Split big-end connecting rods...

By GEOMETER

FOR use on multi-cylinder engines and single-cylinder types with double-web crankshafts which cannot be dismantled, it is essential for connecting rods to have split and bolted big-end bearings. From the constructional point of view, this naturally adds to the work involved, but the processes can all be carried out accurately on a lathe with normal equipment.

In detail, connecting rods may vary according to the designer's ideas or in keeping with the engine being made. For open type horizontal internal combusion engines and steam engines, connecting rods may be of steel with flat ends and split brasses bolted up with steel plates at the ends, as at ***A*** left. Alternatively, steel connecting rods may be bored as at ***A*** right—in which case they are provided with brass or bronze liners—or white metal is run direct on the steel and machined to form the actual bearings. Again, brass or steel liners may be lined with white metal for fitting to the rods. Where reduction of weight is important, as in small high-speed engines, connecting rods may be of duralumin, working direct on crankpins and gudgeon pins.

Sections of connecting rods are usually round for the type at ***A*** left and rectangular or I-section for that at ***A*** right. Bearing liners or shells may be flanged at the ends to run in the crank cheeks, or the connecting rods themselves may thus locate and carry flush-fitting liners, as at ***B*** left and right, respectively. A simple means of locating shells is a pin screwed into the rod or cap fitting in a hole in one half.

In small model sizes, whatever the type of connecting rod being made, it is useful to employ rectangular material and bore the gudgeon-pin hole first—with the bar clamped flat to the faceplate. The bar can then be held in the independent chuck and the end faced, either to take the flat brasses or to the centre line for fitting the cap.

Where flat brasses will be used. the faced end of the connecting rod can be centred, then the bar reversed and the other end centred. Surplus material should be available for fitting a carrier or driving pin to effect a set-up as at ***C***. The bulk of unwanted material can be sawn away, and the rod turned taper with the topslide at an angle.

The small end may be finished afterwards, sawing off the surplus material, then rounding up the boss by filing with hardened stepped plugs in the bore-the ends finally being tapered if desired by machining with the small end clamped on a threaded mandrel by a nut.

The steel plate which will hold the brasses should be drilled and clamped to the connecting rod for drilling the bolt holes-and may also be used as a template for drilling the brasses. On the other type of connecting rod, the cap material may be so employed; and where the holes are long, a set-up in the independent chuck for drilling from the tailstock is advisable.

With the cap material bolted to this type of connecting rod, the big-end can be bored by clamping to the faceplate, as at ***D***, using slotted clamps for access to the joint line, which serves as one setting-up line, while a scribed line is marked on the rod for the other direction. For machining the web of the connecting rod, the set-ups described for simple connecting rods can be employed. Then the big-end may be turned at the sides with the rod clamped on a mandrel, as at ***E***.

For making flat brasses, the material should be machined true if necessary by careful set-ups in the independent chuck or on the angle plate; then the halves are drilled from the steel plate and dowelled together for mounting on the angle plate, as at ***F*** to machine the bore. Round brass liners may be machined similarly from two pieces of flat bar, centred and projecting from the independent chuck for machining the bore and outside at one setting. □