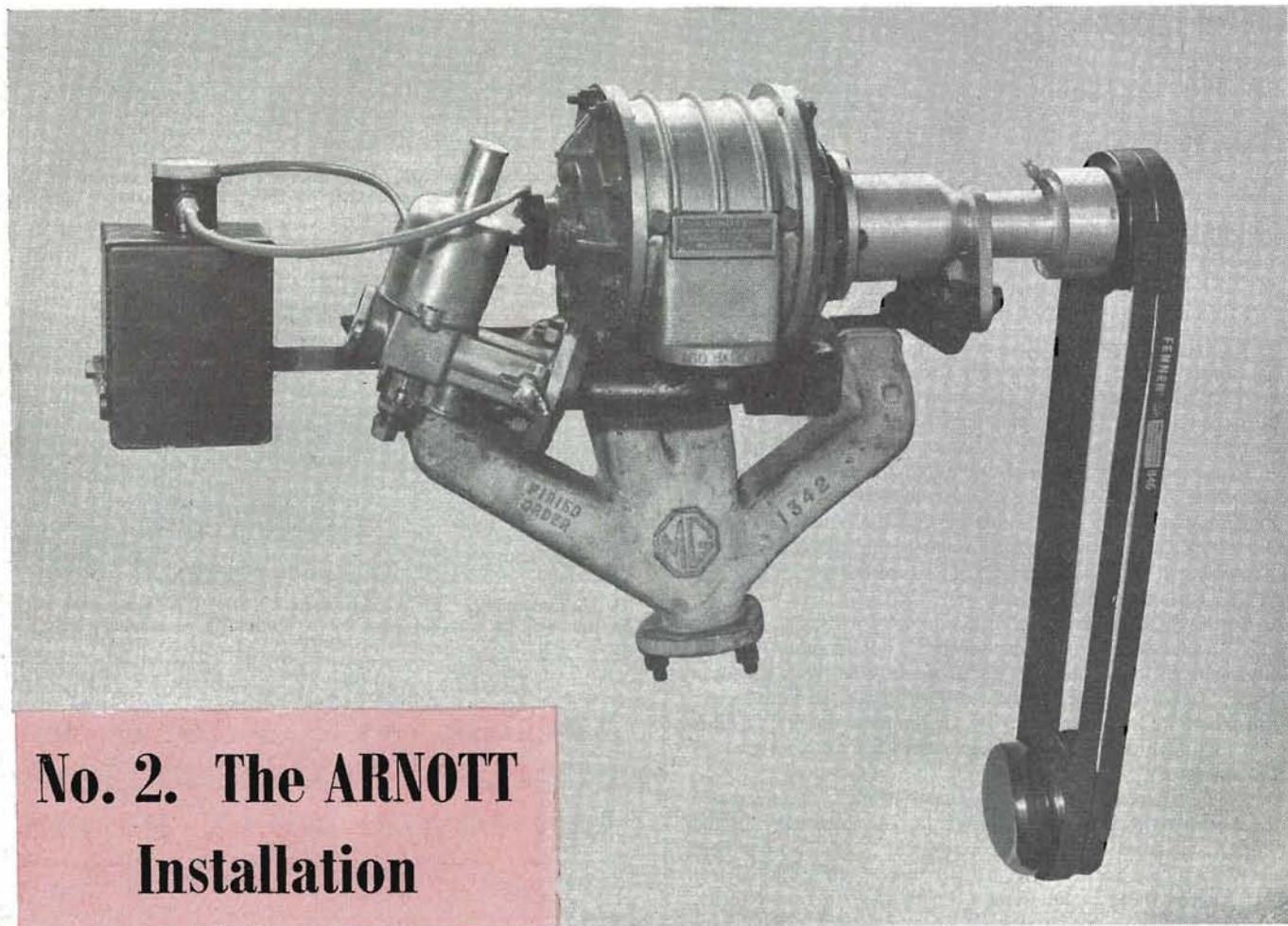


Second of a series of articles dealing with various equipment for

SUPERCHARGING M.G. "XPAG" POWER UNITS



No. 2. The ARNOTT Installation

THE primary object of the Arnott Low Pressure Supercharger, manufactured by Carburettors Ltd., Grange Road, London, N.W.10, is to supply the petrol/air mixture to the engine under pressure so that 100 per cent. filling is effected, thereby overcoming the inherent volumetric inefficiency associated with an unblown engine.

The capacity of the supercharger, together with the speed at which it is driven, are chosen so that approximately 33½ per cent. greater volume is available to the engine. This percentage is closely reflected in "before and after" performance figures, or, expressed differently, the power/weight ratio is improved by 33½ per cent. In addition to the improvement in acceleration, the benefits of a well-atomised and mixed gas are very apparent during part-throttle conditions, and are reflected in fuel economy. The reduced atmospheric pressure at high altitudes causes a considerable drop in the efficiency of any normally-aspirated engine.

With such an engine, and if conditions are ideal, that is if the distribution and burning capabilities of the engine are

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(with acknowledgements to Carburettors Ltd.)

perfect, the part-throttle air/fuel ratio by weight would be 15/15½ to 1. At altitude the ratio would still be the same, but as there would be less air, requiring less petrol (a state of affairs not catered for by the ordinary fixed choke carburetter), the result would be that the mixture becomes progressively richer. This is catered for to a large extent by the standard S.U. carburetters fitted to the "XPAG" power unit, owing to this instrument's inherent compensating characteristic.

In very rough figures it may be said that the power drop at 5,000 feet would be about 15/20 per cent. and at 10,000 feet 28/30 per cent., but this loss can easily be overcome by the use of a low-pressure supercharger.

Drive by V-belt and freedom from gearing within the supercharger, combined with well-designed ports, ensure quiet operation.

All the vane and shaft journals run on ball races, and all races and components are

lubricated via the hollow vane shaft, oil being fed to the shaft from a separate quart-size oil tank.

The oil is fed to the supercharger through a calibrated orifice situated within the tank, being air-bled from within the tank to ensure the free delivery of oil through the pipe lines and also to prevent any siphoning action. As the calibrated orifice is amply protected by a gauze of a much finer mesh than would permit a blockage, attention is not required.

The manifold pressure is conveyed to the interior of the oil tank by a pressure balance pipe, the oil supply to the supercharger being based upon the fact that there is always less pressure within the rotor than in the manifold, this being so whether the throttle is closed or open. The inside of the tank is therefore variably pressurised at all times in accordance with conditions prevailing.

The oil feed pipes are internally armoured P.V.C. tubing, thus providing the necessary flexibility between the supercharger and tank. These pipes should on no account be replaced by larger bore pipes or rubber-

lined pipes, or the even delivery of oil will be impaired.

The Arnott Supercharger is a vane-type pump with an inbuilt feature which enables pressure to rise within the supercharger before transference to the manifold; this is brought about by the late opening of the outlet port. This not only avoids pumping losses but has a strong influence in preventing surge. A further reduction in power required to drive a vane-type supercharger is due to progressive reduction of vane area exposed to pressure as compression rises within the supercharger.

The kits are supplied with all the parts required for the conversion and the design of the installation is such that the fitting may be confidently carried out by any skilled garage mechanic or competent owner-driver.

The supercharger is mounted on the manifold side of the engine, the twin carburetters being replaced by a special manifold, with the supercharger mounted centrally on the manifold.

Directly coupled to the supercharger is the extended drive shaft requiring no universal joints and subsequently no servicing. A grease pump connection is provided for the roller race drive pulley bearing.

Service Requirements

The installation kit provides two other pulleys in addition to the supercharger pulley. The standard crankshaft pulley is replaced by the triple V cast-iron pulley, providing the twin drive to the supercharger. The original fan pulley is replaced by the light alloy pulley, thus giving the necessary clearance for the two supercharger belts. When fitting the fan pulley ensure that the ends of the 5 mm. bolts securing the fan do not protrude through the flange.

The front of the supercharger extended drive, encased in the light alloy housing, is supported from the front cylinder head stud and by a vertical stay from the front engine plate.

To facilitate belt changes it will be necessary to reduce the underside of the radiator header tank support and fit the radiator support tube lower down on the side of the radiator, using the plate and spacers, etc., supplied with the installation kit.

The servicing of the Arnott Supercharger installation is confined to three points:

1. The oil supply requires replenishing every 800 or 900 miles.
2. The replacement of drive belts after long periods.
3. Application of a grease gun to the front bearing greaser when normal car servicing is being carried out.

It will be appreciated that the passage of oil through the supercharger, using the Arnott system detailed, ensures a constant supply of upper cylinder lubricant, thus aiding in giving a long life to the cylinder bores.

The front carburetter of the original S.U. carburetters fitted can be used with the standard Arnott installation. The jet control lever is moved to the outside and a special control supplied with the "TD" set is fitted to allow opening of the throttle when starting. The standard throttle control link is retained, used in conjunction with the extension clamp link provided. The petrol pipes are connected by means of a double-ended union. When the original S.U. carburetter is used the float-chamber faces the *outside*.

For increased performance at the "top end" fit the 1½ in. diameter S.U. carburetter. A special elbow can be supplied for this instrument.

Special Arnott carburetters are available as further alternatives, these being directly fitted to the inlet port of the supercharger, thus eliminating the use of a special elbow and ensuring freedom from fuel vaporisation, difficult cold starting, and improving the performance throughout the range. There are two sizes available: the 1½ in. diameter normally supplied, and the 1⅝ in. diameter used for competition purposes and "top end" improvements.

The use of the air cleaner will depend entirely on the climatic conditions experienced. Unless the atmosphere is very dry and dusty it is preferable to remove the air cleaner, as the capacity may be insufficient for the efficient breathing of the engine at high revolutions. Where climatic conditions demand, however, it should be fitted and if possible the effective area of the filter enlarged.

Ignition Timing

On a supercharged engine an alteration to the ignition setting is advantageous. This is normally carried out by locking the distributor advance and retard mechanism. Removal of the distributor cover and contact breaker plate exposes the centrifugally operated weights. These weights are controlled by two springs hooked into a hole in each weight. Additional holes are usually provided in the weights and the springs should be hooked into these holes. Where there are slots instead of holes a small tag should be soldered across the weights to prevent them moving. After replacing the contact breaker plate and

cover the ignition should be set to give maximum advance.

Although the model 1600, the standard equipment for "XPAG" engines, can be speeded up to give a greater boost, the efficiency at higher engine revolutions shows a definite tendency to fall away. Model 2800 is therefore specified for competition purposes and boost pressures of between 10 and 15 lb. per sq. in. are easily available by simply changing the pulley sizes.

Arnott 1⅝ in., or S.U. 1½ in. or 1¼ in. diameter competition carburetters are used, and special jets and needles for methanol mixtures can be obtained from the respective manufacturers.

The supercharger described here is manufactured by Carburetters Ltd., Grange Road, London, N.W.10.

NEXT MONTH :
The MARSHALL-NORDEC
Installation

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