Oct. 10, 1939. G. H. ESCH 2,175,169

BLANK FEEDING DEVICE

Filed Feb. 24, 1937 4 Sheets-Sheet 1

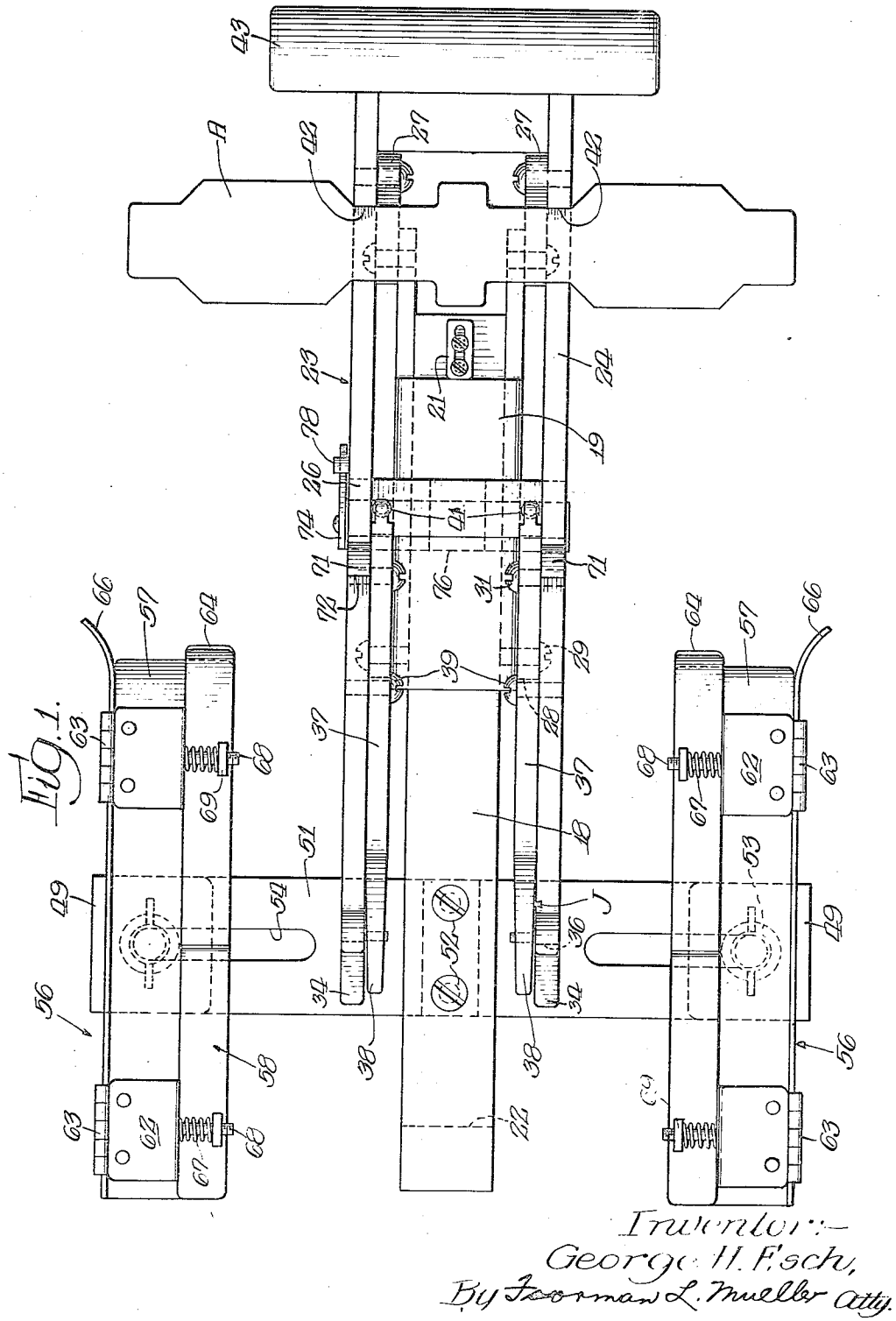


Fig. 1.

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BLANK FEEDING DEVICE

Filed Feb. 24, 1937 4 Sheets-Sheet 2

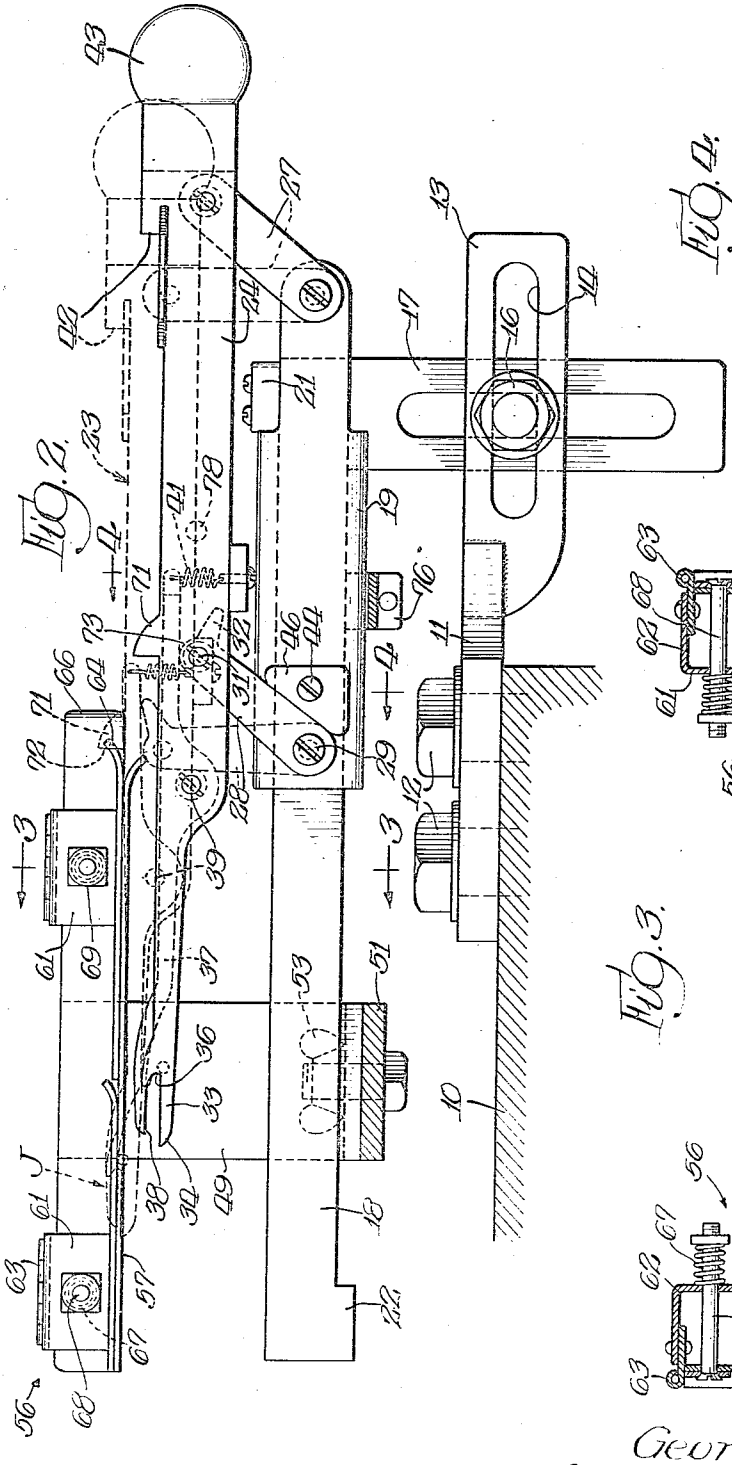


Fig. 2.

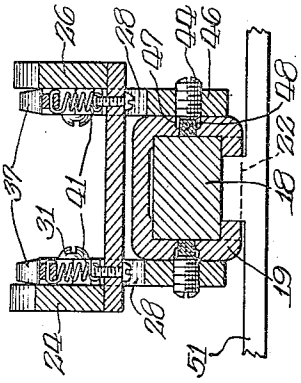


Fig. 4.

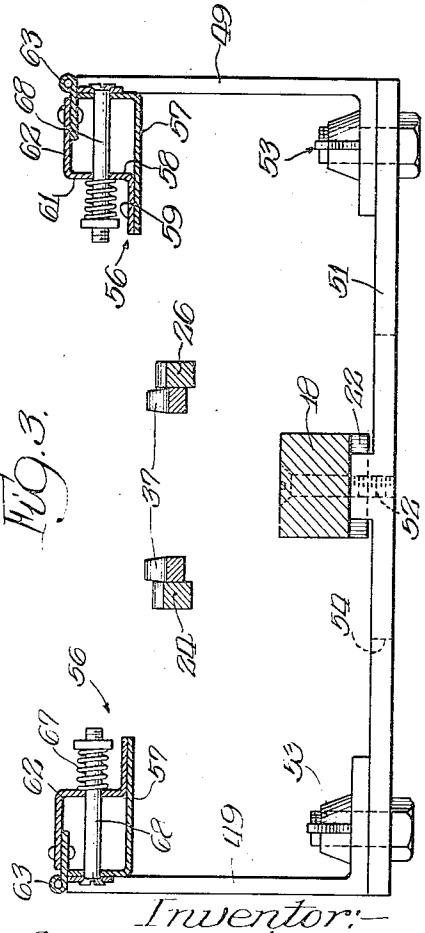


Fig. 3.

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BLANK FEEDING DEVICE

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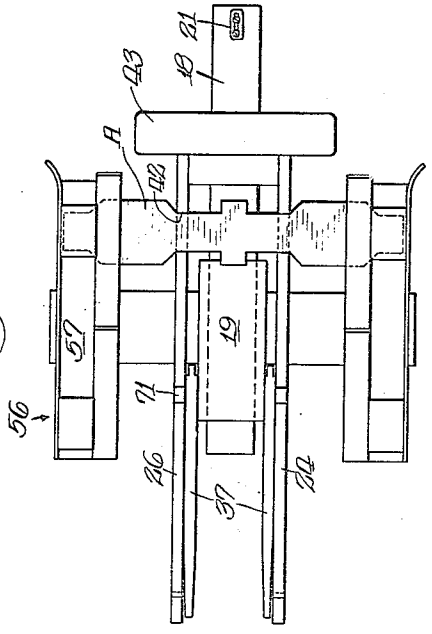


Fig. 6.

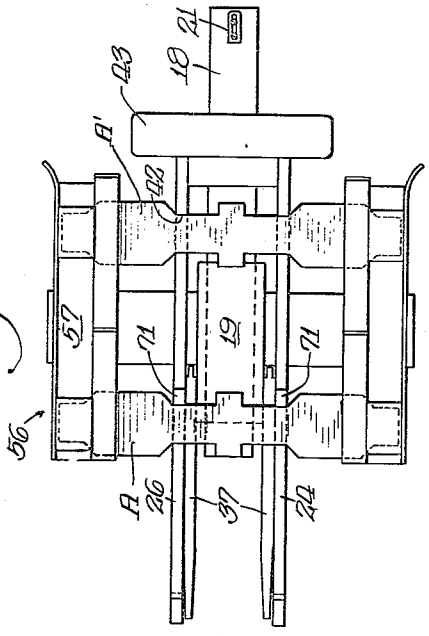


Fig. 7.

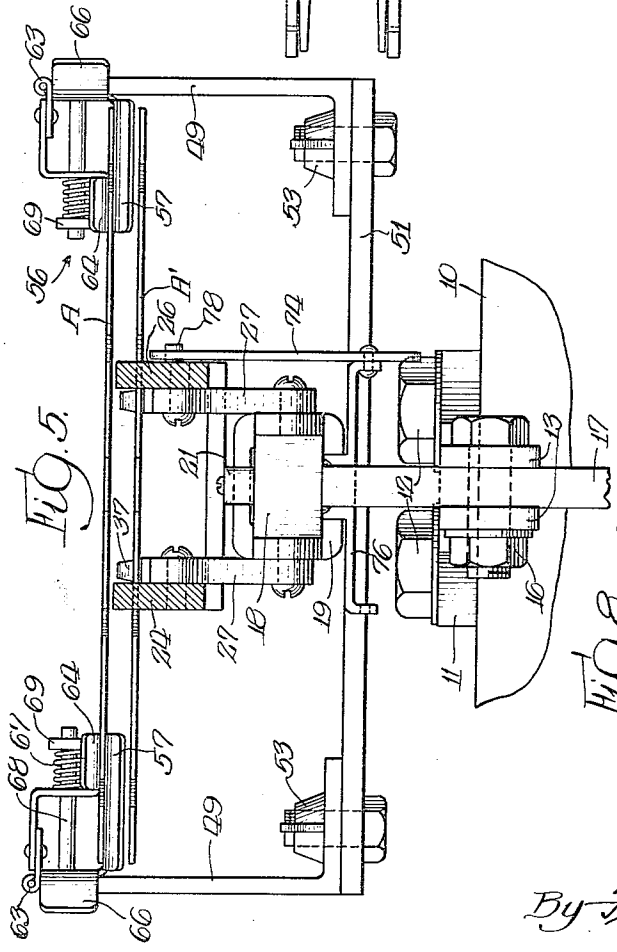


Fig. 5.

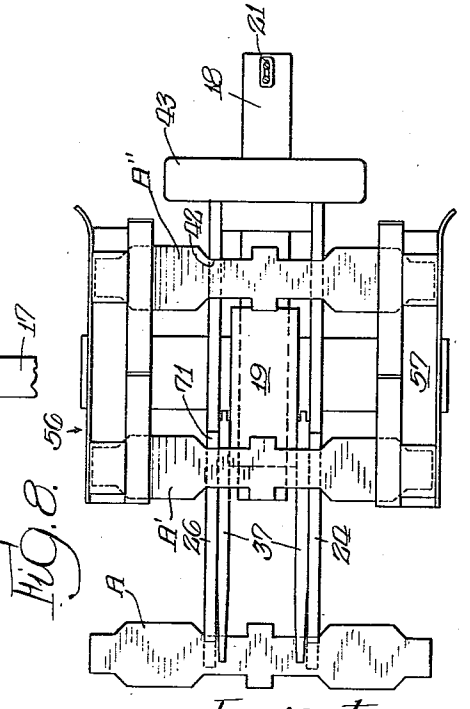


Fig. 8.

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BLANK FEEDING DEVICE

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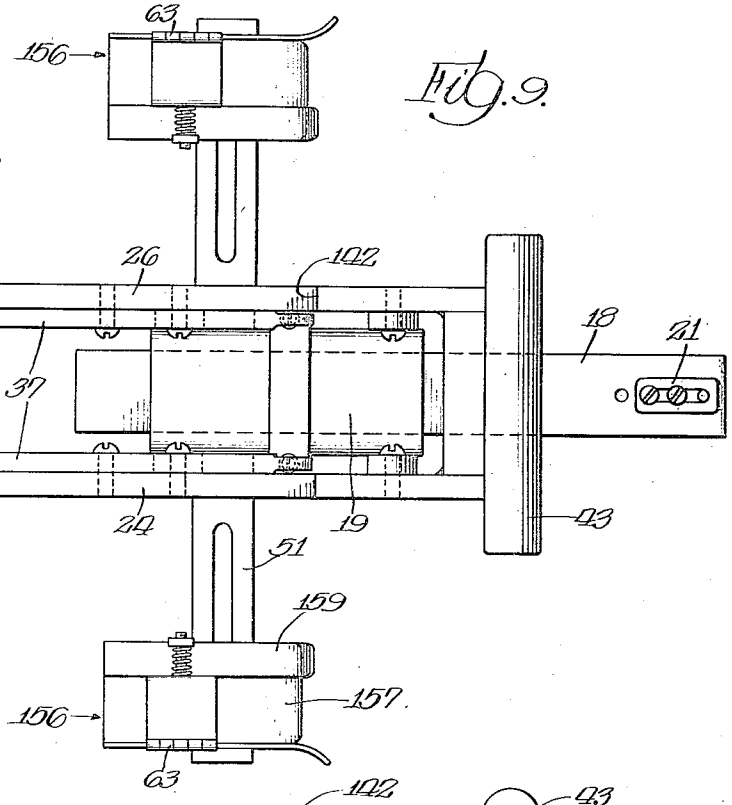


Fig. 9.

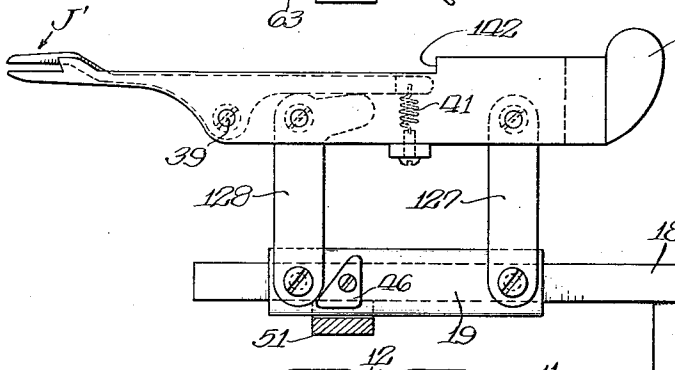


Fig. 10.

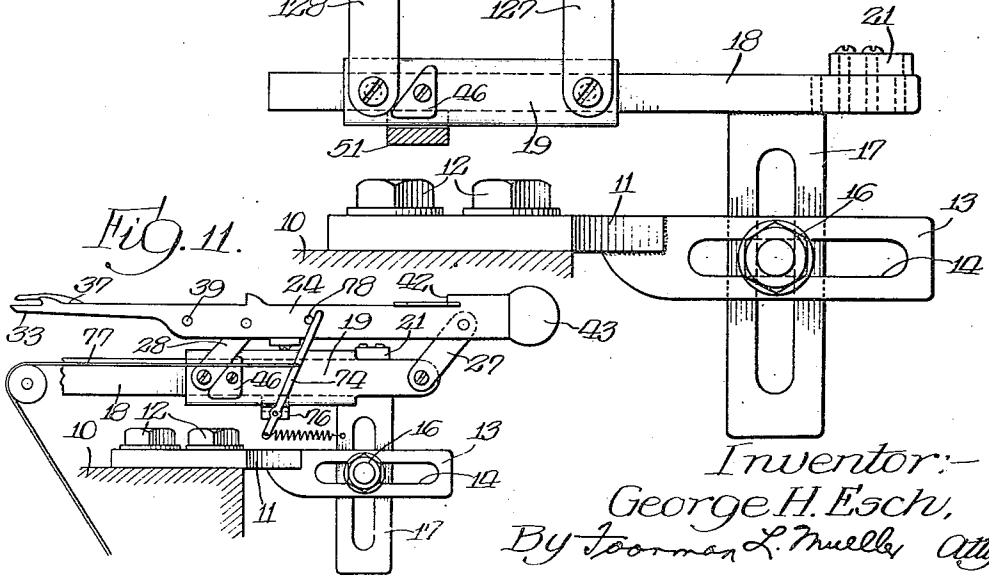


Fig. 11.

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Patented Oct. 10, 1939 2,175,169

UNITED STATES PATENT OFFICE

2,175,169

BLANK FEEDING DEVICE

George H. Esch, Oak Park, Ill., assignor to Asa B. Segur, doing business as A. B. Segur & Company, Oak Park, Ill.

Application February 24, 1937, Serial No. 127,387

25 Claims. (Cl. 271—54)

My invention relates in general to feeding apparatus for punch presses and similar machines, and more in particular to a combination blank feeding and formed blank ejecting apparatus for such machines.

In connection with punch presses and similar machines for performing various types of operations on blanked pieces of material, it has been the general practice to either feed such objects into the machine by hand or by a complicated fully-automatic feeding device designed especially for a particular machine and a particular blanked piece. With the hand feeding methods, where blanked pieces are fed into a punch press, the operator stands or sits in front of the machine, with a large container or pile of blanks, and either feeds the pieces into the punch press with the hand with which he picks up the piece, or transfers the piece to the other hand, to be fed into the machine. In the case of large blanks, the piece may be picked up from a pile with both hands and then transported the distance from the pile into the punch press. Such hand feeding operations are extremely slow and inefficient because both hands are not working at maximum capacity, and the distance of travel of one or both hands in the feeding operation is great when adding this distance up over an hour's operation of the machine. Furthermore, although safety devices are provided on punch presses where there is a hand feeding operation, there still is some danger where it is necessary to place the hand under the die punch plate.

In addition to the danger of injury where it is necessary to feed presses by hand, there is the danger of injury when the hand is passed under the die punch plate to remove the formed piece which sticks in the die. Ejecting devices to prevent the use of the hands for this purpose are not satisfactory in many instances, and also of course add to the total cost of the press. In view of the large cost of the average punch press and the charge on overhead, it is important that the press be operated at maximum capacity and efficiency at all times.

Although automatic feeding devices eliminate the dangers from hand feeding and of course very materially speed up the operation, such automatic feeders are necessarily complicated and very expensive. They are precision built for high speed operation, and are ordinarily designed only for a particular operation and a blank of a particular size. Often these devices are built integrally with the machine which they feed, and unless the manufacturer has enough volume on the particular piece to be fed to the machine, that machine may lie idle part of the time because of the impossibility or the extreme difficulty, of removing the feeding device from the machine to work some other piece.

It is an object of the present invention to provide a hand operated apparatus for transporting, feeding, and ejecting operations on blank pieces to be formed in a punch press or the like.

A further object of the invention is to provide such a device to accomplish these operations from a safety position for the operator externally of the die in the press.

Another object of the invention is to provide such a device in a very simple, inexpensive, and yet highly efficient construction.

It is also an object of the invention to provide in a simple hand operated device, much of the speed and efficiency of an automatic feeding apparatus.

One of the features of the invention is the provision of a hand operated blank feeding and ejecting device for punch presses or the like, where both hands of the operator may be working at substantially maximum capacity at all times with safety.

A further feature of the invention is the provision of such feeding and ejecting mechanism as will substantially obviate the necessity for the operator to pass his hand under the die punch plate for any purpose, and thus increase the safety factor in the operation of that particular machine to a maximum value.

A further feature and advantage in the device of the invention is the portability thereof, as well as the simplified mounting structure therefor, so that it may be easily moved about with a minimum loss of time in preparing for operation of a machine on which it is to be used. Furthermore, because of these characteristics, the device may be readily removed from a machine so that that machine may be operated for other purposes not requiring the feeding device of the present invention.

Particularly with relation to the adaptability and portability of the device of my invention is a further feature wherein a trip lever in combination with the feeding device is provided on the complete apparatus and portable therewith to trip the punch press on the operation of said feeding device without any further action of the operator of the press.

A still further feature of the invention is the provision of a construction and design in the embodiment thereof, that such device may be

adapted to the feeding of many types and sizes of blanks by simple adjustments.

Other objects and advantages will be apparent from the following description, taken with the drawings, in which:

Fig. 1 is a top plan view of the complete apparatus in a position of rest and having a blank thereon in the first feeding position.

Fig. 2 is a side elevation showing the device of Fig. 1 mounted on the bed of the machine with which it is to be operated, and showing the device in full lines in the position of rest of Fig. 1, and showing in dotted lines the position of the device in its operating position.

Fig. 3 is a cross sectional view approximately on the line 3—3 of Fig. 2.

Fig. 4 is a cross sectional view approximately on the line 4—4 of Fig. 2.

Fig. 5 is a rear end view of the structure of Figs. 1 and 2, with the device in a position of rest and with the operating handle for the device removed.

Figs. 6, 7 and 8 are top plan views showing the device in feeding and ejecting position, with Fig. 6 illustrating the first feeding position in getting the device into operation, Fig. 7 the second feeding position, and Fig. 8 the third feeding position wherein three blanks are being acted upon and the foremost blank is ready to be positioned in the punch press.

Fig. 9 is a top plan view of a modified embodiment of the invention.

Fig. 10 is a side elevation of the device of Fig. 9.

Fig. 11 is a side elevation illustrating particularly the trip lever assembly for automatically operating the punch press.

The transporting and feeding device is illustrated in Fig. 2 as mounted on the bed plate 10 of a punch press by means of a mounting plate 11 secured to the bed plate by means of bolts 12, and secured to the mounting plate 11 or integral therewith is a longitudinal adjusting portion 13 with an elongated slot 14 to adjustably receive a bolt 16 which adjustably but rigidly secures a slotted vertical mounting member 17 in any desired position so as to place the transporting and feeding device in the desired position with respect to the punch press. The vertical mounting member 17 is rigidly secured to a rail guide 18, and this rail guide slidably supports the entire feeding device, as will be hereinafter described.

In ordinary punch press practice, blanks are preliminarily cut from ribbon-like strips of metal or other material, or are cut out of sheets of metal or other material in various forms. This original blanking is ordinarily accomplished in a substantially automatic manner, at least so far as feeding the material into the press for cutting out in blanks is concerned. The remaining forming operations on these preliminarily cut blanks are, in the absence of an automatic feeding device, slow, relatively inefficient, and expensive from a labor standpoint. As discussed above, automatic feeding devices are extremely expensive and are usually built for a particular blank and a particular punch press or machine, and, unless this apparatus is utilized all or the greater majority of the time, it represents a costly charge on overhead. The present device, although hand operated, speeds up the feeding and ejecting operation on punch presses very materially over straight hand feeding, and, in addition, by means of the adjustable mounting and positioning feature described above, makes for ready adaptability on all types of machines and portability from one machine to another.

A slide rail 19 (Figs. 2 and 4) is formed to slidably fit on the guide 18 to move under hand pressure over the length thereof and progressively feed blanks into the punch press to be worked upon. In this embodiment, the slide rail comprises a box-like member bearing against all four sides of the guide to be limited in its rearward movement by an adjustable stop 21 and in its forward movement by the stud 22 on the bottom of the guide 18 or by the die plate itself in the punch press. The stop 21 is adjustable to change the rearward position of the slide rail 19 and the feeding apparatus thereon to adapt the machine to blanks of different dimensions from front to back so that the jaws J will grasp such blank properly on the feeding operation, as will be hereinafter described. Although the slide rail with the ordinary lubrication between it and the rail guide moves very readily and easily thereon, it is understood that roller or ball bearings may be utilized in the appropriate manner if desired. The blank pieces to be operated upon by the punch press are carried into the punch press by a carrying frame 23 which includes a pair of elongated bars 24 and 26 supported on the slide rail 18 by means of links 27 at the rear of the rail 19 and connecting links 28 at the front of the slide rail, which are somewhat in the shape of a bell crank lever, including a supporting arm between the pivot 29 on the slide rail and pivot 31 on the carrying frame, and having an integral camlike projection 32 rearwardly of the link for a cam operation, as will be hereinafter described. The bars 24 and 26 pivoted on the links 27 and 28, and the latter pivoted on the slide rail 19 all together are substantially a pantograph assembly as will be apparent from the succeeding description of the operation thereof.

The bars 24 and 26 each terminate in an irregularly shaped prong 33 having a forwardly extending lip 34 and a carrying slot 36 toward the rear thereof. A pivoted arm 37 is secured to each of the bars 24 and 26 and has a projecting lip 38 on the front end thereof to cooperate with the prong 33 on the bar and in its pivotal movement to act as a closing jaw for gripping a blank to feed it into the punch press. The arms 37 are pivoted on the bars at 39 and extend rearwardly beyond the cam portion of the links 28 and are held in a normal open position as shown in full lines in Fig. 2 by means of a spring 41 secured at the rear of the arm and to a bar 24 or 26.

In the normal operation of the device, a blank A of such a size and length as may be accommodated by a particular device, is placed on the top of the bars 24 and 26 of the carrying frame, and against feeding projections 42 toward the rear of the carrying frame. The blank may be placed on the frame with one hand, while the other hand grasps the handle 43 at the rear of the frame, or the same hand feeding the blank may be used also to push the frame, in which case the other hand may be picking up a blank from the other side of the operator to feed to the frame, thus providing for the complete operation with both hands in alternate order. One satisfactory manner of positioning the operating hand is to hold the blank against the projections 42 with the fingers, while the thumb of the same hand drops down behind the handle 43 to move the frame.

As a result of frictionizers provided between the slide rail 19 and guide 18, the movement of the slide rail 19 is delayed on the initial pressure of the hand upon the carrying frame until the carrying frame is pushed up or rocked to a position shown in dotted lines in Fig. 2, wherein the links 27 and 28 stand in a vertical position. This function will be subsequently described in greater detail. As to the frictionizers (Fig. 4), however, one or more of these may be employed, and each comprises a set screw 44 which is threadably carried in a stop member 46 and may in fact carry the stop member 46 on the slide rail 19, or may simply extend through the stop member to a threaded aperture 47 in the slide rail 19. If it is desired to retain the stop 46 by means of the screw 44, the screw will initially extend into the aperture 47 for several thread lengths to adequately grip the same. If the stop 46, however, is secured to the slide rail 19 independently of the set screw 44, the latter extends in substantially to the aperture 47, in which is packed a piece of leather packing 48 bearing against the side of the guide 18 as shown clearly in Fig. 4. The set screw 44 may be turned in so as to place any desired pressure upon the leather packing 48, which in turn will bear against the guide 18 with a corresponding pressure. The stops 46, incidentally, are employed to limit the rearward falling or rocking movement, so to speak, of the front links 28, and in so limiting these links, the entire carrying frame 23 is limited in its downward, rearward movement to a position of rest or recoil.

As the friction between the leather and guide 18 is overcome by increased pressure of the hand on the handle 43, the carrying frame moves forward until stopped by the projection 22, or by the engagement of the ends of the jaws J on the carrying frame and the die in the punch press. In this position illustrated in Fig. 6, the blank A is deposited into side clips or holding members 56 as shown particularly in Figs. 1, 3 and 5. Similar clips are provided on each side of the carrying frame supported by vertical arms 49 which are adjustably secured to a cross piece 51 which in turn is rigidly supported from the bottom of the rail guide 18 in any desired manner. Fig. 3 illustrates the support 51 secured to the guide 18 by means of bolts 52 extending through the two members. The adjustment of the holding members on the support 51 is accomplished by a wing nut and bolt assembly 53 extending through an aperture in the arm 49 and through an elongated slot 54 in this support member 51. With this adjustment, the holding members may be positioned in accordance with the length of the blank which is being transported in the device.

The holding members 56 at each side of the carrying frame in Fig. 1, each include a flanged plate 57 secured to an arm 49 and a pair of spring clips 58 which each include a bearing plate 59 having an integral mounting portion including a vertical extension 61 and a horizontal extension 62 therefrom hingedly secured to the plate 57 by means of a hinge 63. The receiving ends of the bearing plates 59 are curved upwardly slightly, as shown at 64 in Fig. 5, while the corresponding edge of the plate 57 is curved downwardly and the upright flange thereof curved outwardly as at 66, to receive a blank being fed therein by the carrying frame. Tension is provided on the bearing plate to hold the blank in the clip by means of a spring 67 on a bolt or the like 68 to bear against a nut 69 on the end of the bolt and the outer wall of the vertical extension 61 of the bearing member. The bolt 68 extends through corresponding apertures in the flange of the plate 57 and the extension 61 of the bearing plate 59. This tension may be adjusted by movement of the nut 69 on the bolt.

At the end of the forward stroke or movement of the carrying frame, the blank A is deposited in the clips at each side as shown in Fig. 6 and mentioned above. On the return movement of the carrying frame, as a result of the action of the frictionizers between the slide rail and guide, the links 27 and 28 drop back upon the first pull on the handle 43 to a position of rest with the front links 28 bearing against the stops 46. This position of the carrying frame is illustrated in full lines in Fig. 2. With further force on the handle 43, the friction exerted by the frictionizer is overcome and the carrying frame on the slide rail 19 is pulled back to the position of rest shown in Fig. 1.

A second blank A′ is picked up by one hand of the operator and placed against the shoulders 42, after which the same hand of the operator, or the other hand, as discussed above, is used on the handle 43 to push the frame up to the operating position shown in dotted lines in Fig. 2, and the slide rail is then pushed forward on the guide 18. Substantially at its operating position shown in dotted lines in Fig. 2, or slightly thereafter, irregular projections 71 with pushing shoulders 72 engage the rear end of the blank A and as the carrying frame is pushed forward, the blank A is moved into the forward clip and under the bearing plate 57 as shown in Fig. 7. At the end of the forward movement of the carrying frame, the operator then pulls on the handle 43 to drop the frame to the position of rest heretofore described. The slide rail is pulled rearwardly and the projection 71 passes under the blank A′ in the first holding clip, while the jaw J, comprising the prong 33 and projecting lip 38, slides under the blank A in the two forward side clips.

The third operation to fully load the device, at least the device with three transporting or pushing positions of the structure of Fig. 1, is accomplished by placing a third blank A″ on the carrying frame in the manner previously described with respect to blanks A and A′. As the carrying frame is pushed to its operating position on the links 27 and 28, the cam on the top of the front link 38 including the rounded surface 73 and extension 32 engages the under side of the rear portion of the pivoted arm 37 and operating against the tension of the spring 41, lifts the rear end of the bar to close the jaws J as shown in dotted lines in Fig. 2. The construction of the jaws and this closed position may also be seen in Fig. 10. By the time the carrying frame has reached the full upright position, the open jaw has passed onto the blank A and at the full operating position is clamped thereon to pick the blank A out of the forward holding clip and carry the blank to be deposited on the die plate in the punch press. With the frictionizers operating and the carrying frame 23 dropped first on the links 27 and 28 to its position of rest, the cam on the end of the link 28 permits the spring 41 to pull downwardly on the arm 37 to open the jaws J. They release their hold on the blank A and with the added pull exerted on the handle, the carrying frame is returned to its rearward position for receiving another blank.

With the feeding device thus fully loaded, as

each succeeding blank A' and A'' for instance, is carried into the die plate, the preceding blank as A and A', is ejected from the die by the engagement of the incoming blank. The invention thus provides for a transporting and feeding device as well as an ejecting device for punch presses. With this operation, it can be readily understood that both hands of an operator are being utilized to substantially full capacity, and working at maximum efficiency. One hand picks up the blank and places it on the carrying frame, while the other, or, if desired, the same, hand lying on the handle 43, immediately operates the device. Except in unusual circumstances, it is thus unnecessary for the operator to place either hand under the die plate, with the consequent danger of injury even with the ordinary safety devices, and certainly with loss of time which would result from placing the hand this far forward from the position of the operator and from taking his eyes off the supply of blanks to watch his hand passing under the die plate.

After a blank has been placed on the die plate, and as the feeding device is being pulled back to the position of rest, the punch press may be tripped by the foot of the operator. To produce automatic tripping of the press, however, a lever 74 (Figs. 1, 2 and 11) may be pivotably mounted on a bracket 76 rigidly secured to the guide 18 extending underneath the same so as not to interfere with the movement of the slide rail 19. The bracket 76 may desirably extend outwardly to each side of the structure so that the lever 74 can be moved to either side and pivotably carried depending on the position of the safety trip on the press. A flexible cable 77 extends from the lever 74 in an appropriate manner for removably connecting to the safety trip (not shown). A stud 78 may be secured to the bars 24 and 26 on the outside thereof to engage the lever 74 substantially at the end of the return stroke of the carrying frame. On the forward movement of the carrying frame, the bars 24 and 26 will be in the raised position and the stud 78 will clear the end of the lever so that the later can resume its normal position to again be operated on the return movement of said frame. The cable 77 can be readily disconnected upon demounting of the entire feeding device.

In a commercial embodiment of the invention, very satisfactory results have been obtained with three pushing or feeding positions as shown in the structure from Figs. 1 to 8 inclusive. However, this number may be increased by adding to the number of pushing stations on the carrying frame and adding to the number of holding clips, or a fewer number of feeding positions may be provided as shown in the modified embodiment of the structure of Figs. 9 and 10. Except for a change in dimensions, this embodiment is substantially the same as the preferred construction, with a carrying frame supported from links 127 and 128 and having a shoulder 142 for the first loading position, and jaws J' provided on the end of the carrying frame in the same manner as previously described.

With only a single transporting position on the carrying frame, and the jaws at the end, it is necessary to employ only a single holding clip 156 on each side. Each of these clips includes a flanged plate 157 and a spring tensioned bearing plate 159 as heretofore described.

Although the invention has been described as applied primarily to punch presses, it is understood that it may be employed on other types of machines operating on separate or previously formed pieces of material so as to materially speed up ordinary hand feeding of the machine.

I claim:

1. Apparatus for assisting in the feeding of blanks to a punch press or analogous machine including means for receiving and holding a blank in a position of safety removed from the position of operation of the machine and means for moving the blank from said position to the position of operation, said means comprising a reciprocable structure and blank gripping jaw means reciprocating therewith and movable, in part at least in a direction transverse to the reciprocation to engage said blank on its forward movement and to pass clear of the following blank on the reverse movement.

2. Apparatus for assisting in the feeding of blanks to a punch press or analogous machine including means for receiving and holding a blank in a position of safety removed from the position of operation of the machine and means for moving the blank from said position to the position of operation including a reciprocable carriage and an engaging structure carried on said carriage by pivoted links and adapted to move away from said carriage to engage a blank approximately as said carriage moves forward and to retract approximately as said carriage moves rearward to void engagement with following blanks.

3. Apparatus for assisting in the feeding of blanks to a punch press or analogous machine including means for receiving and holding a blank in a position of safety removed from the position of operation of the machine and means for moving the blank from said position to the position of operation including a reciprocable carriage, an engaging structure carried on said carriage by pivoted links and adapted to move away from said carriage to engage a blank approximately as said carriage moves forward and to retract approximately as said carriage moves rearward to avoid engagement with following blanks, and means for opposing the reciprocation of said carriage to cause said engaging structure to shift with respect thereto prior to each movement of the carriage when the moving force is applied to the engaging structure.

4. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired.

5. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and

feed it to the point desired, said last named portion comprising gripping members.

6. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a structure carried by but shiftable transversely with respect therto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired, said last named portion comprising gripping members and means for operating said gripping members automatically by movement of said shifting structure.

7. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a feeding structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said feeding structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired, the receiving portion of said shifting structure being adapted to have an object laid thereon by hand.

8. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a feeding structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said feeding structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired, the receiving portion of said shifting structure being adapted to have an object laid thereon by hand, said holding means being adjustable to adapt it to different articles.

9. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a feeding structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said feeding structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired, the receiving portion of said shifting structure being adapted to have an object laid thereon by hand, said holding means being adjustable to adapt it to different articles and said feeding structure being inherently capable of acting on different articles.

10. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired, the receiving portion of said shifting structure being adapted to have an object laid thereon by hand, and the feeding portion of said shifting structure being adapted to grasp an article in said holder and to positively feed it to the desired position.

11. Feeding apparatus including an intermediate holder and means for supplying articles to said holder and feeding them to another point from said holder comprising a slidable carriage, a structure carried by but shiftable transversely with respect thereto, and a handle on said structure adapted to shift it with respect to said carriage and subsequently shift said carriage, said structure having a portion adapted to receive an article to be fed and deposit it with said holding means and having another portion adapted to take said article from said holding means and feed it to the point desired, the receiving portion of said shifting structure being adapted to have an object laid thereon by hand, and the feeding portion of said shifting structure being adapted to grasp an article in said holder and to positively feed it to the desired position, thereby knocking from said position any article which may have been left there from a previous operation.

12. Feeding apparatus including holding means, a reciprocable pantograph having a reciprocable base member and a shiftable structure carried thereby and adapted to supply an article to said holding means on one movement and on a subsequent movement to remove it therefrom and feed it to the desired position.

13. Feeding apparatus including holding means, a reciprocable pantograph having a reciprocable base member and a shiftable structure carried thereby and adapted to supply an article to said holding means on one movement and on a subsequent movement to remove it therefrom and feed it to the desired position, said shiftable structure including jaws actuated by the pantograph movement for grasping said article.

14. Feeding apparatus including holding means, a reciprocable pantograph having a reciprocable base member and a shiftable structure carried thereby and adapted to supply an article to said holding means on one movement and on a subsequent movement to remove it therefrom and feed it to the desired position, said shiftable structure including jaws and a pantograph link in the form of a bell crank arranged to operate said jaws.

15. Feeding apparatus for feeding blanks to a punch press or like machine including a stationary holding means, a reciprocable pantograph base member, and a pantograph carriage connected thereto by pantograph links, said carriage having jaws at its front end operated by the pantograph movement for seizing a blank held by said holding means and by the reciprocative movement for feeding said blank to the desired position, a rearward portion of said pantograph carriage being adapted to have a blank laid thereon by hand and to move said blank into said holding means, and actuating means for said punch press or like machine operable upon the movement of said pantograph carriage.

16. Feeding apparatus for feeding blanks to

a punch press or like machine including a stationary holding means, a reciprocable pantograph base member, a pantograph carriage connected thereto by pantograph links, said carriage having jaws at its front end operated by the pantograph movement for seizing a blank held by said holding means and by the reciprocative movement for feeding said blank to the desired position, and a rearward portion of said pantograph carriage being adapted to have a blank laid thereon by hand and to move said blank into said holding means, a handle on said pantograph carriage, and movement retarding means on said base whereby a reciprocating force applied to said handle causes the pantograph movement to precede the reciprocative movement in each direction.

17. Feeding apparatus for feeding blanks to a punch press or like machine including a stationary holding means, a reciprocable pantograph base member, and a pantograph carriage connected thereto by pantograph links, said carriage having jaws at its front end operated by the pantograph movement for seizing a blank held by said holding means and by the reciprocative movement for feeding said blank to the desired position, and a rearward portion of said pantograph carriage being adapted to have a blank laid thereon by hand and to move said blank into said holding means, said holding means comprising clamp members adapted to grip the blank but to permit it to be slid therethrough.

18. Feeding apparatus for feeding blanks to a punch press or like machine including a stationary holding means, a reciprocable pantograph base member, and a pantograph carriage connected thereto by pantograph links, said carriage having jaws at its front end operated by the pantograph movement for seizing a blank held by said holding means and by the reciprocative movement for feeding said blank to the desired position, and a rearward portion of said pantograph carriage being adapted to have a blank laid thereon by hand and to move said blank into said holding means, said holding means comprising clamp members adapted to grip the blank but to permit it to be slid therethrough and having a flared receiving end to make accurate initial placement of the blank on the pantograph carriage unnecessary.

19. A universal attachment for a machine operating on small pieces, comprising a base for removable mounting on the machine, a rail guide adjustably carried on said base for feeding at any inclination and a slide rail movably secured on said guide, a blank carrying frame pivotably supported on said slide rail having a plurality of spaced feeding means thereon to progressively feed blanks into said machine.

20. An external transporting and loading machine for punch presses including a slidable piece carrying frame, and a plurality of transporting portions on said frame for progressively transporting pieces to be worked upon toward the die in the punch press, including gripping means on the forward end of said frame for thrusting said piece into the die of said press.

21. An external transporting and loading device for removably mounting on a punch press including a slide member, guide means for said slide member, and a frame carried by said slide member by pivotal connecting links extending between them, stationary releasable holding means outside said frame cooperating with transporting portions on said frame for progressive movement of blanks to said punch press, and loading means on the end of said frame for placing said blank on the die in said press.

22. Hand operated apparatus for assisting in the feeding of blanks to a punch press or analogous machine including means for receiving and holding a blank in a position of safety removed from the position of operation of the machine, and means acting upon each feeding operation of said apparatus to feed a different blank to the punch press or analogous machine and to knock away a previously formed blank from the punch press or analogous machine.

23. Hand operated apparatus for assisting in the feeding of blanks to a punch press or analogous machine including means for receiving and holding a blank in a position of safety removed from the position of operation of the machine, and a jaw at the feeding end of said means for releasably carrying a blank therein to feed said blank into the machine upon the feeding movement of said apparatus and release it in position for the operation of the machine.

24. Manually operable apparatus for assisting in the manual feeding of blanks to a punch press or analogous machine including means for receiving a blank from one hand in a position of safety removed from the position of operation of the machine, a reciprocable carriage, a handle on said carriage adapted to be grasped by the other hand and having lost motion with respect to the carriage, and jaw means operated by said handle in its lost motion to grip a blank held by the apparatus at the beginning of the forward stroke of the handle and to release the blank at the position of operation.

25. Manually operable apparatus for assisting in the manual feeding of blanks to a punch press or analogous machine including means for receiving a blank from one hand in a position of safety removed from the position of operation of the machine, a reciprocable carriage operable by the other hand and including means effective upon the simple manual reciprocation of the carriage to engage the rear portion of the blank and move it from the position of its deposit to the position of operation, said means returning to its starting position without striking a subsequent blank deposited in said position of deposit.

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