March 27, 1934. L. A. WILKIE 1,952,152

APPARATUS FOR DIE STAMPING

Filed July 31, 1933 2 Sheets-Sheet 1

Fig. 1

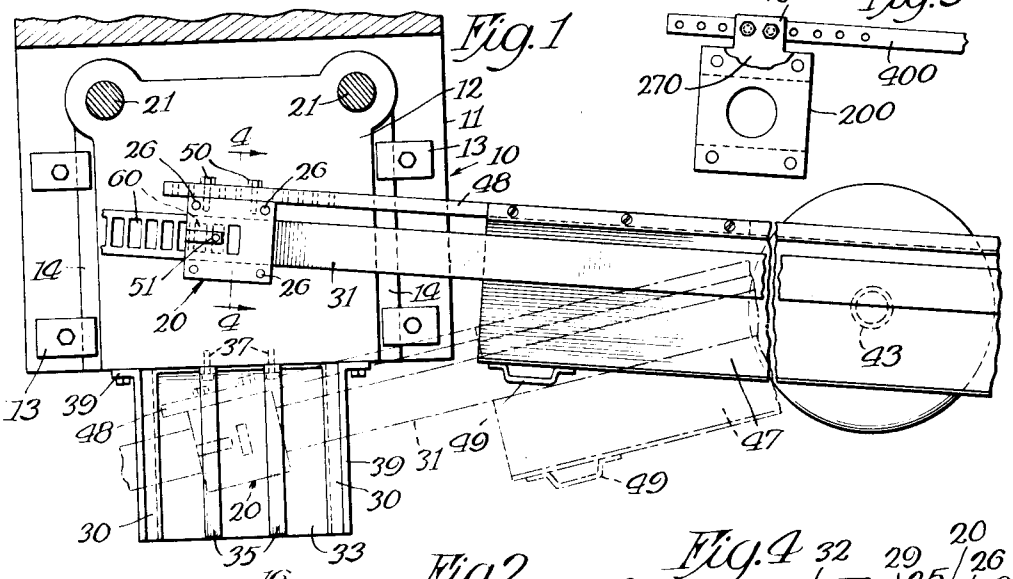


Fig. 5

Fig. 2

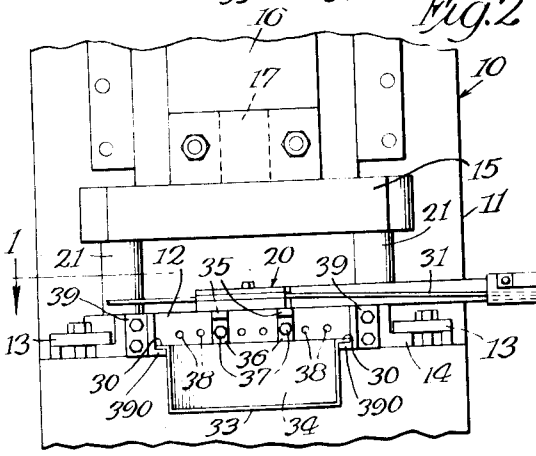


Fig. 4

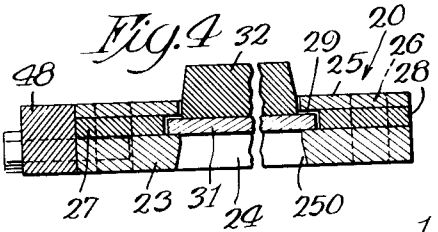
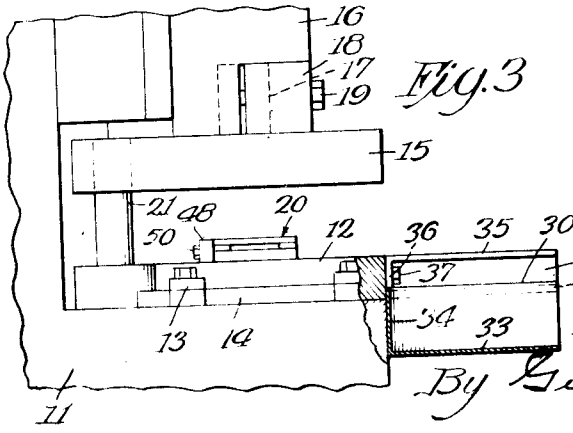


Fig. 3



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APPARATUS FOR DIE STAMPING

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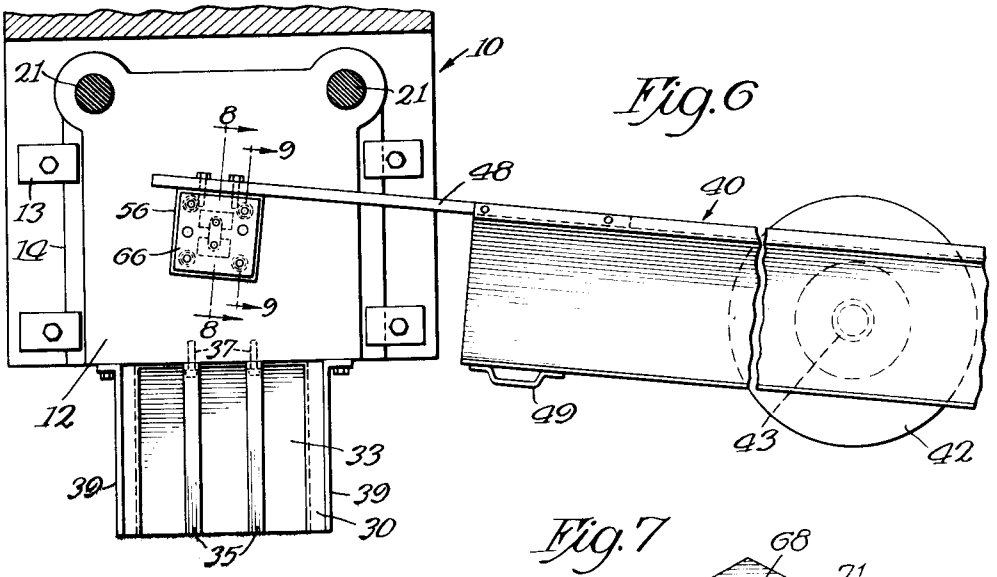


Fig. 6

Fig. 7

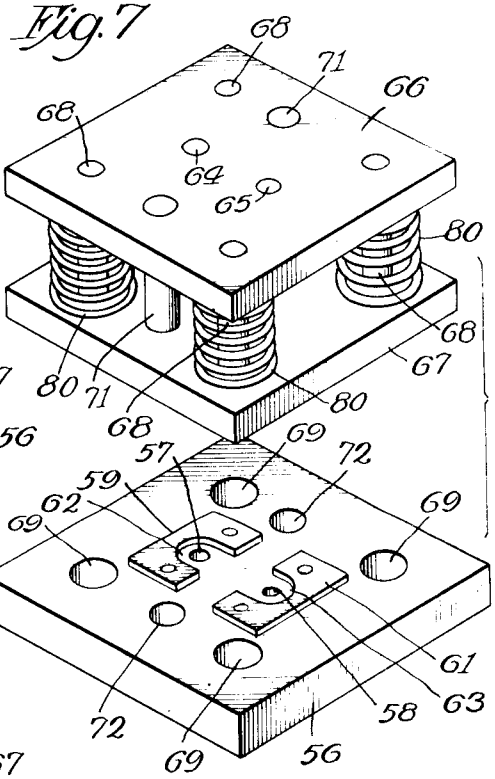


Fig. 8

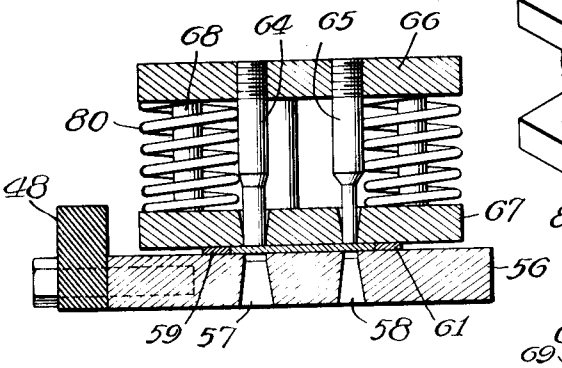
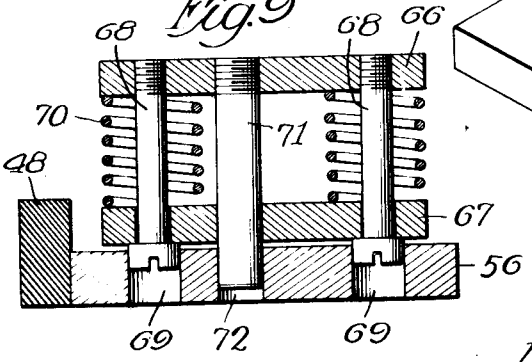


Fig. 9



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UNITED STATES PATENT OFFICE

1,952,152

APPARATUS FOR DIE STAMPING

Leighton A. Wilkie, Minneapolis, Minn.

Application July 31, 1933, Serial No. 682,937

10 Claims. (Cl. 164—94)

An object of the invention is the provision of a new and improved means for and method of cutting, forming and punching blanks from stock material.

A further object of the invention is the provision of a new and improved mechanism for sweeping a die unit from a press without introducing the hands of the operator between the platen of the press.

Another object of the invention is the provision of new and improved mechanism for multiplying the speed of operation of a die unit capable of use in a conventional press.

A still further object of the invention is the provision of a new and improved mechanism for removing die units and blanks from a press that is simple in construction, efficient in operation, inexpensive to manufacture and which is easily operated and which assists materially in increasing the output of the die.

Other and further objects and advantages of the invention will appear from the following description, taken in connection with the accompanying drawings, in which—

Fig. 1 is a horizontal section of a conventional press showing the invention associated therewith, taken on the line 1—1 of Fig. 2;

Fig. 2 is a front elevation of a press and the invention secured thereto, with parts broken away;

Fig. 3 is a side elevation of the press with parts of the invention attached thereto and parts broken away;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a plan view of a portion of the die unit showing a modified form of the means for attaching the same to the removing arm;

Fig. 6 is a view similar to Fig. 1 but showing a modified form of die unit;

Fig. 7 is a perspective view of the die unit with the parts separated;

Fig. 8 is a section on the line 8—8 of Fig. 6 with the parts assembled; and

Fig. 9 is a section on the line 9—9 of Fig. 6.

In my application, Serial No. 634,885, filed September 26, 1932, is disclosed a method and apparatus for stamping and punching sheet metal and the like. In that application no means were disclosed for removing the stamping or punching unit from the press employed in the operation of the unit.

Without some means for removing the work from the press, there is more or less danger of the hands of the operator being accidentally crushed between the press platens. Furthermore, the speed in production is necessarily limited to a very great extent.

The present invention seeks to remedy these objectionable features by the provision of new and improved means for removing the stamping or punching units from the stationary platen in a safe, rapid and efficient manner.

Referring now to the drawings, the reference character 10 designates a conventional press comprising the frame 11 on which is mounted the stationary platen 12 (see Figs. 1 and 2) held in position by the clamps 13 that engage flanges 14 on said platen for clamping the same to said frame. The movable platen is shown at 15 and is rigidly secured to the reciprocating head 16 in any suitable manner. As shown, the platen 15 is provided with one or more upwardly extending projections 17 (see Fig. 3) which are adapted to enter corresponding recesses in the clamp member 18 and be held in position by the bolts or screws 19, as is usual in such constructions. The platen 15 may also be provided with guide members 21 which are adapted to slidably engage corresponding apertures in the stationary platen 12 for guiding the movable platen in its reciprocation. Since the detail construction of the press constitutes no part of the present invention, it is not though necessary to further illustrate or describe the same.

Suitable means are provided for stamping blanks from sheet metal. A die or stamping unit 20 is employed for this purpose. In the form of construction shown, which is by way of example only, this unit which is disclosed in my former application referred to above, comprises a die plate 23 (see Fig. 4) having a die opening 24 therein. The upper marginal edge of said opening constitutes the cutting edge of the die. The lower portion of the opening may be enlarged, as at 250, to accommodate the blanks punched from the stock material. A guide plate 25 is secured to the upper face of the die plate 23 by any suitable means, as by the dowels 26 (see Fig. 4). The guide plate 25 is spaced from the die plate 23 by spacers 27 and 28 at opposite sides of the unit. These spacer blocks are of sufficient width and are separated from each other in order to form a slot or opening 29 through which the stock material 31, which may be in the form of a strip of sheet metal, is adapted to be inserted. The guide plate 25 is provided with an opening in vertical alignment with the opening 24 in the die block for receiving the punch element 32. The length of the punch element 32 is not greater than the thickness of the die unit

so that when the punch 32 is in its lowermost position, it will not project above the upper edge of the plate 25.

In the operation of the unit, the stock material 31 is inserted through the slot or opening 29 and the die element is placed in position above the opening 24 and the unit is then placed in the press and the movable platen 15 lowered, which causes the die element 32 to punch the blank from the material 31.

It is desirable that after the punching operation, the punch element be replaced instead of being retracted through the die opening. The retraction of a punch element through the opening tends to dull or injure the cutting edge of the die, and, for this reason, means are provided for removing the blank and the punch element from the die unit. This is accomplished in the present invention by mechanism that will now be described. A receptacle 33 having an end 34 is connected to the stationary platen 12 in any suitable manner. In the form of construction shown, the receptacle 33 is provided with laterally extending flanges 30 along its side edges which are adapted to slidably engage corresponding flanges 390 on guide strips 39 secured to the stationary platen 12. By means of this arrangement, the receptacle 33 may be removed from the press by pulling outwardly on the same. The front end of the receptacle 33 is open, whereby ready access may be had to the same by the operator, as will presently appear.

A plurality of supporting fingers 35, two being shown on the drawings, are attached to the stationary platen 12 and extend horizontally forward from the press over the receptacle 33. The rear end of these fingers are provided with flanges 36 which are adapted to be clamped to the stationary platen 12 by set screws 37 in such a position that their upper surface is in alignment with the upper surface of said platen. The platen 12 is provided with a plurality of threaded openings 38 whereby the fingers 35 may be adjustably connected to said platen. After the blank has been punched from the material 31 and the movable platen 15 of the press elevated, the die unit is moved forwardly onto the fingers 35 which permit the punch element 32 and the blank to drop into the receptacle 33. The stock material 31 is advanced and the die element removed from the receptacle 33 and replaced in the guide 25 in position to punch the next blank. The unit is then moved back onto the stationary platen.

In order to eliminate the necessity for the operator placing his hand beneath the movable platen 15, suitable means are provided for moving the unit onto the fingers 35 and replacing the same on the platen 12. In the form of construction shown, which is by way of example only, a work table 40 is employed for this purpose. This table comprises a support or pedestal 41 having a base 42 and standard 43 slidably mounted thereon and extending upwardly thereon, on which is pivotally mounted a head 44. The head 44 is preferably provided with a depending socket 45 in which a reduced portion 46 of the standard or pedestal 41 is rotatably mounted. This table is adjusted for height and held in adjustable position by screws 53 or other suitable means.

Attached to the upper side of the head 44 is the material supporting table or member 47 which is preferably U-shape in cross section. Attached to the supporting member 47 is an arm 48 which extends forwardly therefrom, and may, if desired, be provided with means for detachably connecting the die unit 20 thereto. In the form of construction shown, the arm 48 is connected to the die unit 20 by means of suitable bolts 50, or the like, which extend through openings in said arm and engage tapped openings in said unit. A suitable handle 49 is provided on the side of the supporting member 47 for operating said member.

In the operation of the device, the strip or stock material 31 is placed on the work table 40 and its inner end passed through the slot 29 in the die unit 20. The material is held in position by a spring pressed finger 51 that engages in the adjacent blank opening 60, the fingers being beveled to cause automatic release when the strip is advanced. The press is now operated for lowering the die element 32 for forming the blank, after which the operator, by grasping the handle 49 with the one hand, moves the arm 48 to dotted line position shown in Fig. 1, with the unit over the fingers 35, and with his other hand either catches the blank and punch element as they fall from the die unit, or removes them from the receptacle 33 where they are permitted to fall. He next advances the stock material 31 and places the punch element in the guide plate 25 in position to repeat the cycle. By means of the handle 49 he then moves the arm 48 back to the full line position shown in Fig. 1.

In Fig. 5 is shown a modified form of means for attaching the arm 400 of the work table to the unit 200. In this form of construction, one of the die spacer strips 270 of the die unit 200 is made with an extending tongue 70. The tongue 70 is fastened to the arm or die sweep 48 by means of screws, thus affording a rigid connection between the arm 48 and the unit 20.

In Figs. 7, 8 and 9 is shown a different form of die unit from that disclosed in Fig. 4. This construction is a piercing device and comprises a die block 56 having suitable die openings, such, for instance, as die openings 57 and 58 therethrough. This unit is adapted to punch a hole in each end of a blank which is adapted to be held by two plates 59 and 61. These plates are rigidly secured to the die block 56 and are provided with opposed recesses 62 and 63 for engaging the ends of the blank for holding the same in proper position to be pierced. The punches 64 and 65 which cooperate with the die openings are rigidly secured to the punch plate 66 and extend through a guide plate 67 (see Fig. 8). Suitable means are provided for normally holding the punches in their retracted position. In the form of construction shown, spiral springs 80 are employed.

These springs are held in position between the plates 66 and 67 by suitable bolts 68 rigidly connected to the plate 66 and which extend through the guide plate 67 and slidably engaging in the openings 69 in the die block 56. Suitable guides are provided for guiding the movement of the plate 66 during the operation of the device. As shown, plate 66 is provided with depending guide studs 71 which are rigidly secured to the plate 66 and are adapted to extend through the plate 67 and engage suitable openings 72 in the die block 56. In this construction, the arm 48 may, if desired, be attached to the die block 56 of the die unit.

In the operation of the device, after the punching operation, arm 48 is moved to the dotted line position shown in Fig. 1 which will permit the material punched from the blank to fall from the

die openings, after which the upper portion of the die unit is removed, which will permit the removal of the pierced blank from the holding members 59 and 61. A new blank is placed in position, the upper portion of the die unit replaced and the arm 48 moved to the position shown in Fig. 6 to repeat the cycle of operation.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In combination, a press having a movable and a stationary platen, a receptacle secured to one side of said stationary platen, the outer end of said receptacle being open, a plurality of supporting fingers extending outwardly over said receptacle, a support, a head movably connected to said support and means on said head for sweeping across said stationary platen and said supporting fingers.

2. In combination, a press having a stationary and a movable platen, a stamping unit comprising a die, a guide plate spaced from and rigidly connected to said die plate, a punch movable through die and guide openings in said plates for punching blanks and stock material, a support, means rigidly connected to said unit and movably connected to said support for moving said unit into position between said platens for operating said punch and into a position from between said platens for moving said punch and blanks from said unit.

3. A device for removing a stamping unit and stamped blanks from the stationary platen of a press, comprising a support, means for vertically adjusting said support, a head pivotally connected to said support to swing in a horizontal plane, a guideway extending longitudinally of said head for supporting and guiding the free end of a sheet metal strip while blanks are being stamped from the same; a handle for operating said head, an arm carried by said head and extending forwardly therefrom and means on the free end of said arm for connecting the stamping unit thereto.

4. In combination, a press having stationary and movable platens, a die unit on said stationary member, said die unit comprising a die member, a guide plate, a punch member and means for holding stock material in said unit, an open ended receptacle adjacent to one side of said stationary platen, supporting fingers extending from said stationary platen over said receptacle and means movable relative to said stationary platen for moving said unit onto said fingers whereby the blank and die punch of said unit will fall by gravity into said receptacle.

5. In combination, a press having a stationary and a movable platen and a work table comprising a support adjacent to said press, a work supporting member, means for pivotally mounting said member on said support, to swing in a horizontal plane above said support, an arm carried by said member and adapted to be moved across said stationary platen in proximity thereto and means on said arm movable in a horizontal plane for attaching a die unit thereto.

6. In a work table, a pedestal, a work supporting member mounted on said pedestal to swing about a substantially vertical axis, said member comprising a channel element for supporting stock material to be operated upon, an arm extending beyond the inner end of said member, means on the free end of said arm for attaching a die unit thereto and means for swinging said member.

7. In a work table for use in die stamping, a support, means mounted on said support for moving about a vertical axis in a plane above said support, said means having a slideway for receiving and slidably supporting stock material, an arm extending forwardly from said means, means carried by the outer end of said arm for detachably attaching a stamping unit thereto.

8. In combination, a press having a stationary and a movable platen, a receptacle secured to and extending forwardly from said stationary platen, a plurality of finger members extending outwardly from said stationary platen over said receptacle, a piercing unit supported on said stationary platen, said unit comprising a die plate, a punch plate, punch elements secured to said punch plate for cooperating with said die plate for piercing blanks and resilient means for elevating said elements after the punching operation and means for sliding said unit onto said finger members after the punching operation.

9. A work table for use with a press and die unit comprising a support, a U-shaped material supporting member pivoted to said support to swing in a substantially horizontal plane, an arm extending outwardly from said support in alignment therewith, means on the outer end of said arm for attaching a die unit thereto and a handle attached to said supporting member for swinging said arm.

10. In combination, a press having a stationary and a movable platen, a stamping unit comprising a die plate having a die opening therethrough and a guide plate having an opening in alignment with the die opening, spacer members between said plates, said members spaced apart to form a guideway, a strip of stock material slidably held in said guideway, a punch element loosely extending through the opening in said guide plate and supported on said material, a supporting pedestal adjacent to said stationary platen, a stock supporting element rotatably mounted on, and movable in a plane above, said pedestal, said element supporting the free end of said strip of stock material, an arm extending forwardly from said supporting element and means for rigidly connecting said arm to said unit.

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