No. 649,071. Patented May 8, 1900.

A. W. PAULL & A. L. EDWARDS.

A. W. PAULL, Jr., Administrator of A. W. PAULL, Dec'd.

PRESS.

(Application filed July 19, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

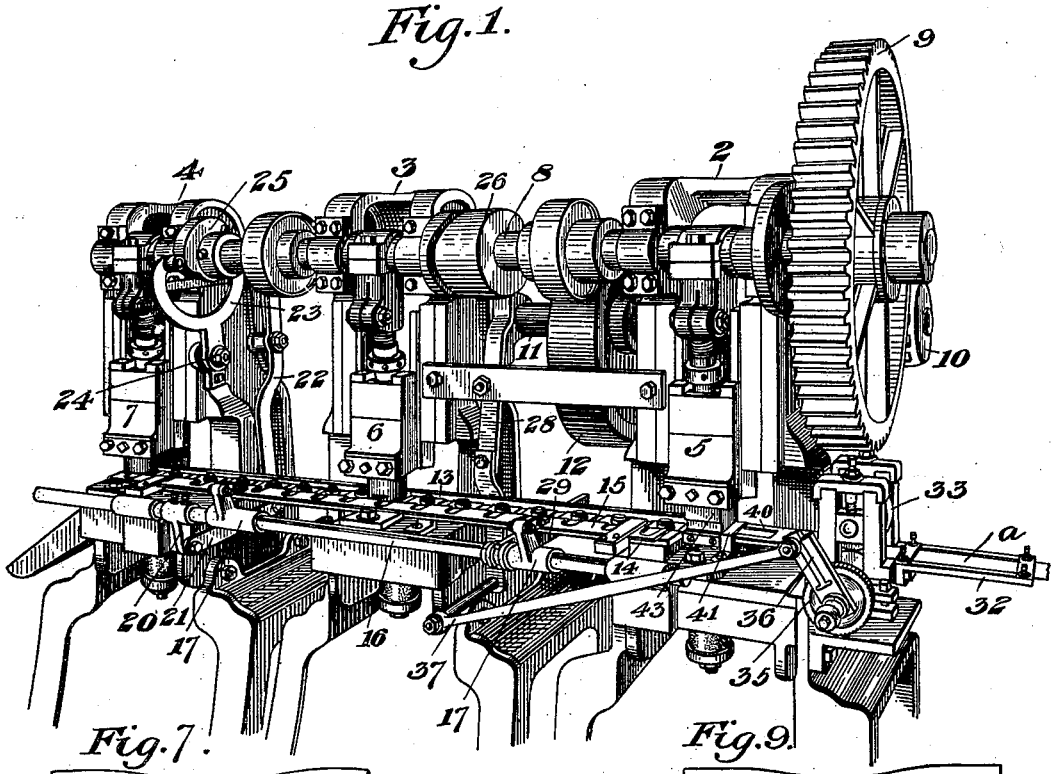

Fig. 7.

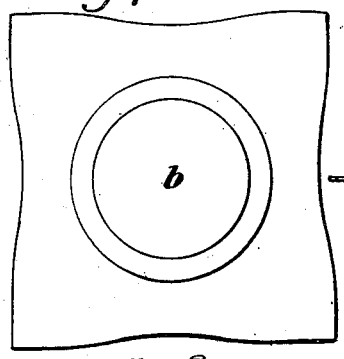

Fig. 11.

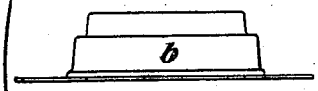

Fig. 9.

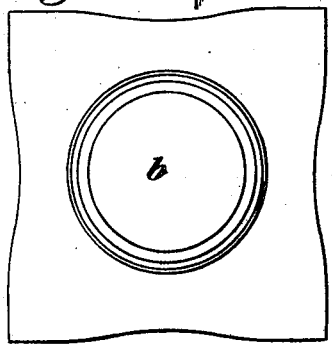

Fig. 12.

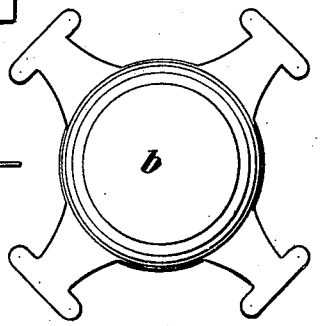

Fig. 8.

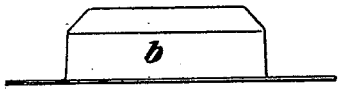

Fig. 10.

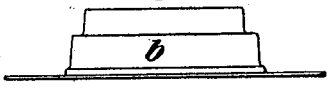

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Fig. 2.

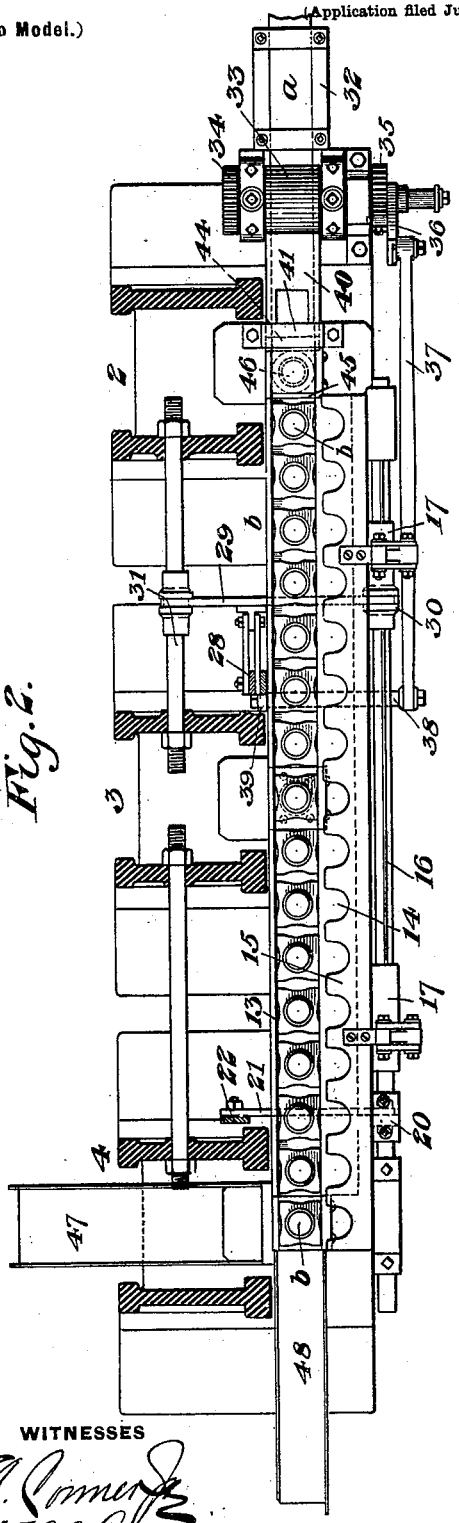
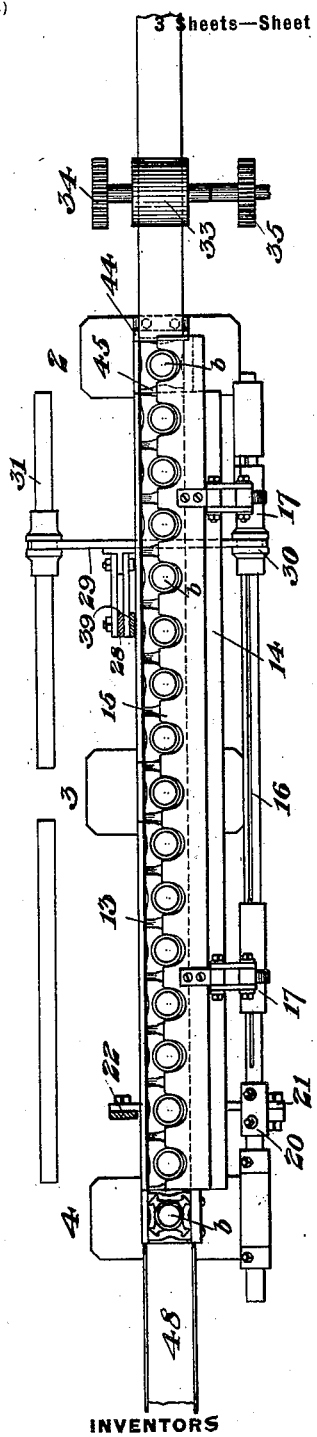


Fig. 3.



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A. W. PAULL, Jr., Administrator of A. W. PAULL, Dec'd.

PRESS.

(Application filed July 19, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

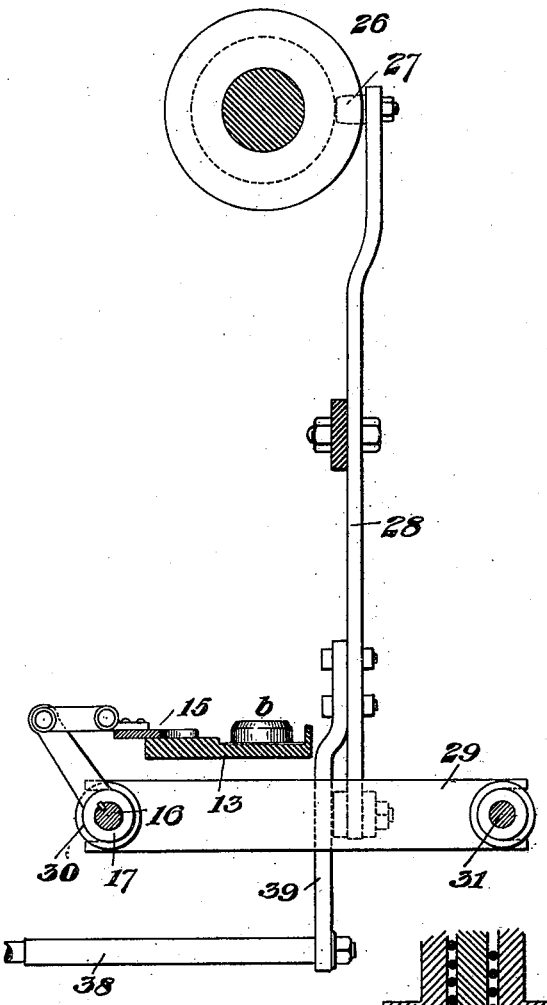


Fig. 5.

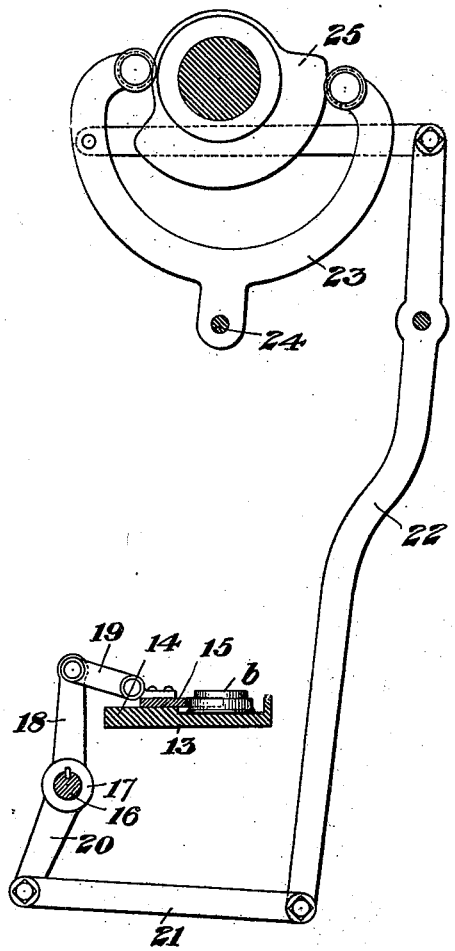
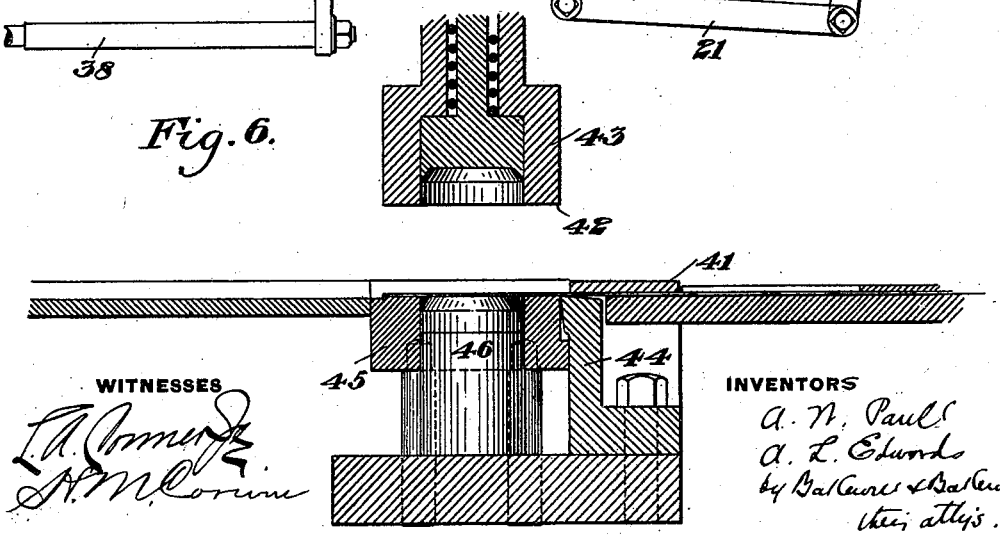


Fig. 6.



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UNITED STATES PATENT OFFICE.

ARCHIBALD W. PAULL, JR., ADMINISTRATOR OF ARCHIBALD W. PAULL, DECEASED, AND ALONZO L. EDWARDS, OF WHEELING, WEST VIRGINIA.

PRESS.

SPECIFICATION forming part of Letters Patent No. 649,071, dated May 8, 1900.

Application filed July 19, 1899. Serial No. 724,361. (No model.)

To all whom it may concern:

Be it known that we, ARCHIBALD W. PAULL and ALONZO L. EDWARDS, of Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Improvement in Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of the improved press. Figs. 2 and 3 are sectional top plan views, partly broken away, showing two different positions of the parts. Figs. 4 and 5 are cross-sections showing the cams and connections for operating the feed. Fig. 6 is an enlarged vertical section showing the first set of dies which shear off and partly draw the blanks. Figs. 7 and 8 are a plan and a side elevation, respectively, of the shell after the drawing operation. Figs. 9 and 10 are similar views of the shell after the second drawing operation in which the shell is formed to its final shape; and Figs. 11 and 12 are a side elevation and a plan view, respectively, of the article after trimming and cutting and as it comes from the press.

The invention relates to the drawing and shaping of sheet metal, wherein the blank is submitted to two or more operations in shaping it to its final form. Heretofore the ordinary practice has been to perform these different steps on different machines. This method is expensive on account of frequent handling of the blanks and shells and the necessity of attendants of each separate machine. It has also been proposed to feed a strip of metal along a trough or guideway and cut a round or other suitably-shaped blank from the intermediate portion of the strip, the strip being fed step by step through the trough. The difficulty in this system lies in the scrap portion of the strip which interferes greatly with the operations upon the blank. The invention overcomes these difficulties and enables a machine or system of connected presses to be used, into which the strip may be fed automatically, and which will automatically perform the several operations upon the blank and do away with the trouble from the scrap portions of the strip.

To that end it consists in feeding a strip, cutting off the entire end portion of the strip, and performing steps upon this blank.

It also consists in automatically feeding a strip with an intermittent movement, cutting off the entire end portion to form the blank, acting upon this blank by the first drawing-die, so as to form a shell, and automatically feeding the shells step by step to the succeeding dies.

It consists, further, in the construction and arrangement of the parts hereinafter more fully described, and set forth in the claims.

In the drawings, 2, 3, and 4 represent presses located end to end or in tandem and having their plungers 5, 6, and 7 connected to a common shaft 8, by which they are simultaneously reciprocated vertically. At the end of the shaft 8 is provided a toothed wheel 9, intermeshing with a pinion 10 upon a counter-shaft 11, driven by a belt-pulley 12 or any other suitable driving connections.

The bed-plates of the several presses are connected by a trough 13, the front portion of which is provided with a shelf 14, upon which rests the notched feeder-plate 15. The notches in this plate are arranged to engage the boss portions of the shells and feed them along through the trough by an in-and-out and endwise motion.

The in-and-out motion of the feed-bar is imparted from a rock-shaft 16, to which are splined the collars 17, having arms 18, which are connected to the feed-bar by links 19. To this rock-shaft is adjustably secured a downwardly-projecting lever-arm 20, having a pivotal link connection 21 with a lever 22, the upper portion of which is linked to a double-armed lever 23, pivoted at 24 to the frame of the machine and actuated by a cam 25, mounted on a shaft 8. The endwise movement of the feed-bar is imparted from a cam 26 on the same shaft and which engages a roller 27, mounted on lever 28, the lower end of which is connected by a link with a sliding cross head or bar 29, which is forked at both ends. Its forward forked end engages a groove in the collar 30, surrounding the rock-shaft 16, while its rear end engages a corresponding collar loosely mounted on a short fixed shaft 31. The collar 30 is secured to

one of the collars 17 and slides this collar along the rock-shaft, thus moving the feed-bar endwise.

The cams 25 and 26 are so arranged relatively to the plungers that as the plungers rise and release the shells the feed-bar is first moved endwise toward the feeding-in end of the machine, is then moved in to engage the series of shells, is then moved endwise to feed the shells one step forward, and is then moved out into the position shown in Fig. 2. The cam 26 is so arranged that it will feed the shells forward exactly the distance between their centers, thus bringing a fresh shell into registry beneath each of the plungers at each movement of the feed.

The strip of metal *a* from which the blanks are cut passes through a guide 32 to a pair of feed-rollers 33, whose shafts are connected by pinions 34 at one end. The other end of the shaft of the lower feed-roller is provided with a ratchet-wheel 35, the teeth of which are engaged by a pawl mounted on a lever 36, loosely pivoted about the shaft and connected by a link 37 to a rod 38, secured to a bar 39, fixed to the lower portion of the lever 28. The link 37 is adjustably connected to the lever 36 by adjustable slide, and the parts are so proportioned that at each stroke the feed-rollers will feed the strip forward exactly the width of one blank, the inner end of the strip passing through a guideway 40 into position beneath the plunger 5, as shown in Fig. 2. A strap 41 is provided adjacent to the dies of the first press to hold down the severed end of the strip, and the blank is severed by a shearing edge 42 upon the die 43 of the plunger 5, which coacts with a transverse cutter 44 in the bottom of the trough and over which the strip is fed. The die 43 coacts with a lower die 45, which is mounted on a rubber buffer 46, the blank being clamped between these two hollow dies as the plunger 5 moves down. The boss portion *b* of the shell of Figs. 7 and 8 is formed by the inner die 46 within the clamping-die 45, which enters the cavity of the upper die 43 as this die moves downwardly after cutting off the blank.

The dies which coöperate with those of the plungers are all located between the ends of the separated trough-sections. The die carried by the plunger 6 and the lower die cooperating therewith shape the shell of Figs. 7 and 8 into that shown in Figs. 9 and 10, and the dies of the plunger 7 cut and trim the shell of Figs. 9 and 10 into that shown in Figs. 11 and 12—the finished form.

The operation is apparent. At each stroke of the machine the three plungers act simultaneously upon a blank or shell. As the plungers rise the entire series of shells are fed forward the distance between the centers of adjacent shells and at the same time the entering strip is fed forward the width of one blank. The operation is entirely automatic, the finished article dropping into a trough 47, extending rearwardly at the end of the machine. The scrap from the trimming-die is discharged into the trough 48 at the end of the machine in line with the feed.

The advantages of the invention result from the great decrease in the cost of production and the increase in output. There is no scrap separate from the severed blanks which would interfere with the operations of the parts, the entire end portion of the entering strip being cut off to form each blank. The mechanism is simple and the motions positive in character. The movements of the different parts are adjustable, so that the movements of the different feed mechanisms can be accurately adjusted.

We have shown the machine as arranged to perform three operations; but it is evident that it may be provided with two, four, or as many coacting sets of dies as may be desired, these being placed in tandem and the feed mechanisms arranged to coöperate therewith. The shape and size of the dies may be changed according to the article desired, and many other changes in the form and arrangement of the parts will suggest themselves to the skilled mechanic without departing from the invention.

We claim—

1. In a press, the combination with cutting mechanism arranged to sever the entire end portion of the strip, of a drawing-die arranged to act upon the cut-off portion while in the position where it is severed, another drawing-die, and a feeder arranged to feed the cut and shaped shell from the first die to the second; substantially as described.

2. In a press, the combination with feed mechanism arranged to feed a strip of metal, of cutting mechanism arranged to sever the entire end portion of the blank, drawing-dies arranged to draw the severed portion simultaneously with the action of the cutting mechanism, another shaping-die, and mechanism for feeding the drawn blank from the first die to the second, substantially as described.

3. A press, having sets of dies arranged in tandem, cutting mechanism arranged to cut off the entire end portion of an entering strip to form a blank, and feed mechanism arranged to feed the shells formed from said blank forwardly, step by step, to the dies; substantially as described.

4. A press, having different sets of dies arranged in tandem, one set having cutting mechanism arranged to cut off the entire end of an entering strip, said dies being arranged to form a shell from the cut-off blank, and feed mechanism arranged to engage said shells and feed them forward step by step through the machine; substantially as described.

5. A press, having several sets of dies arranged in tandem, automatic feed mechanism arranged to feed a strip of metal forward, step by step, cutting mechanism ar-

ranged to sever the entire end portion of the strip to form a blank, and feed mechanism arranged to feed the shell formed from said blank forwardly step by step; substantially as described.

6. A press having a feed-trough, a notched feed-bar arranged to engage the blank therein, a rock-shaft having splined connections with a collar arranged to move the feed-bar in and out, and mechanism for sliding the collar endwise on said shaft; substantially as described.

7. A press, having a series of plungers connected to a common driven shaft, mechanism for feeding in a strip with a step-by-step movement, a feed-bar for the shells formed from said strip, having an in-and-out and endwise movement, and connections between all said feed mechanisms, and the plunger-driving shaft; substantially as described.

8. In a press, the combination with drawing-dies, of cutting mechanism arranged to coact therewith to cut off the entire end portion of an entering strip to form a blank, said drawing-dies forming the blank into a shell, and mechanism to feed the shells forward; substantially as described.

In testimony whereof we have hereunto set our hands.

ARCHIBALD W. PAULL, JR.,
Administrator of the estate of A. W. Paull, deceased.

ALONZO L. EDWARDS.

Witnesses:
WILFRID MCGINTY,
IRWIN PAULL.