Before fitting a new guide a new valve guide circlip should be put on the guide making sure that it rests in the valve guide circlip groove.

New guides are driven into the cylinder head from its camshaft side after the cylinder head has been heated to 200°C (390°F). If the guide appears to be only a light driving fit a valve guide with a suitable oversize outer diameter should be fitted.

Valve guides must be finished reamed with a Churchill reamer RG358 to ·2810 in.-·2815 in. ($\frac{9}{32}$ in. reamer) after they have been driven into the cylinder head.

Before the new reamer is used for finishing a new valve guide it should be "BLUNTED" BY USING IT TO REAM A $\frac{9}{32}$ IN. DIAMETER HOLE THAT HAS BEEN DRILLED IN SOFT GREY CAST IRON. This will prevent it from chattering and ensure that a suitable finish is obtained.

The inlet valve guides are shorter and have a flat face at their top end.

Cylinder heads may be heated in a gas or electric oven having an external thermometer to read oven temperature. Local heating must of course be avoided.

Valve seat inserts—To remove

Old inserts can be removed by boring out until the insert collapses. The machine depth stop should be set so that boring cannot quite reach the bottom face of the insert recess in the cylinder head.

Valve seat inserts—To replace

Remove thermostat.

The inserts can only be fitted when the cylinder head has been uniformly heated to 200°C (390°F). The heating equipment previously described under "VALVE GUIDES —TO RENEW" should be used.

Check the valve seat recess diameter.

Select a suitable oversize valve seat insert and check its outside diameter. Oversize inserts are available.

Machine the cylinder head recess diameter to the best possible finish concentric to the valve guide centre so that the insert will have the correct interference fit given in the Data Section under "Cylinder Head".

Heat the cylinder head for 30 minutes from cold in an oven maintained at a temperature of 200°C (390°F).

Using a suitable tool drive the insert into its recess until it bottoms onto its recess bore.

The valve seat on the newly-fitted insert should be cut or ground at an angle of 45° to a width of ·05 in.-·06 in. (1·27 mm-1·52 mm). The seat must be concentric to within ·001 in. (·025 mm) of the valve guide bore.

Valves—To grind in

This operation will be satisfactory only if the valves and seatings are found to be in good condition after dismantling and examination, and there is no evidence of distortion or burning of the faces and heads of the valves. It is also necessary after new valves have been fitted, or seatings recut.

Place a small amount of fine grinding paste evenly around the face of the valve to be ground, not allowing it to get on the stem or other parts. Place the valve on its seating and by means of a suction grinding tool, rotate the valve from side to side through a few degrees only, using a light pressure. Frequently raise the valve and move round to a new position on its seating and continue grinding. (On no account should the valve be revolved through complete revolutions when grinding, or rings will be formed on the faces with detrimental effects.)

The grinding should be continued in this manner until a continuous but narrow seating has been obtained both on the valve and the seating. The seatings should not be more than ·070 in. (1·78 mm) in width.

After thoroughly cleaning off all traces of grinding paste from the valve and seating with a dry cloth, test by placing a small amount of engineers' marking on the seating and revolving the valve in place not more than about $\frac{1}{8}$ in. (3 mm) in each direction. A complete circle of marking should appear on both valve face and seating, indicating a good seal.

Valves—To replace

The valve stems should be given a thin coating of oil, and a new set of rubber seals should be fitted above the inlet valve guides. The rubber seals rest on top of the inlet valve guides and are fitted inside the steel caps in which the valve spring lower ends rest. The joints used below the inlet valve guide steel cover caps should also be renewed.

If a new valve is fitted, see page 29 under "Valve clearances—special procedures" paragraph 5.

Cylinder head—To replace

If the valves have been refaced and ground in, the valve clearances should be checked and adjusted before replacing the cylinder head. They should also be rechecked after the cylinder head has been tightened down. Full details of checking and adjusting valve clearances are given in the following pages.