, as shown by the popularity of

the "T. T." handlebars for snappy solo riding in that country, but American riders have only recently learned to appreciate the added pleasure that it gives.

Experienced road riders find the position to be ideal when they mount the new Sporting Solo Ace, for the saddle places the rider so low that when he drops his hands on the grips he finds himself just right for lively solo traveling—a slight lean forward against the surge of speed from an opened throttle, positive control of steering due to the wide spread of the bars, steadiness in sand or on treacherous surface because of the position of the grips allow the arms to brace solidly against twisting or wobbling.

"It makes you feel so safe," was one rider's comment after a fast spin on the Sporting Solo. "You get the effect of being seated firmly and securely down between the two wheels—like you **couldn't** fall over. Same as being in a swooping monoplane or a perfectly balanced glider, with the outfit under complete control and ready to answer exactly to your wish."

That's what careful study of riding position for solo driving has accomplished.



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Thus the charm of the Sporting Solo combines the thrill of this tremendous power with the satisfaction of feeling at one with the machine, the sense of complete control due to the wonderful balance and ease of handling produced by the new riding position.

When seasoned riders first try the new model on the road they return fairly bubbling with enthusiasm. Unusually light for a machine of its motor capacity, easy to manipulate, yet ready to unleash enormous power at a touch of the throttle, this new machine, with its attractive lines and handsome finish, is ideal for the thousands of riders who want a lively, zestful solo mount for real pleasure riding and red-blooded out-door sport.

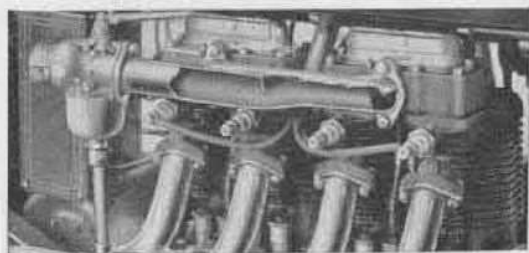
DETAIL SPECIFICATIONS

The more fully the true principles and construction of the four-cylinder Ace are understood, the more clearly its advantages will be perceived. The following data is therefore presented as definitely and concisely as possible without exaggeration or bias, to enable the reader to grasp the facts accurately and judge value soundly:

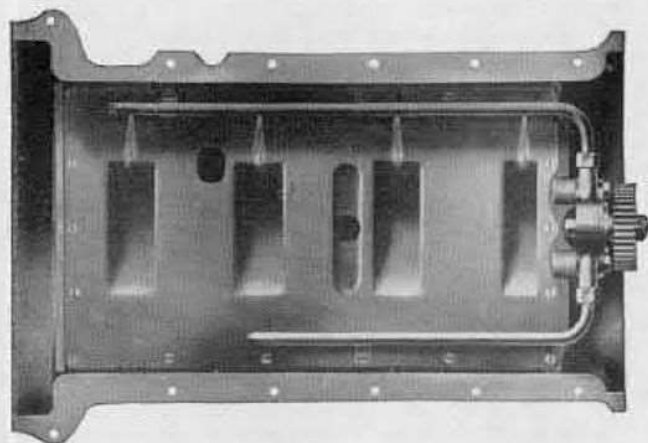
Power Plant—A four-cylinder unit power plant embodying the refinements and perfections worked out by Mr. W. G. Henderson during the ten years that he devoted to designing and building four-cylinder motorcycles. Transmission and clutch housed in rear of motor base and running in oil bath, same as in many fine automobiles.

Motor—Long-stroke four-cylinder engine of 78 cubic inches piston displacement that combines high efficiency with cool, quiet running, great flexibility and ease of control. Bore 2.750", stroke 3.250". Smooth pulling, quick in acceleration, clean, silent.

Cylinders—F-head type, with inlet over exhaust, so that cold incoming gas passes over surface of exhaust valve to assist in keeping the



Inlet manifold cut away to show how gas passage forks so that distance traveled by gas is same in going to all cylinders, thus insuring uniform charges for all cylinders and smooth, even running and steady pulling.



Lower half of motor base, showing oil pan in position. Inlet pipe of oil pump draws from rear of reservoir in motor base and supplies troughs in oil pan below each connecting rod, these troughs thus being kept always filled to proper level. Opening in the center of oil pan allows excess oil to drain back into motor base.

latter cool under sustained hard driving. One-piece casting of fine gray iron. Spark plug located in valve pocket where spark occurs in center of fresh, live gas, so as to insure quick and thorough combustion with no chance of fouling.

Valves— $1\frac{1}{2}$ " diameter, $\frac{1}{4}$ " lift, giving free, unobstructed movement of gases. Inlet valve, 30° seat; exhaust, 45° . Both intake and exhaust tappets easily adjustable without removing from base. Tappets thoroughly lubricated by carefully-designed oil-returns which keep lubricant inside motor and prevent leakage. Inlet valve cages cast in pairs with cooling flanges.

Valve Mechanism—Inlet rocker arms operate on hardened steel pivot pins centered for each pair. Tappet guides generous in size and provided with oil-returns which insure cleanliness of motor. Complete inlet-valve mechanism enclosed in dirt-proof pressed-steel bonnets, with neat snap cover for ease of oiling, thus insuring absence of wear and silence of operation.

Crankshaft—One-piece drop-forging, case-hardened 1-16" deep. Three big bearings, ground to size. Front bearing $1\frac{1}{2}$ " diameter, $1\frac{1}{2}$ " long. Center $1\frac{1}{2}$ " x $1\frac{1}{2}$ ". Rear $1\frac{1}{2}$ " x $1\frac{1}{2}$ ".

Bearings—Bronze babbitt-lined, on crankshaft, connecting rods and countershaft, adjustable to take up wear. Clutch bearing $1\frac{1}{2}$ " diameter, 15-16" long. Pilot bushing $\frac{1}{4}$ " diameter, $1\frac{1}{2}$ " long.

Crankcase—Highest quality aluminum, light and strong. Upper half powerfully reinforced by heavy webs. Front of case strongly flanged where gear cover attaches, providing plenty of thread to avoid stripping. Lower half generously webbed inside and out to give great strength and immunity against road shocks. Three drain plugs, located in horizontal positions so as to be protected from damage.

Road Clearance—Full four inches at lowest point of motor base. Frame cradle clearance $7\frac{1}{2}$ ".

Connecting Rods—Drop-forged, I-beam section, with holes drilled through web to provide maximum lightness combined with strength. Heat-treated and quenched in oil, giving great toughness and endurance. Split at crankpin for take-up. Oil dipper on lower end.

Pistons—Close-grained gray iron, very light and perfectly balanced, provided with oil returns to insure correct lubrication. Three rings to each piston, with light pressure on cylinder walls and narrow faces on rings, to reduce friction to minimum while preserving proper compression and high motor efficiency. Sporting Solo Model provided with aluminum alloy pistons.

Timing Gears—Unusually fine in material and workmanship, insuring precision and accuracy of motor operation. The two large gears, the camshaft gear and the idler gear are steel drop forgings; the other gears are cold-rolled steel. All are cut on Fellows' Gear Shapers, with teeth scientifically generated. All gears are case-hardened. Gears run in an oil bath, insuring silence and freedom from wear. Readily accessible, as all timing gears can be exposed merely by removing gear cover.

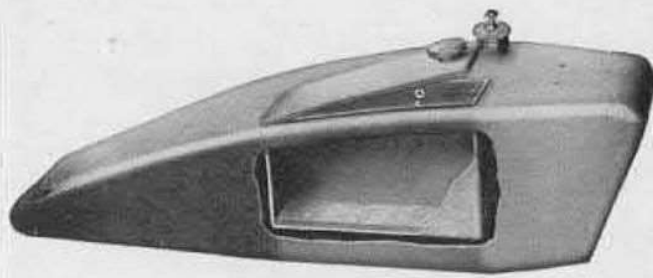
Lubrication—Entirely automatic and trouble-proof. Constant-level circulating-splash system of type used on fine automobiles. Oil carried in reservoir in motor base supplied in constant streams to splash troughs under the connecting rods by positive gear pump, which draws oil from rear of base so as to maintain efficient lubrication when ascending long, steep hills or under other severe conditions. This system insures uniform and adequate lubrication at all times in proportion to speed at which motor operates, and requires no attention from rider except to put oil into motor base occasionally, through the filler plug provided at top of breather in easily accessible position. Oil gauge shows amount of lubricant in oil sump whenever desired. Capacity of oil reservoir, one gallon.

In an article concerning lubrication, published in "Automotive Industries," the following statement is made regarding the efficiency of the Ace system of lubrication for long service.

"Over-oiling has been practically overcome in connection with circulating splash lubrication. With this system the amount of oil thrown onto the cylinder walls depends only on the level of the oil in the splash troughs, the size of the dippers and the speed of the engine. None of these factors varies as the engine grows older and begins to show signs of wear. In a pressure-feed lubricated engine, on the other hand, the pressure being maintained constant by the relief valve, the amount of oil passing through the bearings increases as the latter become loose. Therefore, whereas an engine with splash lubrication that oils properly when it leaves the factory is almost certain to continue to do so as long as the piston and rings are not unduly worn, this is far from being the case with the pressure-feed lubricated engine. . . . The provision of pressure control actuated by the intake vacuum does not overcome the effect of wear in the bearings."

For traveling under average road conditions, all the rider needs do is to put in a quart of oil about every 100 miles.

Small projection on lower end of each con-



Cutaway view showing fuel tank built into gasoline tank. Bottom of fuel tank heavily padded and soundproof. Capacity of gasoline tank 3½ gallons. Large filler cap of proper size to accommodate nozzles of pump hoses used by gasoline filling stations. Squirt gun in filler cap.

necting rod scoops oil from trough on downward stroke and sprays all moving parts with lubricant as it ascends. Main bearings oiled by means of large oil cup formed in casting with holes leading to bearing surface. Wristpin oiled by countersink in upper end of connecting rod, with drilled passage. Timing gears and transmission run in oil bath supplied by splash from motorbase. All superfluous oil returned to sump in motorbase by means of outlet in center of oil pan.

Removable Pan—Oil pan in bottom of crankcase. Lower half of cast aluminum crankcase may be removed without taking engine out of motorcycle frame, thus facilitating inspection or overhauling.

Oil Gauge and Breather—Breather incorporating oil filler, with baffling device to avoid loss of oil, bolted on left of crankcase. Long air pipe extends well down side of motorbase. Oil gauge with notched rod dipping into sump, with cap for quick withdrawal for inspection.

Muffler—Muffler and exhaust manifold in one unit, with $1\frac{1}{2}$ " gas passages arranged in sweeping lines, having no sharp bends or corners to obstruct free movement or cause back pressure. Generous expansion chamber, $2\frac{1}{2}$ " diameter, permits gases to cool and lose velocity before passing into large tail pipe leading to rear of machine. Silent, cool and efficient. Cutout of improved pattern operated by foot; produces pleasant bass hum when open.

Inlet Manifold—One-piece casting with two outlets. Gas passage forked to supply same volume of mixture to each cylinder. Main gas channel straight from carburetor, with no sharp bends or curves to cramp flow of vapor.

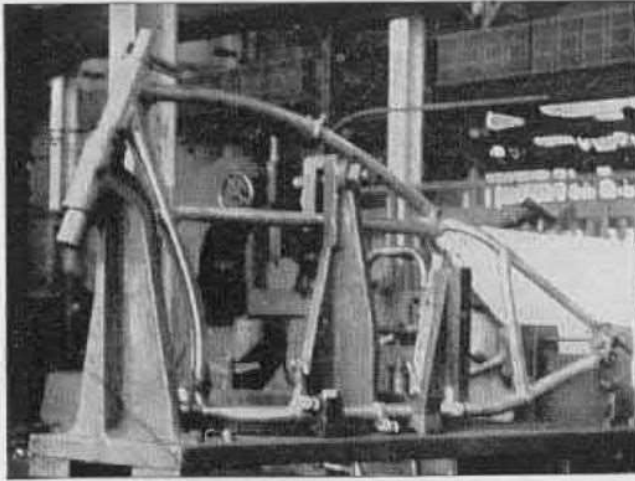
Heating Devices—Air heated by passing through tube enveloped by exhaust flames in muffler before reaching lower air intake of carburetor. Hot spot, provided by copper stamping connecting rear of valve cage to manifold, insures thorough vaporization, thus assisting both in producing maximum power and reducing carbon deposits.

Carburetor—Ace-Schebler, special model designed to meet the particular requirements of this motor. Adjustments for high and low speeds. Special warm-air intake. Located in convenient position for easy adjustment while riding. Easy starting, smooth running free from delicate or complicated parts.

Ignition—High-tension armored waterproof



Powerful spring fork of Ace motorcycle, combining comfort and efficient shock-absorbing qualities with security and strength. Powerful drop forging used for frame connection at head. Shock-absorbing springs mounted in upper barrel, incorporating powerful coil spring for receiving direct shocks and a second spring of generous size and strength to take up rebound.



The frame mounted in jig ready for brazing. This method of frame production insures correct alignment of Ace frames without necessity of bending or otherwise truing up, so that unnatural strains or stresses in the metal are avoided and great endurance thus gained.

magneto. Ignition wires enclosed in black fiber tubes for protection. Spark plugs, metric.

Lighting Generator—Electrically-equipped Ace motorcycles use the regular high-tension magneto for motor ignition and are equipped with an entirely separate unit to provide current for lights, so that no derangement of the lighting circuit has any effect on the operation of the power plant. Lighting current produced by standard Splitdorf generator. Mounted underneath tank on left side, protected from weather or accident. Driven by black fiber sheave wheel, split and clamped on magneto shaft.

Electrical Equipment—Power accumulated in storage battery mounted in box suspended from frame under the saddle, readily accessible and located so as to give best balance. Lid can be removed and battery drawn out for filling without removing terminals. Powerful headlight mounted on strongly-braced bracket, with parabolic reflector and dimmer controlled by switch. Tail light. Motor-driven electric horn securely clamped to frame in inconspicuous position below tank. Horn button ahead of left grip.

Lighting Switch—Lights may be operated singly or together by means of switch conveniently located on side of battery box.

Motor Controls—Spark advanced or retarded by turning the left grip on handlebar. Throttle operated by turning right grip. Simple and positive piano-wire mechanism that does not rattle or develop lost motion. Controls remain where set when hands are removed from bars—do not jar open or shut. Smooth in action, dependable and secure.

Starter—Step-starter with engaging mechanism completely enclosed. Ratchet dogs with flat-face tooth to prevent chipping. Large and powerful drop-forged foot lever. Tubular footpad. Motion down and back. Lever returns to top position by spring at end of down stroke. Folds back out of way when not in use.

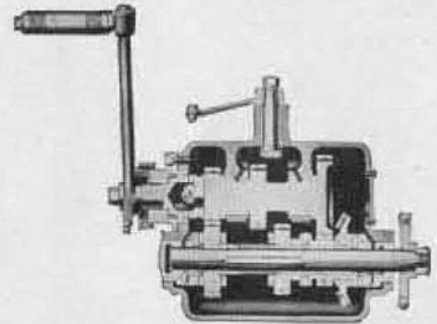
Transmission—Three-speed progressive type, housed in rear of motor base and running in oil bath. Lubricant automatically supplied by splash and requires no attention from rider. Gears of hardened nickel steel, 8-10 pitch, stub tooth, face $\frac{3}{8}$ " wide. Gearshift locking mechanism inside crankcase eliminates need of locks on operating-lever quadrants. Drive through

spiral bevel gears gives silence of operation and absence of wear. Gearshift controlled by lever on left side of tank.

Clutch—Automobile-type multiple-disc clutch built into flywheel and running in oil bath. Abundant friction surface gives tremendous pulling power for heavy loads or high speed. Discs held in engagement by 14 large, carefully-tempered coil springs, each $\frac{1}{2}$ " diameter and $2\frac{1}{2}$ " long. Full range of action compresses spring only small fraction of its length, so that its strength is not affected by long service and tension remains constant. Pressure distributed over all springs so that none is subject to material strain. Requires no adjustment or other attention from rider. Three sets of large chromium-steel ball bearings to carry thrust.

Final Drive—One heavy Duckworth roller chain, $\frac{3}{8}$ " pitch, $\frac{3}{8}$ " wide, from transmission to rear wheel. Ace design eliminates the usual engine-to-countershaft short chain, and thus provides improved efficiency of service and silent running without jerk or rattle.

Foot Controls—Clutch actuated by foot lever beside left footboard, service brake by lever by right footboard, thus giving same operation of foot controls as if driving an automobile. Emergency brake operated by lever located so as to be pressed down by heel of left foot when additional holding power is desired. Clutch may be operated by hand lever when desired.



Section of transmission case, showing three-speed gears and foot starter.

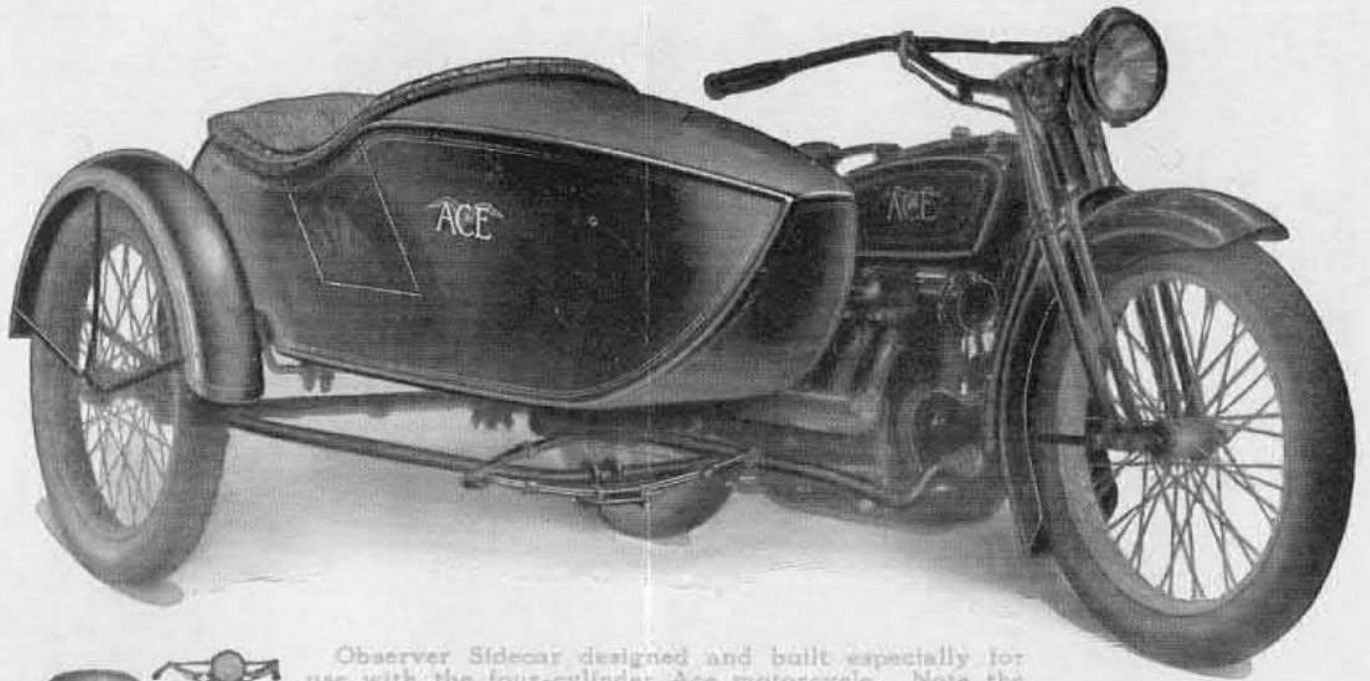
Brakes—Two entirely independent brakes; two powerful double-acting external bands acting on large drums on each side of hub. All parts of each brake interchangeable. Special grade of long-wearing asbestos-composition brake lining.

Hubs—Rear hub, one-piece steel shell with ball bearings, cups and cones of chromium steel. Balls 7-16" diameter, axle $\frac{1}{2}$ " diameter; $4\frac{1}{2}$ " between spoke flanges, extra large and strong for side-car use. Front hub, one-piece steel shell with removable cups; cones and cups of chromium steel. Axle $\frac{3}{4}$ " diameter, balls $\frac{3}{4}$ ".

Wheels—27" diameter, using heavy CC steel rims; strongest and most rugged type of wheel used on motorcycles. 40 spokes front and rear. Front wheel provided with slip axle for easy removal.

Tires—27 x $3\frac{1}{2}$ " non-skid. Large air capacity of this size tire is unusually effective in cushioning rider and machine from road shocks or vibrations, while the increased diameter provides augmented steadiness and security in riding sand and mud or crossing car tracks.

Guards—Very wide full-crown mudguards that protect rider and machine from mud or road dirt. Generous clearance to allow use of tire chains. Extension aprons on sides of front guard to protect from splash. Rear guard fastened with pivot so as to permit tilting for-



Observer Sidecar designed and built especially for use with the four-cylinder Ace motorcycle. Note the unusually deep cowl and long sweeping lines of this car, enhancing its handsome appearance and giving unusually thorough protection to the passenger. The small views at the sides illustrate the appearance of this car as viewed from other angles, and also show the generous road clearance beneath the chassis. Large luggage compartment in space back of seat, readily accessible through door in rear of body. Quick-detachable connections allow car to be removed from motorcycle or re-attached in less than a minute.



ward for easy removal of rear wheel, thus effecting real convenience without a hinge or joint in the rear guard.

Frame—Suspension-cradle type, giving great strength and low distribution of weight. Made of $1\frac{1}{2}$ " 13-gauge seamless steel tubing. Front bar $1\frac{1}{2}$ " 11-gauge, with powerful internal reinforcements. Head frame and fittings are solid drop forgings. Reinforcing brace bars from rear fork crown to cradle bar relieve all strain on rear fork connections and give great strength and durability. All fittings and connections are tough steel drop forgings. Side members of frame completely enclose motor, transmission and control mechanism so as to protect all vital parts from injury by fall.

Wheelbase—59 inches, combining smooth riding qualities and road comfort with ease of control, ready responsiveness and ability to turn quickly.

Saddle—Ace special integral design, built in as part of the motorcycle. Bucket-seat top scientifically shaped for comfort. Double-spring system of special design to avoid bouncing or recoil, with $3\frac{1}{2}$ " range of action. Unusually low and well forward, distributing weight of rider between the two wheels, giving excellent balance and making machine particularly easy to handle—highest point on saddle is only $27\frac{1}{2}$ " from ground, so that even a man of short stature can place both feet flat. Covered with black leather; springs black japanned.

Tank—Pressed steel construction, beveled front and rear, with all corners rounded. Capacity $3\frac{1}{2}$ gallons. Provided with efficient gasoline strainer and sediment trap. Large filler opening to accommodate hose nozzles on gasoline pumps at filling stations.

Toolbox—Built flush inside gasoline tank, out of sight. Lid at top. Tool compartment deep and narrow, with bottom heavily padded to avoid rattle. Waterproof, neat and convenient.

Footboards—Hinged to fold up so as to avoid damage in case of fall. Roomy and comfortable. Substantial steel plates with drop-forged arms, covered with high-grade rubber mat, deeply corrugated to prevent slipping.

Handlebars—Low and wide, giving comfortable position for arms and wrists. Braced by cross-bar. 15-16" steel tubing, finished in all-weather tough black enamel on standard model, on Sporting Solo, $1\frac{1}{2}$ " tubing, 13-gauge, no cross-bar, heavily copper-plated and nicked. Extension cushion rubber grips, deeply corrugated.

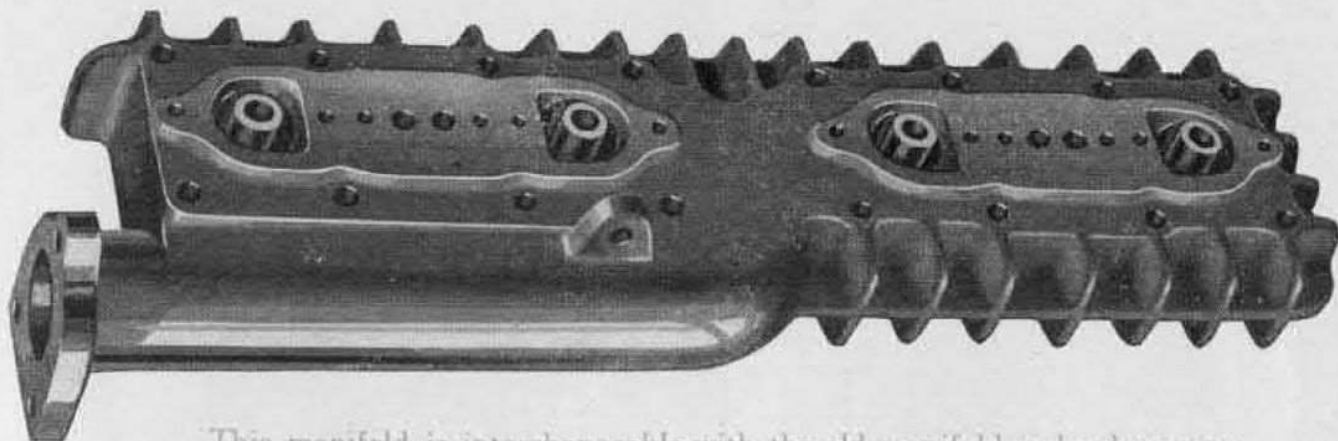
Spring Fork—Double fork with straight sides. Springs and plunger completely enclosed. Angle and leverage of rocker arms designed so as to absorb both small vibrations and severe road shocks; motion of axle back and up. Hardened steel bushing in rockers. Studs of large diameter, hardened, give exceptional strength at point where shocks are met.

Weight—The lightness of the new Ace is a pleasant surprise to many riders who naturally think that because of its great power and strength it must be of more than ordinary weight. As a matter of fact the Ace is the lightest high-powered motorcycle made in America—a fact which is made possible by the high efficiency of perfected four-cylinder design. This lightness combines with its low center of gravity and excellent balance to make the Ace so easy to handle as a solo mount, and so capable under all road conditions. Weight of Ace magneto-model motorcycle, complete, only 365 pounds.

Stand—U-shaped with extra-long side braces. Special rattle-proof spring washers. Attached independently of rear axle, to facilitate adjustment of chain tension.

Finish—Ace high-gloss baked enamel, with fine gold stripe on tank, fork and mudguard; gold nameplate on tank.

www.howit



This manifold is interchangeable with the old manifold and valve cages and can be installed on any Ace Motorcycle, and eliminates 21 component parts.

PRICES

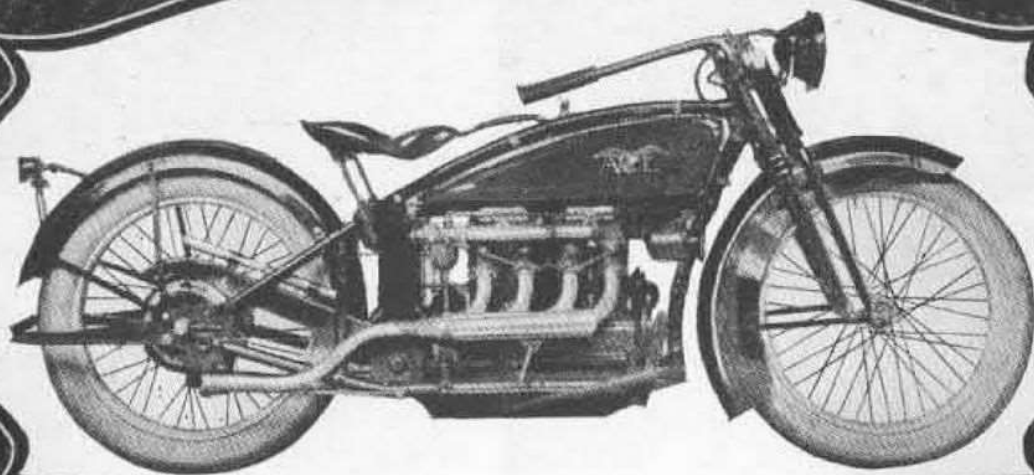
- Standard electrically-equipped model four-cylinder Ace Motorcycle with magneto ignition, separate lighting generator, storage battery, two-bulb headlight, tail light and electric horn..... \$400.00
- Magneto Model, without electrical equipment for lights and horn 370.00
- Sporting Solo Model, with aluminum pistons, high-speed high-compression motor, nickel-plated sport bars and full electrical equipment..... 420.00
- Observer sidecar, complete with tire and all fittings for attaching to motorcycle 110.00

All quotations f. o. b. factory and subject to Federal tax.

Guarantee—Every Ace Motorcycle is fully covered by the guarantee of the Ace Motorcycle Corporation, the standard form of warranty endorsed by the Motorcycle and Allied Trades Association.

The Ace Motorcycle Corporation reserves the right to make improvements or changes in design or construction of its product without notice at any time it considers advisable; all quotations are subject to change without notice in case of strikes, fluctuation of material prices, or other unforeseen causes, and in the event of such changes or improvements no liability shall attach to this company.

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ACE

**ACE MOTORCYCLE CORP.
PHILADELPHIA, PENNA., U.S.A.**

An authority on advertising has said:

"We can spend hundreds of thousands of dollars advertising a product, but if it isn't what the people need, if it doesn't serve, it cannot be a permanent and growing success. It doesn't matter so much what we say about it. Every product finds its own place in the life of the world by the quality of the service it renders. It creates its own good-will. About all advertising can do is call attention to the fact that it exists."

That's the object of Ace advertising, simply to point out the facts about perfected four-cylinder power. The swiftly-growing popularity of the Ace is the natural response to the advantages that motorcyclists thus discover.