July 26, 1955 P. H. TAYLOR 2,713,901

APPARATUS FOR CLEARING PUNCHED BLANKS FROM A PUNCHING ASSEMBLY

Filed Sept. 19, 1950

2 Sheets-Sheet 1

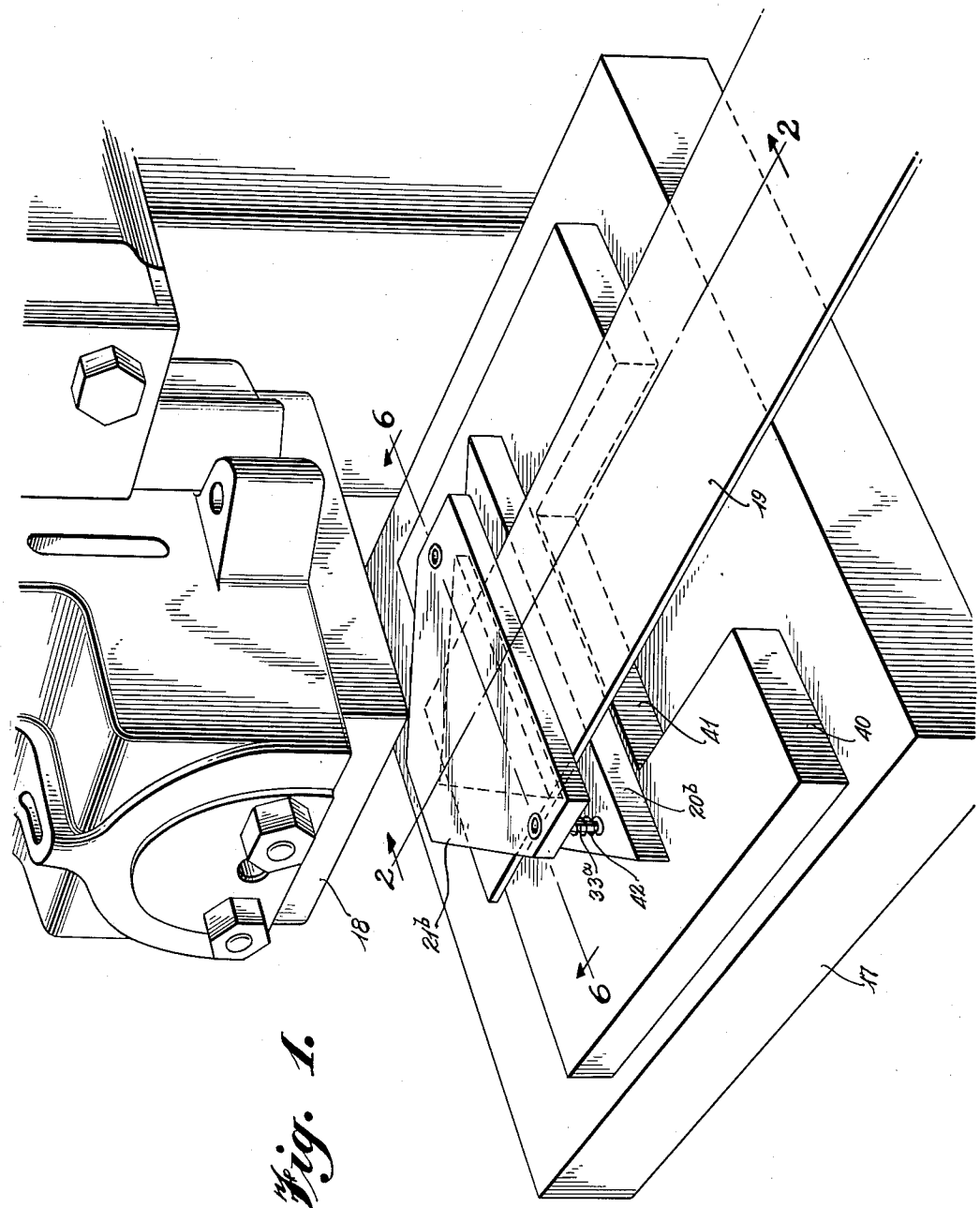


Fig. 1.

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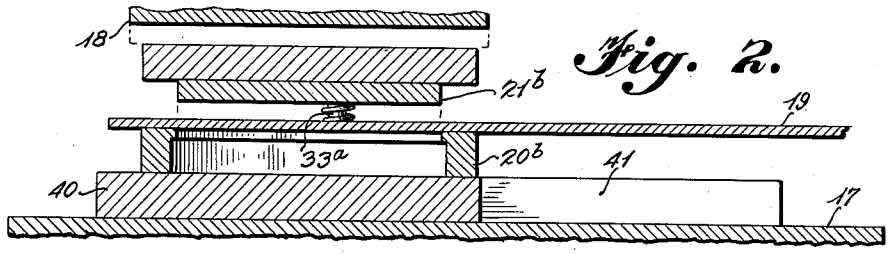


Fig. 2.

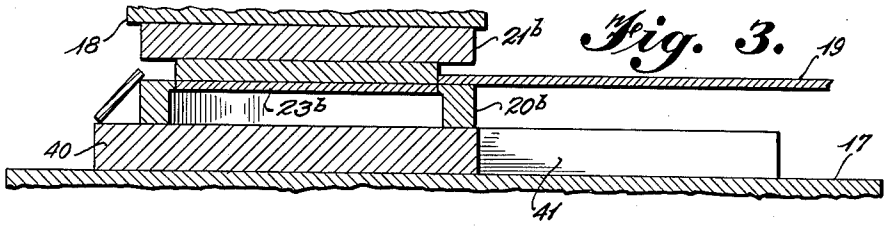


Fig. 3.

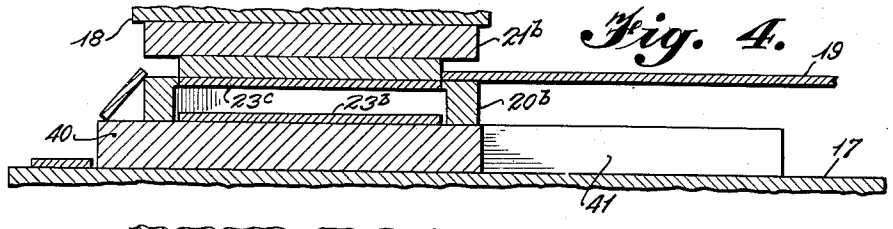


Fig. 4.

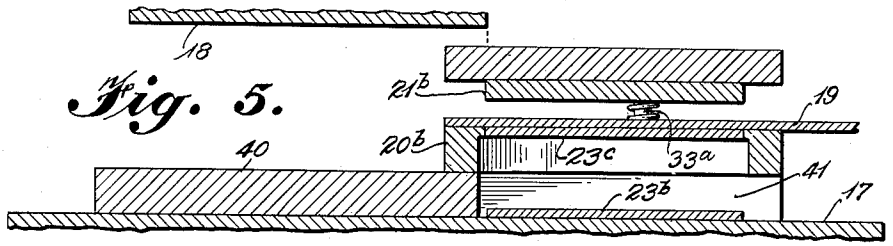


Fig. 5.

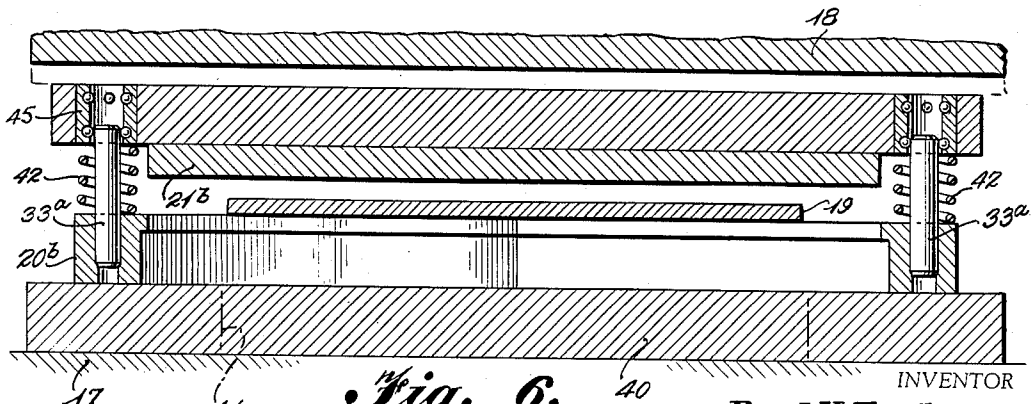


Fig. 6.

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2,713,901

APPARATUS FOR CLEARING PUNCHED BLANKS FROM A PUNCHING ASSEMBLY

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Application September 19, 1950, Serial No. 185,602

5 Claims. (Cl. 164—21)

This invention relates to an apparatus for clearing punched blanks from a punching assembly.

The principal object of the invention is to provide punching apparatus of the character generally described wherein stripping of each punched blank, or work-piece, is effected simultaneously with, and as an incident to, the punching of a succeeding blank and without the aid of special or supplemental stripping means.

A further object is to provide punching apparatus for the purpose indicated which is in the form of a self-contained, or unit, assembly and which may be employed in connection with conventional presses.

A still further object is to provide for facility in handling the punching apparatus and the parts thereof and in removing the punched blanks, or work-pieces, from the apparatus.

A still further object is a novel design and arrangement of the parts of the apparatus, whereby to provide for simplicity and economy in construction and insure ease and accuracy in operation.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a perspective view of punching apparatus embodying the features of the invention, the apparatus being illustrated in connection with stock material from which blanks, or work-pieces, are to be punched the blanking die being shown mounted on a base-plate which is so constructed that the removal of the blank from the apparatus will be facilitated, and the blanking punch and the blanking die being shown in operative relation, respectively, to the bed and ram of a press by which actuation of the parts of the apparatus is to be effected;

Figure 2 is a section, to reduced scale, taken along line 2—2 of Figure 1 and illustrates the relation of the parts of the apparatus and the strip of stock material from which the work-pieces are to be punched prior to the initial blanking operation;

Figure 3 is a similar section showing the relation of the parts after a work-piece has been punched from the stock material, the work-piece being shown lodged between the shearing edges of the blanking die;

Figure 4 is a similar section illustrating the relation of the parts upon completion of the second punching operation in which the initial work-piece is stripped from between the shearing edges of the blanking die and drops upon the base plate supporting the blanking punch and blanking die while the second work-piece is lodged between the shearing edges of the blanking die;

Figure 5 is a similar section showing the blanking punch and blanking die separated and moved laterally to a position in which the original work-piece has dropped through an opening in the base plate and onto the bed of the press so that it may be readily removed and prior to the return of the punch and die elements to the position in which a third work-piece may be punched out of the stock material while the second work-piece is stripped from between the shearing edges of the blanking die; and

Figure 6 is a transverse section taken along line 6—6 of Figure 1.

As best illustrated in Figure 1, the blanking assembly comprises a blanking die 20*b*, and a blanking punch 21*b*, these parts being shown in perspective. It will be noted that all of the parts are generally triangular in shape as the blanks, or work-pieces, one of which is indicated at 23*b* in Figure 4, to be produced are of such shape. Obviously, square, round or otherwise-shaped blanks, or work-pieces, may be produced, it being understood that, although the shearing edges of the blanking die and blanking punch will conform to such shape, the overall, or outside, shape of such blanking elements is not necessarily dictated by the shape of such shearing edges.

The blanking die 20*b* is formed, or provided around its inner walls and at the top thereof with a shearing edge, the latter preferably being of a slightly greater height than the thickness of the stock material 19, and hence of a slightly greater height than the thickness of the blanks, or work-pieces, to be punched from said material. The shearing edge is of a shape which will produce blanks, or work-pieces, of the desired shape and a clearance is provided below the shearing edge.

The blanking punch 21*b* has a marginal edge which corresponds in shape to that of the shearing edge of the blanking die, the side and bottom walls of the blanking punch cooperating with the shearing edge of the blanking die to punch blanks, or work-pieces, from the stock material.

In the embodiment of the invention illustrated the blanking punch 21*b* is located over the blanking die 20*b*, the blanking punch being normally held in spaced-apart relation with respect to the blanking die by springs 42 (Figure 6) around the guide pins 33*a*. Preferably the guide apertures in the blanking punch are provided by ball bushings 45 which are adapted to prevent binding between the blanking punch and the guide pins as a result of any misalignment of the parts or any inequality in the action of the springs 42.

In accordance with the invention, a base plate 40 is arranged upon the bed 17 of the press and provides a support for the punching assembly. As best shown in Figure 1, the base plate 40 is U-shaped, the cross member thereof providing an area upon which the punching assembly is arranged during operation of the ram of the press to actuate the assembly. The legs of the base plate provide supports for the opposite ends of the punching assembly and define an opening 41 over which the punching assembly is adapted to be moved upon completion of the blanking operations.

In Figure 2 a blanking punch and blanking die are shown supported upon the cross member of the base plate and held in spaced-apart relation by the springs 42, the leading end of the strip of stock material 19 being shown located between the blanking punch and blanking die.

In Figure 3 the parts are shown after the completion of the first blanking operation, a work-piece 23*b* being shown punched from the strip of stock material and lodged between the shearing edges of the blanking die.

Figure 4 shows the same relation of the parts of the apparatus after completion of the second punching operation during which a second work-piece 23*c* has been punched out of the stock material and lodged between the shearing edges of the blanking die 20*b* while the original work-piece 23*b* has been stripped from the blanking die and caused to enter the clearance adjacent to and below the shearing edges thereof and come to rest upon the cross piece of the base plate.

Upon completion of the second punching operation, the press parts are separated, as shown in Figure 5, and the blanking assembly moved laterally to a position over the

opening 41 in the base plate. This movement of the blanking assembly slides the work-piece 23*b* which has been stripped from the blanking die to a position over the opening 41. Consequently the work-piece 23*b* enters the opening 41 and comes to rest upon the bed 17 of the press clear of the punching assembly and in a position in which it is readily accessible for removal. During this movement of the blanking assembly, the strip of stock material remains stationary and the apparatus is preferably so designed that when the blanking assembly reaches the position in which the stripped work-piece enters the opening 41, the blanking punch 21*b* will be located over the next section of the strip of stock material from which the next work-piece is to be punched. Hence the blanking punch 21*b* may be depressed at such time to grip the strip of stock material 19 between it and the blanking die 20*b* so that as the punching assembly is returned to its original position over the cross piece of the base plate 40 it will carry the stock material with it, feeding a new section of the stock material into position to be punched.

From the foregoing, it will be apparent that the stock material may be fed in the desired increments as an incident to the movements of the blanking assembly which are availed of to clear the assembly of the work-pieces which are punched from the stock material. The embodiment described, therefore, has the advantage that clearing of the work-pieces from the blanking assembly is facilitated, the apparatus is simplified and the operations involved reduced in number.

The method and apparatus described, therefore, have the advantage that the use of separate stripping apparatus is rendered unnecessary. At the same time, the blanking die serves as a temporary holder for each blank, or workpiece, and consequently facilitates handling of the blanks, or work-pieces, in removing them from the blanking apparatus and press with which the blanking apparatus is employed.

It will be seen, therefore, that a finished blank, or workpiece, is stripped from the blanking die in each operation of the ram as a succeeding blank, or workpiece is being punched out of the stock material, and that after each operation of the ram, beginning with the second operation, the blanking assembly is moved laterally over the stripped workpiece into a position where it is readily accessible for removal, and that upon return of the blanking assembly to working position a new section of stock material will be fed into position to be punched on the subsequent stroke of the ram.

It is to be understood that the blanks, or work-pieces, illustrated are intended merely by way of example as the invention contemplates the punching out of blanks, or work-pieces, of various sizes and shapes from various sizes and shapes of stock material.

I claim as my invention:

1. Apparatus of the character described comprising a blanking punch and a blanking die between which stock material may be introduced and which are operatively related as an assembly adapted to be located between the cooperating stationary and movable parts of a press, said die having a die cavity extending completely therethrough, and a base plate mounted upon one of said parts and having an area upon which said assembly is supported during operation of said press and an opening located at one side of said area, said opening having a width less than the overall width of said die but a width and a length greater than the width and length of the die cavity, said die being mounted directly on said base plate, and said punch being mounted in said assembly above said die, whereby said assembly may be moved over said opening after operation of said press so that a blank punched from said stock material may enter said opening and in so doing be cleared from said assembly which may then be returned to its original position over said area.

2. Apparatus of the character described comprising a blanking punch and a blanking die between which stock material may be introduced and which are operatively related as an assembly adapted to be located between the cooperating stationary and movable parts of a press, said die having a die cavity extending therethrough, resilient means for normally holding said blanking punch and blanking die in spaced-apart relation, and a base plate mounted upon one of said parts and having an area upon which said assembly is supported during operation of said press and an opening located at one side of said area, said opening having a width less than the overall width of said die but a width and a length greater than the width and length of the die cavity, said die being mounted directly on said base plate, and said punch being mounted in said assembly above said die, whereby said assembly may be moved over said opening after operation of said press so that a blank punched from said stock material may enter said opening and in so doing be cleared from said assembly which may then be returned to its original position over said area.

3. Apparatus of the character described comprising a blanking punch and a blanking die between which stock material may be introduced and which are operatively related as an assembly adapted to be located between the cooperating stationary and movable parts of a press, resilient means for normally holding said blanking die and blanking punch in spaced relation, said die having an opening extending therethrough, a shearing edge at one end of said opening, and an inner axially-extending marginal wall bounding said opening for a portion of its height and lying below said shearing edge and in which a blank becomes lodged when the blank is punched from said stock material, said opening being enlarged below said marginal wall to provide a clearance space into which the first blank may enter when another blank is punched, and a base plate adapted to be mounted upon one of said press parts and having an area for supporting said assembly between said press parts, during operation of said press, and an opening located at one side of said area, the last-named opening having a width less than the overall width of said die but a width and a length greater than the width and length of the first-named opening, said die being mounted directly on said base plate, and said punch being mounted in said assembly above said die, whereby said assembly may be moved over said last-named opening, after operation of said press, so that a blank which has entered said clearance space may enter said last-named opening and in so doing be cleared from said assembly.

4. Apparatus of the character described comprising a blanking punch and a blanking die for punching blanks from a strip of stock material located between them, said die having a die cavity extending therethrough, means for aligning the blanking punch and blanking die opperatively together as an assembly, and a base plate having an area upon which said assembly is supported during operation of said press and an opening located at one side of said area, said opening having a width less than the overall width of said die but a width and a length greater than the width and length of the die cavity, said die being mounted directly on said base plate, and said punch being mounted in said assembly above said die, said assembly being movable after operation of said press, and without moving said stock material, to a position over said opening so that blanks punched from said stock material may enter said opening and in so doing be cleared from said assembly, said blanking elements being operable to grip said stock material and feed it lengthwise as the assembly is returned to its original position over said area.

5. Punching apparatus for use with a press having a bed, and a ram, and in which the ram has a limited punching stroke, comprising a U-shaped base plate which is mounted upon said bed and which has a cross portion aligned with said ram and laterally projecting parallel legs, a female blanking die adapted to be mounted on

the cross portion of said base plate for a punching operation and to be slidable onto the leg portions of the base plate to permit discharging a blank into the space between the leg portions of said base plate, and a punch which is adapted to cooperate with said die and to be disposed on top of the stock material which is to blanked, said blanking die having an internal axially-extending marginal wall defining a die cavity, a shearing edge at the upper end of said wall and clearance space joining said die cavity below said wall and opening onto said base plate when the die is positioned on the base plate, and said punch having a shearing edge adapted to confront and cooperate with the shearing edge of said die, the axial length of the marginal wall of said die being so proportioned to the length of the punching stroke of the ram that a blank upon being punched from stock material will lodge in said wall, and the areas of said blanking die and punch being sufficiently great to frictionally grip said stock material upon being pressed thereagainst whereby

said punch and die may be used to grip and feed stock material from a position over the space between the legs of said base plate to a position over the cross portion of said base plate, the distance between the legs of said base plate being less than the width of said die but being greater than the width of said die cavity, and the length of said legs being greater than the length of said die cavity.

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