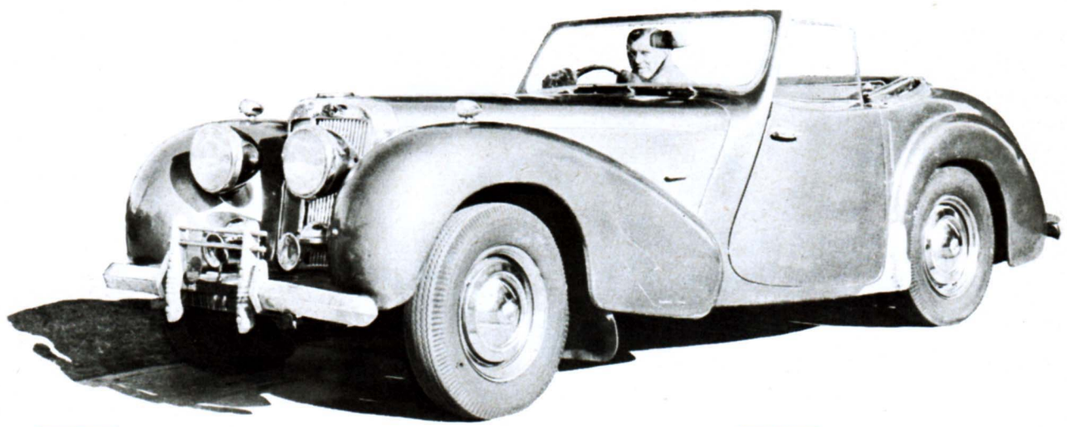
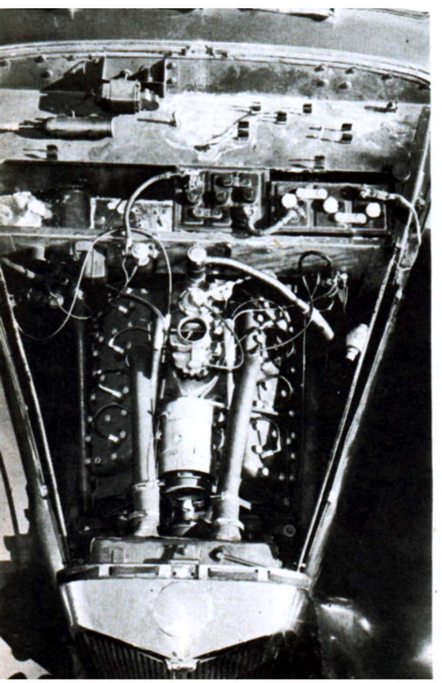
engine swap:

By AL PROKOP



Triumph–Ford

The engine in the Triumph 1800 is a boy doing a man's job. A V8 will add those big muscles



Overhead view, with hood removed shows neatness and balance of installation. Hood length is deceiving, latter third being taken up by battery carrier.

WHEN Leonard Prokine finally realized that the only car his classic Triumph could beat away from a light was a parked '38 Chevy, he became somewhat disconcerted. As a member of the Sports Car Club of America he felt obliged to uphold the reputation of the club. The Triumph was letting down the club, the admirers, and the owner. The engine was tired and, despite its noise, moved the car feebly. The time had come for a change. But what kind of change?

What does an owner, who is proud of his automobile and yet discontented with its performance, do? Dispose of the car and buy another? Perhaps, but not likely! If he has a great fondness for his car as Prokine did, he will embrace the good features, and take steps to improve the imperfections. What other sports car, he reasoned, could be purchased in the same price class and still be as distinctive? And what other sports car had two auxiliary seats in the trunk compartment and could accommodate five passengers if the need arose? Quite obviously, none. The only alternative left for Prokine was to repower the Triumph. The car could stay, but the engine had to go.

Originally, the Triumph was built for a four cylinder engine of approximately 1800 cc displacement. It is a long stroke, small bore engine delivering about sixty-two horsepower at 4400 rpm. The weight of the car is about twenty-five hundred pounds. In terms of power-to-weight, this means that the Triumph 1800 engine hauls about forty pounds for every single horsepower it delivers. This isn't satisfactory for a light truck, much less for a sports car, and so a very justifiable reason for modification. Yet, just modifying this engine wasn't really the answer. In the first place, for the amount of power gained, the cost would be overwhelming. And when all was done, the Triumph would still have four little pistons straining beneath the hood.

These, then, are the considerations with which Prokine had to concern himself. A slightly larger engine would be the answer to the Triumph's troubles. But what engine would do the trick? And how much would it cost? The best thing to do would be to consult someone who had successfully done conversions, and who was familiar with the problems involved. And so Prokine went to Fred Hodgson of Forest Hills.

After some lengthy discussions, they decided on an American engine with a stock horsepower of about one hundred, but not too large in size. The Triumph engine compartment was limited in space and they had no intention of redesigning the body in order to squeeze in a new power plant. There were two reasons for the selection of an American engine. For one, Prokine wanted a car which would take him around the country to the various competitive meets. Should the engine develop difficulty en route, he could casually drop into any garage and be sure of service. If parts were needed they would be immediately available at American prices.

After carefully measuring the engine compartment, and various engines, Hodgson decided a 1940 Ford V8, putting out 90 bhp, would fit snugly but comfortably. However, while the size and power of this engine would be suitable, the engine's characteristics

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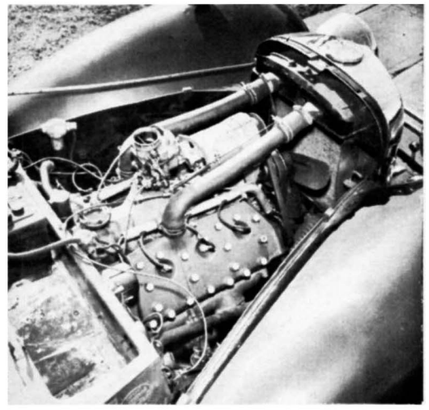
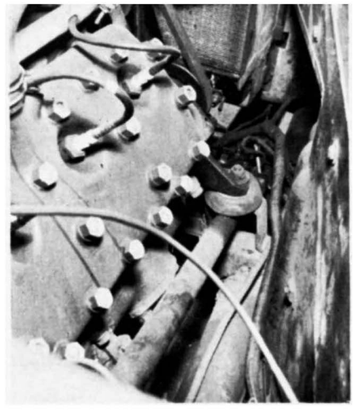
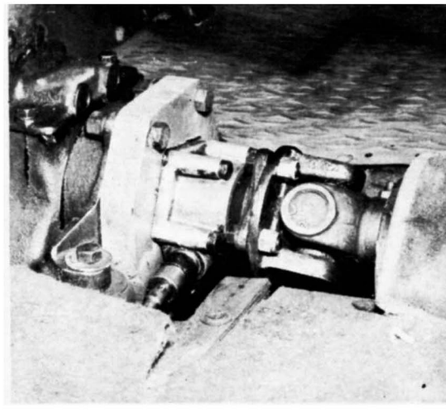


Ford V8 uses almost every available inch under hood. Dual water outlets necessitated adapting Triumph radiator. Generator remained twelve volts.



Steering column runs through engine mount. Clearance between post and support is less than 1/8 inch. Despite narrow clearances, no vibration is felt.



From passenger compartment, view shows machined aluminum plate which retains rear bearing of transmission and holds speedometer drive and housing.

Underview of chassis shows the right front engine mount straddling steering column. Note old mount was burned off, given quarter turn and rewelded.

Ford exhaust manifold flange opened directly on steering column. It had to be closed off and a new flange inserted further back on manifold to clear post.

Pedal linkage rearranged to fit Ford clutch. Shaft was set in right side of housing, eliminating extra linkage to activate clutch bearing from the left side.

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passenger side, directing powerful gusts up inside the skirts of the chickadee of the moment. The driver had trouble keeping eyes-front on these occasions, but nothing to compare with the trouble he got when he didn't.

The same fellow, now in his fifties, still bears a scar on his temple as a memento of a contretemps with his Aero. His home garage was at the end of any alleyway, just one Morgan wide, leading at right-angles out of a steepish section of main road. Aeros, of course, had no reverse, so he evolved a homely technique for putting the thing away tail-foremost without personal exertion. Heading uphill, he would deliberately overshoot the entry by a few Mog lengths, then snick into neutral and make a descending turn by gravity, coasting backwards. In the small hours one morning he minutely misjudged the manoeuver, clipped the apex of the kerb with his front wheel and capsized. The Aero, although a featherweight ensemble, trapped him in such a way that he couldn't move a muscle. It was half an hour before his muffled cries brought a rescuing cop to the spot.

Among the more dreaded ills to which the Aero, and the two-speed Super Sports after it, were heir, was the simultaneous engagement of both gears at once. A locked back wheel at speed, specially on a wet surface, wasn't funny, even if that direct steering did lend itself to lightning correction of the resultant slides. A track racing forefronter of the early 20s, one F.B. Ware, brought his speed career to a premature close when his back tire threw a tread at 80 during the 200-Miles Race at Brooklands, the tread tangled with one or both chains, the wheel jammed solid and instantly the Mog went into tantrums, strewing Ware and his mechanic out with highly injurious results.

Light Car magazine, London, the favorite forum for Morgan owners, once ran a road test report on a Mog and remarked that "unless everything is fixed securely it is liable to fall off or rattle abominably."

To the faithful, a little thing like an abominable rattle or an occasional missing part was nothing to pick a fight with Malvern over. Still isn't, either. Take away what Shakespeare called the "pleasant vices" and there might even be something missing from the character of the brute. But don't let me hear the faithful claiming that a well-found Super Sports is *still* a match for what they scornfully call "modern tinware" because it isn't, and hasn't been for years. #

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were not. Here's why. The Triumph rear-axle gears were designed for the high rpm four-barrel. The V8 was a low speed machine attaining peak at about 3600 rpm. The 4.57 gearing in the Triumph rear-end would quickly let the Ford engine wind out at low speeds. 4.57:1 gearing means that an engine makes a little better than four and a half revolutions to the rear wheels' one complete turn. At the Triumph engine's top rpm of 4400, the car attained a maximum speed of approximately 75 mph. Comparatively, the Ford engine, which had a top rpm of 3600, would give the Triumph a top speed of only 65. At this rate, the Ford engine would burn itself out at moderate cruising speeds of fifty. With such gearing, the Triumph might just as well be a tractor.

There were two possibilities which would solve the problem: Get a higher speed rear end or do something that would increase the speed of the engine to 4400. The installation of a higher speed rear-end would be a conversion on top of a conversion and would add considerably to the cost. The only reasonable alternative lay in modifying the engine. This was to be done by replacing the stock camshaft with a three-quarter race shaft, and by milling the heads .030 of an inch for increased compression. A three quarter cam was preferred to a full race stick so that the engine could be idled smoothly for normal driving. With the combination of these two slight but important modifications, the engine would now peak somewhere near 4400 rpm and develop about 110 horsepower into the bargain. This would raise the cruising speed to about 70 mph with a top speed of about 80 mph. The 110 horsepower would accelerate the Triumph like a startled cobra. The increased ignition requirement took care of itself as will be seen later.

MOUNTING THE ENGINE

The mounting of the engine presented rather a frightening problem. Because the radiator grill is permanently mounted on the two front fenders as one unit, it was a fixed position which cannot be altered. This means that the radiator, which fits exactly within the shell of the grill, also had a fixed position which cannot be altered. The engine, then, had to be placed back sufficiently so that the fan would not interfere with or touch the cooling fins. Yet, if it were mounted too far back, under the tool compartment of the fire-wall, the angle to the drive-shaft would be too sharp. The position decided upon left a one-inch space between the fan and the radiator, and a half-inch between the fuel pump pushrod and the fire-wall.

At this exact position, it was found that the right front engine support sat directly on top of the steering post (the Triumph has a right-hand drive). The mount for the Triumph tubular chassis was removed and welded to the top of the frame just under the steering column. On this was bolted a one inch piece of flat steel stock shaped in the form of an inverted U. This U piece now straddled the steering column. And on this, the engine was mounted. This design was repeated on the left side to balance the engine properly.

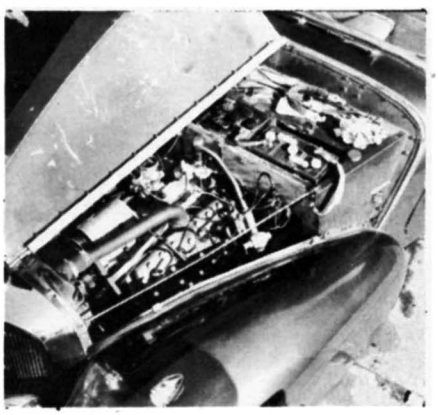
A standard Ford clutch was used with a minor change. The clutch operating shaft which activates the throw-out bearing fork was changed from the left to the right side. Luckily Ford made provision for this change in the bell-housing so that these parts could be used abroad in the English Fords. The clutch pedal was then easily connected to the clutch operating shaft, and no excessive linkage was necessary.

CONVERTING TRANSMISSION MAINSHAFT

The Triumph transmission was now useless. There was no way of adapting it to the engine. In fact, there was little choice. The only transmission that would fit without special adapter plates was a Ford floor shift unit. As it was the transmission had to be adapted to the Triumph drive-shaft, and somehow the speedometer cable had to be adapted to the transmission. It must be remembered that the speedometer is geared in proportion to the rear axle ratio, and the circumference of the tire. Therefore if the Triumph speedometer was to be used, cable gearing had to be maintained.

From the back of the original Triumph transmission, Hodgson removed the speedometer gear housing. Then he designed an adapter approximately six inches long and four inches wide which was machined from a flat piece of aluminum stock one inch thick. This adapter plate had a dual function. One, when bolted to the rear of

the Ford transmission, it would retain the rear transmission bearing. And two, it would hold the speedometer gear housing, which also contained the rear grease seal for the transmission, making it a part of the unit. The mainshaft of the Ford transmission was cut just at the splines, machined and tapped. The Triumph mainshaft was also cut, but at a point where the drive gear for the speedometer cable would be perfectly centered in the speedometer housing. The cut end was machined and threaded so that it could be screwed into the tapped end of the Ford mainshaft. This grafted mainshaft was then machined to make the joint smooth and true. Around this joint, a collar was fitted, welded, and the mainshaft was then heat treated to restore the metal to required temper and hardness. The new mainshaft was then balanced and set into the Ford transmission.



INSTALLING THE RIGHT EXHAUST MANIFOLD

The fitting of the right exhaust manifold added to the complexities of the job, a problem entirely unforeseen. Until recently, V8 engines were designed with a single exhaust pipe leading to the rear of the car. Both banks of cylinders, then, had to be connected by a cross-over pipe. The left manifold was equipped with an extra flange at the rear that led to the exhaust system. Not only was there just no room for the cross-over pipe, but the right exhaust flange with which the pipe would have joined was in direct line with the steering column. The only thing to do was to close up the flange hole with a piece of flat iron stock, and weld a new flange into the manifold a few inches back where it would clear the steering post. An exhaust pipe was then bolted to this new flange, and an exhaust assembly was mounted to the right side of the under carriage. A separate exhaust set-up was installed on the left side, making a complete dual exhaust system.

RE-DESIGNING THE RADIATOR

The depth of the Triumph radiator made up for its narrow width and its capacity was very nearly that of the Ford radiator. It did, however, have only one inlet and one outlet. The radiator was dismounted, and the two hose connections removed. A piece of sheet metal was placed on each opening, top and bottom, and soldered all around it. Four new openings were then cut into the radiator tanks, and four necks, removed from an old radiator, were soldered into the proper places. So far, the reworked radiator cools the engine remarkably well.

TWELVE VOLT SYSTEM REMAINS

The twelve volt electrical system of the Triumph had every possible good feature to recommend it as part of the new installation. Naturally, the prime considerations were expense and convenience. Everything electrical on the car operated on twelve volts; the parking lights; the headlights; the rear lights; the stop lights; the direction signals; the horn; the ignition; the battery charging indicator on the instrument panel; and the instrument panel lights. All these items would have to be converted if a six volt system were installed. There was nothing to be gained by such a substitution. In efficiency, the six volt arrangement would be far inferior to the twelve volt system; the twelve volt battery is able to withstand more abuse. The headlights produce a distinctively bright beam. Where a six-volt ignition will attenuate and become spasmodic at high engine speeds, a twelve volt ignition will not tend to drop off too much.

A late model generator mounting support and band assembly was obtained and the Triumph generator strapped onto it. The Triumph ignition coil was in the system. The rest was all Ford.

The six volt starting motor remained on the Ford engine. Its use is only momentary, and the twelve volts passing through it for that time doesn't even begin to warm it.

RESULTS

While the top speed may not have been increased much over what it was previously, the acceleration rate was vastly improved. The Triumph's best recorded time from zero to sixty was 23 seconds. Now, although an accurate check has not been made, it has been clocked somewhere between thirteen and fourteen without straining the engine to do it. The Triumph may not be able to walk away from every car when the light changes but at least now it doesn't get stuck for the light twice. Prokine is temporarily happy with it which is, after all, the important consideration. But every once in a while, I get rumors from the service pits that Prokine is thinking about that rear axle. #