April 5, 1949. C. F. WILLIAMS 2,466,291

DIE PUNCHING MACHINE

Filed July 12, 1946

Fig 1

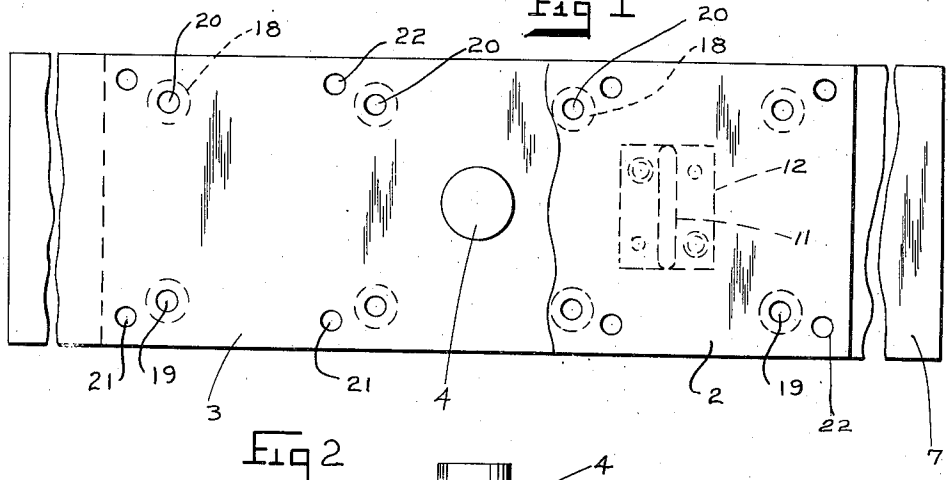


Fig 2

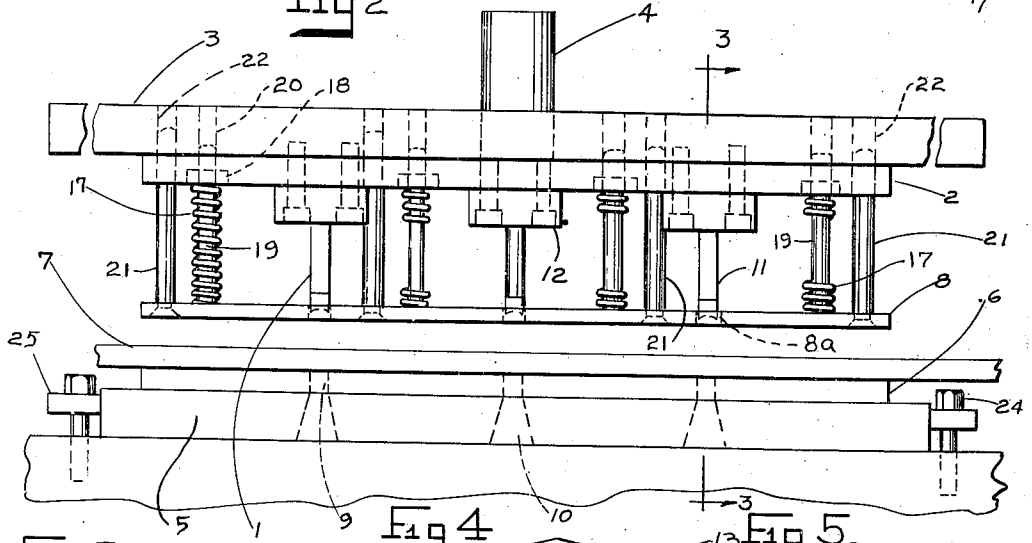


Fig 3

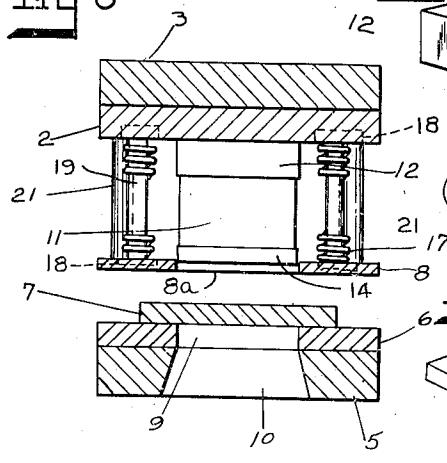


Fig 4

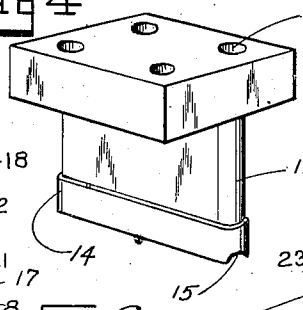


Fig 5

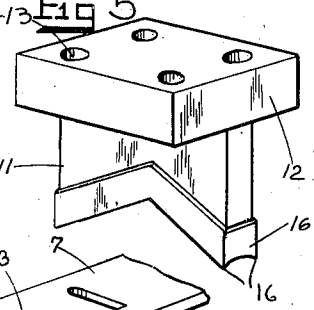
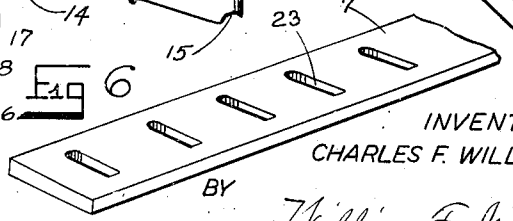


Fig 6



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DIE PUNCHING MACHINE

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2 Claims. (Cl. 164—90)

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This invention is an improvement in die and punching machines, adapted for wood-cutting; and more particularly to a machine designed to fashion openings in pieces or strips of wood, to enable other strips to be passed transversely through them to make a network of partitions for the inside of a box or like receptacle; the network forming with the sides or walls of the receptacle a number of pockets or cells; each of which is intended to receive an individual bottle, jar or other vessel and protect the vessel against breaking or being otherwise damaged.

An important object of the invention is to provide a punching machine of plain design, comprising relatively few parts and costing little to construct; easy and certain in operation; and containing appropriately shaped and efficient punching elements for shearing smoothly through the wood both along and across the grain thereof. A neatly finished product is thus obtained, and chipping or splitting of the wood is fully prevented.

The nature and advantages of the improvement are set forth in the ensuing description, and the novel features are defined in the appended claims. But this disclosure is illustrative only, presenting but the preferred embodiment of the invention; and various changes may be made in details of structure, size and arrangement of parts without departing from the essential combination of elements and members in which the invention resides.

On the drawings,

Figure 1 is a top plan of a machine according to this invention;

Figure 2 is a front view thereof;

Figure 3 is a section on the line 3–3 of Figure 2;

Figures 4 and 5 are perspective views of the specially formed punching elements used in the practice of this invention; and

Figure 6 shows a board or strip of wood in which oblong openings have been cut by said dies.

The numeral 1 indicates the punching or cutting elements, which are affixed to the under face of a supporting member in the form of a bolster plate 2. This plate is attached to a large flat operating head 3, that carries the plate 2 and elements 1, and is mounted on the end of a reciprocating drive shaft 4; which is held in upright position and moves in suitable bearings, not shown, being connected to any well-known source of power to actuate it as required. A bedplate or base is shown at 5, firmly held in stationary position; and bolted or otherwise fixed thereto is the

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die plate 6, having the openings 9 through which the elements 1 are forced by the main shaft. A wooden strip in which the openings are to be cut is laid on this plate 6 as shown at 7. Alternately any kind of material such as cardboard, wallboard, etc. could be worked in place of the wooden strip 7.

The punching elements project through openings 8a in a stripper plate 8 when they make their working strokes with respect to the strip 7; and the elements 1 are in line with the openings 9 in the die plate 6 and downward flaring openings 10 in the base 5. The elements 1 comprise shanks or chisel-like blades 11, of relatively great width that project from heads 12, which are bolted or screwed to the under face of the bolster plate 2; the heads 12 being wide and flanged with respect to the blades 11 and provided with holes 13 for this purpose. The faces of the heads are attached to the plate 2. The elements 1 are slightly thicker at their lower ends as shown at 14 on Figures 4 and 5. The end 14 of the punching element 1 shown in Figure 4 is straight and extends squarely across the blade 11. It is slightly concave transversely, as indicated at 15, with separated parallel cutting edges. This punching element is well calculated to cut through wood along or parallel to the grain thereof. The punching element of Figure 5 is not straight across at the end, but is indented. The end is concave to a slight extent as before, but the two transverse concave surfaces extend inward and upward, each having separate parallel cutting edges 16. This type of punching element gives a saw-tooth effect, and is very useful in cutting holes crosswise of the grain of the wood. Either kind is mounted in the apparatus, according to the kind of woods that are available.

The stripper plate 8 is maintained at a distance below the bolster plate 2 by means of springs 17, the ends of which are disposed in seats 18 on the stripper plate 8 and lower face of the bolster plate 2. Within the springs are guide pins 19, secured to the plate 8 and sliding in holes 20 through the plate 2 and operating head 3. The springs may be permanently attached at their extremities to the plates 2 and 8; as by welding them to the plates, or the plate 8 may be supported in any other suitable way; so that the stripper plate, when the springs are not compressed, will be suspended below the plate 2 adjacent the lower ends of the blades 11, without exposing these lower extremities of these blades below the stripper plate; and when the plate is forced against the wood 7, it yields upward to

compress the springs and allow the blades to be driven through the wood. To the plate **8** are also attached guide pins **21**, which can slide upward and downward through the aperture **22** in the plates **2** and head **3**. The shape of the holes **23** made in the wood **1** is oblong, of the same outline as the cross section of the blades **11**. The base **5** is held down by bolts or the like **24** passing through lugs **25** at the ends of the bed into the ground or flooring.

By this device the elements **1** cut the holes **23** in a single downward stroke. They will work with soft or hard woods to make holes with clean smooth edges without ever chipping or leaving rough edges or splitting the pieces of wood **7**. The elements **1** with straight transverse ends cut nicely along the grain, while the other dies are better adapted to cut across the grain, but both will give the best results. Wood cut with oblong openings **23** as in Figure 6 gives passage to other strips of slightly less width; and the required network is thus readily produced.

The invention thus serves all of the purposes for which it is built; and does much quicker work than punches with round or "router" bits that make only small, separate holes at given distances apart, and have to be combined with the action of a hollow chisel mortiser that follows the bit to cut the wood out between holes, if a long aperture like that shown at **23** is needed. The stock or wood **7** does not have to be moved after being laid in place on the die plate **6**, as is the case with many punching machines by which rectangular holes are made, but lies in one position, and the holes are fashioned at a single stroke by the punching elements **1**.

Having described my invention, what I claim as new is:

1. A punching apparatus comprising a head, a bolster plate secured to the head, cutter elements comprising wide flanged heads for face-attachment to the bolster plate, blades carried by the heads of said cutter elements and projecting therefrom, said blades being of relatively great width in relation to the thickness, and having thickened ends presenting concave terminal faces having parallel cutting edges extending across the width of said blades, a stripper plate having slots in alinement with said blades for the passage thereof, guide pins affixed to the stripper plate, said bolster plate and said head having openings for said pins, springs attached to the stripper plate adjacent said cutter elements, said bolster plate having seats for said springs, guide pins attached to the stripper plate for said springs, said bolster plate and said first named head also having openings for the said last-named guide pins, a die plate below the stripper plate having openings in alinement with the openings in said stripper plate, and a base plate supporting the die plate and having openings registering with the openings in the latter.

2. The punching machine according to claim 1 wherein the ends of said blades are indented to present two concave surfaces at an angle with each other, and each cutting edge has two portions inclined to each other.

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