FITTING AND SERVICING INSTRUCTIONS FOR THE
ALUMINIUM CYLINDER HEAD FOR THE "B" TYPE ENGINE
DESIGNED AND MANUFACTURED BY THE H.R.G. ENGINEERING CO., LTD.

Suitable for the following cars fitted with the B.M.C. B type engine:-
M.G.A., Riley 1.5, Morris Oxford, Austin A.55, Magnette, Wolseley 1500 etc.

Aluminium heads require a little extra care in fitting and servicing, due to the increased heat expansion of the metal itself, compared with cast iron, but this extra trouble will be more than repaid in the advantage gained due to the better heat conductivity of the metal, which permits the compression ratio to be increased by at least one ratio bringing in turn benefits such as extra power and enhanced fuel consumption.

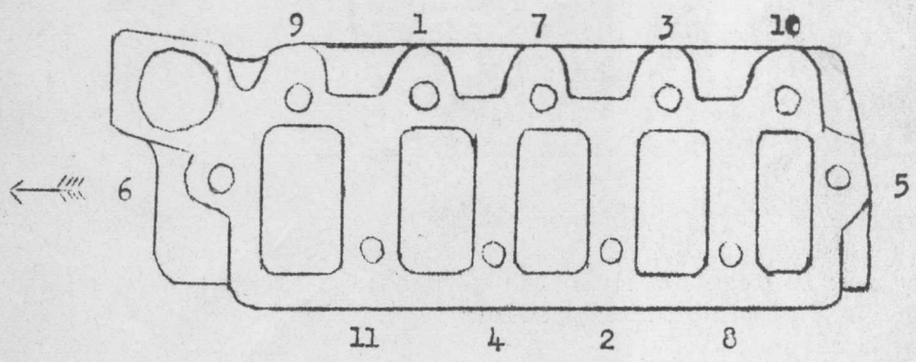
If these natural advantages are combined with the latest practice in port and combustion chamber design, phenomenal results are obtained. In the design of this Head the above advantages have been kept in mind.

In fitting aluminium heads the most important points to remember are:

1. See that the head is free on the cylinder head studs, it should drop over the studs under its own weight, if not check that the studs are true to the cylinder block face; a bent stud can cause trouble.

HEAD STUDS

2. The head nuts must not be over tightened if a torque wrench is used 32-35 ft/lbs. should not be exceeded.
Be sure to use the thick steel washers that are supplied with the head under the nuts, to spread the load of the nuts.
Tighten the nuts in the following order, doing each nut up a little at a time.



ROCKER ARM GALLERY STUDS 18 LB-FT

Top of Head

This will ensure that the head is evenly pulled down. It is wise to check the stud nuts after the engine has been run and reached normal running temperature and then allowed to cool down again.
When removing the head undo the nuts in the same order.

3. Do not use an all metal gasket, always use the combined metal and asbestos type. The standard M.G. gasket Ref. No. H696 (steel copper asbestos) is quite satisfactory.

4. See that the surface of the head, gasket and cylinder block are absolutely clean.

5. On no account remove an aluminium head from the engine when it is hot, allow to cool naturally before removal.

6. Be sure to see that the engine is never run short of water, serious distortion is likely to occur in this event.

The Valves used are standard MGA ref. Inlet IH.653 and Exhaust IH.686. Valve springs, collars, collets, shrouds etc. are standard MGA parts. Valve seat angles are as standard, namely 45°. When heads are supplied less valves, the latter must be ground in before use.

The Valve Guides are HRG design.

The Plugs recommended are:- K.L.G. FE80 for all normal running.
K.L.G. FE100 or FE220 for competition purposes.

The special plug spanner supplied will facilitate plug fitting. It is advisable to smear the thread of the plug with a little liquid or flake graphite before fitting as this will prevent the possibility of plugs sticking in the aluminium.

The Tappet or Rocker clearances should be adjusted to .017" - .019" for both inlet and exhaust valves.

The Ignition should be set to 12° - 15° before T.D.C. at 8.3 C.R. 7° - 8° at 9.3 C.R.

The Carburetters should be as standard MGA, namely 2 - 1½" S.U. Carburetters with GS or GER needles for normaly use, BF needles for competition purposes.

Further Tuning is possible with this light alloy Head. The compression can be raised to 9.3 to 1 substituting the standard piston concave top (8.3 to 1) by the flat top type HRG Part No. 14039. Further increase in compression ratio can be obtained, but only recommended for competition purposes, by machining the underside of the head; .030" off the head with the flat pistons mentioned above, will raise the compression ratio to 10 to 1. With this ratio only premium grade fuels should be used. For maximum performance the use of twin choke carburetters will again be beneficial and as the head has 4 separate inlet ports, these are readily accommodated.

If the head has been machined to increase the compression ratio, it is wise to check that the valve heads do not foul the top of the cylinder block. The lift of the standard camshaft for the MGA is .357". If there is any likelihood of the valve touching, particularly the exhaust valve, the block must be relieved at this point. This can be done by using a rotary file or small grinding wheel in a portable electric drill, care being taken only to remove metal under the valve head. These remarks apply equally well to the standard cast iron head.

Throttle and Choke controls vary according to model and year of manufacture and it is therefore impracticable to supply a standard kit for all applications. It may be necessary to lengthen and/or reposition the flexible Bowden controls. There are, however, a wide range of stock fittings available as extras.

Heater Connections and controls also vary and may require slight re-arrangement. Again, additional fittings are available.

The illustration in the Autocar Road Test shows a car fitted with modified heater and a cold air box. Note particularly the easy curve of the throttle cable and the new position of the heater water tap.

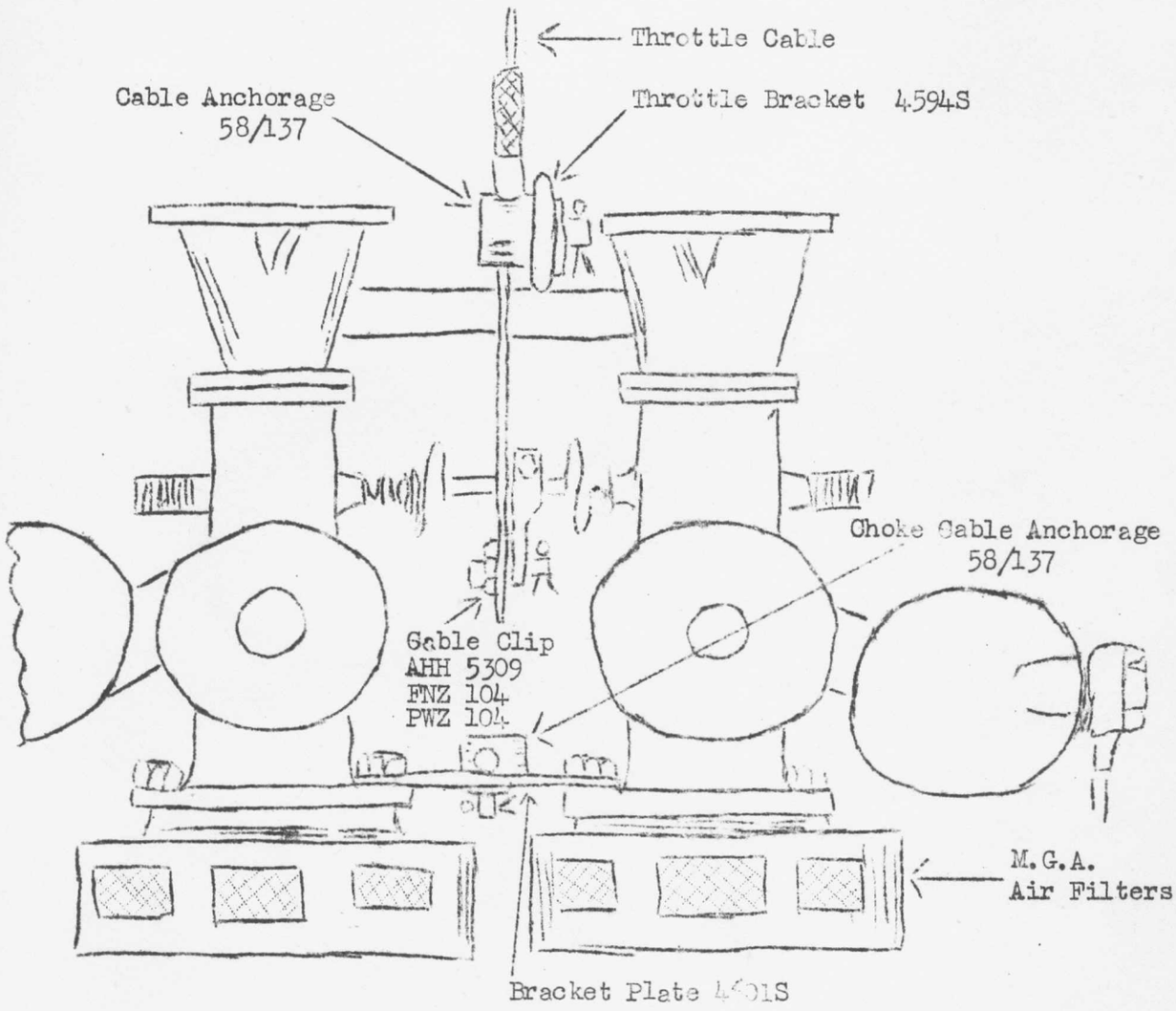
On the M.G.A. we recommend that the radiator fan be modified to 2 blades only, otherwise under normal climatic conditions, as for example exists in England from October to the end of May, the car will be overcooled. The radiator blind (standard M.G. extra) is a very useful fitting in this connection.

The following special parts are supplied for use with the light alloy Head and can be obtained from the Agents.

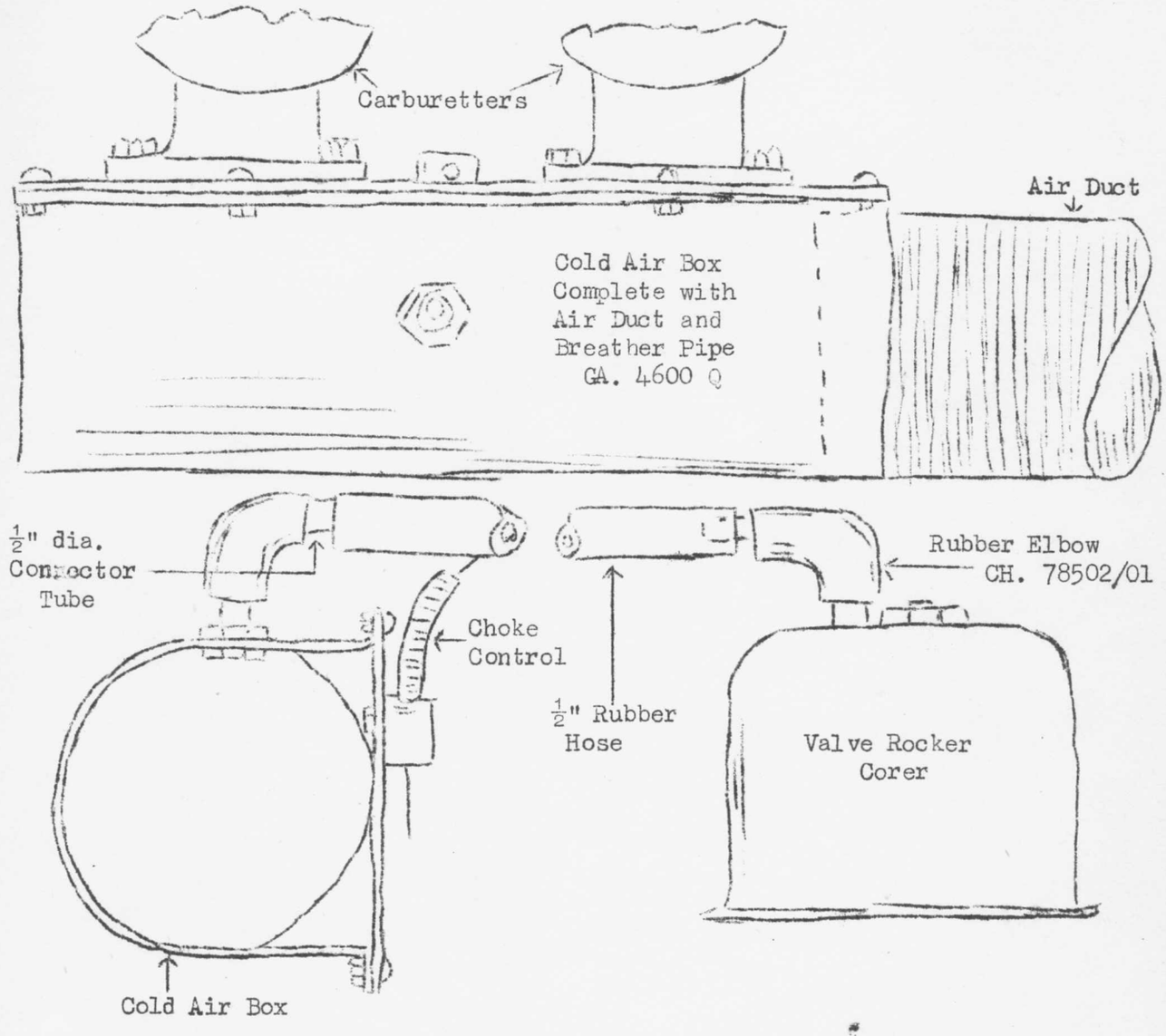
Lightened valves, the inlets are machined all over and the exhaust valves are, in addition, made in KE965 steel with hard chromed stems, bronze exhaust valve guides which assist valve cooling, competition valve springs etc.

For really hard driving or competition work, we strongly advise that the H.R.G. valves and springs be fitted and the oil control shrouds removed. The latter have been known to break up at high R.P.M. and can cause broken valves.

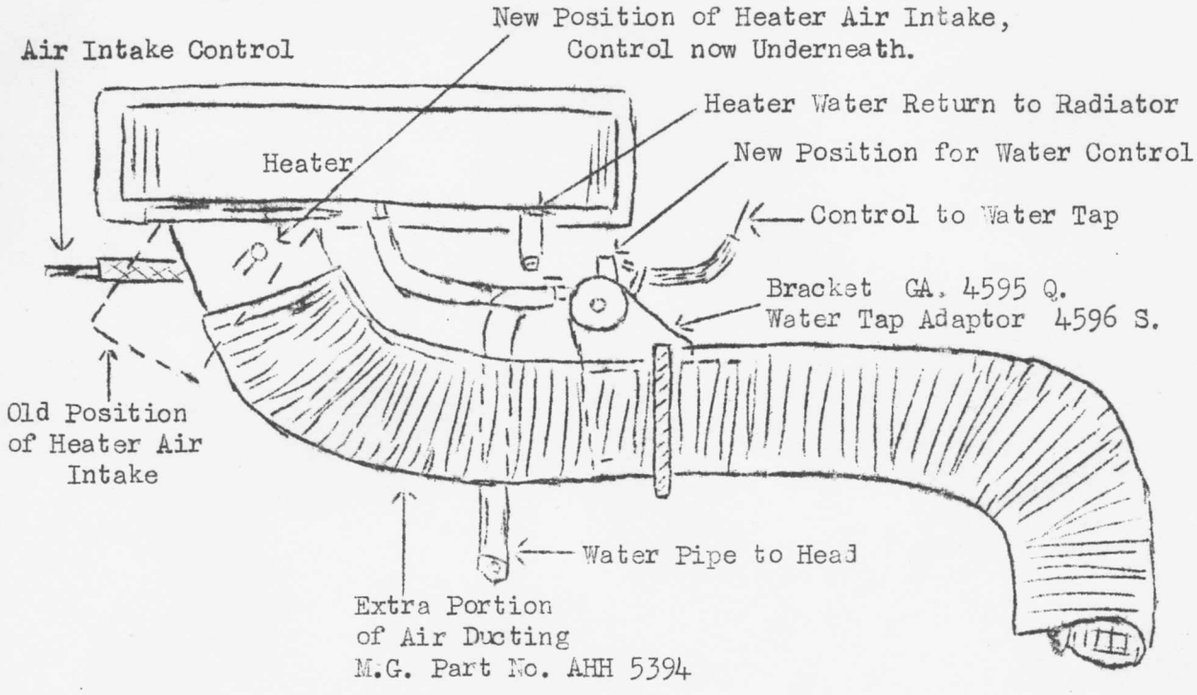
For prices see separate sheet.



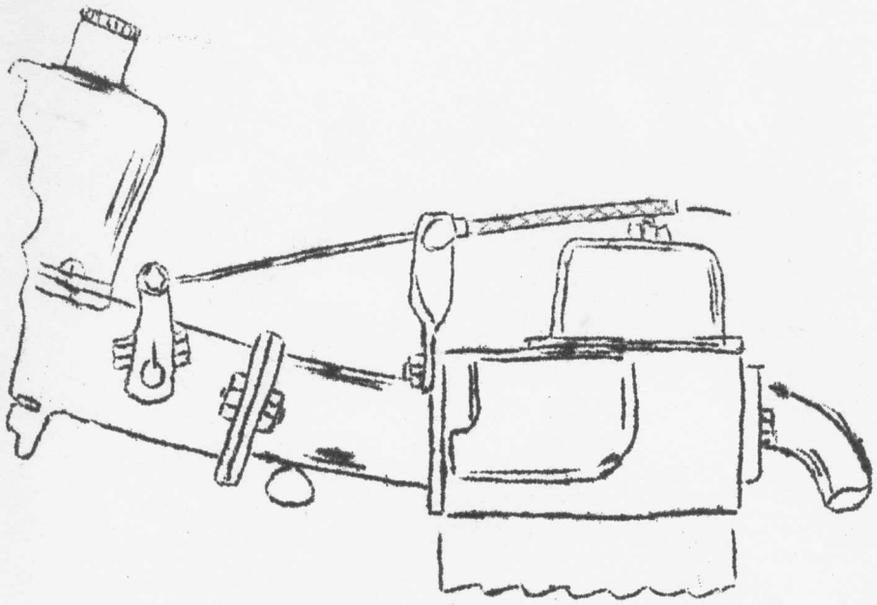
PLAN VIEW OF THROTTLE CONTROL ON M.G.A.

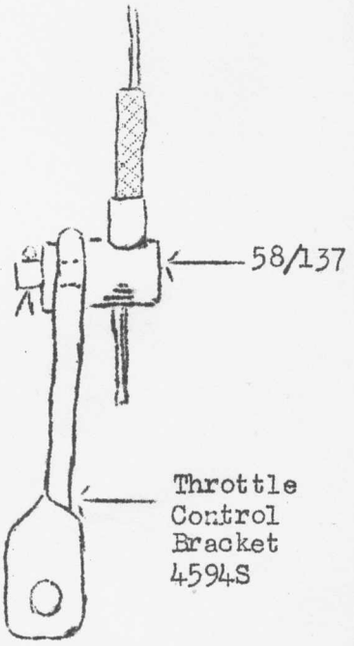


COLD AIR BOX AS FITTED TO M.G.A.

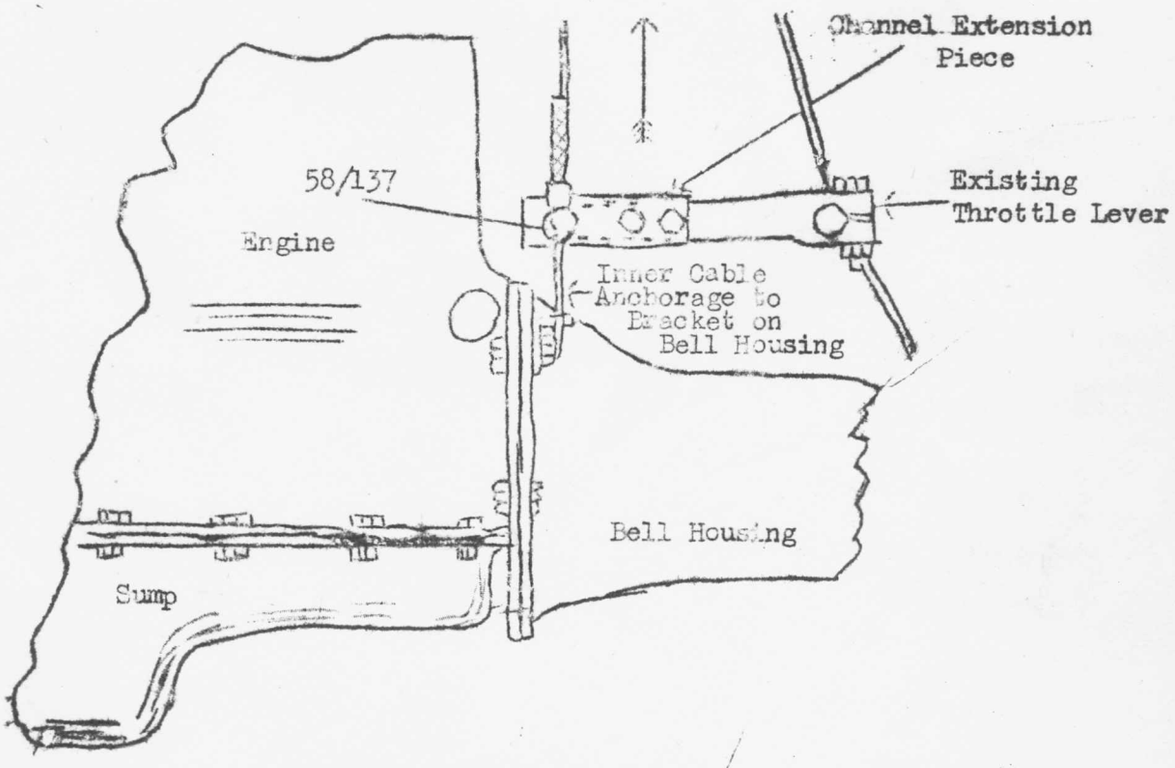


MODIFICATION TO HEATER INSTALLATION FOR M.G.A.





POSITION OF THROTTLE CONTROL AND BRACKET

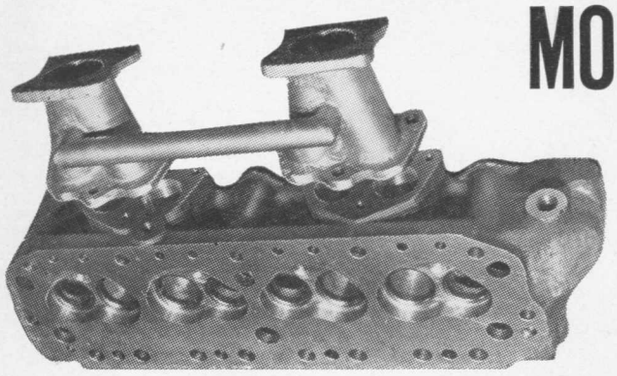


CONVERSION FROM ROD TO CABLE THROTTLE CONTROL ON MAGETTE

Reprinted from The Autocar *12 December 1958*

MORE FROM THE MGA

H.R.G.-Derrington Modifications to the B-type Engine



Polished heart-shaped combustion chambers with valve seat inserts in the light alloy head. Plugs located at each side of the paired induction ports are directed at the exhaust valves. A special spanner is available

ENGINES in a high state of tune in standard form require fundamental changes if they are to yield an appreciable increase in power. Such an engine is the B.M.C. B-type 4-cylinder, 1,489 c.c. unit installed in the M.G. MGA, and a 1955 model recently tested was fitted with special light-alloy cylinder head designed by S. R. Proctor, engineering director of the H.R.G. Engineering Co., Ltd. This firm manufacture the head, and marketing is in the hands of V. W. Derrington, Ltd., 159-161, London Road, Kingston-on-Thames, Surrey, who also provide a swept exhaust manifold.

In the standard cast iron head, exhaust ports and siamesed inlet ports are on the same side, whereas in the light alloy head they are on opposite sides, each inlet valve having a separate induction tract. All ports and the heart-shaped combustion chambers are machined, and seat inserts are fitted for the standard M.G. valves. The guides and the remainder of the valve gear also are unchanged. Special pistons raise the compression ratio to 9.3 to 1 and a pair of induction stubs joined by a balance pipe complete the equipment, the existing twin S.U. carburettors being retained.

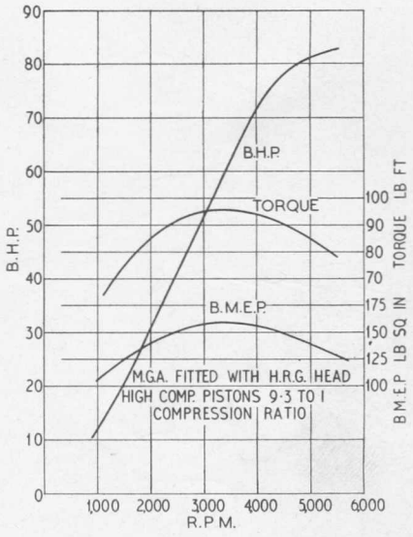
Although the standard exhaust manifold may be used, the Derrington system was fitted on the car tested (giving an extra 2 b.h.p. or so at mid-speeds), bringing the cost to £88 12s.

Where the conversion scores is in the appreciable increase of power at high engine speeds, but this is not at the expense of low speed torque, so that flexibility is excellent; it is possible to accelerate from as low as 10 m.p.h. in top gear. As the comparative performance table shows, improvement in acceleration is most striking above 50 m.p.h., power being so well sustained that the 0 to 90 m.p.h. figure was bettered by no less than 16.2sec.

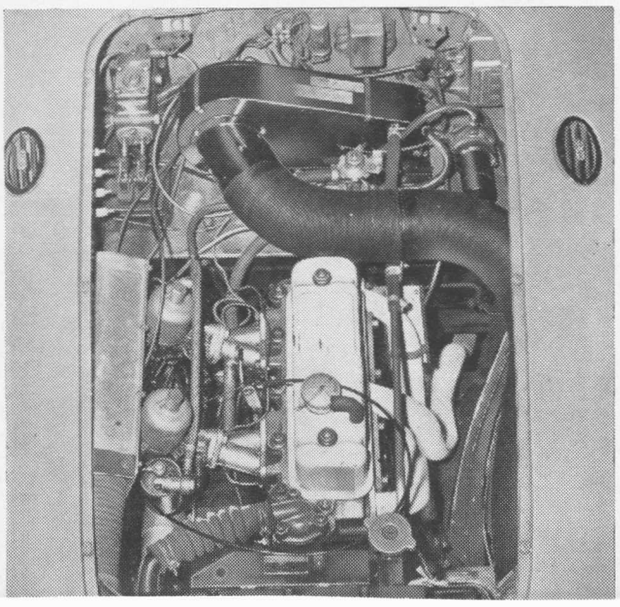
Conditions were against measurement of the absolute maximum speed, but a speedometer 110 m.p.h. (a true 105.5) was easily attained on a level road, with no wind and something still in hand. The engine exhibited no more than the usual harshness of the MGA unit at medium revs, and smoothness was improved beyond this up to 6,000 r.p.m.

There was pinking at low speeds during full-throttle acceleration and some running-on after performance testing, but subsequently it was found that the ignition was slightly too much advanced for the premium fuel used. All testing was carried out with hood up and side screens in position. A damp surface made getaway during standing start testing slower than it could have been but, to help comparison, it was also wet during the testing of the standard car.

Oil pressure was maintained at a steady 60 lb sq in. During 400 miles of mainly hard driving, fuel consumption was 30.4 m.p.g., compared with 27 m.p.g. for the standard car similarly driven over 672 miles—a significant improvement.



Below: Induction and exhaust ports are on opposite sides of the head, and a new three-branch exhaust manifold was fitted. The air box for the carburettor intakes is not part of the equipment. The distributor is difficult to reach below the carburettors. Right: Nett B.H.P., b.m.e.p., and torque curves of the modified engine



PERFORMANCE DATA

Acceleration from rest through gears to: M.P.H.	H.R.G. Derrington conversion sec	Standard* MGA sec
30	5.6	4.9
50	10.6	11.0
60	12.8	15.6
70	18.3	21.4
80	24.2	32.1
90	33.9	50.1
Standing start quarter-mile	19.0	20.2
30—50 m.p.h. in 3rd ..	7.3	8.4
30—50 m.p.h. in top ..	10.2	12.3
40—60 m.p.h. in 3rd ..	7.5	9.1
40—60 m.p.h. in top ..	11.4	13.1
50—70 m.p.h. in 3rd ..	8.1	10.7
50—70 m.p.h. in top ..	12.1	15.0
60—80 m.p.h. in top ..	13.2	18.1
70—90 m.p.h. in top ..	16.1	—
Fuel consumption ..	m.p.g. 30.4	27.0