Cutting discs and rings

BY GEOMETER

CUTTING a disc or ring neatly from sheet material invariably requires swinging either the tool or the material in a circle. Merely marking the material and cutting it with scissors or metal shears produces inferior results, even on outside edges, and the difficulties are obviously increased with inside edges. Successive cuts with scissors or shears are never really uniform, and contours are a series of deviations and flats approximating to circles. In addition, if a material is soft, like thick sheet cork, it can be forced out of shape and chipped at the edges by local pressure.

For materials like cardboard, fibre, composition sheeting, thin plywood, and even soft metal, the type of washer cutter at *A* is very suitable With the blade set to radius and the centre point pressed well down, the tool can be turned in regulated cuts. Except on thin material which can be severed at a single rotation, the first cut should be moderately heavy to leave an indentation to help as a guide for following cuts. A firm backing should be provided by way of a flat board.

Where, owing to the thickness of the material, several turns must be made, the centre can be worn and the blade will wander from the original cut. To prevent this, a pad can be used at the centre, such as a piece of flat steel with a small hole for the point. A piece of square steel with the corners turned down can be used to grip the material when it does not matter if the material is marked.

Working from both sides is advantageous in cutting a disc or ring from plywood; and it is helpful to drill a centre hole into which a small bush can be fitted, such as a short piece of tubing, to take the point of the tool. Cuts from opposite sides then meet at the centre without risk of wander.

Where centre marking is not possible a piece of material with the centre can be temporarily stuck on; and in the case of glass, a suction cup with a moulded-in screw can be usefully employed (such as is used to fix demisters to windscreens). The screw locates an arm with a turned-up end to which a glazier's diamond can be clipped, as at *B*. Adjustment is not usually necessary to cover a range of sizes; and having clipped the diamond tool to the arm, the radius can be marked and the bole drilled.

To break out the circle afterwards, straight cuts can be made at the corners, as at C, so pieces X can be taken off. Then pieces Y will substantially break away. Fragments left can be " nibbled " and crumbled off with flat-nosed pliers, and the circle finished by careful free-hand grinding edgewise on an emerywheel.

For soft, easily deformed materials, a thin sharp blade is required. There is probably nothing better than a piece of razor blade. Using this, a tool can be as at *D,* the portion of blade held by a screw and washer to the turned-down end of the arm, which should be slotted for setting with locknuts to radius on the stem. This last can be a mild steel stud, with a flat handle at the top, and pointed at the bottom by turning down and filing in the lathe, then case-hardened. Alternatively, it can be drilled and a gramophone needle fitted.

Cutting sheet metal

For sheet metal, cutting on the lathe is generally best with 2 backing provided by plywood or board. In large sizes this can be fixed to the faceplate with metal screws with countersunk heads. The sheet to be cut can then be attached with waste portions, using small bolts or .wood screws. A narrow V-tool, light cuts and use of back gear are essential. It is advisable for the centre of the sheet to be held up by a pad from the tailstock or when severed, it may swing off centre and jam.

A friction grip on this principle between wood pads is sufficient for edge-machining a small disc, as at *E, a* steel washer taking the thrust of the tailstock centre; and with concavo-convex faces on metal pads, as at *F*, a transparent disc can be shaped, machined and sprung into the bezel of an instrument as a substitute glass." ❑