Oct. 6, 1959 J. M. ALLEN 2,907,159

CLOTHESPIN LOADING MACHINE

Filed June 24, 1958 4 Sheets-Sheet 1

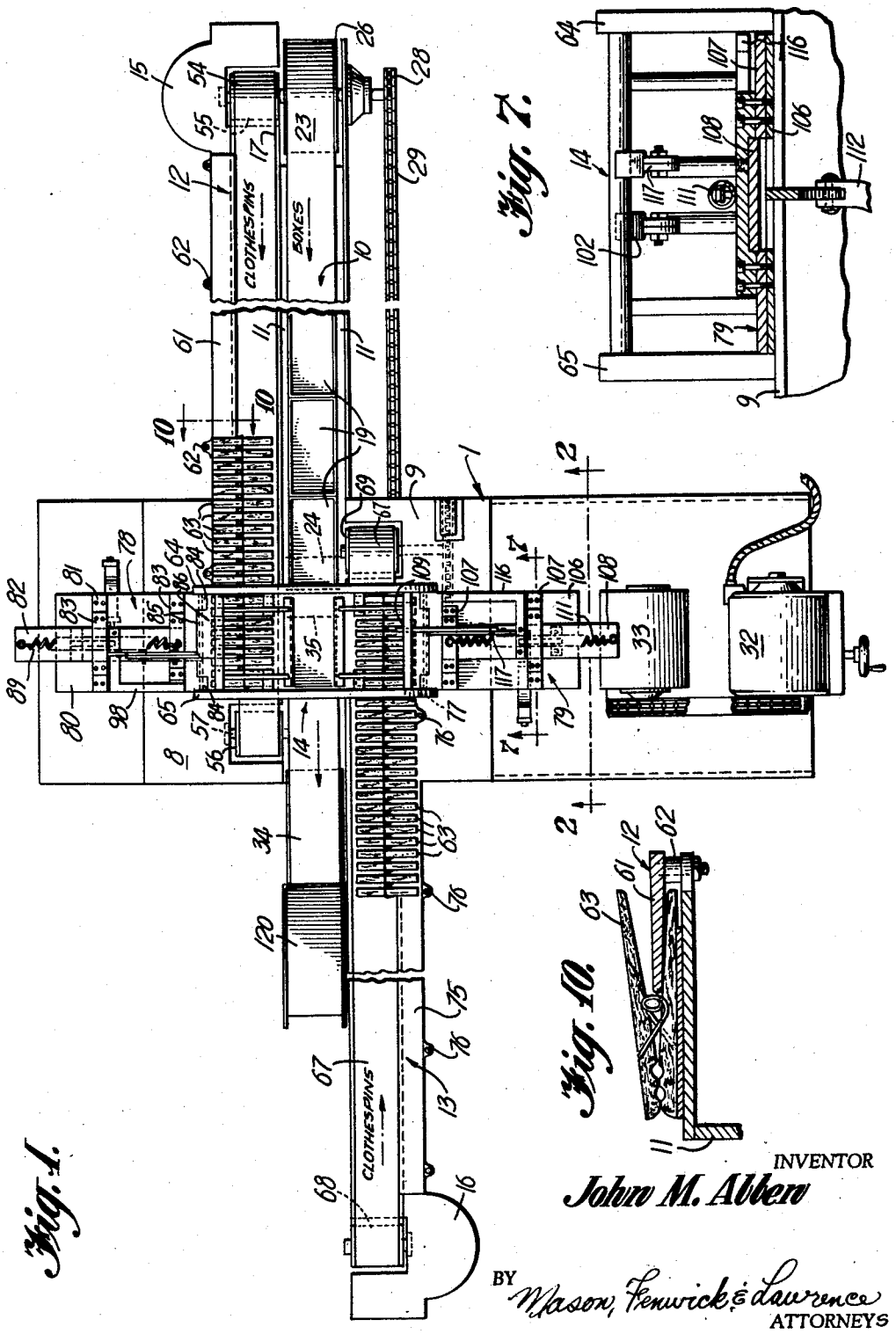


Fig. 1.

Fig. 7.

Fig. 10.

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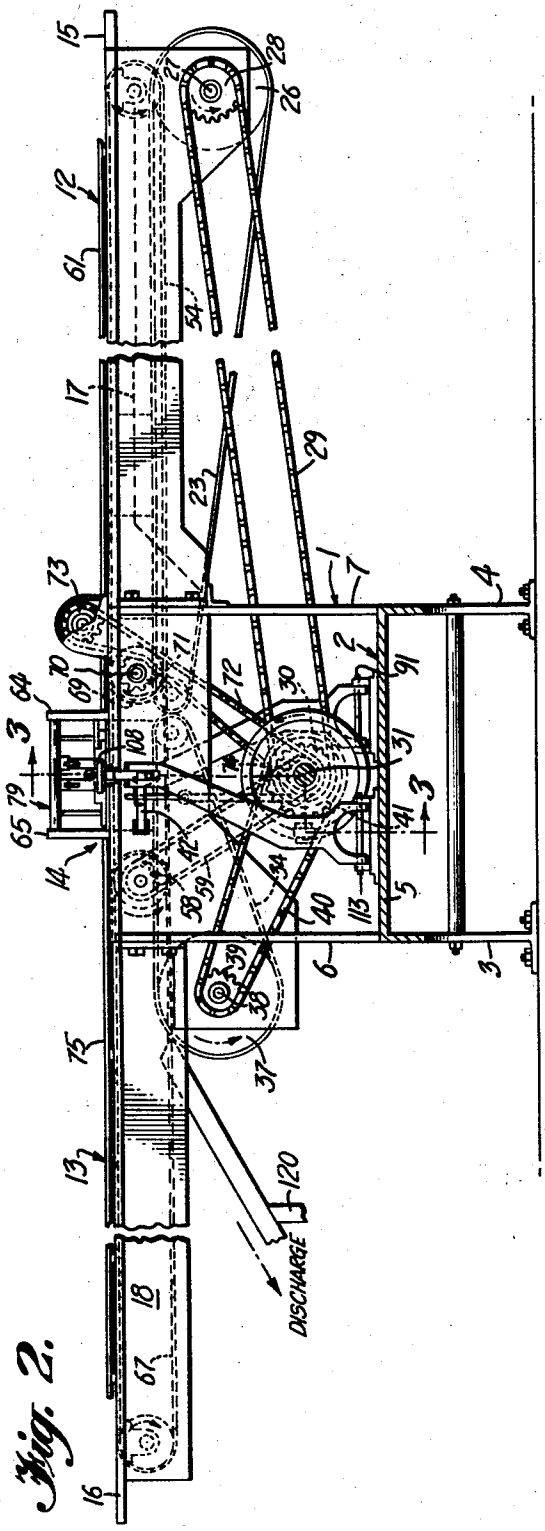


Fig. 2.

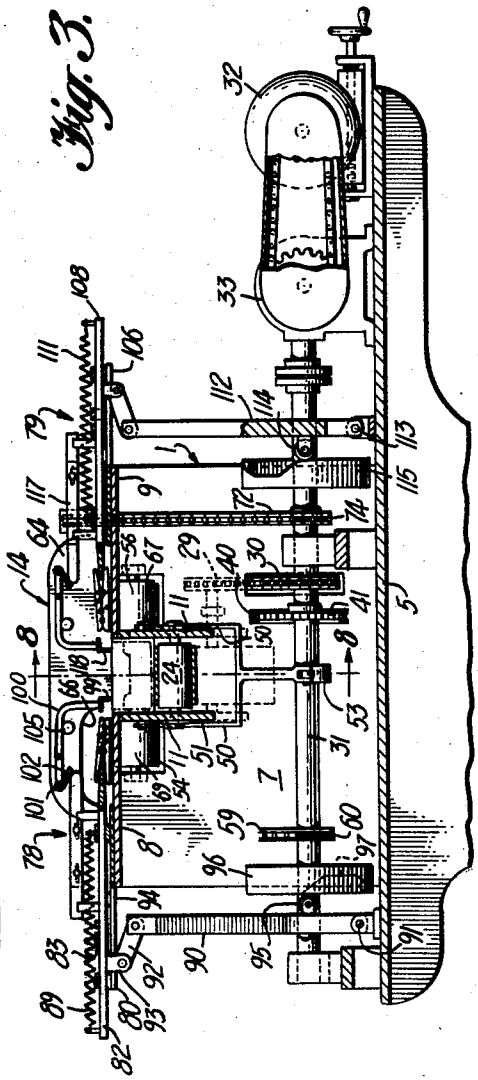


Fig. 3.

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Fig. 4.

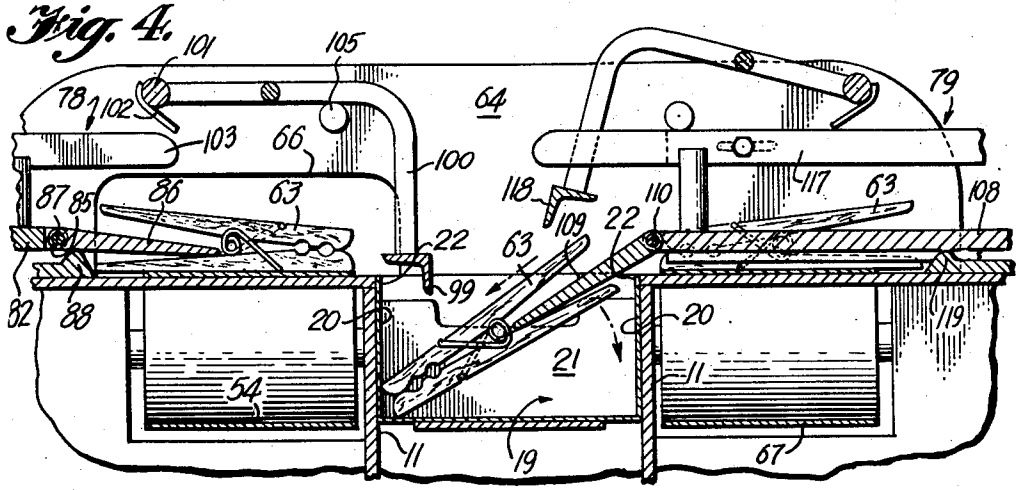


Fig. 5.

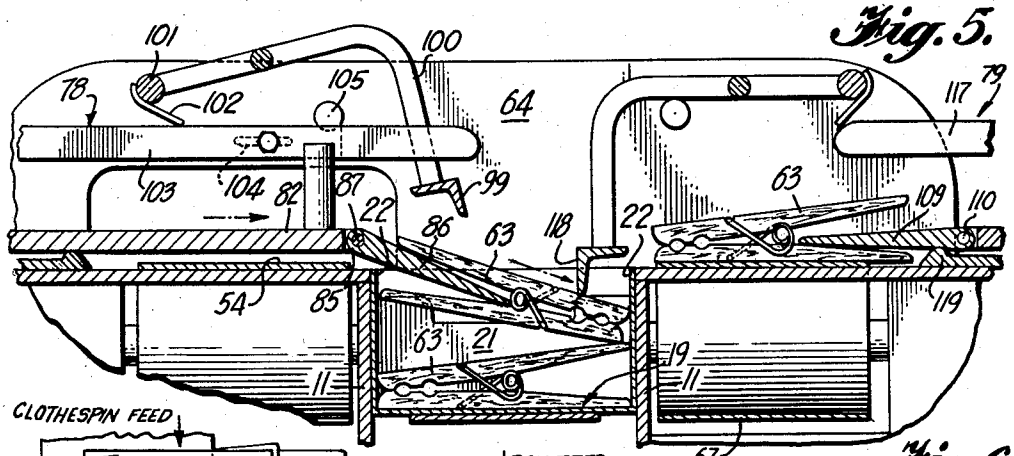
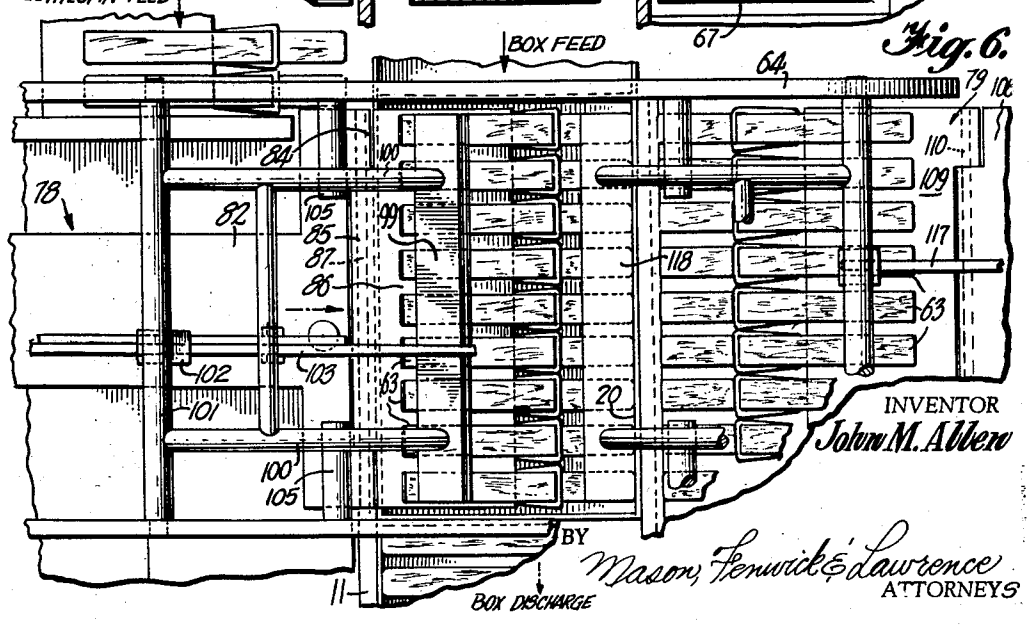


Fig. 6.



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Fig. 8.

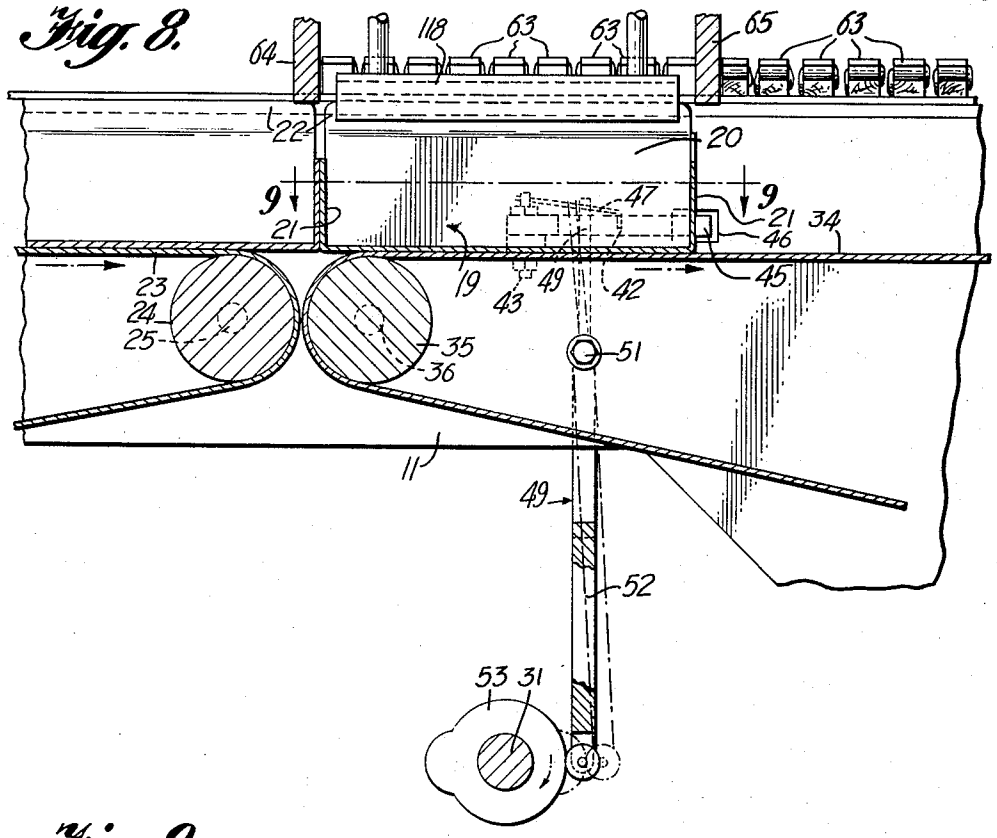
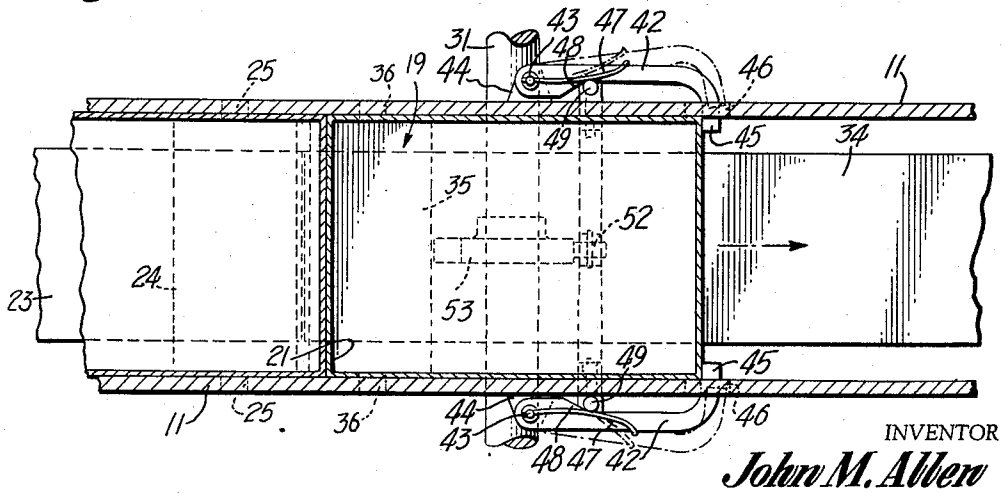


Fig. 9.



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2,907,159

CLOTHESPIN LOADING MACHINE

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Application June 24, 1958, Serial No. 744,089

10 Claims. (Cl. 53—154)

This invention relates to packing machines, and particularly to machines for packing clothespins in boxes, or cartons, for shipping and merchandising.

The primary object of the present invention is to provide a machine which will automatically feed clothespins and containers therefor to a loading station, place the clothespins in the containers and move the filled containers from the machine.

Another object is to provide a machine of this nature which will be capable of packing either spring or slotted type clothespins without necessity for changing the machine to adapt it to one or or the other type.

A more specific object is the provision of such a machine in which the clothespins are arranged in layers, and the container will be held at the loading station until the required number of layers have been inserted.

A further object is to provide improved inserting means for a machine of this kind, which will permit insertion in the bottom of a relatively deep container while maintaining complete control of a plurality of articles being inserted simultaneously.

Yet a further object is to provide a packing machine in which the articles to be packed will be fed to the loading station on opposite sides of the station and inserted oppositely in the container.

A still further object is to provide a packing machine which will advance empty containers to a loading station at a relatively slow speed and, when filled, move them rapidly from the machine, leaving a gap between the incoming and outgoing containers to permit proper function of means to hold the containers in the loading position.

Other objects of the invention will become apparent from the following description of one practical embodiment thereof, when taken in conjunction with the drawings which accompany, and form part of, this specification.

In the drawings:

Figure 1 is a top plan view of a clothespin packing machine embodying the principles of the present invention;

Figure 2 is a section taken on the line 2—2 of Figure 1, showing the major part of the machine in side elevation;

Figure 3 is a central, vertical, transverse section through the machine, taken on the line 3—3 of Figure 2;

Figure 4 is an enlarged detail of the loading station at the same transverse plane as shown in Figure 3 with one loading mechanism moved to insert a layer of pins in the bottom of the box;

Figure 5 is a view similar to Figure 4 with the first loading mechanism retracted and the second in inserting position;

Figure 6 is an enlarged fragmentary top plan view of the parts in the position shown in Figure 4;

Figure 7 is a section taken on the line 7—7 of Figure 1, showing a portion of the inserting mechanism and other structure appurtenant thereto;

Figure 8 is a fragmentary vertical, longitudinal section along the container feeding passageway, and is taken on the line 8—8 of Figure 3;

Figure 9 is a horizontal section through the container at the loading station, showing the container holding and positioning means, and is taken on the line 9—9 of Figure 8; and

Figure 10 is a section taken on the line 10—10 of Figure 1, showing a clothespin on a feeding belt and embracing a guide fixed alongside the belt.

In general, the packing machine of the present invention consists of a pair of belts feeding articles to be packed to a loading station, to which another feeding means brings a container. The machine has means for stopping and positioning the container, means to insert full layers in the container from opposite sides, from the two feed belts in alternation, and means to release the filled container and move it quickly from the machine.

Referring to the drawings in detail, the machine is shown as supported upon a frame structure 1. This has a transversely extending central H-shaped section 2, with the sides 3 and 4 below the cross-members forming legs, and the cross-members 5 a platform which projects laterally to provide a base upon which the drive mechanism can be supported. The sides 6 and 7 above the platform have their tops bridged by table sections 8 and 9 on either side of the machine. The tables are cut out at necessary places to accommodate the various operating mechanisms.

Along the longitudinal center of the machine there is a passageway 10 for containers, formed by wall plates 11, fixed to the upper legs of the central frame. These wall-forming plates extend in pairs, parallel to one another in opposite directions from the central frame. At either side of the container passage, there is a clothespin feed line. These are shown at 12 and 13 running from opposite ends of the machine and terminating adjacent a loading station 14. The feed lines include feed tables 15 and 16, which form continuations of the central table sections 8 and 9, supported upon horizontal beams 17 and 18, fixed at one end to the upper legs of the central H-shaped frame. Any other framing, bracing or table structure can be used as desired.

It would be well at this point to describe briefly one type of container which may be used with the machine and which is shown on the drawings. This consists of a rectangular tray 19 having side walls 20 which extend above the tops of the end walls 21, to form top flaps 22. These are folded over along lines joining the top corners of the end walls to overlie the ends of the clothespins when the box is packed. The flaps will retain the ends of the pins within the box and the package may be wrapped in cellophane, leaving the major portion of the pins visible. This is a conventional package. The containers will be put in the machine with the flaps upright, forming vertical continuations of the side walls (see Figures 4 and 5).

The side walls 11 of the container passageway are spaced apart just enough to permit free sliding movement of containers between them. The containers are brought into the machine upon the top flight of a container feed belt 23. Belt 23 has its top flight horizontally positioned, and located below the clothespin feed tables 15 and 16 just the depth of the containers with flaps 22 vertically positioned. The belt passes over a small pulley 24 located adjacent the near end of the loading station in the direction of container travel (see Figure 8). Pulley 24 is mounted upon shaft 25 journalled in the wall plates 11. At the inlet end of the container passage, belt 23 passes aroung a relatively large drive pulley 26, mounted upon shaft 27, journalled in plates 11. One end of shaft 27 projects beyond the wall plate and carries a sprocket 28, driven by chain 29 from a sprocket

30 on a drive shaft 31. Shaft 31 is powered from a suitable motor 32 through a gear box 33, both mounted on platform 5.

A second belt 34, which is a discharge belt for filled containers, is mounted in alignment with belt 23, and its top flight forms a continuation of the container support. A small pulley 35, mounted on shaft 36, supports the end of belt 34 adjacent the discharge end of the feed belt. At the discharge end of the machine, the belt passes around a drive pulley 37 mounted on shaft 38 journalled in the wall plates 11. Shaft 38 carries sprocket 39, driven by chain 40 from a sprocket 41 on the main drive shaft 31. The ratio of the several sprockets, pulleys, etc. driving the feed and discharge belts will be such that the discharge belt will move at approximately three times the speed of the feed belt. The reason for this will appear later.

It will be noted from Figure 8 that a container at the loading station will have moved off of the feed belt and be resting entirely upon the discharge belt. Dogs 42 pivotally mounted on pins 43, fixed to brackets 44 on the walls 11 are adapted to engage the forward edge of the container to limit its movement. The belt, slipping under the container, will keep it urged against the dogs 42 so that it will be accurately positioned. The dogs are mounted outside the walls 11, and have inturned fingers 45 which pass through openings 46 in the walls to project across the belt 34 and lie in the path of movement of the container. Springs 47 bias the dogs to container-stopping position.

Each dog 42 has an inclined cam surface 48 against which actuating levers 49 are adapted to be moved to cause the dogs 42 to swing about their pivots to move the inturned fingers 45 out of the path of travel of the containers, to permit the belt 34 to remove the container quickly from the loading position. Lever 49 is bifurcated, having operating arms 50 upstanding along the side walls and pivoted to the side walls at 51. A single actuating arm 52 projects downwardly to contact a cam 53 mounted on the drive shaft 31. The cam 53 is contoured to provide one operative movement of the lever 49 each revolution of the drive shaft. The pressure of the dogs against the lever 49 will hold it constantly in contact with the cam 53. The rapidity with which the belt 34 moves filled containers from the loading station will provide ample time for the dogs to move back to container-stopping position before the next empty container, on the slower moving feed belt 23, moves up to the loading station.

As mentioned above, feed tables 15 and 16 lie on opposite sides of the container feed passageway 10, and approach the loading station from opposite directions. A belt 54 has its top flight on the table 15. The belt passes over pulleys 55 and 56 suitably mounted on the frame structure. Pulley 56 is mounted on a shaft 57 which also carries a sprocket 58 driven by a chain 59 from a sprocket 60 on shaft 31. Clothespins will be placed manually on the belt 54 and conveyed to the loading station.

In order to keep the pins in proper upright position for loading and to hold them in alignment, a guide bar 61 is arranged horizontally along the table 15 with its inner edge overlying the edge of the belt. The bar will be supported upon spacers 62 to hold the inner edge at such height as to permit it to lie between the diverging arms of a spring type clothespin 63 on the belt 54, as shown in Figure 10. The bar will also enter the slot in the well-known slotted type clothespins when they are being packed. An operator, when placing the pins on the belt, will orient them properly and position them on the bar. The bar will hold them correctly until they reach the loading station.

The loading station is defined by a pair of side plates 64 and 65, which span the several feed belts and are supported on the table sections 8 and 9. The plates are spaced apart substantially the length of a container 19, so that only enough clothespins to form a layer in the container can be accommodated between the plates. Plate 64 will be cut out above the belt 54 as at 66, to allow clothespins to move into the loading station. Plate 65 will form a wall to serve as a stop to position the pins within the station. In like manner to the container, the clothespins will be held in contact with one another and the lead pin in contact with plate 65 by continuous movement of the belt beneath them.

Feed table 16 is equipped similarly with a belt 67 on pulleys 68 and 69. Pulley 69 is mounted on a shaft 70 carrying a sprocket 71, driven by a chain 72. As belt 67 is to move oppositely to belt 54, chain 72 is held in contact with the underside of sprocket 71 by means of an idler sprocket 73, mounted above sprocket 71. Chain 72 is driven by a sprocket 74 mounted on the main drive shaft 31. Guide bar 75 is fixed on spacers 76 on the table 16, and plate 65 is notched, as at 77, to allow the pins to pass through to the loading station. Plate 64 serves as the pin stop for the pins fed on the belt 67.

Thus it will be seen that empty containers 19 are advanced to the loading station and held precisely in position there. Clothespins are aligned on the belts 54 and 67, and sufficient pins to form layers are accumulated in side-by-side order on each of the belts between the plates 64 and 65, ready for insertion into the container.

The clothespins are placed in the containers, one complete layer at a time, in alternation from the belts 54 and 67, by means of inserting mechanisms 78 and 79.

The inserting mechanism 78 is mounted upon a bed plate 80, bolted to the table section 8 and extends transversely of the machine from the belt 54 to project beyond the table section 8. The bed plate carries guide blocks 81, which are recessed to form seats upon which an inserting plunger 82 may slide. The inserting plunger is held in the seats by cap plates 83. The forward end of the plunger is provided with a pair of spaced eyes 84, between which the mounting eye 85 of an inserting finger 86 is positioned. The eyes of the respective members are drilled, and a pin 87 put through the openings to pivotally connect the inserting finger to the end of the plunger. The finger is capable of vertical tilting and is held horizontally when the plunger is in withdrawn position by resting upon a rib or lug 88 on the bed plate 80. This position is shown at the left of Figure 4. When the plunger is retracted, as in Figure 4, inserting finger 86 will form a continuation of the guide bar 61. Thus, pins moving along on belt 54 will pass off of bar 61 onto the inserting finger 86. Enough of the clothespins to form a layer in the container, nine as shown, will accumulate on the inserting finger and fill it from end to end.

The plunger is urged forwardly, toward the container, by a spring 89 which has one end connected to the outer end of the plunger and the other to one of the guide blocks 81. Movement of the plunger is controlled by means of a lever 90, pivoted on the platform 5, at 91, and having its upper end connected to the plunger by means of a link 92 connected to a bracket 93, secured to the underside of plunger 82. The bed plate is slotted, as at 94, to allow for movement of the bracket 93. Above the pivot 91, and in the horizontal plane of the main drive shaft 31, the lever carries a cam follower roller 95 held against a face cam 96 fixed to shaft 31. The cam has a low 97 which will permit the lever to tilt forwardly and the plunger to advance the inserting finger once each revolution of the shaft 31. As the roller moves off of the low the lever will retract the plunger to inoperative position.

The plunger 82 carries a gate 98 which forms a continuation of the side edge of the inserting finger and will be moved across belt 54 as the finger is advanced, to hold the pins on the belt against movement until the finger is retracted.

It will be seen that as the plunger moves forwardly, the pivot 87 between the plunger and inserting finger will move forwardly of the lug 88 and the finger will be free to pivot downwardly. As the finger moves to the container passageway moving the clothespins with it, it will gradually tilt downwardly to guide the clothespins into the box. The finger will tilt with the pins until the forward ends of the pins are at the bottom edge of the box, thus holding the pins in precise alignment until held by the box. When the finger is retracted, the pins may fall free to lie flat in the container bottom.

In order to insure the pins dropping into the box, a bumper bar 99 is pivotally mounted above the inserting finger. Arms 100 support the bar and are pivoted at 101. An actuating lever 102 is attached to the pivot bar. To control the bumper bar, a cam rod 103 is fixedly mounted on the plunger 82. The rod is at such height that when it moves forwardly it will strike activating lever 102 to lift the bumper bar from the path of the advancing inserting finger and the clothespins therein. When the plunger is retracted, the bumper bar will drop, striking the raised ends of the clothespins to seat them in the box. The cam rod may be made in two sections for adjustment to change the point of release of the bumper bar. The two sections of the rod can be adjusted by means of bolt and slot connections 104 between the sections. The lowermost position of the bumper bar is determined by stops 105, secured to the plates 64 and 65, and located in the path of movement of the arms 100.

Feed mechanism 79 is identical to that just described, consisting of bed plate 106, guide blocks 107, plunger 108, inserting finger 109 pivoted at 110 to the plunger, spring 111 for biasing the plunger, and lever 112, pivoted at 113 and having cam follower 114 to follow cam 115 on shaft 31. The plunger carries a gate 116, and a cam rod 117 for actuating a bumper bar 118. The bed plate has a positioning lug 119 to hold the inserting finger in alignment with the guide bar 75 when in retracted position.

The two face cams 96 and 115 are so oriented on shaft 31 with respect to one another, that the inserting fingers 86 and 109 will operate in alternation to insert superimposed layers of clothespins in the container, and filled containers may be moved away from the loading station and new ones brought up after the second inserting operation. Filled containers will slide down chute 120 onto a belt to be conveyed to wrapping machines, or for any other operation.

It is believed that the operation of the machine has been completely described in connection with the structure of the several mechanisms, so that no separate description of the operation is necessary.

While in the above one practical embodiment of the invention has been disclosed, it will be understood that the precise details of structure shown and described are merely by way of illustration and the invention may take other forms within the scope of the appended claims.

What is claimed is:

1. A machine for automatically packing clothespins in containers comprising, a frame, means on said frame to form a loading station, means defining a feed path for clothespins leading to the loading station, means to move clothespins along said path, a horizontal guide extending along the feed path adapted to be straddled by clothespins on the feed path to maintain the clothespins in fixed alignment, an inserting plunger at the loading station slidably mounted for movement transversely of the clothespin feed path, an inserting finger pivotally connected to said plunger for tilting movement in a vertical plane, said inserting finger having a cross-section similar to said guide and positioned to form a continuation of the guide when the plunger is in retracted position, whereby clothespins moving along the feed path will pass off of the guide and onto the inserting finger, means defining a passageway for clothespin containers, means to move containers along the passageway to and from the loading station, said container moving means located to position containers with their top edges no higher than the horizontal plane of the clothespin feed path, and means to move said plungers to advance the inserting finger to position the clothespins astraddle the finger in a container at the loading station, said pivotal connection of the inserting finger to the plunger permitting the finger to tilt downwardly to enter the container and maintain control of the clothespins on the finger until the leading ends of the clothespins are in contact with the bottom of the container.

2. In a machine for automatically packing clothespins in containers as claimed in claim 1, a gate carried by said plunger to traverse said clothespin feed path as said plunger is advanced to arrest movement of clothespins into the loading station.

3. In a machine for automatically packing clothespins in containers as claimed in claim 1, a bumper bar pivotally mounted above the container passageway at the loading station for movement into containers at the loading station, and means carried by the plunger to lift the bumper bar out of the container as the plunger is advanced.

4. In a machine for automatically packing clothespins in containers as claimed in claim 1, said means to move containers to and from the loading station comprising, a container feed conveyor and a discharge conveyor arranged in alignment with the discharge conveyor forming a continuation of the container feed conveyor to permit automatic transfer from the container feed conveyor to the discharge conveyor, and means to move the discharge conveyor at a faster rate than the container feed conveyor, the adjacent ends of the container feed conveyor and discharge conveyor so located that a container at the loading station will be wholly on the discharge conveyor and the next adjacent container in the passageway will be wholly on the container feed conveyor, and stop means to extend into the path of movement of containers on the discharge conveyor to hold containers at the loading station.

5. In a machine for automatically packing clothespins in containers as claimed in claim 4, means to move said stops from container-holding position.

6. In a machine for automatically packing clothespins in containers as claimed in claim 1, means defining a second feed path for clothespins leading to the opposite side of the loading station from the first mentioned feed path and having a horizontal guide therealong, an inserting plunger mounted transversely of the second clothespin path and having an inserting finger pivotally connected thereto, and means to move said second plunger in alternation with the first.

7. A machine for automatically packing small articles in containers comprising, a frame, means on said frame to form a loading station, means to convey empty containers to the loading station, means to convey articles to be packed to positions on opposite sides of the loading station, means operable in alternation for moving articles from the article conveying means at opposite sides of the loading station and inserting them into containers at the loading station, releasable means for holding empty containers in place at the loading station, and means movable more rapidly than the empty container conveying means to move filled containers quickly from the loading station upon release of said holding means.

8. A machine for automatically packing small articles in containers comprising, a frame, means on said frame to form a loading station, a container feed conveyor to advance containers to the loading station, an article conveyor arranged to transport articles to be packed to the loading station, means at the loading station to arrest movement of articles on the article conveyor to cause accumulation of predetermined group lots of articles at the loading station, article inserting means movable trans-

versely of the article conveyor to move accumulated group lots of articles into containers at the loading station, means to drive said article and container conveyors and said article inserting means, a container discharge conveyor in alignment with said container feed conveyor and closely adjacent thereto to permit containers to pass from the feed conveyor to the discharge conveyor, said discharge conveyor having an entrance end immediately beneath said loading station, means to drive said discharge conveyor at a more rapid rate than said container feed conveyor, releasable means to engage containers and hold them against movement at the loading station, and means to release said releasable means after operation of said article inserting means, whereby filled containers will be moved rapidly from the loading station creating a gap between the discharging container and the next advancing empty container on the slower moving container feed conveyor.

9. A machine for automatically packing small articles in containers comprising, a frame, means on said frame to form a loading station, a container feed conveyor to advance containers to the loading station, an article conveyor arranged to transport articles to be packed to the loading station, means at the loading station to arrest movement of articles on the article conveyor to cause accumulation of predetermined group lots of articles at the loading station, article inserting means movable transversely of the article conveyor to move accumulated group lots of articles into containers at the loading station, means to drive said article and container conveyors and said article inserting means, said article feeding conveyor being located above the container feed conveyor a distance at least equal to the height of the containers, and said inserting means including a pivoted inserting finger engageable with the articles of an accumulated group lot, whereby said inserting finger may tilt with the engaged articles to guide the articles to the bottoms of containers at the loading station.

10. Mechanism for inserting into cartons clothespins having separated legs comprising, means to support an open carton, means above the carton top and to the side thereof to receive a plurality of aligned clothespins with their separated legs extending away from said carton, a plunger, an inserting finger pivotally connected to the plunger on a horizontal pivot, the plunger and finger movable to insert the finger between the legs of the accumulated clothespins and move the clothespins to the carton, the pivotal connection of the finger to the plunger permitting the finger to swing downwardly to guide clothespins to the bottom of the carton.

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