

March 6, 1956

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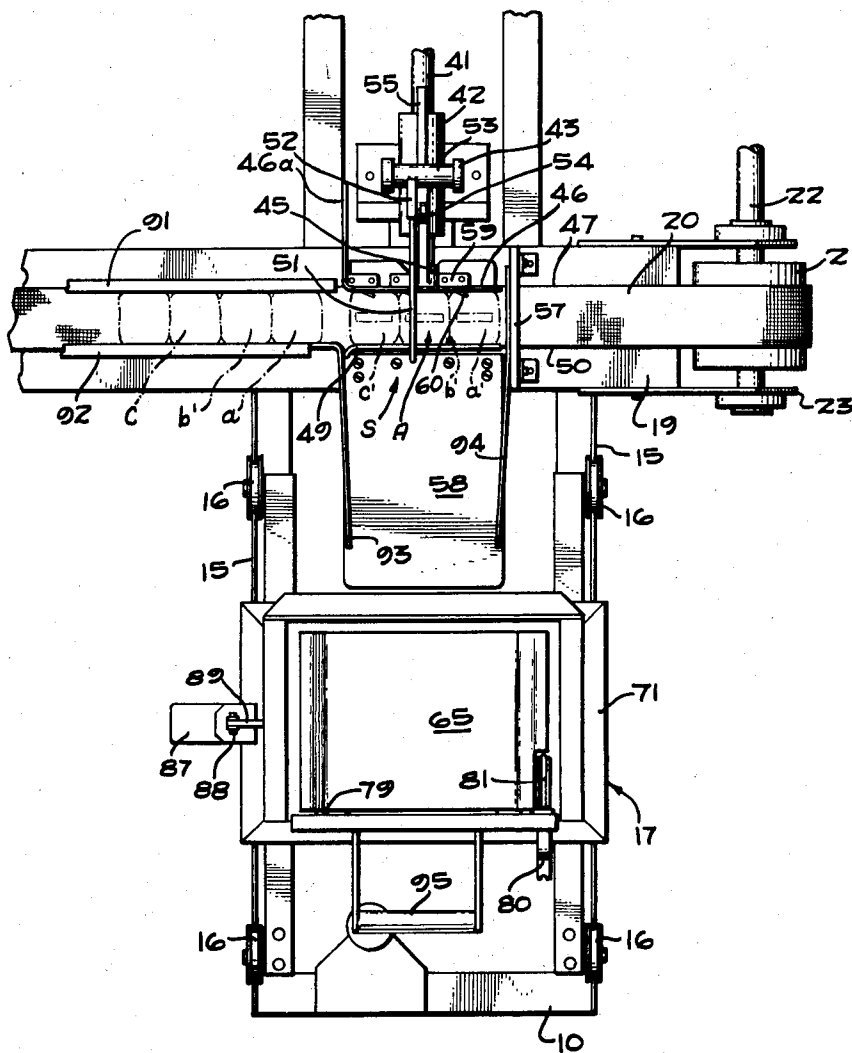
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MACHINE FOR FILLING CASES OR BOXES WITH PACKAGES

Filed April 27, 1951

3 Sheets-Sheet 1

Fig. 1.



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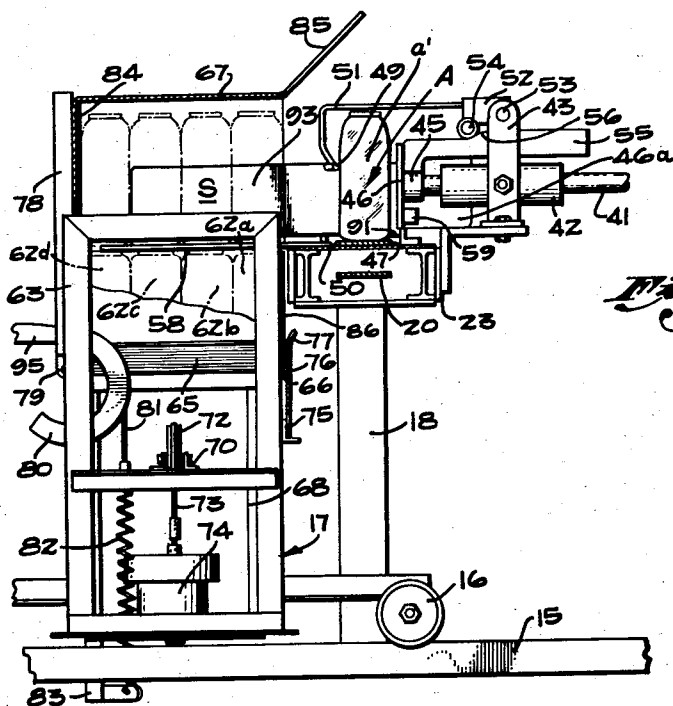
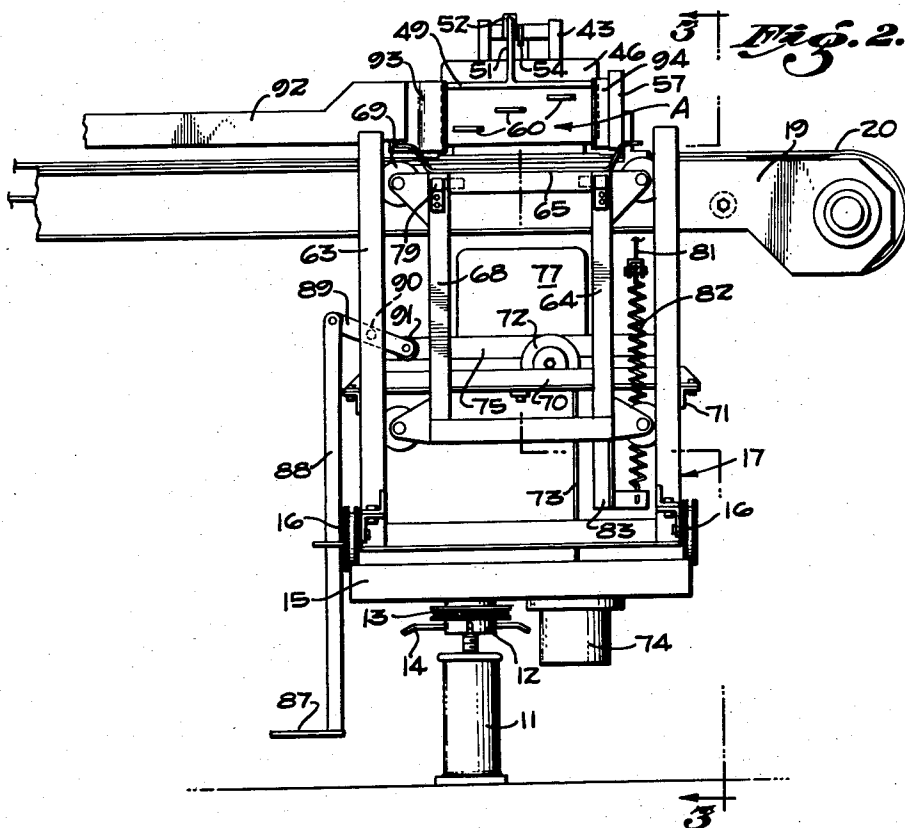
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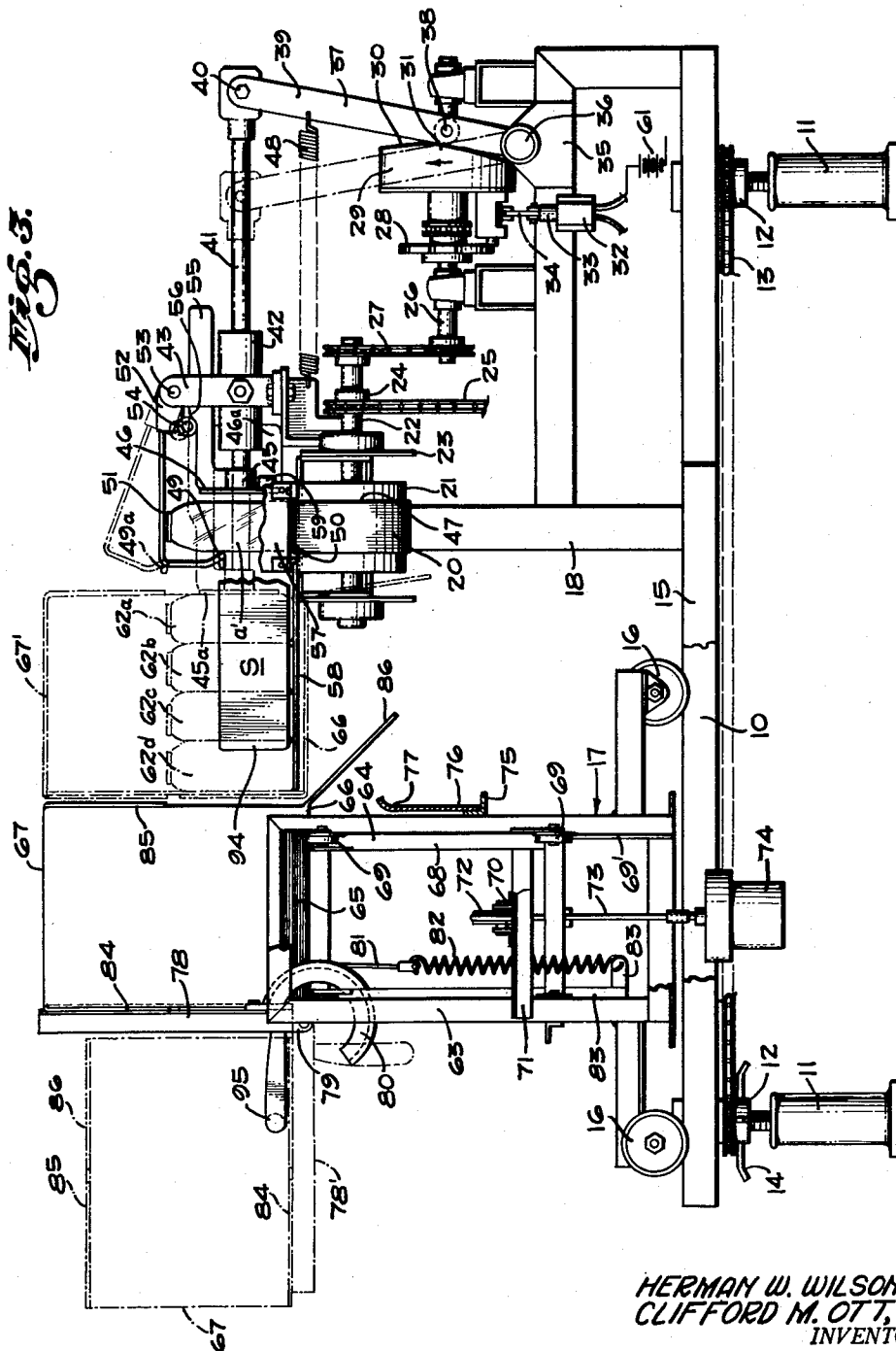
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MACHINE FOR FILLING CASES OR BOXES WITH PACKAGES

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Application April 27, 1951, Serial No. 223,360

5 Claims. (Cl. 226—16)

This invention relates to a device for filling cases or boxes with packages. Although the invention is of especial utility with automatic packaging machines, it may be employed for placing in cases, packages which have been previously formed or filled either by a machine or by hand.

It is an object of the invention to provide a device which will automatically select groups of packages and place these groups in a case adapted to receive the same. Herein the term "case" will be employed in its broad sense to mean a container, whether of metal, wood or fibre board which is to serve as a case for packages, to hold and protect these packages during storage and shipment.

It is an object of the invention to provide a package casing device having conveyor means for moving the packages, such as filled bags or boxes, into a package receiving space, and means which acts when a predetermined number of these packages are in the receiving space to move the group of packages into a case or into a case disposed in the case area.

A further object of the invention is to provide a device of the character set forth in the preceding paragraph having means for supporting a case in the case area so that the groups of packages will be moved into the case.

It is a further object of the invention to provide a box supporting means having a platform to receive the case and means for supporting the platform so that it may be moved from one position to another as sections of the case are filled with packages.

It is an object of the invention to provide in this device, for use with cases consisting of four fibre board side walls with attached bottom and top flaps, means for controlling the positions of the flaps during and after the performance of the casing operations which consist of movement of groups of packages into the case.

A further object of the invention is to provide a casing device having a package receiving platform or leaf on to which groups of packages are moved by an automatically controlled pusher member, and a carriage movable with relation to the extending platform or leaf, this carriage in turn having a movable platform for supporting a case and for moving it into a position wherein the platform or leaf will extend into the case, so that packages which are moved on to the platform will occupy positions within the case.

Further objects and advantages of the invention will be brought out in the following part of the specification, wherein the detailed description of the embodiments of the invention is for the purpose of making a full disclosure and is not to be construed as limiting the scope of the claims or the range of equivalents which may be applied to the claims.

Referring to the drawings which are for illustrative purposes only:

Fig. 1 is a plan view showing important parts of an embodiment of the invention;

Fig. 2 is an end view corresponding to Fig. 1;

Fig. 3 is a side view of device shown in Fig. 1, partly sectioned on a plane indicated substantially by the line

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3—3 of Fig. 2, and showing the power applying means of the device; and

Fig. 4 is a fragmentary side view showing a case in lowered position and moved adjacent the pushing means so that the upper portion of the case may be filled with packages.

The package casing device includes a base 10 fabricated from structural steel parts and being supported on screw jacks 11 for limited vertical adjustment. The screws 12 of the jacks 11 are interconnected for simultaneous rotation by chain and sprocket means 13, one of the screws 12 having projecting handles 14 for rotation thereof.

The base 10 includes parallel structural angles 15 providing tracks for the four flanged wheels 16 of a carriage 17 which is movable toward and away from a pedestal 18 which projects separately from an intermediate portion of the base 10. The pedestal 18 supports a conveyor 19 having a conveyor belt 20 which runs over a pulley 21. The other end of the conveyor 19 is not shown for the reason that it extends to a package filling and closing device forming no part of the present invention. The conveyor 19 extends in a plane normal to the direction of movement of the carriage 17. As shown in Fig. 3, the pulley 21 is mounted on a horizontal shaft 22 supported by side plates 23 of the conveyor 19. The shaft 22 has a sprocket 24 fixed thereon over which a chain 25 runs to rotate the shaft 22 and thereby drive the conveyor 19. A shaft 26 is driven from the shaft 22 by chain and sprocket means 27. A one revolution clutch 28 is mounted on the shaft 26 adjacent a circular cam 29 having a cam face 30 with a crown 31. A solenoid 32 is provided for actuation of the clutch 28, this solenoid having an aperture 33 connected by link means 34 with the mechanism of the clutch 28, whereby energization of the solenoid 32 will actuate the clutch 28 so that rotation will be imparted from the shaft 26 to the cam 29, to carry the cam 29 through one revolution from the position in which it is shown in Fig. 3.

A bracket 35, carried by the base 10, supports hinge means 36 on which a lever 37 swings. This lever projects upwardly and on an intermediate portion thereof has a cam follower in the form of a roller 38 positioned so as to engage the base 30 of the cam 29. The upper end 39 of the lever 37 is positioned above the upper run of the belt 20 and is connected by pivot members 40 with the rearward end of a bar 41 which is slidable in a supporting block 42 carried by brackets 43 which project upwardly from a plate 44 mounted on the face of the conveyor 19 opposite from the carriage 17.

On the front end of the bar 41 there is a bag shover or pusher member 45 having a plate portion 46, extending along and parallel to the rear edge 47 of the conveyor belt 20, and a rearwardly extending plate portion 46a at right angle to the plate 46. A tension spring 48 is connected to the upper portion of lever 37 so as to exert a force attending to move the lever 37 toward the belt 20. This movement is prevented by the crown 31 of the cam, unless the cam 29 is rotated. When the cam 29 is rotated, in consequence of energization of the solenoid 32, the follower roller 38 is permitted to move leftwardly, Fig. 3, so that the spring 48 will move the lever 37 and the pivot connected to the upper end thereof through a cycle of movement. The pusher member 45 will be moved from the position in which it is shown in full lines in Fig. 3 to the dotted line position 45a thereof and then returned to its initial position, at which time rotation of the cam 29 will stop, with the crown 31 thereof in engagement with the roller 38.

A guide bar 49, of substantially the same length as the plate portion 46 of the pusher member 45, is supported

above the front edge 50 of the conveyor belt 20 by a bar 51 which extends forwardly, then upwardly and then over the top of the conveyor and the pusher member 45 to a block 52 which is swingable on a horizontal pin 53 supported by the upper ends of the brackets 43. Forwardly or leftwardly of the pivot pin 53, the block 52 carries a roller 54 which rides on the upper face of a bar 55 which is connected to the bar 41 so as to move therewith and occupies a position above the guide block 42 through which the bar 41 slides. The bar 55 is connected at its front end to the pusher member 45 and is provided with a cam shoulder 56 which lies adjacent the rightward portion of the roller 54 when the pusher member 45 is in retracted position as shown in full lines in Fig. 3. At this time the guide bar 49 is disposed in its lowered position, spaced from the upper portion of the plate 46. When the pusher member 45 starts its forward movement from retracted position, the cam shoulder 56 lifts the roller 54 and rotates the block 52 in clockwise direction so as to lift the guide bar 49 from the position in which it is shown in full lines to the dotted line position 49a thereof.

As shown in Figs. 1 and 2, a stop wall 57 is supported by the structure of the conveyor 19 above and in crossing relation to the conveyor belt 20 adjacent the rear (rightward) ends of the members 46 and 49. These three members 46, 49 and 57 define above a portion of the path of movement of the belt 20 a bag receiving area A into which bags *a*, *b* and *c*, resting on the upper face of the conveyor belt 20, are moved by rightward movement of the upper run of the conveyor belt 20, the bag *a* coming into engagement with and being stopped by the transverse wall 57, after which the bags *b* and *c* are brought to a stop in consecutive order in the area A. When these three bags occupy the area A as indicated at *a'*, *b'* and *c'*, in dotted lines, the pusher member 45 will be actuated to move the bags from the area A on to the inner portion of the shelf 58 which projects outwardly on the level of the upper end of the belt 20 toward the carriage 17 as will be hereinafter described in detail. Guide rails 91 and 92 are positioned adjacent the belt 20 and secured to the conveyor 19 to retain the bags *a*, *b* and *c* in position on the belt 20.

The plate portion 46 of the pusher member 45 has mounted thereon a plurality of micro switches 59, corresponding number to the number of bags or packages *a'*, *b'* and *c'* occupying the receiving area A. These micro switches 59 are provided with small levers 60 which project outwardly above the belt 20 so as to respectively lie in paths of movement of the bags or packages which are moved into the area A. When package *a'*, or other object to be cased, stops against the transverse wall 57 it will engage and depress the lever associated with the rightward micro switch 59 sufficiently to close this micro switch. As the remaining objects *b'* and *c'* come into their respective positions in the area A, the remaining micro switches 59 will be closed as the result of the engagement and depression of their respective levers 60. These micro switches 59 are connected in series with the solenoid 32 and a source of electric current indicated as a battery 61. Therefore, when all of the micro switches 59 are closed, the solenoid 32 will be energized, actuating the one-revolution clutch so that rotation of the cam 29 will permit the spring 48 to move the pusher member 45 leftwardly from the position in which it is shown in full lines in Fig. 3, thereby shifting the packages from the position thereof indicated at 62 into the position indicated by dotted lines 62a on the inner portion of the shelf 58.

The carriage 17 forms part of a case positioning means. It has spaced rectangular frames 63 cooperating in the formation of a vertical structure in which an elevator member 64 is vertically movable. This elevator member 64 has a top horizontal plate or platform 65 which, when the elevator member 64 is raised, lies in a hori-

zontal plane slightly below the plane defined by the lower surface of the shelf 58, so that the side wall 66 of a case 67, supported on the platform 65, will be positioned so that this wall 66 will move under the shelf 58 when the carriage is moved rightwardly from the position to which it is shown in Fig. 3 toward the pedestal 18, thereby carrying the case 67 into the position thereof indicated by dotted lines 67'. The case 67 and the shelf 58 are so related as to size, that the shelf will enter the lower portion of the case 67, and therefore, the packages which are moved on to the shelf 58 will reside within the case 67. Each actuation of the pusher member 45 will result in moving a group of packages into the package receiving space S existing above the shelf 58, and each succeeding group of packages will move the preceding group of packages leftwardly in the space S or leftwardly along the upper face of the shelf 58 until the lower portion of the case occupying the position 67' is filled. Means is provided for maintaining the bags on the shelf 58 should a box not be immediately moved into place, which includes guide arms 93 and 94 secured to the rail 92 and the stop member 57 respectively and extending over the shelf 58 to engage the sides of the bags *a'*, *b'* and *c'* as they are moved thereon. The invention provides means then operative to accomplish filling of the upper portion of the case 67, as will be described in the following.

The elevator member 64 comprises a box like open frame 68 including and extending downwardly from the platform 65. This frame 68 carries four rollers 69 on each side to engage roller guides 69; Fig. 3, on the frame members 63 of the carriage 17. Transverse members 70, supported by horizontal angles which are secured to the frame member 63, project through the interior space of the elevator member 67 and support a sheave 72 over which a cable 73 runs from a counter-weight container 74 to a connection with the lower part of the elevator member 64 so that the counter-weight means contained in the counter-weight container 74 will tend to lift the elevator member 64 from the position in which it is shown in Fig. 4 to the position in which it is shown in Figs. 2 and 3. A horizontal member 75, secured to the portions of the frame member 63 facing the pedestal 18, as shown in Fig. 3, support a plate 76 which extends upwardly in spaced relation to the elevator member 64 and has an outwardly turned lip 77.

A plate 78 is hingedly secured to the rearward edge of the platform 66 by a hinge means 79. A partial sheave 80 is connected to the plate 78 coaxially of the hinge member 79 and a cable 81 is extended over this partial sheave 80 to a tension spring 82 which has its lower end connected to a bracket 83 which projects downwardly from the lower portion of the elevator member 64. The action of the spring 82 is to normally hold the plate 78 in erect position as shown in Fig. 3, but permitting the plate 78 to be swung outwardly into its dotted line position 78' in Fig. 3. A handle 95 secured to one side of the plate 78 is provided to aid in the movement of the carriage 17, the elevator 64 and the plate 78.

The case 67 is of the foldable type made from fibre board, corrugated fibre board or cardboard, having four connected side walls with bottom flaps 84 and top flaps 85 extending from the edges of the side walls of the case. This case is received by the manufacturer in flat condition, two of the side walls of the case lying flat against the remaining two side walls and the flaps projecting outwardly from the edges of the respective side walls. The user of the case, moves the side walls with relation to each other so that they define a rectangular prism. The bottom flaps are then folded inwardly into closed position, to close the bottom end of the case and also hold the side walls relatively rigid in the form of the rectangular prism. The case 67, so prepared, is placed upon the platform 65 with one of its side walls 66 resting in a horizontal plane. The bottom flaps 84 are brought against a face of the plate 78 and by the plate 78 are maintained in closed

relation to the side wall. After the case 67 is so placed, the carriage is moved rightwardly, Fig. 3, so that the lower portion thereof receives the shelf 58, in order that the groups of packages which are pushed from the receiving area A will be moved along the shelf 58 into the interior of the case which now occupies the position indicated by dotted lines 67'.

When the lower half of the case 67 is filled with the groups 62a, 62b, 62c and 62d of packages, the operator extends an arm across the open front of the case so as to engage the packages indicated at 62a, and moves the carriage leftwardly into the position in which it is shown in full lines in Fig. 3, carrying the case 67 back to its original position and causing the packages to slide off from the shelf and rest upon the side wall 66 of the case 67. The weight of the packages will be then carried by the elevator member 64. The counter-weight means, including the counter-weight container 74 and such counter-weights as may be placed therein, is adjusted so that the elevator member 64 may be moved downwardly without material effort to its lowermost position, at which time the level defined by the tops of the packages indicated at 62a, 62b, 62c and 62d will be slightly below the plane defined by the lower face of the shelf 58. At this time the member 76 will engage the previously downwardly hanging top flap 86, and as shown in Fig. 4 will hold such flap in upwardly extending position across the lower part of the case 67 so that the packages occupying the lower part of the case cannot drop out. The next step in the case filling procedure is to shift the carriage rightwardly toward the pedestal 18 so that the intermediate portion of the case 67 will receive the shelf 58. The invention provides means whereby the operator may with facility lift the case under the shelf 58, thereby bringing the upper ends of the packages against the lower face of the shelf 58 as shown in Fig. 4, leaving ample space in the upper part of the case, above the shelf 58, to receive the additional groups of packages required to complete the filling of the case. This means for lifting the case comprises a foot lever 87 extending outwardly from a bar 88 which depends from one end of a lever 89 which swings on a hinge 90 carried by one of the frame parts 63 of the carriage 17. The lever 89 is positioned so that a roller 91 on its inner end will be just below the platform 65 when the elevator member 64 is in its lowered position. When the pedal 87 is pushed downwardly, the lever 89 is rotated in counterclockwise direction, Fig. 2, and force is applied upwardly by the roller 91 to lift the elevator member 64 and thereby force the upper ends of the packages in the lower part of the case 67 against the lower face of the shelf 58.

When the case 67 is filled, the carriage 17 and the case are moved leftwardly away from the shelf 58 and then by pressure against the upper portion of the case it may be caused to swing the plate 78 from the raised position from which it is shown in Fig. 4 to the dotted line position 78', Fig. 3, with the folded bottom flaps 84 resting upon the plate 78. Thereafter, the filled case may be moved on to an adjacent conveyor to be carried to a case closing or sealing machine wherein the top and bottom flap of the case will be secured.

We claim:

1. In a device for placing objects in a case consisting of four side walls, and top flaps and bottom flaps foldable inwardly from edges of at least part of said side walls: a laterally projecting shelf of a size to fit into a case; means operative to move a group of said objects onto said shelf; means having a vertically movable platform for supporting said case in a plurality of positions, said last named means being movable transversely of said shelf to position said platform directly under said shelf whereby said case will extend around said shelf; means operating while said case is on said platform to hold said bottom flaps in closed position; and means operating in consequence of movement of said platform from one of its

positions to another of its positions to fold one of said top flaps into closed position.

2. In a device for casing objects of the character described: a laterally projecting shelf of a size to fit into a case; means operative to move a group of said objects onto said shelf, said means comprising a conveyor for moving a line of said objects into a position along the rear end of said shelf, a pusher member for moving said objects outwardly from said position and means operating in response to the formation of a line of said objects in said position at the rear end of said shelf to actuate said pusher means; and means having a vertically movable platform for supporting said case in a plurality of vertically arranged positions wherein said case will extend around said shelf.

3. In a device for casing objects of the character described: a laterally projecting shelf of a size to fit into a case; means operative to move a group of said objects onto said shelf, said means comprising a conveyor for moving the objects into a position at the rear end of said shelf, a pusher member for moving said objects outwardly from said position and means operating in response to a predetermined number of said objects occupying said position at the rear end of said shelf to actuate said pusher means; means having a vertically movable platform for supporting said case in a plurality of vertically arranged positions wherein said case will extend around said shelf; and counterbalancing means supporting said platform so that it will yield downwardly in response to the weight of objects in the case which is supported on the platform.

4. In a device for placing objects in a case consisting of four side walls, and top flaps and bottom flaps foldable inwardly from edges of at least part of said side walls: a laterally projecting shelf of a size to fit into a case; means operative to move a group of said objects onto said shelf; means having a vertically movable platform for supporting said case in a plurality of vertically arranged positions, said last mentioned means being movable to position said platform directly under said shelf whereby said case will extend around said shelf; a hingedly supported wall normally disposed in vertically extending position and operating while said case is on said platform to hold said bottom flaps in closed position, said wall being swingable outwardly and downwardly so as to accomplish tilting of the case on said platform into a position wherein its bottom flaps will be horizontally disposed; and means operating in consequence of movement of said platform from one of its positions to another of its positions to fold one of said top flaps into closed position.

5. In a device for casing objects of the character described: a conveyor for moving objects in a line; a stop member above said conveyor for arresting movement of an object on said conveyor; pusher means reciprocal transversely of said conveyor from one side thereof; a guide rail extending along the other side of said conveyor, said stop member, pusher means and guide rail forming an object receiving area; means defining an object receiving space adjacent said other side of said conveyor, said rail being movable out of the way of objects moved by said pusher means to said object receiving space; and control means actuated by objects in said area for causing reciprocal movement of said pusher means and movement of said guide rail clear of the path of objects moving from said area to said space.

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