

July 10, 1928.

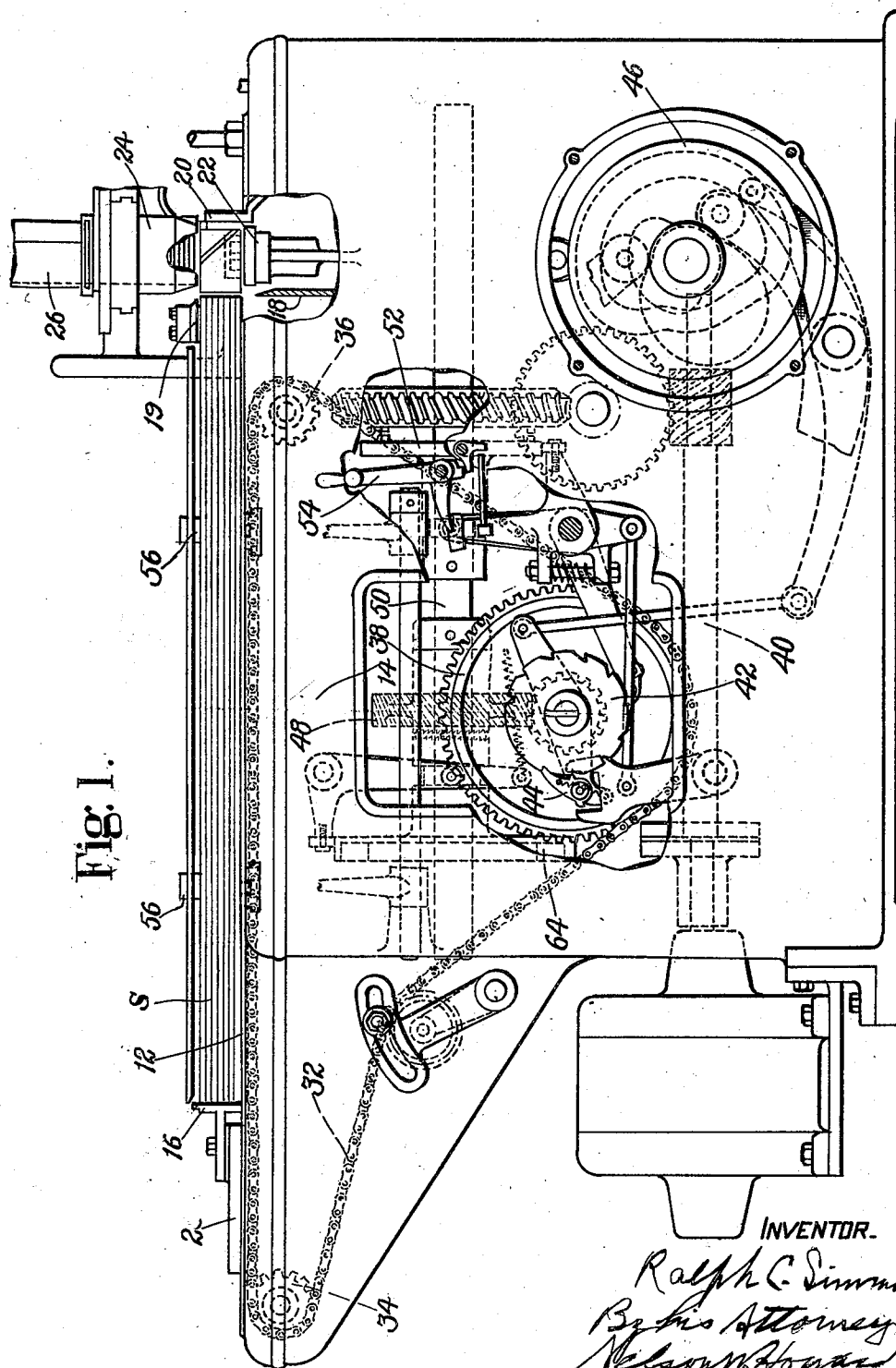
1,676,293

R. C. SIMMONS

FEEDING MECHANISM

Original Filed Nov. 9, 1922

3 Sheets-Sheet 1



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Fig. 2.

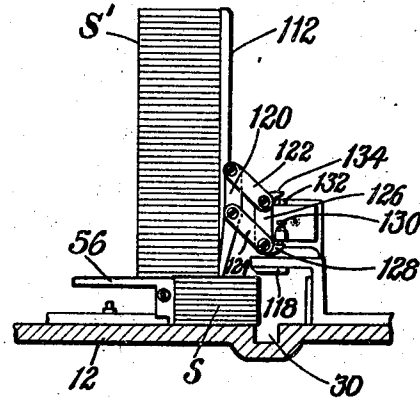
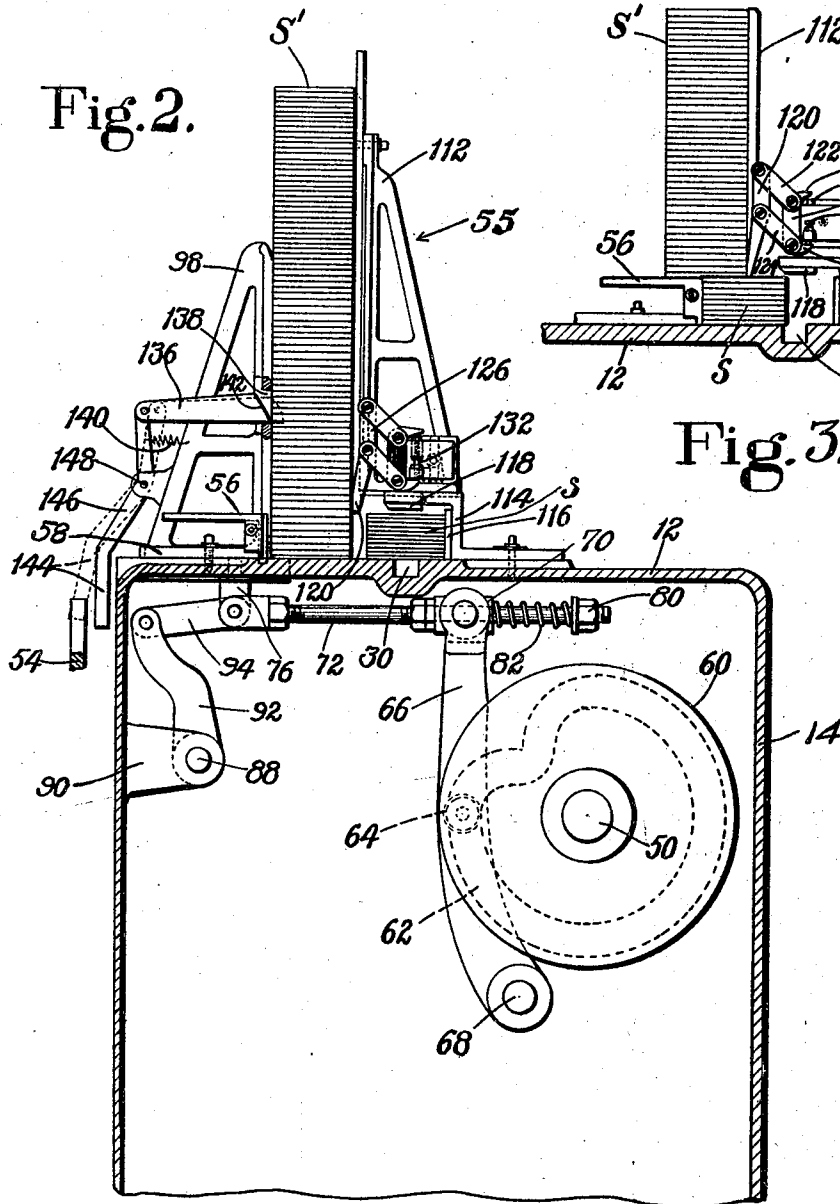


Fig. 3.

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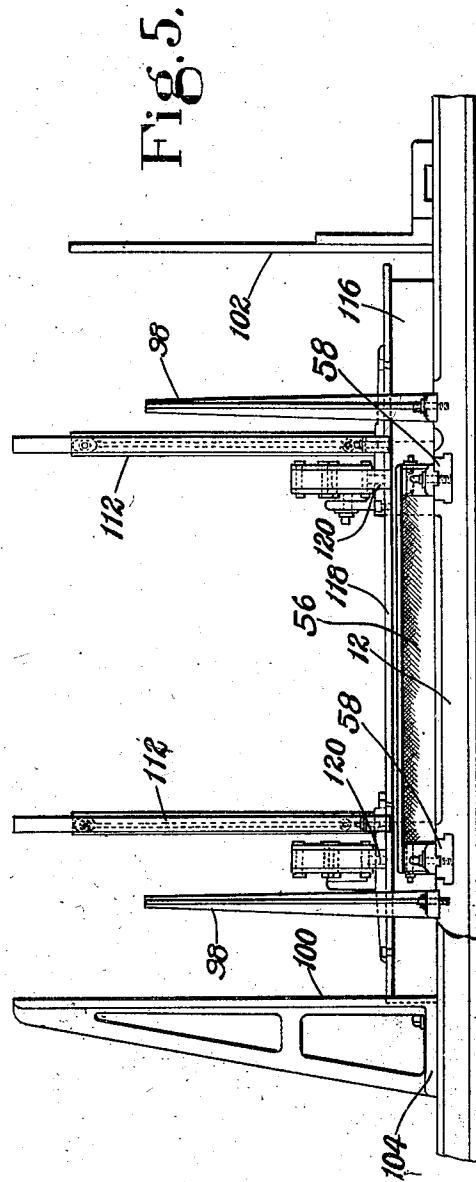
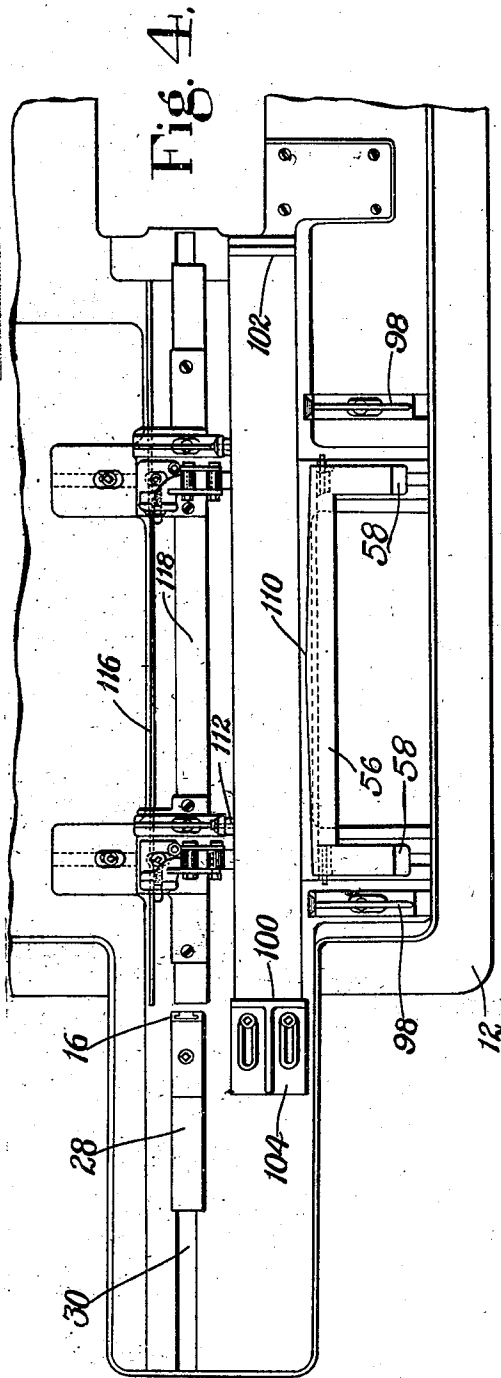
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FEEDING MECHANISM

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM.

Original application filed November 9, 1922, Serial No. 599,925. Divided and this application filed January 3, 1927. Serial No. 158,745.

This invention relates to feeding mechanism. The invention is disclosed herein as embodied in a cutting machine for the production of blanks in large quantity from sheet material, and is a division of my application Serial No. 599,925, filed November 9, 1922.

In the production of blanks from sheet material, use is commonly made of machines comprising mechanism for feeding a stack of sheets step-by-step to cutting devices which operate intermittently upon the sheets to form a plurality of blanks at each operation. In order to render the operations of such machines more nearly automatic and thereby to increase their capacity, additional mechanism is provided for feeding stacks of sheets, as required, from a pile of sheets in a magazine, into position to be fed by the first-mentioned feeding mechanism.

Considerable difficulty has been experienced in the operation of machines of the type referred to, as heretofore constructed, in feeding stacks of sheets of the proper height from a magazine into position for subsequent feeding movements to the cutting devices. This difficulty has arisen from the fact that the thickness of the sheets of material used is not uniform either with respect to different individual sheets in the magazine or with respect to different parts of the same sheet. This results in uncertainty in the feeding operations and frequently results in damage to the material or to the machine by relative displacement of the sheets in a stack.

In view of the above, the present invention provides improved mechanism for feeding sheet material from a magazine which comprises a novel feeder slide having both feeder and separator surfaces by which sheets are properly separated from the bottom of a pile in the magazine and moved in the desired direction. The illustrated machine is of the type having a magazine for the sheet material, such as leather or leatherboard, from which blanks, such as heel-lift blanks, are to be cut and provided with a feed slide which removes one or more sheets from the bottom of the pile in the magazine.

As shown, the feed slide is provided with a vertical surface to contact with and move sheets from the bottom of the pile, and has a sheet separating and supporting surface for maintaining the unseparated portion of the pile in position during the feeding operation.

It has been found that feed devices of the type referred to operate with greater certainty when the magazine is fairly well filled, since under such conditions the sheets at the bottom of the pile will lie practically level and in close contact. Hence if the pile of sheets in the magazine be allowed to become nearly exhausted there may occasionally be trouble in the feeding due to the failure of a sheet or sheets to lie level in the pile. In view of the foregoing means is provided, therefore, for preventing operation of the machine when the pile of sheets in the magazine has reached a predetermined point of exhaustion, thus forcing the operator to keep the magazine well supplied with material. As shown, this means comprises a detector element controlled by the material in the magazine and operative through connections to prevent the initiation of machine operations when the pile of sheets in the magazine sinks below a predetermined height.

Other features of the invention and novel combinations of parts will be pointed out in the detailed description and in the appended claims.

In the drawings,

Fig. 1 is a view in side elevation partly in section of a cutting machine illustrating the invention;

Fig. 2 is an end view partly in section of the magazine and feeding mechanism for stacks of strips;

Fig. 3 is a view similar to Fig. 2 showing the parts in different operative relations;

Fig. 4 is a plan view, with the stack of strips omitted, of the magazine and feed mechanism shown in Fig. 2; and

Fig. 5 is a view in front elevation of the parts shown in Fig. 4.

The machine construction herein described is disclosed in the aforementioned co-pending application to which reference may

be had for a more complete description of the construction and operation of parts not fully herein disclosed and described.

In the illustrated machine there is provided a table or work support 12 (Fig. 1) which is shown as the top plate of a frame 14 for supporting the operating parts of the machine. A feeder member 16 is operated to move sheet material comprising a stack of strips S step-by-step to a cutter or knife 18 which is actuated to sever, from the end of the stack of strips, a pile of sections, the strips being held during the operation of the cutter by a clamping member 19. As the sections are cut they are aligned vertically against an end gage 20 so that upon upward movement of a plate 22 the sections are forced upon the cutting edge of a die 24 whereby blanks are cut from the sections and are forced upwardly through the die into a magazine 26.

The feeder member 16 is mounted upon a plate 28 (Figs. 1 and 4) adapted to fit in and slide along a guide slot 30 which extends the greater part of the length of the top plate 12. The plate 28 is secured to an endless chain 32 arranged to run around sprocket wheels 34 and 36 mounted in bearings in the frame 14, the chain 32 being arranged to be driven in either direction by means of a gear wheel 38 operatively connected to a motor driven shaft 40. In moving the feeder member 16 step-by-step toward the cutter 18, the gear wheel 38 is rotated intermittently by means of a ratchet wheel 42 and pawl 44 actuated by a cam 46 driven by the shaft 40. In moving the feeder member 16 away from the cutter 18 into position for feeding a fresh pile of strips, use is made of a gear 48 for rotating the gear wheel 38 in a reverse direction. The gear 48 is mounted on a shaft 50 arranged to be intermittently rotated by the shaft 40 through mechanism comprising a clutch 52 which is controlled by a control member or hand lever 54. The arrangement of parts is such that manual operation of the control member 54 renders the clutch 52 operative and initiates a continuous movement of the feeder member 16 away from the cutter 18 into fully retracted position, followed by a step-by-step movement of the feeding member toward the cutter.

Means is provided for separating the stack of strips S from the bottom of a pile of strips S' in a magazine 55, and for moving them in a transverse direction into the path of the feeder member 16 prior to the feeding-in movement of the latter. To this end, the illustrated machine is provided with a feed slide 56 (Figs. 2, 3, 4 and 5) secured to slide members 58 which move in grooves in the top surface of the table. Immediately after the return of the feeder member 16 to its initial position at the left of the table, as shown in

Figs. 1 and 4, the slide 56 is reciprocated to move the stack of strips into position directly over the slot 30 in the table and to return to initial position whereupon the feeder member 16 becomes operative to advance the stack intermittently toward the knife 18. Conveniently the slide 56 is operated from the shaft 50 through the cam wheel 60 which is provided with a cam slot 62 to receive a roll 64 (Fig. 2) on a lever 66 pivotally mounted at 68 in the frame of the machine and having its upper end forked pivotally to receive a block 70 slidable upon a rod 72 and pivotally connected at one end to an arm 76 extending downwardly from the slide members 58. Carried by the rod 72 is an adjustable collar 78 with which one end of the block 70 contacts so that upon motion of the upper end of the lever 66 to the left in Fig. 2 the feeder block 70 is positively returned to initial position, there being interposed between the other end of the block 70 and a collar 80 on the end of the rod 72 a spring 82 so that upon movement of the upper end of the lever 66 to the right in Fig. 2 the feeder slide 56 is moved yieldingly to advance the stack of strips into position to be fed by the member 16.

In order that the slide members 58 may operate simultaneously and to the same extent in the operation of feeding the stack of strips in a direction transversely of their widths, there is provided a rock shaft 88 (Fig. 2) mounted on bars 90 extending rearwardly from the front side of the frame of the machine, the said rock shaft having a plurality of arms 92 fixedly secured thereto and extending upwardly from the rock shaft 88 and having pivotally connected at their upper ends links 94 the other ends of which are pivotally connected to the arms 76 projecting downwardly from the slide members 58. It will be understood that the link 94 which is in alignment with the rod 72 serves as a part of the connecting link in the power means for rotating the shaft 88.

The magazine 55, as shown in Fig. 2, comprises positioning members 98 secured to the top plate 12 at the front of the machine and two end members 100, 102 of which the former is preferably adjustable as by bolts and slots in the supporting plate 104, as clearly shown in Fig. 4 of the drawings.

In the feeding of a given number of strips in a widthwise direction from the lower end of a pile of strips, considerable difficulty is often encountered due to the fact that the strips vary somewhat in thickness and this difference in thickness occurs not only as between individual strips but in various parts of the same strip. It will be clear then that if a plurality of feed fingers should be used, there would be likely to occur a disarrangement of the strip or strips at the top level of the stack of strips being separated, in

which one end of a strip at the level of separation of the strips would be moved forwardly by one finger in the feeding operation while the other end would lag behind due to the fact that it is not engaged by the other feed fingers. Such a mode of operation would result in uncertainty in the feeding operations and be almost certainly the cause of damage to the material and obstruction or damage to the machine. The difficulties incidental to widthwise feeding of strips of material from the bottom of a stack are overcome by the provision of the member 56 which, as shown most clearly in Fig. 4 of the drawings, is provided with a convexly shaped surface 110 for contacting with the piled strips along a vertical line near the longitudinal center thereof, the construction and arrangement being such that contact with the bottom surface of the strip next above those being moved begins adjacent to the said line of contact and spreads from either side of said line toward the ends of the member 56. By this construction of the member 56 any strip adjacent to the level of the plane of separation of the strips which is started in the feeding direction will be carried forward with the stack which is being separated, and the strip superjacent thereto even if certain of its portions are below the horizontal level of the upper surface of the member 56 will be left in place in the magazine as the feeding member moves forwardly under said superjacent strip, since the latter is lifted or wedged upwardly in the advance of the feeding member. Opposed to the positioning members 98 are two or more positioning members 112 which constitute the rear side of the magazine 55. As shown, the positioning members 112 are spaced from the table a distance corresponding more or less closely to the height of the stack of strips which it is desired to move into feeding position. Consequently, the members 112 are provided with offset vertical portions 114 which serve to support a block plate 116 to limit the movement of the stack of strips in a widthwise direction in such manner that the said stack is properly positioned for the operation of the feeding-in member 16. The said members 112 also carry a top guard piece 118 which prevents upward displacement of the strips.

In view of the differences in the thicknesses of strips as already discussed in the foregoing description, it is desirable to provide a special separator means for co-operation with the feed slide 56, the said separator means in the illustrative construction comprising yielding gate members 120 (at least two in number), the lower ends of which are in a plane to engage the topmost strip of the stack being separated and to be moved upwardly thereby so as to be sure

to engage the strip next superjacent to the topmost strip engaged by the feed slide 56 to hold the said strip against movement with the stack being separated by the feed slide. If the said gate members 120, or either of them, should engage the topmost strip being fed in by the feed slide, each gate is so constructed as to yield upwardly until it disengages said strip. By this construction the feed slide is enabled to feed in the proper number of strips without displacement of the strips in the magazine and without meeting obstruction due to the action of the separator means of gates 120. For mounting the gate members 120 there is provided in the construction shown a pair of parallel links 122, 124 (Fig. 3) pivoted to the gate member 120 and to a bracket 126. The lower link 124 has an extension 128 adapted to engage an adjustable abutment 130 which operates to limit the movement of the gate member in a downward direction. While the gate members 120 may be weighted so that they may interpose sufficient resistance to movement of the strips in the magazine, there is preferably provided a spring-pressed plunger 132 which operates upon an arm 134 extending rearwardly from the link 122. Pressure against the upright face of the gate member 120 is transmitted to the plunger 132 which resists the movement but is properly tensioned to yield after the gate member has served its proper function of separating the strips by holding back those above the stack being fed by the feed slide 56. Since the verticality of the gate is maintained by the link mounting described its lower end retains all its effectiveness throughout its movement as a separating means for the layers or sheets of material. The co-operation of the feed slide 56 and the yielding gate members 120 in separating a predetermined number of strips to comprise the stack which is later to be fed in an endwise direction by the feeding-in member 16 is of the greatest importance since the feeding of either one more or one less than the predetermined number would result in obstruction or in improper operation of the machine. In this connection it is pointed out that if a smaller number of strips be provided in the stack to be fed by the feeding-in member 16 than that for which the machine is set, there will be failure to cut the strips properly due to imperfect operation of the clamping member 19 in its co-operation with the cutter 18. By the use of the magazine herein described the operator is enabled to provide a sufficient number of strips for a number of cycles of the machine so that plenty of time will be afforded for exchanging empty magazines for those filled with blanks at the dieing out end of the machine.

It is desirable that the pile of sheets or

strips in the magazine be not allowed to become less than a certain predetermined height in the magazine for the reason that the separating devices comprising the feed slide 56 and the gates 120 work to better advantage when there is a certain pressure on the material from above. Moreover, the sheets or strips at the bottom of the pile are much more apt to lie evenly and to be in close contact with each other if the pile be of a considerable height. To insure the best working conditions for the strip separating and feeding means, there is provided a detector mechanism which will warn the operator of the approaching exhaustion of the supply in the magazine. It may operate to lock the starting means of the machine against operation so that the operator must maintain a certain height of material in the magazine. Upon reference to Fig. 2 one embodiment of the detector means is disclosed as consisting of a detector member 136 which is adapted to project through an opening 138 in the magazine member 98 under the propelling force exerted by a spring 140. When additional strips or sheets of material are introduced from above, certain of them will contact with the rounded end 142 of the detector member 136 and force the latter out of the path of the sheets or strips so that the latter may descend in the magazine without any obstructive effect from the detector member. As soon, however, as the pile of strips or sheets sinks below the level of the detector member the latter is projected into the magazine through the operation of the spring 140 and during this movement of the detector member a stop 144 is positioned in the path of the controller lever 54 so that the latter cannot be moved in a direction to initiate further operations of the machine while the stack of strips or sheets in the magazine is below the predetermined level fixed by the end of the detector member 136. In the construction shown, the stop 144 is part of a lever 146 which is pivoted at 148 on the magazine member 98 and connected at its upper end pivotally to the detector member 136.

Having described my application, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the character described, a magazine for sheets of material to be operated upon, means for feeding sheets from the bottom of the pile in the magazine, and means for preventing initiation of machine operations when the pile of sheets sinks below a predetermined level in the magazine.

2. In a machine of the character described, a magazine for sheets of material to be operated upon, means for feeding sheets from the bottom of the pile in the magazine, and a detector means movable upon a sheet in the magazine which sinks below a pre-

termined level for preventing initiation of machine operations.

3. In a machine of the character described a magazine for holding a pile of sheets to be operated upon by the machine, said machine having a control member for initiating machine operations, a stop movable into and out of position to prevent operation of the control member, and a detector element having connections with the stop and operable to position the stop in operative position with relation to the control member when the stack of sheets in the magazine has sunk below a predetermined level.

4. In a machine of the character described, a magazine for sheets of material to be operated upon, means for feeding sheets from the pile in the magazine, and means controlled by the pile of sheets in the magazine for preventing initiation of machine operations when the pile of sheets sinks below a predetermined level in the magazine.

5. In a machine of the character described, a magazine for sheets of material to be operated upon, means for feeding sheets from the pile in the magazine, and a detector member movable into the magazine upon the sheets in the magazine sinking below a predetermined level and having connections for preventing initiation of machine operations.

6. In a machine of the character described, a magazine for holding a pile of sheets to be operated upon by the machine, said machine having a control member for initiating machine operations, a stop movable into and out of position to prevent operation of the control member, and a detector element arranged to be controlled by the pile of sheets in the magazine, said detector element having connections with the stop and being operable to position the stop in operative position when the stack of sheets in the magazine has sunk below a predetermined level.

7. In a feeding means of the character described, a magazine for material in superposed layers, means for feeding layers from the magazine, and a vertically-arranged gate adapted to yield upwardly away from the layer or layers being moved by the feeding means while maintaining its verticality so that its lower end retains all its effectiveness as a separating means for the layers, the feeding means having means for supporting layers above those being moved by the feeding means.

8. In a feeding means of the character described, a magazine for material in layers, a feed slide having a surface for contacting with the layers to be fed to move the same and having further a surface to separate the layers moved by the first surface from the layers superjacent thereto and to support the

layers in the magazine above those separated during the action of the feed slide.

9. In a feeding means of the character described, a magazine for a pile of sheets, a feed slide operating to remove sheets from the bottom of the pile and having a surface for supporting the remainder of the sheets in the pile, a gate member positioned at the other side of the magazine for co-operation with the feed slide to insure the separation of a stack of sheets of predetermined height, and means for supporting the gate member for movement of translation in a vertical direction.

10. In a feeding means of the character described, a magazine for material in superposed layers, and a feed slide having a feed surface for contacting with the layers to be fed and a convexly shaped surface for separating one or more layers from the pile and for supporting the layers in the magazine above those separated through the action of the convexly shaped surface.

11. In a feeding means of the character described, a magazine for material in superposed layers, a feed slide operating to remove layers from the bottom of the pile and having a surface for supporting the remaining layers of the pile during a feeding operation, and a gate member positioned at the other side of the magazine for engaging the layers above the feed slide for co-operating with the feed slide to insure the separation of a predetermined number of layers.

12. In a feeding means of the class described, a magazine for a pile of sheet material, a feed slide having a vertical surface to contact with and move sheets from the bottom of the pile, said slide having a sheet separating surface operative to separate the sheets engaged by the vertical surface dur-

ing the feeding operation from those superjacent thereto, and a gate member co-operating with the feed slide to separate sheets from the pile.

13. In a feeding means of the character described, a magazine for sheet material, a feed slide for separating sheets from the pile in the magazine and having a surface for supporting sheets not to be separated from the pile, a vertically-arranged gate for cooperation with the feed slide, and a pair of parallel links for movably supporting the gate and causing it to engage sheets supported by the feed slide during the separating operation on the sheets.

14. In a feeding means of the class described, a magazine for a pile of sheet material, a feed slide having a vertical surface to contact with and move sheets from the bottom of the pile, said slide having a sheet separating and supporting surface for maintaining the unseparated portion of the pile in proper position during the feeding operation, and gate members cooperating with the feed slide to separate a stack of sheets from the pile.

15. In a feeding means of the character described, a magazine, means for separating and feeding sheets from the pile in the magazine having means for supporting the sheets in the pile which are not fed during a feeding operation, a vertically-arranged gate for co-operation with the separating and feeding means, and a pair of parallel links for movably supporting the gate and causing it to maintain its verticality during movement to separate sheets from the pile.

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

RALPH C. SIMMONS.