Rocker grinding set-ups

By GEOMETER

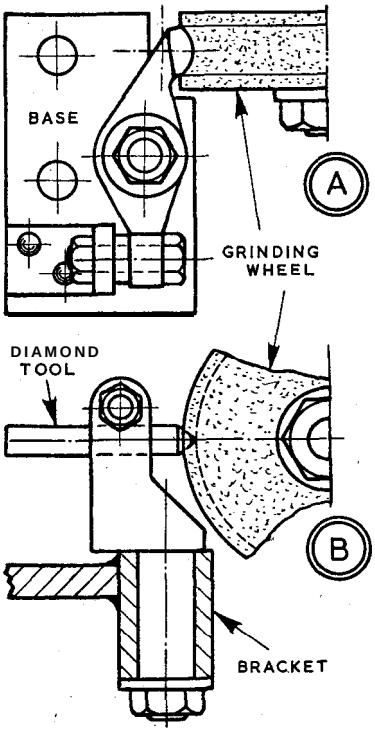
WORKSHOP HINTS and TIPS

PERHAPS because rockers are about the simplest, most compact means of changing or completely reversing the direction of straight-line motion (of a " push "type) through short distances, they are commonly employed in i.c. engines for operating overhead valves.

In multi-cylinder car engines, where they are most numerous, the straight-line motion, in an upward direction, originates with the tappets operated by the cams. Push rods with rounded ends fitting in hollows in the tops of the tappets continue the motion with a small degree of side-swing at the top.

Here, their hollow or socket ends engage adjustable ball screws in the outer arms of the rockers. which, mounted on a fixed shaft, have the function of simple levers with an upward swing. The opposite or inner arms, moving in reverse arcs with a downward swing, bear directly on the ends of the valves, which, constrained by their guides, open straight downwards. Thus, the push-type short-distance straight-line motion is reversed in the simplest possible manner.

Working clearances on the gear are set from the adjustable ball screws, and checked by feeler gauges between the ends of the valves and the rockers, where a radius on each ensures smooth working. However, in the course of time, from the sliding as well as pushing action, and the small area of contact which means high unit loading, fairly substantial wear occurs, marking the end of each valve and indenting the rocker. Consequently, clearances can no longer be accurately set-apart from the possible ill effect the change in geometry may have on smooth action.



Jig for valve ends

The valve ends which should be flat and square can be dealt with easily on a simple grinding jig having a drilled and reamed hole through which the stems can be pushed for the ends to contact the face of a grinding wheel; and when wear on rocker radii is slight, correction is possible by hand honing with an abrasive slip. In the case of substantial wear, the rocker radii must be ground either on a forming or a generating principle -for, of course, they are hard. Grinding on a forming principle, as at *A*, a broad wheel has the appropriate radius. A simple jig, with a flat base to mount on an angle plate on the vertical slide, has a pillar for the rocker, and an angle bracket to bolt up its screw end.

In setting up, unworn parts of a radius locate a rocker into the wheel; and in grinding, the cross-slide puts on feed, and the vertical slide brings the rocker up past the wheel. In this way, a set of rockers can be trued very easily, when the wheel has been prepared, as at B, with a diamond tool set to radius in a swivelling holder, mounted in a built-up bracket on the angle plate.

Using a swivelling holder

For setting the diamond tool, the swivelling holder can be removed from the bracket and laid in V-blocks on a surface plate, so a height gauge, suitably adjusted, can be applied to the tip. Cuts on the wheel should be very light-put on by cross-feed-and the holder swivelled by hand.

Grinding on a generating principle, as at C and I), the rocker must be on a swivelling holder, mounted in a bracket similar to that for the diamond tool. Contact is made on the face near the outside edge of the wheel, which can be a straight type, although a flaring cup or saucer wheel may be needed for some rockers-depending on how the radii are located.

The baseplate of the holder should be slotted to admit of adjusting the pillar, which may be provided with collars to facilitate fitting .off-set or "handed" rockers; and an angle bracket, brazed or welded to the baseplate, should carry an adjustable backing screw, to use jointly with the pillar for locating the rocker radius about the axis of the swinging holder. Setting up must be done experimentally on the first rocker, and feed put on moving the saddle on the lathe bed.