

Oct. 31, 1944.

L. HERMANI

2,361,687

PUNCH PRESS

Filed Feb. 5, 1943

2 Sheets-Sheet 1

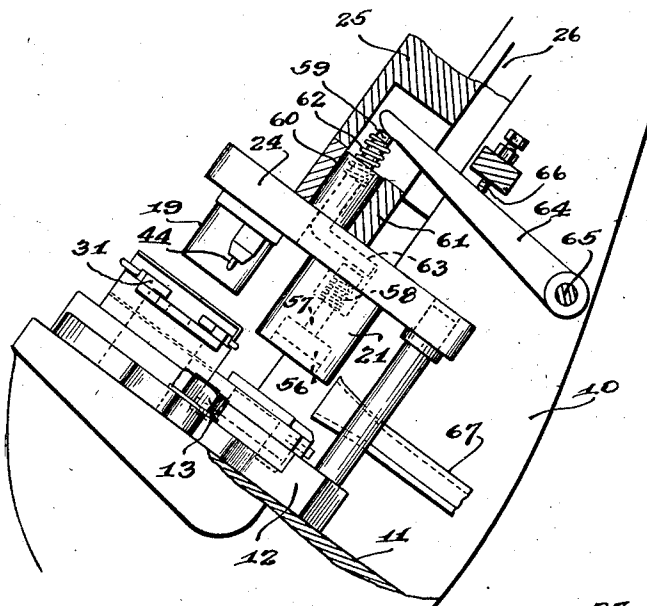


Fig. 1.

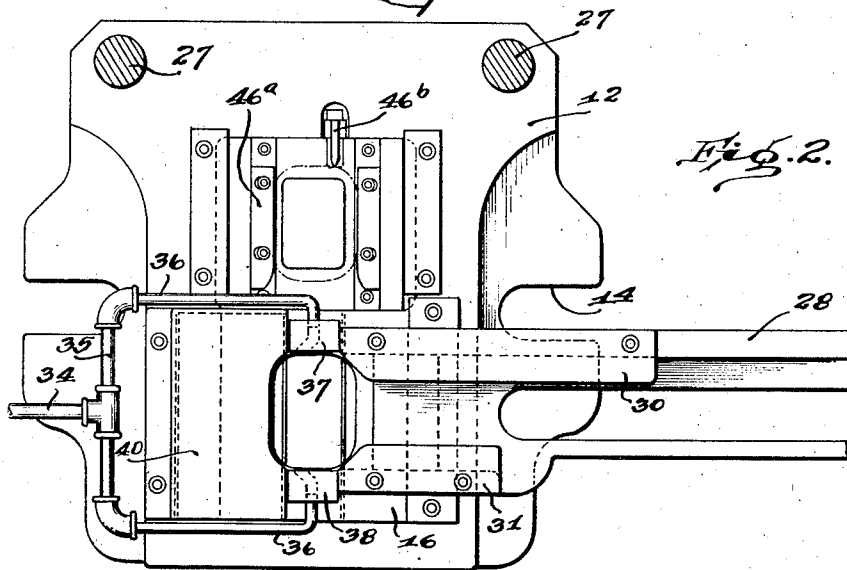


Fig. 2.

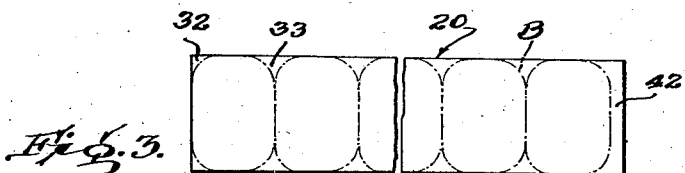


Fig. 3.

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Fig. 4.

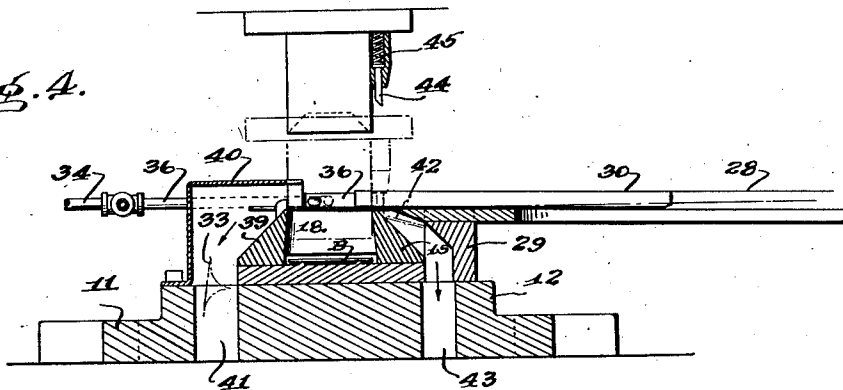


Fig. 5.

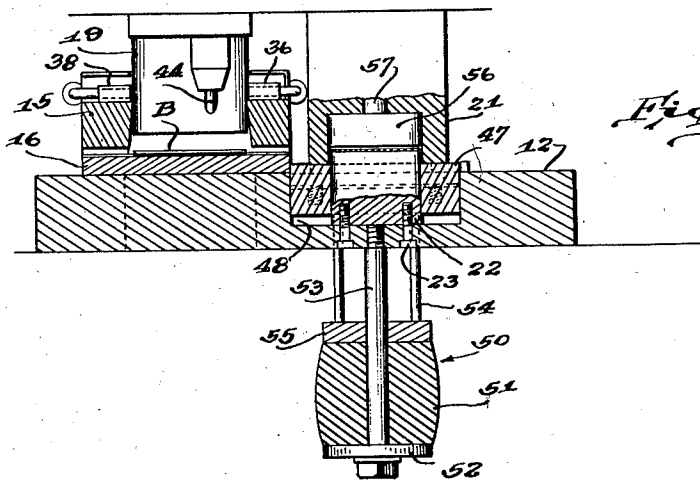
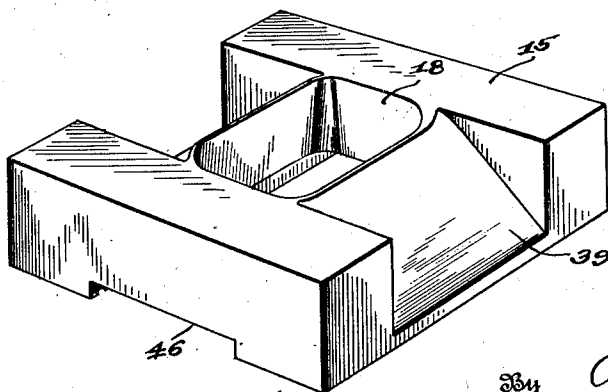


Fig. 6.



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UNITED STATES PATENT OFFICE

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PUNCH PRESS

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Application February 5, 1943, Serial No. 474,774

6 Claims. (Cl. 164—19)

My invention relates to machines for punching blanks from sheet material and shaping the blanks.

The machine in its preferred form as herein illustrated is a two-station machine comprising a press punch and die for cutting blanks from sheet metal stock, and a forming punch and die for shaping the blanks.

An object of the invention is to provide a machine adapted for cutting blanks from a strip of sheet material in a manner to eliminate or reduce to a minimum, the amount of waste material. To this end the machine provides mechanism for cutting blanks which are approximately rectangular in form, with the corners rounded, the blanks being cut in such a manner that there is no waste material except the small pieces of scrap severed from the rounded corners, and in some instances, a narrow margin at the end of the stock strip.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a fragmentary part-sectional elevation of a punch press constructed in accordance with the present invention.

Fig. 2 is a view looking down on the machine in an inclined direction normal to the bed or bolster plate of the machine.

Fig. 3 is a plan view of a strip from which the blanks are cut.

Fig. 4 is a sectional elevation through the blank cutting punch and die.

Fig. 5 is a section at right angles to Fig. 4 showing both punches and dies.

Fig. 6 is a perspective view of a die block.

The machine as herein shown, comprises a main frame 10 of usual construction, having an inclined bed or platform 11 on which is mounted a bolster plate 12, secured to the bed by means of bolts 13 extending through slots 14 in the bolster plate. A die block 15 is mounted on a platen 16 which is supported on the bolster plate 12.

The die block 15 is formed with a die opening 18 which cooperates with a press punch 19 for cutting the blanks B from strips 20 of sheet metal or other material.

A pair of shaping dies is arranged in line with the die 15 and comprises an upper die member 21, and a lower die 22. The latter is secured by bolts 23 to the bolster 12. The upper die members 19 and 21 are mounted on the lower side of a plate 24 which is secured to and forms part of a head or frame 25 which is periodically moved up and down in guideways 26 on the main frame. The

plate 24 is slidable on guide posts 27 rising from the bolster plate 12.

A horizontally disposed arm 28, the inner end of which is supported on a spacing block 29 (Fig. 4) on the plate 12, provides a guideway along which the strips 20 of sheet metal stock are fed to the punch press. Guide strips 30 and 31 are mounted on the arm 28 in position to overlie the margins of the strips 20 as the latter are advanced. The strip 20 is moved forward intermittently step by step in synchronism with the movements of the punch 19, thereby positioning the forward end of the strip at each step movement over the die opening 18 so that as the punch 19 descends, it cuts a blank B. The strip 20 is arrested at the end of each step movement and held in such position that its forward edge coincides with the forward edge of the punch so that there is no waste material cut from the side of the blank. The width of the strip 20 and the guideway through which it passes are also substantially equal to the length of the blanks so that no waste material is cut from the ends of the blanks. The rounding of the corners of the blanks leaves small corner pieces 32 (Fig. 3) which are cut away at the front end of the strip 20 when the first blank is punched. Waste corner pieces 33 in like manner are cut away as each succeeding blank is stamped from the strip, each piece 32 representing corners of two succeeding blanks.

A blowing device is provided for blowing away the waste pieces 32 and 33. It comprises an air pressure pipe 34 connected to a header 35 having branch pipes 36, the forward ends of which connect with channels 37 extending through blocks 38 which serve as nozzles from which the air is blown. The nozzle openings are inclined (as shown) to direct blasts of air against the waste pieces 32 and 33 as the latter are severed and blow them downward along one of the inclined surfaces 39 formed on the die block.

A hood 40 (Fig. 4) is mounted on the plate 12 and extends over the inclined surface 39, being spaced to provide a passageway through which the waste material is carried. The bolster is provided with an opening 41 in line with the hood, through which the material is discharged.

The length of the stock strip 20 may be such that when the last blank is cut therefrom, a narrow end strip 42 is left. This strip is discharged through a passageway 43 (Fig. 4) extending along the inclined surface 39 and through the block 29 and pillow block 12. In order to insure the strip 42 being completely disconnected from the blank

and directed into the channel 43, a pusher device 44 is provided. This is in the form of a finger 44 mounted for movement up and down on the side of the punch 19 and yieldingly held in this lowered position by a coil spring 45 (Fig. 4). When the punch descends for cutting a blank, the finger 44 is arrested by the strip 20 and yields upwardly during the final punching movement. When the last blank is punched from a stock strip, the finger 44 strikes any remnant 42 and pushes it downward, thereby starting it through the channel 43.

When a blank B is severed from the strip 20, it drops down onto the platen 16 (Fig. 5) and then slides lengthwise rearwardly and downwardly into position between the shaping dies 21 and 22. The bottom face of the die block 15 is cut away at 46 to provide a passageway for the blank. The blank moves between guide strips 46^a onto a stripper block 47 and is arrested by a stop 46^b. The stripper block 47 is mounted for up and down movement in a recess 48 formed in the plate 12. The lower die 22 extends through an opening in the stripper block. Said block is yieldingly held in its lifted position with its upper surface flush with that of the platen 16, by means of a buffer device 50. The latter includes a body or block 51 of rubber or like elastic compressible material, supported on a disk 52 carried on a rod 53 fixed to and depending from the bolster plate. A pair of rods 54 attached to and depending from the block 47 are connected at their lower ends to a plate 55 overlying the body 51.

When a blank B has been positioned over the lower die 22, the upper die 21 descends and shapes the blank as shown (Fig. 5). The particular form of die herein shown is adapted to turn the marginal portion of the blank at right angles to the body thereof for forming a section of a shallow box or receptacle. As the die 21 descends, it engages the block 47 and moves the latter downward during the shaping of the blank, to the Fig. 5 position, thereby compressing the block 51. When the die 21 commences its upward movement, the block 51 by its expansive force, lifts the stripper 47 and thereby strips the blank from the lower die member, leaving it in the upper die 21.

An ejecting device for discharging the finished blank from the upper die comprises an ejector block 56 mounted in the die opening. This block has a headed stem 57 (Fig. 1) on which is mounted a coil compression spring 58 tending to hold the head 56 in its upper position relative to the die. A rod 59 is movable up and down in a sleeve 60 within an annular member 61 carried on the plate 24. A coil spring 62, mounted on the rod 59, is held under compression and yieldingly holds said rod in its upper position. The rod has an offset end 63 which extends over the rod 57. Means for moving the rod 59 downward relative to the die 21, comprises a rock arm 64 which is pivoted at 65 to the machine frame. An adjustable stop screw 66 limits its upward movement. When the frame 25 carrying the punch 21, is lifted, the rod 59 is arrested by the arm 64 so that the further upward movement of

said frame operates through the rods 59 and 57 to stop the ejector block 56 so that the blank is ejected from the die. The blank is directed into a chute 67 and discharged from the machine.

5 Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. A punch press machine comprising a punch and die shaped for cutting blanks of substantially rectangular form with rounded corners, from a strip of sheet material, means providing a guideway of such width and so arranged that a strip of said material fed therethrough to the dies may be cut to form a series of blanks with no waste material except the corner pieces severed by the rounded corners of the die.

2. A punch press machine comprising a punch and die shaped for cutting blanks of substantially rectangular form with rounded corners, from a strip of sheet material, means providing a guideway of such width and so arranged that a strip of said material fed therethrough to the dies may be cut to form a series of blanks with no waste material except the corner pieces severed by the rounded corners of the die, means providing a passageway through which said corners are discharged, and a blower arranged to direct blasts of air against said corners as they are severed.

3. A machine for cutting blanks comprising a die block having a die opening therein and downwardly and outwardly inclined faces exterior to said opening with their upper edges approximately coinciding with the edges of the said opening, a cooperating punch, and means for discharging pieces of waste material down said inclined faces.

4. A machine for cutting blanks comprising a die block having a die opening therein and downwardly and outwardly inclined faces exterior to said opening with their upper edges approximately coinciding with the edges of the said opening, a cooperating punch, means providing a passageway having one of said inclined faces forming a wall thereof, and means for directing a blast of air against pieces of waste material cut from said strip and thereby ejecting said pieces through said passageway.

5. A die block formed with a substantially rectangular opening therethrough, said block having a flat upper surface and having portions cut away to provide downwardly and outwardly inclined surfaces exterior to said opening with the upper edges of said inclined surfaces parallel with and approximately coinciding with opposite cutting edges of the said opening.

6. A blank cutting machine comprising a pair of dies including a stationary die and a movable die, means for feeding a strip of material between the dies, means for reciprocating the movable die and thereby cutting blanks in succession from said strip, a spring actuated finger mounted to reciprocate with said movable die and contact said strip during the cutting of a blank, said finger being positioned to engage a remnant of the strip during the cutting of the last blank therefrom, and means providing a passageway through which said remnant is discharged.

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