

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Guillotine Machines

We MECCANO LIMITED, of Binns Road, Liverpool 13, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to guillotine machines and is more particularly concerned with portable guillotine machines for cutting sheet material such as cardboard, millboard or thin wood in the production of jig-saw puzzles and the like as a pastime or hobby occupation.

One object of the invention is the provision of an improved and simplified construction of such a machine which is adequately safeguarded against causing injury to even an unskilled operator when in use.

According to the invention, in a portable guillotine machine for cutting sheet material such as cardboard, millboard or thin wood, the cutting blade is shielded on that side which faces outwardly towards the operator's hand by a guard plate or block formed of transparent material which is movable relative to the cutting blade to enable the blade to pierce the work material and to strip the material off the blade. Preferably the thickness of such guard plate or block, measured in the direction from the blade edge towards the operator's hand or fingers, is several times the maximum clearance or spacing distance between the blade edge and the surface of a co-operating support for the work material whereby entry of even the tips of the fingers is prevented.

The invention will be better understood from the following description of one practical embodiment taken in conjunction with the accompanying drawing in which:

Figure 1 is a part-sectional side elevation of one form of machine according to the invention,

Figure 2 is a front elevation of the head portion of the machine shown in Fig. 1,

Figure 3 is a fragmentary perspective view

of the cutting blade and its mounting arrangements,

Figure 4 is a perspective view of the cutting blade and the co-operating table plate showing the relative positioning of the parts while

Figure 5 is a detail sectional view of a modified form of table plate.

The machine shown is one arranged for temporary attachment to a table top and comprises a rigid but mainly hollow body 10, conveniently of die-cast metal, formed in two substantially similar but mirror-image left and right hand side parts 10a, 10b. Such body is shaped to provide a central, table supporting portion 11, an overhanging head portion 12 and a dependent clamp arm 13. The two body halves 10a, 10b are held together by self tapping screws 10c.

The central portion 11 is hollow and supports, by means of nylon bushings 14 trapped between the body halves, a drive shaft 15 of circular section and rotatable by means of an attached or integral crank arm 16 having a handle 17 which is snap-fitted into an aperture at the free end of such arm.

The shaft 15 has integral therewith two eccentric cam discs 18 and 19. The cam disc 18 rotates within a bearing recess 20 formed in a slide block 21 guided for vertical up and down movement in the front end of the central body portion 11. To the upper surface of the slide block 21 is secured a downwardly flanged die-cast metal table plate 22, held in place by spinning parts thereof under flange extensions 23 of the block. The table plate is pierced by a cutter receiving slot 24 while a rearwardly directed channel 25 in the block 21 provides for clearance of waste material.

The cam disc 19 operates on the lower end of a push rod 26 trapped between and slidable within the body halves 10a, 10b. The upper end of this push rod operates on one end of a rocking lever 27 which is pivoted centrally on integral stub portions of the body

halves and which bears by its forward end upon the upper end of a vertically slidable stripper 28. This stripper also operates as guard plate for the knife blade 29 which is of the curved shape as shown more clearly in Fig. 4 and is secured by screws to a blade mounting block 30 having side projections 31 which are located and held within slots 32 in the respective body halves 10a, 10b as seen more clearly in Fig. 3.

The stripper 28 is formed of a transparent plastics material and, while shaped on its rearward side to conform to the curvatures of the blade 29 along which it can slide is made of substantial thickness, many times that of the blade itself and several times that of the maximum gap for the work material. The depth of such stripper 28 is such that, when in the position shown in Fig. 1, its lower end surface is either level with or preferably slightly below the level of the cutting edge of the blade 29. The stripper is also provided with side flanges 28a which embrace and cover the side edges of the blade. Access to the blade for removal or replacement is provided by a detachable front cover 33 held by screws 34. The latter are obscured by a cover/name plate 35 held in place by push fit rearward projections thereon entering apertures in the front cover 33.

The clamp arm 13 is provided with a clamp screw 36 having a swivel head 37 loosely trapped on a spherical upper end and a hand wheel 38 of a plastics material moulded on to its lower end. The screw 36 runs in a threaded nylon bushing 39 trapped between the body halves and held against rotation by a projecting lug 40. Table engaging pads 41 of P.V.C. or rubber are provided on the underside of the central body portion 11.

With the machine in the form shown in Fig. 1, there is some difficulty in obtaining precise register needed for satisfactory operation between the knife blade 29 and blade receiving slot 24. A modified form of table plate which avoids this difficulty is shown in Fig. 5. In this modified form the top surface of the table plate 22 has a depression 50 and a fibre pad 51 is secured within the depression by self-adhesive material on the back of the pad.

In operation, rotation of the crank arm 16 causes a rising movement of the slide block 21 and table plate 22. At the same time the push rod 26 undergoes a falling movement so that the stripper 28 hangs by gravity over the edge of the cutting blade and when the work material engages with the lower surface of the stripper 28, the latter is able to move upwardly relative to the knife blade 29. Subsequent upward movement of the table plate causes cutting of the work material by the blade 29. With the embodiment shown in Fig. 1, the blade enters the receiving slot 24 and any waste material is cleared through channel 25. However, with the embodiment shown in Fig.

5, the dimensions of the pad are such that when the cutting operation is completed, the edge of the cutting blade just makes contact with the surface of the fibre pad 51.

Continued rotation of the crank arm causes the table plate to undergo a falling movement and at the same time the push rod 26 undergoes a rising movement. This movement of the push rod causes, through anti-clockwise rotation of the rocking arm 27, a forcible downward movement of the stripper 28 to strip the pierced work material from the knife blade. The operation is then repeated after repositioning of the work material so as eventually to divide the work material into a number of non-uniform and interlocking pieces.

It will therefore be seen that during one complete operation, the knife blade is always shielded by the stripper. Thus on the upward movement of the table plate, the stripper will be in the position shown in Fig. 1 until the work material engages with the lower surface of the stripper. During cutting, the blade is of course embedded in the work material and thereafter as the stripper strips the work material from the blade at the same time it shields the blade as the work material is stripped.

It will be appreciated that with the embodiment shown in Fig. 5, no provision is made for the clearance of waste material. However, it is found in practise that the amount of waste material is negligible whereas the advantage of using the fibre pad is considerable.

WHAT WE CLAIM IS:—

1. A portable guillotine machine for cutting sheet material such as cardboard, millboard or thin wood, wherein the cutting blade is shielded on that side which faces outwardly towards the operator's hand by a guard plate or block formed of transparent material which is movable relative to the cutting blade to enable the blade to pierce the work material.

2. A portable guillotine machine as claimed in claim 1, wherein the guard block hangs by gravity over the edge of the cutting blade during the approach of the work material to the cutting blade, is lifted by engagement of the work material with its lower surface and is forcibly moved downwardly on the termination of the cutting operation to strip the work material from the blade.

3. A portable guillotine machine as claimed in claim 1 or 2, wherein the thickness of the guard block measured in the direction from the edge of the cutting blade towards the operator's fingers is several times the maximum clearance or spacing distance between the blade edge and the surface of a co-operating support for the work material.

4. A portable guillotine machine as claimed in claim 1, 2 or 3 wherein the guard block is formed of a transparent plastics material.

5. A portable guillotine machine as claimed in claim 2, wherein two oppositely phased

5 cams are provided on a manually operated shaft, one of the cams controlling the upward movement of a support for the work material towards the cutting blade whereas the other controls the forcible downward movement of the guard block.

10 6. A portable guillotine machine as claimed in claim 5, wherein the support for the work material is in the form of a table plate, the upper surface of which has a dished portion in which is secured a fibre pad, the dimensions

of which are such that at the termination of the cutting operation the edge of the cutting blade is just in contact with the fibre pad.

7. A portable guillotine machine substantially as described with reference to the accompanying drawing. 15

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