

The MG 1¼ litre SERIES 'Y'

OVERHAULING THE CYLINDER HEAD

by Eric Blower

CONTINUING the series on the 1¼-litre series 'Y' model, it is now possible to turn attention to the cylinder head. There is no need to give details of decarbonising and grinding of the valves, etc., as previous articles on M.G. engines have dealt with this operation and the same basic principles will apply. Nor is it proposed to give data as to dimensions of components, valve spring tensions, etc., as these have already been covered in the October issue, giving a description of the power unit. This month's article, therefore, will be confined chiefly to descriptions of the cylinder head removal, valve removal, valve guide renewal, etc.

As a preliminary to removing the cylinder head drain the water system by opening the drain taps in the base of the radiator and in the cylinder block immediately below and in front of the exhaust manifold. While it is draining, extract the two screws at the rear of the bonnet hinge and remove the complete bonnet from the car. If the drain taps are blocked in any way clean with a suitable piece of wire.

Detach the high-tension leads from the sparking plugs and remove the plugs, being careful not to damage the porcelain. Detach the positive lead at the battery.

Disconnect the throttle controls and mixture controls at the carburetter. Uncouple the exhaust pipe from the manifold by removing the three brass nuts. Disconnect, at the carburetter end, the fuel pipe from the fuel pump. Remove the carburetter silencer and air cleaner and branch pipe, the float-chamber overflow pipe and the two bolts securing the carburetter to the induction manifold, and lift the carburetter clear of the engine. Remove the bolt securing the exhaust pipe clip to the right-hand side of the gearbox. Remove the four nuts and clamps securing the induction and exhaust manifolds to the cylinder head and withdraw the manifolds.

Loosen the top clips on the thermostat by-pass pipe and remove the top radiator hose and thermostat body. Remove, at the cylinder head left-hand side, the external oil feed pipe to the hollow rocker-shaft.

It is necessary to slacken the fume pipe and side inspection cover, and, if the gasket is damaged, to fit a new one before the engine is run.

As the cylinder head is now free of all its attachments, remove the two nuts securing the cylinder head cover and lift the cover from the head. Knock down the ends of the lock plates and remove the eight bolts securing the rocker-shaft and rockers and remove shaft, complete with rockers, from the cylinder head. Fit new lock washers when replacing the rocker assembly. It is beneficial to slacken off the bolts a partial turn at a time until they can be extracted by the fingers.

Before withdrawing the push-rods, tap each rod with a screwdriver to make sure it is free of the cam follower.

Withdraw the push-rods, keeping them in their order of removal. Release the ten cylinder head stud nuts a partial turn at a time, until they are free for complete removal by hand.

Replace the two valve cover nuts on the two long studs in the top of the head and break the joint between head and block by tapping each side of the cylinder head with a hammer, using a piece of wood interposed to take the blow. Using the two nuts on the cover studs, lift the head clear of the cylinder block by giving a direct pull, so that its head is lifted squarely with the studs.

The copper and asbestos gasket can also be removed without difficulty provided that it, too, is lifted squarely with the studs.

Removing the Valves

The valve springs are secured by means of split cotters and to remove each valve the cylinder head should be placed on a bench, combustion space downwards, with a block of wood or suitable packing piece fitted in the combustion space below the valves which are being dealt with.

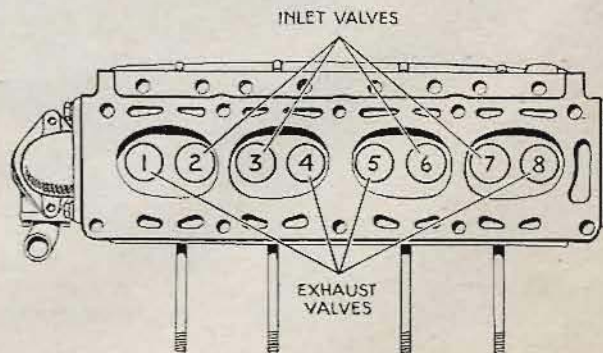
Depress the valve spring from above and remove the two halves of the conical cotter. The valve spring and cap can then be removed. On the valve stem will be found a small synthetic rubber oil seal ring which can easily be slipped off.

Remove the head from the bench, remove the wood block and withdraw the valves from their guides. Repeat this operation on all the remaining valves.

It is advisable to number each valve as it is removed to ensure that they are inserted into the correct ports on reassembly.

Removal and Replacement of Valve Guides

Rest the head, combustion space downwards, on a clean, flat surface and drive the valve guides downwards into the combustion



Valves should be numbered to ensure their return to their correct ports.

space, using a suitable-sized shouldered drift. This should take the form of a hardened steel punch, $\frac{1}{2}$ in. in diameter and not less than six inches in length, with a locating spigot $\frac{1}{16}$ in. in diameter, machined at one end for a length of one inch to engage the bore of the valve guide.

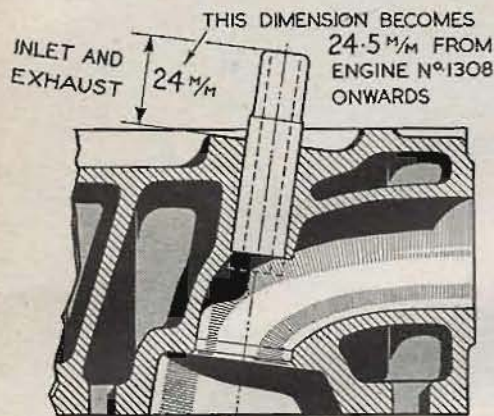
When fitting new valve guides, press them in, again using a suitable mandrel to prevent crushing the guide, until .954 in. is protruding above the machined face of the cylinder head. Although the inlet valve guides are $\frac{3}{32}$ in. longer than the exhaust valve guides, all valve guides project the same distance above the valve seating.

Recut the valve seat from the new guide to make sure that the valves seat correctly.

Dismantling the Rocker-shaft and Rockers

Remove the circlip washer and spring from the end of the rocker-shaft and remove the rockers, springs and brackets from the shaft, carefully noting the relative positions, to ensure correct reassembly.

When reassembling, fit the rocker-shaft with the oil holes uppermost, and with the single oil feed hole at the bottom of No. 4 bracket. Make sure that the 'D' washers are fitted to Nos. 1 and 4 brackets and the plain circular washers to Nos. 2 and 3 brackets, so that they engage with the keyways in the shaft.



The correct position of the valve guide in the cylinder head.

Commencing at Engine No. XPAG/SC/16831 a redrilled rocker-shaft was introduced together with exhaust valve rockers with longer bosses and bushes. The long spacer spring was replaced by a medium spring and medium springs replaced by short ones. Ten shaft washers were added.

Reassembling the Valves

When reassembling, ensure that the valves are inserted in their correct ports. First oil the valve stem with a little engine oil and insert the valve in its guide, resting the head on a wood packing block, and place the valve spring in position with the valve cap resting on it. Engage a tool on the top of the cap and depress the spring to expose almost the whole of the groove in the upper end of the valve stem. The synthetic rubber oil seal must then be fitted to the bottom of the cotter groove. Then insert the two conical cotters, small ends downwards, and gradually release the spring. Make sure the cotters are properly engaging in their grooves.

Refitting the Cylinder Head

Make sure that both faces of the cylinder head and cylinder block are clean, and then slip a new cylinder head gasket over the studs, taking care not to damage the gasket in the process. The gasket may with advantage be smeared with grease, a method to be preferred to the use of jointing compound. Lower the cylinder head into position and fit the cylinder head securing nuts finger-tight and then tighten up in the correct order.

Ensure that the cylinder head gasket is fitted with the elongated hole for the waterways to the rear of the cylinder head. This is essential.

Fit the push-rods and rocker gear assembly. Check the tappet clearances and make sure there is clearance, the correct adjustment being given after the engine has been assembled and run.

Fit the valve cam and valve cover gasket, using a new gasket for preference. Care should be taken when fitting this gasket as it is not very wide. It can, with advantage, be stuck to the cylinder head with jointing compound.

Reconnect the oil feed pipe to the rocker gear, and tighten the side inspection cover, using a new gasket if necessary. Refit the induction and exhaust manifolds complete with carburetter assembly, evenly tightening the securing nuts.

Fit the mixture control, throttle controls and exhaust pipe to the manifold and clip to the bracket on the gearbox. Check and adjust sparking plug gaps, replace, and connect the high-tension leads and the positive lead to the battery.

Replace the thermostat body and radiator connecting hose and tighten the hose clips and fill the cooling system. Connect the fuel pipe to the carburetter, switch on the ignition and check for fuel leaks. Start the engine and allow to run briskly until the water temperature rises to between 70° and 80° C. or 160° and 175° F. With the engine at this temperature remove the valve cover and retighten the cylinder head holding-down nuts and adjust the valve clearance.

Adjusting the Valves

Adjust the valves to give a clearance of .019 in. for both inlet and exhaust valves between the end of the valve stem and the toe of the rocker when the engine is hot; an extra .001 in. must be allowed when the engine is cold.

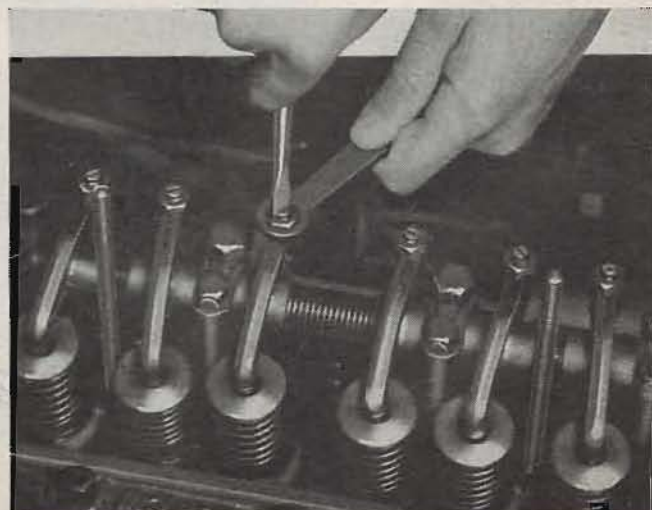
Turn the engine by means of the starting handle until No. 1 valve is wide open and then give one further complete turn of the starting handle, which will bring the valve into the correct position for adjustment.

This is effected by means of the ball-ended screw engaging the tops of the push-rods. A special spanner is provided in the tool kit for this purpose.

Release the locknut and rotate the adjusting screw with a screwdriver, checking the clearance with a .019 in. feeler gauge.

Tighten up the locknut and again check the clearance to ensure there was no alteration during the tightening of the locknut. Follow all this procedure for all the eight valves. Replace the valve cover, air cleaner and branch pipe and refit the bonnet complete.

Next Month:—The Cylinder Block and its Components.



To adjust the valves a special spanner and screwdriver are required.