Sept. 15, 1953 G. M. WOODRUFF ET AL 2,651,896

CONTAINER OPENING AND POSITIONING MACHINE

Filed Sept. 2, 1947 5 Sheets-Sheet 1

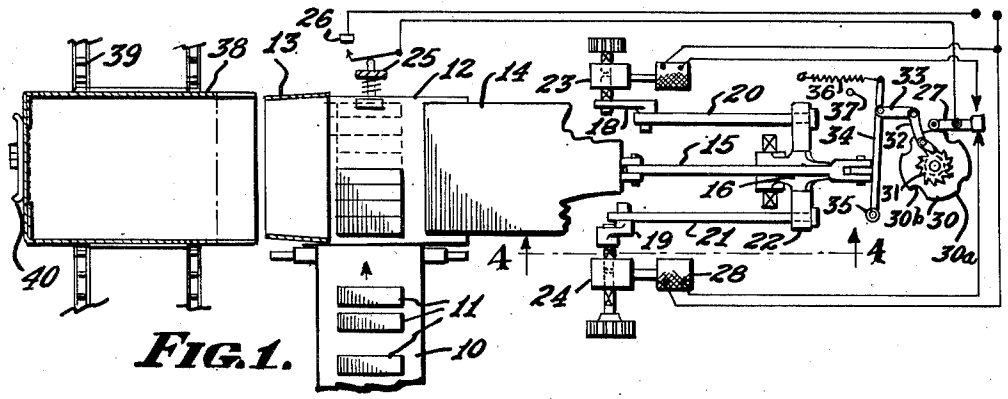


FIG. 1.

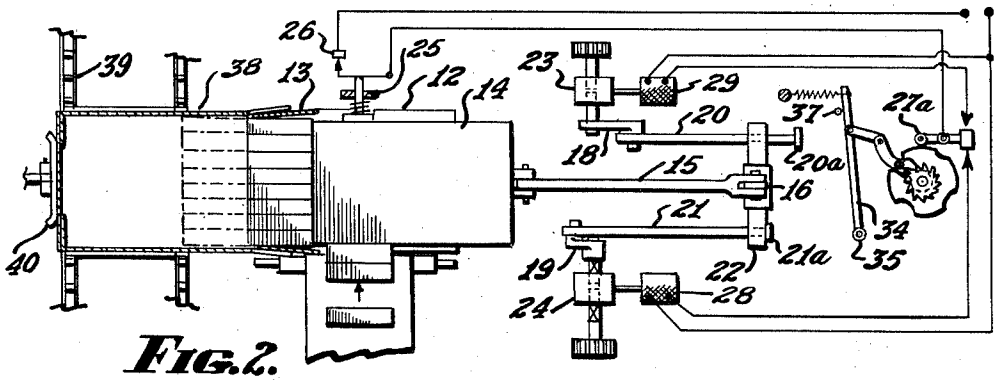


FIG. 2.

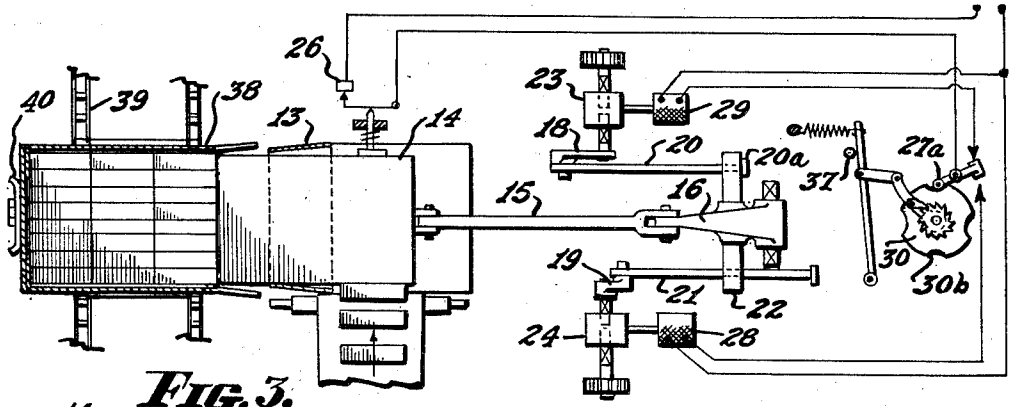


FIG. 3.

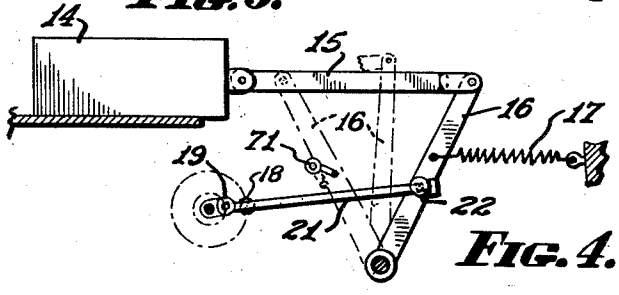


FIG. 4.

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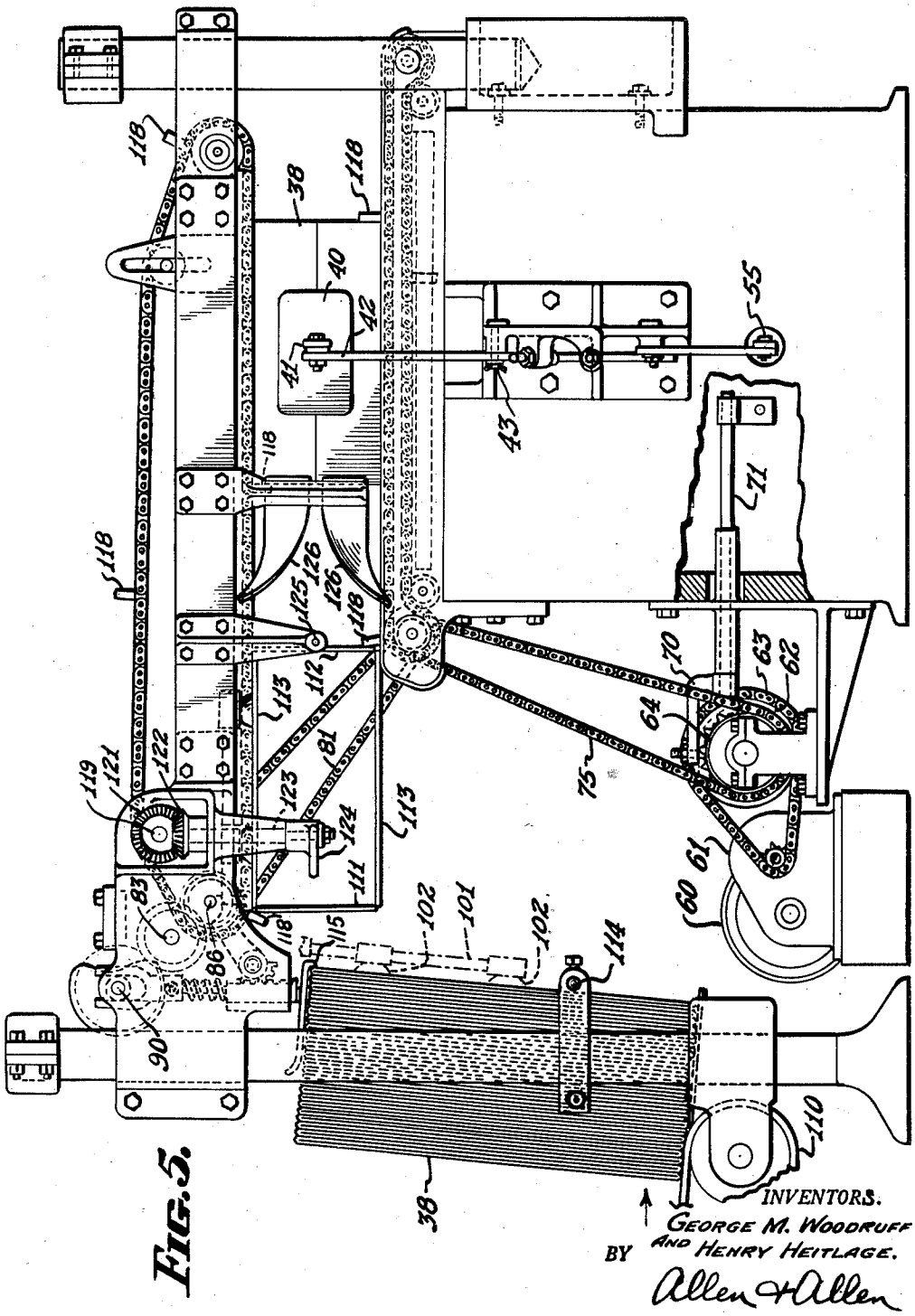


FIG. 5.

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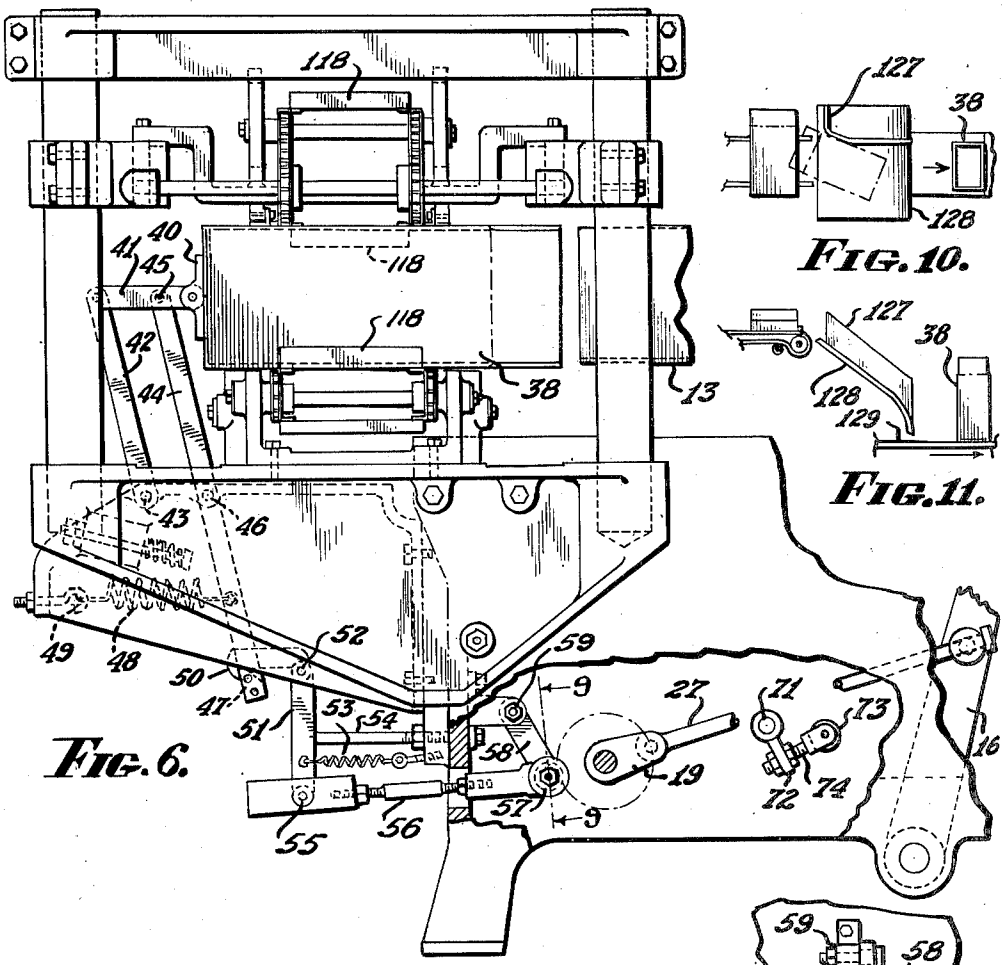


FIG. 6.

FIG. 10.

FIG. 11.

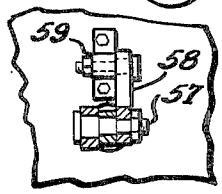


FIG. 9.

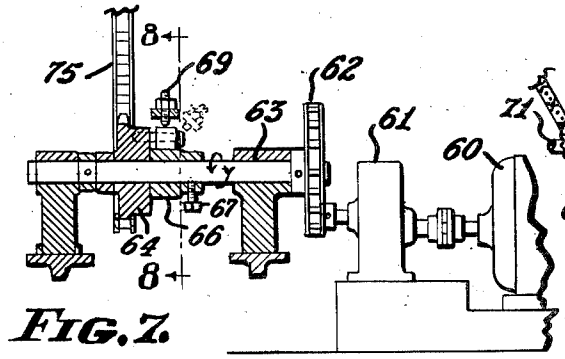


FIG. 7.

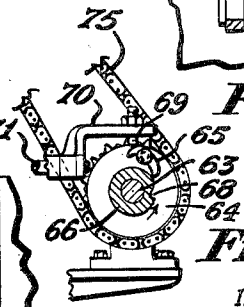


FIG. 8.

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CONTAINER OPENING AND POSITIONING MACHINE

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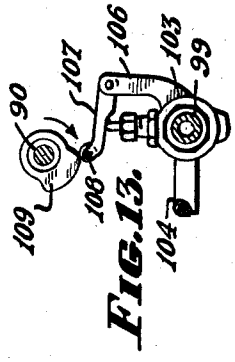


FIG. 13.

FIG. 12.

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CONTAINER OPENING AND POSITIONING MACHINE

Filed Sept. 2, 1947 5 Sheets-Sheet 5

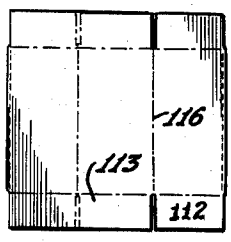


FIG. 16.

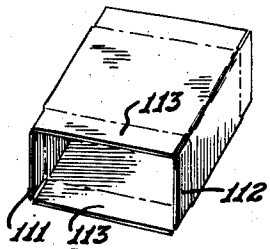


FIG. 17.

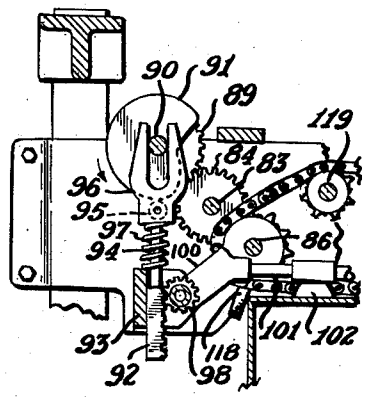


FIG. 15.

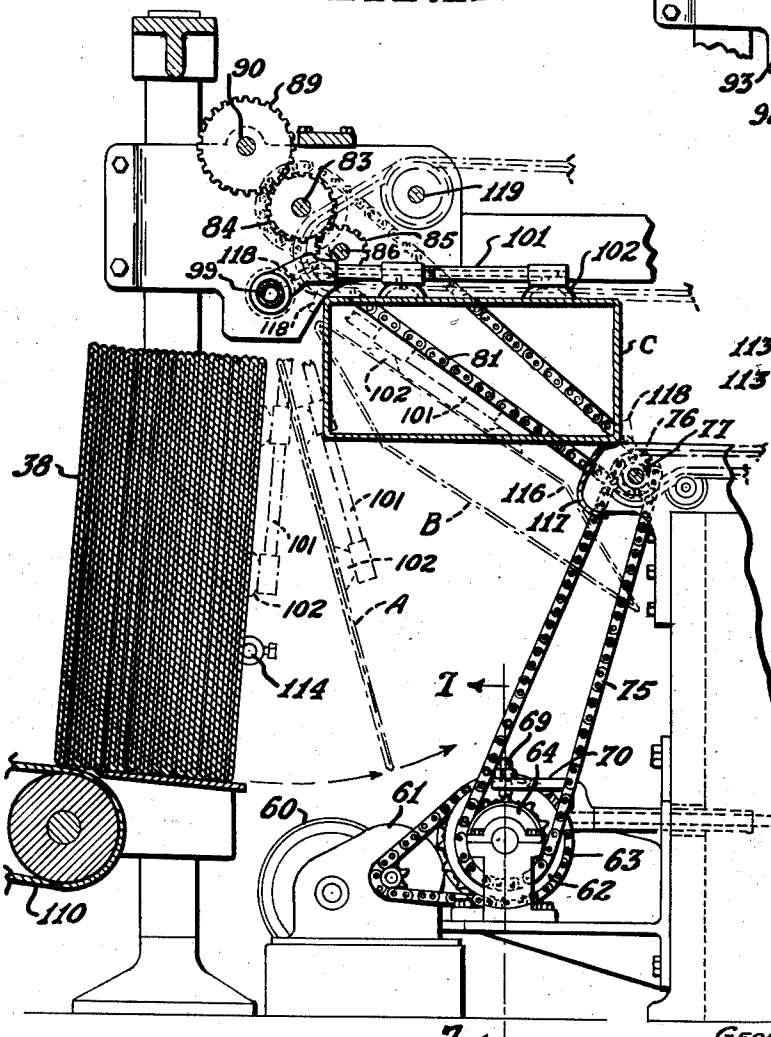


FIG. 14.

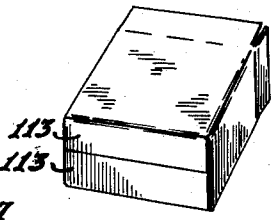


FIG. 18.

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Patented Sept. 15, 1953

2,651,896

UNITED STATES PATENT OFFICE

2,651,896

CONTAINER OPENING AND POSITIONING MACHINE

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Application September 2, 1947, Serial No. 771,692

15 Claims. (Cl. 53—45)

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This invention relates to a container opening and positioning machine particularly for use in connection with automatic case packers. In industries where products are packaged for sale, it is usual to place a certain number of such packages in a larger container or case for shipping purposes. Such containers or cases may be packed with, say, two dozen of the individual packages. Case packing machines are well-known in industry and usually comprise a conveyor which conducts the packages to be packed into the case into a loading position. There is then usually provided a ram which operates when a predetermined number of packages are lined up and advances such line of packages transversely to their previous direction of travel by an amount sufficient to clear a succeeding line of packages coming along said conveyor. Succeeding packages advance in the same manner and when an appropriate number are lined up as before, the plunger again advances the two rows of packages. This procedure repeats until such time as a block of packages constituting a complete case is lined up and the plunger then usually gives a longer stroke loading the entire block of packages into the case.

In such installations there has been no provision for handling the empty cases themselves and it has been conventional to provide an operator who will remove a knocked down case from a stack, erect it in tubular form, fold over the bottom end flaps and place the prepared case in position on a funnel through which the case load is advanced by the above mentioned plunger. It has been usual to employ female operators for this work, and the forming and positioning of the empty cases has proved to be a very tiring operation.

Empty case forming devices have heretofore been proposed, but these have had undesirable features which it is our object to avoid in the present invention. Common disadvantages of such prior machines are that the supply stack of empty collapsed cases is usually placed so high that it is difficult to load from a hand truck, and that it is usually designed to hold collapsed cases in a horizontal position.

Our machine provides for such a supply stack close to the floor, with the collapsed cases held in substantially vertical planes—two features which we have found very advantageous in supplying the stack with collapsed cases from a hand truck with a minimum of physical effort.

It is an object of our present invention to provide an apparatus which will take collapsed

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cases from a conveniently located stack, square them up, fold over the bottom end flaps, advance them into position adjacent the funnel of the case packing machine, and place them on the funnel while they are being packed.

It is another object of our invention to provide a device as outlined which will perform these various operations in timed relation to the operation of the case packing machine so that there will be a new case coming up for positioning each time a packed case is moved away.

It is another object of our invention to provide a machine of the type outlined which will be relatively simple in operation and which will not require a great deal of maintenance.

Further objects of our invention include the provision of a device as outlined which will be relatively simple in construction and therefore inexpensive to manufacture.

These and other objects of our invention, which we shall describe in more detail hereinafter, or which will be apparent to one skilled in the art upon reading these specifications, we accomplish by that certain construction and arrangement of parts of which we shall now describe an exemplary embodiment. Reference is made to the drawings forming a part hereof and in which:

Figures 1, 2 and 3 are diagrammatic plan views of a case packing machine showing the relation between the case packing machine and the apparatus of our present invention. These figures show different positions in the cycle of operation.

Figure 4 is a fragmentary cross-sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a side elevational view of the case squaring and bottom flap closing portion of our apparatus.

Figure 6 is an end elevational view of the same.

Figure 7 is a fragmentary cross-sectional view taken on the line 7—7 of Figure 14.

Figure 8 is a fragmentary cross-sectional view taken on the line 8—8 of Figure 7.

Figure 9 is a fragmentary cross-sectional view taken on the line 9—9 of Figure 6.

Figures 10 and 11 are diagrammatic views in plan and side elevation respectively showing the section of the apparatus where a filled case is deposited end up on a conveyor for removal to a subsequent treating station.

Figure 12 is a plan view of the apparatus.

Figure 13 is a fragmentary cross-sectional view taken on the line 13—13 of Figure 12.

Figure 14 is a fragmentary cross-sectional view taken on the line 14—14 of Figure 12.

Figure 15 is a fragmentary cross-sectional view taken on the line 15—15 of Figure 12.

Figures 16, 17 and 18 are respectively a plan and two perspective views of the case in succeeding steps of being prepared for packing.

Referring more particularly to Figures 1 to 4 inclusive, we shall first describe briefly the operation of the case packing machine so that the coaction of our invention therewith will be apparent.

The case packing machine includes a conveyor 10, on which the filled packages to be packed into the case, and indicated at 11, are brought into packing position. The conveyor 10 brings the packages 11 onto a table 12 which is stationary so that when a single package 11 is pushed by the conveyor 10 onto the table 12, it stops until a succeeding package 11 is pushed against it which causes the package to be advanced a package width. This procedure continues, as clearly shown in Figure 1, until a desired number of packages are aligned on the table 12. While the particular number of packages will vary with the particular requirements of the industry involved, we have shown a case packing machine in which eight packages are lined up for loading.

To one side of the table 12, there is a funnel 13 which is an annular structure, rectangular in cross-section, of more or less frusto-pyramidal form, so that its smaller end will fit within the flaps of the case to be packed and flare outwardly to facilitate insertion of the packages into the case.

At the other side of the table 12, there is provided a plunger 14 of a width to engage all eight packages simultaneously. The plunger is provided with a connecting rod 15 which is pivoted to a crank member 16. The crank member 16 is acted upon by a spring 17 to keep the plunger normally in a retracted position (see Figure 4), and the plunger is moved forward by means of one or the other of the cranks 18 and 19 which are connected by means of connecting rods 20 and 21 respectively to a bar 22. The rods 20 and 21 are provided with the heads 20*a* and 21*a* respectively and pass through apertures in the rod 22, so that when the above described mechanism is being actuated to move the plunger to the left by one of the two cranks 18 or 19, the bar 22 simply slides over the other connecting rod 20 or 21 as shown in connection with the connecting rod 20 in Figure 2 and connecting rod 21 in Figure 3. It will be noted that the crank 18 has a relatively large throw, while the crank 19 has a relatively small throw. The operation of the crank 19 produces a movement of the plunger 14 of the extent shown in Figure 2, advancing a row of packages into the funnel 13 so as to clear the table 12 for a succeeding row of packages. Actuation of the crank 18, on the other hand, produces a loading stroke of the plunger 14, as shown in Figure 3.

Each of the cranks 18 and 19 is provided with a one-revolution clutch indicated diagrammatically at 23 and 24 respectively. The plunger 14 is caused to be actuated by a switch indicated generally at 25 which is positioned on the table 12 where it can be actuated by the leading package in a row, so that when, in the particular case shown, eight packages have been pushed onto the table 12, the leading package of the group pushes against the switch 25 closing the contacts 26. In

order to determine when the contacts 26 are closed, whether the plunger will be actuated by the crank 18 or the crank 19, we provide another switch generally indicated at 27. This switch, in the position shown in Figures 1 and 2, completes a circuit to a relay 28 associated with the clutch 24 whereby the crank 19 is caused to make one revolution. When the switch 27 is in the position shown in Figure 3, a circuit is completed through the relay 29 associated with the one-revolution clutch 23 whereby the crank 18 is caused to make one revolution.

The positioning of the switch 27 in the proper position is accomplished as follows. A star wheel cam indicated generally at 30 has fixed to it a ratchet 31 actuated by a pawl 32. The pawl is actuated through a linkage 33, 34, the member 34 being pivoted at 35 and being urged in a counterclockwise direction by a spring 36 toward a stop 37. Thus each time the plunger 14 moves to the left, the member 34, which is spring urged into contact with the connecting rod 15, moves to the left against the stop 37, and each time the plunger 14 returns to the right, it abuts the member 34 and moves it back to the right, causing the pawl 32 to advance the ratchet 31 one space. The relationship between the number of teeth in the ratchet and the rises and falls in the star wheel cam 30 is such that the follower 27*a* of the switch 27 rides on one of the rises 30*a* for two successive actuations of the plunger, and on the third actuation, the follower 27*a* drops into one of the cam notches 30*b*. When the follower 27*a* has dropped into a notch 30*b*, the switch 27 is thrown to the position of Figure 3 which causes the plunger to be actuated by the long throw crank 18 to produce the loading stroke. When the plunger 14 returns from the position of Figure 3 and its connecting rod abuts the arm 34, the ratchet 31 will be advanced another notch causing the follower 27 to ride up onto the next rise 30*a* of the star wheel cam, throwing the switch 27 back to the position of Figures 1 and 2.

It will be noted that the case to be packed, which is indicated generally at 38, is positioned on a conveyor generally indicated at 39, and the bottom end of the case is held in position by a plate 40. Referring now to Figure 6, it will be seen that the plate 40 has a link 41 which is pivoted to a link 42, pivoted on a part of the machine frame at 43. A long lever 44 is pivoted to the link 41 at 45, and is pivoted on the machine frame at 46. At its lower end it is provided with a lip 47, and the lever 44 is urged in a clockwise direction by a spring 48 secured to the machine frame, as by a hook 49. The lever 44 is held against clockwise rotation by a dog 50 which constitutes a part of a bell crank 51 pivoted on the machine frame, as at 52. The bell crank 51 is urged in a counterclockwise or latching direction by a spring 53 which urges the bell crank counterclockwise against a stop pin 54.

The lower end of the bell crank 51 is pivoted as at 55 to an adjustable link indicated generally at 56 which is pivoted at 57 to another link 58 which is pivoted on the machine frame at 59. It will be clear that as long as the parts are in the position of Figure 6, the plate 40 simply defines the position of the case to be loaded on its conveyor.

With the parts in the position of Figure 1, if now the crank 19 makes its first revolution to move the first row of packages into the funnel 13, a consideration of Figure 6 will show that the crank 19 as it swings around abuts against the

right-hand end of the link 56, pushing it slightly toward the left. This produces a clockwise rocking movement of the bell crank 51, releasing the dog 50 from engagement with the lip 47, whereby under the influence of the spring 48, the lever 44 swings clockwise, pushing the case 38 onto the funnel 13, which is the position shown in Figure 2. The case remains in this position until the final packing stroke of the plunger 14, which pushes the loaded case off the funnel as shown in Figure 3, and thereby pushes the lever 44 counterclockwise to the point where the lip 47 is again engaged under the dog 50, at which point this part of the mechanism is ready for another cycle.

We shall now proceed to describe how the knocked down cases are erected and moved along to the position shown in Figures 1 and 6. A driving motor for the machine is shown at 60 in the various figures, and this driving motor through a speed reducer 61 drives the sprocket 62 to cause rotation of the shaft 63 continuously. In Figures 7 and 8 we have shown a type of one-revolution clutch which may be used to cause the drive from the shaft 63 to be transmitted to the sprocket 64 for one revolution at a time. The sprocket 64 carries a dog 65 which, in the position shown in Figure 8, is held in an inoperative position. A collar 66, secured to the shaft 63 as by a set screw 67, is provided with a notch 68. The dog 65 is urged in a clockwise direction by a spring (not shown), and is held in the position shown in Figure 8 by a set screw 69 mounted in the bracket member 70. The bracket member 70 is secured on a shaft 71. From a consideration of Figures 7 and 8, it will be clear that if the shaft 71 is rocked to bring the bracket 70 and its associated screw 69 to the dotted line position of Figure 7, the dog 65 being thereby released, will engage the notch 68 in the collar 66 so that the shaft 63 will transmit its motion through the dog 65 to the sprocket 64. It will also be clear that if during this turning movement the bracket 70 and its pin 69 are returned to their original positions, contact between the pin 69 and the dog 65 will raise the dog to inoperative position so that it clears the notch 68 of the collar 66, and the shaft 63 continues to turn without driving the sprocket 64.

Referring back to Figure 6, it will be seen that the shaft 71 carries a lever 72 on which is mounted an abutment roller 73 by means of the adjustable arrangement indicated generally at 74, and the roller 73 is in a position to be abutted by the lever 13 when the plunger 14 makes its final case loading stroke. In this way the operation of the case preparing portion of the machine is caused to operate in timed relation to the case packing machine in that when the plunger 14 makes its final stroke which loads the case and pushes it back off the funnel, bracket 70 is caused to move out of position to permit the one-revolution clutch of Figures 7 and 8 to function to cause the sprocket 64 to make one revolution.

The sprocket 64 drives a chain 75 which drives another sprocket 76 on the shaft 77. The shaft 77 is horizontally mounted transversely of the machine and carries sprockets 78 which drive the chains 79 constituting the lower flight of the case conveyor. The shaft 77 also carries a sprocket 80 which drives a chain 81 passing over a sprocket 82 mounted on a stub shaft 83. On the other end of the stub shaft 83 is fixed a pinion 84 which drives a pinion 85 fixed on a shaft 86. The shaft 86 carries the sprockets 87 which drive the chains 88, which constitute the upper flight of the case conveyor. The pinion 84 also drives the pinion 89 fixed on a shaft 90.

Fixed on the shaft 90 is a cam 91, best seen in Figure 15. A rack 92 is mounted for vertical sliding movement in guides 93 in the machine frame and has a rod 94 carrying on its end a cam follower 95 and a fork 96. A spring 97 urges the entire assembly upward pressing the cam follower 95 against the cam 91. The fork 96 simply embraces the shaft 90 to maintain vertical alignment. The rack 92 meshes with a pinion 98 secured on the shaft 99, and the shaft 99 carries the arms 100 in which are mounted the rods 101 carrying the vacuum cups 102. The rods 101 are hollow, as are the arms 100 and the shaft 99, and the shaft 99 communicates with a valve indicated generally at 103, from which a pipe 104 leads to a vacuum tank 105.

Referring more particularly to Figure 13, the valve 103 carries a bracket 106 on which is pivoted a valve actuating lever 107 carrying on its end a cam follower 108. This cam follower rides on a cam 109 which is secured to the shaft 90 described above. In the position shown in Figure 13, the valve is open and the vacuum is on, and it will be clear that as soon as the shaft 90 rotates in the direction of the arrow, the cam follower 108 will drop off the rise of the cam 109, shutting the valve and cutting off the vacuum.

Referring back to Figures 5 and 14 more particularly, we have shown a continuously moving conveyor at 110 upon which the empty collapsed cases 38 are brought to the machine. Figure 16 is a plan view of a typical case which has four side walls and a glue flap, as is well-known in the art, and which is supplied in knocked-down condition. In Figure 17 the case is shown squared up with the end flaps open. In Figure 18 we have shown the case in condition for packing whereby the short end flaps 111 and 112 are first infolded and then the long end flaps 113 are folded down thereover.

These cases in the condition of Figure 16 are advanced along the conveyor 110 and piled up against the side fingers 114 and the top finger 115. These fingers engage the leading collapsed case only at its very edges.

When the arms 101 are knocked down as above described, the vacuum cups 102 engage the front surface of the leading case, as shown in Figure 14 in broken lines, and pull it out of engagement with the fingers 114 and 115. This condition is shown by A in Figure 14. As the collapsed case is brought up to the position indicated at B, that portion thereof beyond the fold line 116 engages an abutment 117 on the machine frame, and as the vacuum cups carry the case on upward, it is brought into a squared-up condition as indicated at C. The upper and lower flights 88 and 79 respectively carry a series of lugs 118. These lugs are so spaced on the respective conveyors that a lug 118 on the lower flight engages the lower leading edge of the case while a lug 118 on the upper flight engages the upper trailing edge of the case. The normal resiliency of the material from which the case is made, and which would tend to cause it to collapse to its original flat condition, causes it to be retained quite tightly between the opposed lugs 118. In other words, the two lugs 118 actually abut the case along its two corner edges which initially were sharply folded, and this is usually quite sufficient to hold the cases in squared-up condition. Supplementary support-

ing means may be provided if found desirable in particular situations.

Mounted in the machine frame is a shaft 119 which carries the sprockets 120 which support chains 88 of the upper flight of the conveyor. At one end the shaft conveys a bevel gear 121 which meshes with another bevel gear 122 mounted on a shaft 123. Fixed to the lower end of the shaft 123 is a tucking finger 124. As the case moves from the position shown in Figures 5 and 14, toward the right, the tucking finger 124 rotates in the direction of movement of the case, and folds down forwardly the flap 111. The leading flap 112 is folded down by engagement with a stationary finger 125. The flaps 113 are folded down by the plows 126, so that by the time the case is positioned in front of the plate 40, it will be in the condition shown in Figure 18.

It must be borne in mind that all of the above described operations, except the feeding of collapsed cases over the conveyor 110, take place intermittently and in timed relation to the operation of the case packing machine. The general outline of the sequence of steps is as follows. Assuming a case 38 to have been packed whereby the one-revolution clutch of Figures 7 and 8 has been actuated, and whereby the plate 40 has been restored to its initial position, the following things happen simultaneously. The upper and lower flights 88 and 79 begin to travel moving the packed case on beyond the case packing machine and moving the newly squared-up case into position in front of the funnel 13. At the instant the newly squared-up case begins to move, the cam 109 has caused the vacuum to be shut off, so that the vacuum cups 102 release their grip on the case. Also, at this time the leading end flap 112 is being tucked down, and the tucking finger 124 is tucking down the trailing flap 111, and as the case arrives at the plows 126, the long end flaps 113 are folded down over flaps 111 and 112. By the time the newly squared-up case has cleared the arms 101 with their vacuum cups 102, the cam 91 through the rack 92 and the pinion 98 causes the arms 101 to swing downwardly to engage the next collapsed carton and coincident therewith the cam 109 releases the valve 103 so that vacuum is again applied to the cups 102. As the cam 91 continues to turn, the follower again mounts upon the rise of the cam and returns the arms 101 to their uppermost position, in the course of which movement, the case is squared-up, as shown in Figure 14.

Meantime, the case packing machine has pushed the first row of packages into the funnel 13 and coincident therewith has released the dog 50 from engagement with the lip 47 whereby the plate 40 has pushed the case onto the funnel 13. The case packing machine continues to function until the case is completely loaded and the plunger 14 makes its final loading stroke, thereby setting into motion a repetition of the entire cycle.

The loaded cases pass away from the packing station, and as shown in Figure 10 they may be given a quarter turn about a vertical axis by means of the abutment 127, and caused to slide down a chute 128, and thus be deposited open end up upon a run-off conveyor 129 which conducts them to a case sealing machine which forms no part of our present invention. Alternatively, the loaded cases may be conveyed directly from the packing station to a case sealing machine.

From the foregoing description it will be clear that we have provided a fully automatic machine for taking collapsed cases, squaring them up, folding in the bottom end flaps and positioning them for loading by a case packing machine. It will be clear that the operation of the machine is fully automatic and that the entire operating cycle is carried on in timed relation to the operation of the case packing machine.

While we have described this machine in its preferred embodiment in considerable detail, it will be clear that numerous modifications may be made in specific details of construction without departing from the spirit of our invention. We therefore do not intend to limit ourselves except as set forth in the claims which follow.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. For use with a case packing machine having a funnel and a plunger for pushing rows of packages through said funnel, said plunger having a cycle of operation in which it makes a number of short feeding strokes one less than the number of rows of packages to be packed in said case, followed by a long packing stroke; an apparatus for successively presenting cases to said funnel in condition for packing in timed relation to the operation of said plunger, said apparatus comprising a number of intermittently operating mechanisms, a drive for said mechanisms including a one-revolution-clutch, and means operative in response to said long packing stroke of said plunger for actuating said one-revolution-clutch to cause said mechanisms to perform their functions.

2. The structure of claim 1, in which one of said mechanisms is a conveyor, means are provided for presenting tubed cases to said conveyor to be carried thereby in spaced relation, and in which each operation of said one-revolution-clutch advances said conveyor to position a tubed case in front of said funnel.

3. The structure of claim 2, in which means are provided to fold down the end flaps of said tubed case during its advance into position in front of said funnel, and in which a plate is provided to hold said flaps in folded condition.

4. The structure of claim 3, in which means are provided to actuate said plate to push said case into engagement with said funnel in response to the first feeding stroke of said plunger.

5. The structure of claim 4, in which mechanism is provided to reset said last named means in response to said long packing stroke of said plunger.

6. The structure of claim 1, in which one of said mechanisms is a conveyor for tubed cases, said conveyor comprising upper and lower flights, each of said flights carrying transverse lugs in staggered relation, the lugs on one flight engaging leading corners of said cases, and the lugs on the other flight engaging trailing corners of said cases, the horizontal distance between a lug on one flight and the corresponding lug on the other flight being equal to the width of a tubed case, and that flight having the lugs engaging the trailing corners of said cases extending beyond the other flight at the entrance end of said conveyor by a distance at least equal to the width of said tubed cases.

7. The structure of claim 1, in which one of said mechanisms is a conveyor for tubed cases,

and in which there is provided a stack of collapsed cases, another of said mechanisms comprising means for removing single collapsed cases from said stack and placing them on said conveyor, and means acting on said collapsed cases during their movement from said stack to said conveyor to cause them to assume a tubed condition, and means associated with said conveyor to retain said tubed cases in tubed condition.

8. The structure of claim 7, in which the stack of collapsed cases rests upon a rack positioned at a level below said conveyor, said collapsed cases being positioned on said rack in substantially vertical planes.

9. The structure of claim 8, in which the means for removing collapsed cases from said stack comprises a swinging arm, a vacuum cup on said arm, a vacuum tank and connections between said vacuum tank and said suction cup, including a valve, said valve and swinging arm being actuated in timed relation to the operation of said case packing machine, to swing said arm toward said stack and open said valve, and to return said arm toward said conveyor and close said valve in an intermittent repeating cycle.

10. The structure of claim 9, in which said vacuum cup engages only a main panel of said collapsed case, and in which an abutment is provided in the path of said collapsed case adjacent said conveyor for tubed cases, said abutment being positioned to be abutted by a side panel of said collapsed case to retard the said side panel in relation to said main panel to cause said case to assume a tubed condition.

11. The structure of claim 10, in which said conveyor for tubed cases comprises spaced flights, the spacing between said flights being equal substantially to the width of a case side panel, and in which said flights carry lugs in spaced staggered relation, the lugs on one flight adapted to engage leading corners of said cases and the lugs on the other flight being adapted to engage trailing corners of said cases, the distance between a lug on one flight and the corresponding lug on the other flight being substantially equal to the width of a case main panel, and that flight having the lugs adapted to engage trailing corners of said cases extending beyond the other flight at the entrance end of said conveyor by a distance substantially equal to the width of a case main panel, said conveyor being arranged to operate intermittently in timed relation to said swinging arm and being at rest during said swinging movement, whereby a tubed case is deposited on said conveyor in engagement with said lugs at diagonally opposed corners, said lugs serving to maintain said case in tubed condition.

12. A case handling apparatus comprising a conveyor for tubed cases, said conveyor having spaced flights, and means associated with said flights for maintaining a tubed case in erected condition, one of said flights extending beyond the other at the entrance end of said conveyor by an amount substantially equal to the width of a tubed case, and constituting the conveyor entrance, means for holding a supply of cases in collapsed condition adjacent said conveyor entrance in such orientation, that an arcuate movement is necessary to bring a main panel of one of said cases into engagement with said extended flight, and with an adjacent side panel extending beyond said main panel, means for engaging a main panel only of a case from said supply and swinging it about an arc toward said extended flight, and an abutment in the path of said side panel in its swinging path, said abutment opposing further arcuate movement of said side panel to cause said case to assume a tubed condition just as it is placed on said conveyor.

13. An apparatus according to claim 12, in which the means associated with said conveyor for maintaining tubed cases in erected condition comprises spaced lugs on each of said flights, the lugs on one flight being staggered in relation to the lugs on the other flight, and the longitudinal distance between a lug on one flight and the corresponding lug on the other flight being substantially equal to the width of a tubed case, whereby a tubed case between said flights is maintained in erected condition by the fact that said corresponding lugs on the opposed flights impede the normal tendency of said tubed case to collapse to its knock-down condition.

14. For use with a case packing machine having a package funnel and a plunger for pushing rows of packages through said funnel, said plunger having a cycle of operation in which it makes a number of short strokes one less than the number of rows of packages to be packed in said case, followed by a long packing stroke; an apparatus for successively presenting cases to said funnel in condition for packing, said apparatus comprising means for feeding collapsed cases, means for withdrawing a collapsed case, tubing it and depositing it on a conveyor, said conveyor serving to move said case into position opposite said funnel means operative during said movement for closing the end flaps of said case at the end opposite said funnel, and means operative in response to the first of said short strokes of said plunger for thrusting the open end of said case onto said funnel, said last mentioned means being reset for a succeeding cycle by the long packing stroke of said plunger, and means operative in response to the long packing stroke of said plunger to set into motion all of said other above mentioned means.

15. The structure of claim 14, in which said means for withdrawing collapsed cases, tubing them and depositing them on said conveyor, and said conveyor, have a common drive including a one-revolution-clutch, and in which means are provided operative in response to the long packing stroke of said plunger to cause said one-revolution-clutch to operate, to cause said means and conveyor to operate intermittently in timed relation to said case packing machine.

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