SUPERCHARGED!

750cc Norton Street Bike Gets Boost From Judson VW Blower

When Phillip Watterberg decided to supercharge his 1964 Norton Atlas 750cc Scrambler, he had three objectives in mind. He wanted: (1) A machine that would, in full street trim, turn upwards of 120 mph in the ¼ mile with e.t.'s in the mid-eleven second bracket. (2) A bike that would cruise effortlessly at 70 mph with an engine speed not above 3000 rpm, with proper gearing, for an ultra-smooth highway ride. (3) A dependable, docile street cycle for everyday transportation.

Phillip, an 18-year-old high school graduate who plans to study mechanical engineering, found the key to his desires in the form of a Judson supercharger originally intended for a Volkswagen! The nature of the VW version of this popular small car supercharger made it ideal for the motorcycle application: Its compact size (6" x 9") permitted an easier, less bulky installation than some other possible choices, and being of the vane type it operates only in proportion to throttle opening and engine load. This eliminates any tendency to overheat. Any time less than ⅓ throttle is employed, the pressure is kept on the vacuum side of the scale, resulting in more normal aspiration. But when the rider "grabs a handful of throttle", the pressure gauge needle bounces past the 5 lb. mark (pressure in the buffer chamber) to really force that fuel-air mixture down the Norton's throat.

REVERSED ROTOR

The supercharger was in the planning and wishing stage for about five months. But the actual purchase of the unit last December got the ball rolling. The next step was to order a specially built reversed rotor from the Judson factory, since the Volkswagen and Norton crankshafts turn in opposite directions. Then a buffer chamber had to be constructed

SUPERCHARGED by JUDSON

allowing more than 90 cubic inches of volume while keeping to minimal exterior dimensions. The design finally employed allows access to the rear rockers and ample space for the supercharger. Most important in the design of the buffer chamber are the two blow-off valves, one on each side. Much experimentation and trial went into the welding of this chamber by expert welder Werner Kuhn. In

Judson Supercharger. Designed for Volkswagen, this unit is guaranteed to give VW's and Karmann-Ghia autos a 45% to 55% horsepower boost at the rear wheels.

(Courtesy Bill Corey, Engineered Accessories, Pasadena, California)

PRESSURE GAUGE is neatly located between speedo and tach above headlight.

A "CLEAN" INSTALLATION by owner-builder Phillip Watterberg of Albuquerque, New Mexico.

case of engine backfire, the ignited gas of a supercharged engine has no escape as it would have from conventional carburetion. Thus without some sort of relief device, a supercharged engine might experience a bomb-like explosion. The blowoff valves on the Norton prevent such occurrences. They instantly begin releasing gas that reaches a pressure higher than 20 lbs. per square inch. As a further safeguard, one of the bottom seams of the buffer chamber was brazed instead of being welded. The braze is more likely to give from the explosive pressure than the inner engine. As of this writing, Phillip has not yet experienced a backfire to test the safety system, but he tells us he has his fingers crossed.

Another unique feature of this custom-engineered buffer chamber is a built-in inner tube valve stem for testing and checking pressures. A hand air pump can be attached to the inner tube valve to create a pressure condition. By checking the pressure gauge, the observer can quickly detect any leakage.

A large aluminum inspection plate is bolted directly to the supercharger unit and buffer chamber. When the supercharger and the twelve retaining bolts for the plate are removed, there is more than enough room for easy access to the bolts which hold the chamber to the head and also to the blowoff valves. Simplicity, compactness and accessability were the watchwords in this operation!

MOUNTING

The proper positioning of the supercharger on the chamber was followed by the sturdy mounting of the unit to the motorcycle frame in a manner that would resist the strong pulling force. To accomplish this a ¼" aluminum plate was bolted to the end cover of the right side of the supercharger. It extends down to where it fastens to the transmission and frame. On the left side two 1" x 1⅛" steel braces were attached at the end cover of the supercharger and to two separate parts on the frame.

The clutch serves as the direct source of drive power for the Judson blower. Much work was entailed developing a functional, troublefree power transmission system from the clutch to the supercharger. A 44-tooth #40 plate sprocket was machined for a sliding fit over the outside of the clutch bell. This was silver soldered into place beside the primary chain sprocket. Next, the V-belt pulley intended for the VW installation was discarded in favor of a 24-tooth sprocket fitted snugly over the supercharger shaft. Shims were added until this sprocket aligned with the clutch sprocket. A chain was then cut to fit and installed. The first phase of the operation was over.

As in almost all custom installations, the seemingly trivial problems following the major surgery take almost as much time to resolve as the initial butchery. Maintaining proper chain tension proved

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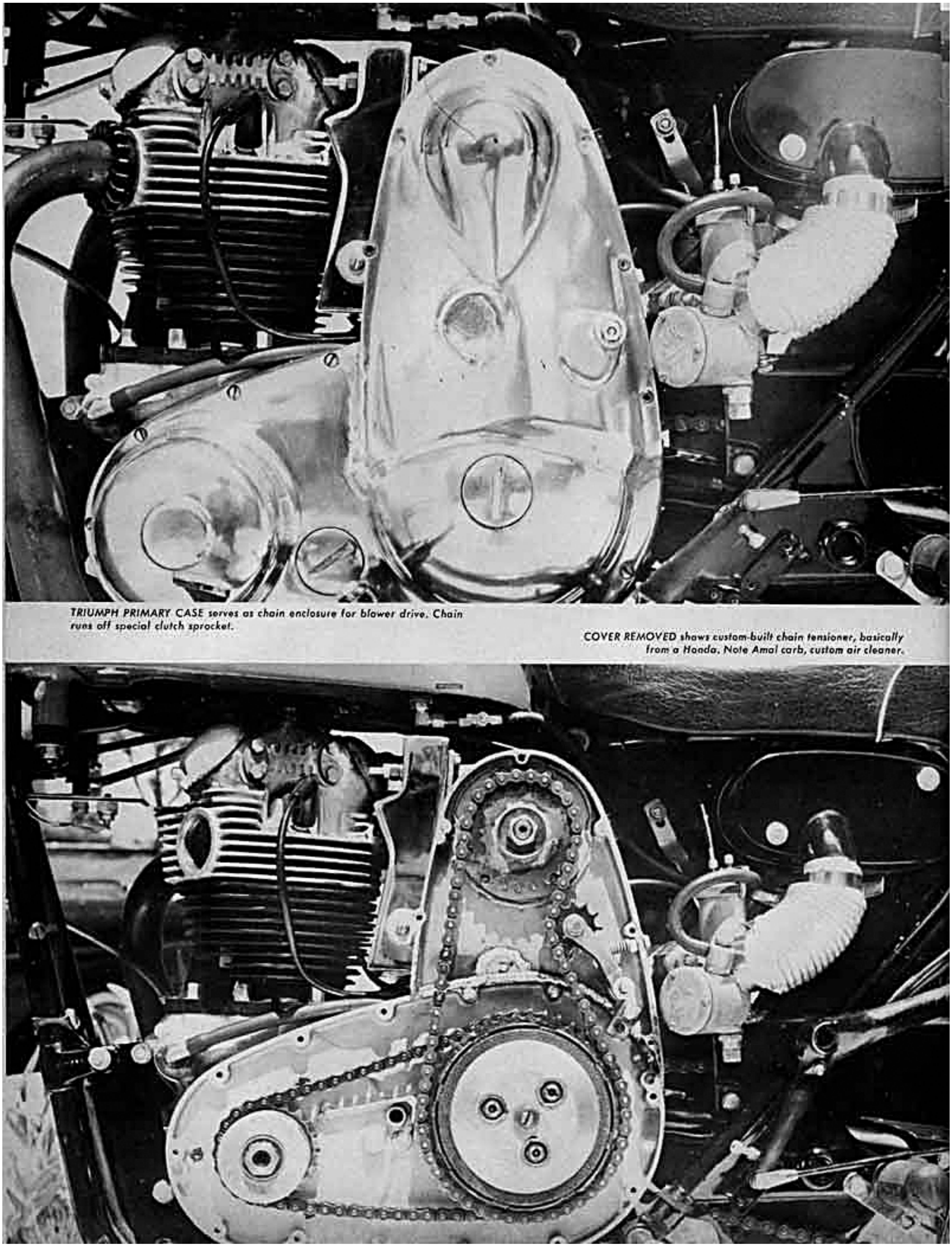
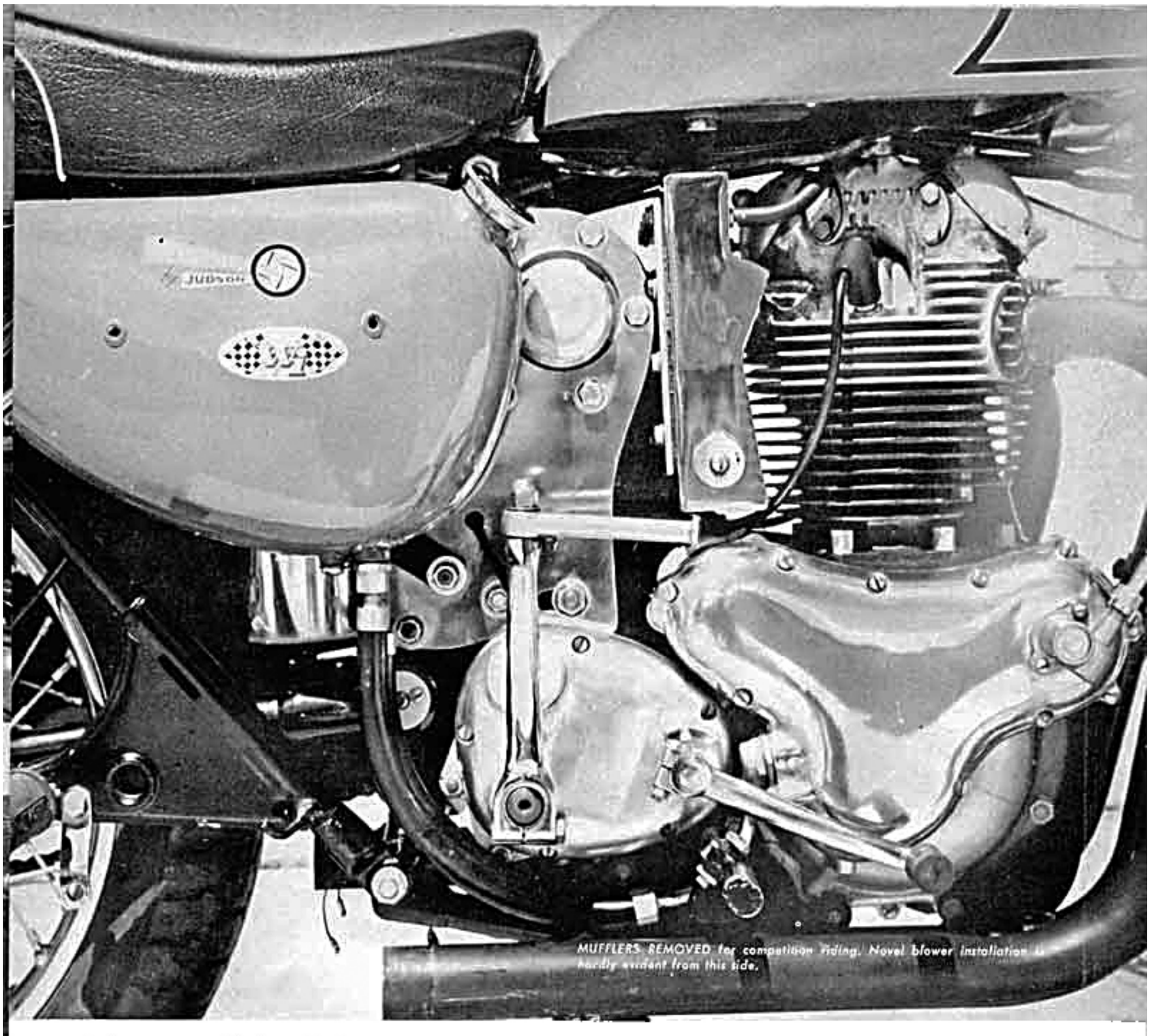


TRIUMPH PRIMARY CASE serves as chain enclosure for blower drive. Chain runs off special clutch sprocket.

COVER REMOVED shows custom-built chain tensioner, basically from a Honda. Note Amal carb, custom air cleaner.



MUFFLERS REMOVED for competition riding. Novel blower installation is hardly evident from this side.

to be a nuisance. Finally, a hybrid setup was worked out, employing an idler sprocket, part of a Honda cam chain tightener and a high speed bearing. (The idler sprocket reaches speeds up to 13,000 rpm, hence the high speed bearing instead of a bushing.) The tightener is bolted to the back vertical Triumph case and utilizes a compressible spring to keep constant chain tension.

The chain itself is enclosed in an ingenious housing made of Triumph primary cases. Much filing, sawing and grinding was necessary for the right fit prior to welding. Then the welds were ground and polished until the entire aluminum package looked like a factory option!

CARBURETION

Carburetion was facilitated by using a curved section of automobile exhaust pipe welded to two flanges, one to fit the supercharger and the other to fit the carb. The flanges were precision ground for a leakproof fit. Of course, an extra long throttle cable had to be used along with a modified fuel line system. The air cleaner employed is from an old Matchless twin. It is more than adequate for the job.

Bike builder Watterberg's big moment came shortly after he filled the tank with premium and primed the carb. "I gave her two hearty kicks and she crackled into life for the first time in four months," he said. As of this writing the local dragstrip has not yet opened for the season, so no performance figures are available. However, it runs fine on the street and Phillip is extremely confident that as soon as a few minor "bugs" are eliminated, no one will be able to touch him in competition. Future plans? Phillip is experimenting with a fuel injection system and a gearing change in the supercharger to increase pressure from 5 psi to 7 psi.

Some miscellaneous information: The finished Norton weighs 410 lbs. Larger (1¾") exhaust pipes were fitted giving a diameter increase of ⅜" over stock. The sound emitted is "out of this world." Mufflers are, of course, used on the street. The supercharger is lubricated by a vacuum operated oiler which supplies oil inversely in proportion to manifold vacuum. This unit is mounted ahead of the rear wheel, which necessitated some fender chopping. A Steward Warner Vac-Press gauge is mounted between the speedometer and tach and looks quite natural in this location.

Now that the major challenge of building this remarkable street bike has been met, the owner is concentrating on some more unusual motorcycle developments and is contemplating selling the Norton. Offers over $1200 will be considered. Inquiries will be handled through CYCLE's offices.

Owner-builder Watterberg has "lived" motorcycling for the past six of his eighteen years. We have no doubt that some important contributions will come from this enthusiast as he pursues his career in engineering. ◀