

CYCLE WORLD

OCTOBER 1968

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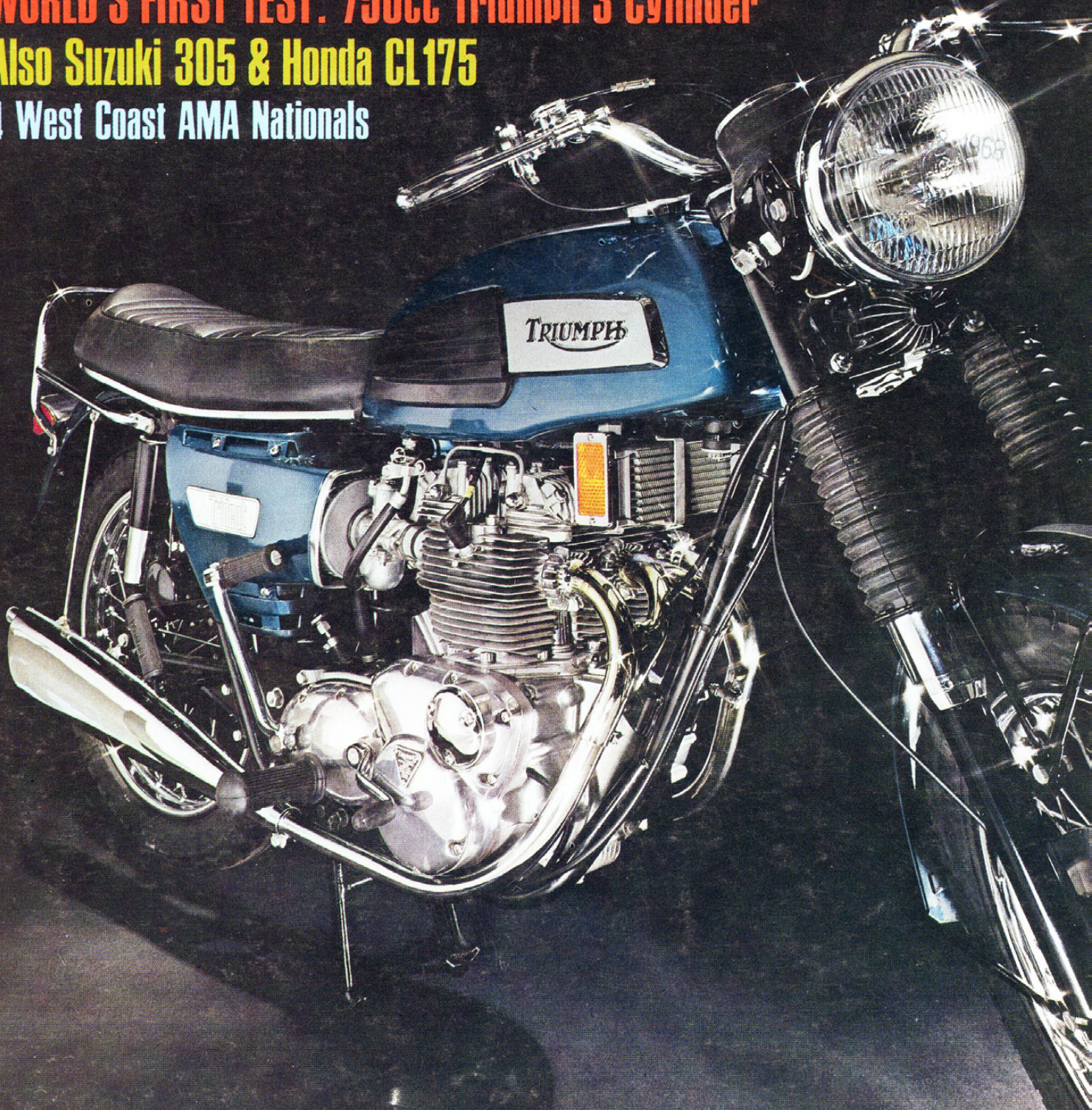
FIFTY CENTS

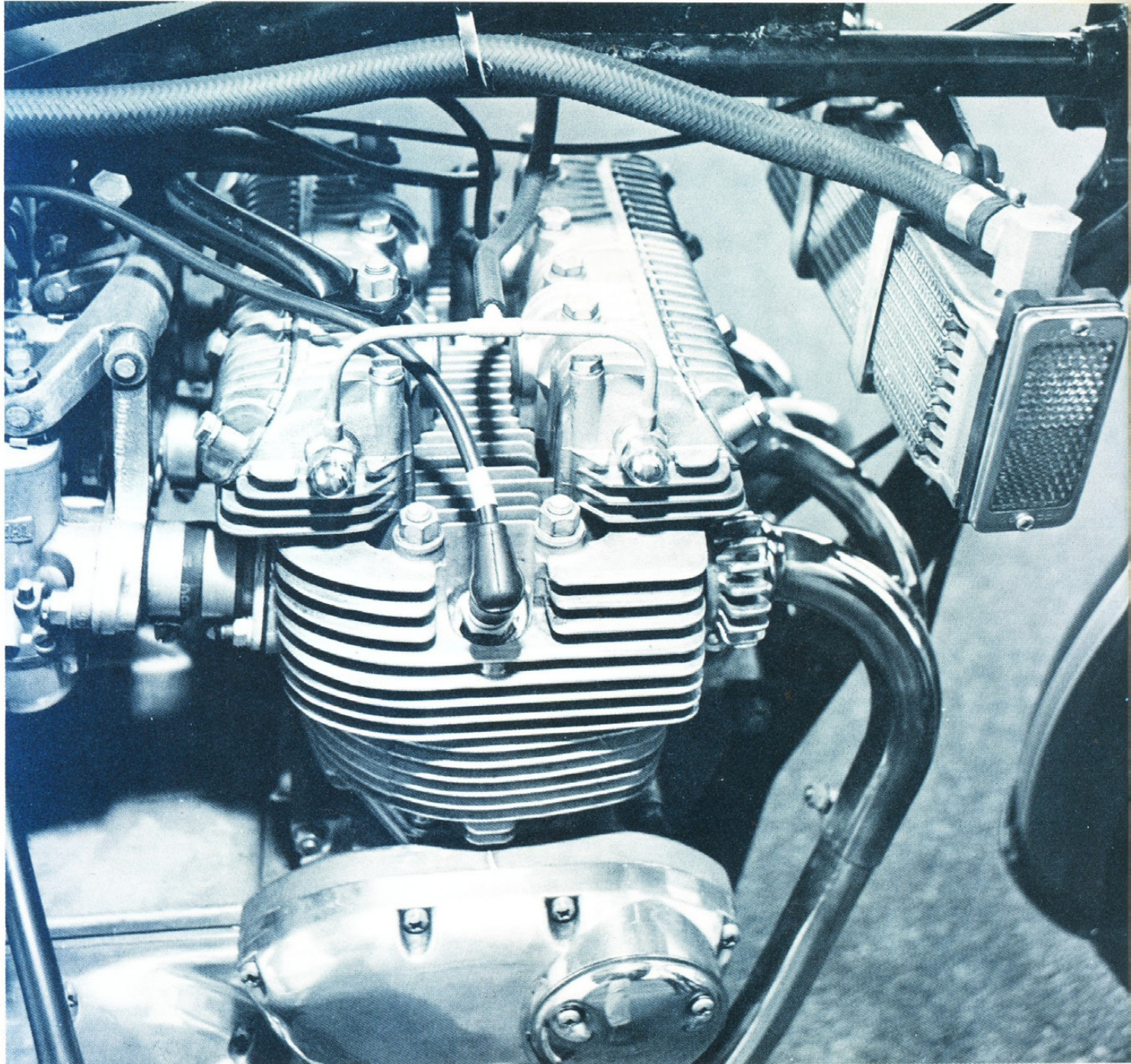
AMERICA'S LEADING MOTORCYCLE ENTHUSIASTS' PUBLICATION

WORLD'S FIRST TEST: 750cc Triumph 3 Cylinder

Also Suzuki 305 & Honda CL175

4 West Coast AMA Nationals





TRIUMPH TRIDENT 750

A Swift New Three For the Connoisseur

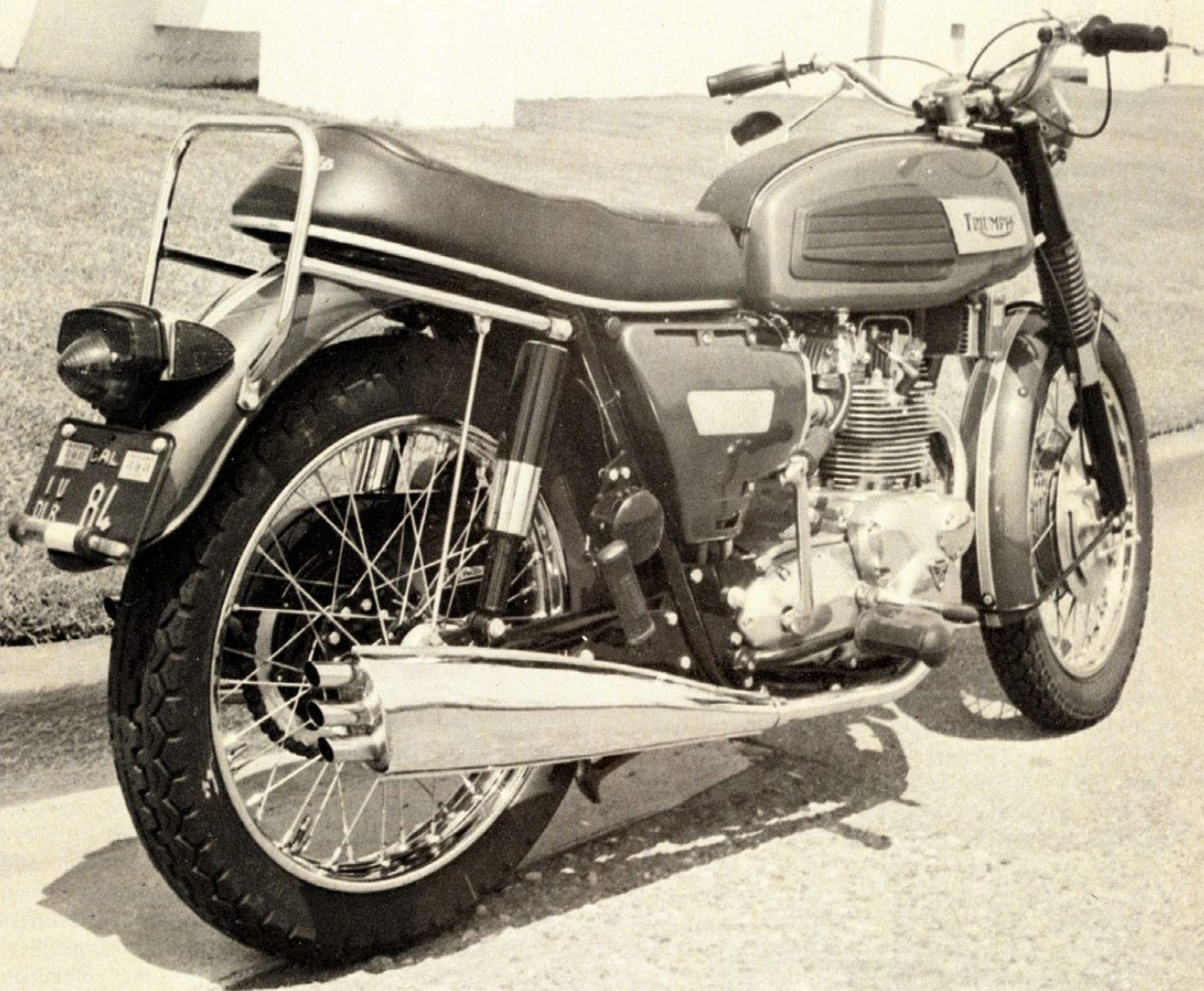
CYCLE WORLD
ROAD TEST

TRIUMPH'S SUPER secret, that didn't remain a secret for long, now is open to public view—officially. After two and a half years of development, the factory's 750-cc ohv Three is here. Exotic projects such as the Three are difficult to keep hidden, and indeed, on both sides of the Atlantic, the motorcycling press and many riders in the street long have known of the bike's existence. During open road

testing, it frequently has been cloaked in shabby tank and accessories in attempts to disguise its blatantly different engine. Now, the Three—named the Triumph Trident—is in dealers' hands, for everyone to see.

And it's truly a stirring sight. For, the Three is unique. The world over, there is not another three-cylinder roadster motorcycle in production. The Trident could even be the first non-racing Three ever made, a possibility this test will not press; who knows what obscure maker might have produced a short-lived Three during the shifting fortunes of the early motorcycle industry. Not only is the Trident unusual, it also goes very fast. Only days after its delivery from England to the U.S., it recorded a maximum speed of 117.03 mph. Regardless of piston displacement, that's quick for any street machine. More proof of the Trident's abundant horsepower is available in its quarter-mile time of 13.71 sec.

These figures appeared more than satisfactory, until the Triumph men discovered that, in the rush to deliver the bike for test, slightly inaccurate timing on the center cylinder had



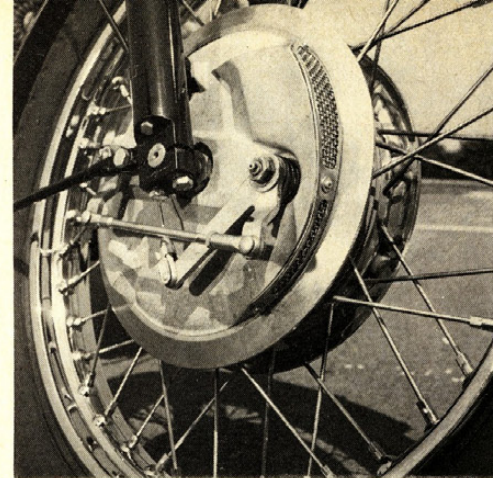
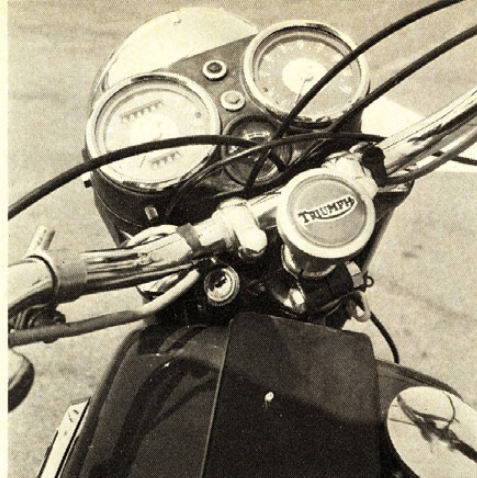
not been corrected. This task attended to, a "pro" drag rider mounted the Trident. Bob Ebeling, AHRA record holder on his 650-cc Triumph fueler, was the man, and he set a shattering time of 13.028 sec., and burst the 100-mph barrier with a top end speed of 102.73 mph. The most ardent of big bike admirers will find nothing to fault in the Trident's straight line accelerative performance.

Most of all, however, the Trident is a prestige motorcycle. An awesome number of people will find that third cylinder irresistible. It will mark its owner as surely as if he were to drive a 427-cu. in. hot pink Corvette Sting Ray among the swarming minicars of the Triumph's homeland...well, almost. Single- and twin-cylinder bikes are commonplace, even Fours are offered by more than one manufacturer. But, there is only one Three.

If three cylinders are not sufficient as a showstopper, the Trident's exhaust note should do the job. As more than one test rider commented reverently, "It's the Ariel Square Four reborn." Just like the now-defunct 1000-cc Ariel, a busy,

slightly hoarse burble of sound is emitted from the Triumph's six little exhaust outlets. No one could mistake this music for the harsher pulse of a parallel Twin. And, when the throttle is open, and the Three is hard at work, the cacophony of sound will turn the head of any motorcyclist within hearing range. This is not to say that the Triumph is excessively loud; the attractiveness of its exhaust note lies in its quality, not in its quantity. Few people will disagree that it's the most exciting road motorcycle to be heard today.

But, why did Triumph choose a Three? The number sounds out of balance, without the symmetry of a twin-cylinder machine, or the unity of a Single. Actually, there is no inherent mechanical barrier that prevents a three-cylinder engine from being totally efficient and reliable. Presumably, Triumph could have moved to a four-cylinder layout. But many factors point in favor of a Three. It should be more efficient and powerful than a Twin of comparable size, and turn at higher speeds. Yet its frontal area, and possibly, its weight, should be less than that of a Four. A vital con-



sideration is that an increase in the number of cylinders invariably means higher manufacturing costs. Thus, while a Three will be more expensive than a Twin, it generally will not be as costly as a Four.

A Three also scores heavily in the matter of balance. A twin-cylinder engine with both crankpins set at 360 degrees is vulnerable to problems of crank flexing, as both pistons move in unison. The flexing sometimes is transmitted throughout the motorcycle, and the rider feels it in the form of vibration. One firing stroke occurs per crankshaft revolution.

But the ideal crankshaft design for a Three is a 120-degree configuration, which Triumph has adopted for the Trident. In such a layout, forces created by the moving parts of the engine are canceled out, and the result is considerably smoother operating characteristics.

The Trident engine is an alloy unit that features some of the neatest looking components to be found on English bikes. Not surprisingly, some parts are taken from Triumph's 500- and 650-cc machines. However, the majority of engine pieces are new. The sturdy, forged, one-piece crankshaft rides in an unusual mixture of bearing types, with two plain bearings in the center, a ball bearing on the drive side, and a roller bearing on the timing side. Big end bearings also are plain. Crankpin diameter, at 1.624 in., is identical to that on Triumph's 650-cc models. Main bearing internal diameters are: plain, 1.91 in; ball, 1.25 in.; and roller, 0.98 in.

Twin camshafts are located fairly high in the block, in typical Triumph style, and pushrod tubes run between the cylinders, also in customary style, and are identical in appearance to those used on Twins. Valve diameters are 1.53 in. for the inlet, and 1.31 in. for the exhaust. Duration for both inlet and exhaust camshafts is 271 degrees.

The aluminum alloy cylinder barrels are cast as one unit, as

are the heads, while two separate rocker covers are bolted to the heads.

Drive from engine to rear wheel is transmitted by a triplex primary chain running in an oil bath, a Borg and Beck diaphragm spring single-plate dry clutch (similar to automobile units), a four-speed gearbox, and a single-row chain as final drive. Primary chain adjustment is effected by a rubber faced tension blade. A rubber packed shock absorber unit inside the clutch sprocket assists smooth power transmission.

The Trident's engine/gearbox assembly follows modern unit construction design, but in a rather unusual manner. The crankcase casting is in three sections; the center portion extends rearward to include the gearbox, while two outer casings divide vertically from the center section. In addition, there are separate covers for the primary drive, on the left, and for the timing mechanism, on the right. Unfortunately, this design includes four vertical splits across its width, each of them vulnerable to possible oil leaks. Fears about possible leaks proved well founded, for oil exuded in tiny amounts from the cylinder heads and in greater quantities from beneath the crankcase during the test period.

The dry sump lubrication system follows orthodox design, apart from the groovy looking 0.25-pt. capacity oil cooler mounted beneath the nose of the fuel tank. Oil coolers frequently are employed on road racing machinery, but rarely on touring bikes. Obviously, a Three calls for special consideration. Oil is gravity fed from the tank to a geared pump, and passes through a cartridge filter and along drillways to the center main bearings and connecting rod big ends. The pistons, wrist pins, and outer main bearings are splash fed.

A pressure bleed from the center main bearing caps feeds the exhaust and inlet cam followers. After draining back into the crankcase, the lubricant is drawn through the scavenge side

of the oil pump, passes to the oil cooler, and then returns to the tank. An oil line between the scavenge pump and the cooler delivers oil to the valve mechanism. Three separate filters are employed—one in the tank, another in the lower rear end of the crankcase, and a third in the crankcase sump.

Gearbox and primary chaincase contain their own separate supplies of oil. Triumph's customary drip feed system lubricates the final drive chain. An easily accessible screw, located just below the oil tank filler cap, allows for adjustment of the rate of delivery to the chain.

Three 27-mm Amal concentric carburetors supply the mixture, after receiving air through a wire mesh and gauze filter element which cannot be cleaned. A small alloy casting is mounted transversely above the carburetors, and each throttle slide is linked to it. Thus, only one throttle cable is needed—a movement of the handlebar grip simultaneously shifts the casting, and all three slides.

Unmistakably Triumph—that's the verdict on the appearance of the powerplant and its satellite components. And why not make the Three look like a Triumph? The factory already possesses a multitude of followers all over the world for its big Twins, so to make the entire range appear similar is a logical step. A dohc Three, for example, just would not possess the Triumph stamp.

On the road, the Trident is very un-Triumphlike, as any Three must be in comparison with Twins. Certainly, a full throttle blast on the Trident, accompanied by that magnificent bellow of sound from three cylinders, is an exotic sensation.

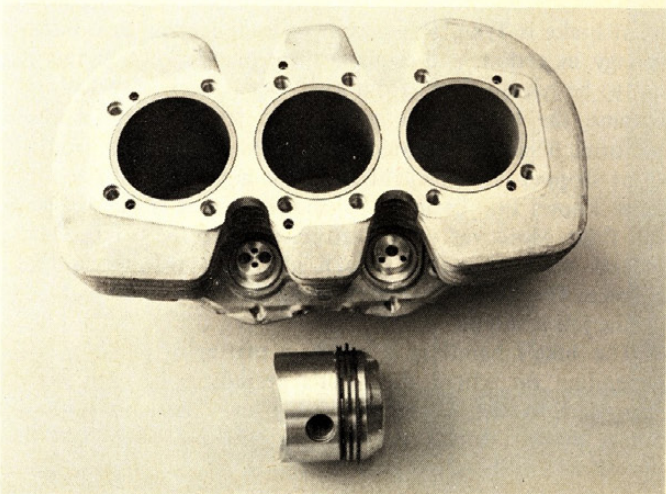
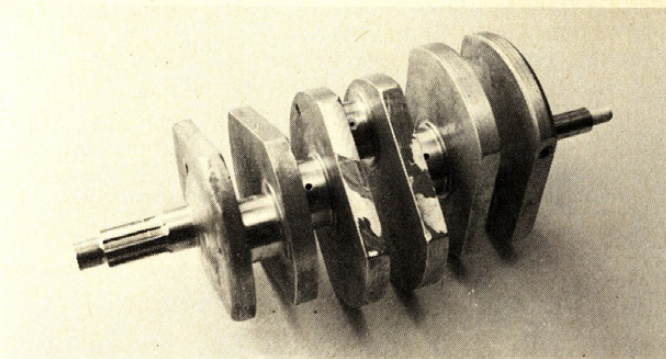
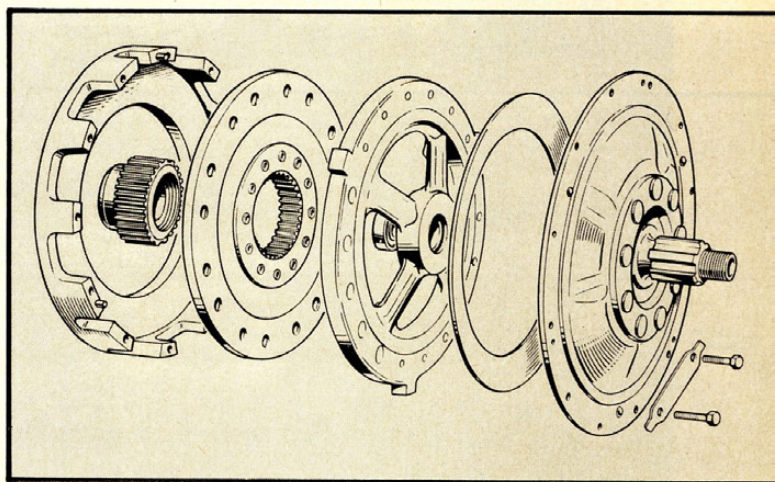
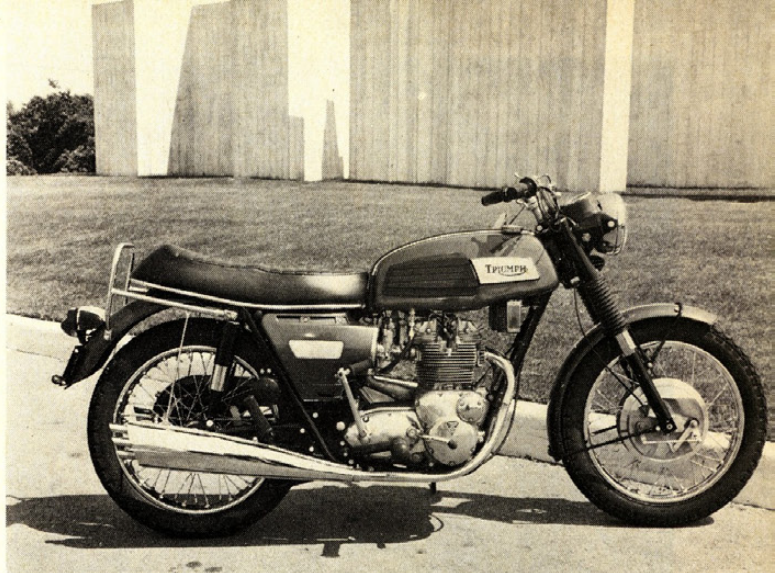
The engine spins quickly and freely to peak rpm of 8000, and is so smooth that it feels more like an automobile unit than a motorcycle engine. This, too, is a characteristic of Ariel Square Fours. Surprisingly, there was little torque at low crankshaft speeds. The engine must turn at 3000 rpm or more before any real degree of low end thrust is felt. Crankshaft design is clearly responsible for at least a part of this effect, for there are two flywheels. The lack of torque, combined with the Trident's weight—almost 500 lb.—makes the bike somewhat of a handful in city traffic. With a passenger on the rear, maneuvering is rather more cumbersome. On the majority of machines over 500 cc, pickup from a halt can be achieved at little over tickover engine speed. On the Trident, particularly two-up, it's a matter of easing rpm to around 3000, and slipping the clutch for a while.

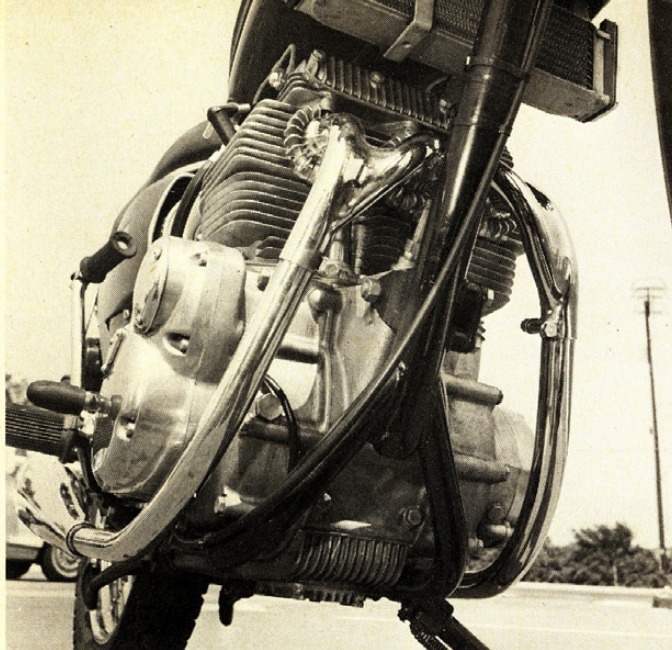
Despite this inconvenience, the bike is definitely a machine for two people to enjoy. The neatly pleated seat is borrowed from the 650 Triumphs, but on the Trident its location appears to have been changed. The rider sits on its immediate forward end, in a natural riding position, and leaves a long expanse of seat for his companion. And, the passenger can lean against, or hold onto, a large grab rail mounted behind the seat. It's one of the best rider/passenger layouts on any motorcycle, and two people could cover many Trident miles without discomfort.

Slight, high frequency vibration *can* be felt, vaguely through the handlebar, more definitely through the footpegs. But the shakes are not excessive, and are no deterrent to ownership of a Trident.

The gear change pedal, mounted on the right as on all British bikes, operates on a one-down, three-up pattern, as on all Triumphs. Swift, quiet upward changes are possible, but down changes require care if a crunch is to be avoided. Clutch lever action is stiff and, when cold, the clutch mechanism drags a little, causing graunches when low gear is selected from rest. Again, this is a Triumph characteristic.

Frankly, the brakes are not up to the task of halting this 500-lb. projectile, in view of the speeds it can achieve. The





machine for lurid, footpeg-scraping daredevilry. The bike just does not inspire in its rider that much confidence. The rear tire is Dunlop's new K81 design, a fine cover offering ample grip; the front tire is a Dunlop K70.

For more restrained cornering tactics, however, the Three performs adequately. And as a long distance hauler, it's a keen machine. A rider is likely to arrive at his destination without cramp, and without the numbing effects of vibration. Highway cruising is effortless, and is aided by a softish suspension which absorbs the majority of highway irregularities.

Frame configuration is similar to the layout on 650 Triumphs, except that tubing diameter is greater in some areas. Diameter of the single front downtube has been increased, for example. Two toptubes, one above the other, converge under the fuel tank, and arc downward to a point slightly ahead of the swinging arm pivot. The rear frame legs are bolted to the main frame section, and the swinging arm pivots on bronze bushings.

While the Trident engine is an exciting example of machinery, other aspects of the bike are disappointing. For example, a motorcycle priced at more than \$1700 should employ something more refined than fragile strips of rubber to attach horn, dimmer and kill switch electrical leads to the handlebars. These strips, little more than rubber bands, deteriorate rapidly.

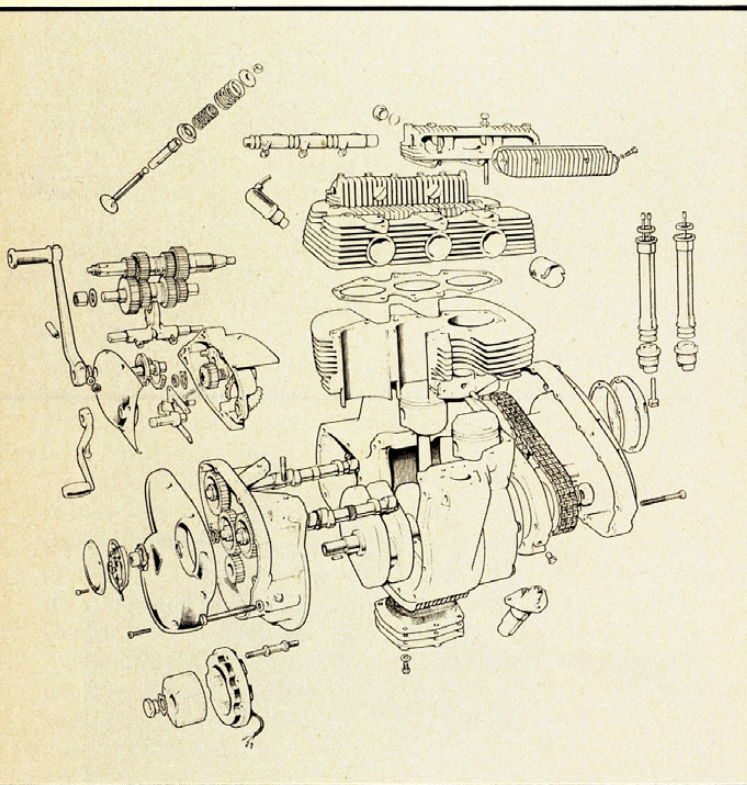
The tank is decorated along its top centerline with a strip of hollow plastic that doesn't appear at all durable.

One of the major complaints can be leveled at the exhaust system. Those three little outlets emerging from each silencer would look more at home peeking from beneath the skirts of a motor scooter. The header system consists of a single pipe from each head, with the center pipe dividing into two. One of these center pipes joins the left exhaust tube, the other meets the right one. It's all a kind of a super-siamesed setup. But the area around each of the junctions between pipes very quickly blued, hinting that burnt gases could be momentarily bogging, instead of making a clean exit. The header pipes are bolted to the lower exhaust pipes, with the upper sections fitted outside the joints, forming a possible source of exhaust leaks. Three entirely separate exhaust and silencing systems might have looked sharper, and worked more efficiently.

All early Tridents will be finished in an aquamarine blue color, containing a hint of metallflake finish. The fenders and the 5.12-gal. fuel tank are formed of steel, while fiberglass paneling makes up the bodywork rearward of the seat. A pair of Smiths instruments, a speedometer and tachometer, are fully encased in rubber, and are easily read.

Electrical components include a crankshaft driven alternator, battery, breaker points, and coils. The only variation from convention are a triple contact breaker, and three coils—on the Trident, many things happen in threes! Starting is easy, provided the two outside carburetors are liberally flooded, and twin horns emit a powerful, melodic blare. Powerful lighting takes the difficulty from night riding.

For a final demonstration of the merits of three-cylinder engines, doubters need only look at the history of international road racing. The Italian Guzzi factory, and West Germany's DKW plant, both have constructed successful racing Threes. But perhaps the most famous example of all is the MV Three, which has won the 500-cc world championship for the past three years. In its 350-cc version, it recently clinched the first MV title in that class. So, it appears that Triumph probably will gain indirect publicity from the efforts of a rival factory. But, disregarding racing Threes, there is no doubt that the Triumph Trident is a big, fast, groundshaker of a motorcycle. And there isn't another bike like it. ■



front brake is Triumph's new twin leading shoe unit, but it is spongy in action, and requires sheer musclepower if the bike has to be hauled down from high speed. Lack of feel is partly because the brake cable is too thin for the duty it has to perform. The tail-mounted brake light is operated from the front stopper—an excellent idea, for any rider with common sense knows that in any stop, the front unit is the one to go for first. Moreover, this feature is expected to become a federal safety standard, which all states will be asked to enforce. The Trident's single leading shoe rear brake just won't do the job it should.

The bike's handling is largely a matter of personal taste, depending on where the rider's prejudices lie. Anyone accustomed to the Olympian agility of Triumph's 650- and 500-cc models, or to a fine handling lightweight, may well find the Three cumbersome and deliberate in comparison. This is particularly true at low speeds. It also is not the most suitable

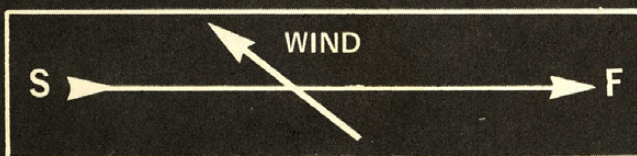
TRIUMPH TRIDENT 750

SPECIFICATIONS

List price \$1765 (p.o.e. west), \$1750 (p.o.e. east)
 Suspension, front telescopic fork
 Suspension, rear swinging arm
 Tire, front 3.25-19
 Tire, rear 4.10-19
 Brake, front, diameter x width, in. 8 x 1.625
 Brake, rear, diameter x width, in. 7 x 1.2
 Total brake swept area, sq. in. 67.19
 Brake loading, lb./sq. in. 9.96
 Engine, type four-stroke Three
 Bore x stroke, in., cc .. 2.67 x 2.75, 67.0 x 70.0
 Piston displacement, cu. in., cc 45.0, 753.0
 Compression ratio 9.5:1
 Carburetion (3) 27-mm Amal concentric
 Ignition battery, coils
 Claimed bhp @ rpm 60 @ 8000
 Oil system dry sump
 Oil capacity, pt. 6.0
 Fuel capacity, U.S. gal. 5.12
 Recommended fuel premium
 Starting system kick, folding crank
 Lighting system battery, generator
 Air filtration wire mesh and gauze
 Clutch diaphragm spring, dry
 Primary drive (1.73:1) triplex chain
 Final drive (2.74:1) single-row chain
 Gear ratios, overall:1
 5th none
 4th 4.88
 3rd 5.82
 2nd 8.26
 1st 11.91
 Wheelbase, in. 57.5
 Seat height, in. 31.7
 Seat width, in. 11.5
 Handlebar width, in. 27.7
 Footpeg height, in. 10.5
 Ground clearance, in. 6.1
 Curb weight (w/half-tank fuel), lb. 499
 Weight bias, front/rear, percent 44/56
 Test weight (fuel and rider), lb. 669

TEST CONDITIONS

Air temperature, degrees F 87
 Humidity, percent 43
 Barometric pressure, in. Hg. 29.94
 Altitude above mean sea level, ft. 1632
 Wind velocity, mph 9
 Strip alignment, relative wind:



PERFORMANCE

Top speed (actual @ 7452 rpm), mph .. 117.03
 Computed top speed in gears(@8000rpm),mph:
 5th none
 4th 125.7
 3rd 105.4
 2nd 74.2
 1st 51.5
 Mph/1000 rpm, top gear 15.71
 Engine revolutions/mile, top gear 3821
 Piston speed (@ 8000 rpm), ft./min. 3666.75
 Fuel consumption, mpg 20.3
 Speedometer error:
 50 mph indicated, actually 51.20
 60 mph indicated, actually 62.84
 70 mph indicated, actually 73.95
 Braking distance:
 from 30 mph, ft. 36.67
 from 60 mph, ft. 157.0
 Acceleration, zero to:
 30 mph, sec. 2.3
 40 mph, sec. 3.1
 50 mph, sec. 4.0
 60 mph, sec. 5.6
 70 mph, sec. 6.7
 80 mph, sec. 8.3
 90 mph, sec. 10.4
 100 mph, sec. 14.3
 Standing one-eighth mile, sec. 8.40
 terminal speed, mph 81.44
 Standing one-quarter mile, sec. 13.71
 terminal speed, mph 98.46

