Proportional compasses

WORKSHOP HINTS and TIPS

BY **GEOMETER**

LIKE others who copy in proportion-draughtsmen, map-makers, painters of miniatures-model engineers who have chosen subjects for which exact information is lacking can often make use of proportional compasses. Chiefly in mind are those who make models of ships, early steam vessels, unusual locomotives, and portable and traction engines. All they may have to work on may be some leading dimensions, non-dimensioned illustrations in old technical journals, and reproductions of photographs-all of different sizes.

Considerable preliminary work may be involved; and proportional compasses, of which *A* depicts typical examples, assist in bringing order out of chaos. The two legs are slotted for the greater part of their length, so the adjustable hinge can be set to give the required proportions at the opposite pairs of points. One leg has a key, as indicated, which fits into a slot in the other when the compasses are closed-at which position, the hinge should be adjusted.

Take as an example a locomotive shown in front and side elevations in a journal. No dimensions are given but the gauge is known and the scale required is 1 in. : 1 ft. If the gauge is 4 ft 8 1/2 in., the hinge is adjusted so that dimension X is 4 17/24 in., and dimension Y corresponds to the between-rail dimension on the front elevation. This may involve several re-settings and checkings against a steel rule and the illustration; but once the setting is obtained, the compasses can be opened and closed as required for other dimensions.

From the side elevation it is then possible to get a mass of valuable information-overall length, tender length, driving and other wheel diameters, verifying all of them to 1 in. : 1 ft on the steel rule. If further details are contained in a photographic side view of a different size the proportional compasses can be adjusted to suit.

Thus, from the gauge on the end view, driving wheel size can be taken to 1 in. : 1 ft. For working on the photograph, X would be kept at driving wheel scale size on the steel rule, while dimension Y is adjusted to the diameter. on the photograph. Other dimensions will thus appear at 1 in. : 1 ft. Briefly, one can adjust the proportions as necessary for this or any other scale.

A reasonable amount of " give and take " must, of course, be allowed for. In many instances a fair average or intelligent estimate would have to be made. Needless to say when using a valuable reference the compass points should not be allowed to mark the illustration, but carefully brought near to it.

The legs of proportional compasses are usually built up, the slotted parts of German silver or brass, and the points of steel screwed or sweated in. Each slot is taper-sided to about 8 deg. (16 deg. included angle); and the hinge is of special type, as at ***B***. Each slot is engaged by a small slide, outside which is a collar. A pin passes through all, and the joint is tightened by a knurled nut. The head of the pin is in a recess in the lower collar, and a plain diameter passes through the lower slide. Above this, the pin is squared for the upper slide and collar. Friction can thus be regulated, and when used the hinge camiot work loose.

The pin is as at a plain turning and filing (or milling) job. Each slide and collar can be made separate -as the upper one shows-with the square holes filed and broached, and the two parts tinned, clamped and soldered. The key can be made and riveted in, as at ***D,*** and the steel points screwed or sweated in.

A silver steel cutter, as at ***E,*** turned to angle, teeth filed, hardened and tempered, will produce the taper slots following a plain slot milling operation. A finishing lap can be made by bolting a taper-sided block to a plate-the block being drilled for a taper pm, and slotted for adjustment by tapping in the pin. ❑