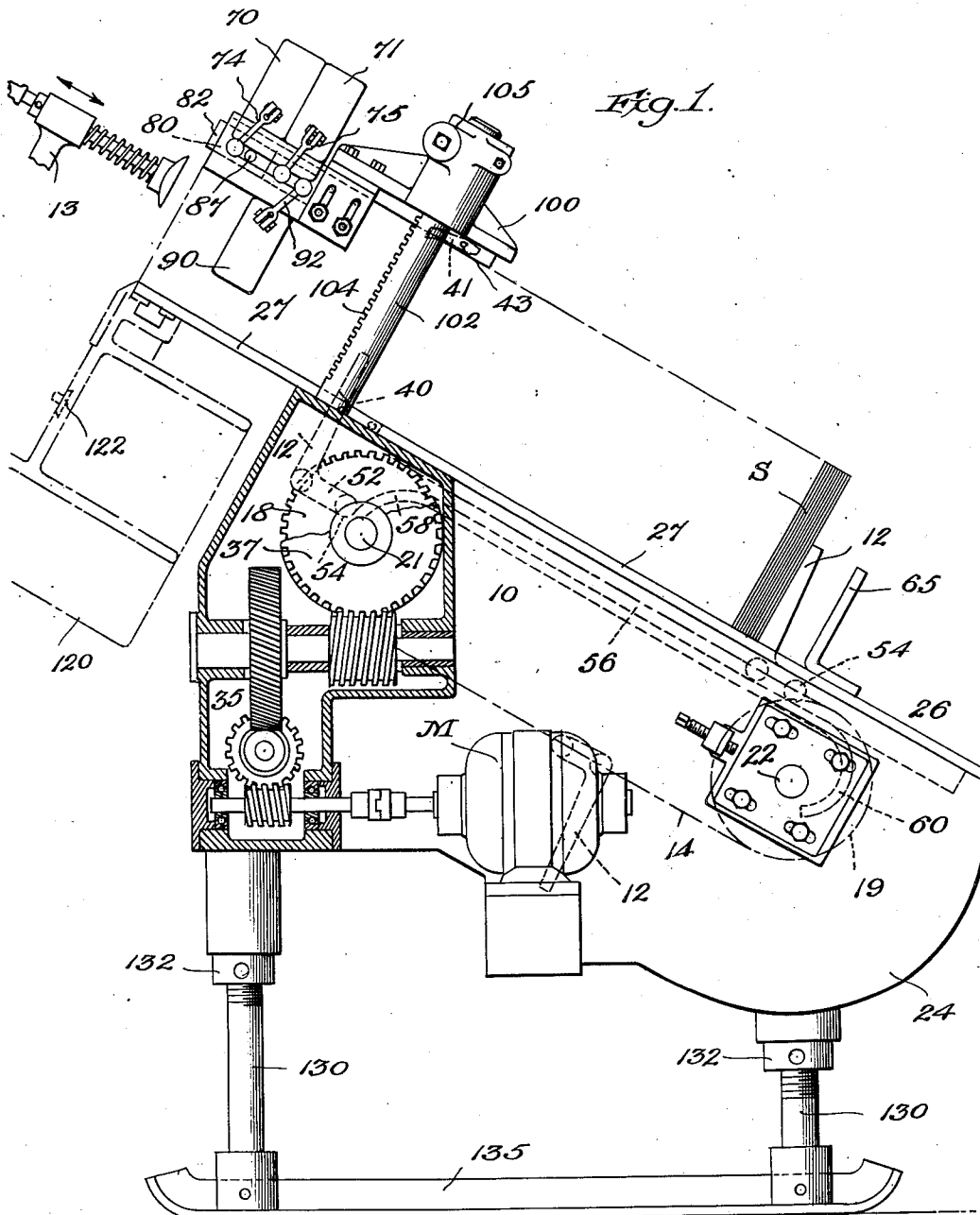


Nov. 29, 1938.

I. PATRICK
AUTOMATIC APPARATUS FOR FEEDING STRIPS OR
SHEETS TO PRESSES OR OTHER MACHINES
Filed Oct. 15, 1937

2,138,306

3 Sheets-Sheet 1



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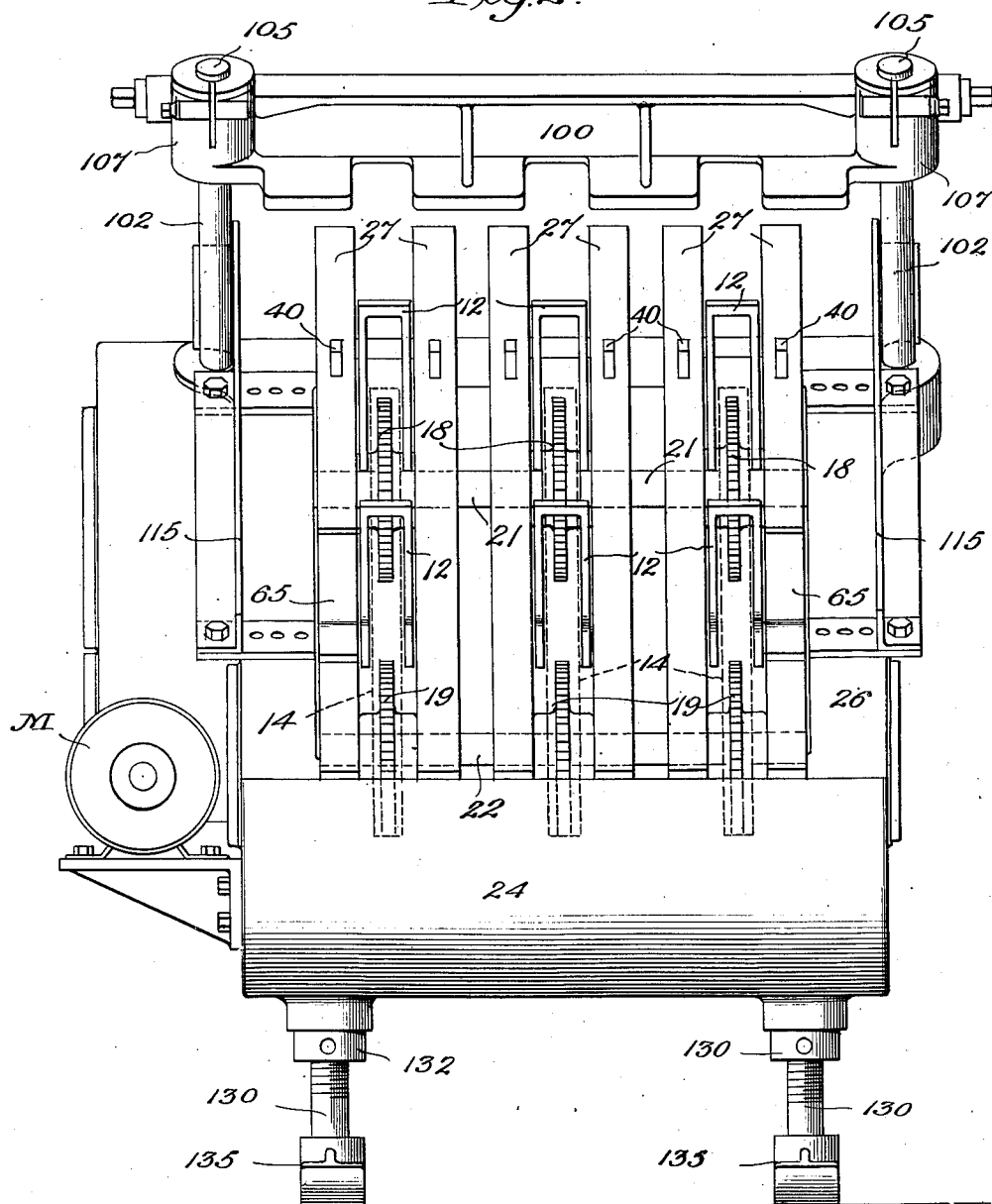
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3 Sheets-Sheet 2

Fig. 2.



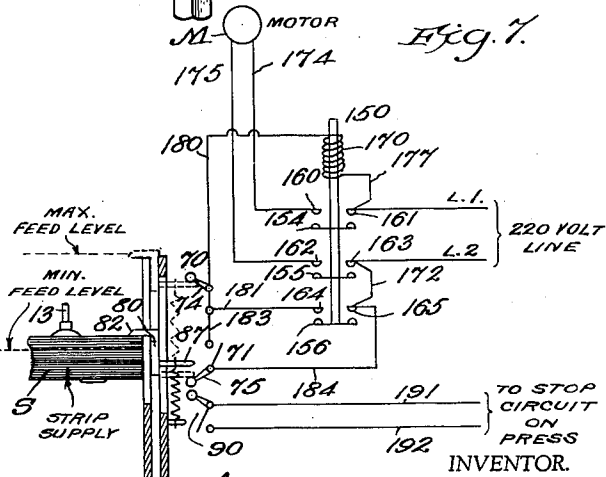
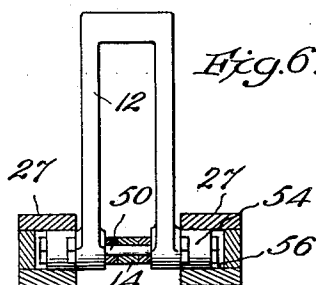
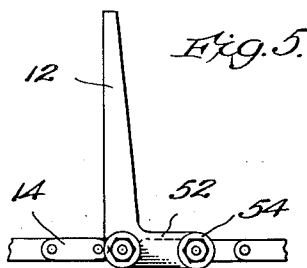
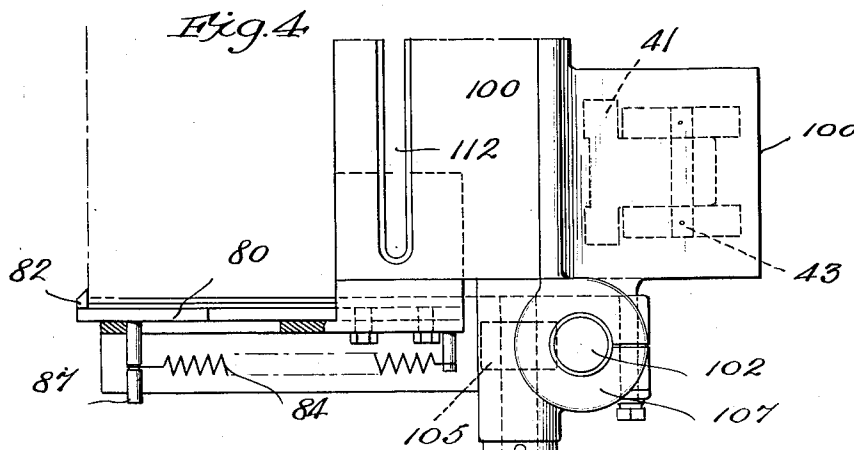
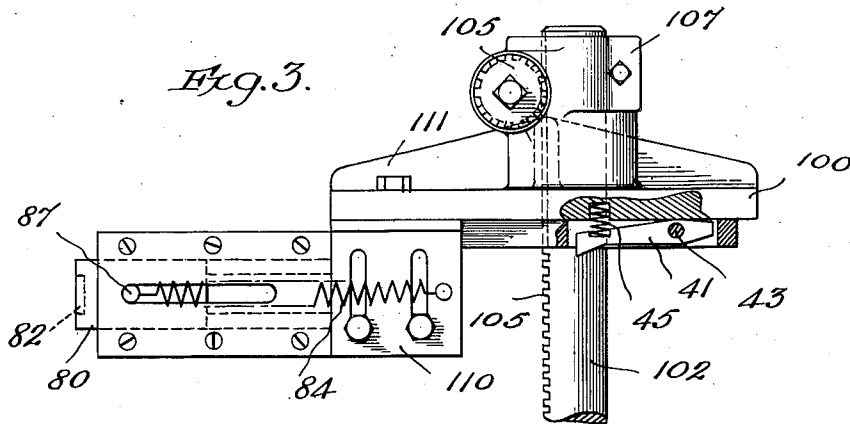
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,138,306

AUTOMATIC APPARATUS FOR FEEDING
STRIPS OR SHEETS TO PRESSES OR
OTHER MACHINESIsaac Patrick, Brooklyn, N. Y., assignor to E. W.
Bliss Company, Brooklyn, N. Y., a corporation
of Delaware

Application October 15, 1937, Serial No. 169,128

10 Claims. (Cl. 271-62)

This invention relates to automatic apparatus for feeding strips or sheets of metal or other material to presses or other machines, and provides improvements therein.

5 The invention provides automatic feeding apparatus capable of receiving a large supply of strips or sheets and capable of replenishment without stopping the running of the feeding apparatus or of the machine to which the sheets are fed. The replenishment can be done at convenient intervals, so that a single attendant can take care of the requirements of a considerable number of machines equipped with the present feeding apparatus. The invention further provides automatic feeding apparatus of the character described as a self-contained unit which may be used alongside of different kinds of machines for working on strips or sheets, for automatically feeding them thereto. The invention further provides automatic feeding apparatus of the character described capable of handling sheets or strips of different dimensions and having straight or scroll-cut sides.

25 An embodiment of the invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevation, with parts in section.
Fig. 2 is a front elevation.

30 Figs. 3 and 4 are respectively a side elevation and top plan view of the plate and certain parts of the motor controlling means attached thereto, which are seen also at the upper left-hand part of Fig. 1.

35 Figs. 5 and 6 are respectively a side elevation and a cross-section of a part of the elevator chain and bracket for raising the stack of sheets or strips.

Fig. 7 is a diagram of the motor and parts for controlling its operation.

Referring to said drawings, numeral 10 designates an elevator having one or more brackets 12 thereon for supporting a stack S of sheets or strips of metal or other sheet-material, which sheets or strips are fed successively from the top of the stack to a press or other machine by means of a reciprocated suction device 13. In the embodiment illustrated the elevator 10 comprises endless chains 14, running over pairs of sprocket-wheels 18, 19 on shafts 21, 22 at upper and lower parts of a frame 24. The apparatus may also include an inclined table 26, which includes a plurality of spaced plates or bars 27, on which the stack S of sheets is partially supported.

55 A motor M is provided for actuating the elevator 10, to raise the stack of sheets S resting

on the bracket 12. In the form of elevator illustrated, the elevator 10 is driven by the motor through a suitable speed reduction gearing 35, and a worm wheel 37 on the shaft 21 carrying one of the sprockets over which the chains 14 5 run.

Dogs 40, 41 or equivalent means are provided, for supporting a portion of the stack S above the lift-limit of the elevator bracket 12. In Fig. 1 the uppermost bracket 12 is shown at its lift-limit, which is substantially flush with the upper edges of the dogs 40, 41. These dogs are suitably arranged on pivots 43, so as to allow the stack S to be raised by the elevator past them, and are pressed toward the stack, as by 15 springs 45, in such manner as to engage the bottom or lower portion of the stack S, and hold the stack or portion of the stack above them while the bracket 12 returns to its lower position to receive another stack of sheets S to be 20 united to the portion of the preceding stack supported by said dogs 40, 41.

Means are advantageously provided for retracting the brackets 12 from the bottom of the stack thereon, at the lift-limit, in line substantially parallel or flush with the bottom of the stack. In the form of elevator illustrated, the bracket 12 is pivoted to the chain, as indicated at 50, and the bracket is also provided with an arm or arms 52 having projecting rollers 54 30 thereon which make contact with a guide 56, which guide may be in the form of a cam groove formed in one or more of the table bars 27. During the upward flight of the chain 14 the rollers 54, on the arms 52 of the bracket 12 run 35 on the guide 56, and while on said guide the bracket 12 is held substantially perpendicular to the line of lift of the elevator. At its upper part the guide 56 is provided with a curved or cam-shaped portion 58, against which the roller 40 54 on the bracket 12 runs, and the contour of which is such as to maintain the bracket in its position substantially perpendicular to the line of lift while the chain 14 on which it is pivoted bends around the sprocket 18, and thereby re- 45 tract or withdraw the said bracket 12 laterally along the bottom face of the stack S. After the roller 54 passes off of the cam shaped portion 58 of the guide, it may turn on its pivot, and hang down as shown in Fig. 1. The lower portion of 50 the guide 56 is also provided with a cam-shaped portion 60, with which the roller 54 on the arm 52 of the bracket 12 makes contact, and is thereby lifted or righted so that when the straight portion of the guide 56 is reached the bracket 12 55

stands in the position heretofore described, perpendicular to the line of lift, and in position to receive a fresh stack S of sheets or strips.

For greater facility or convenience in the use of the apparatus, a rest 65 is provided, which rest is conveniently fastened on one or more of the bars 27 of the table 26 at a lower part thereof. A single attendant usually takes care of a number of these automatic feeding apparatus, and, when the rest 65 is provided, he can place a stack of sheets on the rest 65 whenever he has an opportunity and irrespective of the position of the bracket 12. When a stack of sheets is resting on the rest 65, and the bracket 12, in the course of its movement, comes to the position of the said rest 65, the stack of sheets is transferred from the rest 65 to the bracket 12, and raised by the elevator to unite with the portion of the preceding stack held by the dogs 40, 41.

Means are provided for controlling the movement of the elevator so as to always maintain a stack of sheets above the dogs 40, 41. In the form of embodiment shown the controlling means comprises a stopping switch 70 and a starting switch 71 in the circuit of the electric motor M. These switches have arms 74, 75 respectively, and the switches 70, 71 are actuated through the arms 74, 75 by means of a part 80 which has a movement in relation to the height of the stack above the dogs 40, 41. Part 80 is conveniently in the form of a slide having a hook or projection 82 thereon which projects over and makes contact with the top of the stack. The projection 82 on the slide 80 is normally pressed toward the top of the stack by means of the spring 84. The slide 80 carries a projection 87, which is positioned between the arms 74, 75 of the switches 70, 71.

When the height of the stack S is reduced a predetermined amount, the slide 80 co-acting with the top of the stack by means of the hook or projection 82, is pulled by the spring 84 to a position where the projection 87 thereon makes contact with and turns the arm 75 to close the switch 71. This starts the motor M in operation and actuates the elevator 10 to raise a stack of sheets S thereon to bring said stack against the bottom of the preceding stack resting on the dogs 40, 41, and the elevator continues to operate after the stacks are united as aforesaid, until the united stacks reach a predetermined position which moves the slide 80 to a position where the projection 87 thereof is brought into contact with and moves the arm 75 of the switch 70 to cut off the motor M.

Numeral 90 designates a cut-off switch which may be placed in the circuit of the motor which operates the press or other apparatus with which the present feeding apparatus is connected. The purpose of the switch 90 is to stop the running of the press in case the elevator 10 fails to operate, or in case the attendant fails to properly supply the feeding apparatus with a stack of blanks to be lifted by the elevator. The operation of the switch 90 is effected by the projection 87 on the slide 80. If after the projection the arm 75 is turned to operate the switch 71 the height of the stack resting on the dogs 40, 41 continues to be reduced, the projection 87 will be moved further downward, causing the arm 57 to move against an arm 92 of the switch 90, and through the arm 92 effect the opening of the switch 90.

The feeding apparatus is adaptable for sheets

and strips of different dimensions, and for either straight or scroll cut edges. To this end the apparatus may be provided with a plate 100 extending across and adjustable toward the face of the table 26. The plate 100 may be supported by posts 102 projecting from the frame 24, and the adjustment aforesaid may be effected by means of a rack 104 on the post 102 and a pinion 105 mounted on a hub 107 attached to said plate 100. The dogs 41 are conveniently attached to the plate 100 and move toward and from the table 26 with plate 100 as the said plate 100 is adjusted for sheets of different size. The slide 80, and the switches 70, 71 are also preferably mounted on the plate 100 (and move therewith as it is adjusted) through a suitable connection such as an L-shaped bracket indicated at 110. The connection 110 is advantageously made adjustable, for sheets of different length, in a suitable manner by means of a bolt 111 projecting through a transverse slot 112 in the plate 100.

The table 26 may be provided with adjustable side pieces 115, the adjustability providing for sheets of different length.

In Fig. 1 there is indicated in dot and dash lines, a part 120 of the feed mechanism of the press. The sheets successively removed from the top of the stack S by the suction device 13 are dropped onto the part 120, and thence fed laterally to the press by suitable means, a part of which is indicated at 122. Where a press or other machine is not provided with the parts indicated at 120, these can be combined with the feeding mechanism herein previously described.

The apparatus is conveniently formed as a self-contained unit so as to be sold and used in connection with different machines. To this end the frame 24 is conveniently mounted on legs 130 and means 132 may be provided for adjusting the height of the frame on the legs. The legs may also be mounted on skids 135 to facilitate the transfer of the feeding apparatus from one machine to another.

Referring to the diagram, Fig. 7, numeral 150 designates a multiple switch comprising a movable part or armature 152 and having contact-arms 154, 155, 156 thereon which cooperate with pairs of fixed contacts 160, 161; 162, 163; 164, 165, to make and break the electrical connection through said pairs of fixed contacts. A solenoid 170 is provided for moving the armature 152 to bring the arms 154, 155, 156 into contact with the pairs of contacts 160—165, and the armature is moved to break the contact between said arms and the pairs of contacts 160—165 in a suitable manner; as diagrammatically shown, the armature 152 moves to break said contact under the force of gravity. In practice, the multiple switch is a commercial unit sold by the General Electric Company. L1 and L2 designate leads from an electrical line, which are connected to the contacts 161, 163 respectively. The contact 163 is connected to contact 165 through a conductor 172. Leads 174, 175 from motor M are connected to contacts 160, 162. The solenoid 170 is connected to contact 161 by a conductor 177 and also to contacts 164 and 165. The connection to contact 164 is through conductors 180, 181 and switch 70 (normally closed) and the connection to contact 165 is through conductor 183 (branching from 181) switch 71 (normally open) and conductor 184. Numerals 191, 192 designate conductors leading from the cut-off switch 90

to the control-switch of a press-motor or the like (not shown).

The parts are in the position shown when the projection 87 on slide 80 is not in contact with either of the arms 74, 75 of the switches 70, 71.

The motor M is started when the projection 87 on the slide 80 makes contact with the arm 75 of switch 71, and closes said switch. The projection 87 acts to close switch 71 when the height of the stack S (by reason of the feeding of sheets from the top) decreases to a predetermined level, as that indicated by the dotted line, Fig. 7, designated the minimum feed level. The closing of switch 71 establishes a circuit through L1, conductor 177, solenoid 170, conductor 180, normally closed switch 70, conductor 183, switch 71, and conductors 184 and 172 to the opposite side L2 of the line, energizing the solenoid 170 which moves the armature 152 so that the arms 154 and 155 close the circuit to motor M through the contacts 160, 161, conductors 174 and 175 and contacts 162, 163.

The motor M, being energized, causes the elevator bracket 12 to lift the stack S, the lifting or raising of the stack continuing until the top thereof reaches a predetermined height, indicated by the dotted line Fig. 7, maximum feed level.

As the projection 87 on slide 80 moves away from the arm 75 of switch 71, (as the slide 80 is moved by reason of the engagement of the hook 82 thereon with the top of the stack) the switch 71 will be opened; the motor M however will continue to operate to raise the stack S because the armature 150 will continue to maintain the arms 154, 155 in contact with 160, 161, 162, 163. When the switch 71 opens, a holding circuit through the solenoid 170 is maintained as follows: lead L1, conductor 177, solenoid 170, conductor 180, normally closed switch 70, conductor 181, contact arm 156, and contacts 164, 165, conductor 172, lead L2.

When the top of the stack S reaches a predetermined height, indicated by the dotted line Fig. 7, designated maximum feed level, the projection 87 on slide 80 will have been brought in position to move the arm 74 of the normally closed switch 70, to open said switch. The opening of switch 70 will break the circuit through the solenoid 170, which will allow the armature to open the circuit established through the multiple armature 150, and thereby stop the operation of the motor M.

Résumé of operation

The attendant places a stack S of sheets or strips on a bracket 12 of the elevator 10, or upon the rest 65 which is provided in the preferred form of the apparatus, from which rest 65 the stack S is transferred to the bracket 12, as previously described. The motor M is then started. This may be done by manually turning the arm 75 of the starting switch 71. This causes the elevator 10 to lift the stack S on the bracket 12. The lifting is continued until the stack passes the dogs 40, 41 and the top of the stack reaches a position in proximity to the suction device 13, which in the form of embodiment shown would be at or near the upper ends of the bars 27. The top of the stack in this position has been engaged by the hook 82 on the slide 80 and the slide 80 has been moved to a position where the projection 87 thereon has moved the arm 74 of switch 70 to break the circuit to the motor M.

The reciprocated suction device 13 successively removes sheets or strips from the top of the stack, reducing the height of the stack. When the height of the stack is reduced a predetermined amount, the slide 80 is retracted by the spring 84 to a position where the projection 87 on the slide makes contact with the arm 75, and turns it to close the circuit to the motor M through the switch 71. The elevator 10 then resumes lifting of the stack until the operation of the elevator is again stopped by the action of the slide 80, projection 87 and switch 70, as previously described. When the bracket 12 reaches the limit of its lift, it is retracted from the underside of the stop. At this position the bottom of the stack is engaged by the dogs 40, 41, which hold the stack after the bracket 12 is retracted. The retraction of the bracket 12 is preferably performed in such a way as to slide laterally along the bottom face of the stack. In the embodiment illustrated this is effected by the bending of the chain 14, (to which the bracket 12 is pivoted) around sprocket 18, and the action of the cam 58 of the guide 56 during this time, as previously explained. The bracket 12 maintains a position substantially perpendicular to the line of lift until the roller 54 on the arm 52 of said bracket runs off of the cam portion 58 of the guide. Thereafter the bracket 12 may swing away from the underside of the stack, and is righted by the cam portion 60 of the guide 56 as the chain bends around the sprocket 19 and resumes its upward movement. At convenient times the attendant has stacked sheets on the rest 65. The bracket 12 in the course of its upward movement acts to transfer the stack already upon the rest 65 to the bracket 12.

When the height of the stack resting on the dogs 40, 41 is reduced a predetermined amount, the switch 71 is again operated by the projection 87 on slide 80 to close said switch 71 and again start the operation of the motor M and the elevator 10 driven thereby.

The motor and the elevator 10 continue to operate until the new stack on the bracket 12 is united with the portion of the preceding stack resting on the dogs 40, 41, and thereafter the lifting continues until the elevator is stopped by the projection 87 on slide 80 operating the switch 70 through arm 74 to break the circuit to the motor and stop the movement of the elevator.

What is claimed is:

1. In automatic apparatus for feeding strips or sheets to presses or the like wherein the topmost sheets or strips are successively fed from the top of a stack and the stack is raised by elevating means as sheets or strips are removed from its top so as to bring the topmost sheets or strips of the stack into position to be acted on by the sheet removing means, an elevator having a bracket thereon for supporting a stack of sheets, a motor for actuating said elevator to raise and lower said bracket, dogs arranged to support a portion of said stack above the lift-limit of said elevator bracket while said bracket returns to its lower position to receive another stack of sheets to be united to the portion of the preceding stack supported by said dogs, a rest at a lower part of the elevator for supporting a stack of sheets in position to transfer the stack thereon to said elevator-bracket following the return-movement thereof, and means for controlling the movement of said motor-driven elevator.

2. Apparatus of the character described ac-

cording to claim 1, further comprising means for retracting said bracket at the lift-limit of the elevator substantially parallel to the underside of the stack.

5 3. Apparatus of the character described according to claim 1, wherein said elevator comprises an endless chain and a pivotal connection between said bracket and chain, and further comprising means for holding said bracket
10 substantially parallel with the underside of the stack during the rising movement of the bracket.

4. Apparatus of the character described according to claim 1, wherein said elevator comprises an endless chain and a pivotal connection
15 between said bracket and chain and further comprising means for holding said bracket substantially parallel with the underside of the stack during the rising movement of the bracket, and also during the bending movement of the chain
20 at the upper part of the elevator while the bracket is being retracted from the underside of the stack.

5. Apparatus of the character described according to claim 1, wherein said elevator comprises an endless chain and a pivotal connection
25 between said bracket and chain, and a guide cooperating with said pivoted bracket to hold it substantially parallel with the underside of the stack during the rising movement of the bracket and during the bending of the chain.
30

6. Apparatus of the character described according to claim 1, wherein said means for controlling the movement of said motor driven elevator comprises a starting and stopping device,
35 and a part cooperating with the top of said stack and movable in accordance with the height of the stack above said dogs, and operating on said starting and stopping device to stop the operation of the motor when said stack exceeds a predetermined height and to start the operation of said motor when said stack falls below a predetermined height.

7. Apparatus of the character described according to claim 1, further comprising an inclined table against which a side of the stack rests, and a plate extending across and adjusta-

ble toward the face of said table, said dogs being mounted on said table and plate respectively.

8. Apparatus of the character described according to claim 1, further comprising an inclined table against which a side of the stack
5 rests, and a plate extending across and adjustable toward the face of said table, said dogs being mounted on said table and plate respectively, and said controlling means comprising a part
10 mounted on said plate cooperating with the top of said stack and movable in accordance with the height of the stack above said dogs.

9. In automatic apparatus for feeding strips or sheets to presses or the like wherein the topmost sheets or strips are successively fed
15 from the top of a stack and the stack is raised by elevating means as sheets or strips are removed from its top so as to bring the topmost sheets or strips of the stack into position to be acted on by the sheet removing means, an elevator having a bracket thereon which the elevator
20 moves upwardly in one path and downwardly in another, means for actuating said elevator to raise and lower said bracket, a rest at the lower part of the elevator for supporting a stack of sheets in the path of the upward movement of said bracket, said bracket in the course of its upward movement lifting a stack of sheets from said rest and thereby transferring the stack from
25 said rest to said bracket, dogs arranged to support a portion of said stack above the lift-limit of said elevator bracket, while said bracket returns to its lower position to lift from said rest another stack of sheets to be united to the portion of the preceding stack supported by said dogs, and means for withdrawing said bracket from beneath the stack as the bracket reaches
30 its lift-limit and starts upon its downward movement, said stack being at this time transferred from said bracket to said dogs.

10. Apparatus of the character described according to claim 9, further comprising means
40 cooperating with the top of the stack for controlling the movement of said elevator actuating means.

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