

April 29, 1924.

1,491,821

J. E. PRAY

CUTTING MACHINE

Filed Jan. 24, 1921

2 Sheets-Sheet 1

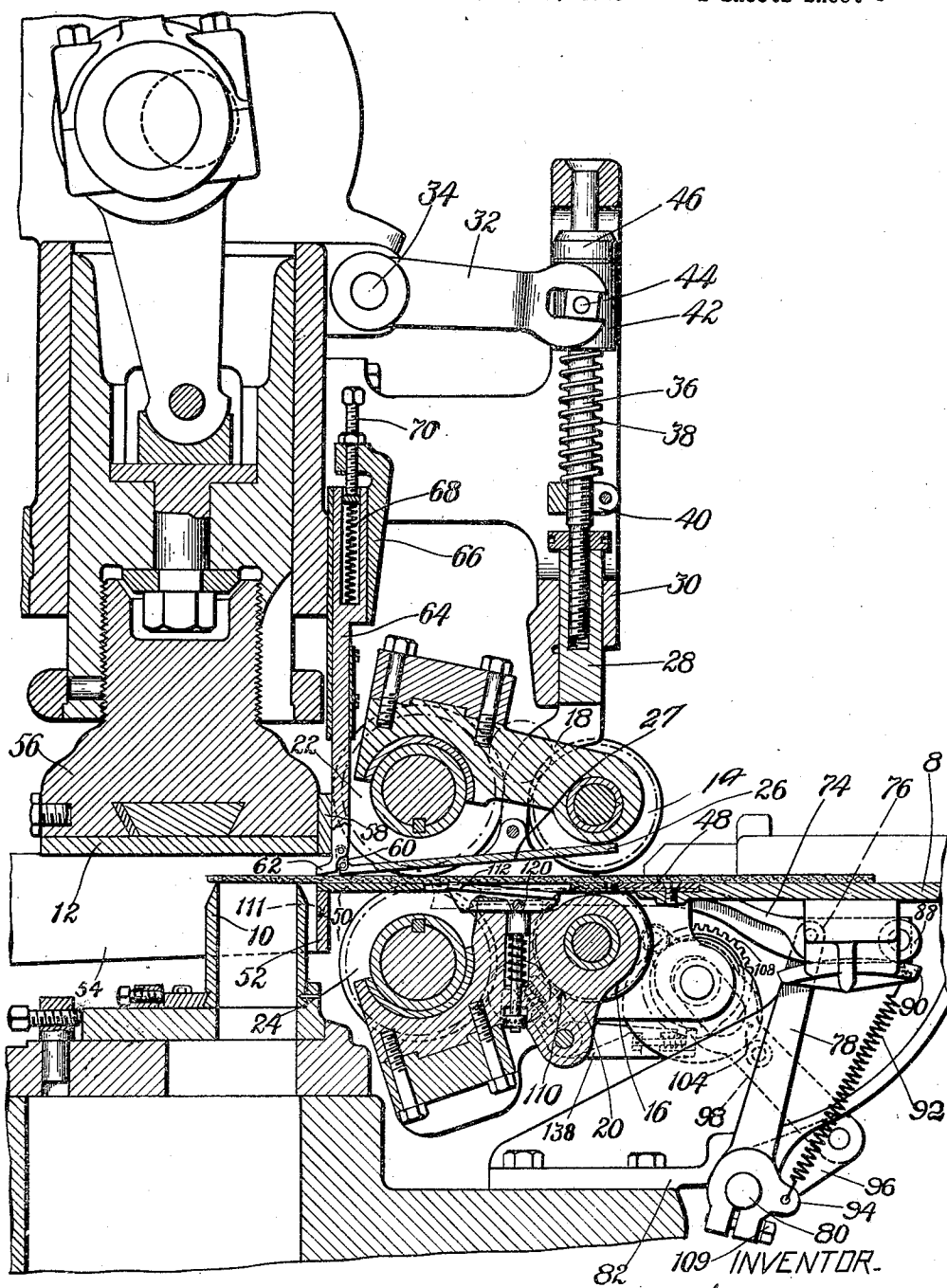


Fig. 1.

April 29, 1924.

1,491,821

J. E. PRAY

CUTTING MACHINE

Filed Jan. 24, 1921

2 Sheets-Sheet 2

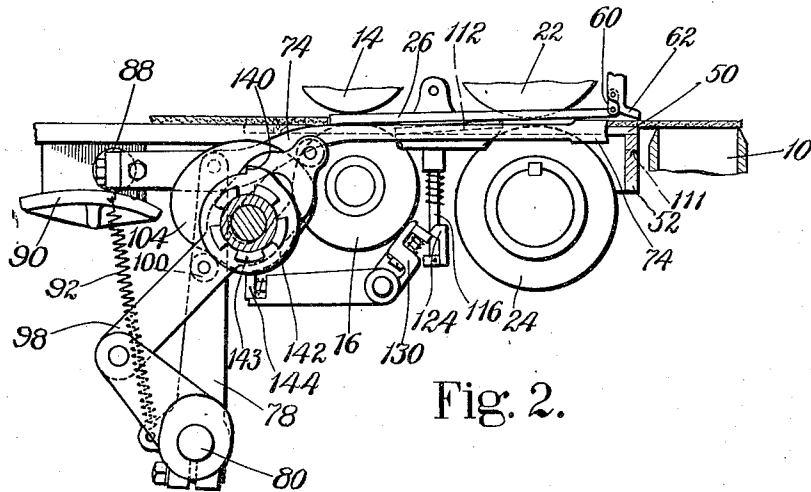


Fig. 2.

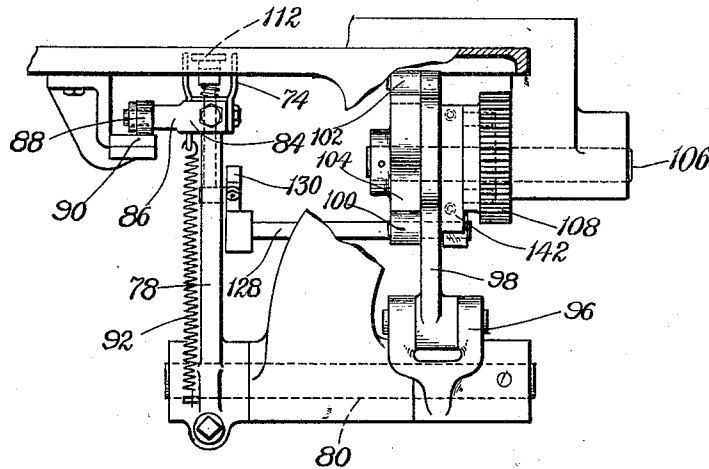


Fig. 3.

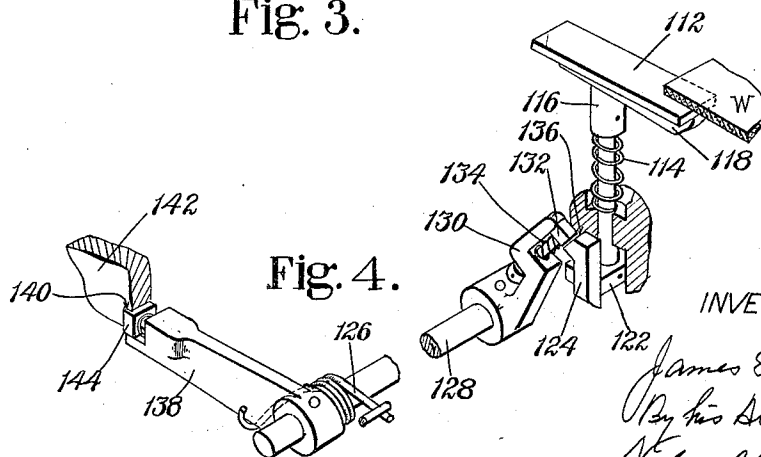


Fig. 4.

INVENTOR.

James E. Pray
By his Attorney,
Nelson M. Howard

UNITED STATES PATENT OFFICE.

JAMES E. PRAY, OF ROWLEY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CUTTING MACHINE.

Application filed January 24, 1921. Serial No. 439,482.

To all whom it may concern:

Be it known that I, JAMES E. PRAY, a citizen of the United States, residing at Rowley, in the county of Essex and State of Massachusetts, have invented certain Improvements in Cutting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to cutting machines and more particularly to machines for cutting blanks from sheet material.

It is an object of the invention to provide improved means for feeding sheet material to the cutting means which will be simple in construction and reliable and efficient in operation.

In one aspect the invention resides in the provision in a power operated machine of a reciprocable feeding member designed to engage an edge of the sheet material to feed the same and to be driven by operating means normally inoperative until the material is in position to be engaged by the reciprocable member whereupon the operating means is connected to the source of power. An important advantage of such an arrangement is that the feeding member operates only when sheet material is in position to be fed by it, so that idle or useless reciprocations of the feeding member are obviated.

In another aspect the invention comprises means for feeding work through engagement with an edge portion thereof, which is positively operated, and controlled by the work, the construction and arrangement being such as to ensure proper timing of the feeding means with respect to other work operating instrumentalities.

In the illustrative construction, there is provided a pusher member which has a definite and uniform movement during feeding operations upon pieces of material which are yieldingly clamped upon the support for the material by a member having an end portion which directly engages each piece of material and co-operates with the pusher member in successively locating the pieces of material for cutting operations.

The invention further contemplates improvements in an organization wherein feed rolls spaced from a die operate to feed the

material thereto in successive steps of uniform extent determined with reference to the size of the die, which improvements comprise a pusher member having a positive feeding movement and so operated that the end portion of the material located between the feed rolls and the die is carried into proper position over the die for a cutting operation.

Still other features of the invention reside in various details of construction and combinations of parts, all of which will be described in the specification and pointed out in the appended claims.

In the drawings:—

Figure 1 is a view largely in section of a heel lift cutting machine embodying the invention;

Fig. 2 is a view in side elevation and partly in section showing details of the novel feeding means;

Fig. 3 is a view of the feeding means looking from the left in Figure 2; and

Fig. 4 is a detail view showing the means for controlling the clutch of the feeding means.

In the illustrative construction the sheet material is supported upon a table 8 and fed to the cutting means which comprises a die 10 and a cutting block or plate 12 by means of two pairs of feed rolls of which the rolls 14 and 16 are supported in brackets 18 and 20 respectively. Mounted in suitable yielding supports in the frame of the machine is the second set of feed rolls comprising rolls 22 and 24, respectively, both sets of rolls being operated simultaneously at regular recurring intervals (by means not shown) to feed the sheet material to project the forward end portion thereof in proper cutting position over the die 10. In order that the sheet may be entered between the first set of feed rolls 14, 16 at the proper time, there is provided a stop 26 operated in properly timed relation to the feed rolls and comprising a plate 27 which is pivoted to the lower end of the holder 28 reciprocable in a bearing 30 through the operation of a crank arm 32 on the rock shaft 34. Connections between the crank arm 32 and the holder 28 comprise a rod 36 which is adjustably received in a socket in the upper end of the holder 28, a spring 38 surrounding the rod between a fixed collar 40 and a sleeve 42 slidable on the rod and connected

to the crank arm 32 by trunnions 44. It will be understood that the holder 28 is lifted by the crank arm through contact of the upper end of the sleeve 42 with the collar 46 which is secured fixedly to the rod 36 while downward movement of the sleeve presses the stop plate yieldingly in a downward direction to contact with the work support 8 or with the work, because of the interposition of the spring 38 between the sleeve and the lower collar 40 on the rod 36. When the plate 27 is down on the table 8 its forward end serves as a stop 26 to prevent the introduction of another sheet of material until the proper time has arrived.

Secured to the table 8 is a lug 48 having pivoted to its rearward end a plate or guide member 50 which can be depressed into circular slots in the lower feed rolls 16 and 24, the rear end of the plate 50 being supported upon the cross bar 52 of a stripper member 54 which is yieldingly supported by spring means (not shown) so that the upper surface or the plate or guide member 50 is in a plane slightly above the cutting edge of the die 10. Secured to the block or plate carrier 56 is a lug 58 which, in the descent of the block carrier, engages the upper surface of the sheet material and depresses it together with the work supporting plate 50 and the stripper bar 52 at the same time that the material is forced upon the die 10, the object being to avoid bending the material at a point between the end of the support at 50 and the die 10. For a more detailed description of the mechanism so far disclosed reference should be had to Patent No. 1,344,975, granted June 29, 1920 upon application of W. C. Baxter.

For holding the sheet material down upon the work supporting table 8 and upon the plate or guide member 50 the stop 26 is extended rearwardly as the plate 27 and is joined by means of a link 60 to the lower end of a presser foot 62 which is shown as integral with a bar 64 vertically slidable in a guideway 66 in the frame of the machine. Preferably the bar is continuously pressed upon by a spring 68 located in a socket in the upper end of the bar and pressed upon or tensioned by an adjustable set screw 70. It will be understood that the plate 27 co-operates with the rollers in holding the material on the work support during feeding movements which carry the material to the cutting means. In addition the presser foot 62 which is fixed to or integral with the bar 64 contacts directly with the upper surface of the work to press it against the rear end of the supporting plate or guide member 50 to hold the material properly on the work support during cutting operations and more particularly to hold the end portion of the material after it has passed from the grip of the rollers 22, 24 against displacement

relatively to the die. It will be observed that the presser foot 62 has a slightly inclined lower surface which enables the presser foot to grip the work firmly in co-operation with the rear end of the plate 50, there being no tendency of the material to slip away toward the die 10 from the clamping jaws thus formed. Moreover, because of the link connection between the presser foot and the stop plate 27, the latter in its movement does not interfere with the effective clamping action of the presser foot, nor tend to tip it away from material in any of the movements of the presser foot and plate 50.

It will be observed that the feed rolls 22, 24 are spaced from the die 10 a substantial distance and hence there will always be left at the end of each sheet or strip of material a portion which cannot be fed by the feed rolls, this end portion of the sheet material corresponding approximately in length to the distance between the line connecting the centers of the feed rollers 22, 24 and the nearest edge of the die 10. For the purpose of feeding the end portion of the strip there is provided a finger or a pair of fingers 74. As shown, two fingers are provided pivoted at 76 upon a crank arm 78 fixedly secured to a shaft 80 carried by a bracket 82 fixedly attached to the frame of the machine. Conveniently the front ends of the fingers, the ends away from the die in the direction of feed, are secured to a member 84 (Fig. 3) which is provided with an arm 86 carrying a roll 88 held yieldingly in contact with a fixed guide 90 through the operation of a spring 92 attached to the member 84 and at its other end to a projection 94 on the crank arm 78. As shown, the fixed guide 90 has a curved surface along which the roll 88 moves under the action of the spring 92, the construction and arrangement being such that the rear end of the fingers 74, the ends nearer the die 10, tend to move constantly in the same plane parallel with the upper surface of the work support or table 8. When work is passing along the table 8 under the action of the feed rolls, the fingers are depressed in slots in the plate 50, and rise to engage the end of the sheet due to the action of the spring 92. For reciprocating the fingers means is provided for causing rocking movements of the shaft 80 and, in the illustrative machine, such movements of the shaft are positive and definite in amount as distinguished from prior constructions in which the movements of the shaft are variable in amount because of yielding connections in its operating means. Secured fixedly to the other end of the shaft 80 is a short crank arm 96 to which is pivoted a link 98 provided with rolls 100, 102, which engage with directly opposite portions of a cam 104.

As shown in Figs. 1 and 2, the roll carry-

ing end of the link 98 is slotted to surround the shaft 106 and to permit movement of the yoke end of the link transversely of the shaft which, it will be understood, has the cam 104 fixedly secured thereto. Mounted for rotation on the shaft 106 is a gear 108 which is constantly in mesh with a gear 110 which is secured fixedly to the shaft of the roll 16 to move therewith. In the illustrative construction a clutch mechanism is provided for connecting the gear 108 to the shaft 106 at predetermined intervals in such manner that the fingers will be operated to engage with the end portion of the sheet material as soon as the latter has passed beyond the grip of the feed rolls 22, 24. Through the mechanism described, the fingers 74 are moved positively through a predetermined distance to shove the end portion of the sheet material into cutting position over the die 10. This feed movement of the fingers is of a length to position the described end portion of the sheet material in proper position for cutting by any of the sets of dies that is intended to be used with the machine. And it will be understood that control of the material being fed is maintained very effectively through the constant pressure or clamping action of the presser foot 62 in co-operation with the guide plate 50. In this connection it should be pointed out that the front edge of the die, i. e., the edge adjacent to the stripper bar 52, is always located in the same position relative to the bar 52 and presser foot 62 irrespective of the size of the die. Hence the travel of the feed fingers 74 is the same for all sizes of dies in order to place the rear edge of the piece of material in proper position with respect to the front edge of the die. When the machine is to be run at a very high speed, the rear end of the fingers 74 will be spaced slightly farther from the front edge of the die than when the machine is set up to run much slower, since at high speed the end piece of material may be given a slight throw or toss in spite of the presser member 62. Such adjustment of the feed fingers is effected by proper manipulation of the bolt 109 and adjustment of the crank arm 78 on the shaft 80. As indicated at 111 there is a notch or slot in the bar 52 so that the ends of the feed fingers may approach closely adjacent to the forward edge of the die.

In order that the feed fingers may operate only when there is an end portion of the material to be fed into position above the die and remain stationary during the feeding of the sheet material by the feed rolls, there is provided in the illustrative construction a work-controlled member which determines the time of operation of the feed fingers. As shown, the work-controlled member, which is the controller for the clutch referred to in the foregoing description, com-

prises a feeler or presser plate 112 which projects up through a slot in the guide member 50 and is maintained yieldingly in contact with the under side of the sheet material being fed by the rolls by means of a spring 114 which surrounds a post or plunger 116 which is securely affixed to the lower surface of a plate 118 to the upper surface of which the feeler or presser member 112 is adjustably secured as by a set screw 120 (Fig. 1). Conveniently the post 116 is mounted in the bracket 20 which is provided also with a socket for receiving the spring 114. At the lower end of the post 116 is a plate 122 (Figs. 2 and 4) which serves to limit the upward movement of the plunger or post 116 under the action of the spring 114 and which serves further as a carrier for an actuator member 124 which operates in conjunction with the spring 126 to cause a rocking movement of the shaft 128. Secured to the shaft last mentioned is an arm 130 provided with a socket and otherwise constructed to carry a latch member 132 which is yieldingly held in operative position by a spring 134 that surrounds the shank portion of the latch. Upon inspection of Fig. 4 it will be clear that, upon upward movement of the actuator member 124, the arm 130 will be pushed over to the left in said figure due to the action of the cam surface 136 on the actuator member acting upon the latch member 132 whereby the shaft 128 is rocked in a direction to depress the outer end of the arm 138 which is secured to the shaft 128, return movement of the shaft being effected by the spring 126. When the feeler plate 112 is next depressed by the arrival of new sheet material the actuator member 124 in its downward movement displaces the latch member 132 downwardly until the end of the actuator member has reached a position below at one side of the latch which immediately springs back to position under the action of the spring 134. As shown the outer end of the arm 138 is normally in position to engage with a shoulder 140 on the cage member 142 of a Horton clutch indicated at 143, and the said end of the lever 138 is normally maintained by the spring 126 either in contact with said shoulder or with the periphery of the cage member so that the yielding end 144 of the arm may again engage with the shoulder to shift the cage member and thus release the clutch from holding engagement with walls of the socket in the gear member 108. It will be recalled that the gear 108 is in constant mesh with a gear 110 so that it is driven with the feed rolls 14, 16, 22, 24, the shaft 106 and the parts operated thereby remaining stationary until the shaft is clutched with the gear 108 as just described.

Referring to Fig. 1 of the drawings, it will be observed that the rear end of the

plate or feeler member 112 is spaced further from the line joining the centers of the rolls 22, 24 than is the rear end of the feed fingers 74, the effect of this arrangement 5 being that the work releases the feeler plate 112 from its depressed position prior to the similar release of the forward end of the finger or fingers 74. As the end of the sheet material passes from above the feeler 10 plate 112 the latter rises under the action of the spring 114 and, through the connections above described, causes the throwing in of the clutch. The fact that this takes an appreciable amount of time accounts for 15 the difference in spacing between the rear ends of the feeler plate 112 and of the fingers 74 so that by the time the edge of the end portion of the material passes from above the feed fingers and the latter spring up 20 into the plane of the material through the action of the spring 92, the said fingers will be actuated promptly to exert a positive feeding action on that portion of the sheet material lying between the feed rolls 22, 24 and the die 10. The feeler plate 112 25 is adjustable on its supporting plate 118 in order that the timing of their clutch may be such that as the feed fingers rise upon release by the work they will be instantly 30 actuated to engage the edge of the material and to push the latter into position over the die. When another sheet of material is introduced into the machine, the feeler plate is depressed thus restoring the actuator member 124 to operative position. 35 It will be clear that there is provided the equivalent of a one-revolution, non-repeating clutch mechanism whereby the feed fingers are reciprocated only when there 40 is work in position to be fed by them and that no idle or useless reciprocation of the fingers takes place. Furthermore, the operating connections are such that the fingers are operated positively along a path of pre-determined extent. 45

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:—

50 1. In a machine of the class described, means for cutting sheet material, means for advancing sheet material toward the cutting means comprising feed rolls spaced 55 from the cutting means, and positively operated feed fingers for engaging the end portion of the material after it has left the feed rolls to position the said end portion for a cutting operation.

60 2. In a machine of the class described, means for cutting sheet material, means for advancing sheet material toward the cutting means comprising feed rolls spaced from the cutting means, feed fingers for engaging the end portion of the sheet material 65 after it has left the feed rolls to position

the said end portion for a cutting operation, and means controlled by the work for positively operating the feed fingers.

3. In a machine of the class described, means for cutting sheet material, feed rolls 70 spaced from the cutting means and operative for feeding sheet material through the field of cutting operations, a feed finger for engaging the end portion of the sheet material after it has passed the feed rolls 75 for advancing said portion for a cutting operation, and means controlled by the work for causing a predetermined feeding movement of the said finger.

4. In a machine of the class described, 80 means for cutting sheet material, feed rolls spaced from the cutting means and operative for feeding sheet material through the field of cutting operations, a feed finger 85 for engaging the end portion of the sheet material after it has passed the feed rolls for advancing the portion for a cutting operation, and work controlled means for causing a feeding movement of the finger, said last-mentioned means comprising a one- 90 revolution clutch so arranged that the finger is disconnected from its power means at the end of each feeding movement.

5. In a machine of the class described, a die and cutting block relatively reciprocable to effect cutting operations on sheet material, feed rolls spaced from the die and intermittently operative to advance the sheet material to the die, a feed finger for 95 engaging the end portion of the sheet material after it has left the feed roll to advance the said portion over the die, and work controlled means for causing the feed 100 finger to move the exact distance that the sheet material is fed at each step by the feed rolls. 105

6. In a machine of the class described, means for cutting sheet material, a feed finger for engaging an edge surface of a sheet of material to advance the said sheet 110 over the cutting means, and a member arranged to be depressed by the sheet material as it is being moved into position to be fed by the feed finger and to be released as the end of the sheet passes by, and operative 115 to initiate a feeding movement of the feed finger whereby the material is advanced to cutting position.

7. In a machine of the class described, means for effecting cutting operations on 120 sheet material, a feed finger for engaging an edge surface of the sheet material to advance the material to cutting position, means for operating the finger comprising a shaft and a one-revolution non-repeating clutch, 125 and a member controlled by the sheet material for causing the operation of the clutch to connect the shaft to the source of power thereby causing a feeding operation of the feed finger. 130

8. In a machine of the class described, a die and block relatively reciprocable for cutting sheet material, means for advancing sheet material toward the cutting means
5 comprising intermittently operated feed rolls spaced from the cutting means, and positively operated feed fingers for engaging the end portion of the material after it has left the feed rolls to position the said end
10 portion for a cutting operation.

9. In a machine of the class described, a work support, means for cutting sheet material, means for advancing sheet material over the work support and toward the cutting means comprising feed rolls spaced
15 from the cutting means, feed fingers for engaging the end portion of the sheet material after it has left the feed rolls to position the said end portion for a cutting operation, a member located in the work support
20 and arranged to be controlled by the work, and means controlled by said member for positively operating the feed fingers.

10. In a machine of the class described,
25 means for cutting sheet material, feed rolls spaced from the cutting means and operative for feeding sheet material through the field of cutting operations, a feed finger for engaging the end portion of the sheet material after it has passed the feed rolls for
30 advancing said portion for a cutting operation, a member operated in one direction by the sheet material as it passes to the cutting means, spring means for operating the member in another direction, and means controlled by the member for causing a prede-
35 termined feeding movement of the said finger.

11. In a machine of the class described,
40 means for cutting sheet material, feed rolls spaced from the cutting means and operative for feeding sheet material through the field of cutting operations, a feed finger for engaging the end portion of the sheet material after it has passed the feed rolls for
45 advancing the portion for a cutting operation, a member arranged to be moved in one direction and to be released by the work, and operating means for the finger comprising a one-revolution clutch controlled by the
50 member in such manner that the finger is disconnected from its power means at the end of each feeding movement.

12. In a machine of the class described,
55 a die and cutting block relatively reciprocable to effect cutting operations on sheet material, feed rolls spaced from the die and intermittently operative to advance the sheet material to the die, a feed finger for
60 engaging the end portion of the sheet material after it has left the feed roll to advance the said portion over the die, and work controlled means for causing the feed finger to move the exact distance that the
65 sheet material is fed at each step by the

feed rolls, said means comprising a member adjustable along the path of the sheet material so as to vary the time of operation of said means.

13. In a machine of the class described,
70 a die and cutting block relatively reciprocable to effect cutting operations on sheet material, feed rolls spaced from the die and intermittently operative to advance the sheet material to the die, a feed finger for
75 engaging the end portion of the sheet material after it has left the feed roll to advance the said portion over the die, said feed finger being stationary during a plurality of feeding operations by the feed rolls,
80 and a member arranged to be depressed by the sheet material as it is being fed by the feed rolls and to be released as the end of the sheet passes by in the feeding operation and operative to initiate a feeding move-
85 ment of the feed finger whereby the end portion of the material is advanced to cutting position.

14. In a machine of the class described,
90 a die and cutting block relatively reciprocable to effect cutting operations on sheet material, feed rolls spaced from the die and intermittently operative to advance the sheet material to the die, a feed finger for engaging the end portion of the sheet material after it has left the feed roll to
95 advance the said portion over the die, means for operating the finger comprising a shaft and a one-revolution non-repeating clutch, and a member controlled by the work for
100 causing the operation of the clutch once for each piece of work to connect the shaft to the source of power thereby causing a single feeding operation of the feed finger.

15. In a machine of the class described,
105 means for operating on work, a work support, means extending up through the work support, and normally depressed by the work passing over the support, for engaging an edge surface of the work to progress the
110 same along the support, and operating means for said last mentioned means normally inoperative until said edge surface of the work is in position to be engaged by the
115 work progressing means.

16. In a machine of the class described,
means for operating on work, a support over which the work is fed to said means, a member for engaging an edge surface of the work to move it along the support, and oper-
120 ating means for said member inoperative while the work is passing over the member and becoming operative as soon as said member rises to engage the end of the work.

17. In a machine of the class described,
125 means for operating on work, a work support over which the work is moved to said means, means for feeding the work over the support comprising a member held normally depressed by the work and rising to
130

engage an edge surface of the work as the latter is moved from over the member, and a second member controlled by the work for causing the operation of said work feeding means.

18. In a machine of the class described, a work support, means for engaging work to feed the same along the support, a member serving as a source of power, and operating means for the work feeding means normally inoperative until the work is in position to be engaged by the work feeding means whereupon the operating means is connected to the power member.

19. In a machine of the class described, means for operating on work, a support over which the work is fed to said means, a member movable for engaging an edge surface of the work to move it along the support, and operating means for said member inoperative while the work is passing by the member and automatically operative when said member moves to engage said edge surface of the work.

20. In a machine of the class described, means for operating on work, a work support over which the work is moved to said means, means for feeding the work over the support comprising a member held normally depressed by the work and rising to engage an edge surface of the work as the latter is moved from over the member, a power element, connections comprising a one-revolution non-repeating clutch between said member and said element, and a second member controlled by the work for releasing the clutch to cause operation of the work feeding means.

21. In a machine of the class described, means for operating on sheet material, positively operated means for engaging an edge surface of a sheet of material to feed the same, said feeding means being held by the sheet material in a depressed inoperative position until said edge surface reaches a predetermined relation with respect to the feeding means, and means controlled by the sheet material for timing the operation of the last-mentioned means.

22. In a machine of the class described, means for cutting sheet material, a work support over which the material passes to the cutting means, spring means for yieldingly supporting that end of the work support adjacent the cutting means, and a vertically movable presser foot comprising a rod constructed and arranged to have its lower end in direct contact with the work to press the same upon the support at the end thereof closely adjacent to the cutting means.

23. In a machine of the class described, a block and die relatively reciprocable to cut blanks from sheet material, a support over which the material passes to the die, said support comprising a yieldingly supported

portion which moves relatively to the die during a cutting operation, and a presser foot movable with the movable portion of the work support and comprising a rod operable to contact directly with the sheet material to clamp the sheet material on the work support at a point closely adjacent the die.

24. In a machine of the class described, a die and block relatively reciprocable to cut blanks from sheet material, a support for the material, means for feeding the material over the support, a stop for positioning the material prior to its engagement with the feeding means, a presser foot arranged to engage the material directly to press it against the work support at a point closely adjacent the die, and a link for connecting the presser foot with the stop.

25. In a machine of the class described, means for cutting sheet material, a work support over which the material passes to the cutting means, spring means for yieldingly supporting that end of the work support adjacent the cutting means, a positively operated pusher member having an invariable throw for moving a piece of material over the cutting means, and a vertically yieldable presser foot comprising a rod constructed and arranged to have its lower end in direct contact with the work to press the same upon the support at the end thereof closely adjacent to the cutting means.

26. In a machine of the class described, a block and die relatively reciprocable to cut blanks from sheet material, a support over which the material passes to the die, said support comprising a yieldingly supported portion which moves relatively to the die during a cutting operation, a positively operated pusher member for moving a piece of material over the die and a presser foot comprising a rod having its lower end directly contacting with the sheet material and movable with the movable portion of the work support and operable to clamp the sheet material on the work support at a point closely adjacent the die.

27. In a machine of the class described, a die and block relatively reciprocable to cut blanks from sheet material, a support for the material having a portion which moves relatively to the die during a cutting operation, means for feeding the material over the support, and a presser foot having an inclined end surface arranged to engage the material directly to press it against the work support at a point closely adjacent the die.

28. In a machine of the class described, means for cutting sheet material, means for advancing sheet material toward the cutting means comprising feed rolls spaced from the cutting means, a feed finger for

engaging the end portion of the material, after it has left the feed rolls, to position the said end portion for a cutting operation, and means for moving the feed finger a pre-
5 determined amount in the feeding direction.

29. In a machine of the class described, cutting means comprising a die and a block relatively reciprocable for cutting sheet material, means for advancing sheet material
10 toward the cutting means comprising intermittently operative feed rolls spaced from the cutting means, a feed finger for engaging the end portion of the material, after it has left the feed rolls, to position the said
15 end portion for the cutting operation, and cam means for giving to the feed finger reciprocatory movements predetermined in amount.

30. In a machine of the character described, means for feeding sheet material 20 comprising a normally stationary feed member adapted to engage an edge portion of the material, and means controlled by the sheet material for determining the time of operation of the feed member. 25

31. In a machine of the character described, positively operated means for feeding sheet material comprising a normally stationary feed finger adapted to engage the rear edge of the material to be fed, and a 30 member controlled by the sheet material for determining the time of operation of the feed finger.

In testimony whereof I have signed my name to this specification.

JAMES E. PRAY.