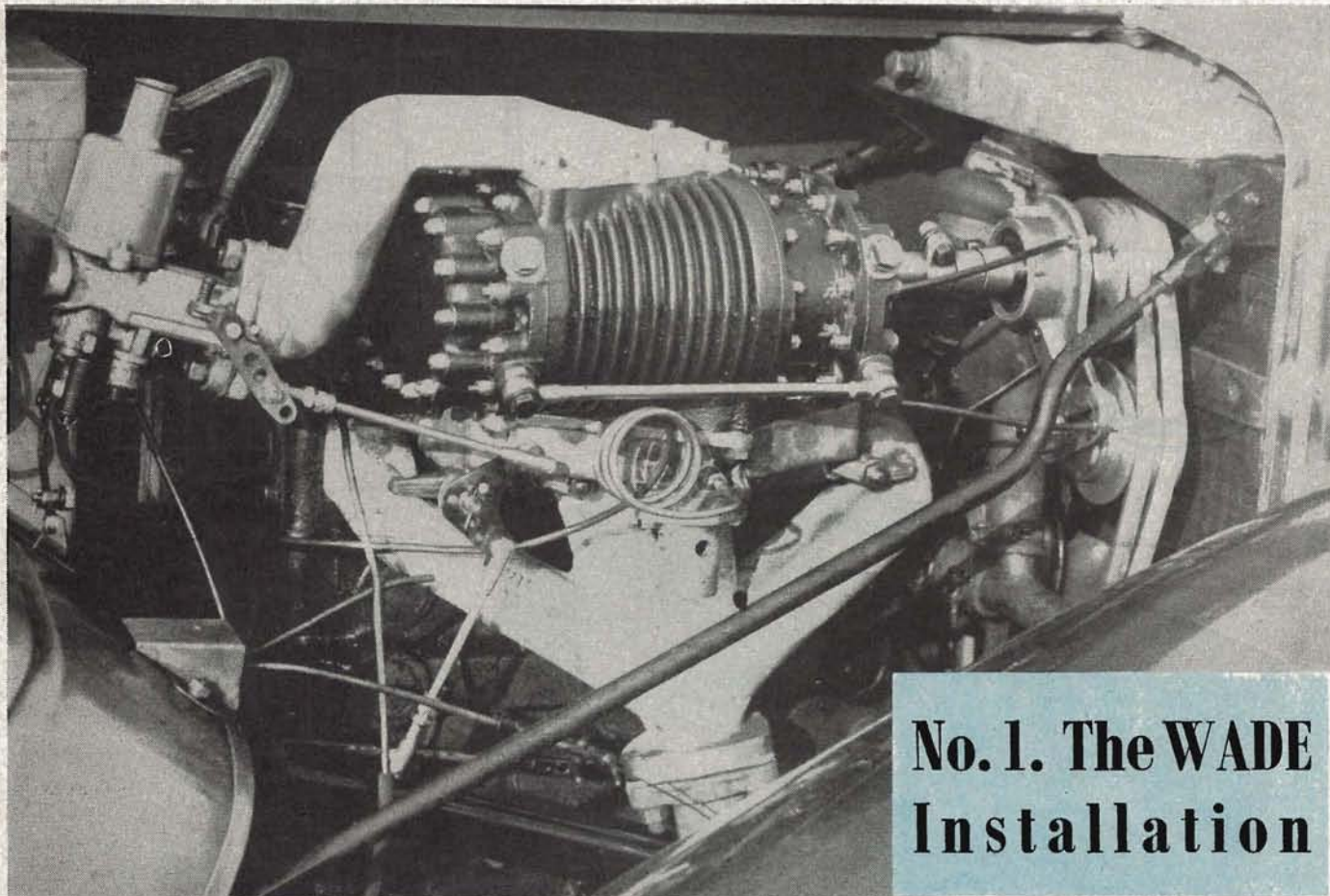


First of a series of four articles dealing with various equipment for  
**SUPERCHARGING M.G. "XPAG" POWER UNITS**



## No. 1. The WADE Installation

**A**N unsupercharged engine (relying on partial vacuum created by the piston's descent on the induction stroke) is never fully filled. This is all the more understandable when it is realised that, on the average car, there are approximately 100 inductions per second at 45 m.p.h. A supercharger overcomes this handicap by supplying a mixture under pressure.

The Wade supercharger consists, basically, of a case, ported on either side, and containing two contra-rotating rotors driven from the engine. The carburettor mixture is carried round by the lobes of the two rotors and expelled through the outlet port to the engine. As the delivery from the supercharger exceeds the swept volume of the engine, a pressure is built up and efficient filling of the cylinders and equal mixture distribution is ensured.

The Wade Ventor Supercharger, type R010, serial number 20, is a neat and compact installation and does not appear to interfere with the normal engine accessibility. It is a Roots-type supercharger, the alloy casing containing two four-lobe rotors coupled by means of steel and bronze helical gears, silent in operation, in a separate portion of the main casing. There are therefore no sliding vanes to wear out, but although the rotors do not touch each other or the case, obviously

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(with acknowledgements to Wade Engineering Ltd.)

the clearance must be very small, otherwise leakage and loss of performance would ensue.

Oil for the lubrication of the gears and rotor bearings is taken from the main engine oil supply and is retained in the bearing and gear housings by means of patented labyrinth oil seals. These patented oil seals are frictionless and have an unlimited life.

As far as it is possible, pulsation-free delivery with a minimum of operating noise is achieved by the inlet and outlet ports in the casing being cut on the slant, so arranged to pass across the rotor lobes in such a manner to give the effect of helical lobes.

The drive is by means of twin endless V-belts from a pulley at the front end of the engine crankshaft. The supercharger, which is mounted directly on a specially cast inlet manifold, is driven at 1.1 times engine speed, delivering a maximum pressure of 4.75 lb. per sq. in. above atmospheric.

The supercharger pulley is mounted independently of the supercharger, being carried by an outrigger bracket, a mechanical coupling completing the drive. By using this method the rotor bearings are

relieved of any loading due to belt pull. A blow-off safety valve is incorporated.

No lubrication is required in the supercharger case as there are no contacting parts. The amount of oil required by the bearings contained in the end housings, and the gears in the front, is very small—an eggcupful every 200 miles. They are lubricated by splash feed from oil contained in these end housings. The oil level is maintained by topping up from the tapping in the main engine oil supply. This is achieved by depressing the lubrication button for ten seconds every 200 miles, with the engine idling.

In no circumstances should this topping up be overlooked or the supercharger will run dry and the gears will become excessively noisy. Normally an injection of oil will cure this, and unless the unit has been permitted to run dry for a prolonged period it is unlikely that damage will have been caused.

If an excess of oil is injected the exhaust will, in all probability, smoke for a brief period, until the oil drops to its correct level in the housings. The drive shaft outrigger bearing should be greased every 500 miles.

It is absolutely essential that the V-belts be kept at the correct tension. They will tend to slip if they are allowed to run

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## SUPERCHARGING M.G. "XPAG" POWER UNITS

(continued)

slack, while overtight adjustment will generate excessive heat, causing rapid deterioration of the belts. Adjustment, effected by moving the jockey pulley towards or away from the belt, should be checked every 500 miles.

The carburetter is set with the correct jet for normal use. Providing the engine and carburetter itself are in sound condition the petrol consumption should only be slightly greater than when unsupercharged.

It is interesting to record that petrol consumption is not seriously affected, although naturally if more power is available and is constantly used it must be paid for. Generally speaking, however, driven carefully, the difference is as low as four per cent. in favour of the unsupercharged car, with certainly less consumption than an unsupercharged car giving the same performance.

Let us pause for a moment and compare the blown and unblown performance in acceleration and petrol consumption with an M.G. Midget Series "TC" produced in 1947, with a considerable mileage recorded on the speedometer.

Acceleration 0-50 m.p.h.

Unsupercharged: 16.8 sec.

Supercharged: 11.0 sec.

Average petrol consumption (m.p.g.)

Unsupercharged: 28 m.p.g.

Supercharged: 26 m.p.g.

The design of the supercharger is such that fitting can confidently be carried out by the enthusiastic owner or the competent amateur mechanic. When superchargers are despatched from the Works full instructions for fitting are given with the kit. It is proposed to give brief instructions on fitting, to assist any owner or mechanic who has been fortunate enough, perhaps, to pick up the installation second-hand but is without the fitting instructions.

### Assembly

Drain the cooling system by opening the tap beneath the radiator bottom left-hand corner and the tap in the right-hand side of the cylinder block. Disconnect top and bottom water hoses and remove the bolts securing the headlamp mounting brackets to the radiator. Remove the radiator mounting bolts and nuts, and withdraw the radiator complete.

Remove the air cleaner and air cleaner pipe, disconnect all carburetter controls and remove the carburetters complete from the induction manifold. Disconnect the front exhaust pipe from the exhaust manifold and then remove both inlet and exhaust manifolds.

On the "TD" Midget, after removal of the radiator, remove the cylinder head water outlet pipe complete with thermostat. The replacement casting supplied with the kit should be fitted in its place and the length of convolute rubber hose is for connecting the replacement elbow to the radiator header tank, as the thermostat is not replaced.

Slacken off the front engine mountings and raise the front end of the engine by means of a jack or lifting tackle. Remove the starter handle dog nut, withdraw the crankshaft pulley, and fit the replacement pulley supplied. Lower the front of the engine and tighten up the front engine mountings. On the "TD" Midget it is suggested that the horn be moved alongside

the S.U. petrol pump, new holes being drilled in the bulkhead for the horn mounting bracket and the wire lengthened accordingly.

The supercharger assembly can now be fitted to the engine, but it will be found that the supercharger and manifold have to be placed in position together. Ensure that the gaskets between manifolds and engine are good. If doubts arise as to their condition replace them, as leakage between supercharger manifold and engine will result in the loss of pressure and petrol fumes in the car. Fit the clamps and holding nuts and tighten securely. Refit the front exhaust pipe to the flange on the exhaust manifold.

Now fit the outrigger bearing assembly. The assembly supporting plate is secured by the two bolts on the left-hand side of the water outlet elbow when viewed from the front of the car. The normal procedure is to remove the two bolts and offer the assembly into position. Then take the two  $\frac{1}{2}$  in. diameter stays, screwed at each end, and fit them between the appropriate holes in the outrigger bearing housing and the holes left open around the front casing of the supercharger; at the same time make up the leather coupling on the end of the drive shaft with the driving flange of the supercharger and bolt the two together, using  $\frac{1}{2}$  in. B.S.F. bolts. There should be a steel washer on either side of the leather disc (between the bolt head and the disc and between the disc and the supercharger coupling flange). Tighten up the bolts and split pin. Fit the bolts securing the outrigger bearing housing mounting plate to the water outlet but do not tighten them fully at this stage.

### Alignment

Check the alignment of the supercharger and drive shaft by turning the supercharger by hand and watching the driving pulley to ensure it is running true. If it is not, tap the pulley lightly, using a rubber or leather mallet, until correct alignment is attained. *It is of the utmost importance* that the shaft be correctly trued before the outrigger bearing housing is finally tightened up.

Tighten up the two bolts securing the mounting plate to the water outlet and adjust and tighten up the two stays between the outrigger bearing housing and the supercharger. The stays should be adjusted in such a manner that the outrigger bearing housing remains square. Incorrect adjustment will cause the jockey pulley to run out of truth with the belt and rapid belt wear will take place; or, worse still, trouble may be experienced with belts flying off.

Remove the four bolts securing the fan assembly to the fan pulley boss, remove the split pin and nut securing the pulley to the pump spindle, remove the pulley and fit the replacement supplied. With the replacement pulley fitted it will not be possible to replace the split pin in the pump spindle, so fit the  $\frac{1}{8}$  in. shakeproof spring washer provided and securely tighten the castellated nut. Replace the fan blade.

Now fit the drive belts. The original belt is fitted as before, but the two new belts supplied go around the extra grooves in the crankshaft pulley, around the extra grooves in the water pump pulley and finally over the supercharger pulley. Fit the jockey pulley engaging in the slot in the outrigger bearing housing and adjust the pulley to keep the belts in tension. Replace

the radiator, connect up water hoses, close drain taps and refill cooling system.

On the "TD" Midget, due to the omission of the thermostat, there will be a surplus by-pass pipe. Using the 1 in. diameter plug in the kit, blank off this pipe, pushing well home into the end of the rubber hose and clipping with one of the original hose clips.

Carburation is by means of one of the original carburetters, and this should now be fitted to the unit, and the throttle linkages, petrol pipes, etc., modified to suit.

A length of  $\frac{3}{8}$  in. inside diameter hose is supplied, and this should be connected to the breather pipe in the top of the valve cover and then led by the most convenient path to the carburetter air intake and fixed with the bolt and clip provided, so that fumes from the engine will be sucked into the carburetter air intake.

Mount the chromium-plated oil control valve in any convenient spot on or near the dashboard. Oil is taken from the main engine supply and the most convenient point is from the pipe between the engine and the oil pressure gauge. This connection should then be taken to the union on the end of the control valve. A connecting pipe should also be inserted between the union on the side of the control valve and the union in the casing of the supercharger. Two or three coils should be made in the pipe to allow for engine movement.

### Lubrication

In no circumstances should the connection to the oil pressure system be joined to the union on the side of the control valve, as this would result in serious oil leakage at the valve. Remove the front and rear brass plugs on top of the supercharger and distribute a quarter of a pint of engine oil between the front and rear housings. Replace the brass plugs and fibre washers and tighten securely.

Start the engine, using choke and some throttle, setting the controls for the engine to run at a fast tick-over speed. Slacken the connection of the oil supply pipe to the top of the supercharger and depress the control valve until oil flows freely from the end of the pipe, then reconnect.

Carburetter settings will depend on the fuel to be used. Three spare needles are supplied in the kit—richer (DR), medium (DQ) and weaker (DP). It is advisable to try the richer needle first, and if it is found, after normal test and adjustment of the jet nut, that this is excessively rich, a weaker needle should be substituted.

Erratic running, and a lack of slow running and pronounced "flat spot" on acceleration, normally denote a very weak mixture created most probably by an air leak. In this instance, all manifold joints and the oiling union and plugs should be checked to ensure they are tight.

As rapid acceleration calls for a higher delivery rate of petrol to the carburetter it is essential that the petrol pump be in good order. Pay careful attention to the ignition system. See that all plugs and the contact breaker points are good and clean, for by paying careful attention to all the foregoing points the supercharger installation will give years of good service.

The supercharger described here is manufactured by Wade Engineering Ltd., Gatwick Airport, Horley, Surrey, England.

**NEXT MONTH :  
The ARNOTT Installation**