May 5, 1942. L. BISCHOFF 2,282,160

BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 1

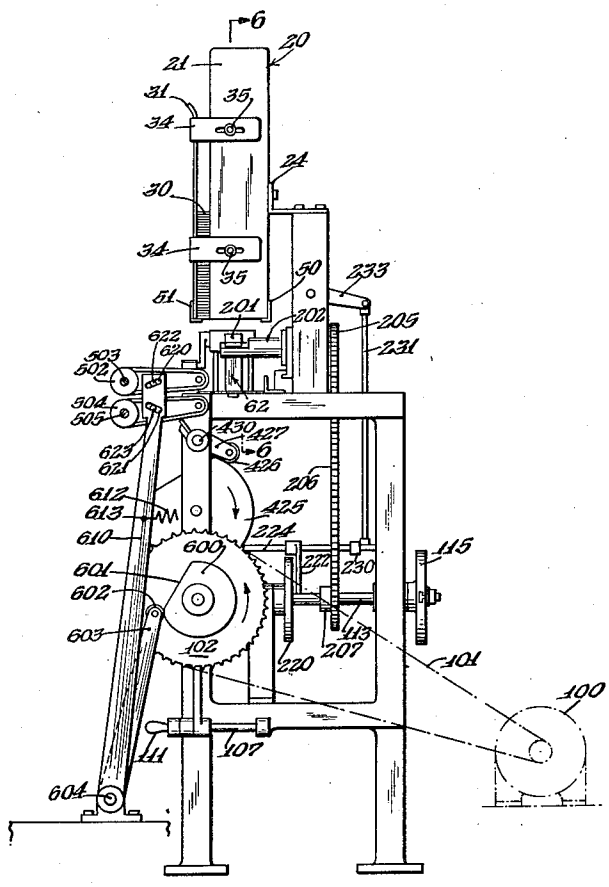


FIG. 1.

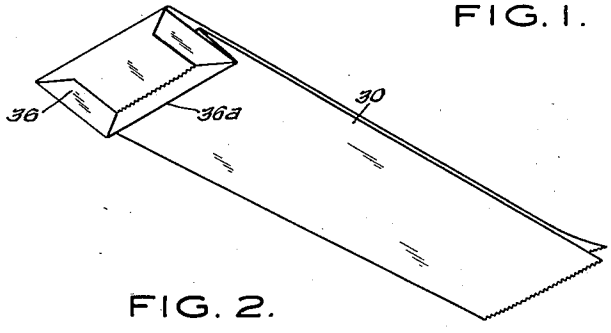


FIG. 2.

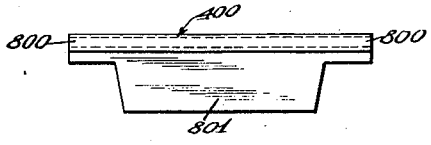


FIG. 2_A.

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BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 2

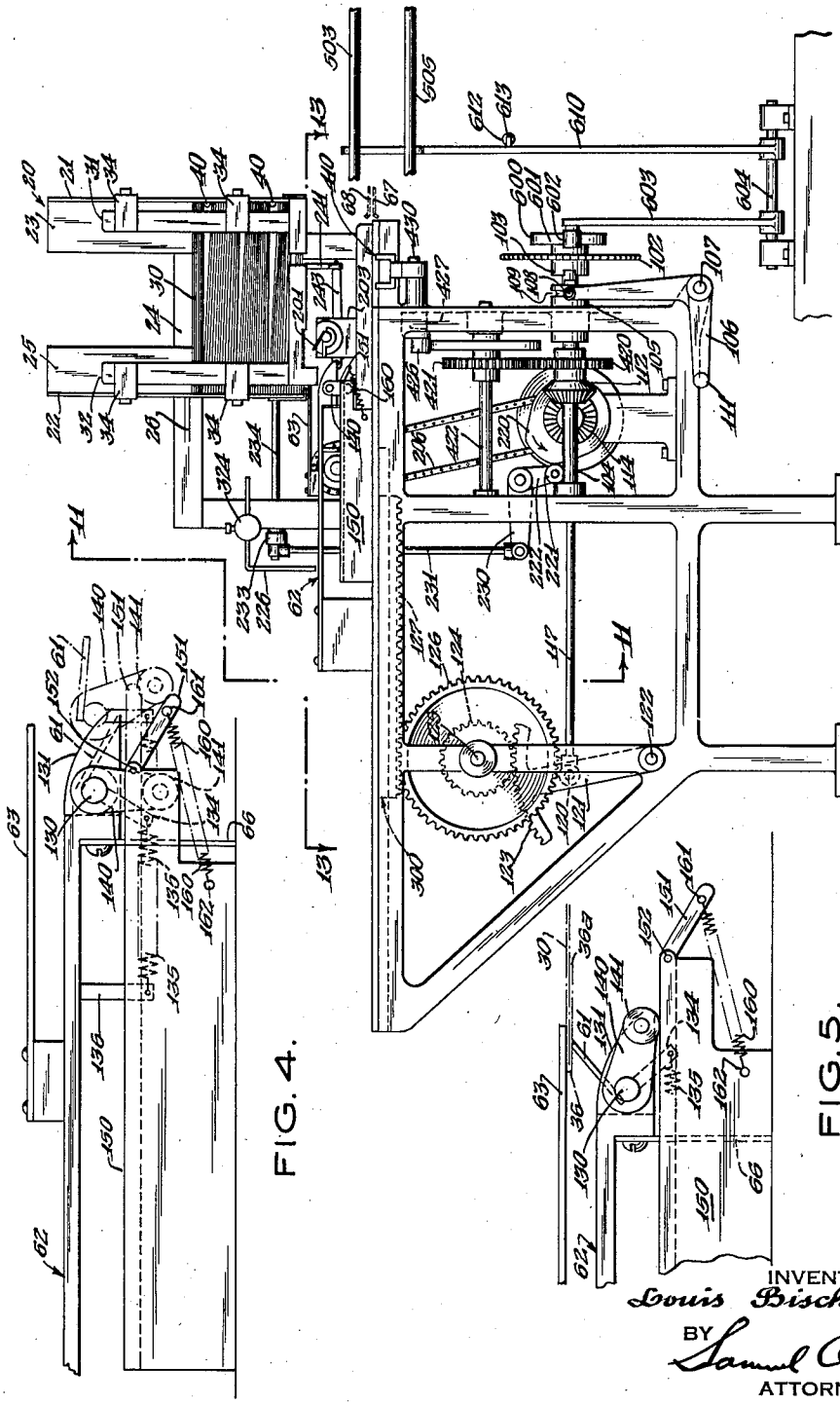


FIG. 3.

FIG. 4.

FIG. 5.

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May 5, 1942. L. BISCHOFF 2,282,160

BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 3

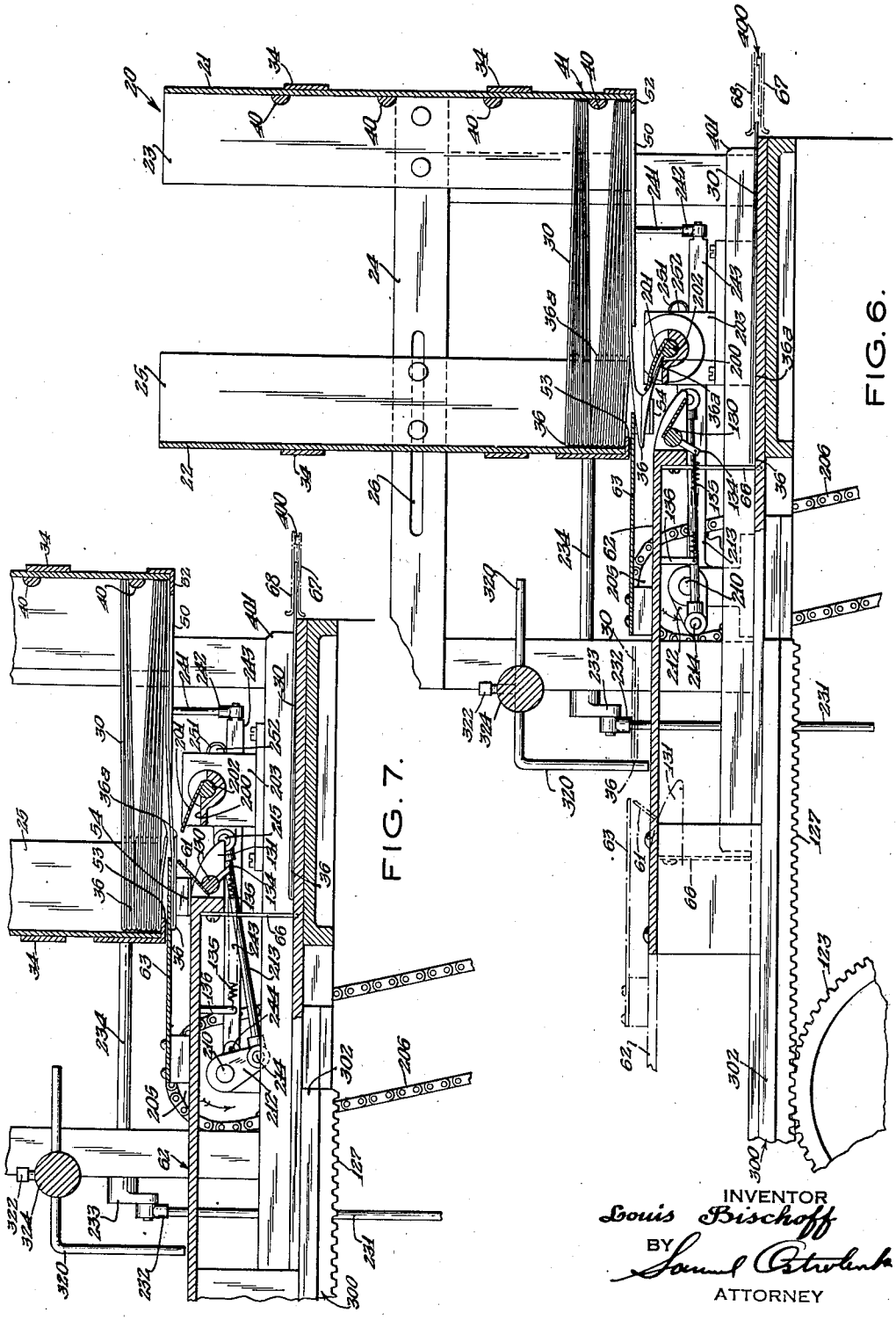


FIG. 6.

FIG. 7.

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BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 4

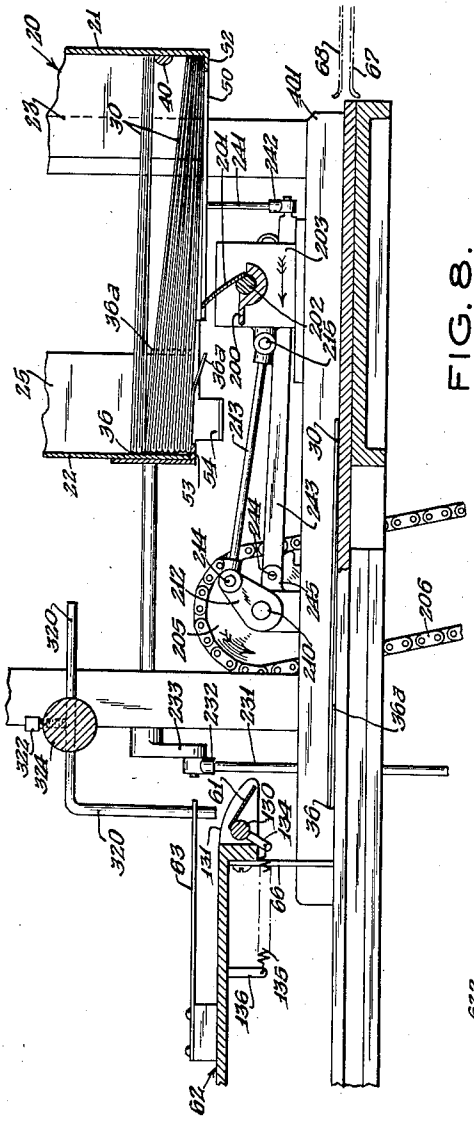


FIG. 8.

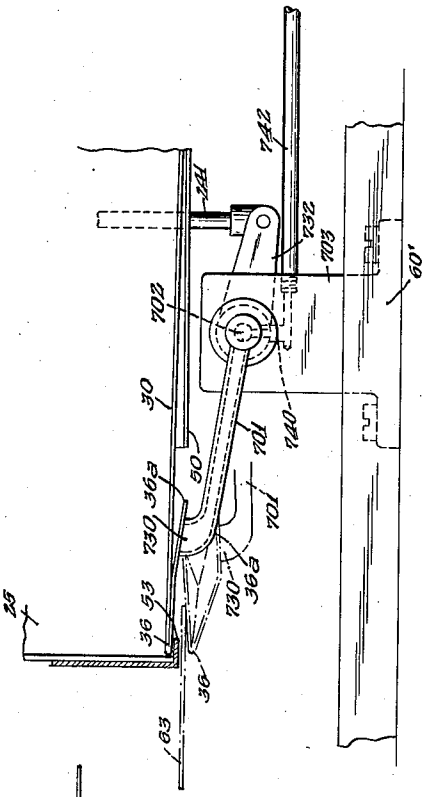


FIG. 9.

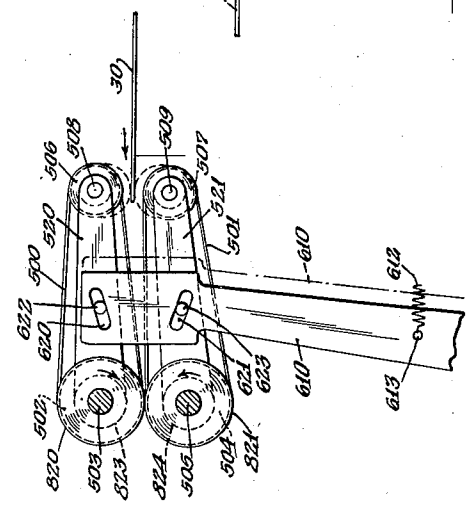


FIG. 10.

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May 5, 1942. L. BISCHOFF 2,282,160

BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 5

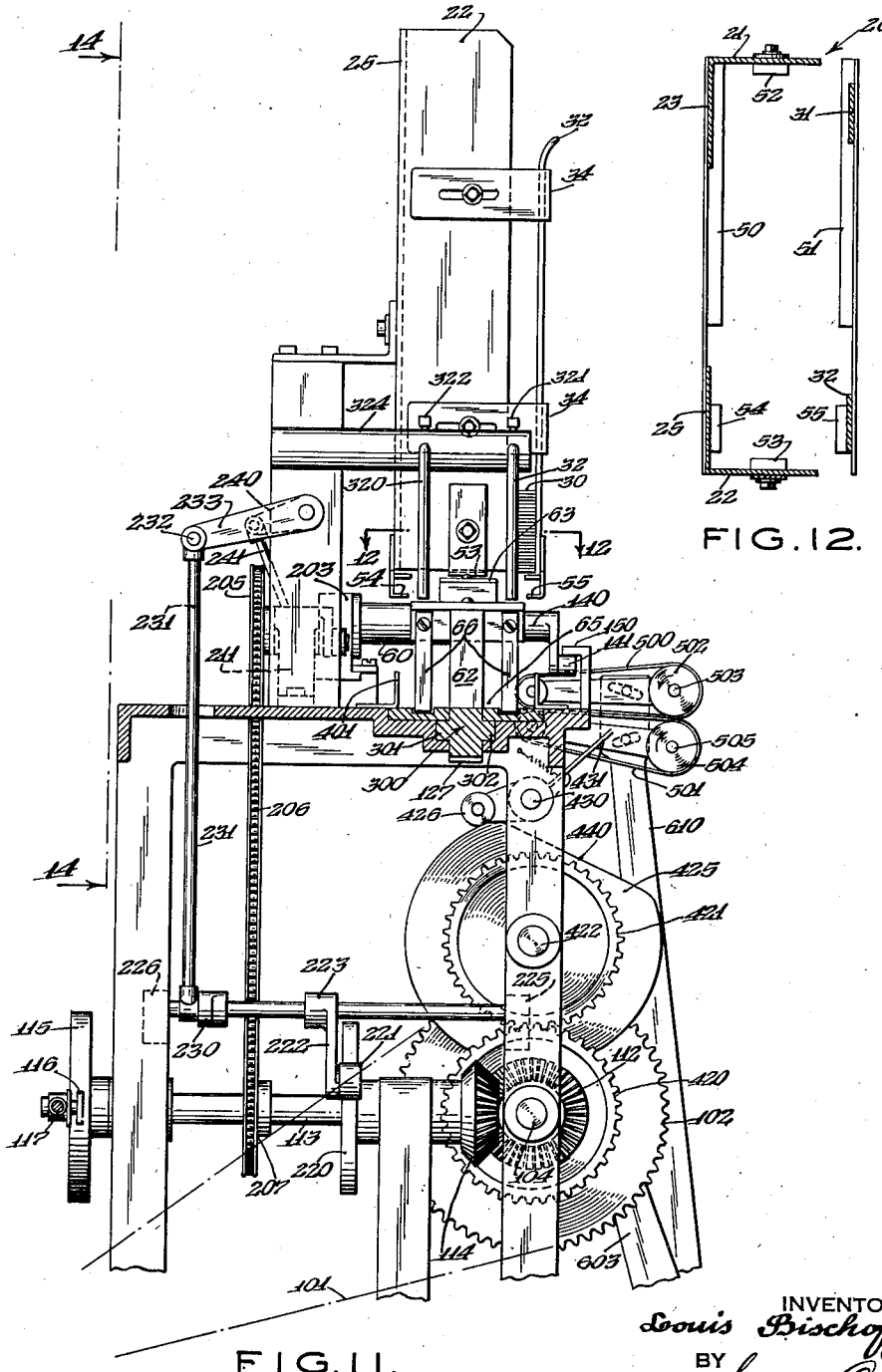


FIG. 11.

FIG. 12.

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May 5, 1942. L. BISCHOFF 2,282,160

BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 6

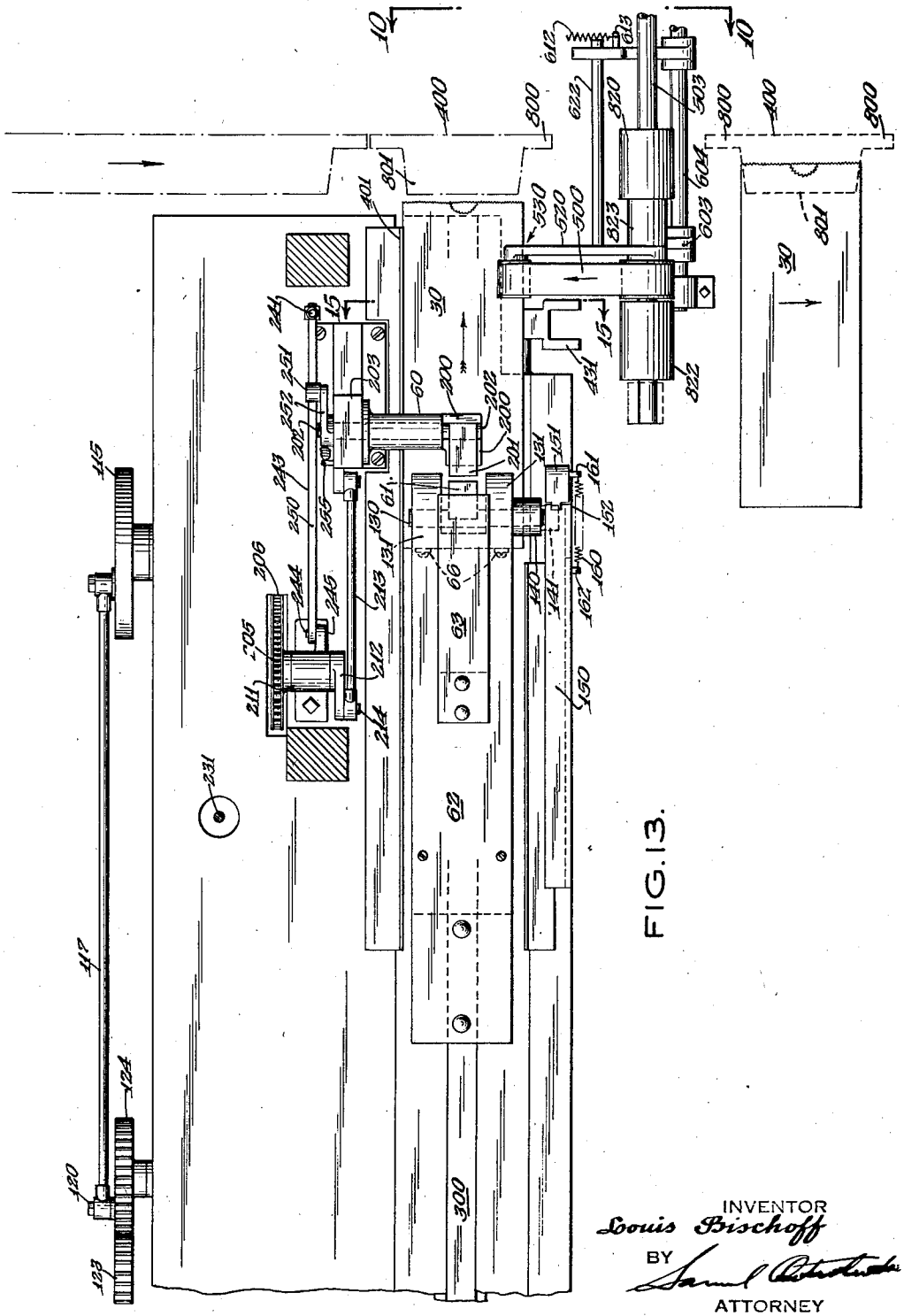


FIG. 13.

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May 5, 1942. L. BISCHOFF 2,282,160

BAG FEEDING APPARATUS

Filed Feb. 11, 1941 7 Sheets-Sheet 7

FIG. 15.

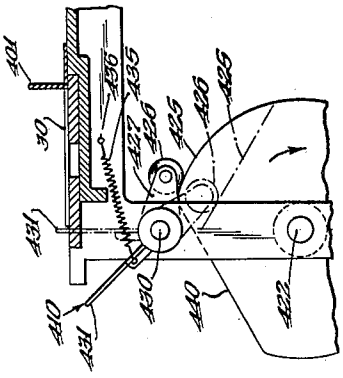


FIG. 14.

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UNITED STATES PATENT OFFICE

2,282,160

BAG FEEDING APPARATUS

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Application February 11, 1941, Serial No. 378,366

17 Claims. (Cl. 271—1)

This invention relates to bag apparatus and more particularly to apparatus for successively feeding bags into a tin-tie attaching device.

It is quite often desired, in the manufacture and use of bags, to provide means integrally associated therewith for facilitating the closure or fastening of the bag. One of the common means utilized for this purpose is the so-called tin-tie consisting of a flexible, foldable or bendable metallic tape around which is wrapped and secured a sheet of paper having an extending tongue which may be adhesively secured to one surface of the bag at the top edge thereof.

The tin-tie is then arranged in such a manner that when the top of the bag is closed and rolled up, the projecting ends of the tin-tie may be bent over the edge of the roll and thus secure the closure.

Heretofore, while the manufacture of the tin-tie itself and the actual securement of the tin-tie to the bag has been mechanical and automatic, real difficulty was encountered in feeding the bag to the tin-tie securing mechanism; and the full potentialities of the tin-tie securing mechanism were scarcely realized because the feeding of the bag thereto was to a great extent manual.

The object of this invention, therefore, is the provision of automatic mechanically operated means for feeding bags to the tin-tie securing machine.

Still a further object of the present invention is the provision of means in connection with such apparatus for mechanically feeding bags to tin-tie securing mechanisms and for treating the bags without first requiring any special arrangement thereof.

For this purpose it is both necessary and useful that the bags need not be separated or otherwise manually treated before they are placed in the mechanism. And it has been found, in the operation of this invention, that piles of bags may be virtually indiscriminately placed in the hopper of the feeding mechanism and then appropriately fed to the tin-tie securing machine.

Other objects of the present invention will in part be apparent and, where not apparent, pointed out, and the specific mechanisms by means of which these and the foregoing objects are obtained will be fully set forth in the following description and drawings in which:

Figure 1 is a side view of one form of apparatus for accomplishing the purpose and functions of the present invention.

Figure 2 is a bottom view of a bag in connection with which the present invention is intended to operate.

Figure 2a is a plan view of a tin-tie which it is desired to secure at the closure of each of the bags.

Figure 3 is a front view partially broken away of the apparatus of Figure 1.

Figure 4 is an enlarged fragmentary view of a portion of the mechanism of Figure 3.

Figure 5 illustrates the operation of the mechanism of Figure 4 in another operating position.

Figure 6 is a cross-sectional view taken on line 6, 6 of Figure 1 looking in the direction of the arrows.

Figure 7 is an enlarged fragmentary view of a portion of the mechanism of Figure 6 showing a different stage of the operation thereof.

Figure 8 is a view corresponding to that of Figures 6 and 7 showing still another position of the operating mechanism.

Figure 9 is a view partly in cross-section and partly in elevation showing a slightly modified form of the operating mechanism of Figure 8.

Figure 10 is an enlarged fragmentary view of a portion of the mechanism of Figure 1.

Figure 11 is a cross-sectional view taken along line 11, 11 of Figure 3 looking in the direction of the arrows.

Figure 12 is a cross-sectional view taken along line 12, 12 of Figure 11 looking in the direction of the arrows.

Figure 13 is a top plan view of the bed of the machine partly in cross-section taken along line 13, 13 of Figure 3 looking in the direction of the arrows.

Figure 14 is a view in elevation of the rear of the machine taken along line 14, 14 of Figure 11 looking in the direction of the arrows.

Figure 15 is a cross-sectional view partly in elevation taken along line 15, 15 of Figure 3 looking in the direction of the arrows.

Referring now to the figures, there is shown an adjustable vertical hopper 20 having a pair of side plates 21 and 22 which are respectively integrally flanged extensions of supporting plates 23 and 25. The supporting plates 23 and 25 are mounted on a back plate 24 and may be adjustably positioned thereon by means of any suitable engagement thereof with slots 26 in the said plates 24.

The movement of side plates 21 and 22 will adjust the mechanism for various lengths of bags 30.

A pair of front plates or guides 31 and 32 are also provided (see Figures 1 and 3). These front guides are supported by angle irons 34 which are adjustable by means of the bolts 35 on the side plates 21 and 22 in order to prepare the hopper for bags of different widths.

The upper ends of the guides or plates 31 and 32 are curved upwardly slightly, as shown in Figure 1, in order to facilitate the insertion of bags in the hopper.

In order to facilitate the operation of the mechanism herein described, the bags are placed

in the hopper in the position shown in Figure 2, that is, with the double bottom portion 36 thereof downwardly; and the ends of each of the bags having the double bottom portion 36 are placed against the side plate 22, the open ends of each of the bags abutting the side plates 21.

Since, as is seen particularly in Figure 2 the double bottom of the bag creates an additional thickness at one end thereof, some means should preferably be provided to level off the bags so that a tall pile of the bags will not tend to curve unduly.

For this purpose it has been found, as seen in Figures 3, 6, 7, and 8, that a plurality of spaced horizontal beads 40 on the inner surface of the side plate 21 abutting the free end of the bag will serve to level the bags off sufficiently to permit accurate operation thereon.

Ordinarily, as seen at 41 on Figure 6, one end of each of the bags is supported on one of the beads 40. As the opposite ends continue to drop in accordance with the withdrawal of the lowest bags, the distance between the ends 36 of the bags and the bead 40 slightly increases. When this distance becomes greater than that of the length of the bag, then the bag will fall down on the pile below and the operation will commence once more.

Any number of beads 40 may be provided appropriately spaced in order to maintain the vertical alignment of the bags and to prevent an excessive curvature of the pile.

The bags at the bottom of the hopper are supported on a plurality of inturned flanges as seen in Figure 12. Flanges 50 and 51 support the sides of the bottoms of the bag, and flange 52 supports the open ends of the bottom bag. The double bottom or closed end 36 of the bag is supported on flange 53. Flanges 54 and 55 are, as is seen more particularly in Figure 11, spaced substantially below flange 53 and are in position to support the closed ends of the bags after they have been detached from flange 53.

The closed end 36 of each bag is withdrawn from engagement with the flange 53 of the bottom of the hopper by means of the trigger apparatus 60 (see Figure 6) which grasps the tongue 36a created by the satchel bottom or double bottom 36 of the bottom bag in the hopper and pulls the end 36 away from and beneath the position where it is supported by the flange 53.

The end 36 of the bottom bag then drops down on the flanges 54 and 55, whereupon the trigger 60 releases the tongue 36a.

The plate 61 on the slide 62 then is forced up to pinch the bag against the upper plate 63 carried by the slide and thus engages the end 36 of the bag in the manner shown in Figure 7.

The slide 62 then moves back to the position shown in Figure 8 where the movable plate 61 is moved back to its original position, thus releasing the bag and causing it to drop down on the bed 65.

By this time, of course, the entire bag 30 has been withdrawn from the bottom of the hopper so that there is no further impediment to its dropping.

The downwardly projecting fingers 66 of the slide 62 now push the bag once more toward the right (with respect to Figure 8), into the position shown in Figure 6, where it enters the lips 67, 68 of the tin-tie attaching apparatus so that the tin-tie 400 may be secured thereto.

The bag with the tin-tie secured is then removed from the bed of the machine by the belts 500 and 501 (Figures 1, 10, 11 and especially 13).

The entire apparatus is driven from any suitable prime mover or power source 100 which by any appropriate pulley or chain 101 is connected to and drives the sprocket 102 (see Figures 1 and 3). The sprocket 102 rotates on one element 103 of the clutch mounted on the shaft 104 and may be engaged in driving relationship with the shaft 104 when the opposite element 105 of the clutch is brought into meshing relationship with element 103 by means of the crank 106.

The crank 106 pivots on a bearing 107, one end thereof carrying a pin 108 which rides in a groove 109 of clutch element 105 and the opposite end thereof having a handle member 111.

Rotation of shaft 104 causes the bevelled gear 112 to rotate. Shaft 113 is rotated by bevelled gear 114 which is in meshing relation with gear 112.

The rotation of shaft 113 causes the plate 115 mounted at the opposite end thereof to rotate. Plate 115 carries eccentrically thereof a pin 116 on which is pivotally mounted one end of the link 117 (see Figures 11 and 3).

The opposite end of link 117 is at 120 pivotally connected to the oscillating arm 121 which is rotatably mounted on the pivot 122 and which carries on the opposite or free end thereof the rack or gear segment 123.

It will now be clear that rotation of the sprocket 102 by the motor 100 will, through the rotation of the shaft 104 and the bevelled gears 112 and 114 cause rotation of shaft 113 which will in turn rotate the disk 115. The rotation of the disk 115 will, through the eccentric pivotal securement of the link 117, cause the link 117 to oscillate, this in turn causing the oscillating arm 121 and the rack 123 carried thereby to oscillate.

Obviously, instead of a plate 115 and a pin 116, a crank arm may be mounted on a shaft to produce the same result.

The rack or gear segment 123 meshes with the gear 124 mounted on the shaft 125 and thus causes this gear 124 to rotate first in one direction and then in the other, in accordance with the oscillation of the rack 123.

Gear 126 also keyed to shaft 125 meshes with the rack 127 which is secured to and constitutes a part of the slide 62.

Gear 126, by reason of the foregoing operations induced by the oscillation of the rack 123, is caused to rotate first in one direction and then in the other, and therefore, causes the rack 127 to move back and forth, and hence causes the slide 62 to move back and forth.

As has already been pointed out, the slide 62 in its forward movement beneath the bag hopper 20 engages the free end 36 of the lowest bag which has just been released from the flange 53.

When the slide 62 has been moved to the opposite end of its stroke, as in Figure 8, and thus has withdrawn the bag completely from the hopper, the bag is dropped down on to the bed of the machine in position to be forced forward into the tin-tie attaching apparatus.

It is necessary, however, to provide means operable by the movement of the slide 62 which will engage the free end of the bag at the end of the forward movement of the slide and which will cause the disengagement of the bag after the bag has been withdrawn from the hopper.

The plate 61 which pinches the bag end 36

against the plate 63 at the end of the forward movement and which releases the bag at the end of the backward movement is operated by a combination roller and plate arrangement shown in Figures 4 and 13.

As is seen in these figures, the pinching or securing plate 61 carried by the slide 62 is mounted upon and secured to a shaft 130 which is rotatable in appropriate bearings 131 on the principal frame member 132 of the slide 62.

The plate 61 may be secured to the shaft 130 in any suitable manner, as for instance by screws.

The shaft 130 also carries keyed or otherwise secured thereto a lever or crank 133. The free end of the lever 133 is at 134 secured to the tension spring 135.

The opposite end of the tension spring is secured to any suitable portion of the slide 62, as for instance a plate 136 which depends from the main frame 132 thereof.

The bias of spring 135 tends to rotate shaft 130 in a clockwise direction with respect to Figure 4 and this tends to cause the shaft 130 to rotate in a manner to depress the plate 61.

An additional crank member 140 is secured to one end of the shaft 130 in such a manner that rotation thereof will effect rotation of the shaft 130.

The outer end of the crank member 140 carries a roller 141 rotatably mounted on any suitable pin 142 thereof.

It will now be obvious that movement or rotation of the crank 140 by any member which engages the roller 141 will cause a corresponding rotation of shaft 130 and a corresponding movement of the plate 61.

In order to effect this movement of plate 61, and in order to ensure that the movement of plate 61 will be accurately synchronized with the oscillatory movement of the slide 62, a stationary plate or rails 150 is provided on the bed 65 of the machine and located along one side thereof.

Stationary plate 150 has at the end thereof nearest the hopper an additional small hinged plate 151 pivotally secured thereto at 152 and constituting a movable extension of the plate 150.

Plate 151 is normally held in the dependent angular position shown by the solid lines of Figure 4 by the tension spring 160 which is secured at one end to the pin 161 of the plate and at the other end to a stationary pin 162 on the frame of the machine.

Normally the bias of spring 135 causes the shaft 130 to rotate so that the roller 142 thereof and the crank 140 are in the vertical position shown by the solid lines of Figure 4. Hence, at the end of the backward movement and at the inception of the forward movement, the roller 141 may enter beneath the edge 170 of the plate 150 and neither the plate nor the roller will interfere with each other during the continuance of the forward movement.

As the slide 62 completes its forward movement, the roller 141 passes beneath plate 151 and, since the tension of spring 135 is greater than that of spring 160, it tends to lift the plate 151 to the position shown by the dotted lines.

As the roller 141 passes beyond the forward edge of plate 151, plate 151 snaps down and the roller 142 now rides on the upper surface of the plate.

Now during the return or backward movement of the slide 62, the roller 141 must necessarily ride on the top edge 171 of the plate 150. This causes crank 140 to be displaced in a counterclockwise direction with respect to Figure 4 and, therefore, also causes the rotation of the shaft 130 and the pinching plate 61 in a counterclockwise direction.

Thus, immediately on the inception of the return movement of the slide 62, plate 61 is rotated upwardly to engage the end 36 of the bag against the plate 63 in the manner shown in Figure 7.

The bag is, therefore, securely gripped between plates 61 and 63 and withdrawn from the hopper.

When the slide 62 reaches the end of its withdrawal movement, the roller 141 may then drop down from the surface 171 of plate 150 and spring 135 will cause the pinching plate 61 to rotate to non-engaging position thus permitting the bag 30 to drop down in the manner shown in Figure 8. The continued forward movement of the slide 62 will now by reason of the dependent fingers 66 push the bag forward, in the manner previously described, into and between the lips 68 and 67 of the tin-tie apparatus.

At the same time, as is seen in Figure 6, the slide 62 has been returned to a position where it is just about to grasp the edge 36 of the next lowest bag in the hopper. The manner in which the pinching plate 61 is in this way pressed against plate 63 with the bag end 36 between immediately after the inception of the return or backward movement of the slide 62 is clearly shown in Figure 5.

In order, however, that the slide 62 carrying the plates 61 and 63 may engage or grasp the end 36 of the lowest bag 30 it is necessary that this end be withdrawn from the position where it rests on the flange 53 to a position where it rests on the flanges 54 and 55.

Trigger 60 accomplishes this result immediately after the completion of the return or backward movement of the slide 62 and after the lowest bag has been dropped down on the bed 65.

The trigger 60, it will be noted, comprises the stationary plate 200 and a gripper 201 which is mounted or otherwise keyed to a rotatable shaft 202.

It is necessary and at least useful that the base 203 on which the trigger mechanism 60 is mounted oscillate backward and forward so that it will be moved into position to engage the tongue 36a created by the bottom of the bag when it is desired to withdraw the bag from the flange 53 and so that the trigger will be moved out of the way of the plates 61 and 63 on slide 62 when these plates are to pinch the withdrawn end 36 of the bag.

In order to accomplish this purpose (see particularly Figure 8) the base 203 is arranged so that it may oscillate or slide in the guide rails 204.

The mechanism which causes the base 203 to oscillate comprises a sprocket 205 which is driven by a chain 206 from a sprocket 207 (see Figure 11) mounted on the shaft 113.

The manner of obtaining the rotation of shaft 113 has been previously described.

The sprocket 205 is keyed to the shaft 210 which rotates in a bearing in the standard 211. Crank 212 is also keyed to this shaft and rotates therewith.

Tie rod 213 is pivotally connected at one end to the end 214 of crank 212 and at the other end is pivotally connected at 215 to the base 203 of the trigger mechanism 60.

It may now be clear that rotation of sprocket 205 by means of the rotation of shaft 113 will cause crank 212 to rotate and hence will cause the entire rod 213 to oscillate, thus causing the base 203 to move backwards and forwards in its rails 204.

By appropriate gearing arrangement and by appropriate proportioning of the diameters of the various pulleys involved, the oscillatory movement of the base 203 may be coordinated with the corresponding oscillatory movement of the slide 62 so that these movements will supplement each other. This is, of course, greatly facilitated by the fact that both of these elements are driven from the single shaft 113.

It is now necessary to synchronize the movement of the gripper 201 with the movement of its base 203 so that it may engage the tongue 36a created by the double bottom 36 of the bag. Here again, in order to obtain perfect synchronism, it is desirable that the operating mechanism for effecting rotation of the gripper 201 should be operated from shaft 113.

Accordingly a cam 220 is mounted upon the shaft 113 and is rotatable thereon.

A cam follower or roller 221 mounted on an arm 222 engages the surface of cam 220. The arm 222 is, at 223, keyed to the shaft 224 which is rotatable in appropriate bearings 225 and 226 in the main frame of the mechanism.

A crank arm 230 is also keyed to shaft 224 and is rotatable therewith. This crank arm carries at the outer end thereof one end of a tie rod 231 which is at 232 pivotally connected to the crank 233. (See also Figure 14.)

Crank 233 is keyed to shaft 234 so that rotation of the said crank results in rotation of shaft 234 which rides in bearings 235 and 236 of the frame of the mechanism.

The end of the shaft 234 opposite the end at which crank 233 is attached carries a crank 240 to the end of which is secured a connecting rod 241. The opposite end of the connecting rod 241 is pivotally secured at 242 to the gripper shaft operating link 243. The opposite end of the gripper shaft operating link is at 244 pivotally secured to an ear 245 extending from the standard 211.

When the eccentricity of the cam 220 mounted on the shaft 113 causes the cam follower 221 to change its position, it thus causes the rotation of shaft 224 which through the crank 230, connecting rod 231 and crank 233 causes the rotation of shaft 234. This, in turn, through crank 240 and connecting rod 241 causes an up and down movement of the end 242 of the operating link 243, the said end 242 rotating about the pivot 244 as seen.

The operating link 243 is squared off and on the upper surface 250 thereof there rides a roller 251.

The roller 251 is secured at one end of the crank 252, the opposite end of the crank being secured to the shaft 202 which operates the gripper 201. The shaft 202 in addition to carrying the crank 252 and the gripper 201, also carries keyed thereto a lever 253 to the free end of which there is secured a tension spring 254, the opposite end of which is held by the pin 255 on the base 203 of the trigger mechanism 60.

The spring, therefore, biasses the shaft 203 into rotation in a clockwise direction with respect to Figure 14 so that the roller 251 is always engaged with the top surface 250 of the operating link 243.

When, by reason of the eccentricity of the cam 220 and the corresponding movement of the other elements above-described, the operating link 243 is caused to drop, then the shaft 202 is permitted to rotate in a clockwise direction with respect to Figure 14 in response to the bias exerted by spring 254. When, further, owing to the eccentricity of the cam, the operating link 243 is caused to rise then the pressure of the surface thereof against the roller 251 causes the shaft 202 to rotate in a clockwise direction with respect to Figure 14 and thus with respect to Figures 6, 7, and 8 it causes the gripper 201 to rotate in a counter-clockwise direction in order to effect the gripping operation.

All of the moving elements, therefore, are completely and permanently synchronized by reason of the fact that they are operated from the common shaft 113. Thus, the rotation of the gripper 201 to gripping relationship, the movement of the base 203 to the position where the gripper may be operated to best advantage, and the movement of the slide 62 after the gripper has performed its appropriate operation are inter-related so that they cannot fall out of phase and thus destroy the operation of the mechanism.

It now is clear that as the base 203 is moved toward the left with respect to Figure 6, the gripper 201 enters into the pocket between the tongue 36a of the bottom 36 of the bag and the adjacent outside surface of the bag 30.

The rotation of shaft 202 now causes the gripper 201 to press the tongue 36a down upon the plate 209, thus serving to detach the end 36 of the bag from its support by the flange 53.

If this alone should not be sufficient to effect the detachment required, then the return movement of the base 203 serves to complete this operation.

As the base 203 returns to the right with respect to Figure 6, the gripper 201 is rotated in a clockwise direction with respect to Figure 6 into non-gripping relationship and the bag end 36 is now free to be pinched between the plate 61 and plate 63 for withdrawal from the bottom of the hopper in the manner previously described.

It will be clear, of course, that the plate 63 is so arranged that it will be slid immediately beneath the flange 53 which had previously supported the end 36 of the bag and thus will slide on the opposite or upper surface of the bag so that the bag may be pinched between the two gripping elements 61 and 63 as seen in Figure 5.

It will, of course, be clear that various other elements are either useful or necessary in connection with the foregoing operations in order to ensure that the same be accurately carried out.

Thus, as is seen in Figure 11, the slide member 62 has a main base 300 at the bottom of which the rack 127 is located. The main base 300 has rail elements 301 and 302 registering in grooves in the top of the frame in order accurately to position the same during its sliding motion.

The fingers 66, which serve to push the bag into the tin-tie attaching mechanism after the same has been dropped down on the bed 65 of the machine, ride in grooves 310, 310 of the bed 65 in order to ensure that the bag which has been dropped must necessarily be forced forward into the tin-tie attacher.

A pair of bars 320, 320 may be adjustably secured by the bolts 321 and 322 in a support

324 above the slide 62 in such a manner as to be interposed in the path of the bottom end of the bag during the backward movement of the slide 62.

The bars 320 ensure that the bag, after it has been released from the plates 61 and 63, will be dropped down on the bed 65.

When the bag is being pushed forward into the tin-tie attaching mechanism 68 and 67, it is useful and desirable that means be provided to ensure that the bag is perfectly straight so that the tin-tie 400 (see Figure 2a) may be accurately attached in the manner shown in Figures 6 and 13.

For this purpose there is provided at one side of the bed 65 along which the bag travels a vertical flange 401. (See Figures 3, 6, and 13.) And along the opposite side of the path of travel of the bag a movable fork 410 is provided which may be operated in such a manner as to align the bag against the vertical flange 401.

Fork 410 must necessarily, therefore, be operated in synchronism with all of the other portions, and hence should be operated from shaft 113 or through members which are inescapably connected therewith.

Accordingly, a gear 420 is mounted on shaft 104 which is in geared relation with shaft 113 and hence inescapably integrated therewith.

Gear 420 engages with and drives gear 421 which is mounted on shaft 422 (see Figures 3 and 11), the said shaft 422 rotating in appropriate bearings 423 and 424 in the frame of the mechanism.

Shaft 422 carries keyed thereto and rotatable therewith cam 425.

Cam follower 426, which is a roller, bears against the surface of cam 425. The cam follower or roller 426 is rotatably mounted on the end of crank 427, which is, in turn, keyed to and, therefore, rotatable with a shaft 430.

Shaft 430 carries keyed thereto and rotatable therewith the fork 431.

The cam follower 426 is held against the cam so that it may translate variations in the surface of the cam into corresponding movements of the fork by a tension spring 435 which is connected at one end to the fork and at the other end to a pin 436 on the frame.

As the flattened portion 440 of the cam 425 reaches roller or cam follower 426 then the spring 435 is permitted to raise the fork 431 to vertical position; and the fork is returned once more to the position shown in Figures 13 and 11 when the cam follower 426 rides on the remainder of the cam. The fork is caused to rise to the vertical position as the slide moves and thus guides the bag into position to properly enter the tin-tie attaching mechanism.

The fork 431 will then serve to move the side edge of the bag so that the opposite edge thereof will be aligned against the flange 401 so that the bag will be perfectly aligned when the tin-tie is attached.

After the tin-tie has been attached by any suitable means which are now known in the art, it is necessary that the bag be removed from the bed 65 of the machine so that the next bag to be operated upon may enter the tin-tie attaching mechanism.

Accordingly there has been provided a pair of belts 500 and 501.

Belt 500 rotates at one end about the pulley 502 mounted on the rotatable shaft 503; and belt 501 rotates about the pulley 504 mounted on the rotatable shaft 505.

While shafts 503 and 505 are rotatable, they are not otherwise movable, and the pulleys 502 and 504 are so arranged that they are always in engagement with each other so that the surfaces of belts 500 and 501 are at the area in which they are in contact with these pulleys always in engagement.

The opposite end of belt 500 is operated over rotatable pulley 506 and the opposite end of pulley 501 is operated over rotatable pulley 507, each of these pulleys being rotatable about its respective shafts 508 and 509.

Shafts 503 and 509 are so arranged that they may be separated or brought together. When brought together, pulleys 506 and 507 are in sufficiently close contact with each other to cause the surfaces of the belts 500 and 501 at that time to be in contact along the area of these pulleys.

In this latter case, the inner surfaces of each of the belts are in contact along their entire path.

Shafts 508 and 509 are respectively each mounted on brackets 520 and 521 each of which is respectively rotatable about the shafts 503 and 505 which have a fixed relationship to each other.

When the brackets 520 and 521 are separated, then shafts 508 and 509 are separated, and hence the ends of the belts traveling around pulleys 506 and 507 are likewise separated.

The belts, at the areas in which they approach or engage pulleys 506 and 507, lie on either side of the bed 65 which is cut out at 530 at this point.

The edge of the bag 30, therefore, passes between pulleys 506 and 507 when the open end of the bag is forced into the tin-tie attaching mechanism.

After the tin-tie has been attached, then the pulleys 506 and 507 are brought together so that the bag is then captured between the areas of the belts 500 and 501 which are adjacent the pulleys 506 and 507; and thereafter, owing to the direction of the movement of the belts, the bags are fed out laterally away from the bed 65 of the machine, and away from the tin-tie attaching apparatus so that the apparatus is now ready for the next succeeding bag.

Here again the mechanism which causes the pulleys 506 and 507 to separate in order to permit the bag to be fed therebetween and the mechanism which causes these pulleys to be brought together out of the tin-tie attaching apparatus should also be synchronized with the operation of the mechanism.

One way in which this may be done is shown in Figures 1, 3 and 10.

A cam 600 is keyed to the shaft 104 and rotatable therewith.

This cam has a cam surface 601 against which the cam follower or roller 602 bears. The cam follower or roller 602 is mounted on the end of an arm 603, the opposite end of which arm is keyed to and rotatable with a shaft 604.

The shaft 604 also carries keyed thereto and rotatable therewith an arm 610.

The roller or cam follower 602 is held in a position where it engages against the cam surface by the tension spring 612 which is caught at one end on the pin 613 of the arm 610 and at the other end on the frame of the machine.

The upper end of the arm 610 has, as is more clearly seen in Figure 10, a pair of inclined slots 620 and 621.

Pins 622 and 623 secured to the brackets 520 and 521 extend through the slots 620 and 621.

Movement of the arm 610 in response to the tension of the spring, which is permitted to operate by eccentricity of the cam, causes slot 621 and 620 to move to varying positions with respect to the pins 622 and 623. When the arm 610 has been moved to the position shown by the dotted lines of Figure 10, then the brackets 520 and 521 are brought together so that pulleys 506 and 507 are in engagement with each other and the belt may then engage the bag and move it outwardly.

When the arm 610 is moved back to the position shown by the solid lines of Figure 10, then the brackets 520 and 521 are forced apart so that the bag 30 passing between pulleys 506 and 507 will not be engaged by the belts. By this means, therefore, a simplified removal mechanism is provided after the tin-tie has been attached to the bag.

This invention may, of course, be modified in many different ways in order to secure the results and the operations hereinabove described.

One such modification has been shown in Figure 9 where the trigger 60', instead of being a purely mechanical one, depends entirely upon suction in order to remove the end 36 of the bag from the flange 53.

It will also be clear that by the use of suction in the modified form of Figure 9, no dependence is placed upon the tongue 36a of the bag 30 in order to remove the bottom end of the bag from the flange 53.

An ordinary bag which does not have such a tongue or a double bottom may be operated upon by this device in the same manner as is seen in Figure 9.

The trigger mechanism 60' therein shown comprises a base 703 which, however, need not oscillate, but which may be provided with oscillating means exactly similar to that provided in connection with the base 203 above-described.

A rotatable shaft 702 may be provided which is carried by the base 703, and this rotatable shaft may carry secured thereto and rotatable therewith a tube 701 having a mouth 730.

The shaft 702 may be caused to rotate in exactly the same manner previously described in connection with the shaft 202 of Figure 6.

But if the base 703 is to remain stationary, then the link or connecting rod 241 may be directly secured to a crank 732 which is keyed to the shaft 702.

A manifold 740 may be provided in the member 703 connecting the end 741 of the tube 742 and the end of the tube 702, thus drawing air through the mouth 730 of the tube 701.

The tube 701 may be brought up into engagement with the underside of the bag.

At this time a suitable timing valve may operate to permit suction to become effective on the mouth 730 of the tube, thus making it possible for the tube in its downward movement to withdraw the bag from the flange 53. Immediately after the withdrawal operation has been performed and before the slide 62 comes into operation, a suitable valve may operate to cut off the suction from the mouth 730 of the tube so that no impediment will exist to the withdrawal of the bag from the bottom of the hopper.

This represents but one suggested modification of the many operations of the mechanism. Many other modifications of each of the elements thereof should now be obvious to those skilled in the art.

The actual tin-tie attaching means which operates in connection with the elements 68 and 67 of Figure 6 above have not been illustrated since these are believed to be conventional in the art and since this mechanism may be used to feed bags into any type of tin-tie mechanism.

The present mechanism may, of course, be utilized to feed bags from a hopper into any other type of machine or for any other purpose, and the present invention is by no means to be understood to be limited solely to tin-tie attachment.

The tin-tie 400 (Figures 2a and 13) as has been previously described is, in the ordinary tin-tie machine, formed from a continuous strip consisting of a strip of metal around which paper has been wrapped, a portion of the paper being permitted to project.

The tin-ties are then cut off from this continuous strip and the tongue elements 800, 800 are provided extending from the sides of the attaching element 801.

After a suitable adhesive has been applied to the surface of the attaching element 801, and after the bag has been moved into position so that one surface of the upper end thereof rests on the element 801, the application of pressure in a manner well-known in the art of attaching tin-ties will secure the tin-tie to the bag.

Essentially the entire operation of the mechanism herein described as used in connection with the attachment of tin-ties to the bag consists of the placement of the bags in the hopper 20, the release of one end of the bags from the bottom of the hopper by means of the gripper 201 on the trigger 60, the withdrawal of the bag from the bottom of the hopper by means of the slide mechanism 62, the dropping of the bag down on the bed 65, pushing the bag forward into the tin-tie attaching mechanism, aligning the bag while it is being pushed forward, and removal of the bag from the tin-tie attaching mechanism in preparation for the next succeeding operation.

Each of the operations of each of the elements herein mentioned has been set forth specifically in connection with the description of each of these elements.

Although in the foregoing there have been illustrated various specific embodiments of this invention, many variations of each of the elements and of the methods of combining the same should now be obvious to those skilled in the art.

I prefer, therefore, to be bound not by the specific disclosures herein, but only by the appended claims.

I claim:

1. A bag feeding apparatus comprising a hopper, means for supporting a plurality of stacked bags therein, means for releasing a portion of a bag from the bottom of the stack and a slide member having a plate engageable with said released portion of the bag, said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed and means for thereafter moving said bag in said first direction upon said bed.

2. A bag feeding apparatus comprising a hopper, means for supporting a plurality of stacked bags therein, means for releasing a portion of a

bag from the bottom of the stack and a slide member having a first plate and a rotatable plate, said plates being engageable against each other on either side of the released portion of the bag, said slide member being movable in a first direction to cause said first plate to come between the upper surface of the released bag and the bottom of the next succeeding bag, said rotatable plate being rotatable against the under surface of the released portion of the bag and against said first plate after completion of said movement of the slide member in said first direction, said slide member being movable in an opposite direction to withdraw said bag from the bottom of the hopper, said rotatable plate being rotatable out of engagement with the bag upon completion of said movement in said opposite direction, said bag dropping upon a bed upon completion of said last mentioned movement and members carried by said slide engageable with the end of said bag and moving the same on said bed in said first direction when said slide next moves in said first direction.

3. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a first plate and a rotatable plate; said plates being engageable against each other on either side of the released portion of the bag; said slide member being movable in a first direction to cause said first plate to come between the upper surface of the released bag and the bottom of the next succeeding bag; said rotatable plate being mounted on a shaft on said slide member; a crank on said shaft and a roller on said crank; a rail on said apparatus parallel to the path of said slide member; means for causing said roller to ride beneath said rail when said slide moves in said first direction; means for causing said roller to ride on the upper surface of said rail when the slide moves in an opposite direction; said shaft being rotated to rotates said rotatable plate against said bag and said first plate at the inception of the movement in said opposite direction; said slide member being movable in an opposite direction to withdraw said bag from the bottom of the hopper; said rotatable plate being rotatable out of engagement with the bag upon completion of said movement in said opposite direction; said bag dropping upon a bed upon completion of said last mentioned movement; and members carried by said slide engageable with the end of said bag and moving the same on said bed in said first direction when said slide next moves in said first direction.

4. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a first plate and a rotatable plate; said plates being engageable against each other on either side of the released portion of the bag; said slide member being movable in a first direction to cause said first plate to come between the upper surface of the released bag and the bottom of the next succeeding bag; said rotatable plate being mounted on a shaft on said slide member; a crank on said shaft and a roller on said crank; a rail on said apparatus parallel to the path of said slide member; an end plate hingedly secured at the end of said rail and substantially coinciding with the position of said roller at the end of said movement in the first direction; said roller riding beneath said rail during the movement of the slide in the first direction; said roller riding beneath and beyond said end plate at the end of said movement; means for depressing said end plate after said roller has passed beyond the same; said roller, at the inception of said movement in an opposite direction riding upon the upper surface of said end plate and then upon the upper surface of said rail, said shaft being rotated when said roller rides upon the upper surface of said rail to rotate said rotatable plate against said bag and said first plate; said slide member being movable in an opposite direction to withdraw said bag from the bottom of the hopper; said rotatable plate being rotatable out of engagement with the bag upon completion of said movement in said opposite direction; said bag dropping upon a bed upon completion of said last mentioned movement; and members carried by said slide engageable with the end of said bag and moving the same on said bed in said first direction when said slide next moves in said first direction.

5. In a bag feeding apparatus for operating upon bags having a double bottom, the bottoms of each of said bags, when folded flat, forming a re-entrant tongue; a hopper; means for supporting a plurality of flat stacked double bottom bags therein with the bottom end of each adjacent one side of the hopper, and with the re-entrant tongue formed by the folded double bottom of each arranged on the under surface of each bag in the hopper; a plurality of flanges at the bottom of the hopper for supporting the stack of bags including an end flange at the end of the hopper adjacent the bottom end of each bag; means engageable with the re-entrant tongue of the bottom bag in the stack for releasing the end of said bag from engagement with said end flange; and means thereafter engageable with said released portion of the bag for withdrawing said bag completely from the bottom of the stack; and additional means associated with said last mentioned means for feeding said bag in a predetermined direction after it has been withdrawn from the bottom of the stack.

6. In a bag feeding apparatus for operating upon bags having a double bottom, the bottoms of each of said bags, when folded flat, forming a re-entrant tongue; a hopper; means for supporting a plurality of flat stacked double-bottom bags therein with the bottom end of each adjacent one side of the hopper, and with the re-entrant tongue formed by the folded double bottom of each arranged on the under surface of each bag in the hopper; a plurality of flanges at the bottom of the hopper for supporting the stack of bags including an end flange at the end of the hopper adjacent the bottom end of each bag; a trigger mechanism for releasing an end of the bottom bag of the stack from engagement with said end flange, said mechanism comprising an oscillatory base, said base having a plate stationary thereon and a rotatable gripping plate, said base being movable toward said re-entrant tongue, said stationary plate registering with the under surface of said tongue, said gripping plate entering between said tongue and the under surface of the body of said bag, said gripping plate being then rotatable to capture said tongue between it and said stationary plate, said plates releasing the bottom end of said bag from said end flange upon return movement of said base, said plates releasing said tongue from engagement there-

between upon said return movement of the base; and means thereafter engageable with said released portion of the bag for withdrawing said bag completely from the bottom of the stack; and additional means associated with said last mentioned means for feeding said bag in a predetermined direction after it has been withdrawn from the bottom of the stack.

7. In a bag feeding apparatus for operating upon bags having a double bottom, the bottoms of each of said bags, when folded flat, forming a re-entrant tongue; a hopper; means for supporting a plurality of flat stacked double bottom bags therein with the bottom end of each adjacent one side of the hopper, and with the re-entrant tongue formed by the folded double bottom of each arranged on the under-surface of each bag in the hopper; a plurality of flanges at the bottom of the hopper for supporting the stack of bags including an end flange at the end of the hopper adjacent the bottom end of each bag; a trigger mechanism for releasing an end of the bottom bag of the stack from engagement with said end flange; said mechanism comprising an oscillatory base, said base having a plate stationary thereon and a rotatable gripping plate, said base being movable toward said re-entrant tongue, said stationary plate registering with the under surface of said tongue; said gripping plate entering between said tongue and the under surface of the body of said bag, said gripping plate being then rotatable to capture said tongue between it and said stationary plate, said plates releasing the bottom end of said bag from said end flange upon return movement of said base, said plates releasing said tongue from engagement therebetween upon said return movement of the base; a slide member having a plate engageable with said released portion of the bag said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; and means for thereafter moving said bag in said first direction upon said bed.

8. In a bag feeding apparatus a hopper, means for supporting a plurality of flat stacked bags therein with the bottom end of each adjacent one side of the hopper, a plurality of flanges at the bottom of the hopper for supporting the stack of bags including an end flange at the end of the hopper adjacent the bottom end of each bag; suction means engageable with the bottom end of the bottom bag in the stack for releasing the end of said bag from engagement with said end flange; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; and means for thereafter moving said bag in said first direction upon said bed.

9. In bag feeding apparatus; a hopper; means for supporting a plurality of stacked bags therein with the bottom of each bag adjacent one side of the hopper; a plurality of flanges at the bottom of the hopper for supporting the stack of bags including an end flange at the end of the hopper adjacent the bottom end of the bag; suction means engageable with the bottom end of the bottom bag in the stack for releasing the end of said bag from engagement with said end flange; said suction means comprising a tube having an open end rotatable into engagement with the end of the bottom bag resting on said end flange, means for applying suction at said open end of the tube, means for rotating said tube downwardly to release said end of said bag from said end flange, means for discontinuing the suction on completion of said releasing movement; and means thereafter engageable with said released portion of the bag for withdrawing said bag completely from the bottom of the stack; and additional means associated with said last mentioned means for feeding said bag in a predetermined direction after it has been withdrawn from the bottom of the stack.

10. In a bag feeding apparatus for operating upon bags having a double bottom, the bottoms of each of said bags, when folded flat, forming a re-entrant tongue; a hopper; means for supporting a plurality of flat stacked double bottom bags therein with the bottom end of each adjacent one side of the hopper; and with the re-entrant tongue formed by the folded double bottom of each arranged on the under surface of each bag in the hopper; a plurality of flanges at the bottom of the hopper for supporting the stack of bags including an end flange at the end of the hopper adjacent the bottom end of each bag; means in said hopper for maintaining said stack in substantially regular vertical arrangement, said means comprising a plurality of spaced horizontal beads on the interior of the side of the hopper adjacent the open ends of the bags and parallel thereto, said beads providing a support for an open end of a bag, said open end of said bag being released from said bead, when the double bottom end of the bag drops downwardly a sufficient distance to make the distance between the bottom end of the bag and the bead greater than the length of the bag.

11. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed; and additional means for aligning said bag upon said bed during said last mentioned movement thereof, said means comprising a flange adjacent one side of and parallel to the path of movement of said bag; and an additional member rotatable in a plane normal to the path of movement of the bag; said additional member being rotatable into engagement with the other side of said bag and aligning the same against said flange.

12. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said

portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed; and additional means for aligning said bag upon said bed during said last mentioned movement thereof, said means comprising a flange adjacent one side of and parallel to the path of movement of said bag; and an additional member rotatable in a plane normal to the path of movement of the bag; said additional member being rotatable into engagement with the other side of said bag and aligning the same against said flange; said additional member being rotatable out of said aligning relationship to permit removal of the bag from the bed and to permit an additional bag to to be moved into place upon said bed.

13. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide fastener member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed; and means for removing said bag from said bed upon the completion of said last mentioned movement, said means comprising a cut-out in said bed, a pair of moving belts arranged for movement normal to the original path of movement of said bag, surfaces of said belts extending on either side of the original path of movement of said belts, pulleys carrying said belts, said pulleys being arranged on either side of the path of movement of the bag and spaced from each other, said bag, during its original movement being slidable between said pulleys, means for bringing said pulleys and said belts together at the completion of said original movement, said belts capturing said bag between them and removing the same from the bed.

14. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed into the operating mechanism of a tin-tie attaching apparatus.

15. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed into the operating mechanism of a tin-tie attaching apparatus; and additional means for aligning said bag upon said bed during said last mentioned movement thereof, said means comprising a flange adjacent one side of and parallel to the path of movement of said bag; and an additional member rotatable in a plane normal to the path of movement of the bag; said additional member being rotatable into engagement with the other side of said bag and aligning the same against said flange.

16. A bag feeding apparatus comprising a hopper; means for supporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed into the operating mechanism of a tin-tie attaching apparatus; and additional means for aligning said bag upon said bed during said last mentioned movement thereof, said means comprising a flange adjacent one side of and parallel to the path of movement of said bag; and an additional member rotatable in a plane normal to the path of movement of the bag; said additional member being rotatable into engagement with the other side of said bag and aligning the same against said flange; said additional member being rotatable out of said aligning relationship to permit removal of the bag from the bed and to permit an additional bag to be moved into place upon said bed.

17. A bag feeding apparatus comprising a hopper; means for suporting a plurality of stacked bags therein; means for releasing a portion of a bag from the bottom of the stack; a slide member having a plate engageable with said released portion of the bag; said slide member being movable in a first direction to engage said portion of the bag and in the opposite direction to remove the bag from the bottom of the hopper; means for disengaging said bag from said plate at the completion of said movement in the opposite direction and for dropping said bag upon a bed; means for thereafter moving said bag in said first direction upon said bed into the operating mechanism of a tin-tie attaching apparatus; and means for removing said bag from said bed upon the completion of said last mentioned movement, said means comprising a cut-out in said bed, a pair of moving belts arranged for movement normal to the original path of movement of said bag, surfaces of said belts extending on either side of the original path of movement of said belts, pulleys carrying said belts, said pulleys being arranged on either side of the path of movement of the bag and spaced from each other, said bag, during its original movement being slidable between said pulleys, means for bringing said pulleys and said belts together at the completion of said original movement, said belts capturing said bag between them and removing the same from the bed.

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