

# Replacement of Exhaust Valve Seat Rings

Type 220

When it is required to replace a valve seat ring, mill (turn) old ring out carefully and remove it. This may be done on an upright drilling machine. (For milling cutter diameters see Column 2 of Table 18.)

After the old valve seat has been removed, check the bore. If the diameter of the bore has not been increased by more than 0.02 mm (0.0008"), a ring of the same size can be installed. However, a minimum overlap of 0.1 mm (0.004") must be reached by all means. If this is not the case, mill the bore to the next larger size (see table) and install a ring of corresponding size. Exhaust valve seat rings of standard size and 1st oversize are only used in cast iron cylinder heads.

## Sizes of Exhaust Valve Seat Rings, Bores in Cylinder Head and Milling Cutters

Dimensions in mm (in.)

Table 18

Only valid for cylinder heads of cast iron

Size	Dia. of milling cutter for milling out the old ring	Dia. of milling cutter for the new bore	Bore in cylinder head $D_1$	Dia. of valve seat ring $D$	Height of valve seat ring $h$	Depth in cylinder head $t$
Standard size	38.70 (1.524)	—	$\frac{39.000}{39.016}$ (1.53543) (1.53606)	$\frac{39.140}{39.130}$ (1.54094) (1.54055)	$\frac{8.10}{8.00}$ (0.319) (0.315)	8.00 (0.315)
1st repair size	—	39.50 (1.555)	$\frac{39.500}{39.516}$ (1.55511) (1.55574)	$\frac{39.640}{39.630}$ (1.56063) (1.56023)	$\frac{8.30}{8.20}$ (0.327) (0.323)	8.20 (0.323)

The valve seat rings are made from special castings.

**Note:** When replacing the exhaust valve seat rings in one of the first engines, the bore in the cylinder head must be bored 1 mm (0.04") larger, as the diameter of the former valve seat rings was 1 mm (0.04") smaller.

## Overlap of Valve Seat Rings: 0.114–0.140 mm (0.0045–0.0055")

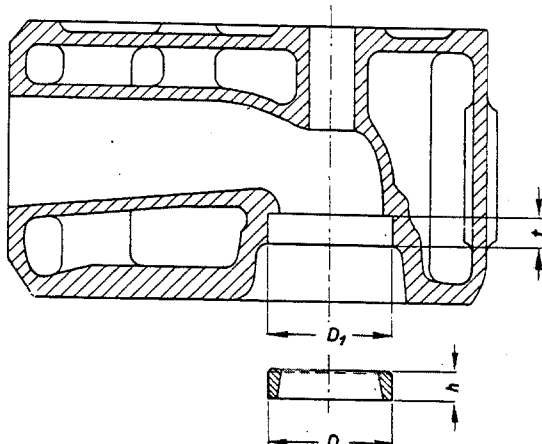


Fig. M 27/00

### Special Tools:

Valve seat ring milling attachment 000 589 00 66

Tools for valve seat replacement 000 589 02 66

Internal measuring tool 000 589 10 21

### Procedure:

1. Clean exhaust valve guide and check with a plug gauge (10.00–10.015 = 0.39370–0.39429"). If necessary, replace the guide (see Operation No. M 26).

2. Insert pilot pin with clamping sleeve (000 589 09 31 and 000 589 10 31) into bore of valve guide. The pin with sleeve will center itself in the valve guide.
3. Secure milling cutter for milling out the old ring to spindle of milling attachment. (Before this is done, insert key into groove of spindle.)
4. Push milling attachment on pilot pin and align it. Tighten attachment so that spindle can be rotated easily when milling cutter is free.
5. Mill into the old valve seat ring, until it starts to rotate with the cutter. Be careful! Stop milling at once, or the attachment might be damaged (automatic feed).
6. Take off attachment and remove the remaining part of the old valve seat ring.
7. Check bore for valve seat ring. If the dimensions are within the specified tolerance (minimum overlap  $0.1 \text{ mm} = 0.004''$ ), press a new ring in. Otherwise mill the bore to the next larger size.
8. Take off milling cutter used for milling out the old ring and in its place install milling cutter for the next larger size.
9. Align and tighten attachment as described under cf. 4.
10. Loosen adjusting collar and turn back the feed insert. To do so, let milling cutter rest on the cylinder head surface. Determine milling depth by interposing between adjusting collar and housing the new valve seat ring to be installed. Tighten adjusting collar and pull valve seat ring out (Fig. M 27/10).
11. Mill recess for valve seat ring. When the adjusting ring abuts against the housing, this indicates the end of the milling operation (Fig. M 27/11).

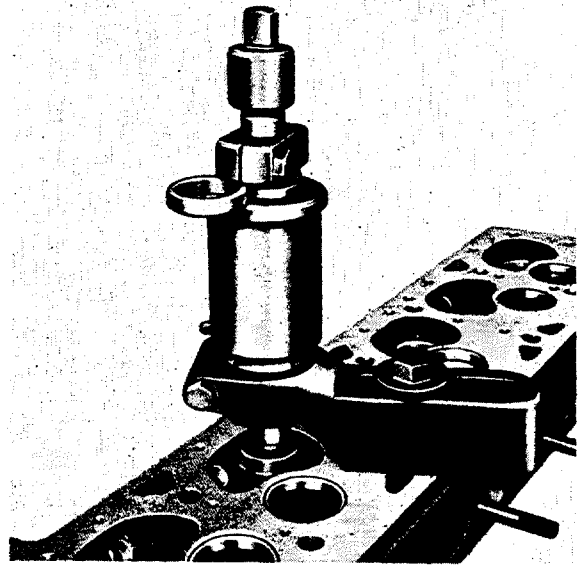


Fig. M 27/10

12. Loosen screw of adjusting collar and smooth bottom of recess. Adhere to the determined milling depth. The milling depth must correspond to height  $h$  of valve seat ring.

Note that for the smoothing operation only a light pressure must be exerted on the milling spindle.

13. Unscrew milling attachment and remove. Pull out guide pin with clamping sleeve.

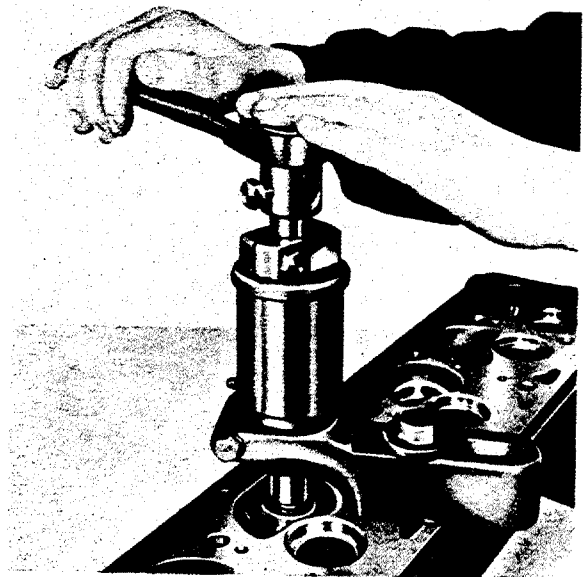


Fig. M 27/11

14. Clean recess for valve seat ring and check with an inside gauge (Fig. M 27/14).
15. Place valve seat ring (if possible, in under-cooled condition) in recess and drive lightly in by means of pressing-in plug with thrust washer (000 589 06 61 and 000 589 07 61), until ring abuts snugly against bottom of recess. Be careful to avoid heavy blows, or the valve seat ring might break.

Make sure that valve seat ring is flush with the cylinder head. The upper edge of the ring must by no means project.

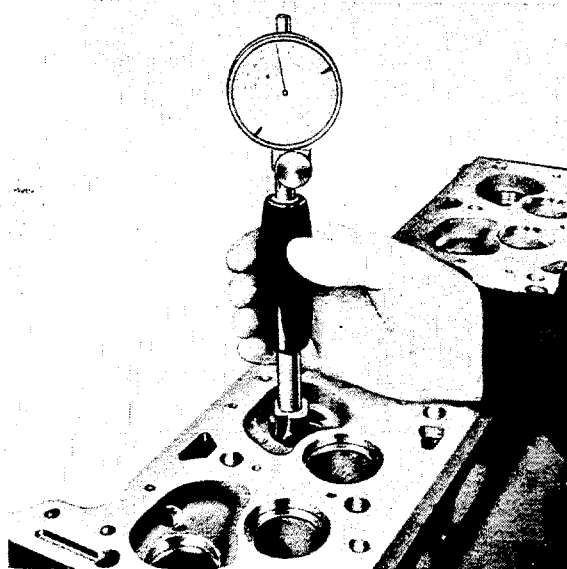


Fig. M 27/14