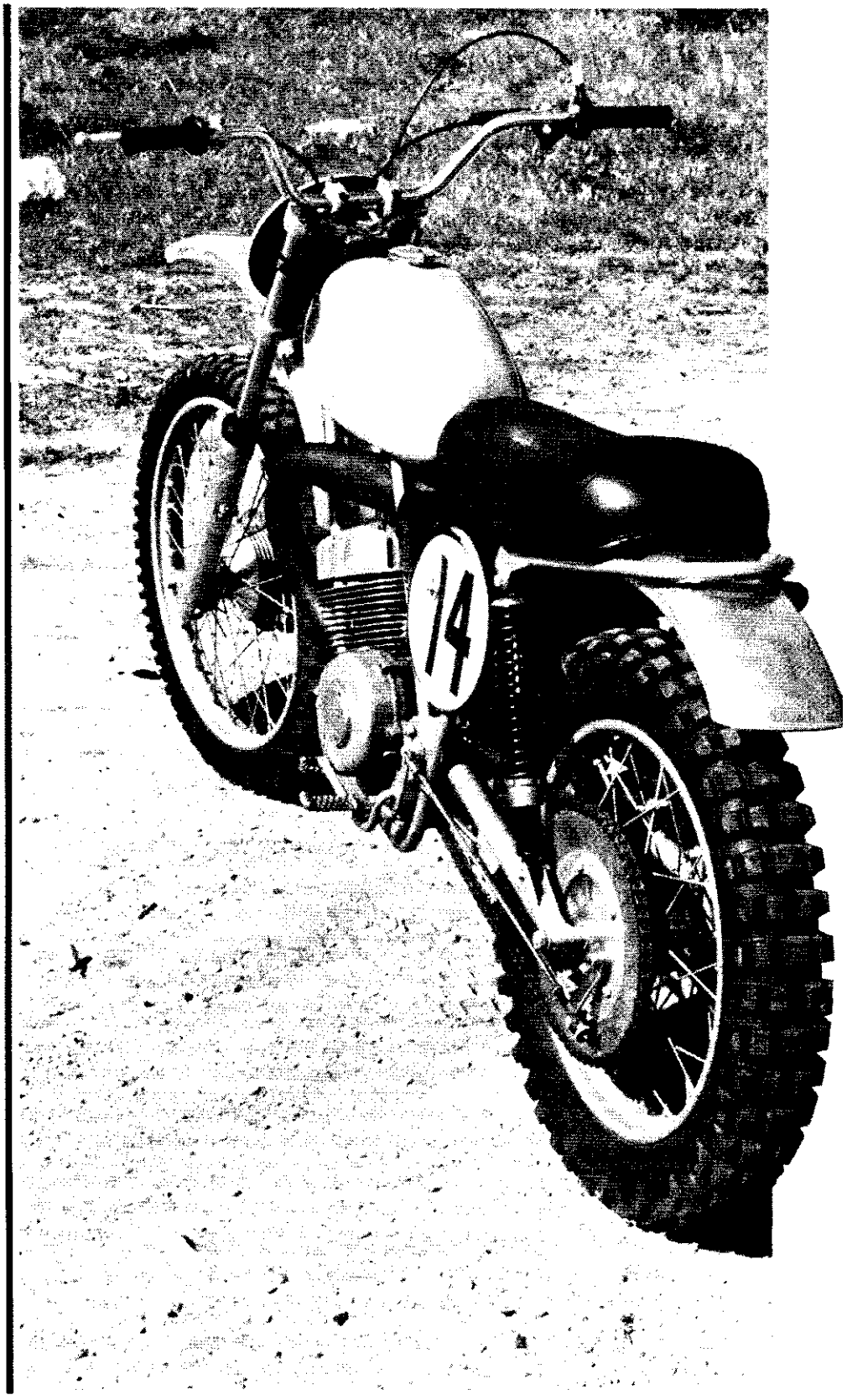
If you were to ask us what we consider to be one of the most difficult tasks in motorcycling, we would reply, "to build a dirt racer capable of winning the first time out." Consider for a moment the state of the art of moto cross racing, and we think you'll agree. For the past several years, international moto cross racing has been dominated by two brands of motorcycles, one made in Sweden, the other in Czechoslovakia. Other firms produce machines that are every bit as good, but lack the highly skilled riders to bring them victory. Cobby as they look, the modern day moto cross racer is a highly sophisticated, utterly dependable piece of equipment.

To attempt to create a machine capable of running in this company would indeed be an ambitious undertaking. The firm of Norton-Villiers is nothing, if not ambitious, and in late 1967 that firm began campaigning a prototype scrambler named the Y4 AJS. The power plant in the prototype machine was based on an engine used as early as 1966 in racing efforts by Peter Inchley. In its road racing form, with Inchley in the saddle, the Ajay won races at Mallory Park and at Snetterton. The machine as well set a new 250 record at the famed Brands Hatch course. Obviously, Norton-Villiers had a dependable and potent power plant on hand.

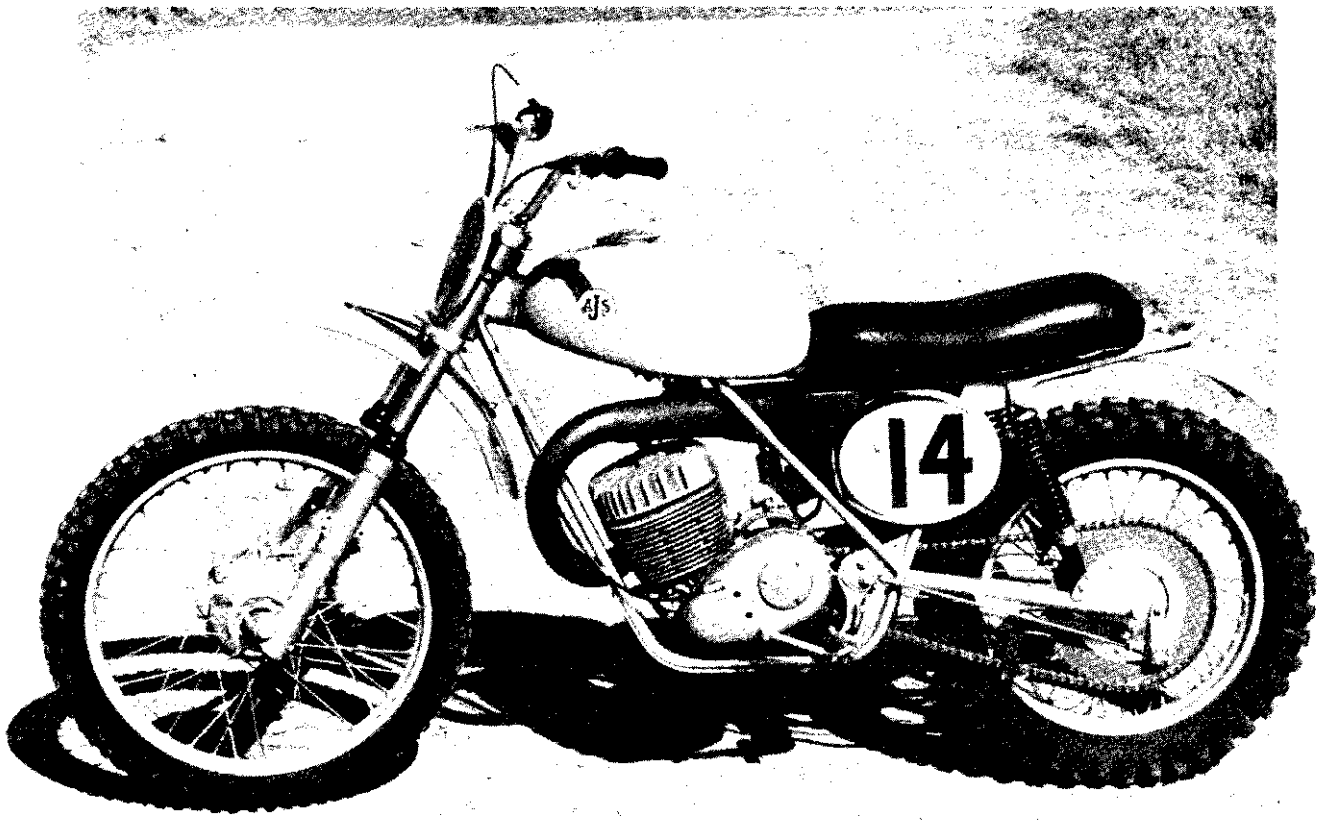
Norton-Villiers was indeed brave when they decided to develop their new

HIGH STYLING AND VERY GOOD POWER OUTPUT COMBINE TO MAKE A HANDSOME AND POTENT DIRT RACER

THE AJS Y4 MOTO CROSS RACER



A MODERN CYCLE ROADTEST



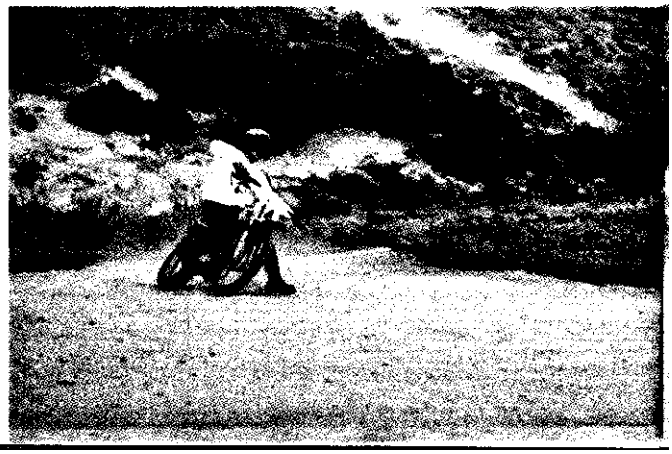
Fragile in appearance only, the AJS frame is constructed of Reynolds 531 steel alloy tubing. Duplex downtubes provide a very rigid cradle for the power plant.

MOTO CROSS RACER

AJS scrambler in actual competition rather than behind closed doors and on factory owned test tracks. Naturally, all mistakes and mechanical breakdowns occurred in full view of the motorcycling public. Failures caused by the heat of competition were thoroughly investigated, and each failure taught a lesson. Throughout the year 1967, the Y4 improved as design errors were weeded out. Simplicity and reliability were two of the main factors sought by the Ajay technicians. It was known that the engine could be made to produce 32 hp, yet Peter Inchley felt that 27 hp developed at 6,400 rpm was more than sufficient and that this output would increase the reliability factor, so essential in moto cross racing. Simplicity was sought so that the owner could run the machine in race after race without the need for extensive overhauls.

By the beginning of 1968, the factory felt ready and a young rider, Malcolm Davis was hired to campaign the machine in the 250 British Moto Cross Championships. Competing against other factory supported riders, Davis was able to garner the championship for AJS in what was essentially its first year of real moto cross competition.

The AJS Scramblers finally reached these shores last fall when several factory riders, including Andy Roberton and Bendt-Arne Bonn campaigned a group of machines in the Inter-Am series. Their debut in the States was impressive considering the caliber of



riders and machines with which they had to compete. The Inter-Am Ajays displayed good turn of speed, and the handling appeared to leave nothing to be desired.

Finally, the AJS Scramblers have become available to the buying public and their machines worthy of the attention of anyone considering entering the sport of moto cross racing. We chose the Y4 250cc model for our test and evaluation.

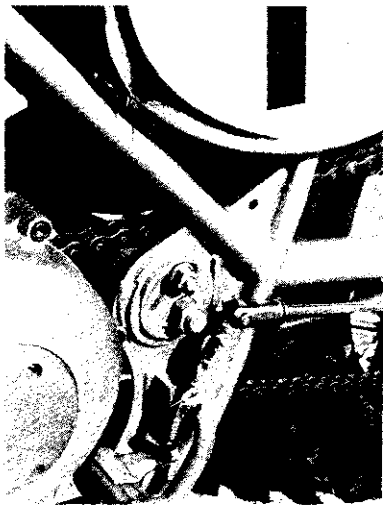
If first impressions are, as they say, the most lasting, then the Ajay scores very heavily. The Y4 has a light and agile (fragile?) look that belies its potency. The bright orange fiberglass gas tank is eye catching, and the great gobs of ground clearance make it appear that the machine could pass over the largest of obstacles with no problems. Small diameter conical hubs, fenders, carried in the high position, and small diameter tubing in the frame add to the look of lightness. While not extremely thick, the seat is long, wide, and well padded. An exhaust pipe carried in the low position is fine for moto cross racing, but hardly the hot setup for woods riding or desert competition. The Ajay will score with the cross country racer because of the position in which its expansion chamber is located. The pipe is carried in the high position and the main portions of the chamber pass within the framed tubing. This allows the factory to mount a substantial bash plate to the downtubes of the frame.

Norton-Villiers has assigned the name Stormer to their 250cc AJS Scrambler; we assume the name refers to the output of the power plant. While basically similar to other single cylinder two-stroke engines, the Ajay motor does possess characteristics that are outstanding. Based on the original road racing Starmaker unit, the Ajay single cylinder two-stroke has a compression ratio of 12.3 to 1 and is constructed entirely from aluminum alloy. Machining of the cylinder base and crankcase mouth assure the best possible seal. Both the head and barrel are light alloy castings with quite long fins closely spaced. The

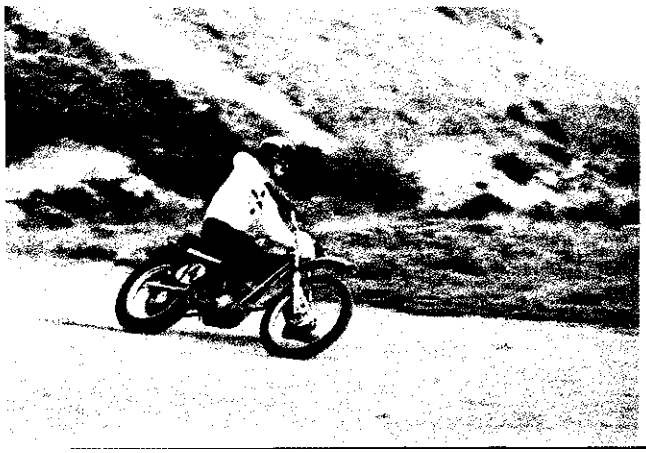
finning on the cylinder head is angled so as to direct the blast of cooling air toward the center mounted spark plug. A spuncast iron liner is pressed into the cylinder and all ports are very carefully matched. The piston is a gravity die-cast light alloy unit fitted with two cast iron rings. The dome of the piston is slightly convex and it, the connecting rod, and flywheels are all individually balanced. The small end of the con rod is fitted with a bushing, while the big end is borne by double roller bearings.

A "square" bore and stroke of 68 mm gives a total capacity of 247cc. Maximum output of 27 hp develops at 6,400 rpm. It's obvious from just glancing at the engine that the crankcases were cast with ample strength. Space between the inner surfaces of the crankcase and the flywheel is absolutely minimal. These close tolerances insure that the maximum amount of fuel oil mixture is passed through the transfer ports and into the combustion chamber. A total of six studs are used to secure the head and barrel to the crankcase. Actually, only four of these studs pass all the way through the barrel and into the crankcase. The other two are short studs taped into the barrel. These two smaller studs were added in an attempt to keep distortion to a minimum.

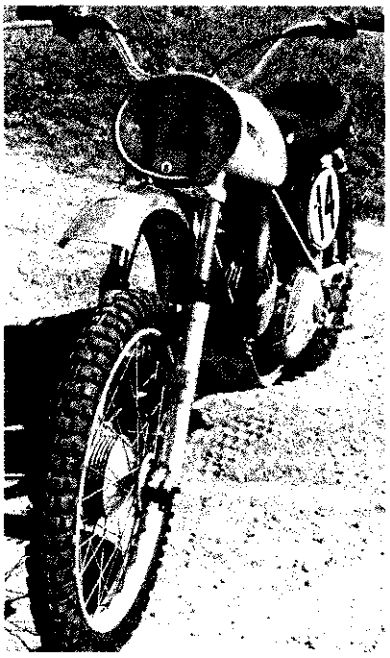
A 32 mm concentric bowl Amal carburetor feeds fuel to the combustion chamber through a long inlet tract. The 932 model Amal is modified especially to meet the demands of the Ajay power plant. These modifications apparently work. This example of the concentric is by far one of the best we have ever encountered. The engine responds very smoothly to applications of the throttle. It's obvious that the carburetor sends the fuel to its destination with absolutely no delay. Clean air is supplied by a filtration system carried beneath fiberglass side panels on either side of the frame. The filtration system was designed to actually aid the power plant by minimizing any restriction in the flow of air. The exhaust system location goes against the currently accepted standard in moto cross design. Yet, the machine seems to suffer not at all from



Rear axle adjustment is made at the swinging arm pivot rather than at the wheel. A pair of eccentric discs are rotated to give the desired chain adjustment.



THE AJS Y4



Forks, designed by AJS, offer better than seven inches of travel. Both the triple clamp and crown are of light alloy, and the front end is predictably light.

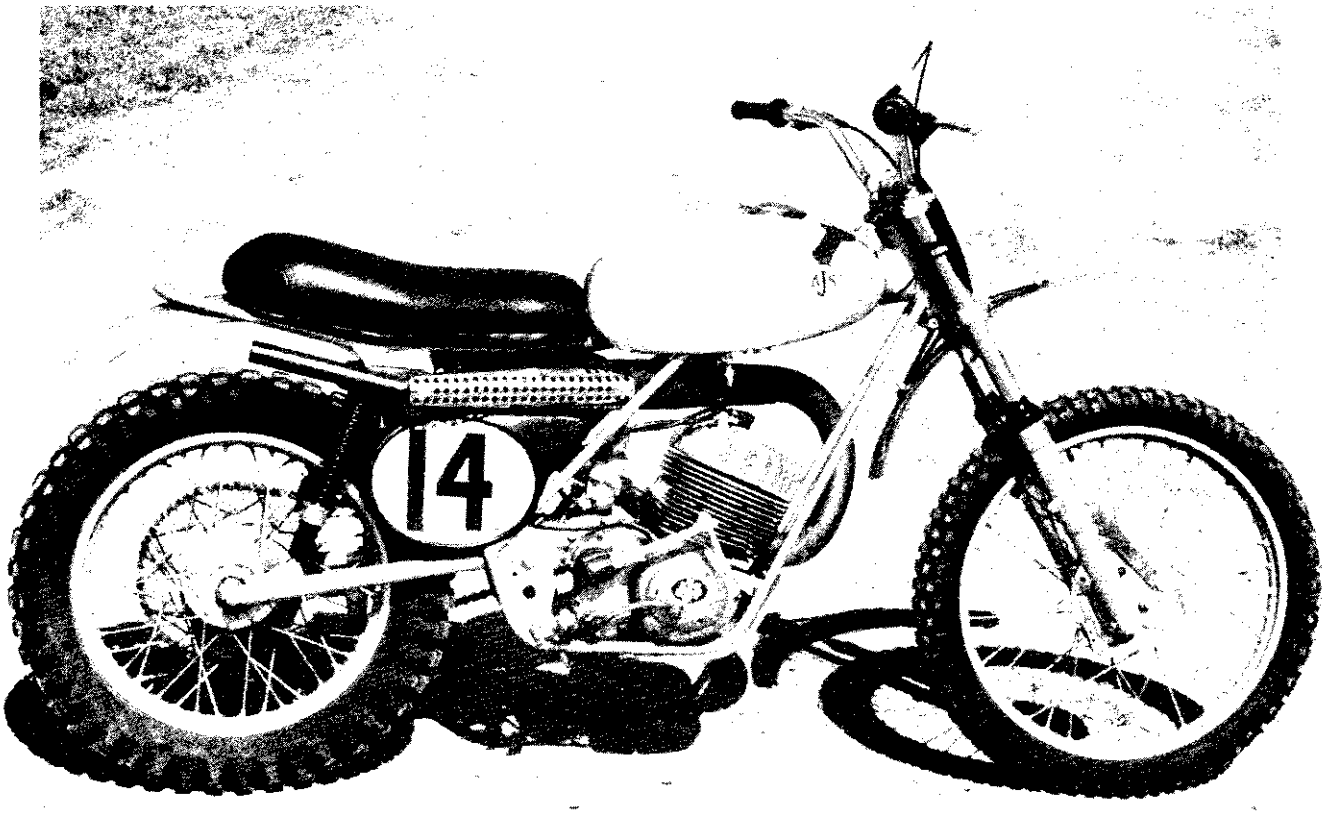
the location of the pipe. The exhaust system arcs upward and curves to the left of the cylinder head.

The expansion chamber is carried beneath the gas tank and seat, and the stinger exits from the right side of the machine just in front of the shock absorber. In this location the exhaust system is very effectively out of the way of the rider. In fact, the only heat shielding is on the very aft portion of the secondary cone in the chamber. A tad more power probably could have been obtained by running the system under the engine. However, this would obviously have affected the ground clearance of the bike.

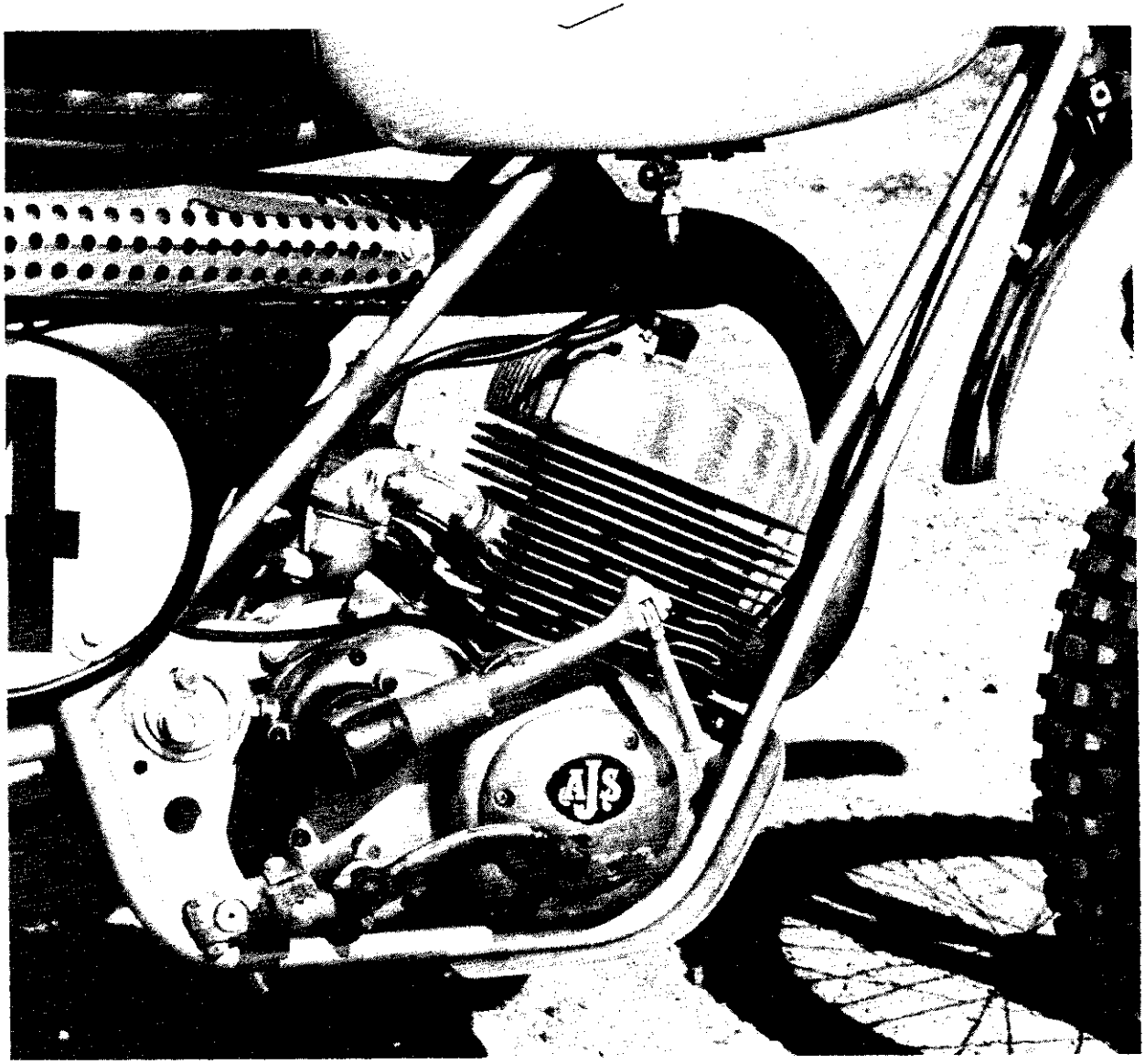
Ignition is supplied by an energy transfer system which consists of a newly designed coil matched to an AC generator. This set up supplies a hefty spark right through the engine's speed range. Access to the points is gained by removing a small plate on the outside of the timing side cover. Adjustment is simple since the points are located on the end of the crank and not beneath the flywheel magneto.

Separate gearboxes and crankcases are no longer in vogue, yet AJS seems to get good results from this supposedly dated form of design. Primary drive is on the left side of the engine, and a duplex roller chain transmits power from the crankshaft to the clutch hub. The AJS engineers have used an all metal diaphragm-type clutch, similar in design to those used in many high performance racing cars. The drive is taken through a close ratio four speed gearbox of quite sturdy construction. Both the transmission gears and the clutch run in an oil bath. Gear changes are made with a lever mounted on the right side of the transmission, and the pattern is not at all to our liking. Low gear is obtained by lifting the lever with the toe; acceleration is accomplished by pressing down on the shift lever; and of course, downshifting is accomplished by raising the lever. We've always preferred just the reverse on dirt racing machines. In our estimation, it's simpler

(Text continued on page 43)



Steel wheels are laced to light alloy conical hubs. The front fender mounted on a spring steel strap flexes something fierce, yet comes to no grief. The color impregnated fiberglass gas tank has a capacity of 2.4 gallons.



"Square," with both the bore and stroke at 68 mm, the total displacement of the engine is 247 cc. The separate transmission carries close ratio gears that are ideally suited to moto cross racing.

Make	AJS
Model	250 Y4 STORMER
Price As Tested	$1,075.00
Engine Type	TWO CYCLE, SINGLE CYLINDER
Bore	68mm
Stroke	68mm
Displacement	247cc
Compression Ratio	12.3:1
B.H.P, at R.P.M.	27 AT 6,400
Carburetor	AMAL (32mm concentric)
Ignition	ENERGY TRANSFER
Fuel Capacity	2.4 GALLONS
Lubricating System	GAS/OIL MIST
Clutch Type	WET, METAL DIAPHRAGM
Final Drive	CHAIN
Starting System	KICK, FOLDING CRANK
Gear Ratios	1st: 23.07:1; 2nd: 17.36:1; 3rd: 14.18:1; 4th: 11.35:1
Top Speed	62.78 MPH
Tire Size	FRONT: 2.75 x 21; REAR: 4.00 x 18
Suspension	FRONT: TELECOPIC FORK; REAR: SWINGING ARM
Frame Type	TUBULAR STEEL, DOUBLE CRADLE
Weight	227 POUNDS
Wheelbase	55.5 INCHES
Ground Clearance	8.5 INCHES
Peg Height	11 INCHES
Seat Height	31 INCHES

THE AJS

to make downshifts by simply pressing down on the shift lever. Obviously, the shift pattern can be gotten used to; some very good riders are posting some very good results on these machines.

We feel that AJS was wise in producing a machine with exceptionally good breathing characteristics, characteristics that produce excellent torque, particularly in the medium engine speed range. This broad torque span means that the engine pulls strong from relatively low revs. It also means that the power is very manageable, unlike most moto cross racers the Ajay does not come on the pipe with a great rush of power. This one characteristic accounts for the ease with which the Stormer may be ridden. With the power coming on in such a predictable manner, it is much easier to negotiate the tight bends and curves common to moto cross racing. Try to punch it while coming out of a turn on a really pipey machine, and you are liable to find yourself on your fern. We certainly don't want to imply that the Ajay does not accelerate quickly—it's just that it accelerates from minimum revs and nowhere across the scale do you find a sudden jump in the output of power.

If smooth and predictable can be used to describe the output of the engine, it also can be applied to the handling characteristics of the AJS Y4. As the sport of moto cross racing has grown in this country, the machines used in the sport seem to have become slightly more difficult to ride. All of the really competitive bikes offer good handling, yet some of these machines seem to leave all of the work up to the rider. Ride the Ajay briefly, and you get the odd sensation that the bike is on your side. It is possible to get very badly out of shape and still avoid the dire consequences usually brought on by this sort of maneuver. Much of the Stormer's inherent stability can be traced to the configuration of the frame.

Constructed of Reynolds 531 tubing, the Ajay frame is ultra light and extremely strong. Bronze welding is used throughout in the construction of the tubework, and gusseting is minimal. Basically, the Y4 frame consists of a large diameter tapered backbone tube which connects the steering head to the nose of the subframe structure. This backbone absorbs all the major stresses in the frame while the looping downtubes carry the engine and gearbox assembly. The diagonal stringers that connect the backbone to the cradle tubes bear all fore and aft and tension loads. The cradle tubes, above the stringers, take all "up and down" tension and compression loads.

Sturdy tabs welded within the curves of the cradle tubes provide the pivot points for the swinging arm. The arm pivots on sealed polyudethane bushings that theoretically never need lubrication. No provision for axle adjustment is made at the aft sections of the arms. Instead, adjustment is made at the pivot by means of eccentric washers. This method of adjustment assures very precise wheel alignment and makes chain adjustment a very simple matter. Additional tabs are welded to the frame as mouths for the lightweight forged steel folding footrests. The pegs are mounted on a splined adapter which gives a wide range of adjustment.

The Ajay frame is fragile in appearance only! In actual use, it proves to be an extremely light, very rigid device. Finish on the tubework is also top quality. All the welds are very nicely dressed, and the frame is finished off in a flat metallic paint.

When the AJS engineers set about designing the suspension for the Y4, they utilized slow motion cameras in order to study the behavior of suspension units under the most extreme conditions. These modern methods resulted in the extremely efficient and relative wearfree lightweight "Teledraulic" forks used on the Ajay. This method also determined the type of gurling suspension units mounted on the rear of the machine. Unsprung weight was further reduced by the use of special high tensile steel rims and ultra lightweight AJS hubs. The hubs are molded with special anti-dust and anti-water sealing. The front rim on the Y4 Stormer is fitted with a 2.75 x 21 knobby, and the rear rim carries the more or less standard 4.00 x 18 cover. The light alloy hubs are formed in a conical shape, and each house a 5 inch diameter brakedrum. While not extremely large, the brakes are more than capable of handling the demands placed upon them.

Suspension is truly one of the Stormer's strong points. The springing has the ability to soak up all but the very worst of jolts while allowing the rider to maintain a good degree of control over his pitching machine. In truth, control is one of the features of the Ajay that truly impresses us. The suspension, as we have said, controls the terrain well, the power comes on in a very controlled manner, and steering control or precision, if you will, allows the rider to get the Ajay through the turns with a minimum of bother. Considering the fact that the AJS Y4 is a truly competitive moto cross racer, it is surprising that the bike is so easy to ride. We look for the AJS Y4 to very quickly become one of the more popular moto cross racers available in this country. ●