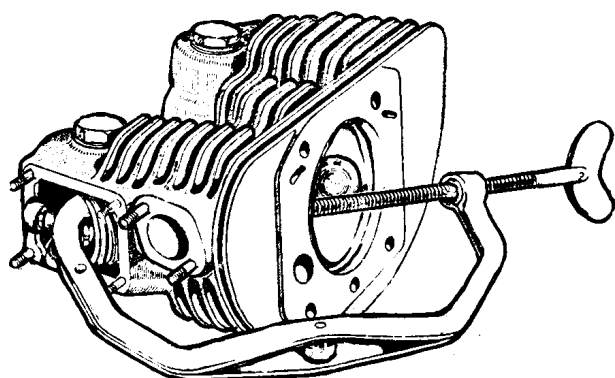


at a time in turn. Begin with the two inside nuts and the one by the spark plug, leaving the final tightening of the corners to the last.

### 28. Removal of the Valves

Having removed the cylinder head, remove the rocker-box covers, each held by four nuts, and swing the rocker clear of the valve. Using a suitable valve spring compressing tool, compress the valve springs and remove the split collets from the end of the valve stem. Slacken back the compressing tool and release the springs. Withdraw the valve and place its springs, top spring collar (and bottom collar if it is loose) and split collets together in order that they may be reassembled with the valve from which they were removed.



REMOVAL OF VALVES

Fig. 7

Deal similarly with the other valves in the heads.

If the valve will not slide easily through the valve guide, remove any slight burrs on the end of the valve stem with a carborundum stone. If the burrs are not removed and the valve is forced out, the guide may be damaged.

### 29. Removal of the Rockers

To remove the rocker, first take off the cylinder head. Remove the hexagon plug on the inner side and the rocker spindle may be drawn out by means of a bolt screwed into the rocker spindle, which is tapped  $\frac{5}{16}$  in. B.S.F.

On reassembling make sure that the spring washers are fitted on the sides of the rockers nearest the centre of the engine and the plain thrust washers on the outer sides.

### 30. Removal of the Valve Guides

To remove the valve guides from the heads two special tools are required which can easily be made.

The first is a piece of tube with an internal bore of not less than  $\frac{7}{16}$  in.

The second is a mandrel about 4 in. long made

from  $\frac{9}{16}$  in. diameter bar with the end turned down to about  $\frac{5}{16}$  in. diameter for  $\frac{1}{2}$  in.

Support the cylinder head on the tube which fits over the collar of the valve guide. Using the mandrel force the guide out of the head with a hand press or by using a hammer.

To fit a new guide, support the head at the correct angle and use a hand press and the same mandrel. If a hand press is not available and the guide is replaced by a hammer, use a piece of tube of  $\frac{9}{16}$  in. internal diameter to prevent damage to the bore of the guide. If a valve guide is removed for any reason, an oversize one should be fitted in order to maintain the interference. It is necessary to re-cut the valve seat and grind in the valve after a guide has been replaced. (See Subsection 35).

A worn exhaust valve guide may give rise to slight smoking from the exhaust pipe due to oil passing down the valve stem on to the hot valve head. This may also be caused or increased by faulty operation of the breather.

### 31. Removal of the Sparking Plugs

Care must be taken when removing and replacing the sparking plugs not to damage the threads in the cylinder heads.

If the threads do become damaged, they can be tapped out to a larger size and steel wire inserts fitted.

Special tools are available for tapping and inserting the steel wire inserts. The latter tool consists of a piece of  $\frac{7}{16}$  in. diameter tube or rod with a slot cut in the end.

The insert is placed over the tool with the tag engaging in the slot and it is screwed into the plug hole in the cylinder head from the outside until the last coil is 1 to  $1\frac{1}{2}$  threads below the top face. A reverse twist of the tool will then break off the tag.

If the cylinder head has been removed, the fitting of the insert will be facilitated if the tool is put through the hole from the inside and the insert screwed back from the outside.

If the cylinder head has not been removed, care must be taken not to drop the end of the tag into the cylinder and in such a case it is better to break off the tag with a pair of long-nosed pliers.

### 32. Removal of the Cylinders

When the cylinder heads have been removed the cylinders can be lifted clear of the studs. This should be done with the pistons at top dead centre.

It is advisable to put a clean cloth over the mouth of the crankcase to prevent anything, such as a piece of broken piston ring, from falling in.

When replacing the cylinders, clean off the joint faces and fit new paper joints, two to each cylinder, one each side of the compression plate.