

SIMPLE PATTERNMAKING

ABILITY to produce simple patterns in wood from which castings can be obtained frees a constructor from continued acceptance of commercial designs and the limitations and work involved in built-up or fabricated constructions.

It need not be overlooked, of course, that early efforts may not be so good as comparable commercial designs, not that a particular component might not have been equally well made by a skilled operator of welding equipment. But granted these, it then remains virtually indisputable that castings do, as a rule, provide the best means of construction, with freedom when of one's own design to express ideas mechanically.

Woods employed for small patterns should be the hard, close-grained variety—boxwood, beech, oak—ash—that can be turned in a lathe reasonably easily without tearing. Rotational speed should be as high as possible, and tools should possess ample rake and clearance. Complicated shapes can be built up by gluing, screwing, tacking and dowelling pieces of wood together, interstices being filled and fillets formed with plastic wood or putty, the surfaces finally smoothed with sandpaper and painted with a filler paint—followed by further rubbing down and painting if required.

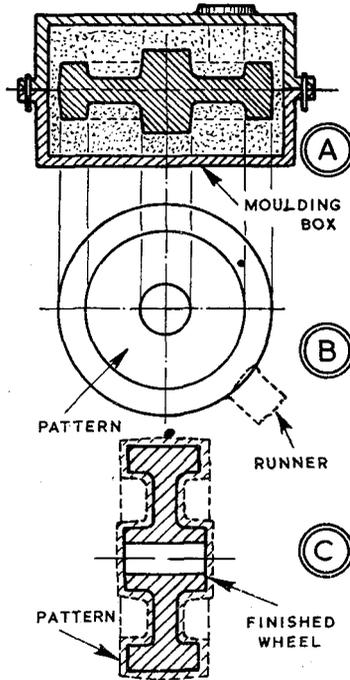
An important feature of any simple pattern (which resembles the casting to be produced) is that it must leave the mould cleanly, and to ensure this fact is not overlooked, it is necessary to keep in mind the principle on which such a pattern is moulded. At *A* and *B* is shown in section and plan the pattern for a flywheel, which could be cast in cast iron. The moulding box at *A* is in halves, dowelled together.

The pattern is pressed into the sand in the lower half to form its shape, while positioning the upper half of the box causes the shape to be similarly formed in the sand of the upper half. Taking off the upper half of the box, removing the pattern and replacing the upper half, then provides the mould into which the metal can be poured through a channel.

As the pattern is relieved to form a central web on the flywheel, the pattern must be positioned horizontally as shown, for if the pattern were placed

vertically the sand close to the web would inevitably be disturbed on lifting it out. A simple pattern, therefore, must in at least one attitude be free of "undercuts".

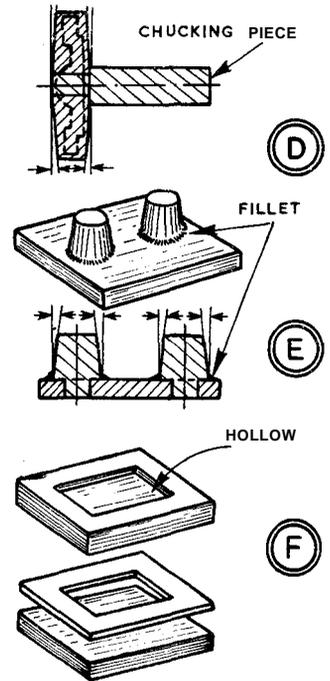
Where machining on a casting will be necessary, an allowance must be made on the pattern, and where a casting will be of substantial size and



not necessarily machined all over an allowance must be made for metal shrinkage. Per foot of length, this allowance is 1/10 in. to 1/8 in. for cast iron; 1/8 in. to 3/16 in. for aluminium and 1/5 in. to 1/4 in. for brass. If desired "contractio n" rules can be used on which all dimensions are these proportions overlength.

On small patterns the machining allowance will easily accommodate shrinkage on the castings. For general purposes, an allowance of 1/16 in. is satisfactory. If one is sure of good small castings reduction to 1/32 in. is possible; where there is doubt an increase to, say, 1/8 in. is advisable. The allowance must be added to all surfaces as at *C*. On wheels, where the "runne r" in the

By Geometer



mould is to the periphery, extra allowance counteracts a possible adjacent hollow.

A simple pattern for casting a circular cover, as at *D*, may be provided with a shank as a chucking piece. Machining the casting the shaped end of the cover and outside would be turned holding the chucking piece; this would then be sawn off, and the cover held by the outside for finishing the step and end.

Features of any depth to draw from a mould should be tapered on each face about two deg. as shown. Bosses, as at *E*, may be dowelled and glued in, and fillets made with plastic wood, while a pattern with a hollow can be built up from two pieces glued, as at *F*. □