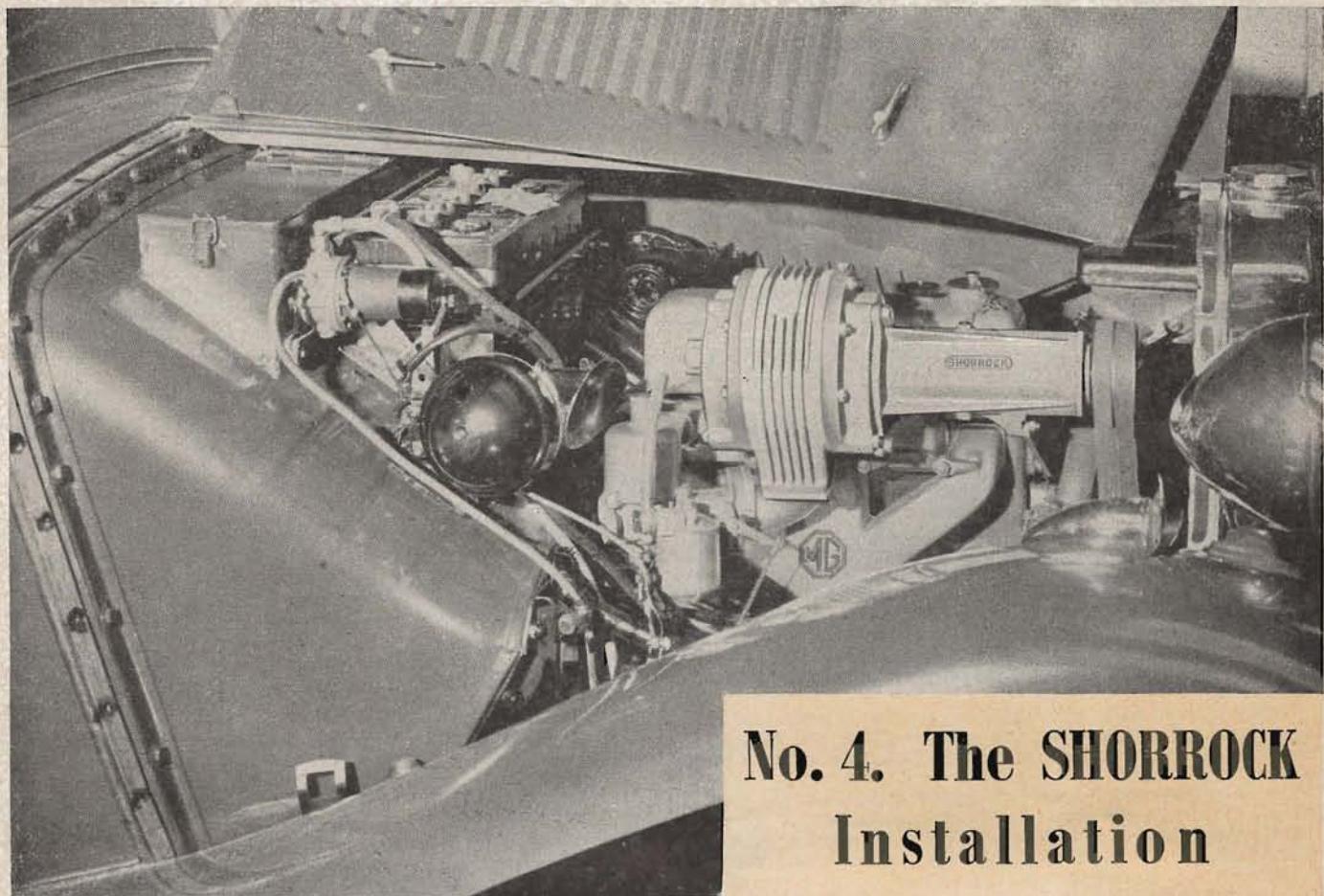


The last of a series of four articles dealing with various equipment for
SUPERCHARGING M.G. "XPAG" POWER UNITS



No. 4. The SHORROCK Installation

THE Shorrock Supercharger is the outcome of many years of experience in the design of high-efficiency compressors, resulting in the production of a supercharger with remarkably high adiabatic efficiency and low power absorption, operating with complete absence of mechanical noise.

It is a positive displacement eccentric-drum-type compressor, employing four vanes. The vanes are mounted radially to the compressor casing, each vane being carried by two ball journals mounted on a shaft of ample dimensions, concentric with the outer casing. The vanes are impelled by the internal rotor, which is mounted eccentrically to the outer casing, and through which the vanes pass. The angular motion of the vanes relative to the rotor is accommodated by specially designed trunnions. This construction makes practical the very fine clearances necessary for high efficiencies, since the vanes being mounted radially to the casing, and anchored by the vane shaft, cannot come into contact with the casing, yet can be run at very high speeds.

The four vanes passing through the rotor, and having very fine clearances between their extremities and the casing and end plates, virtually subdivide the crescent-shaped chamber into four separate chambers. The inlet port of the supercharger is

by **W. E. BLOWER**

with acknowledgements to Shorrock Superchargers Ltd.)

so positioned that as one of the chambers receives its full volume of air the adjacent chamber (on the inlet side of the unit) is increasing in volume and creating a vacuum at the inlet port. Immediately the vanes have reached the position where the chamber between them contains its maximum volume, the volume between the vanes diminishes as the space between the rotor and the casing becomes less, thus compressing the charge within the supercharger itself, before releasing it through the outlet port into the engine manifold.

The rotor itself is carried on its own bearings, mounted in the supercharger end plates. The rear end of the rotor is carried by a large ball race whilst the drive end is carried by a substantial roller journal mounted on the drive shaft. The drive shaft is integral with the rotor end plate, the outer race of the roller journal being mounted in the supercharger front end plate.

Particular attention has been given to the lubrication, which is fully automatic. Due to the special design features only a very small quantity of lubricant is required to

enable the supercharger to function with complete reliability.

The supercharger is mounted on the manifold side of the engine and driven by twin vee-belts from the front end of the crankshaft.

The installation design is such that the fitting may confidently be carried out by any competent garage mechanic or owner-driver.

Open the drain taps in the bottom of the radiator and right-hand side of the cylinder block, and whilst the cooling system is draining remove the bonnet complete. Remove the carburettor controls, air cleaner and branch pipe, carburettor(s) and inlet manifold. As the capacity of the air cleaner is not sufficient for the supercharged engine, it is not replaced. Remove the fan belt after slackening the dynamo mounting and adjusting bolts. Remove the starting handle dog nut and remove the pulley from the front end of the crankshaft.

With the Midgets, Series "TB" and "TC", it will be necessary to remove the front engine mounting bolts and raise slightly the front of the engine before the pulley can be withdrawn. Remove the bolts securing the radiator right-hand stay tube to the radiator and engine bulkhead and remove stay tube. This is not replaced. Fit the three-grooved pulley supplied with the

installation kit, placing the existing belt and the two new belts over the pulley before fitting. As the pulley is made from cast iron, extreme care should be exercised when fitting as undue force may cause considerable damage. Replace the starting handle dog nut.

Fit the supercharger complete with the special inlet manifold provided, and drive housing, both the inlet and exhaust manifolds being clamped by the existing clamps. The front plate is fitted between the lug on the under side of the drive housing and the two bolts holding the square flange of the water pipe on the cylinder head.

Remove the cylinder head nut behind the rear inlet port and replace with the barrel nut, the back stay plate being bolted to this and two of the supercharger end plate studs. Fit the dynamo drive belt and the twin supercharger drive belts over the supercharger pulley. It may be found necessary to cut away a small section of the radiator header tank support web to accomplish this. Fit the carburettor to the flange on the supercharger and reconnect the existing jet control wire in its original position. Connect the petrol pipe by linking the two existing pipes with the double-ended union supplied.

To connect the throttle control, remove the existing control rod from the lever and fit the extension piece. Replace the original control rod and connect to the throttle arm on the carburettor, as originally.

Lubrication

The supercharger lubrication is obtained from the engine oil supply by replacing the rocker oil feed banjo on the cylinder head with the union and tee piece. Remove the banjo on the oil feed pipe and replace with the union nut and nipple supplied attached to the tee piece.

Connect the oil feed pipe to the overhead valve gear to one branch of the tee piece, the other branch being connected to the supercharger by the flexible oil pipe supplied. Remove the oil filler plug from the top of the drive housing and partially fill the drive housing with a recognised brand of S.A.E. 30 engine oil. The level of oil is governed by the plug on the under side of the housing.

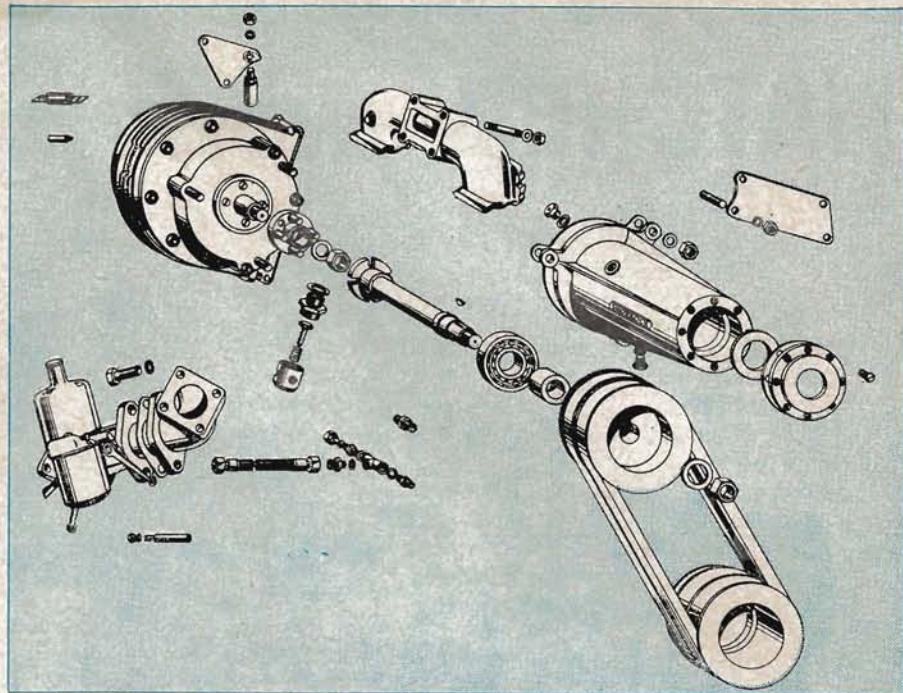
Adjust the dynamo and securely tighten it in position, close the drain taps and refill the system with water. Refit the bonnet and test the car on the road to obtain the correct carburettor and ignition settings.

Running in

The supercharger is a precision mechanism, and although fully tested before dispatch requires running in, and it should be driven gently for the first 250 miles. During the running-in period the maximum road speed in top and third gears should not exceed 45 m.p.h. and 30 m.p.h. respectively. Dismantling and major overhauls should only be undertaken by authorised distributors or dealers, but it is preferable for the installation to be removed as a complete unit and returned to Shorrock Superchargers Ltd., Fletchampstead Highway, Coventry.

The lubricating oil must be kept clean and free from sludge, as dirty, unsuitable or graphited oil will clog the lubricating passage, eventually leading to serious damage.

The supercharger, when dispatched by the manufacturer, is fitted with a .309 in. diameter pin in its lubricator, which should



prove satisfactory for initial and permanent running. When starting up from cold there will be a slight amount of smoke from the exhaust, but this is quite normal and should clear after a few minutes' running.

An oversized pin, .310 in. in diameter, is supplied in a plastic capsule bolted to the supercharger, and should signs of pronounced oiling arise this pin should be fitted in place of the standard pin. If the larger diameter pin is fitted be sure to tighten down firmly the supercharger nuts after detaching the capsule, and after fitting the new pin check that the supercharger is receiving an adequate supply of oil. Every 1,000 miles remove the lubricator pin and wipe with a soft rag. *Abrasives must not be used.*

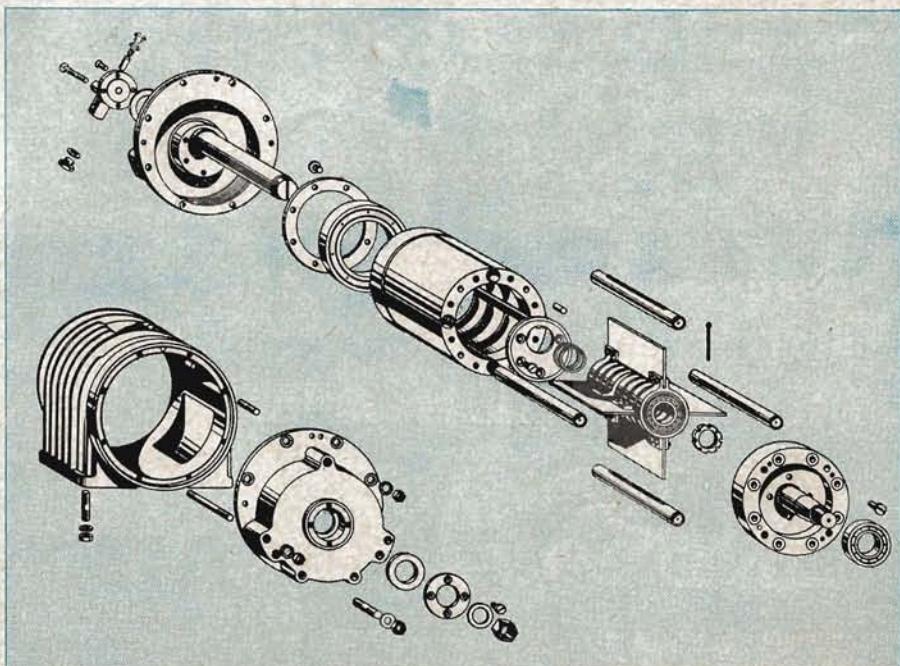
To remove the lubricator pin proceed as

follows : (Superchargers with external brass lubricator.) Unscrew the plug at the end of the lubricator farthest from the shaft, when the plug spring and pin will come out together. To reassemble, assemble pin, spring and plug together, insert and screw down plug firmly.

For superchargers with the lubricator inside the drive shaft unscrew the pipe union at the end of the supercharger, when the spring will push out the pin. To reassemble, insert the spring first, then the pin, and screw up the pipe union firmly.

As the supercharger drive housing is not connected to the main engine oil supply the level should be checked every 1,000 miles. The early type superchargers, with the

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separate oil tank fitted to the engine bulk-head, were fitted with a standard oil metering pin .304 in. in diameter, with an alternative pin .306 in. in diameter. This

type of supercharger can, however, be very easily modified to the later type now available.

Finally the comparative performance figures for the unsupercharged and supercharged current M.G. models may make interesting reading.

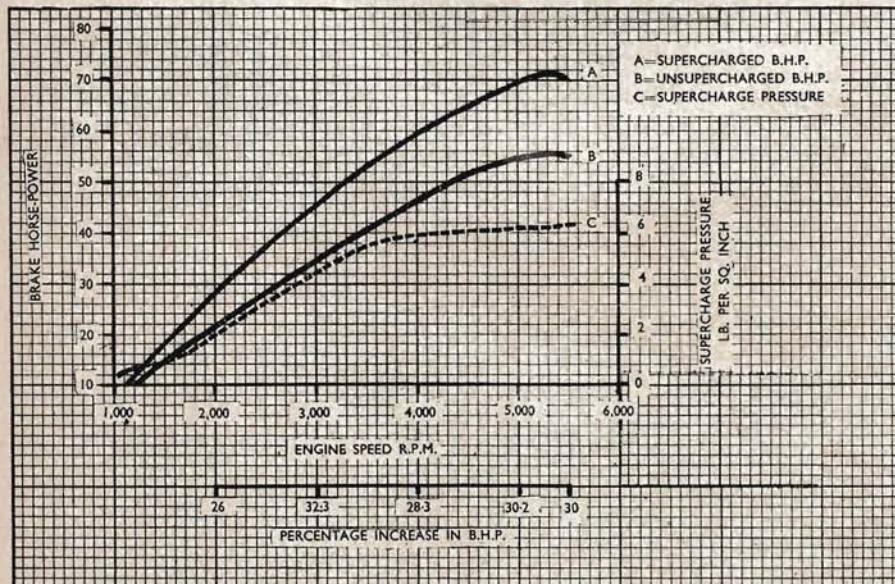
Comparative Performance Figures.

1½ litre Saloon. Series "Y"		
	Unsupercharged	Supercharged
Brake horse-power ..	46 at 4,800 r.p.m.	69 at 5,200 r.p.m.
Maximum speed ..	75 m.p.h.	84 m.p.h.
Overall fuel consumption ..	27.5 m.p.g.	25 m.p.g.
Compression ratio ..	7.2/7.4 to 1	7.2/7.4 to 1.
Fuel used in tests ..	70/72 octane	70/72 octane.
<i>Acceleration in top gear</i>		
20-40 ..	14.0 secs.	8.4 secs.
30-50 ..	18.0 secs.	7.4 secs.
40-60 ..	22.6 secs.	10.0 secs.
<i>Acceleration in third gear</i>		
20-40 ..	9.7 secs.	7.4 secs.
30-50 ..	13.8 secs.	8.0 secs.
<i>Acceleration through gears</i>		
0-40 ..	10.8 secs.	7.2 secs.
0-50 ..	18.8 secs.	11.4 secs.
0-60 ..	29.9 secs.	19.0 secs.

Comparative Performance Figures.

Midget. Series "TD"		
	Unsupercharged	Supercharged
Brake horse-power ..	54.4 at 5,200 r.p.m.	69 at 5,200 r.p.m.
Maximum speed ..	72.2 m.p.h.	90 m.p.h.
Overall fuel consumption ..	26.3 m.p.g.	23 m.p.g.
Compression ratio ..	7.2/7.4 to 1	7.2/7.4 to 1.
Fuel used in tests ..	70/72 octane	70/72 octane.
<i>Acceleration in top gear</i>		
10-30 ..	11.5 secs.	9.0 secs.
20-40 ..	11.8 secs.	7.7 secs.
30-50 ..	12.7 secs.	8.4 secs.
40-60 ..	17.3 secs.	8.8 secs.
<i>Acceleration in third gear</i>		
10-30 ..	7.8 secs.	6.8 secs.
20-40 ..	7.7 secs.	6.0 secs.
30-50 ..	8.9 secs.	6.0 secs.
40-60 ..	—	6.0 secs.
<i>Acceleration through gears</i>		
0-30 ..	5.5 secs.	4.2 secs.
0-40 ..	9.0 secs.	6.5 secs.
0-50 ..	13.5 secs.	9.4 secs.
0-60 ..	21.3 secs.	11.7 secs.
0-70 ..	—	17.2 secs.

The unsupercharged figures are from Road Test Nos. 11/51, 3/47 and 1/50 respectively of the British journal *The Motor*. The supercharged speed figures are the mean of several runs in opposite direction. All figures quoted are supplied by the manufacturers of the installation, Shorrock Superchargers Ltd.



Comparative performance curves of the 1250 c.c. M.G. "TD" engine with a Shorrock Supercharger, Type A.75.