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3,358,567

CARTON FOLDING OR SEALING APPARATUS

Filed April 15, 1965

4 Sheets-Sheet 1

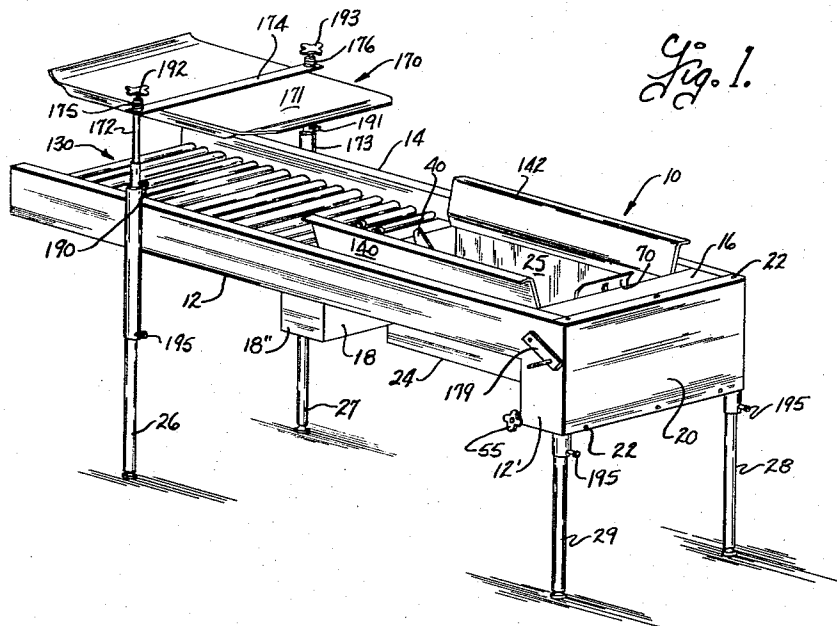


Fig. 1.

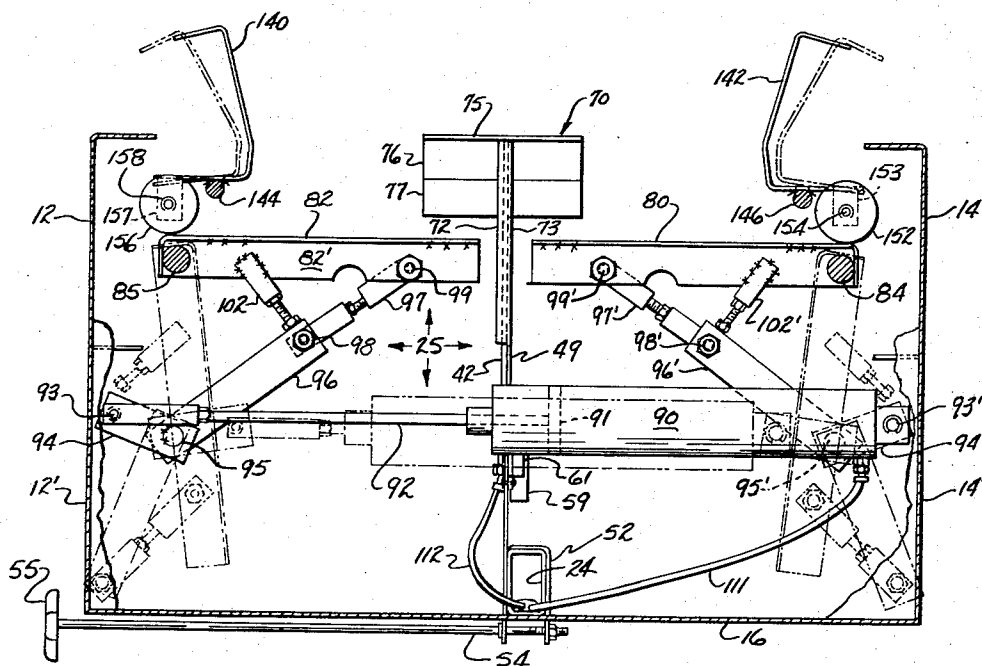


Fig. 5.

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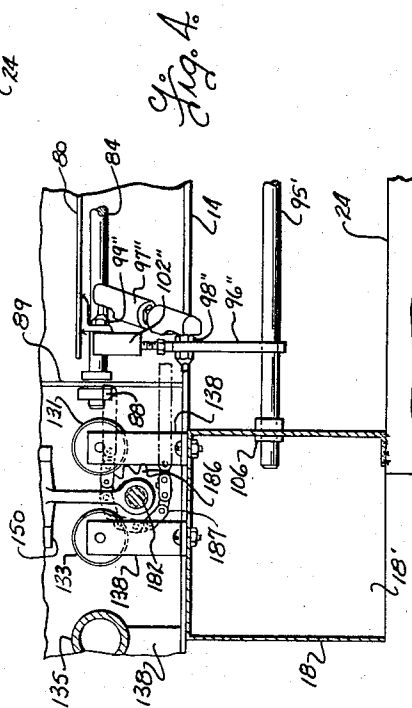
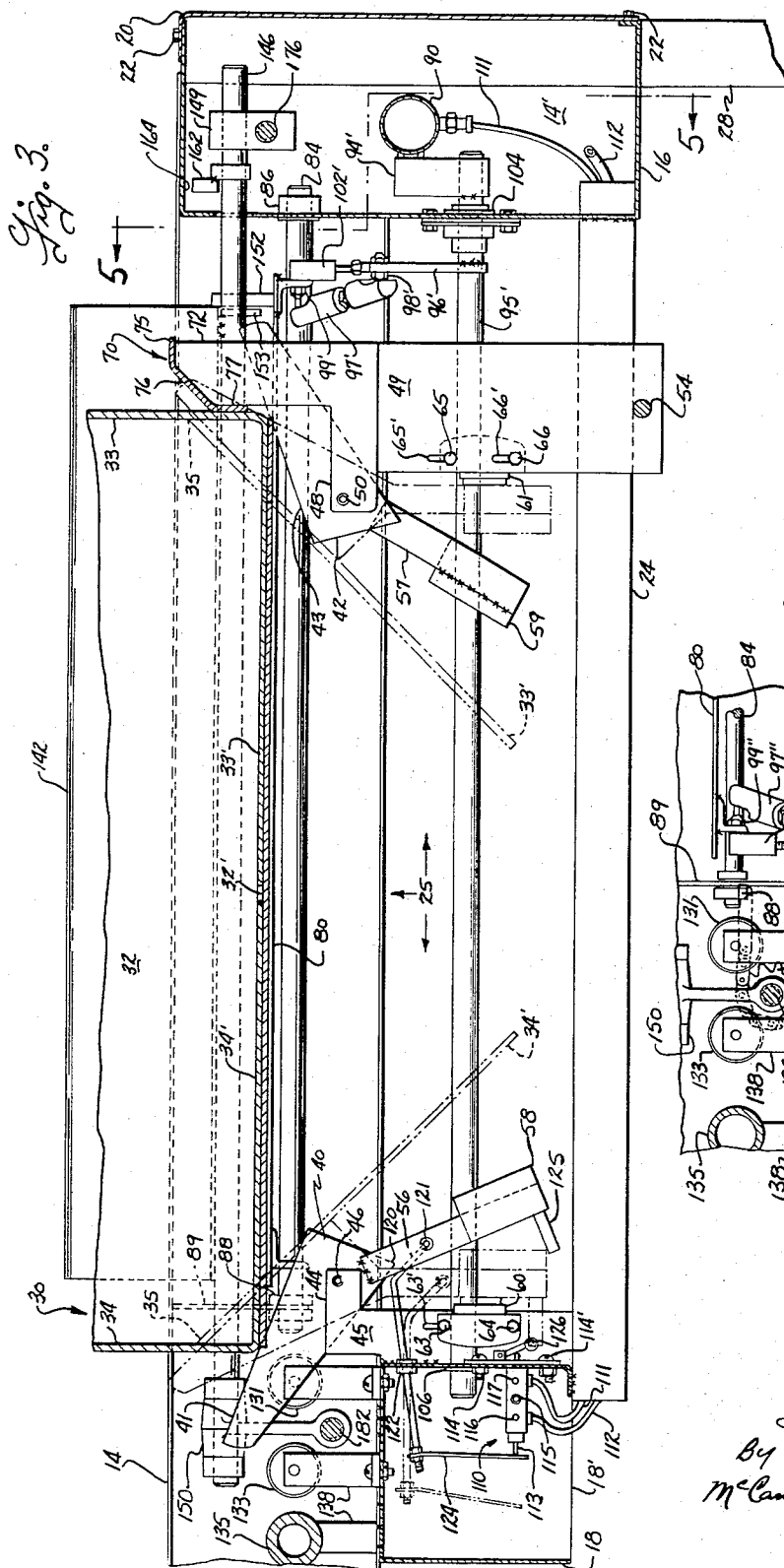
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CARTON FOLDING OR SEALING APPARATUS

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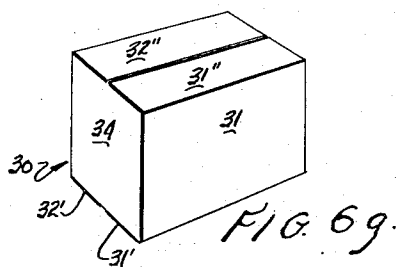
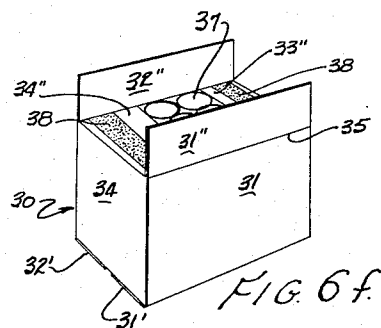
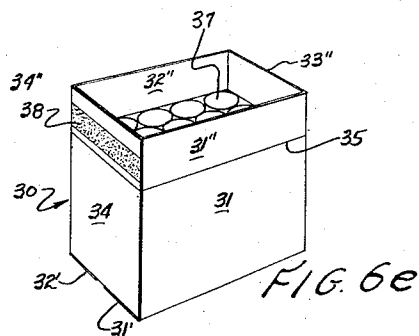
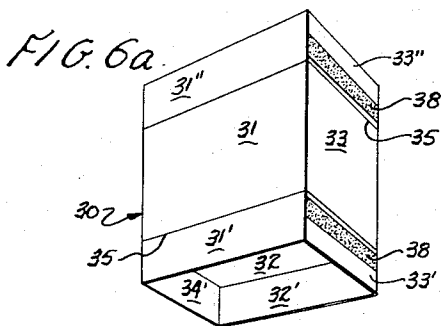
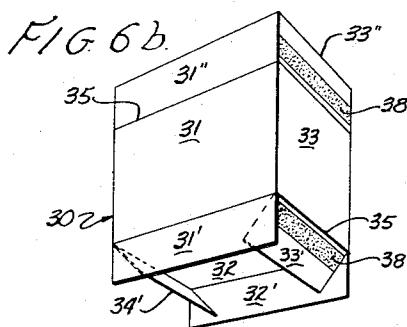
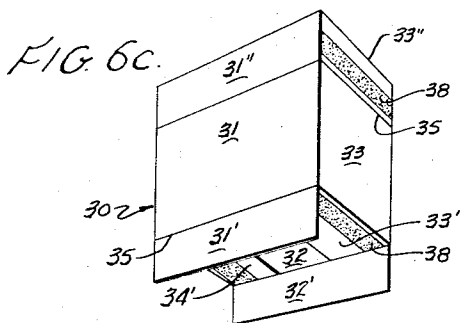
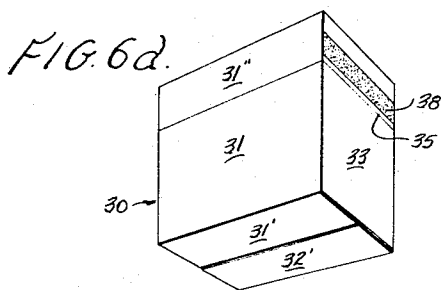
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CARTON FOLDING OR SEALING APPARATUS

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4 Sheets-Sheet 4



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1

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CARTON FOLDING OR SEALING APPARATUS
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20 Claims. (Cl. 93—49)

ABSTRACT OF THE DISCLOSURE

Side rails and an end guide plate defining a cavity for receiving a tubed carton. A pair of blades for folding the end flaps and a pair of foldable doors for folding the side flaps and urging the side rails inwardly to square the carton. A conveyor and an overlying plate to compressibly hold the top flaps.

This invention relates in general to apparatus for use in folding or sealing the flaps of a carton. More particularly, this invention relates to a machine for folding the flaps of a carton received in tubular form, said flaps generally having adhesive applied thereto.

An object of this invention is to provide a new and useful machine of simplified construction for folding the bottom flaps of a carton arranged in expanded tubular form.

Another object is to provide a unique machine for folding the bottom flaps of a tubed carton, some of which flaps have an adhesive applied thereto, and which machine includes means for holding the carton in semi-assembled position with its bottom flaps folded until the bottom flaps are adhered or sealed.

Yet another object of this invention is to provide a machine in accordance with the foregoing object and which can be used as a "loading station" for products to be placed in the carton.

Still another object is to provide a new and useful machine in accordance with the foregoing objects and including a means for compressibly holding the folded top flaps of the carton until said top flaps are adhered or sealed.

Another important object of this invention is to provide a unique machine for folding the bottom flaps of a tubular carton and which machine may be quickly and readily adjusted to receive any of various size cartons and which adjustment can be easily performed by an unskilled operator.

A further object is to provide a machine in accordance with the foregoing objects which has few moving parts and which can be operated by compressed air.

A still further object is to provide a machine of improved and simplified construction for folding the bottom flaps of a tubular carton and which machine is compact and substantially portable, of relatively uncomplicated and economical construction, and yet durable and trouble-free.

Additional objects and advantages of this invention will become apparent as the same becomes better understood by reference to the following description and the accompanying drawings wherein:

FIGURE 1 is a perspective view of an embodiment of the present invention;

FIG. 2 is a partial top view on a larger scale than FIGURE 1 of a machine constructed in accordance with the present invention and with a portion broken away to better reveal the parts;

FIG. 3 is a partial longitudinal sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a partial longitudinal sectional view taken along line 4—4 of FIG. 2;

2

FIG. 5 is a traverse sectional view taken along broken line 5—5 of FIG. 3 and with a portion of the housing broken away to better reveal the relationship of the parts; and

FIGS. 6a—6g are diagrammatic perspective views showing the steps in folding and sealing a carton as performed by the machine and its operator.

Referring now more particularly to the drawings wherein the same numerals indicate the same parts throughout the several views, a preferred embodiment of the invention will be described. The carton folding or sealing apparatus, generally designated by the numeral 10, includes a frame which may be formed of any suitable material, such as steel. It is contemplated that the frame may be shaped in any manner convenient to effectuate the purpose of the apparatus, however, it is herein illustrated as having spaced side rails 12 and 14 joined, as by welding, to transverse members 16 and 18. The aforementioned members of the frame may be of any convenient structural shape and are herein illustrated as channel shaped members. Depending portions 12' and 14' of side rails 12 and 14, respectively, are conveniently provided as closures for the ends of transverse member 16 and a cover 20 is provided to close the open side thereof, as best shown in FIG. 1. Cover 20 is attached to transverse member 16 by means of a plurality of fasteners 22 and, in this manner, an enclosed housing is formed which may be easily accessible for maintenance of parts therein which will hereinafter be described. Transverse member 18, which is shown in the form of a downwardly facing channel, is conveniently provided with ends 18' and 18'' to provide an enclosure for additional parts which will hereinafter be described. Since the enclosure formed is open at the bottom, it can be seen that parts therein are easily accessible for maintenance. A central frame member 24 is disposed intermediate side rails 12 and 14 and attached at either end to transverse members 16 and 18, respectively, by any convenient manner. The aforementioned frame members are conveniently arranged with flat sides facing outwardly to provide a generally smooth body for the apparatus. These frame members also advantageously surround and define an upwardly opening cavity 25 for receiving a box or carton 30 in expanded tubular form. The frame may be supported in any convenient manner and is herein illustrated as being supported by a plurality of legs 26—29, as best shown in FIG. 1.

As an aid to the understanding of the construction and operation of the apparatus, the manner in which the bottom flaps of a carton 30 are folded or sealed, the carton filled with a product; and the top flaps folded or sealed will now be discussed. While the operation may sometimes hereinafter be described as sealing the flaps, it should be understood that this also includes merely folding the flaps. Referring now to FIG. 6, the ordinary box or carton 30 has sides 31 and 32 and ends 33 and 34. Attached to the sides 31 and 32 and depending therefrom are bottom flaps 31' and 32', respectively, and rising from the sides are top flaps 31'' and 32'', respectively. In like manner, ends 33 and 34 have bottom end flaps 33' and 34' and top end flaps 33'' and 34'', respectively. The junctures between the flaps and the respective sides or ends are well defined and are in the form of a crease or fold line shown at 35. While the cartons illustrated in FIG. 6 are shown with both top and bottom flaps, it should be understood that the apparatus of the present invention may be utilized for folding or sealing cartons having only one set of flaps rather than sets at both top and bottom. When the cartons are pregglued, an adhesive 38 is preferably applied to the outside of the end flaps as shown in FIG. 6. Any suitable adhesive may be utilized, but it must be one which will not set before the flaps are folded into sealing or adhering position. A carton 30 in

tubular form (FIG. 6a) is inserted downwardly into cavity 25 of the machine 10. The machine operates to first guide the bottom end flaps 33' and 34' inwardly to start the folding operation (FIG. 6b). Bottom end flaps 33' and 34' are then folded toward a folded position as shown in FIG. 6c and the bottom side flaps 31' and 32' are folded upwardly against the end flaps to close the bottom of the box (FIG. 6d). In its preferred form, the apparatus simultaneously operates to square the box as the bottom flaps are folded and hold the box in the position illustrated in FIG. 6d for easy loading of a product, herein shown as cans 37 (FIG. 6e). It is contemplated that the machine provide adequate support for any materials to be loaded into the box or carton and, if an adsorption-type adhesive is utilized, the weight of the product in the box will cause the bottom flaps to be sealed. The operator may then fold the top flaps as shown in FIGS. 6f and 6g and remove the box to a compression means for holding the flaps in said position until they are sealed.

Referring now to FIGS. 2-5, the mechanism which operates to achieve the aforementioned steps will be described. Disposed within the cavity 25 and generally along the centerline thereof are a pair of folding arms herein shown as substantially flat blades 40 and 42 generally at opposite ends of the cavity. Blade 40 is pivotally mounted between generally parallel arms 44 and 44' (see FIG. 2) of mounting 45 by means of fastener 46. Mounting 45 is conveniently secured to transverse member 18 in any convenient manner, such as welding. Blade 42 is mounted on generally parallel arms 48 and 48' of mounting 49 by means of fastener 50. Mounting 49 is slidably mounted on central frame member 24 by means of L-shaped bracket 52 and securing mechanism 54. Securing mechanism 54 is provided with a handle 55 for manually tightening the mechanism to secure the mounting 49 in place, as best shown in FIG. 5, and for loosening the mechanism whereby the mounting may be selectively adjusted along central frame member 24 thus changing the position of blade 42 in the cavity for a purpose which will hereinafter become apparent.

Blades 40 and 42 have a normal or at-rest position shown in phantom lines in FIG. 3. Depending arms 56 and 57 are secured to blades 40 and 42 respectively, as by welding, and have counterweights 58 and 59 attached adjacent their respective ends. Thus, in normal position, the counterweights 58 and 59 lie adjacent mountings 45 and 49, respectively. Means is provided for retaining the blades and counterweights in said normal position and is herein illustrated as magnets 60 and 61 attached to mountings 45 and 49, respectively, as by fasteners 63-66. Sufficient force is applied by magnets 60 and 61 to retain the blades 40 and 42 in said normal position for deflecting the end flaps 33' and 34' inwardly as the carton 30 is inserted into the cavity by the operator, as shown in phantom lines in FIG. 3. When the fold line 35 of carton 30 engages the blades 40 and 42, however, the force of the insertion of the carton is applied directly to the blades through ends 33 and 34. This additional force is sufficient to overcome the retaining force applied by the magnets and cause the blades to pivot about pivots 46 and 50 and move to raised or folding position best shown in FIG. 3. Slots 63', 65' and 66' are provided in mountings 45 and 49 to provide convenient adjustment of the magnets either closer to or further from the pivot points thereby changing the moment arm and adjusting the retaining force of the magnets. Thus, it is deemed obvious that the bottom end flaps of the box or carton are guided inwardly by the blades as the carton is inserted into the cavity and then are raised upwardly toward a folding position as the blades pivot. It can be seen that the fold lines must engage the blades externally of the pivots 46 and 50. To assure that the carton engages the blade at the proper position, and end guide plate generally designated by the numeral 70, is mounted on upwardly extending arms 72 and 73 of mounting 49. End plate 70 includes a generally

horizontal member 75, a generally vertical guide member 77, and an intermediate, outwardly extending, member 76 which interconnects the two. Thus, when the carton is inserted, end flaps 33' will ordinarily slide down intermediate portion 76 to the correct position adjacent the vertical portion 77. A slot 78 is provided in guide plate 70 to provide an opening through which blade 42 may assume its normal position. By adjusting mountings 49 along central frame member 24, the apparatus can be adjusted so that the opposite end of the carton engages blade 40 at the proper position. It should be noted that blades 40 and 42 have a substantially straight and smooth upper edge 41 and 43, respectively, to allow the end flaps to slide therealong, and that the blade is relatively narrow to disturb the minimum amount of adhesive 38. The carton 30 now has its end flaps folded toward a folded position as shown in FIG. 6c.

The carton folding or sealing apparatus 10 next operates to fold the bottom side flaps 31' and 32' upwardly against the bottom end flaps 33' and 34'. For this purpose, there is provided a pair of folding members herein illustrated as generally flat doors 80 and 82 disposed within the cavity 25. The doors 80 and 82 are preferably pivotally mounted on shafts 84 and 85 respectively, for movement between a normal or lowered position adjacent the respective sides of the cavity, as shown in phantom lines in FIG. 5, and a raised or fold position. Shaft 84 is pivotally mounted in bearing 86 attached to transverse member 16 and in bearing 88 attached to bracket 89 which is secured to side rail 14, as best shown in FIG. 2. Shaft 85 is similarly mounted by means of bearings 86' and 88' and bracket 89'. The movement of the doors between said lowered position and said raised position is preferably accomplished by an actuating means which conveniently operates through a series of lever arms. As herein illustrated, the actuating means is in the form of a hydraulic cylinder 90, a piston 91 disposed within said cylinder, and piston rod 92 attached to said piston and extending out of said cylinder. Piston rod 92 is pivotally attached by means of fastener 93 to lever arm 94 which is secured to shaft 95, as by welding, as shown in FIG. 5. Lever arm 96 is secured to shaft 95 at one end and pivotally connected to lever arm 97 by means of fastener 98. Lever arm 97 is pivotally connected to bracket 82' of door 82 by means of fastener 99 and, in this manner, rotation of shaft 95 operates to raise and lower door 82. An adjustable stop 102 is attached to bracket 82' and engageable with lever arm 96 to provide an overcenter lock which operates to hold the doors in raised position. Similarly, the opposite end of hydraulic cylinder 90 is connected to shaft 95' by means of lever arm 94' and fastener 93'. Rotation of shaft 95' operates to raise or lower door 80 through parts similar to those described for raising or lowering door 82 by rotation of shaft 95 and similar parts are indicated by the same number followed by a prime (''). As best shown in FIG. 3, shafts 95 and 95' extend the length of the cavity 25 and are mounted at one end on transverse member 16 by means of bearing 104 and at the other end to transverse member 18 by means of bearing 106. The aforescribed hydraulic cylinder and lever mechanism is mounted adjacent transverse member 16. As best shown in FIG. 4, additional sets of lever mechanism are each mounted on an end of door 80 or 82 adjacent transverse member 18. The lever mechanism illustrated in FIG. 4 is similar to that described supra and identical parts carry the same number with a double prime ('') thereafter.

A particularly advantageous cooperation is provided between the blades 40 and 42 and the doors 80 and 82. This cooperation is provided by having the blade 40 operate a switch or valve means controlling the movement of hydraulic cylinder 90 and thereby controlling the movement of doors 80 and 82. In the embodiment illustrated, a valve mechanism 110 is operative to control flow of fluid to opposite sides of piston 91 through fluid lines 111

and 112. An arm 120 is pivotally attached to depending arm 56 at 121, as best seen in FIG. 3. Arm 120 extends through opening 122 in the wall of transverse member 18. Arm 120 has a depending member 124 arranged to engage an extending switch member 113 of valve mechanism 110. As best shown in FIG. 3, valve mechanism 110 is mounted on the interior wall of transverse member 18 by means of fasteners 114 and 114' and is arranged so that extending switch member 113 extends through the wall of transverse member 18 when engaged by depending member 124 for a purpose which will hereinafter become apparent. The valve mechanism is provided with a coupling 115 for connection to a supply (not shown) of fluid which is preferably air. Thus, when the carton has been inserted into the cavity and the end flaps are raised toward fold position by the blades, depending member 124 will engage extending switch member 113 and cause a flow of air through fluid line 111 to extend the piston rod out of the hydraulic cylinder. Because of the particular arrangement, the door with the least resistance will be the one to be raised first. This is a preferred arrangement because only half as much air pressure need be applied to consummate the raising of the doors since they need not be raised simultaneously. Additionally, the over center lock arrangement on the lever arm described above, will hold the doors in position and support a considerable amount of weight as the product is placed in the box (FIG. 6e). This arrangement eliminates the necessity of utilizing the hydraulic cylinder to support the doors in raised position and provides a safety factor in that the doors will not collapse should the weight of the product exceed the force applied by the hydraulic cylinder or should there be a failure of the air supply. When air is supplied through fluid line 111, there may be an amount of fluid on the other side of piston 91. Such fluid is forced back through line 112 and is exhausted through port 116 in valve mechanism 110. After the operator has completed the loading operation (FIG. 6e), the carton 30 is removed from the cavity by conveniently sliding it onto the conveyor means 130 adjacent the end of the cavity opposite end guide plate 70. It is contemplated that the conveyor means may be of any convenient kind, but it is herein illustrated as a plurality of rollers as best shown in FIG. 1. FIG. 2 illustrates rollers 131-135, the first four of which are short in length and arranged in pairs on either side of the center line of the apparatus to provide a gap at about the center line of the cavity 25 for receiving blade 40 in fold position described above. The rollers may be mounted in any convenient manner but are herein illustrated as mounted on brackets 138. After the carton has cleared blade 40, counterweight 58 will cause blade 40 to return to normal position. As this occurs, means is provided for engaging extending switch member 113 to reverse the flow of air to the hydraulic cylinder 90. For this purpose an extending member 125 is attached to counterweight 58 and is arranged to engage pivoted arm 126 which overlies extending switch member 113, as shown in FIG. 3. When switch member 113 is returned to first position, the flow of fluid is directed into fluid line 112 to reverse the position of piston 91 and retract piston rod 92. The air already in the cylinder is returned through line 111 and exhausted through a port which preferably has an adjustable plug therein, shown in the form of a screw 117, to control the exhaustion of the air and assure that the doors will be returned to lowered position in a cushioned manner.

Side guide plates 140 and 142 are disposed along opposite sides of the cavity 25 and adjacent the side rails 12 and 14, respectively. The side guide plates are similar in shape to end guide plates 70, described above, but are conveniently somewhat higher to first engage the sides and center the box on the cavity prior to the function served by end guide plate 70. Side guide plates 140 and 142 are secured, as by welding, to longitudinal shafts 144 and 146 respectively. Longitudinal shaft 144 is pivotally mounted adjacent its opposite ends to bearings 147 and 148 and

longitudinal shaft 146 is likewise mounted adjacent its opposite ends to bearings 149 and 150, as best shown in FIG. 2. A wheel 152 is mounted adjacent the rear side of side guide plate 142 by means of mounting 153 and fastener 154, as best seen in FIG. 5. In like manner, wheel 156, mounting 157, and fastener 158 are provided on side guide plate 140. When doors 80 and 82 are in normal or lowered position, the center of gravity of the side guide plates is such that they assume a normal position shown by phantom lines in FIG. 5. When the doors are raised to folding position, they engage wheels 152 and 156 which cause side guide plates 140 and 142 to cam inwardly slightly through rotation about shaft 144 and 146 respectively. When the side guide plates are in normal position, the box will slide easily into the cavity; when the side guide plates are cammed inwardly, they operate to square up the box and frictionally hold it in position thus freeing the hands of the operator for easy loading. It is contemplated that this holding action is sufficient to overcome the "bounce back" action caused by the folded flaps but that it is sufficiently light to allow an operator to slip the box onto the conveyor means quite easily. When the carton has been removed and the doors returned to their normal position, the side guide plates will also assume their normal position. Stops 160 and 162 are conveniently affixed to longitudinal shafts 144 and 146, respectively, adjacent transverse member 16. These stops operate to control the amount of movement of the longitudinal shafts by engaging the top of longitudinal member 16 at point 164 shown in FIG. 3. In this manner, there is provided a safety mechanism which prevents the side guide plates from accidentally being knocked into the cavity from their normal position.

When the operator has placed a product 37 into the carton 30 (FIG. 6e), the operator will then fold the top flaps (FIGS. 6f and 6g) and slide the folded carton onto the conveyor means 130. A compression means, generally designated by the figure 170, is disposed above said conveyor means at a level approximating the height of the carton 30 when all flaps are folded for compressibly holding the carton to seal the flaps thereof. While it is contemplated that various types of compression means may be utilized, it is herein illustrated as a generally flat plate 171 mounted on extensions 172 and 173 of legs 26 and 27, respectively, by means of crossbar 174. Springs 175 and 176 are mounted above bar 174 and on extensions 172 and 173, respectively, for applying the pressure necessary to hold the flap while the adhesive sets.

It is now deemed obvious that an operator may insert a carton, in tubular form, into the apparatus which will guide the end flaps inwardly and then move them upwardly toward a folded position, that the side flaps will be folded upwardly against the end flaps and that the box will simultaneously be squared up and held in folded position for easy loading. The apparatus thus provides a packing station, allowing the operator to fill the carton, fold the top flaps thereof, and push the carton under a spring loaded compression plate for sealing the flaps thereof.

A salient feature of this invention, however, is its adjustability. For example, the embodiment herein illustrated may be easily adapted to receive cartons ranging in size from 6" x 6" x 4" to 24" x 12" x 24" and any size in between, and this adjustment may be quickly and readily made by an unskilled operator. It should be understood that the foregoing sizes of cartons are mentioned by way of illustration, and not limitation, and that it is contemplated that this invention may be adapted to handle boxes of various other sizes. The manner in which the apparatus is adjusted will now be described.

It has already been indicated that mounting 49 may be adjusted longitudinally of the cavity 25 to accommodate different length cartons. The position indicated in FIGS. 2 and 3 is intermediate the extremes of movement of mounting 49 and was chosen to better illustrate the relationship of the parts. By turning handle 55 and re-

leasing the pressure of securing mechanism 54 on bracket 52, mounting 49 may be moved adjacent transverse member 16 to accommodate larger cartons, or may be moved in the other direction to a point near blade 40 to accommodate smaller cartons. The mounting of depending arms 56 and 57 and counterweights 58 and 59 on opposite sides of blades 40 and 42 allow those parts to swing past each other and thus allows the apparatus to accommodate the smallest cartons possible.

The apparatus is also adjustable to accommodate different width cartons. For this purpose side guide plates 140 and 142 are simultaneously movable toward the center of the cavity a generally equal distance so that the blades remaining at the approximate centerline of the carton to be handled. For this purpose, bearings 147 and 149 are mounted on screw shaft 176 which extends transverse of the apparatus inside the housing described by transverse member 16 (see FIG. 2). Screw shaft 176 is mounted in bearings 177 and 178 on side rails 12 and 14, respectively. Screw shaft 176 conveniently extends outside the aforementioned housing on the operator's side thereof, herein shown as the side adjacent side rail 12, and has a crank 179 affixed thereto for convenient adjustment by the operator. Bearings 148 and 150, disposed above transverse member 18, are mounted on screw shaft 182 which is mounted on side rail 12 by means of a bearing (not shown) and on side rail 14 by means of bearing 184. Sprockets 185 and 186 are conveniently secured to screw shafts 176 and 182, respectively, and are interconnected by means of a chain 187 so that screw shafts 176 and 182 will rotate simultaneously. The two screw shafts have right and left hand threads extending in opposite directions from the centerline of the apparatus so that rotation of the respective shafts will move the bearings 147-150 in opposite directions simultaneously. Thus, turning crank 179 operates to rotate both screw shafts and move the bearings, thereby adjusting side guide plates 140 and 142 an equal distance about the centerline of the apparatus to accommodate different width boxes.

The apparatus is also adjustable to accommodate different height cartons by moving compression means 170 up or down. For this purpose are provided locks, shown as screws 190 and 191 mounted on extensions 172 and 173 respectively, which are selectively releasable to allow the extensions to be extended or retracted. The amount of compression applied is adjustable by tightening or loosening nuts 192 and 193 mounted above springs 175 and 176, respectively. When different height boxes or cartons are used, the top of the box, or work area, will vary in distance above the floor. Thus, it is desirable to be able to selectively adjust the height of the machine to maintain the work area at a convenient elevation for the operator. Additionally, different height operators will necessitate different height machines. To accomplish such an adjustment, a plurality of locks such as screws 195 are provided on the legs 26-29, as best shown in FIG. 1. It should be understood that different means may be utilized for adjusting the height of the machine or compression apparatus and for adjusting the compression in the springs.

While we have thus described a preferred embodiment of our invention, this has been done by way of illustration and not limitation, and we do not wish to be limited except as required by the attached claims.

We claim:

1. In a carton folding or sealing machine, the combination of a frame generally defining a cavity for receiving a tubed carton having bottom side and end flaps, a pair of folding arms each pivotally mounted adjacent a respective end of the cavity for folding the bottom end flaps toward a folded position, a pair of folding members each mounted for movement between a lowered position adjacent the respective side of said cavity and a raised position for folding the bottom side flaps to a sub-

stantially horizontal position against the bottom end flaps, a pair of side guide means mounted adjacent the sides of the cavity for guiding the sides of the tubed carton into the cavity in one position, and means on at least one of the side guide means for engaging a respective folding member when in raised position for moving the side guide means to a second position inwardly against the carton for holding the carton in position with its bottom flaps folded.

2. The combination of claim 1 including means for selectively moving said side guide means toward the center of said cavity a generally equal distance for adapting the apparatus for various width cartons.

3. The combination of claim 1 including an end guide means mounted adjacent one of said folding arms for guiding an end of the tubed carton into the cavity.

4. The combination of claim 3 including means for selectively moving said one of said folding arms and the end guide means adjacent thereto along a line generally parallel to the sides of the cavity for adapting the apparatus for various length cartons.

5. In a carton folding or sealing machine, the combination of a frame generally defining a cavity for receiving a tubed carton having side and end flaps, means for supporting said frame, means for folding the side and end flaps into generally contiguous relationship, a pair of side guide plates each mounted adjacent the respective sides of the cavity and extending generally upwardly and outwardly from said cavity for guiding the sides of the carton into the cavity in one position, means mounting said guide plates for pivotal movement between said one position and a second position inwardly for holding the carton in position with its flaps folded, and means on the side guide plates for engaging the folding means and moving the side guide plates between said one position and said second position.

6. In a carton folding or sealing machine the combination of a frame generally defining a cavity for receiving a tubed carton having at least bottom side and end flaps defining fold lines, means for supporting said frame, folding means for folding the bottom flaps to closed position and including a pair of folding arms having a generally smooth edge and disposed between the sides of the cavity and substantially parallel thereto, means pivotally mounting each folding arm adjacent a respective end of said cavity for movement from one position with the edge inclined downwardly and inwardly toward the middle of said cavity for guiding the bottom end flaps of the carton inwardly and thereby starting a folding operation and a second position for raising the bottom end flaps toward a folded position, each said pivotal mounting means located internally of the respective end of the tubed carton as it engages said folding arms, a depending member on each folding arm arranged to lay adjacent the respective end of the cavity when the folding arm is in said one position, a pair of magnet means for engaging the respective depending member for holding the folding arms in said one position as the carton is inserted into the cavity until the end fold lines of the carton engage the folding arms, and means on the depending member for returning the folding arms to said one position when the carton is removed from the cavity.

7. The combination of claim 6 including means for selectively moving at least one of said folding arms within said cavity along a line generally parallel to the sides of the cavity for adapting the apparatus for folding cartons of various lengths.

8. In a carton folding or sealing machine the combination of a frame generally defining a cavity for receiving a tubed carton inserted downwardly thereinto, said carton having at least bottom side and end flaps defining fold lines, means for supporting said frame, a pair of folding arms having a generally smooth edge and disposed between the sides of the cavity and substantially parallel thereto, means pivotally mounting each folding

arm adjacent a respective end of said cavity for movement from one position with the edge extending downwardly toward the middle of said cavity for guiding the bottom end flaps of the carton inwardly and thereby starting a folding operation and a second position for raising the bottom end flaps towards a folded position, each said pivotal mounting means located internally of the respective end of the tubed carton as it engages said folding arms, a pair of retaining means for holding the folding arms in said one position until the end fold lines of the carton engage the folding arms, a pair of folding members for folding the bottom side flaps to a folded position against the bottom end flaps, means mounting each said folding member for movement between a lowered position adjacent the respective side of said cavity and a raised position extending substantially horizontally for folding the bottom side flaps, moving means for moving said folding members between said lowered position and said raised position, and actuating means responsive to the movement of one of said folding arms toward said second position for actuating the moving means as the folding arms approach said second position.

9. In a carton folding or sealing machine the combination of a frame generally defining a cavity for receiving a tubed carton having at least bottom side and end flaps defining fold lines, a pair of folding arms having a generally smooth edge and disposed between the sides of the cavity and substantially parallel thereto, means pivotally mounting each folding arm adjacent a respective end of said cavity for movement from one position with the edge extending downwardly toward the middle of said cavity for guiding the bottom end flaps of the carton inwardly and thereby starting a folding operation and a second position for raising the bottom end flaps toward a folded position, each said pivotal mounting means located internally of the respective end of the tubed carton as it engages said folding arms, said folding arms so constructed and arranged that they return to said one position when the carton is removed from the cavity, a pair of magnet means for holding the folding arms in said one position until the end fold lines of the carton engage the folding arms, a pair of folding members for folding the bottom side flaps to a folded position against the bottom end flaps, means mounting each said folding member for movement between a lowered position adjacent the respective side of said cavity and a raised position extending substantially horizontally for folding the bottom side flaps, moving means for moving said folding members between said lowered position and said raised position, switch means for controlling said moving means, first means on one of the folding arms for engaging the switch means as the folding arm approaches said second position for actuating the moving means for moving the folding members to raised position, and second means on one of the folding arms for engaging the switch means as the folding arm approaches said one position for actuating the moving means for moving the folding members to lowered position.

10. In a carton folding or sealing machine the combination of a frame generally defining a cavity for receiving a tubed carton having at least bottom side and end flaps, a pair of folding arms having a generally smooth edge and disposed between the sides of the cavity and substantially parallel thereto, means pivotally mounting each folding arm for movement from one position with the edge inclined downwardly and a second position for raising the bottom end flaps toward a folded position, said folding arms so constructed and arranged that they return to said one position when the carton is removed from the cavity, a pair of folding members for folding the bottom side flaps to a folded position against the bottom end flaps, means mounting each said folding member for movement between a lowered position adjacent the respective side of said cavity and a raised position extending substantially horizontally for folding the bot-

tom side flaps, moving means for moving said folding members between said lowered and said raised position, switch means for controlling said moving means, first means on one of the folding arms for engaging the switch means as the folding arm approaches said second position for actuating the moving means to move the folding members to raised position, a conveyor adjacent the frame and disposed at a level approximating the top of the folding members in raised position for receiving the carton after the bottom flaps have been folded, and second means on one of the folding arms for engaging the switch means as the folding arm approaches said one position for actuating the moving means to move the folding member to lowered position.

11. A carton sealing machine comprising a frame generally defining a cavity for receiving a tubed carton having bottom side and end flaps at least half of which have an adhesive applied thereto, means for supporting said frame, a pair of folding arms disposed between the sides of the cavity and substantially parallel thereto, means mounting each folding arm for movement between one position for guiding the bottom end flaps inwardly to start a folding operation and a second position for folding the bottom end flaps to a substantially horizontal position, a pair of folding means for folding the bottom side flaps to a substantially horizontal position against the bottom end flaps, means mounting each said folding means for movement between a lowered position adjacent a respective side of said cavity and a raised position extending substantially horizontal whereby the bottom side flaps are folded, moving means for moving said folding means between said lowered position and said raised position, actuating means for actuating said moving means as the folding arms approach said second position for moving the folding means to said raised position, conveyor means adjacent said frame and disposed at a level approximating the top of the folding means in raised position for receiving the carton after said bottom flaps have been folded, and compression means disposed above said conveyor means at a level approximating the height of said carton when all flaps are folded for compressibly holding said box to seal the flaps thereof.

12. In a carton folding or sealing machine the combination of a frame generally defining a cavity for receiving a tubed carton having side and end flaps, a pair of folding arms disposed between the sides of the cavity and substantially parallel thereto, means pivotally mounting each folding arm adjacent a respective end of the cavity for movement between one position for guiding the bottom end flaps of the carton inwardly to start a folding operation and a second position for folding the bottom end flaps toward a folded position, a pair of folding members each pivotally mounted for movement between a lowered position adjacent the respective side of said cavity and a raised position for folding the bottom side flaps against the bottom end flaps, means for moving said folding members between said lowered position and said raised position, actuating means for actuating said moving means as the folding arms approach said second position, a pair of side guide members mounted adjacent the sides of the cavity for guiding the sides of the tubed carton into the cavity in one position, and means on at least one of the side guide members for engaging a respective folding member as it approaches said raised position for moving the side guide member to a second position inwardly against the carton and thereby holding the carton in position with its bottom flaps folded.

13. A carton sealing machine comprising a frame generally defining a cavity for receiving a tubed carton having bottom side and end flaps at least half of which have an adhesive applied thereto, means for supporting said frame, a pair of folding arms disposed between the sides of the cavity and substantially parallel thereto, means mounting each folding arm for movement between one position for guiding the bottom end flaps inwardly to start

a folding operation and a second position for folding the bottom end flaps to a substantially horizontal position, a pair of folding means for folding the bottom side flaps to a substantially horizontal position against the bottom end flaps, means mounting each said folding means for movement between a lowered position adjacent a respective side of said cavity and a raised position extending substantially horizontal whereby the bottom side flaps are folded, moving means for moving said folding means between said lowered position and said raised position, first actuating means for actuating said moving means as the folding arms approach said second position for moving the folding means to said raised position, a pair of side guide members mounted adjacent the sides of the cavity for grinding the sides of the tubed carton into the cavity in one position, means on at least one of the side guide members for engaging a respective folding member in said raised position for moving the side guide member to a second position inwardly against the carton for holding the carton in position with its bottom flaps folded, second actuating means for actuating said moving means after the carton has been removed for moving the folding means to said lowered position and to thereby move said side member from said second position to said one position.

14. The apparatus of claim 13 including means for selectively moving said side guide means toward the center of said cavity a generally equal distance for adapting the apparatus for various width cartons.

15. The apparatus of claim 13 including an end guide means mounted adjacent one of said folding arms for guiding an end of the tubed carton into the cavity, and conveyor means adjacent the end of the body opposite said end guide means and disposed at approximately the level of the top of said folding means in raised position.

16. The apparatus of claim 15 including means for selectively moving said one of said blades and the end guide means adjacent thereto within said cavity along a line generally parallel to the side of the body for selectively adapting the apparatus for various length boxes.

17. In a carton folding or sealing machine, the combination of a frame generally defining a cavity for receiving a tubed carton having bottom side and end flaps defining fold lines, means for supporting said frame, a pair of blades having a generally straight edge and disposed generally equidistant between the sides of the cavity and substantially parallel thereto, means pivotally mounting each blade adjacent respective ends of said cavity for movement between one position with the edge inclined downwardly toward the middle of the cavity for guiding the bottom end flaps inwardly to start a folding operation and a second position for raising the bottom end flaps toward a folded position, each said pivotal mounting means located internally of the respective end of the tubed carton as it engages said blades, a depending member on each blade arranged to lay adjacent the respective end of the cavity when the blade is in one position, a pair of magnet means for engaging the respective depending member for holding the blades in said one position as the carton is inserted into the cavity until the end fold lines of the carton engage the blades, a pair of generally flat folding members disposed within said cavity adjacent opposite sides thereof and each having a length less than the length of said cavity and a width less than the distance between said blades and the respective side of the cavity, mounting means for pivotally mounting each said folding member for movement between a lowered position adjacent the respective side of said cavity in a raised position extended substantially horizontal to fold the bottom side flaps, moving means for moving said folding members between said lowered position and said raised position, actuating means for actuating said moving means as the blades approach said second position for moving the folding members to said raised position, and means for grasp-

ing the carton to hold it in position with the bottom flaps folded.

18. A carton sealing machine including a frame generally defining a cavity for receiving a tubed carton having side and end flaps defining fold lines and at least a portion of which flaps have an adhesive applied thereto, means for supporting said frame, a pair of blades having a generally straight edge and disposed generally equidistant between the sides of the cavity and substantially parallel thereto, means pivotally mounting each blade adjacent a respective end of said cavity for movement between one position with the edge inclined downwardly toward the middle of the cavity for guiding the bottom end flaps inwardly to start a folding operation and a second position for raising the bottom end flaps toward a folded position, each said pivotal mounting means located internally of the respective end of the tubed carton as it engages said blades, a depending member on each blade arranged to lay adjacent the respective end of the cavity when the blade is in said one position, a pair of magnet means for engaging the respective depending member for holding the blades in said one position as the carton is inserted into the cavity until the end fold lines of the carton engage the blades, an end plate mounted adjacent one of said blades and substantially parallel to an end of said body, said end plate shaped for extending generally upwardly and outwardly from said cavity for guiding an end of the carton into the cavity, means for selectively moving said end plate and the blade and magnet means adjacent thereto within said cavity along a line generally equidistant between the sides of the cavity for selectively adapting the machine for various length cartons, a pair of generally flat folding members disposed within said cavity adjacent opposite sides thereof and each having a length less than the length of said cavity and a width less than the distance between said blades and the respective side of the cavity, mounting means for pivotally mounting each said folding member for movement between a lowered position adjacent the respective side of said cavity and a raised position extending substantially horizontal to fold the bottom side flaps, at least one pair of hinged arms each pivotally attached at one end to a separate one of said folding members, means for pivotally mounting the other end of each arm, a cylinder connected to one of said arms, a movable wall inside said cylinder, a rod having one end attached to said wall and the other end connected to the other of said arms, supply means for supplying fluid under pressure to said cylinder for moving said folding members between said lowered position and said raised position, valve means for controlling the flow of fluid from said supply means to selective sides of the wall in said cylinder, an arm attached to the second of the blades opposite said one blade and movable with said second blade for engaging said valve means when said second blade is in said second position whereby fluid flows to one side of said wall for moving the folding members to said raised position, a pair of side guide plates each mounted adjacent the respective side of the cavity and extending generally upwardly and outwardly from said cavity for guiding the sides of the carton into the cavity in one position, means mounting said side guide plates for pivotal movement between said one position and a second position inwardly for holding the carton in position with its bottom flaps folded whereby a product may be placed therein, means on the side guide plates for engaging the respective folding member and moving the side guide plates between said one position and said second position, means for selectively moving said side plates generally simultaneously toward the center of said cavity a generally equal distance for adapting the machine for various width boxes, conveyor means in juxtaposition to said body at the end adjacent said second blade and disposed at a level approximating the top of said folding members in raised position for receiving the carton after said folding of the bottom flaps, means on said second

13

blade for engaging said switch means as the second blade approaches said one position for reversing the switch means to move the doors to said lowered position, and compression means disposed above said conveyor means at a level approximating the height of said carton when all flaps are folded for compressibly holding said carton to seal the flaps thereof.

19. The combination of claim 18 including lock means attached to each said arms for holding the folding members in said raised position.

20. The combination of claim 18 wherein said compression means comprises a pair of posts each disposed on either side of said conveyor means and extending to a level above the same, a generally flat plate extending across said conveyor means and mounted on the posts, means for selectively adjusting the height of the plate above said conveyor means for adapting the compres-

14

sion means for various height cartons, spring means for compressibly holding the plate against the carton, and means for selectively adjusting the spring means for varying the pressure applied to the carton; and wherein said means for supporting said frame includes adapting means for selectively adjusting the height of the machine for varying the height of a work area at the top of the carton to accommodate different operators and various height cartons.

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