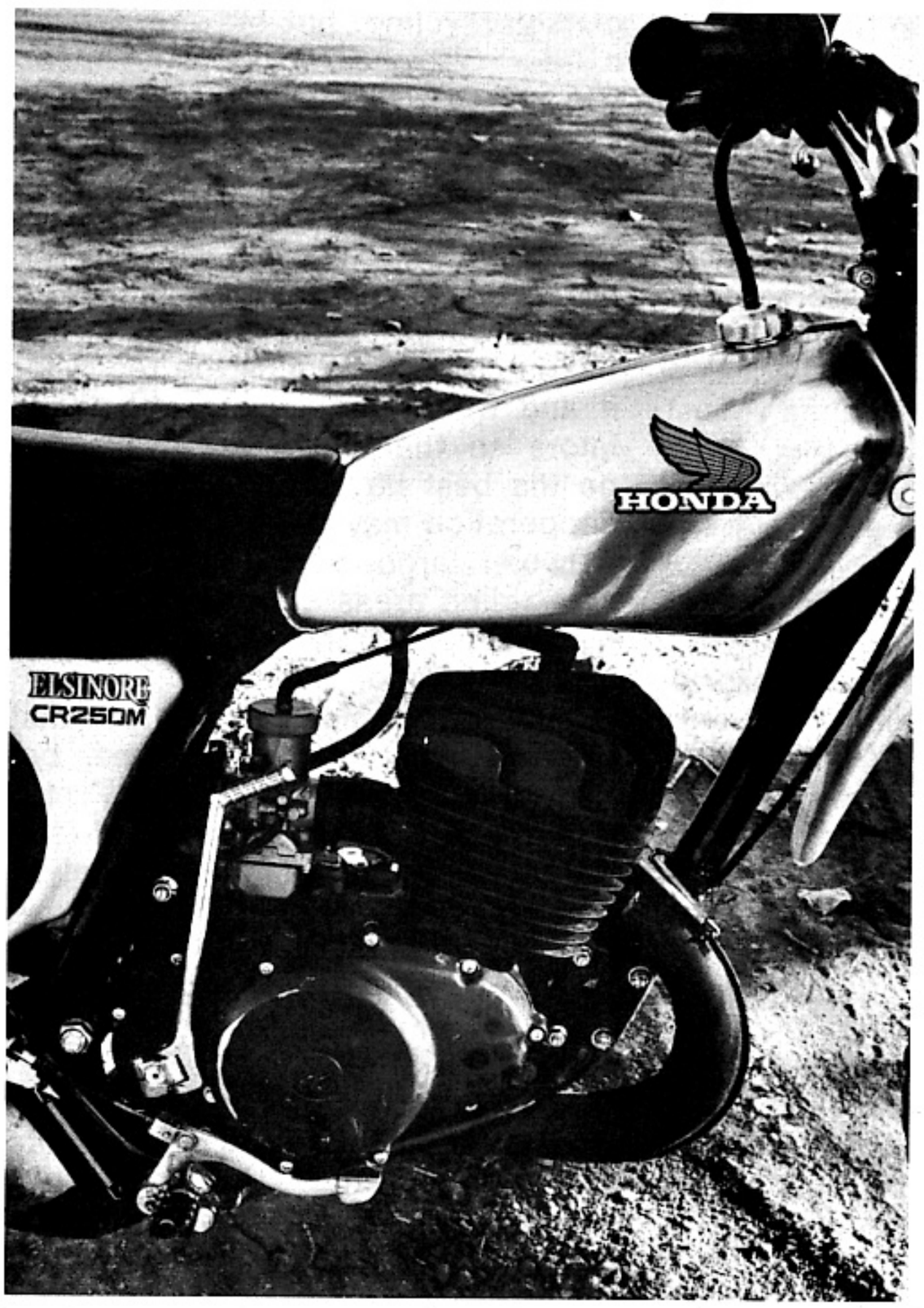
"There was a time
when you had to
apologize for having
a Honda dirt bike."

By Dave Ekins

# HONDA 250 MOTOCROSS



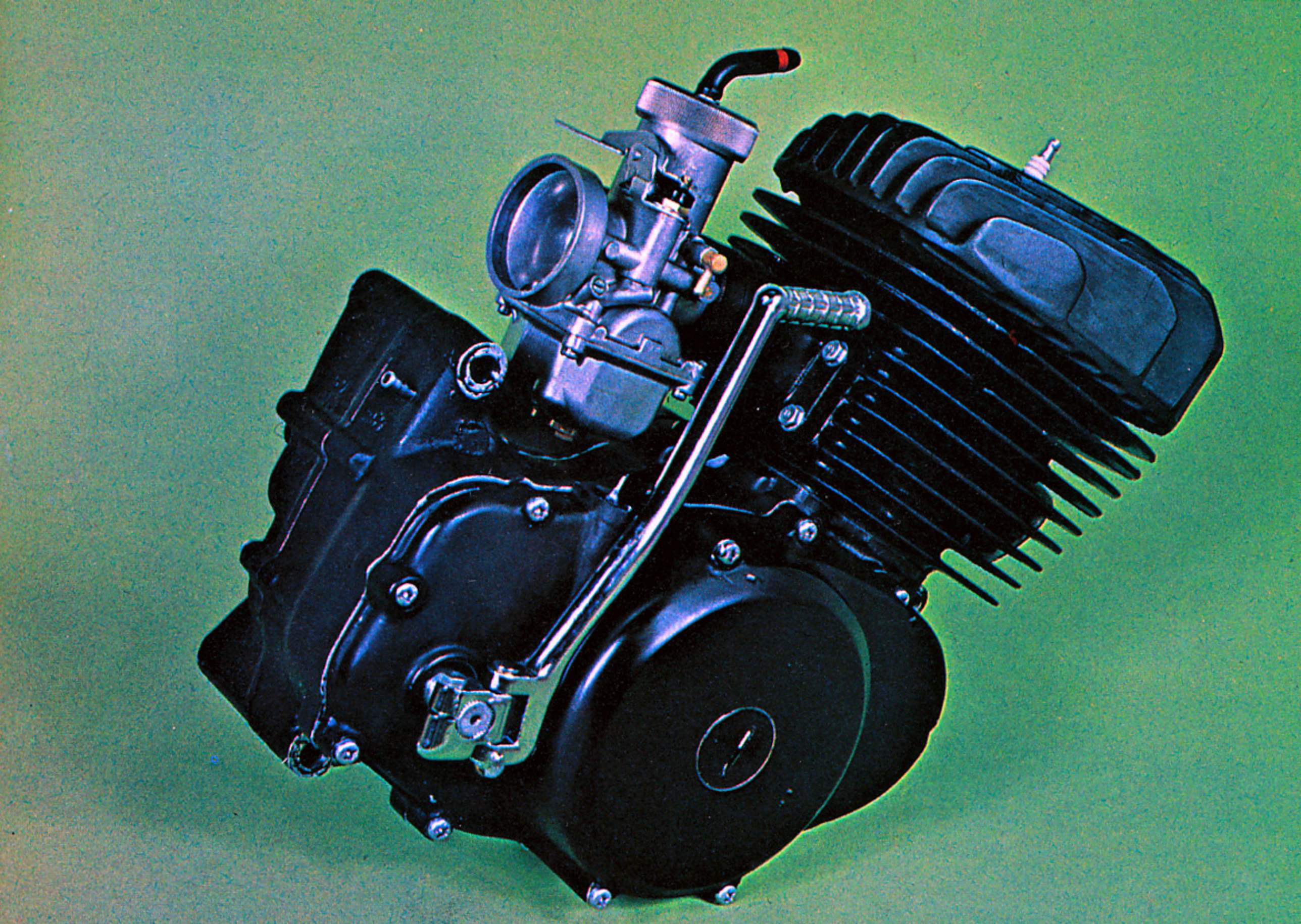

Within our world of motorcycling, even off-road motorcycling, Honda is the all-important bike. Not because of any earth shattering design or blinding performances; they have gained this lofty position through sheer volume—like every other machine in the U. S. is a Honda.

They performed this magic by taking motorcycling from an obscure place in our society and bringing it to the masses. Like, everybody is aware of motorcycles but some don't admit it. They prefer to call all powered two-wheelers Hondas, not motorcycles. This, we assume, is the result of all the mega-bucks programmed through advertising to perpetuate the grand Honda name. Apparently it works.

A few other things within the Honda organization also work. Mister Honda himself goes by the common rule that if you make it better than anyone else its got to sell. Another little gimmick they've got going for them is that only four-strokes come off their assembly lines. The three other existing Japanese giants squabble over the half of the market Honda doesn't have, offering two-cycle powered motorcycles for the most part.

Recently Yamaha and Kawasaki have gone into the on-road touring market offering engines with valves and cams that emit smokeless trails from their mufflers. So with this poaching with Honda's realm by the two-strokers Honda has retaliated.

We have seen photos and heard many tales of the coming Honda two-stroke. Honda reacted with denials and "no comments," until very recently a surprising phone call from the engineering and research department set up a special test outing with the mystery bike and **Dirt Rider** Magazine's staff. The meeting place was Indian Dunes, Valencia, California, 9:00 a.m. on a cold Wednesday morning.


HONDA
HONDA
CR250M

Met by research engineer George Ethridge and staff chief K. Okimoto, we could hardly keep our eyes off the two 250cc motocrossers—one, scruffy and well used, the other all shiny and fresh. "You can ride this one and photograph the other bike," was George's comments.

The bikes have a subdued look about them, no gaudy colors or trick sculpturing. Just black and polished aluminimum, and black and yellow decals on the newest one. "Elsinore CR250M" they read. For some reason (probably after viewing Bruce Brown's "On Any Sunday") the committee that makes such decisions felt Elsinore, in reference to the Elsinore races, would be an appropriate name for this racer. There was some talk about calling it an Elsinore and leaving Honda off all together. Lucky for everyone concerned that idea was scrapped, and also, maybe, the Elsinore GP.

"There is only one reason for the CR250M to be put into production," George was saying, "and that is to have a true out-of-the-box production motorcycle that will win races without having to fit, fettle, remove, or modify the machine." Great idea but nobody's been successful in this type of endeavor so far. J. N. Roberts tricks up the chassis on his Husky, and most of the CZ guys change their rear shocks and gas tanks. You just don't take 'em out of the box and race 'em, especially here in the U. S. where goodies are plentiful.

"This Keihin was designed especially for the Honda two-stroke engine, it's different from any carburetor they've made," George commented. Honda only uses Keihin units on their four-strokes. This one's really far-out; its even been fitted with a richening device, that trick starting gimmick designed especially for all the other Japanese two-strokes.

"Leave the bike on its side stand, stand on the left foot rest and kick it through with your right leg. It always starts on the first kick." I tried it and the sharp amount of compression kicked my leg back. I tried it again with a little more authority and the thing fired up just like George said it would. The side stand is designed for this kind of abuse, a no-no with any other motocrosser—something you expect with 1200cc Harleys. And like the H-D you'd better be wearing a pair of boots when you attack the starting lever.

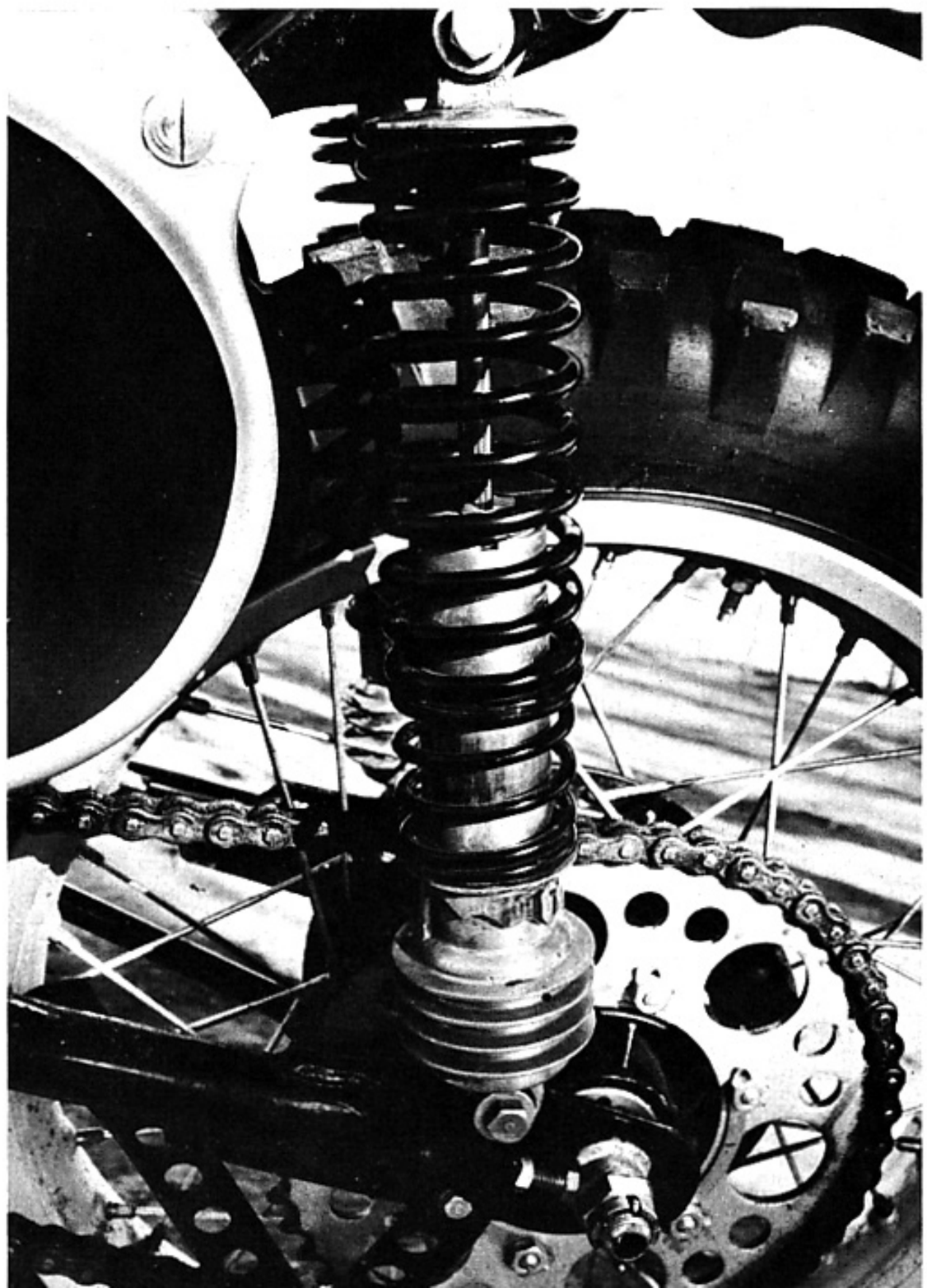
I later tried starting the Honda without the side stand, the conventional way, placing your left foot on the ground for balance. The kickstarter hinged back towards the end of its stroke giving me an incomplete shot at the crank. It didn't start.

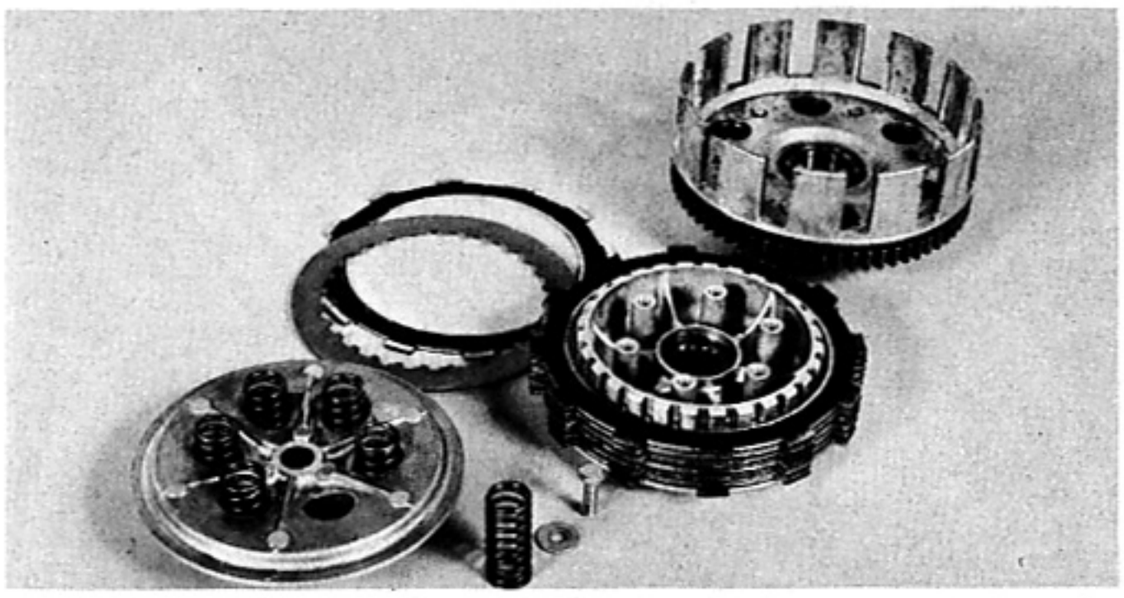
Honda has already produced 250 of these racers in order to comply with the Motor Federation of Japan. They have an extensive motocross program going in Japan and they're not doing too badly. An undisclosed number of these machines was sent to the U. S. for future market evaluation. Many months and several thousand testing hours later we were the first magazine people to be treated to this racer. We were told the production seat will be ½-inch higher and 1½ longer. The bend of the bars was proper but for production they will go to thin-wall chrome molybdenum tubing and leave them unplated.

I sat on the bike feeling lever placement and the position of the handlebars. Footrests to seat to handgrips dimensions felt very good, normal, with the two toe operated levers right under the big toes. Both hand levers, the shift and rear brake levers are impact forged aluminum pieces. They will bend but not break. You can bend them back and forth, within limits of course. Also of a dense aluminum material are the impact forged upper and lower triple clamps. Both light and strong, they hold the fork tubes parallel to the headpiece of the frame.

**Sliders are machined from aluminum billets for light unsprung weight and extra strength. Note external return spring on the brake arm.**

**Rear cushion features an aluminum alloy housing, 2 single rate springs stacked, cooling fins, and they are rebuildable.**





Both fenders are unbreakable plastic with the silver color impregnated into them. The number plates/air filter cover are also plastic but from a more rigid compound. A dense pore urethane air filter is used that has a fuzzy outer layer which causes incoming water to ball up rather than enter the foam and subsequently enter the engine. A slick touch.

Something else borrowed from the space age is the seat base. Vinyl covered foam seats have to have a strong base to support the impacts from a bouncing rider. The Honda seat base is a piece of plastic sandwiched by two thin layers of sheet aluminum. The combined thickness is about an eighth of an inch but the resulting strength is greater than an eighth-inch sheet of aluminum at a fraction of the weight. The CR250M seat weighs less than two pounds—much less.

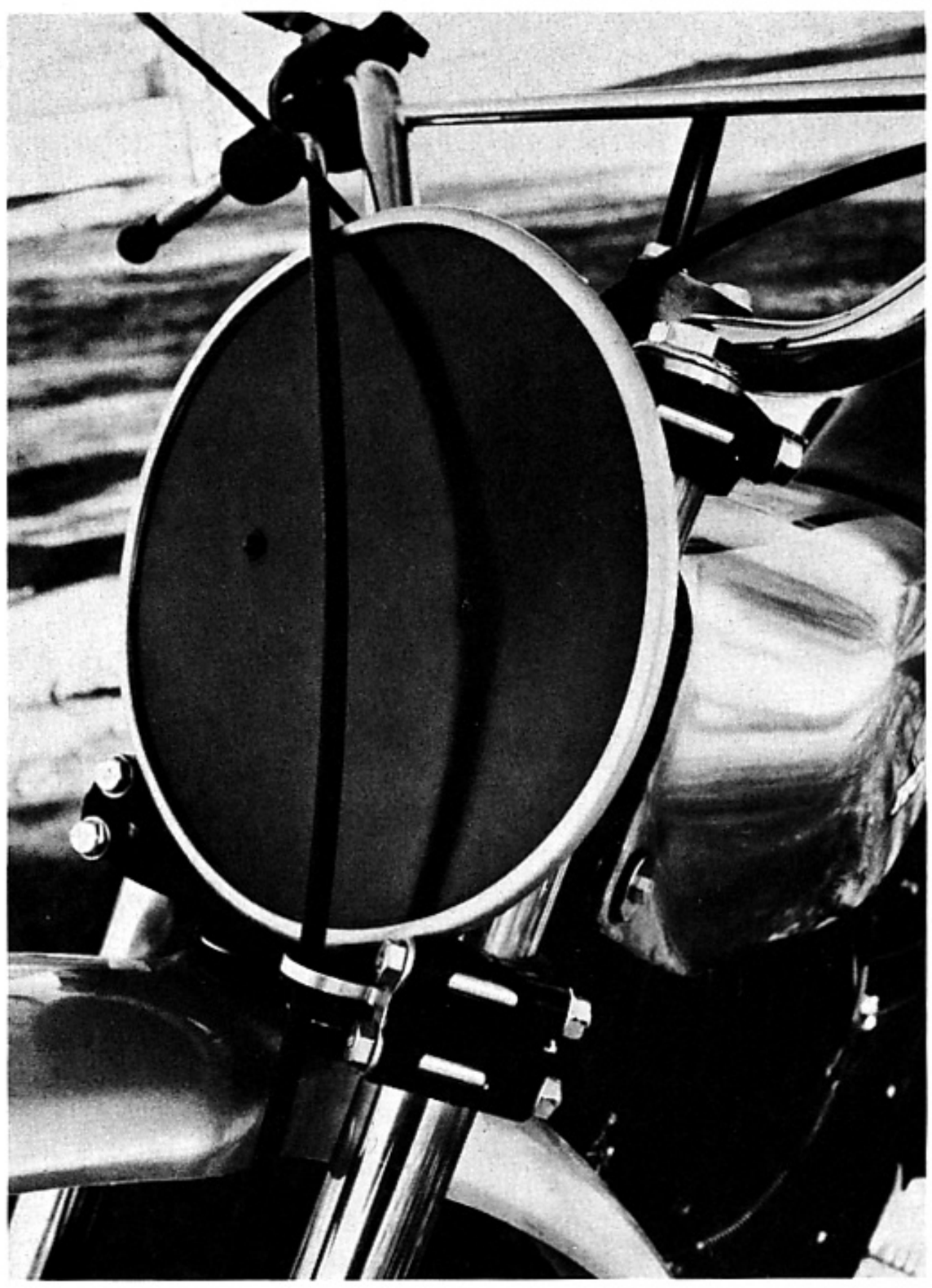
A polished aluminum fuel tank slips over the single top frame tube and is deceptively narrow. The thin wall container has a capacity of 1.8 U.S. gallons, more than enough for the average 30-45 minute moto. The aluminum tank has been hardened and is difficult to prang or dent, just like the rims.

Daido rims created a sensation when they first appeared on the four valve Honda XL250 more than a year ago. Honda Motor Company invented them and licensed Daido to manufacture the jewels, holding them to one year exclusive that has since run out. Now everybody has 'em.

The CR's front hub is an unexciting looking spool thing made from an aluminum casting that does just what its supposed to do, stop the bike. The rear casting is a bit more complicated looking, with the brake on one side and the sprocket carrier on the other. There is no drive cushion, as is not Honda's custom, and the sprocket is aluminum. Drive cushions add weight and in the world of off-road the dirt itself acts as a cushion so the cushion is not needed and a bunch of unnecessary unsprung weight has been neatly eliminated.

Like the front, the rear hub has a thick coat of dull black paint that is decorative as well as functional. The rear backing plate anchors to the swing arm by a large alloy strut. It is not a floater. Honda's is cable operated and George Ethridge feels a cable operated rear brake has the same characteristics as a rod operated floater. It all has to do with the swinging motion of the rear fork changing the pressure on the brake shoes. Whatever, the CR's rear brake was without fault during our abbreviated tests. It didn't lock up on a ripply surface yet it has a good soft feel to the foot. We didn't take the bike into the chilly waters of the Santa Clarita River like we do so many of our test machines but were reassured they work under damp conditions. It was just too darned cold.

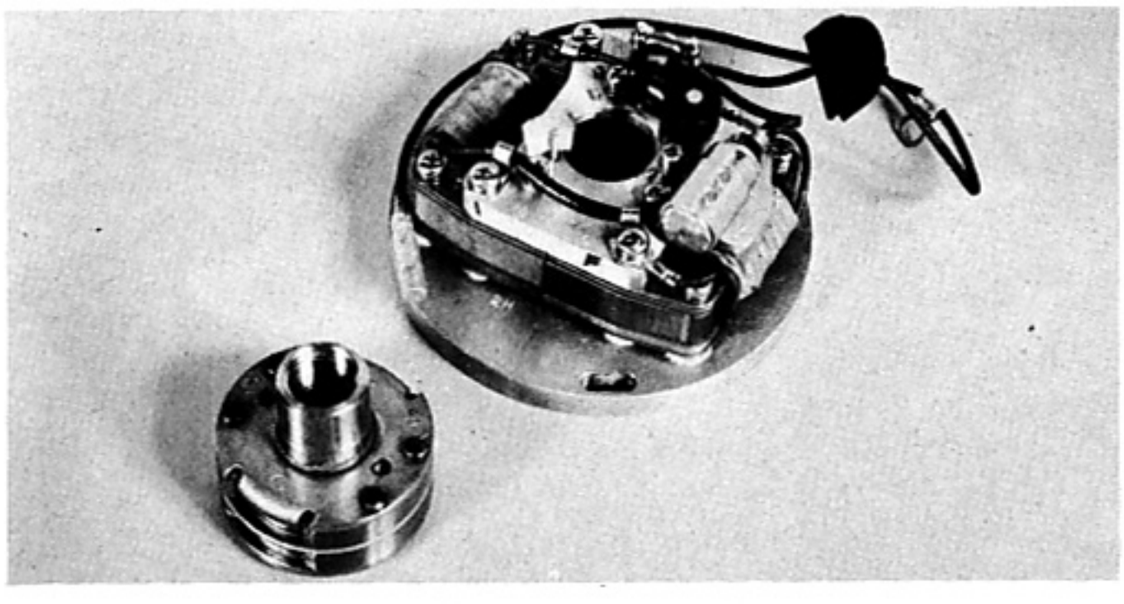
In an exhaustive program to create a very light racer Honda went to a welded chrome-moly chassis that is very similar to CZ and the Suzuki GPs' design with a semi double cradle with a single down tube. This is a far cry from what we've seen in the past as chassis representative of the Honda production line. Steel stampings and automatic welding are not found on the CR250M. What does all this add up to? How about



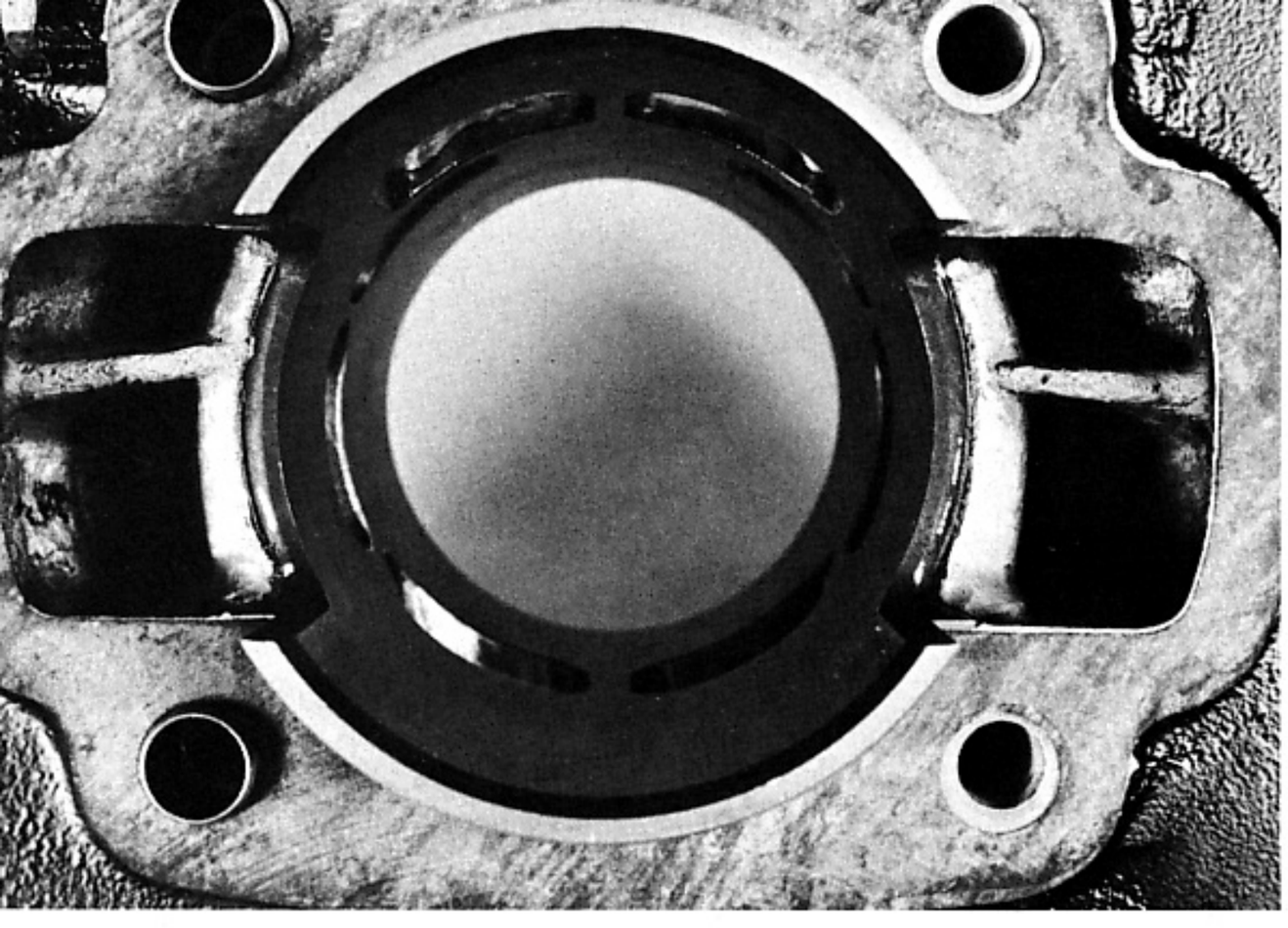
**How far they went in making this the lightest production 250 is evident by the absence of excess and unnecessary material in these triple clamps, they're forged aluminum to begin with.**

211 pounds dry. Absolutely the lightest production 250cc motocross motorcycle on the market today—rather, about to be on the market. It's scheduled for mid-March '73.

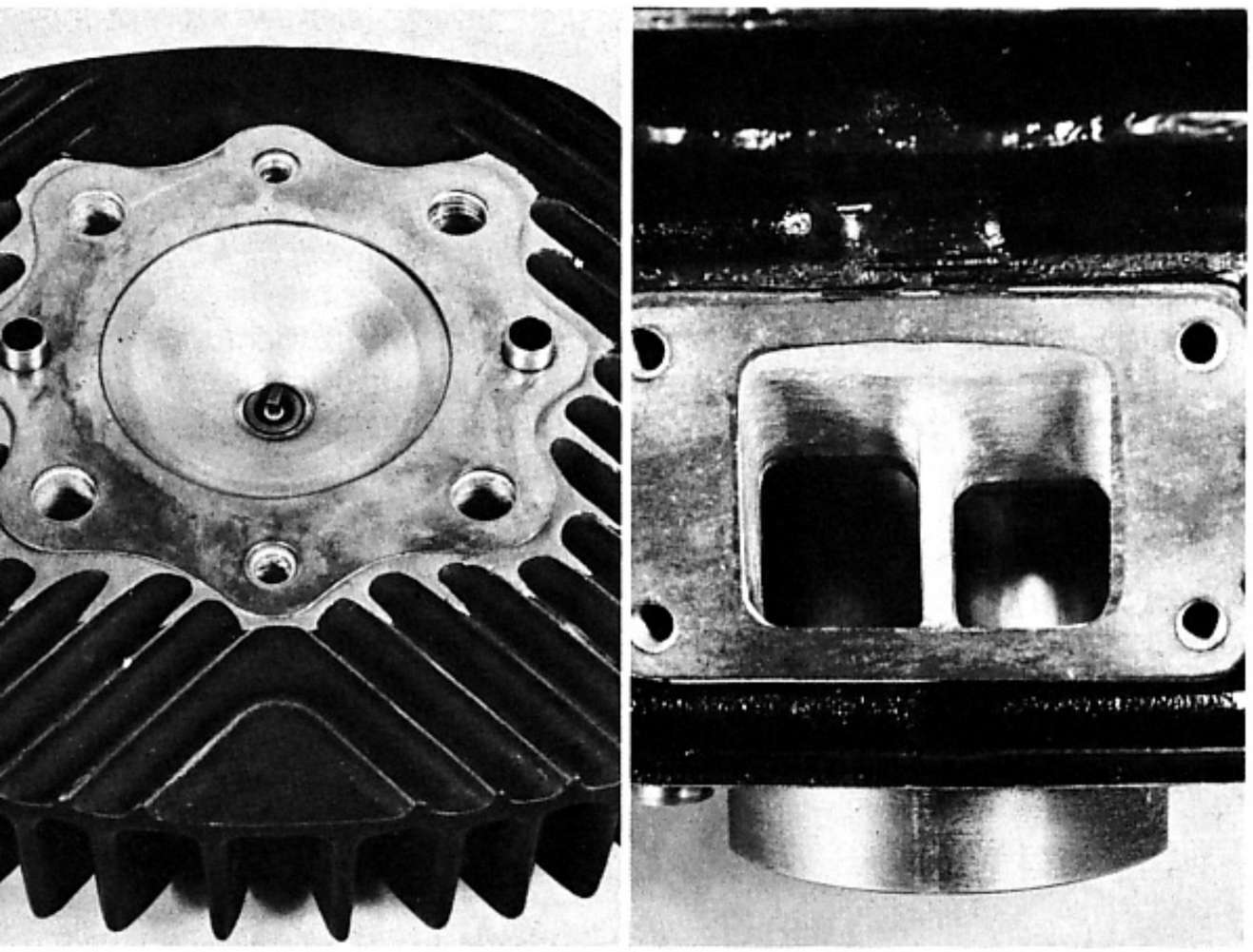
211 pounds is about 15 pounds over the FIM minimum for Grand Prix machines of that displacement. Figuring the proposed $1050.00 price tag for the Honda against the several times figure of genuine GP bikes or the fractionally less outlay for one of the other Japanese motocrossers and you may realize just how big an impact Honda is going to make on the off-road market with their technically advanced and super performing new racer.



**Crankshaft, countershaft, and rear axle appear to be on a common centerline, the swing arm pivot is raised about an inch. A secret in handling?**

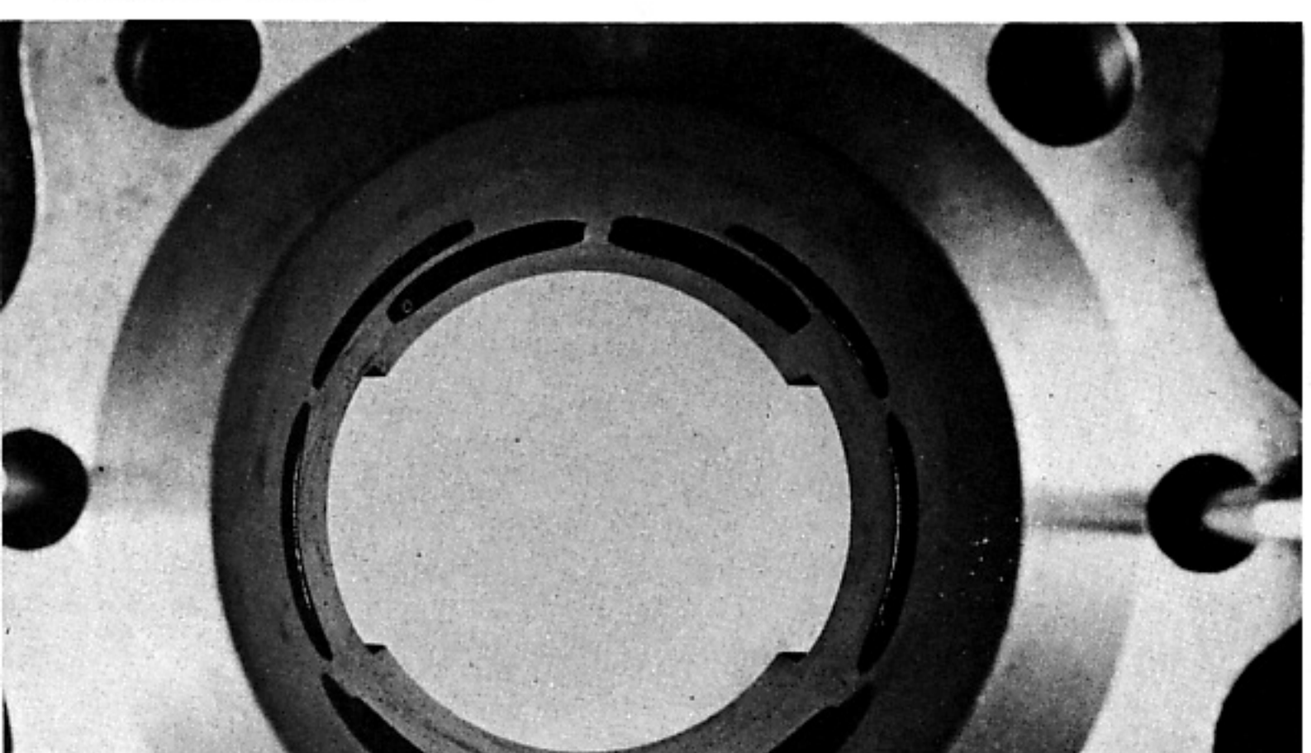


**Some obvious features of the porting in the cylinder are the staggered inlet, canted roof on the rearward transfer ports, and the upper radius on the exhaust port which is bridged.**



**Symmetrical chamber and centrally located spark plug in combination with a progressive two-stage squish band are the internal tricks of the cylinder head.**

**There is so much magic going on in the ports of this cylinder it would embarrass Houdini. Our only explanation is that it works.**



Except during its very beginning Honda has not produced two-cycle engines, but they have more than kept up with two-stroke technology. The CR250M engine is a conventional looking thing of piston port configuration, painted flat black for better heat dissipation. Cases are sculpted in tight around the internal working parts resulting in a very narrow power plant. The cases split vertically. Four studs run partway through the cylinder, and head bolts protrude well past the cylinder head face into the cylinder. Four additional 10mm studs make up the cylinder head bolting pattern and a solid copper gasket seals the two.

The combustion chamber is a very symmetrical dome with two squish bands of different angles. It is not a half moon nor is it a trench, just round. Four transfer ports are used, the two main ones have flat roofs while the rear two are roofed on an angle to allow better flow towards the back of the cylinder and away from the exhaust port.

Both exhaust and intake ports are bridged. The very top of the exhaust port is made very wide by the addition of two large radii that overlap the transfer outlets. The inlet port is stepped. The hole on the left of the bridge is 5mm taller than the one on the right. I don't know the reason for it. I've never seen this done before, and all I've got to say is whatever they've done its put them away ahead of all the other two-strokes when it comes to producing torque and horsepower.

A 34mm Keihin carburetor that is cast aluminum, not pot metal, is special for this engine. The main jet can be changed by removing a brass plug that carries an O-ring for a gasket. The main jet carries a splash baffle so the jug doesn't surge when going over jumps and bumps. The huge slide is a chrome plated chunk of brass that resists wear and sticking. George tells us they've never changed a jet from out of the crate tuning.

The 70mm diameter piston is made from a special porous aluminum developed by Honda, it carries the familiar trade mark "ART" inside. Two very narrow rail type rings are used. They're hard chromed on the wear edge for long life and the basic metal is unbreakable. You can practically straighten them out with your fingers and they won't shatter.

A large diameter pin is a push fit into the piston and is carried in the small end of the connecting rod by caged needles. The big end is caged rollers.

There doesn't seem to be a lot of bottom end stuffing as the flywheels are not fully round. A bunch of material has been removed to balance the unit with its piston assembly. Both main bearings are huge caged balls with the left side lubricated with oil mist and the other sealed from the primary compression area and getting its oil from the primary drive cavity.

Narrow straight-cut gears transfer engine energy to the clutch assembly. A steel ring gear is riveted to the alloy clutch basket that carries six fiber-bonded alloy plates and six steel driving plates. Six springs in compression contain the lightweight unit. The primary kickstarting gear splines onto the back of the hub inboard of the ring gear.

A conventional five-speed transmission is used, riding on large diameter shafts in ball bearings. Lengths of the shafts have been held to a minimum by making the gears larger in diameter and engaging them with dogs through the body of the biggest gears. Three shifting forks operate off a drum to program the gear sets. The shift throw is precise and short, the ratios close. Internal ratios within the gearbox are as follows: first, 2.056:1; second,, 1.571:1; third, 1.250:1; fourth, 1.037:1; and fifth 0.862:1. Primary ratio is 3.30:1 and final reduction ratio is 3.357:1. The rear sprocket has 14 teeth and pulls a ⅝ by ¼ width chain.

Sparks are supplied through a primary and secondary magneto type system utilizing points. The spinning roto is about three inches in diameter and fits behind the backing plate and all its paraphernalia. The result is a small amount of weight bolted to the crankshaft and points out where you can get to them. A very small vent hole is built into the outer ignition cover that utilizes a labyrinth chamber to keep foreign matter from readily entering the area.

The sparks are good; the engine fires on the first try in gear or out. A muffler on the end of the stinger emits a well toned-down exhaust note. Throttle response is something short of an Indy car. A blip of the throttle brings instant rpm from the engine and no noticeable vibration from the handlebars. It has the feel of a no-flywheel engine until you ride it.

The clutch pulls smoothly and the lever engages first with just a short tap. It's undone in first before you get the throttle twisted half-way open. It does the same in second, but the bike is not geared too short. It just accelerates like a shot. A combination of trick porting and a super carburetor gives the Honda a tremendous power band. Its light weight helps complete the sensation.

If you tend to peak an engine out or over-rev it you're wasting time. The trick is to get the bike into a higher gear and use the torque. The Honda is designed for second gear starts yet peaks out in fifth close to 70 mph. You would normally backgear two or three times at the end of a long straight into a tight turn. With the CR250M you do it one less change. When it's time to get the power on it's best to be in a higher gear for two reasons. One, things happen a little slower and you don't get all crazy with wheelspin, and two, you've saved yourself the fraction of a second used to make an unnecessary gear change. These power characteristics are found in 400cc class motocross bikes, and they are built into the 250cc Honda two-stroke.

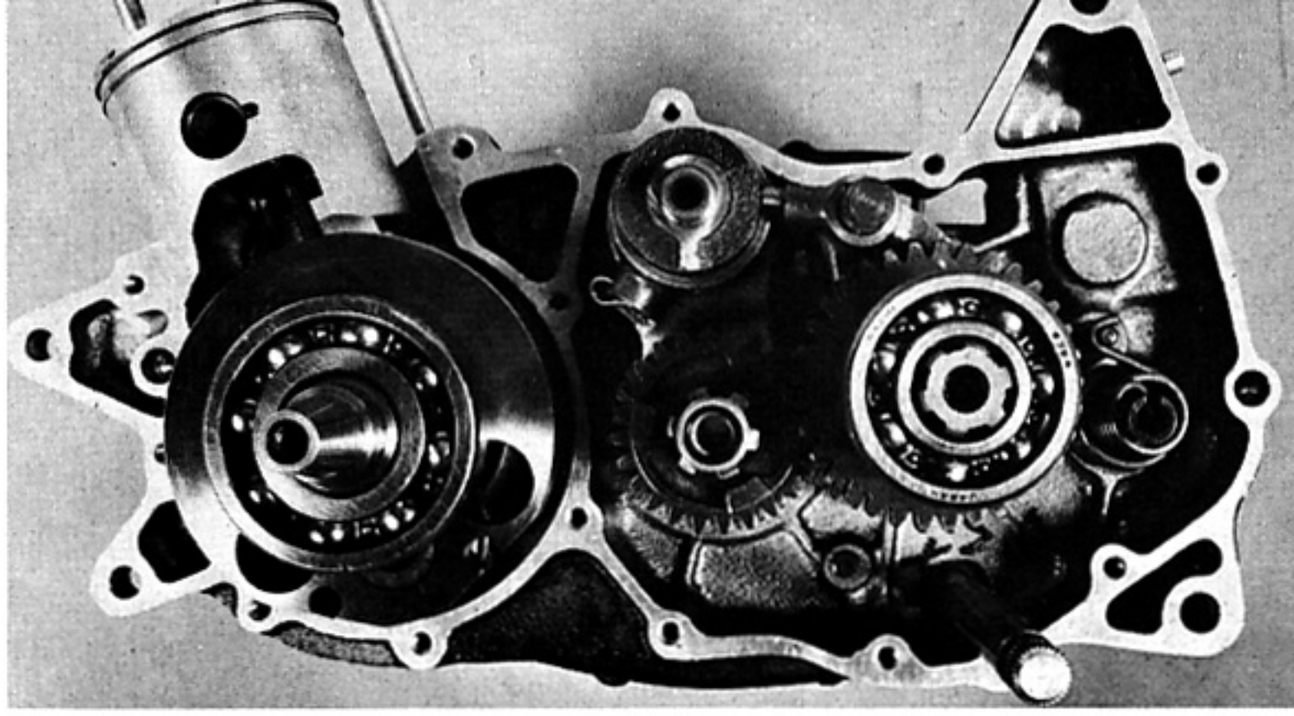
With this type of usable power and light weight the chassis becomes a very critical package. Extensive testing at Honda, Japan, plus many more hours of testing here in the U. S. has produced what I consider a very good frame coupled to excellent suspension units.

Light oil and heavy springs in the front forks produce a ride not altered as the weather changes. There's 7.1 inches of travel in front and 4.1 at the rear. The rear shocks are in aluminum housings finned for air cooling. We checked the suspension legs after some runs and felt them raise well within detectable-by-the-touch temperatures.

We felt no topping, no bottoming, and no endswapping. I ran the machine across giant ripples to the point of blurred vision and still it felt safe and stable. You don't go any faster than that. Its long wheelbase, low CG and lightweight make it easy to point in the other direction. Tim Hart on a curiosity ride was doing things like berm shots and wheelies from one turn to the next. Hart had two comments: the suspension is soft and the motorcycle is fast. Few of us have the ability of the Tim Harts of this world. We can all find stiffer suspension because Honda intends to offer the bike with a choice of spring rate.

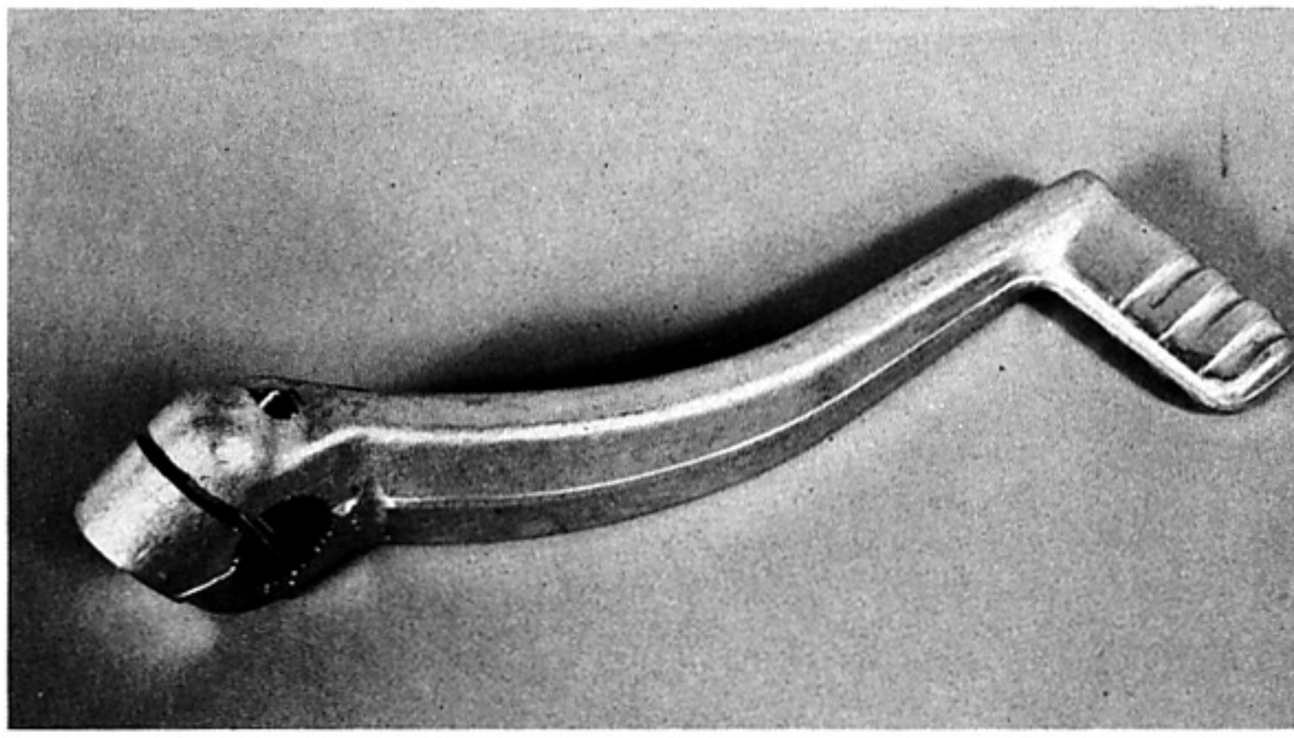
**Dirt Rider** Magazine's staffers were all very excited with the CR250M. The suspension suited them just fine. George Ethridge checked out the suspension back at the engineering facility and found we were riding the domestic production bikes set up for riders who weigh about 125 pounds. The U.S. bikes are gonna be stiffer. That settles that.

In conclusion, Honda has come up with a production motocross motorcycle that is better than anything I've seen offered for sale. It's a complete and well done package that has outdone even Honda. ●



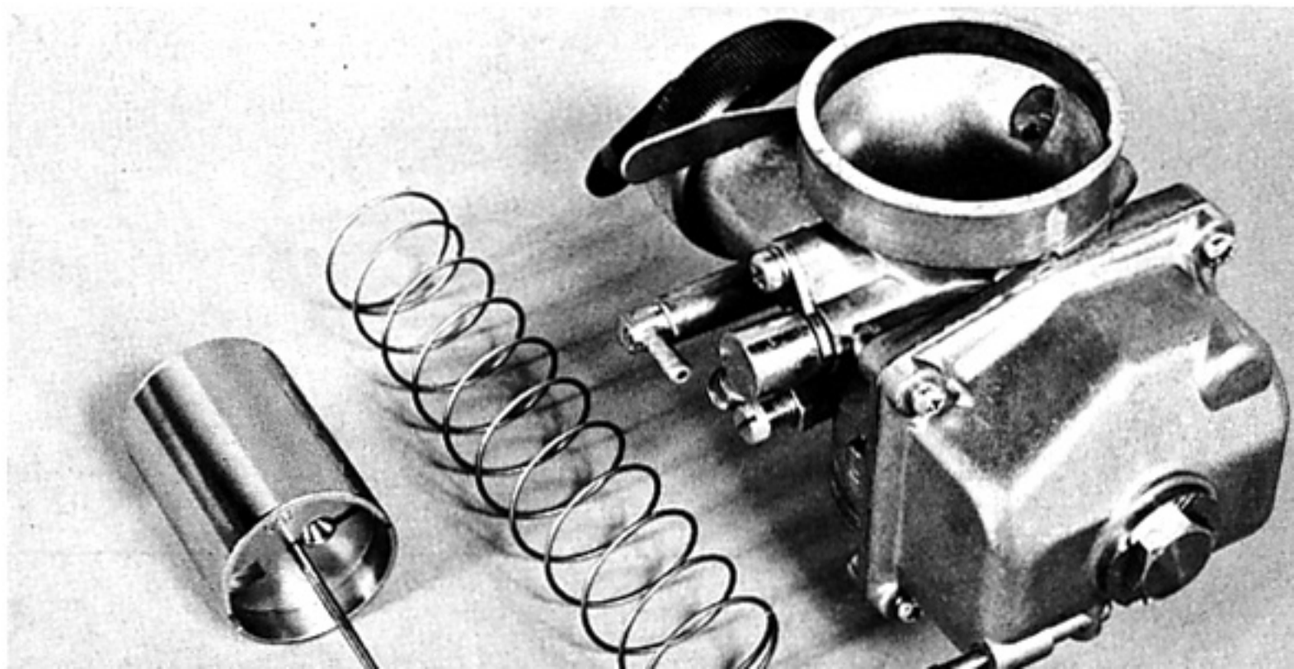
**This half case engine exposure clearly shows transmission shaft layout and the crank. Everything important is on low friction ball bearings.**

**Piston, pin, and needles, the material in the piston is very porous to aid oil retention, note the narrow rings.**



**Shift lever is high density aluminum alloy impact forged for strength and lightness. Lever weighs just a few ounces and is malleable.**

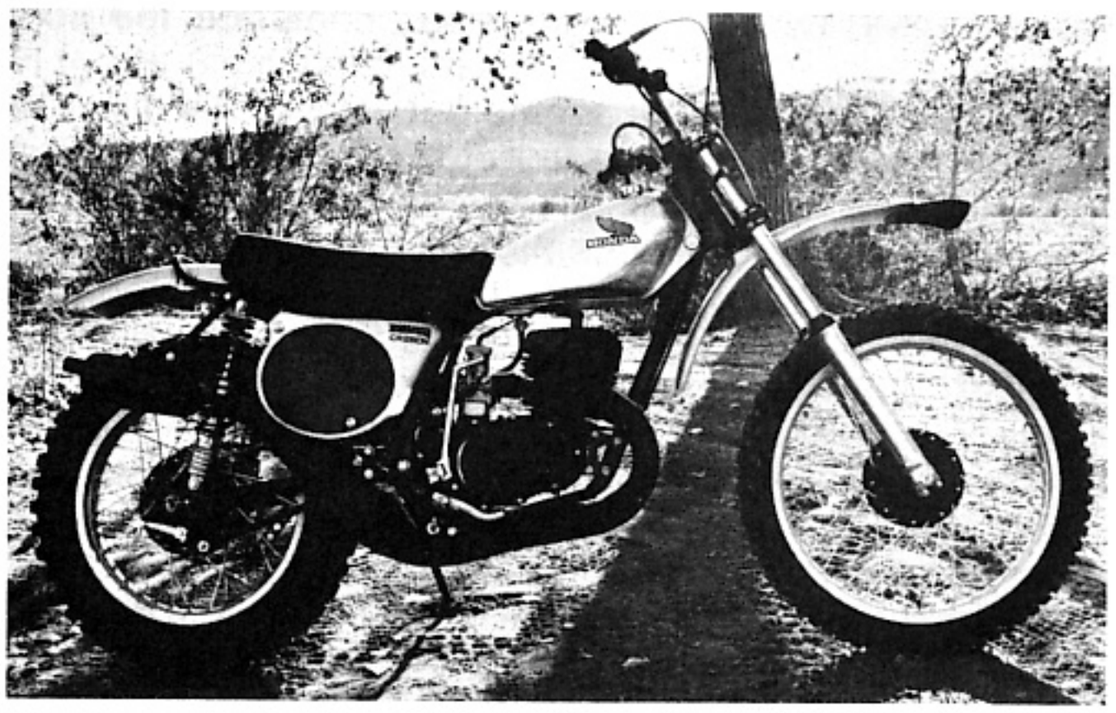
**Keihin carburetor was made especially for the CR250M. It features an anti-surge baffle and chrome plated brass slide.**



TEST

# HONDA ELSINORE CR250M

## PRICE: N.A.
## WEIGHT: 211 lbs. DRY
## DISTRIBUTOR: AMERICAN HONDA MOTOR CO 100 WEST ALONDRA BLVD., GARDENA, Ca. 90247



## SPECIFICATIONS

| | |
|---|---|
| Engine Type | SINGLE CYLINDER, TWO-STROKE |
| Bore, mm | 70 |
| Stroke, mm | 64.4 |
| Displacement, cc | 248 |
| Compression Ratio | 7.2:1 CORRECTED |
| Bhp at rpm | (EST.) 33 AT 7500 |
| Carburetor | 34mm MIKUNI |
| Ignition | POINTED MAGNETO |
| Starting System | KICK |
| Lubricating System | OIL MIST |

## DIMENSIONS

| | |
|---|---|
| Wheelbase, in. | 56.5 TO 57.5 |
| Ground Clearance, in. | 7.5 |
| Peg Height, in. | 12 |
| Seat Height, in. | 33 |

## CAPACITIES

| | |
|---|---|
| Fuel, gal. | 1.8 |
| Oil | IN FUEL |

| IMPRESSIONS | Poor | Good | Excellent |
|---|---|---|---|
| Throttle Response | | | ● |
| Acceleration | | | ● |
| Power Band | | | ● |
| Starting | | | ● |
| Engine Noise | | ● | |
| Muffling | | ● | |
| Vibration | | | ● |
| Handling | | | ● |
| Choice of Tires | | | ● |
| Suspension | | | ● |
| Rider Comfort | | | ● |
| Transmission | | | ● |
| Instrumentation | | na | |
| Lighting | | na | |
| Toolkit | | na | |
| Paint and Chrome | | ● | |
| Mileage | | ● | |
| Braking | | | ● |


HONDA