March 19, 1946. J. CUTLER 2,396,988

MECHANISM FOR REMOVING BLANKS FROM MAGAZINES AND TRANSFERRING THE BLANKS TO MANDRELS

Original Filed July 10, 1943 5 Sheets-Sheet 1

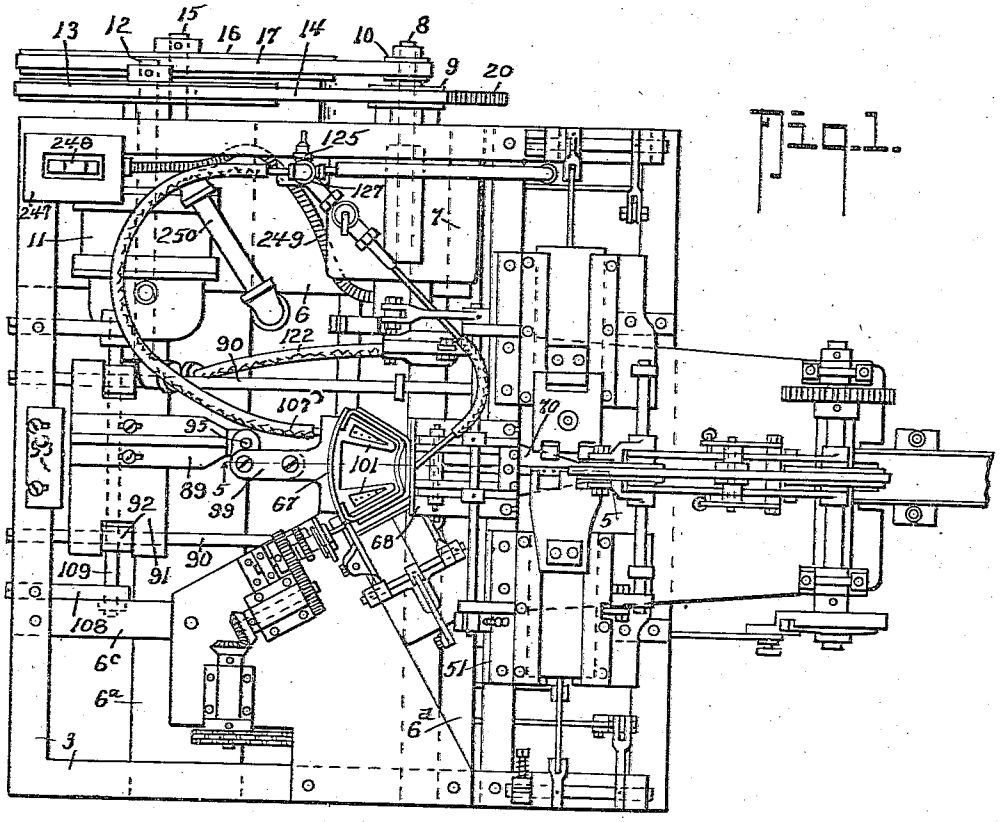

Fig. 1.

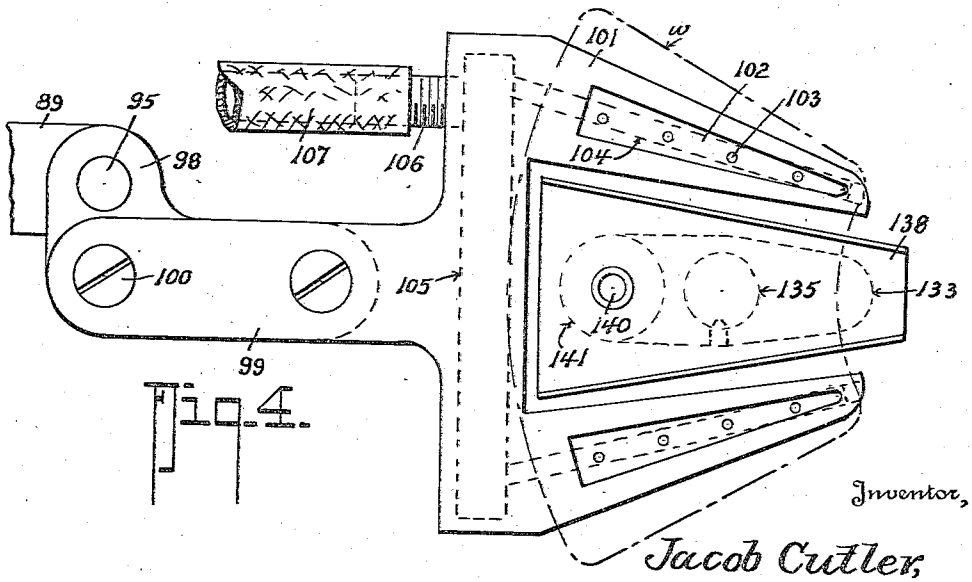

Fig. 4.

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Fig. 2.

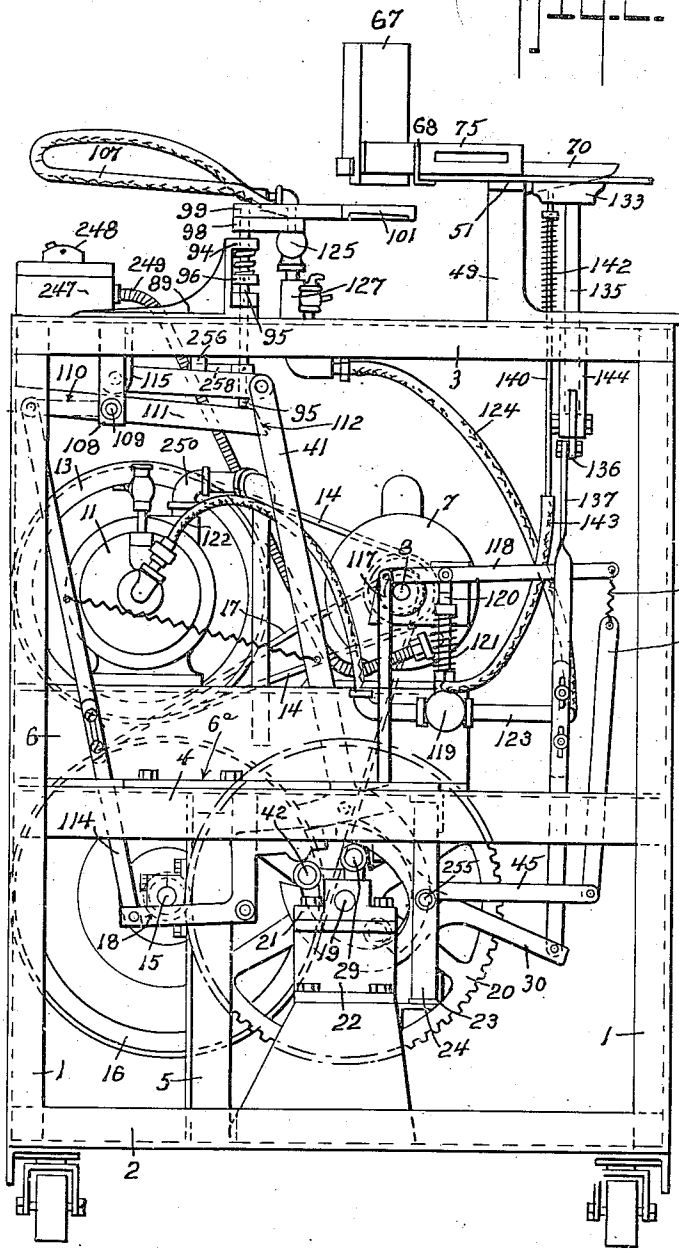

Fig. 3.

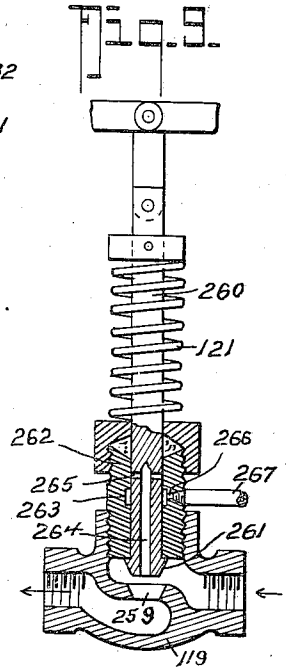

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Fig. 3.

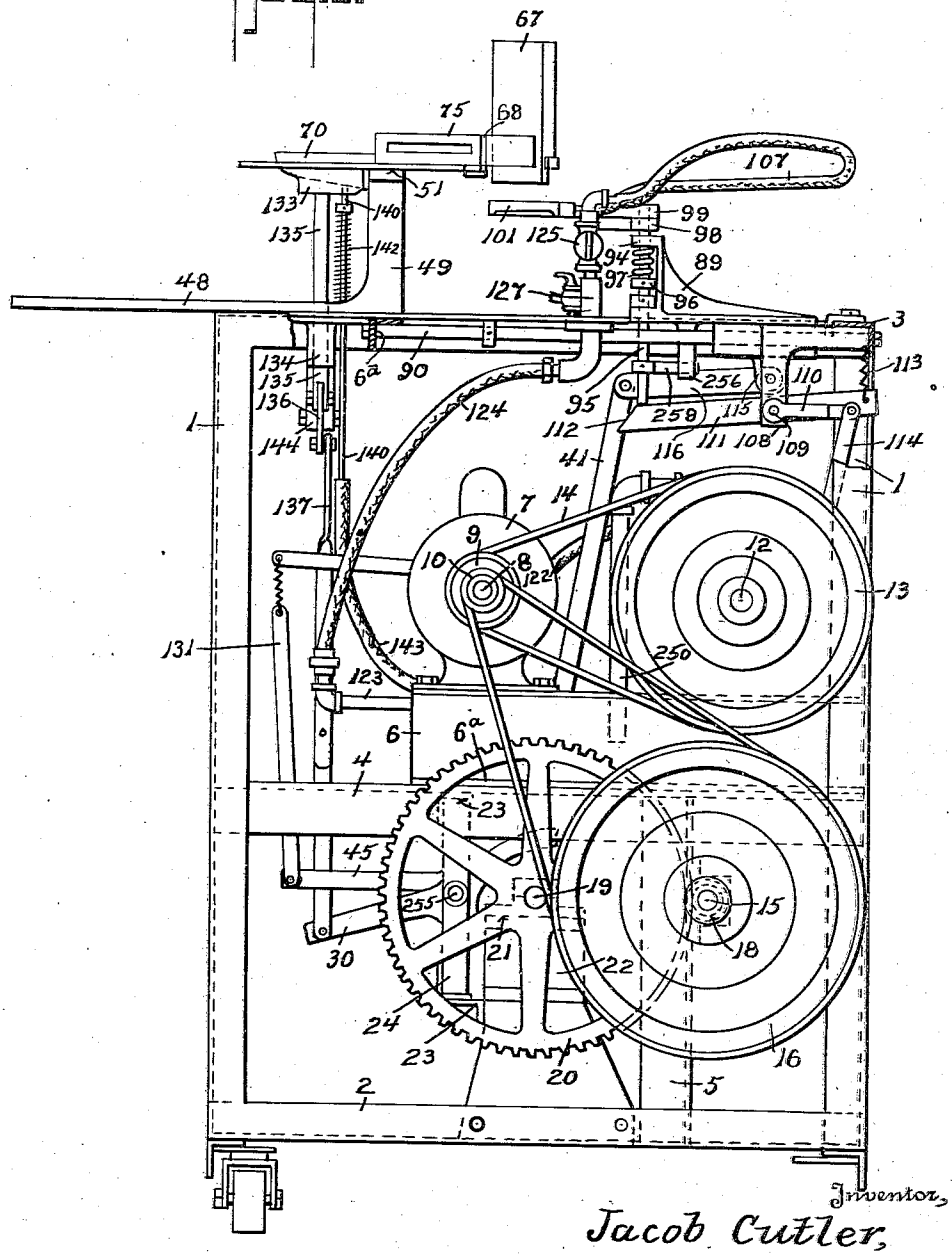

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Fig. 5.

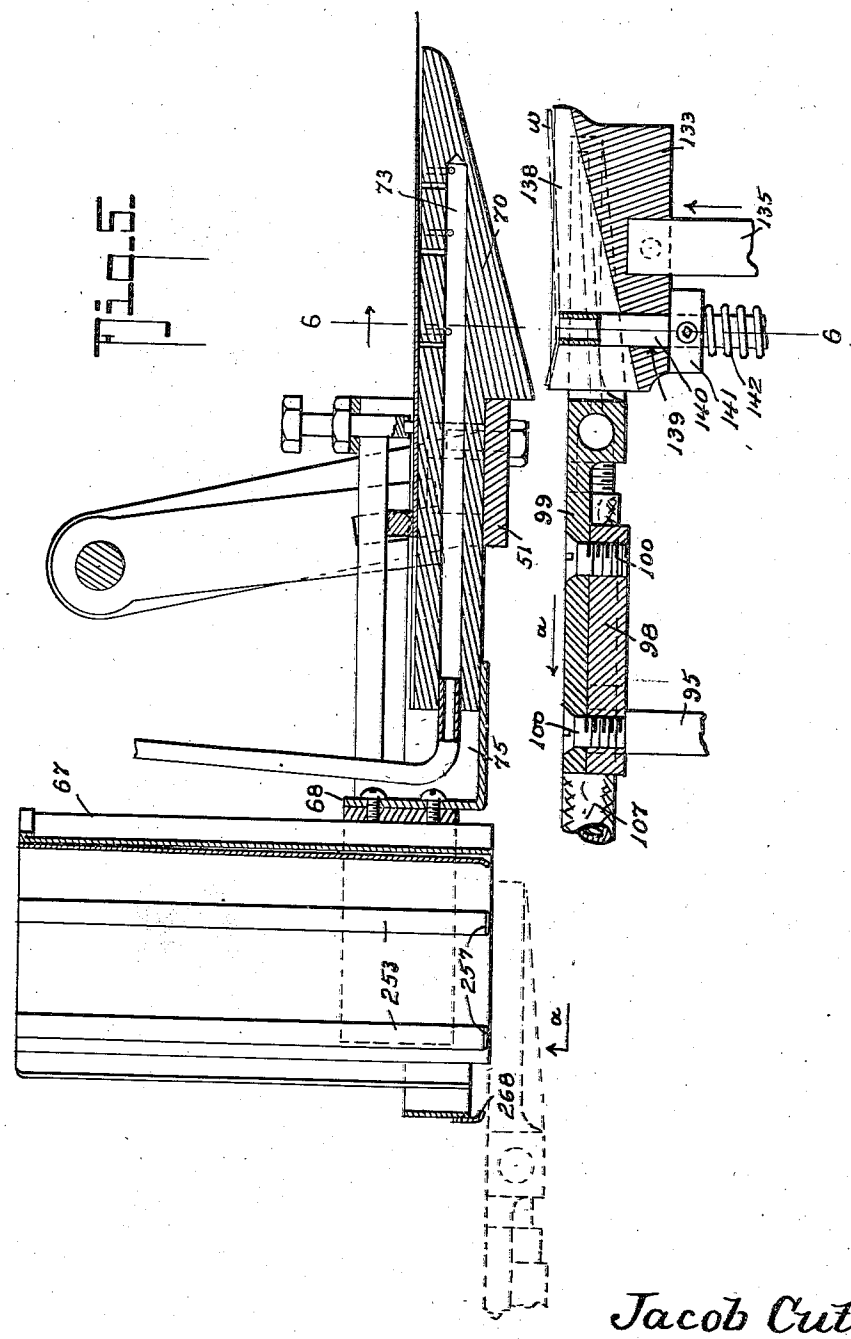

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Fig. 6.

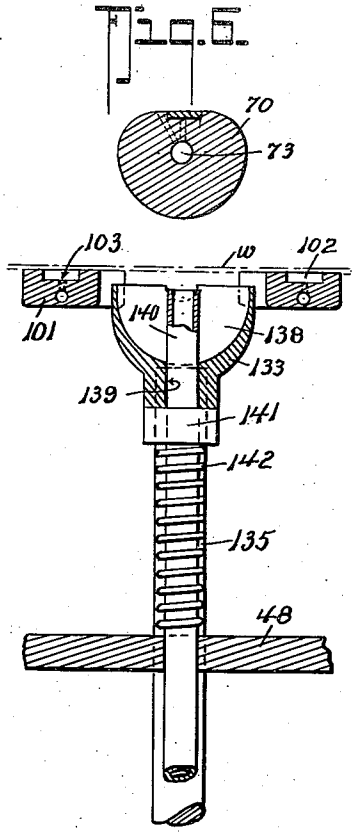


Fig. 7.

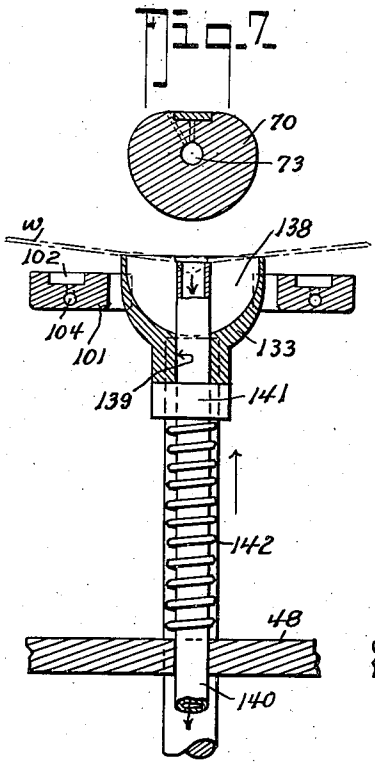


Fig. 8.

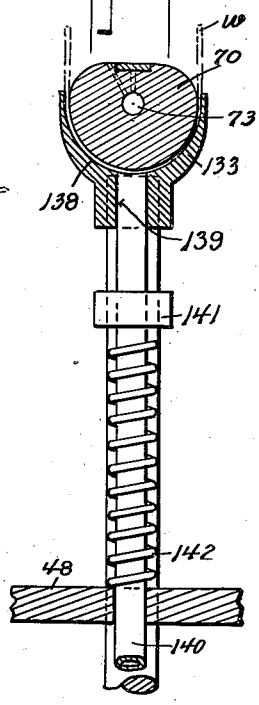


Fig. 10.

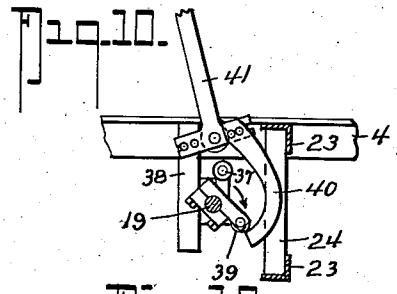


Fig. 11.

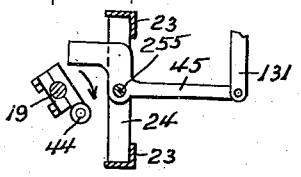


Fig. 12.

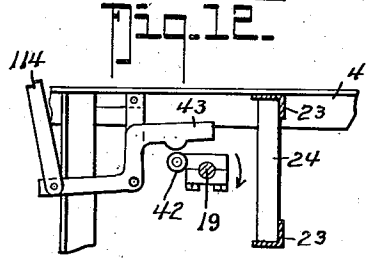
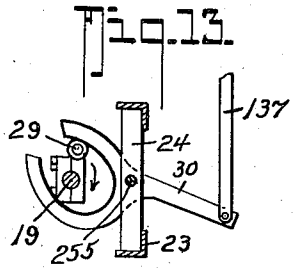


Fig. 13.



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Patented Mar. 19, 1946 2,396,988

UNITED STATES PATENT OFFICE

2,396,988

MECHANISM FOR REMOVING BLANKS FROM MAGAZINES AND TRANSFERRING THE BLANKS TO MANDRELS

Jacob Cutler, Mattapan, Mass.

Original application July 10, 1943, Serial No. 494,239. Divided and this application November 13, 1944, Serial No. 563,244

5 Claims. (Cl. 271—44)

My present invention relates to mechanisms for removing blanks from a magazine in which they are stacked and carrying them to and placing them on a mandrel on which the blanks are formed into jackets.

More specifically the present invention lies in a blank transferring mechanism that is particularly adapted for use in the cone jacket forming machine which constitutes the subject matter of my original application filed July 10, 1943, Serial No. 494,239, of which application the present one is a division.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Fig. 1 is a top plan view of a machine in which my invention is embodied, the machine being that disclosed in my original application aforesaid.

Fig. 2 is a side elevation of so much of the machine as particularly relates to the present application, the remaining parts of the machine being omitted.

Fig. 3 is a similar view looking at the side opposite that of Fig. 2.

Fig. 4 is an enlarged detail plan view of the blank-carrying fork member and the blank-lifting member.

Fig. 5 is an enlarged detail vertical section on about the line 5—5 of Fig. 1, parts being omitted.

Fig. 6 is a cross section on the line 6—6 of Fig. 5, showing the position of the blank lifter at its lowest position.

Fig. 7 is a view similar to Fig. 6 showing the blank lifter on its upward course and having reached the position shown in Fig. 5.

Fig. 8 is a view similar to Figs. 6 and 7, showing the position of the parts when the lifter has brought the blank to the mandrel, at which time the blank-carrying fork will have been withdrawn from embracing the lifter.

Fig. 9 is an enlarged detailed vertical section of the valve device which controls the vacuum actions.

Figs. 10 to 13 inclusive are detail views of the various cam elements that effect the operation of the various parts of the present invention.

In the drawings in which like numerals and letters of reference indicate like parts in all the figures, the same reference numbers and letters have been used as are used on like parts of the machine disclosed in my original application aforesaid.

In general, the machine of my original application (in which machine the present invention is especially useful) embodies a supporting frame, a drive motor, a vacuum pump, a magazine for the jacket blanks, a means to apply adhesive to the blanks as they are taken from the magazine, a conveying means to take the blanks from the magazine and convey them to the mandrel on which they are formed, a means to fold the blanks about the mandrel and cause the adhesive to function, and a mechanism for stripping the blanks from the mandrel and discharging them from the machine.

The subject matter of the present application involves only the mechanisms that take the blanks from the magazine, carry them to a position beneath the mandrel and raise the blanks into contact with the mandrel.

The frame of the machine comprises vertical corner angle bars 1, bottom side and end angle bars 2, top angle bars 3, intermediate side angle bars 4, vertical supports 5 and horizontal supports 6, 6^a, 6^b, 6^c, and 6^d.

Mounted on the support 6 is a driving electric motor 7 and a vacuum pump 11. The motor 7 has a drive pulley 9 and a smaller drive pulley 10 secured to its shaft 8 (see Fig. 3), while the pump shaft 12 carries a large driven pulley 13. The pulleys 9 and 13 are connected by a belt 14, thereby constituting a reduction speed drive for the pump. The small pulley 10 is connected by a belt 17 to a large pulley 16 on a stub shaft 15. The pulley 16 is secured to the stub shaft 15 as is also a pinion 18 which meshes with a master gear 20 on a cam-shaft 19.

The cam-shaft 19 is journalled in suitable bearings 21 that are mounted on supports 22 which are carried by the side bars 2 of the frame.

Secured to the bars 4 is a transverse angle bar 23, there being another such bar 23 mounted below and secured to the supports 22. Secured, at suitably spaced intervals, to the bars 23 are vertical supports 24 for the pivots 255 of the several cam levers shown in detail in Figs. 10 to 13 inclusive.

The operating cams

Referring now particularly to Figs. 2, 3 and 10 to 13 inclusive, it will be seen that the several cams comprise split clamps that carry the various

cam rollers. Fig. 10 shows the jacket blank carrier advancing cam 37, the blank carrier retracting cam 39 and the respective arms 38 and 40 of the lever 41 which cooperate with the cams 37 and 39, respectively. Fig. 11 shows the vacuum control cam 44 and its lever 45. Fig. 12 shows the cam 42 and its lever 43 which serve to effect the raising and lowering of the jacket blank carrier when the carrier is beneath the magazine. Fig. 13 shows the cam 29 and its lever 30 which effect the raising and lowering of the device which lifts the blanks to and partly about the mandrel.

The blank transfer mechanism

Slidably mounted on rigid guide rods 90 is a carriage 91 (Fig. 1) which carries a bracket 89. Oil pads 92 are located on the rods 90 between furcations of the sliding carriage 91 and slide with it along the rods to lubricate the bearing surfaces. 93 is a back-stop for the carriage and is secured to the frame adjustably.

Vertically, slidably mounted in suitable bearings in the bracket 89 (Figs. 3, 4 and 5) is a rod 95 to the top of which is rigidly secured an offset bracket 98, to which the blank removing and carrying forked member (or transfer member) 99 is rigidly fastened, as at 100. The rod 95, between the upper and lower bearings 94, carries a spring 97 and a spring-tension-adjusting collar 96. The shaft or rod 95 is held from turning on its axis by means of an arm 258 whose end is slidable in a vertically slotted stud 256 that is secured to the bracket 89 (Fig. 3).

The jacket blanks transfer member 99 includes converging arms 101 having along their upper faces longitudinal grooved portions 102. Ducts 104, 105 are formed in the member 99 and communicate with ports 103 in the grooved portions 102 (Fig. 4). The duct 105 is connected to a flexible duct 107 by means of a nipple 106. The duct 107 is connected to the suction regulating valve 125 that communicates with the suction pump 11 via fitting 127, flexible duct 124, rigid duct 123, suction control valve 119, and flexible duct 122 (Figs. 2 and 3).

Brackets 108, secured to the frame of the machine, carry a rock shaft 109 and an arm 110. A connecting rod 114 connects arm 110 with cam lever 43 (Figs. 2 and 12). Secured to the shaft 109 is a lever or rocker arm 111 having a beveled edge 112. The lever 111 lies in the plane in which the rod 95 is moved by the carriage 91 so that when the carriage is in its retracted or back position the rod 95 will have ridden up onto the end of lever 111 (Fig. 3). A spring 113 connects the rear end of lever 111 with the frame of the machine and constantly tends to urge the lever 111 to lower its beveled end.

The sliding carriage 91 also has a slotted lug 115 to which is pivoted one end of a link 116, the other end of which is pivoted to the cam lever 41.

The suction control valve

The suction control (on and off) valve 119 has its stem 120 linked to a lever 118. One end of the lever 118 is pivoted to a bracket 117, while the other end thereof is joined by a spring 132, constituting a yieldable connection, to the connecting rod 131 that joins to cam lever 45.

The valve 119 is of a special kind in order to effect properly the timely action of the suction means. This valve comprises a casing having a valve seat 259 for controlling the main passage. The neck 262 of the valve has an annular groove 263 from which leads a port 266 to the nipple 267 to which the flexible duct 143 connects.

The stem 260 of the valve has the valve plug 261 which cooperates with the seat 259. The stem also has a bore 264 entering its lower end. Ports 265 effect communication between the bore 264 and the groove 263 when the plug 261 is seated, i. e. when the stem 260 is pressed down by the lever 118, thereby cutting off the suction to the fork fingers 101 and the mandrel and establishing suction in the pipe 140.

The valve stem 260 is held down only for a short time, namely only while head 133 is taking a blank off the blank transfer member 99 (Fig. 7) and elevating it to the mandrel 70. As soon as pipe 140 contacts the mandrel and is depressed to the bottom of the groove 138, valve 119 returns to normal position i. e., with passage via seat 259 open and passage via 264, 263, and 266 closed.

Located for up and down movement beneath the operative part of the mandrel 70 is a grooved folding head 133 that is carried by a vertically reciprocatable rod 135. The rod 135 is mounted in a bearing boss 134 (Fig. 3) depending from the plate 48 and is pivoted at its lower end to a lever 136 that is fulcrumed in a second boss 144, also depending from the plate 48. The lever 136 is connected, by a connecting rod 137, with cam lever 30 (Fig. 13).

The groove 138 in the head 133 conforms to the shape of the mandrel 70. The head has a bore 139 intersecting the groove 138, through which bore a pipe 140 projects. The pipe 140 is held with its upper or free end located on a level preferably slightly below the level of the top of the head, by means of a spring 142 and a stop collar 141. The lower end of the pipe 140 is connected to a flexible duct 143 (Figs. 2 and 3) which in turn connects to and is controlled by the valve 119.

The blank magazine 67 is fixedly held by a bracket 68 which in part also carries the slotted guides 75 and the mandrel 70, the latter also being supported on the cross bar 51. The magazine 67 is provided with leaf springs 253 and a finger 268 for holding the pack of blanks from falling out of the magazine, and for this purpose the springs 253 have their lower ends 257 bent inwardly (Fig. 5).

Operation

Assume the parts to be in the position shown in Figs. 1, 2 and 3. At this time the blank transferring mechanism is in its retracted position, the fork 99 lying directly beneath the magazine 67.

Cam 42 is just about to engage lever 43 (Fig. 12) to cause lever 111 to lift rod 95 and the jacket-transferring member 99 in order to gather a jacket blank from the magazine. Continued operation of the machine causes the member 99 to be raised up to the magazine (see dotted lines, Fig. 5); causes valve 119 to open by spring 121, allowing pump 11 to produce a suction in grooves 102 of the transfer fork, thereby to draw down the bottom blank from the magazine. As soon as the blank has adhered to the arms 101 of the fork 99, the fork is instantly lowered, whereupon the carriage 89 is advanced toward the mandrel 70. As the carriage advances, taking with it the blank, the head 133 remains at its lower position so that it will be straddled by the fork when the

fork reaches its farthest advanced position (Fig. 5).

As soon as the fork **99** reaches the position shown in Fig. 4, the head **133** rises and the jacket is lifted from the fork arms **101**.

It should be understood that suction is maintained in the fork fingers from the time the fork takes a blank from the bottom of the stack in the magazine and carries it to the head **133** until the head takes up the blank. As soon as the head has lifted the blank from the fork **101** the carriage **89** returns to the position shown in Figs. 1, 2 and 3, thus completing a cycle of operation.

While I have shown a practical and preferred embodiment of my invention I wish it understood that changes in the construction may be made without departing from the spirit of the invention within the scope of the appended claims.

From the foregoing description taken in connection with the accompanying drawings it is thought the complete construction, operation and advantages of my invention will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In a jacket forming machine wherein is provided a magazine for stacked blanks and a distant mandrel to which blanks are to be transferred, the improvement which includes: a supporting frame; a carriage horizontally reciprocatably mounted on said frame; a vertically movable blank transferring member mounted on and carried by said carriage and positioned to lie directly under and spaced from the magazine when said carriage is at one extremity of its path of movement and to lie under and spaced from said mandrel when the carriage is at the other extremity of its path of movement, means for advancing and retracting said carriage; and means for raising and lowering said blank transferring member while the carriage is retracted; and means to cause the bottom blank to adhere to the blank transferring member when said member is raised to withdraw a blank from the magazine and hold the blank while it is being transferred to the mandrel.

2. The machine of claim 1 in which said means for raising and lowering said blank transferring member includes a pivoted rocker fixedly located on said supporting frame, a vertically slidable rod mounted on said carriage, on which said blank transfer member is mounted, said rod engaging said pivoted rocker when the carriage is in its retracted position, and cam means for actuating said rocker to raise and lower said rod at timed intervals.

3. In a jacket forming machine wherein is provided a magazine for stacked blanks and a distant mandrel to which the blanks are to be transferred and applied, the improvement which includes; a supporting frame; a rectilinearly reciprocatable carriage mounted on the frame to pass under the magazine and the mandrel; a vertically reciprocatable blank transfer member mounted on said frame and including a forked member having grooves in the upper face of the arms of the fork and having suction ducts connecting with said grooves; means for moving said carriage back and forth to bring said forked member alternately beneath the magazine and the mandrel; means to raise and lower said transfer member when it is beneath the magazine; and means operable between the forked member arms when the same is beneath the mandrel for lifting the blank from said forked member and placing it against the mandrel.

4. The machine of claim 3 wherein said blank-lifting means includes a grooved head, a vertically movable rod on which said head is mounted, a spring-loaded suction pipe projecting through a hole in said head and into the groove thereof for holding the blank as the blank is lifted from the forked member and until the blank reaches the mandrel.

5. The machine of claim 3 wherein said blank-lifting means includes a reciprocating head operable between the arms of said forked member while said forked member is beneath the mandrel, and suction means cooperative with said head for holding the blank on said head while it is rising to the mandrel; and means for timing the suction means of said forked member and that of said head so as to cause the suction means of said head to act as soon as that of said forked member ceases to act while beneath the mandrel.

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