

G. F. REZNOR.
PUNCHING MACHINE.
APPLICATION FILED DEC. 3, 1919.

1,358,328.

Patented Nov. 9, 1920.

Fig. 1

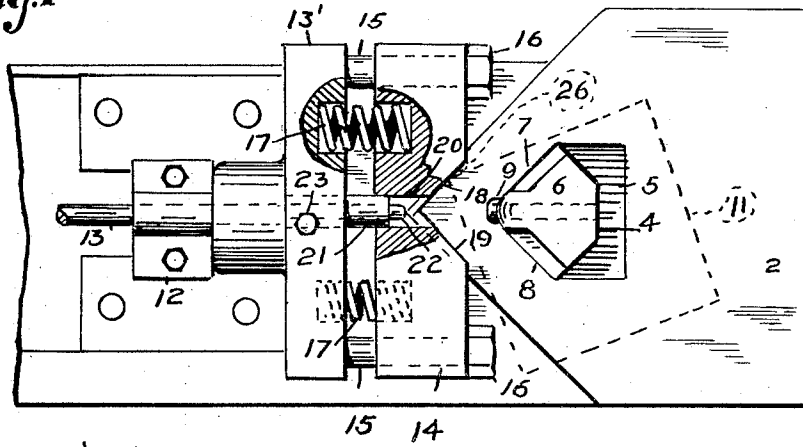


Fig. 3

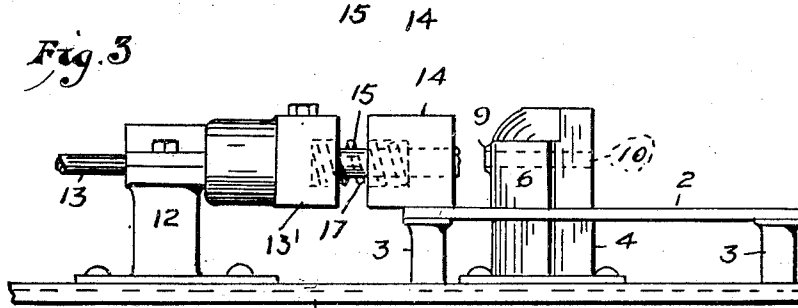


Fig. 2

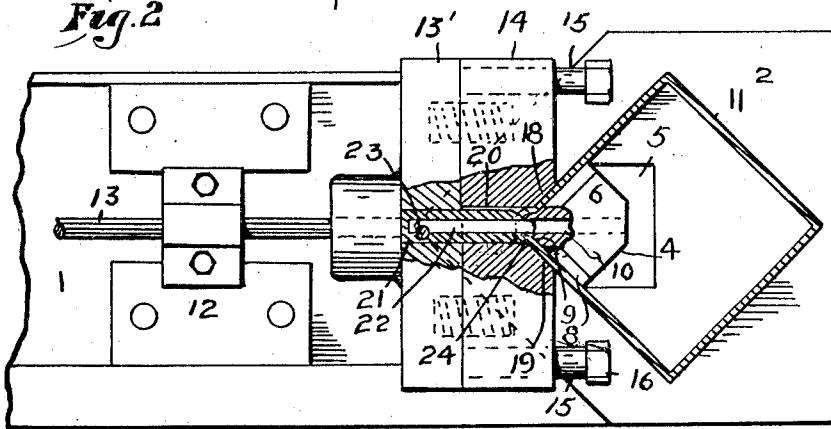
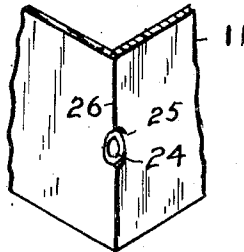


Fig. 4



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PUNCHING-MACHINE.

1,358,328.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE F. REZNOR, a citizen of the United States, residing at Mercer, in the county of Mercer and State of Pennsylvania, have invented new and useful Improvements in Punching-Machines, of which the following is a specification.

My invention relates to punching machines for making holes in the angles or corners of sheet-metal.

The principal object of this invention is to provide a machine which will accurately position and clamp between dies an angularly-bent sheet metal stove-body or like article and punch a hole at the angle or bend thereof. Other objects appear hereinafter.

Referring to the accompanying drawings, Figure 1 is a plan view, parts being broken away, showing the preferred form of my invention; Fig. 2, a plan view similar to Fig. 1, but showing the parts in a different position; Fig. 3, a side elevation of Fig. 1; and Fig. 4, a perspective view showing a portion of a stove-body having a hole such as this invention makes.

On the drawing, 1 designates the bed of the machine, and 2, a work-holding table supported on the posts 3 standing on the bed 1. 4 is a fixed column resting on the bed 1 and extending up through the opening 5 in the table. The top of the column 4 supports the fixed die 6 which has two vertical clamping faces 7 and 8 arranged at right angles to each other. At the meeting angle of these faces is the boss 9 having the horizontal central opening 10 extending entirely through the die. The top of the die 6 is beveled downwardly and outwardly to the faces 7 and 8 to form a guide for the stove-body 11, so that the latter can be dropped down over the die 6 without necessity of being accurate as to the precise place where the stove-bodies descend over the die to the table 2.

The bed 1 supports the standard or bearing member 12 having a horizontal opening in line with the opening 10 in the die 6. The rod 13 reciprocates through an opening in the member 12 and has its forward end connected to the cross-head 13'. The clamping die 14 lies between the die 6 and the cross-head 13' and has a reciprocation in the direction of the reciprocation of the cross-head in addition to the reciprocations of the cross-head. The latter is supported on the two bolts 15 extending through the clamping die and into the cross-head, the heads 16 of the

bolts limiting the distance of the clamping die from the cross-head. The springs 17 having their ends seated in recesses in the opposed faces of the clamping die and the cross-head tend to keep them spaced apart with the clamping die in contact with the bolt heads 16.

The clamping die has at its forward end the die faces 18 and 19 arranged at right angles to each other and adapted to fit the die faces 7 and 8, respectively. An opening 20 in line with the rod 13 and the boss 8 extends entirely through the cross-head. The cross-head has the forwardly projecting die 21 slidable in the opening 20 and adapted to engage the boss 9 when the cross-head is pushed to its forward limit. The die 20 is axially hollow and contains the punch 22 which is adapted to enter the opening 10. The die 21 and the punch 22 are secured in the cross-head by the screw or pin 23 which passes through all of them.

The parts being as in Fig. 1, a rectangular sheet-metal stove-body, shown at 11 in dotted lines, is dropped over the die 6 and allowed to rest on the table 2. The die 6 and the clamping die 14 are spaced apart widely, that is, many times the thickness of the sheet metal, so that the stove-body can be positioned between the dies without any strict degree of attention. A corner, as 26, may lie as in Fig. 1 quite a distance from the angle between the die-faces 7 and 8, or 18 and 19. The bevels at the top of the die 6 also aid to direct the stove-body to some place between the dies. Without these bevels the lower end of the stove-body might engage the horizontal top of the die and require further attention of the operator to get the stove-body down to the dies. With these bevels and the widely separated dies, the operator can position the stove-bodies between the dies without even seeing the operation at all. Having positioned the stove-body as shown in Fig. 1, for example, the operator causes the rod 13 to move by any suitable power toward the die 6. The clamping die is pushed forward by the spring 17, the die-face 18 engaging the corner 26 of the stove-body and, with the help of the die 6, causes the stove-body to rotate and the corner 26 to slide gradually into the angle between the die-faces 18 and 19, as the clamping die moves. As the resistance of the stove-body increases beyond a certain limit, the cross-head moves toward the clamping die compressing the

springs as it moves, and finally bringing the die 21 into engagement with the corner 26 opposite the boss 9 and forming the boss 25 on the said corner while the punch 22 makes the hole 24 in the boss 25, and enters the opening 10. During the punching operation the die faces 7, 8, 18, and 19 hold the stove-body rigidly. Upon the movement of the rod 15 in the opposite direction the stove-body is obviously released, so that the operation just described may be repeated.

I claim:

1. In a punching machine, a table, a pair of opposed clamping dies above the table, each die having two vertical clamping faces arranged at an angle to each other and the corresponding faces of the dies being parallel, the dies having alined openings at the meeting angles of their faces, means for causing the dies to clamp between their opposed faces a sheet metal article standing on the table and bent to correspond to the faces of the dies, a punch arranged to reciprocate through the opening in one die and through the said article into the opening in the other die.

2. In a punching machine, a pair of opposed clamping dies, each die having two vertical clamping faces arranged at an angle to each other and the corresponding faces of the dies being parallel, the dies having alined openings at the meeting angles of their faces, means for causing the dies to clamp between their opposed faces a sheet metal article bent to correspond to the faces of the dies, a punch arranged to reciprocate through the opening in one die and through the said article into the opening in the other die, the dies being when fully open separated from each other several times the thickness of the said sheet-metal, whereby the said article may be roughly positioned between the dies without the necessity of accurately bringing the angle of the article into line with the angles of the two die faces.

3. In a punching machine, a pair of opposed clamping dies, each die having two clamping faces arranged at an angle to each other and the corresponding faces of the dies

being parallel, the dies having alined openings at the meeting angles of their faces, one of the openings being surrounded by a boss projecting toward the other opening, and means for causing the dies to clamp between their opposed faces a sheet metal article bent to correspond to the faces of the dies, a punch arranged to reciprocate through the opening in one die and through the said article into the opening in the other die, and a shaping die behind the end of the punch adapted to engage the said article and cooperate with the said boss surrounding one of the said openings and form a boss on the said article.

4. In a punching machine, a table, a pair of opposed clamping dies above the table, each die having two vertical clamping faces arranged at an angle to each other and the corresponding faces of the dies being parallel, the dies having alined openings at the meeting angles of their faces, a cross-head behind one of the dies yieldingly spaced from the same, a punch carried by the cross-head and reciprocable in the opening of the last-named die and adapted to be moved into engagement with the said article when standing on end on the table and pass through the same into the opening in the opposite die, after the space between the dies has been reduced by the movement of the cross-head toward the adjacent die, and the said article has been clamped between the dies.

5. In a punching machine, a table, a pair of opposed clamping dies above the table, each die having two vertical clamping faces arranged at an angle to each other and the corresponding faces of the dies being parallel, the dies being when fully open separated several times the thickness of the said sheet-metal whereby the said article when standing on end on the table may be roughly positioned between the dies and rotated by the dies as they move, one toward the other, so as to bring the angles of the article and the die-faces into alinement.

Signed at Mercer, Pa., this 29 day of Nov., 1919.

G. F. REZNOR.