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A Miniature Moulding Spindle

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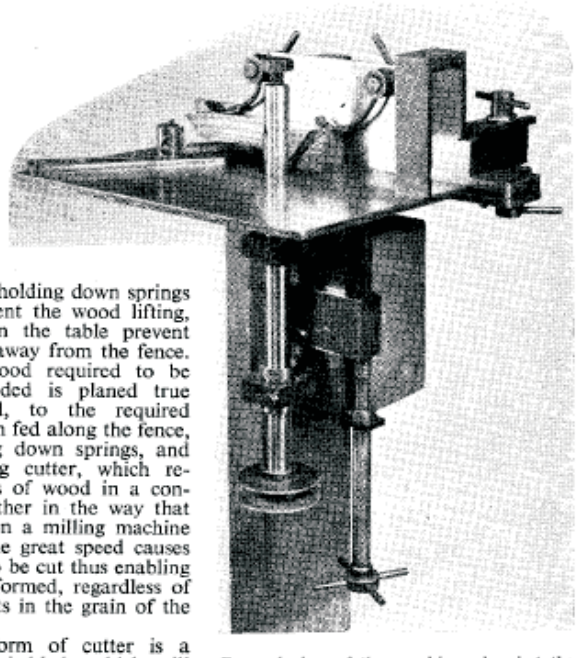


General view of the machine, showing the elevating screw

THIS machine has been constructed for cutting mouldings or grooves in wood. It is a kind of vertical milling machine, carrying varieties of fly-cutters on a spindle which passes through the centre of a horizontal work table, and which revolves at high speed —four or five thousand revolutions a minute. The spindle can be raised or lowered in relation to the surface of the table. At its upper end is a vertical slot, passing right through, into which the cutters are inserted, and held in position by a locking-bolt in the axis of the spindle.

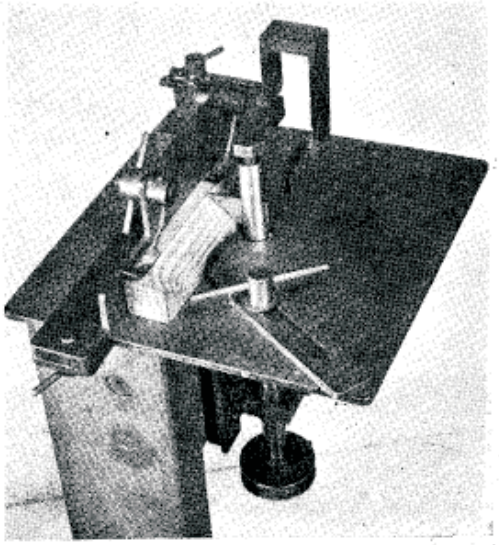
The Cutters

These are made from flat tool-steel of $\frac{1}{4}$ in. $\times$ $\frac{1}{8}$ in. section, and, when filed to any required shape, are hardened and tempered. A cutter is placed in the spindle so that its shaped edge which is to generate a moulding, projects, the blank end being left flush with the other side. An adjustable "fence" made from steel angle bar is placed on the table, and made fast in any position by a locking device. The position of the fence in relation to the spindle is governed by the size of the wood lengths required to be moulded, its function being to guide the wood past the cutter.

Two adjustable holding down springs in the fence prevent the wood lifting, and two more on the table prevent it from vibrating away from the fence. The length of wood required to be grooved or moulded is planed true and parallel-sided, to the required section, and is then fed along the fence, under the holding down springs, and past the revolving cutter, which removes small chips of wood in a continuous stream rather in the way that a fast fly cutter on a milling machine removes brass. The great speed causes very small chips to be cut thus enabling mouldings to be formed, regardless of "shakes" or knots in the grain of the wood.

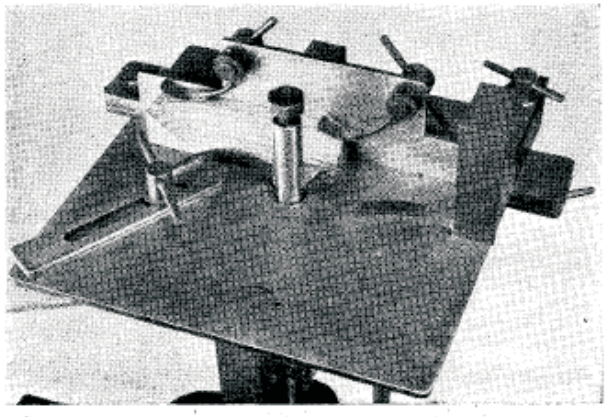
The simplest form of cutter is a single square-ended blade which will cut a square groove along the face of a length of wood. Since the spindle can be adjusted in a vertical direction, the groove may be cut at any position on the face of the wood. If a second square blade were formed on the cutter, separated by a non-cutting portion, a double groove would result. Reduced to the necessary smallness, the two grooves in the sides of double blocks for ship models can be formed on a length of boxwood, which, turned at right-angles, can receive a single score (for the rope strop) made by a blade with a rounded end. The blocks can then be shaped and cut off one by one. The method ensures uniformity in size, saves time in scoring and grooving.

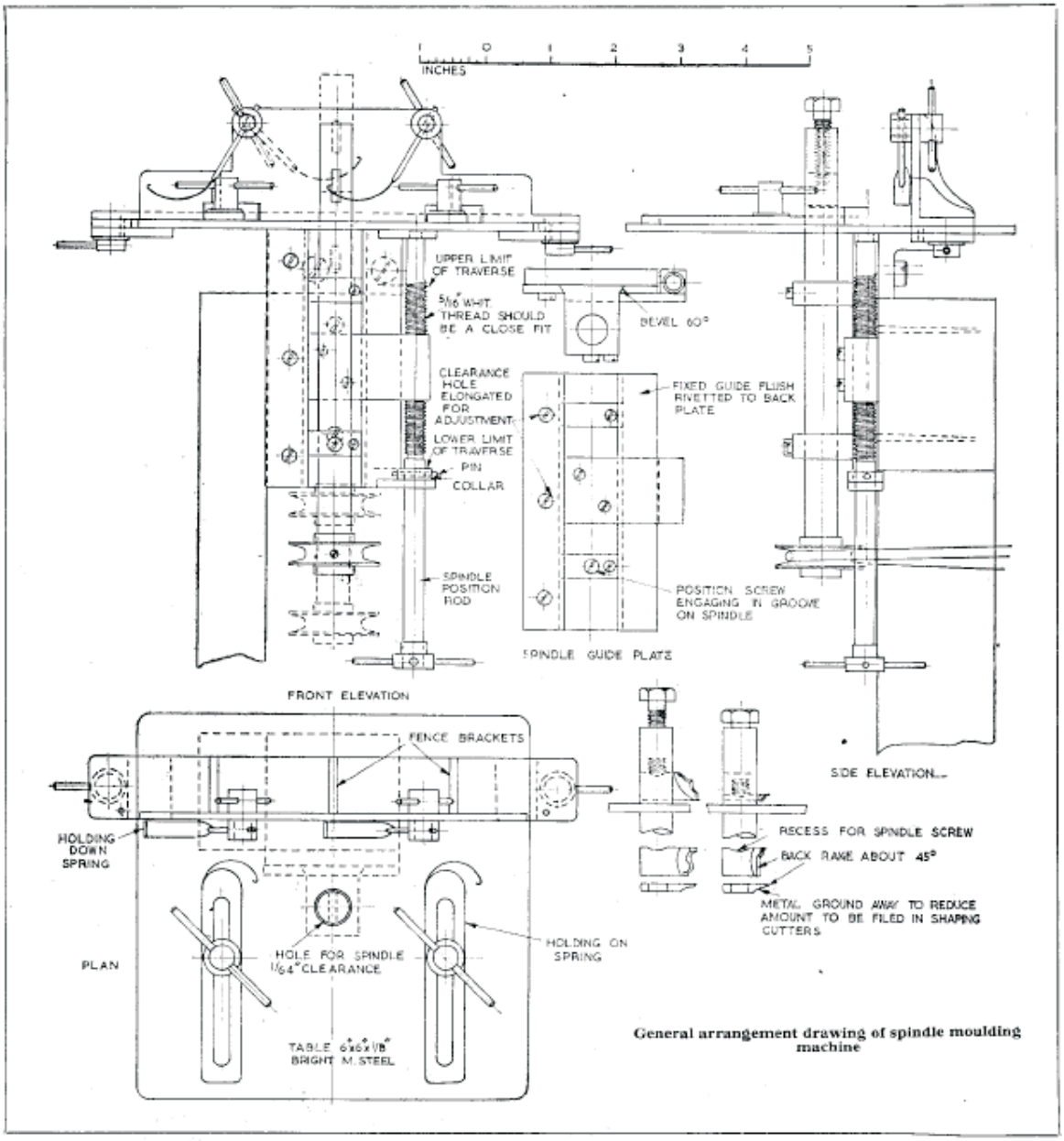
A cutter having three or four steps formed on it will generate flights of steps for architectural models. A few years ago, I received a contract from the Imperial War Museum to build a



Left: Piece of wood being moulded. The curved end of the cut shows the radius of the path of the cutter

Below: General view of table and fence. A second spring on the table, as shown in the drawing, would be better than the one on the right attached to the fence





General arrangement drawing of spindle moulding machine

model of the cruiser *Dorsetshire*, together with a model of No. 14 dock at Portsmouth Yard, in which she was represented in the final stages of a refit and re-armament. The scale was 1 in. = 16 ft. and all the "altars" and steps of the dock were made on the machine illustrated here. This would have been a lengthy process without it.

Variations of the step type of cutter, made by filing the square parts into curves, produce all the classical and most of the Gothic mouldings and, depending on the size and power of the machine, of any scale.

Varied Uses

The reader will see that the spindle can have very varied usefulness in general modelmaking. In a film studio, it is indispensable, as the construction of sets involves the use of great quantities of mouldings of all kinds. It is rather a dangerous tool to use as the high speed of the spindle makes the cutters quite invisible. On a full-size machine, the latter may be blades three inches deep and projecting four or more inches. There was an occasion at Ealing Studios when the spanner used to tighten the securing bolt for the cutters was left on, and the machine started. Fortunately it was noticed and a man yelled to everybody to lie on the floor, whereupon he crawled up to the switch and stopped the motor. If that spanner had come off it would have gone through a wall! For this reason,

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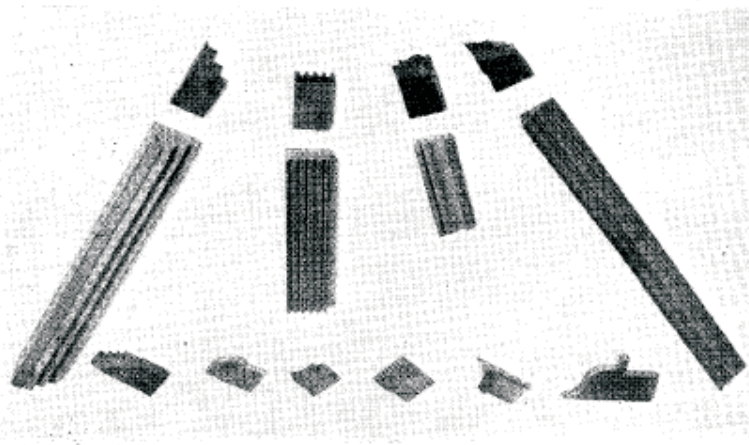
the cutters have a groove filed on them at the upper edge to take the end of the bolt to prevent them flying out.

It is with some diffidence that I am sending the description of my machine to this magazine, knowing that experienced model engineers will see its defects at a glance, and be able to think of many improvements to the design. I can think of some myself, one of the most obvious being a better position for the driving pulley, which should be between the bearings, rather than below them. This would require taller bearing blocks, but as the whole thing was made from scrap metal, the design was governed by the material instead of the material by the design. It cost a shilling, all the same, as I had to buy the steel plate for the table !



Top, left to right : Cutter for making flights of steps, cutter for multiple grooves, cutters for architectural mouldings. Bottom : Miscellaneous cutters