

*Shift up to seventh and gas it!*

# UNDERSTANDING HERCULES' 175

By the DIRT BIKE Staff

Perhaps the first, and most exciting, thing anyone will notice about the Hercules is that it uses a completely new Fichtel-Sachs engine. And, obviously, the first thing anyone wonders about the new Fichtel-Sachs motor is what resemblance it bears to the old Sachs B. So let us point out right away that the similarities are limited to their essentially Teutonic nature and little





more.

All the new Sachs motors, 100 through 250, are based on the same crankcases and transmissions. These units split horizontally, enabling easy access to gearbox components and providing what is generally considered a better method for locating and securing seals and bearings. Rather than being a slip or press fit into a case half, bearings and seals are located by spacers and then pinched between the two case halves. This positively secures the bearings, lessening the possibility of the outer race spinning, and also eliminating wear from installation. After three or four overhauls, the bearing mounts in vertical cases can become worn from the installation process.

The crankshaft is not full circle, but has relatively large counterweights to keep the spin spinning. Two main bearings support the crank on the drive side, though the



helical gears also produce longitudinal thrusts on the crank.

The helical gears drive a rubber cushioned clutch with interlocking plates. The tangs on the plates are L-shaped so that there is more surface area to contact the hub. This reduces wear on the alloy hub. The clutch is quite large and exceedingly strong. It is, in our experience, capable of handling any abuse conceivable. Idler gears hide behind the hub to provide primary kickstarting. And the kickstarter itself is integral with the clutch case, ala Husqvarna, so that it comes off with the case. When reinstalling the

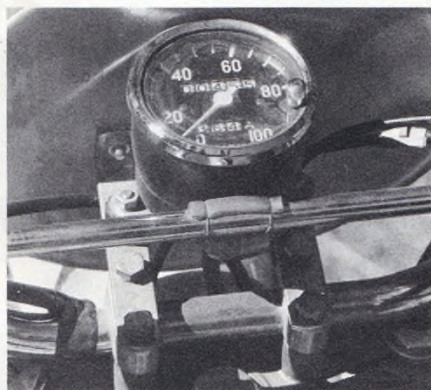


clutch case the kickstarter spring must be preloaded and the lever held at maximum travel to hold the spring end in a cavity in the case. If the lever is not held down, much frustration will be your lot. Believe us.

Shifting is accomplished via a hook and pins mechanism to a drum with detentes. The drum moves three shifting forks which in turn move engaging rings on the transmission shafts. Thus, the gears themselves are not moved by the shifting forks. Seven different ratios are gained by an ingenious method. The regular mainshaft has an

additional idler shaft with two gears of different ratios connected to it and that sits on the bottom of the case. These two gears are constantly in mesh with two gears on the mainshaft. By varying the engagements, power is moved through different combinations of gears. Though the transmission is like a four-speed (between the main and countershafts), the idler shaft produces three other potential ratios. A full explanation of the shifting is available with an illustration elsewhere. Suffice it to say here that this is perhaps one of the cleverest innovations of the year. Seven speeds





Speedometer has the best mounting arrangement yet. Still alive after 455 miles. The rubber on the crossbrace helps.

with ample-sized gears and the narrow width of a four-speed.

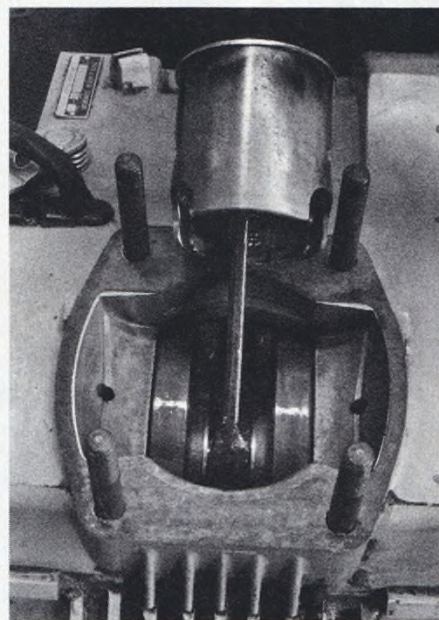
The power unit is not atypical of previous Sachs motors. Cylinder finning is massive and the cylinder ports relatively conventional. A single Dykes ring piston travels along a siamesed intake, two booster ports, two transfers and an exhaust port with two holes instead of fingers. A large surface area connects the cylinder to head, providing excellent heat transfer and sealing. The cylinder itself is held in place by four nuts accessed through the top of the cylinder and the head attaches to the top.

An external flywheel Motoplat provides ignition and lighting.

Air enters through a side-mounted filter into a well sealed and thoroughly waterproof air box. Upon reaching a Bing carburetor of 32mm measure the air runs into gasoline and whisks both into the combustion chamber for incineration. Shortly thereafter the remains gets kicked out the exhaust port and through a three-section high-pipe to be dissipated with a whisper to the rear of the motorcycle.

As explained in the impressions portion of this test, the motor mounts with only two bolts below and one in the rear. Because of stresses encouraged by cantilever shocks, the head stays had a tendency to snap on early models, such as our test bike. This has recently been cured by an added forward motor mount.

Ceriani forks handle a conical front hub and new ultra-tough



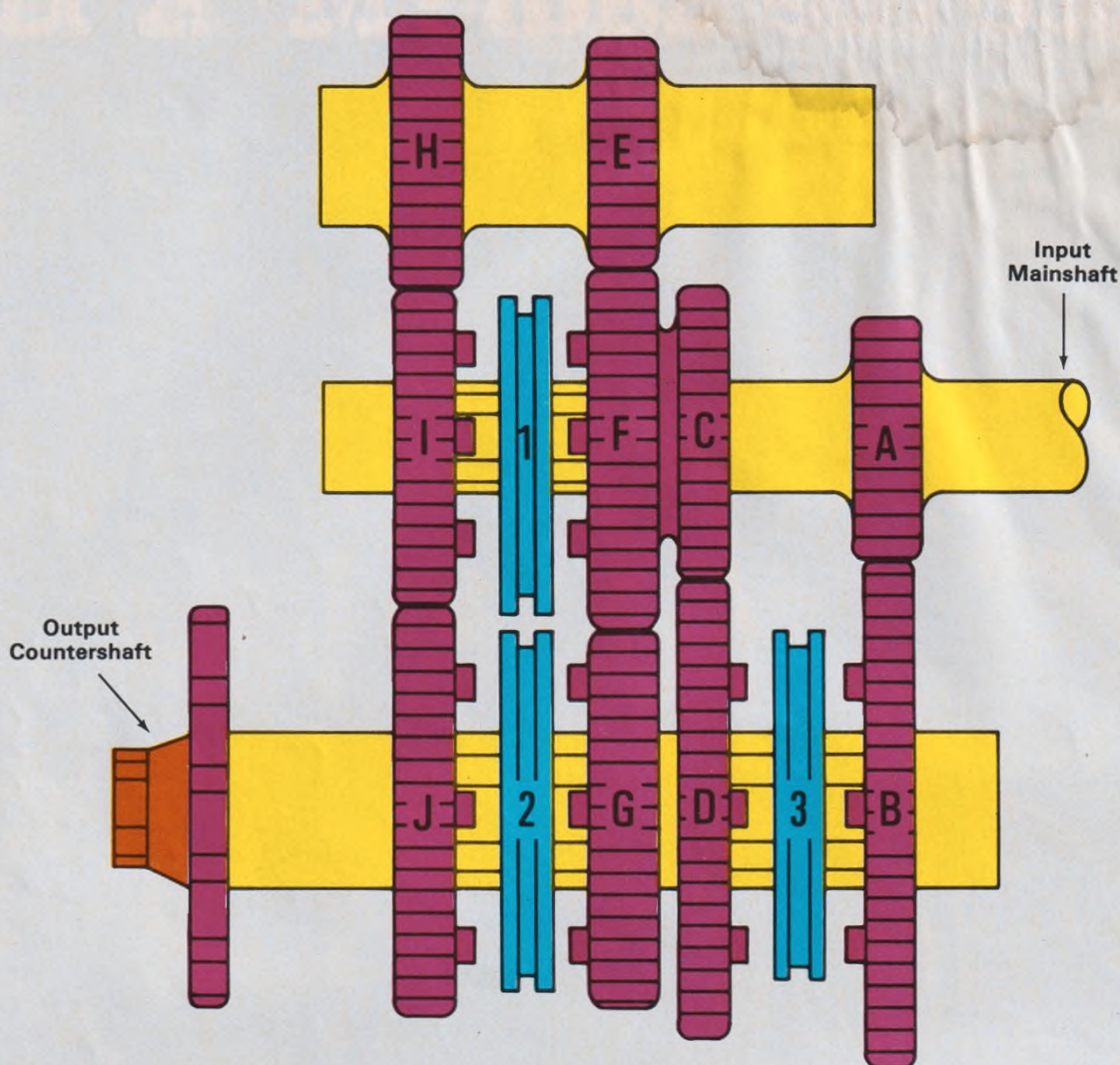
Crankwheels are not full circle, but hefty nonetheless. We've heard that the single Dykes ring piston will be replaced by two.

Akront rim with tenderness. Fork action is exceptionally compliant, but also up to the tougher tasks. The front brake cannot be faulted. It is progressive and two-finger powerful. Magura controls actuate it, along with clutch and throttle, but you'll hold onto a Magura grip, too, to reach the brake. Not the worst grip, not the best.

A 530 chain, the second to be found on a dirt bike, tugs on an alloy sprocket to make the wheel go

*Continued on page 74*





**F**ichtel-Sachs employs a clever method of deriving seven different transmission ratios in the GS175, while maintaining a narrow engine profile and substantial gears. By adding a third shaft, which engages the mainshaft and lies directly below it, three additional ratios can be gained from what would otherwise be a four-speed gearbox. In this diagram we have placed the third ("idler") shaft at the top for easier explanation. Both gears, "H" and "E" are integral with the "idler" shaft. Also, gears "F" and "C" are locked together making "FC." Other gears, with the exception of gear "A," are free to rotate independently when the transmission is in neutral.

In departure from standard practice, none of the gears move laterally on their shafts. Different

ratios are selected when shifting forks move engaging rings (1, 2 and 3) along splines on the shaft. These engaging rings engage dogs on the gears, thereby locking the gear to the shaft. In this diagram the transmission lies in neutral since no engaging ring is engaging any gear.

In order to follow the transmission of power through the different gear sets, the reader need only follow the progress of power from input, at the right side of the mainshaft, through the various lettered gears ("A" through "J") as follows:

1st: Engaging ring (3) moves right to engage "B." Power flows through "A" to "B" and out. Direct ratio.

2nd: Engaging ring (1) moves left to engage "I" and engaging ring (3) moves left to engage "D." Power flows from "I" through "H" and "E" to "FC" and then to "D" and out. Indirect ratio.

3rd: Engaging ring (1) moves

right to engage "FC" and engaging ring (3) moves left to engage "D." Power flows from "FC" to "D" and out. Direct ratio.

4th: Engaging ring (1) moves left to engage "I" and engaging ring (2) moves right to engage "G." Power flows through "I" to "H" and "E," then to "FC" and to "G" and out. Indirect ratio.

5th: Engaging ring (1) moves left to engage "I" and engaging ring (2) moves left to engage "J." Power flows from "I" to "J" and out. Direct ratio.

6th: Engaging ring (1) moves right to engage "FC" and engaging ring (2) moves right to engage "G." Power flows from "FC" to "G" and out. Direct ratio.

7th: Engaging ring (1) moves right to engage "FC" and engaging ring (2) moves left to engage "J." Power flows from "FC" to "E" and "H," then to "I" and to "J" and out. Indirect ratio.





round. The wheel is another alloy conical unit with another strong Akront rim. Inside is another cush



Boost ports add to the effect of transfer charge, just above intake port. Small holes above transfer are merely additional exhaust.

hub, further reducing driveline jerks. Driveline jerks are notoriously inconsiderate of bearings and gear faces.

Marzocchi gas shocks attach to the roller bearing mounted swingarm. Their general good nature is threatened by lengthy or aggressive riding techniques. There's too much spring when going slow and too little when going fast. Hercules team riders have used Fox Air Shocks and Works Performance Shocks with success.

All enduroing accoutrements are present. Headlight, VDO speedo, horn, taillight, brake light and even

mounts for a tank bag are included. Fenders are plastic and the rear makes a good springboard for the taillight. Both side- and centerstands are stock.

What could have been that wasn't? A folding shift lever would be a worthy addition, though the stock item seems willing to be bent and rebent without breaking. The pegs could use more serrations to better grip a boot by. A rimlock in the front wheel would have helped avoid ripped tubes. Two bolts get the seat off, but it takes four for the tank. And the gas cap could have actually sealed the tank. Minor trivialities common to most competitive machinery.

Because of the circumstances of the test the Hercules 175 has presented your beloved DIRT BIKE staff with some heady problems. We have had the bike for a considerable length of time now and have been under its influence even longer. It



**Ceriani forks are superb, but their laid-back triple clamps restrict the Hercules's turning radius too much.**

has become a member of the family. When we first received the bike it was like a forlorn runaway. Fresh from the knowing hands of a journalist mechanic, the poor Hercules was thoroughly inoperable and sported a brace of hammer-modified parts. About the only grin on the poor thing's face was relative cleanliness and a new set of Metzlers.

A Sachs aficionado friend of ours, Chick Harmon, picked up the Herc from the magazine which had been

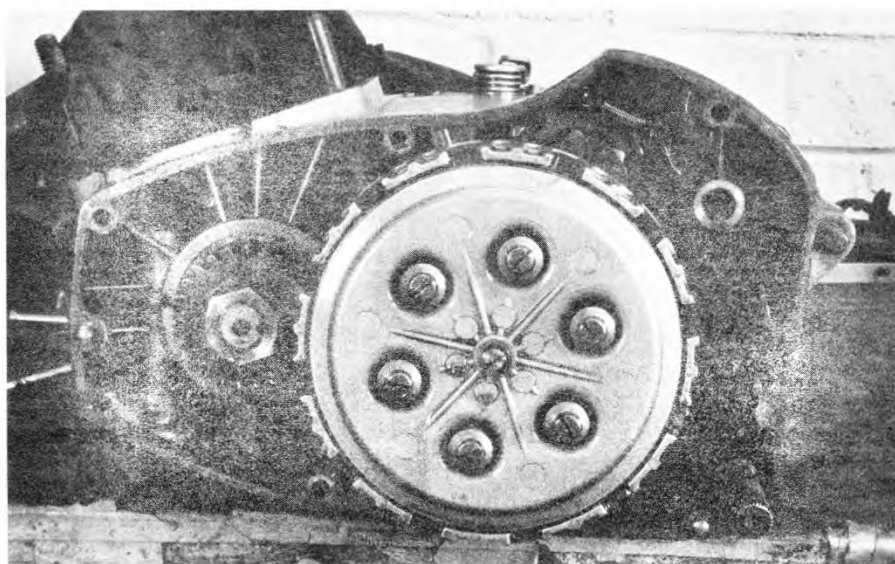
testing it in the aforementioned condition and set it straight for his own use. After his purposes were at least partially taken care of and the Hercules was once again a viable motive force, he turned it over to us for the test. Thus two tests and only 200 (!) miles down the odometer we did receive Herc. (Note: at first it was the Hercules, which degenerated into the Herc and finally to just plain Herc.)

Our first few outings together were less than a classic romance. The combination of sodden reflexes and drought-condition trails produced little more than passive grunts. Suspension seemed a little flaccid, the motor was pipey as a choir boy and the front tire went phss-s-s-s. There was only one common positive comment — the Hercules 175 was definitely fast.

And there were a few teething problems. The carb liked to fall off a lot. Ala old Maico, the Bing Concentric is mounted in a rubber tube with no flange. Barring the

days later we returned to the scene of the crime to try again. With the confidence of having applied the wrenches personally, one daring rider proceeded up a stream bed with bravado. At roughly the third crossing, while wheelstanding quite smartly, he did temporarily lose control of the display. After picking himself and the bike back up off the ground, regaining control, bending shifter and footpeg back close to straight again and surveying the holes in his costume, he made an ominous claim, "It don't feel heavy at all, until it gets a mind of its own." At this point we were frankly quite worried. The relationship seemed pervaded by ominous rumblings.

Then the rains came. Water pitter-pattered out of the skies, an exceptionally unusual phenomenon here in Californy. After it did so for a number of days, we hustled back to the mountains for a rematch. On tacky trails, in pleasantly cool air, the harmony finally started to come.



Cases split horizontally, but the clutch must be removed to disengage the shifting arm which lies behind it.

availability of a proper fix, a piece of radiator hose and a better hose clamp kept the carb near the inlet port. Also, one weak-kneed editor, slightly over the edge of controlling the Hercules powerband, walloped the left peg and shifter into a convenient rock. The shift lever curled up and hid and the footpeg bent back at a 30-degree angle, mounting bolts hanging.

Quite thoroughly humbled, we adjourned to the shop for meditation and wrench consultation. A few



Both shift lever and footpeg took lots of abuse because of the Herc's lack of ground clearance. Folding shifter, please.

## HERCULES

Price (approx. retail, West Coast): \$1490  
 Engine . . . Piston-port, two-stroke, single  
 Displacement . . . 171cc  
 Bore x Stroke . . . 60mm x 61mm  
 Compression Ratio: 11.5:1 (uncorrected)  
 Standard Jetting . . . 140 main, 40 pilot  
 horsepower . . . N/A  
 Clutch . . . Multi-plate, wet  
 Primary Drive . . . Helical gear, 2.60:1  
 Transmission Ratios:

- 1) 3.15
- 2) 2.18
- 3) 1.64
- 4) 1.29
- 5) 1.11
- 6) .97
- 7) .84

Final Drive . . . 530 chain, 3.93:1  
 14-tooth countershaft  
 45-tooth rear sprocket

Air Filtration . . . Twin-Air  
 Electrics . . . Motoplat  
 Lubrication . . . Pre-mix/40:1  
 Recommended Fuel . . . Premium  
 Recommended Oil . . . Bel-Ray  
 Fuel Tank Capacity: 2.9 gallons (11 liters)  
 Frame . . . Chrome moly, double downtube  
 Suspension:

Front: Ceriani, 7.8 inch  
 Rear: Marzocchi, 6.5-inch

Starting . . . Primary kick  
 Wheels & Spokes:

Akront, stainless spokes

Tires . . . 3.00x21 and 4.00x18 Metzeler  
 Dimensions:

Wheelbase . . . 55.0-56.6 inches (140.0 cm)  
 Swingarm Length . . . 18.0 inches (455 mm)  
 Ground clearance . . . 10.0 inches (254 mm)  
 Bars, height . . . 46.0 inches (1105 mm)  
 width . . . 32.5 inches (812 mm)  
 Pegs, height . . . 12.5 inches ( mm)  
 width . . . 10.0 inches (754 mm)  
 Seat height . . . 35 inches (847 mm)  
 Fork angle . . . 28.5 degrees  
 Weight . . . 268 pounds (120 kg)

Brakes:

Front . . . Conical, cable  
 Rear . . . Conical, rod

Instruments . . . VDO speedo

Lights . . . 6V, 35-watt

Silencer . . . Yes

Spark Arrestor . . . Not legal, but real

DbAHP . . . 86clb A

Warranty . . . None

Though the declaration was still toward amazing pipeyness, the combination was beginning to work.

Two days later we hurried back again to the mountains. On this day the romance bloomed. With almost 400 miles on the odometer the motor began to break in. Now there was some pulling power in the lower revs. Though the Herc still burst onto the powerband in a frenzy, the motor would carry the combined mass of bike and rider over obstacles at moderate rpm. Too, the bike would negotiate level or downhill trails without being buzzed abu-

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DIRT BIKE



## HERCULES GS175

Continued from page 76

sively.

Some of the more elusive handling characteristics began to be revealed. Rather than being juggled down a trail, weaving between obstacles in third gear, the Herc preferred fourth gear and right over the top of everything. Rocks ahead? Shift up and hang on. A skip and a hop and you're smoothly over. A drop-off in a turn? Don't go around, just leap off it in third gear. Whenever there is the opportunity to go straight, do so.

And when there are turns to be made, do them with the power on and weight over the front wheel. Standing makes a dynamic difference to the front wheel's manners. Keep on the front wheel and use the excellent Ceriani forks to their maximum; because the Marzocchi rears will give up the ghost if you use them too much. They'll hobble, and bounce and ultimately hit bottom with exciting results.

There's more than the power and handling saying you should stay atop obstacles, too. For a long travel suspension bike, the Hercules is low to the ground, both seat and chassis. Once the suspension compresses, which the Marzocchi shocks love to do, ground clearance nuzzles down to the five-inch level. By riding on top of rocks, the frame, engine, levers and pegs are protected. Otherwise they'll be beaten mercilessly. A small plastic bash plate does help out the frame, though a few crunching encounters pretty well destroyed the poor thing.

But staying atop obstacles is fun on the Hercules. The extremely stable forward tendencies are confidence-inspiring. It takes the woe out of going rough and would be better yet given good shock absorbers. Just pay attention to the powerband and pump on the shift lever a lot. With one exception shifting is as good as any. The first-second detente is longer than the others to make room for neutral. Unfortunately, there's almost always room for neutral unless the rider concentrates on a firm and lengthy tug on the lever.

As a matter of fact, one plastic-booted tester reached an unaccustomed frustration level while going uphill on the Herc. Fumbling over and over again with the shift lever, something like

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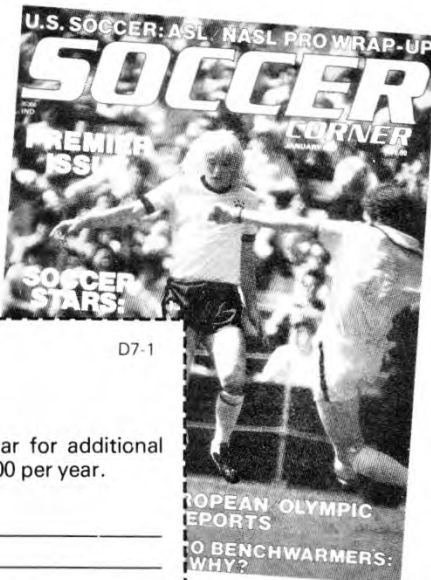
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pounding straight pins with a hammer, he finally located second and sped off in a fury. Upon reaching a waterbar, memory of those missed shifts prompted him to punish the recalcitrant Herc. He walloped the rear wheel into the waterbar at full tilt, bottomed the poor abused Marzocchis and heard a resounding thunk.

Since vibration now coarsed through the chassis, he pulled to the side to find broken-off head stays. Apparently, the stress from the top shock mount was transferred through the frame and toward the engine through the head stays. The stays were the weak link in a marginal situation. The Sachs motor is mounted with two bolts from below (threaded into the aluminum) and one to the rear. Once the head stays are gone, the cases follow soon behind. We limped home and got on the phone.

No one denied the problem, but there was good news to be had. All recent models have had a forward engine mount added to the frame and crankcase. Now the Hercules sports engine mounts just as big as anyone's. End problem. Meanwhile, we fashioned a repair with softer grade bolts instead of studs, and have encountered no further problems in quite a few hundred miles. Mighty impressive miles at that.

Once the riding and maintenance methods were determined and polished, the Hercules proved to be a proverbial trail rocket. Finally Hercules put itself far beyond the madding crowd into a rather exclusive land: competitive 175s. With the addition of the Hercules this territory has become plural. Now there are the Hercules and the Penton 175 to choose between for top-notch 175 cross-country machines. And the difference is small enough that you'll have to make your own choice. We wouldn't even try to tell you. But we would tempt:

You could credit the Penton with lighter weight and the Hercules with better wheel assemblies and brakes. The Penton has a lighter gas tank, but the Hercules has a superior seat. The Penton has more suspension travel, but the Hercules comes enduro-equipped. None of these details will declare a winner, it's purely a matter of which style of motorcycle you prefer. And to tell you the truth, the styles aren't much different. Pick your preference.

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