

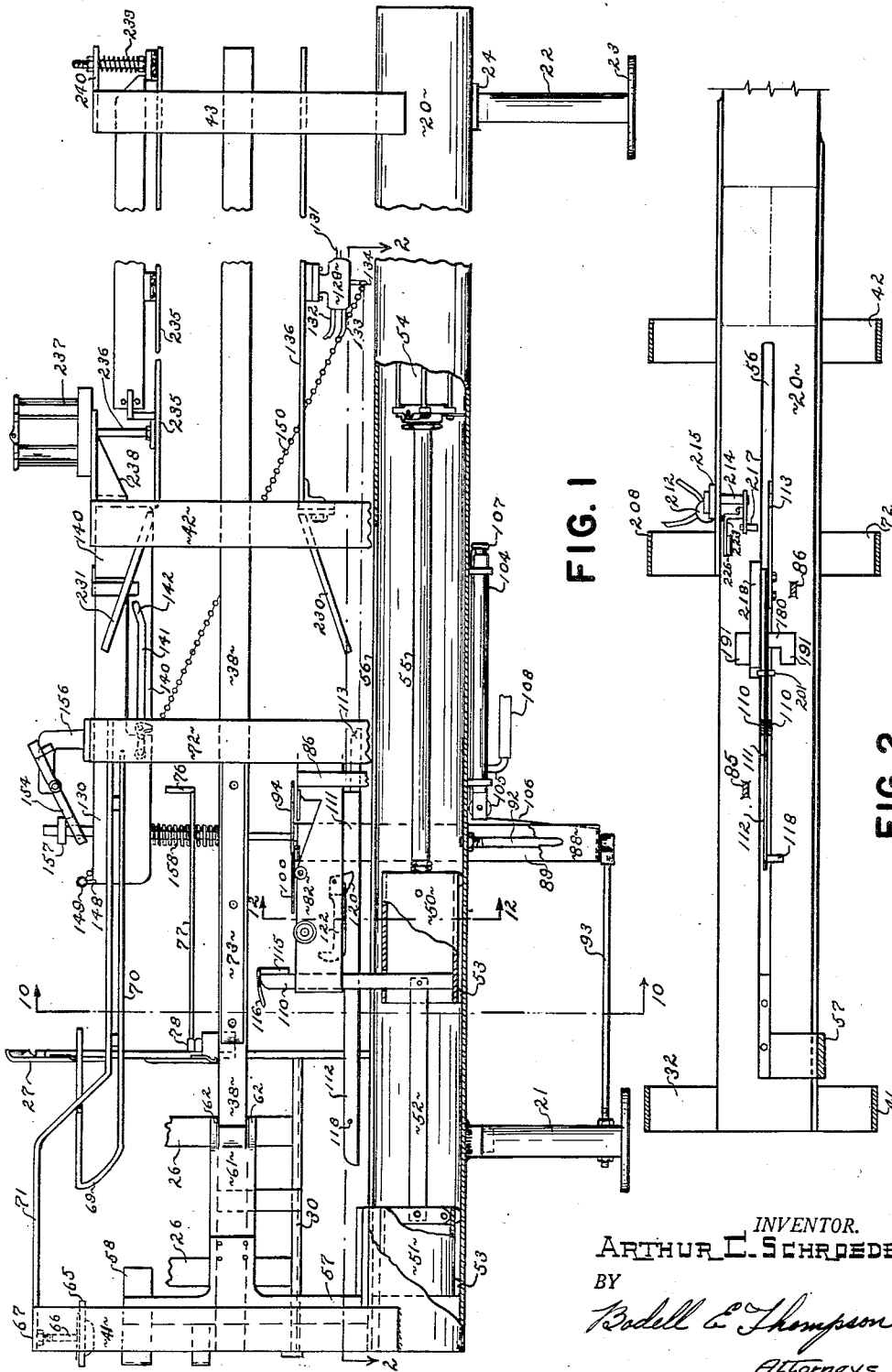
June 3, 1958

A. C. SCHROEDER
CARTON HANDLING MACHINE

2,836,946

Filed Nov. 30, 1949

11 Sheets-Sheet 1



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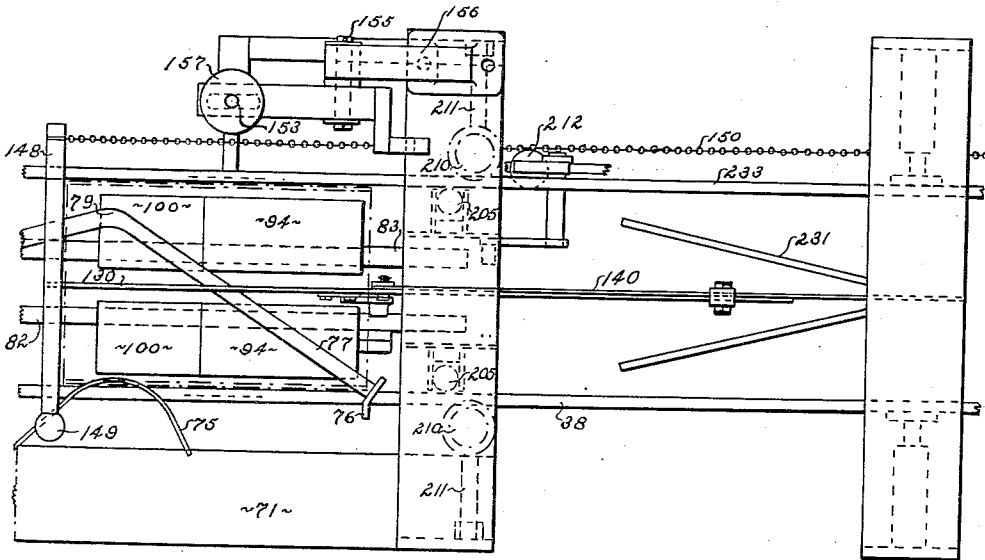


FIG. 8

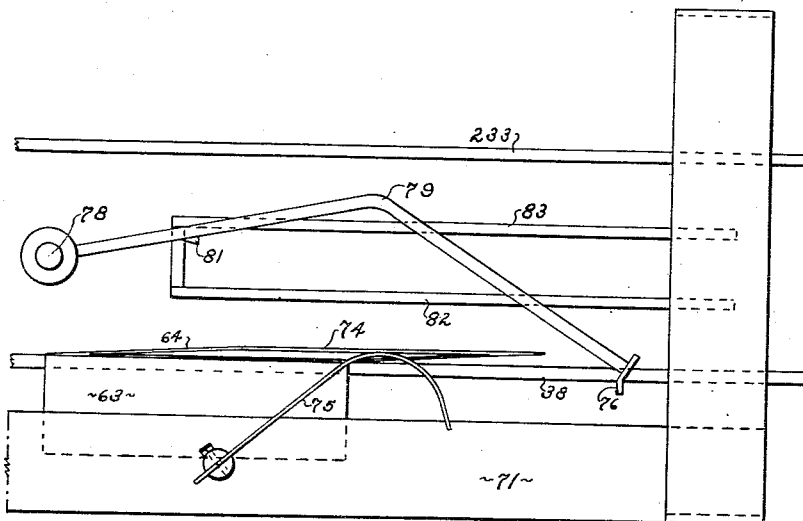


FIG. 4

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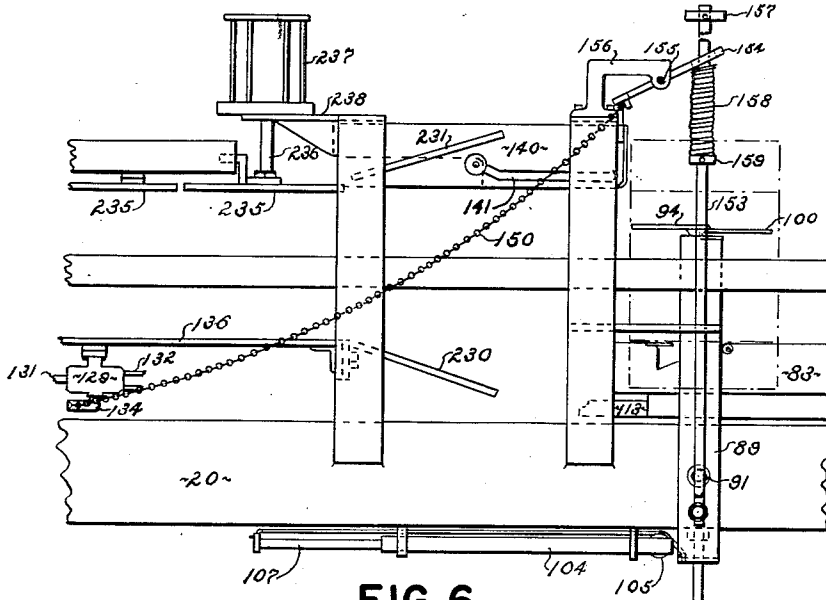


FIG. 6

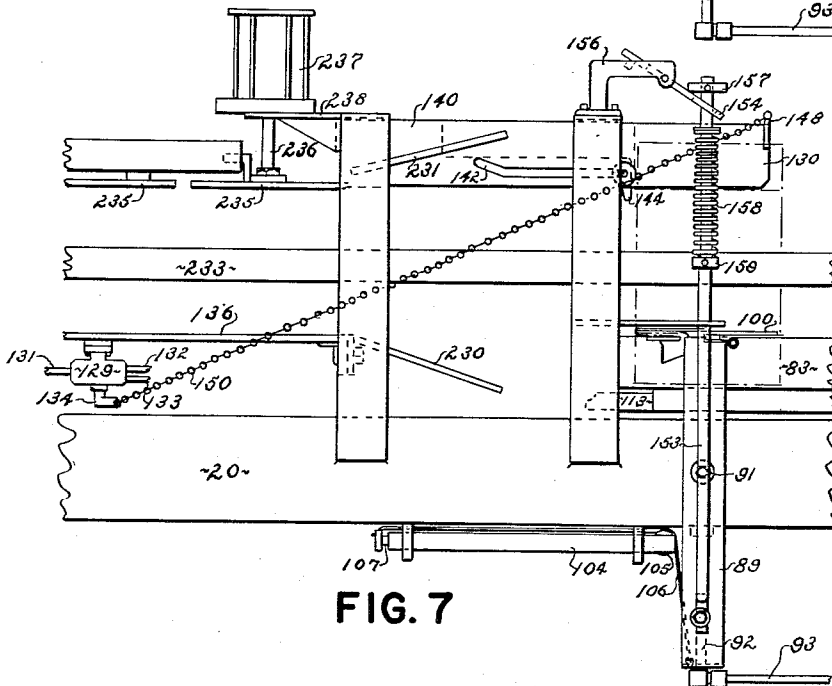


FIG. 7

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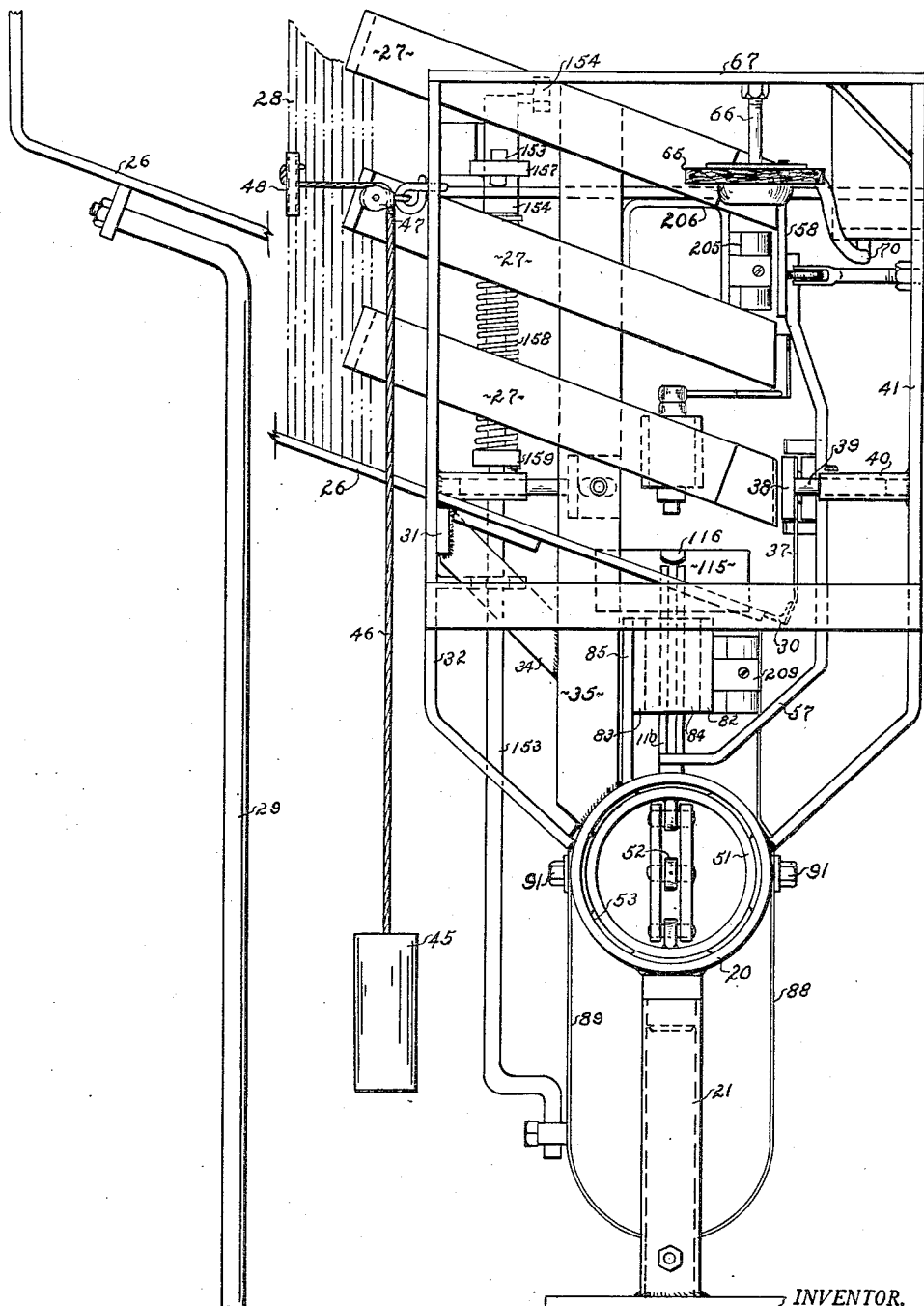


FIG. 9

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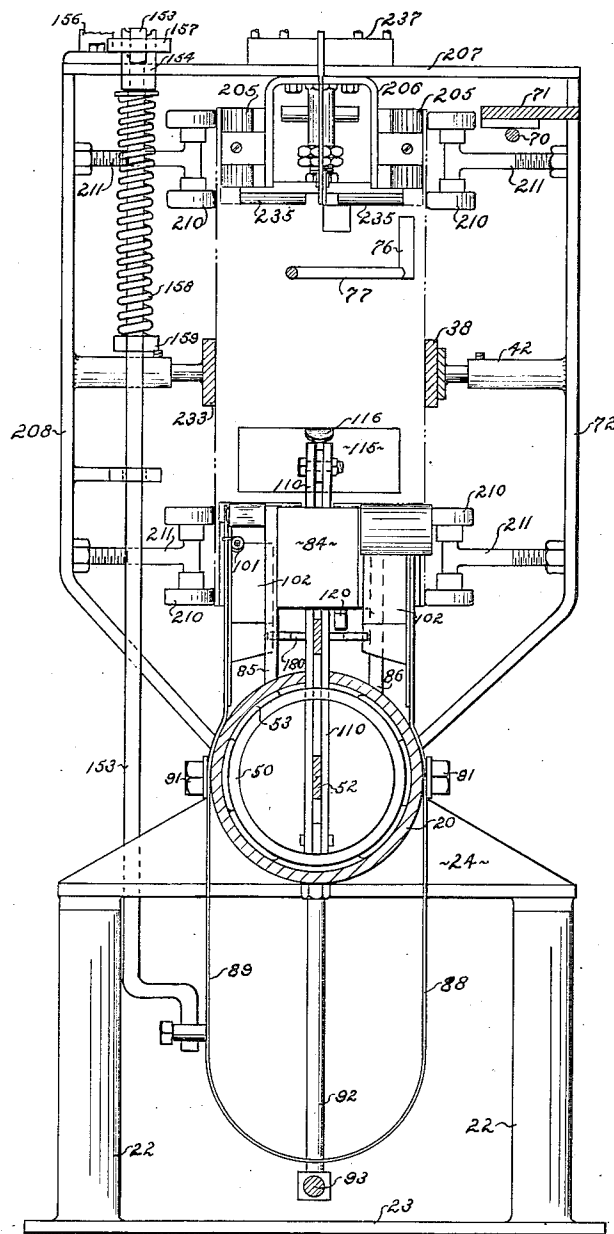


FIG. 10

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FIG. 12

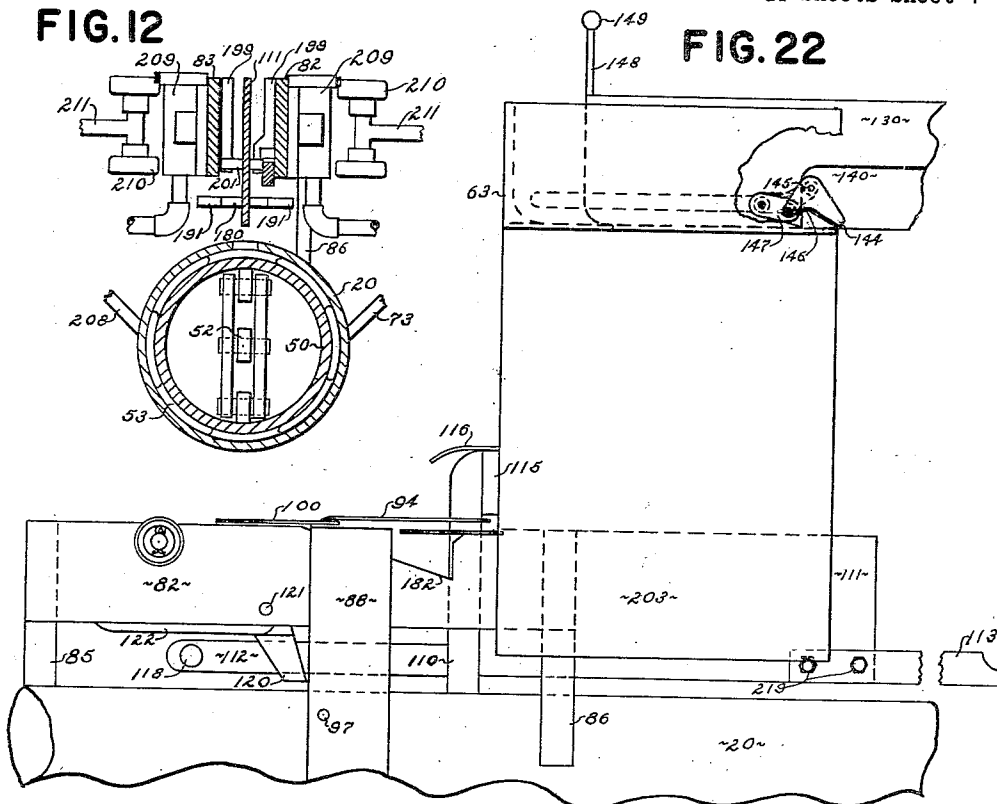


FIG. 22

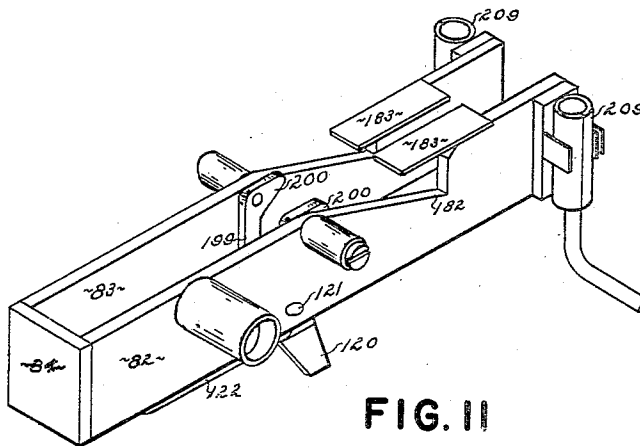


FIG. 11

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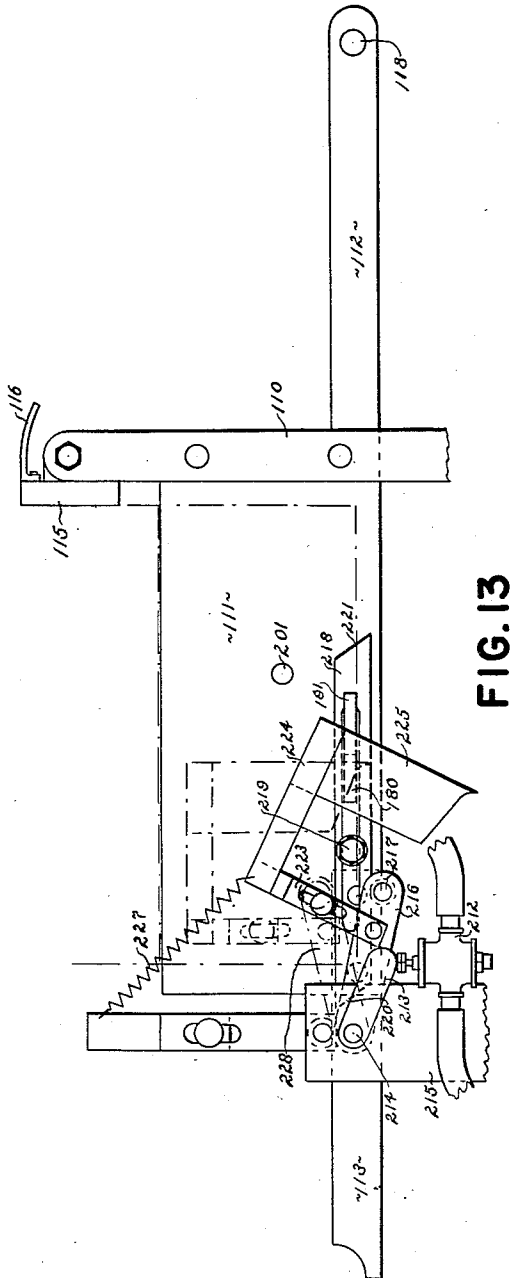


FIG. 13

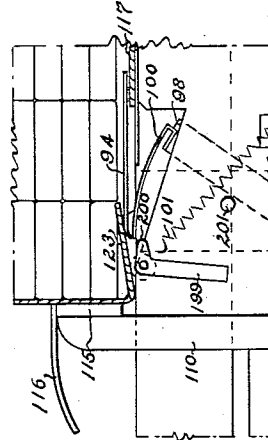


FIG. 21

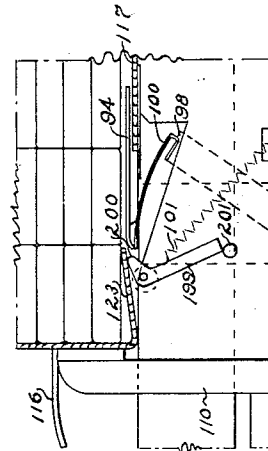


FIG. 20

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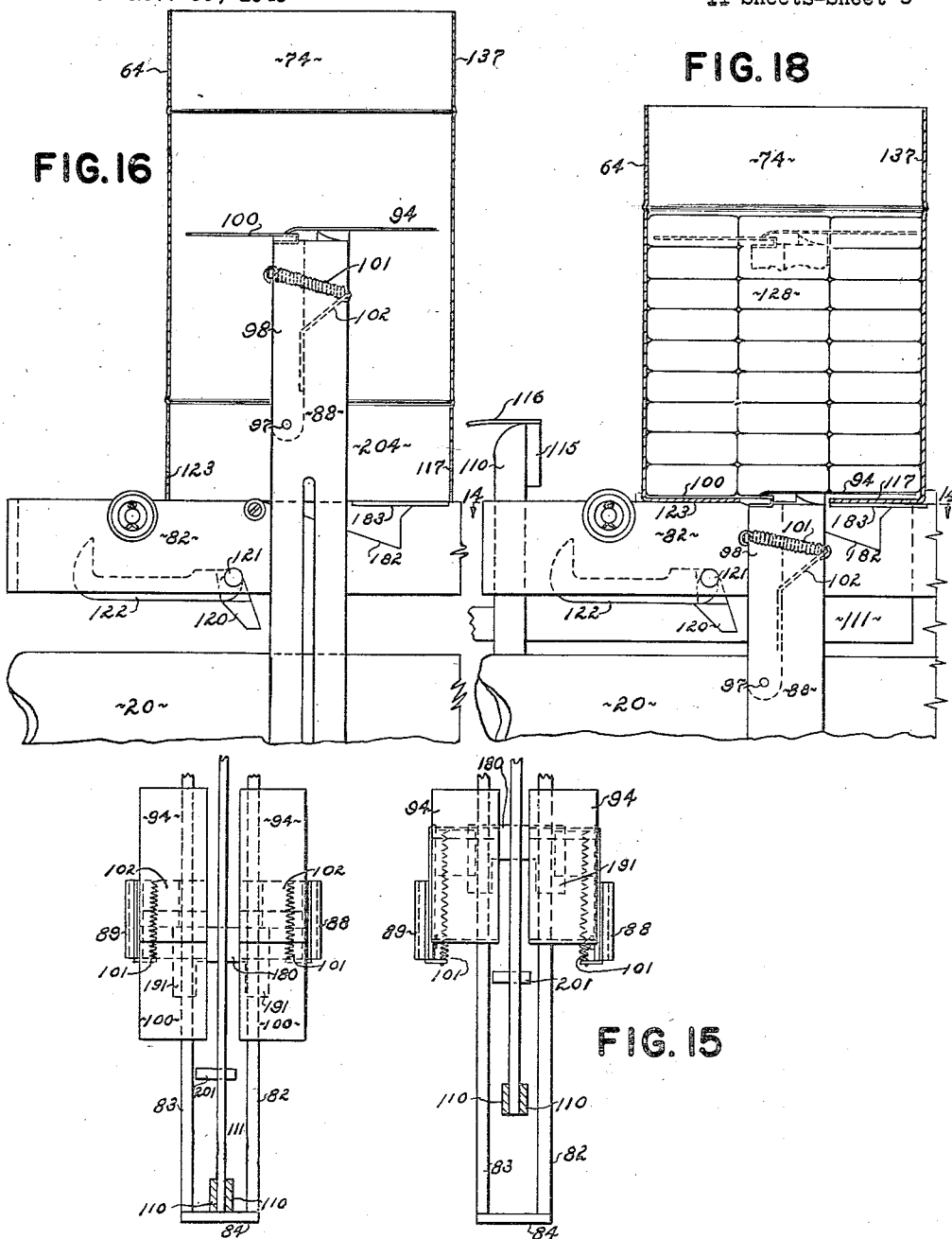


FIG. 14

FIG. 15

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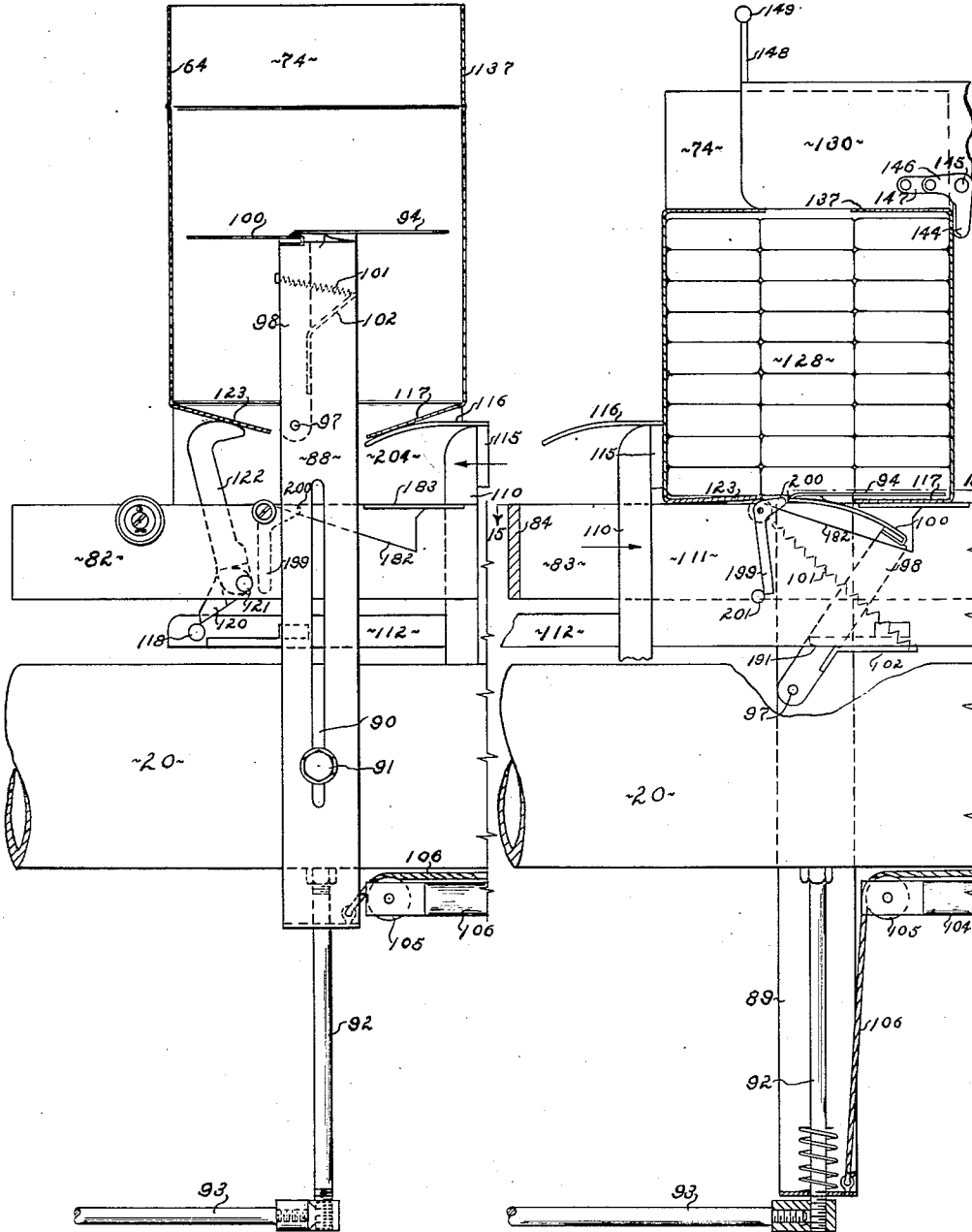


FIG. 17

FIG. 19

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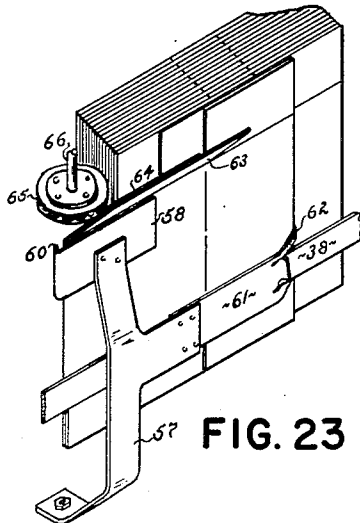


FIG. 23

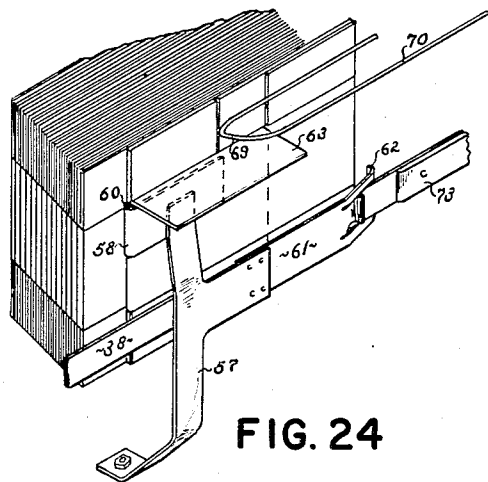


FIG. 24

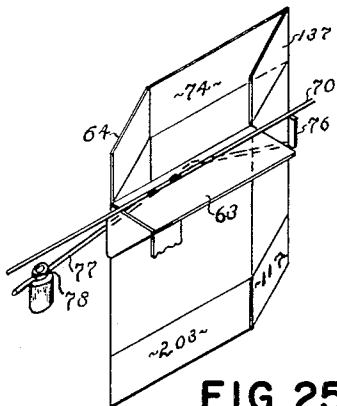


FIG. 25

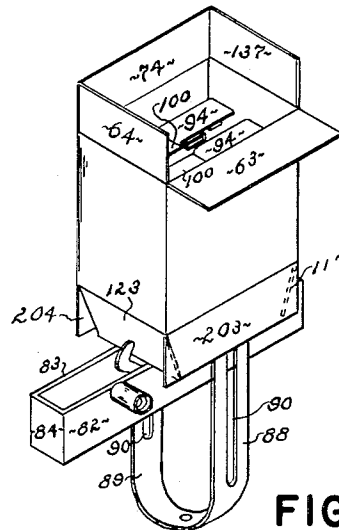


FIG. 26

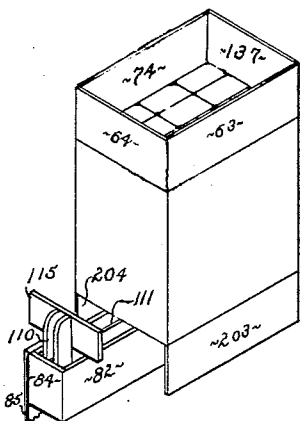


FIG. 27

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2,836,946

CARTON HANDLING MACHINE

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Application November 30, 1949, Serial No. 130,226

9 Claims. (Cl. 53—186)

This invention relates to a carton handling machine of the general type disclosed in my copending application, Ser. No. 35,017, filed June 24, 1948, now U. S. Patent No. 2,660,844, and embodies a structural arrangement which is operable to advance flat collapsed cartons successively from a supply to a carton packing station and expand the carton to tubular form and support the same for packing. The machine is further operable to advance the packed carton from the packing station and to effectively seal the top and bottom flaps of the carton in closed position.

The invention has as an object a machine of the type referred to and which embodies a structure in the form of a loading platen initially positioned adjacent the top of the open expanded carton to receive articles packed in the carton and which moves downwardly in the carton as tiers or layers of articles are added to very materially facilitate the packing of the carton and accordingly reduce time normally consumed in packing the carton, and materially reducing the fatigue of the operator.

The invention further includes a novel arrangement and structure by which the loading platen is removed from the interior of the carton while certain of the bottom flaps are maintained in closed position.

The invention has as a further object a carton handling machine wherein the flat collapsed cartons are initially moved rearwardly and, upon forward movement toward the packing station, one of the top flaps is folded outwardly over the carton advancing member and by which the carton is supported during its forward advancement to and expansion at the carton packing station.

The invention has as a further object a particularly simple, rugged and compact structural arrangement which is of low initial construction cost and which requires an unusually low maintenance and operating cost for a machine of this type.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevational view of a machine embodying my invention with parts shown in section and parts broken away.

Figure 2 is a view taken on line 2—2, Figure 1.

Figure 3 is a top plan view.

Figure 4 is an enlarged top plan view at the packing station showing a carton advanced in proximity to the station.

Figure 5 is a view similar to Figure 4 showing the carton further advanced.

Figure 6 is a rear side elevational view of the machine at the carton packing station.

Figure 7 is a view similar to Figure 6 showing the top folding flap member moved rearwardly over the carton packing station.

Figure 8 is a top plan view of the machine at the carton packing station including structural details not shown in Figures 4 and 5.

Figure 9 is an end elevational view looking to the right, Figures 1 and 3.

Figure 10 is a view taken on line 6—6, Figure 1.

Figure 11 is a perspective view of the carton support at the packing station.

Figure 12 is a view taken on line 8—8, Figure 1.

Figure 13 is a rear side elevational view of the packed carton advancing member.

Figure 14 is a top plan view of the carton support and loading platen with the plates thereof in expanded form.

Figure 15 is a view, similar to Figure 10, showing the movable plates of the platen positioned beneath the fixed plates thereof.

Figure 16 is a side elevational view of the carton support at the packing station and the loading platen, and showing a carton in expanded form.

Figure 17 is a view, similar to Figure 12, showing forwardly and rearwardly disposed bottom flaps being folded toward closed position.

Figure 18 is a view showing the carton fully packed and with the loading platen adjacent the folded bottom flaps.

Figure 19 is a view showing the movable plate of the loaded platen moved beneath the fixed plate of the platen.

Figure 20 is a view showing the free edge of the rearwardly disposed bottom flap being moved upwardly in preparation of the advancement of the packed carton.

Figure 21 illustrates the packed carton being advanced sufficiently to move the rearwardly disposed flap onto the fixed plate of the loading platen.

Figure 22 is a side elevational view of the packed carton being advanced from the packing station.

Figures 23—27 illustrate diagrammatically the handling of the carton from the supply stack to packed position in which—

Figure 23 illustrates the selection of the carton from the supply and the initial folding of the top flaps.

Figure 24 illustrates the forward advancement of the collapsed carton.

Figure 25 illustrates the expansion of the collapsed carton to tubular form.

Figure 26 illustrates the expanded carton at the packing station and with the loading platen elevated in the carton.

Figure 27 illustrates the packed carton ready to leave the packing station.

The machine comprises a frame, the chief part of which consists of an elongated tubular member 20 supported at one end by a leg 21, and at the opposite end by a pair of legs 22 mounted on a connecting pad 23 and having affixed to their upper ends a cross support 24. A supply of the flat collapsed cartons is supported in a magazine constructed at one end of the tubular member 20 and which consists of laterally extending bottom slats 26 and side slats 27. The cartons are arranged in stack formation in the magazine in vertically extending position, as indicated by dotted outline 28, Figure 9. The bottom slats 26 may be extended to support a large supply of the cartons, the extended portions being supported by a leg 29. The bottom slats 26 incline downwardly toward the tubular member 20 and have secured to their lower ends an angle stop member 30. The slats are welded to a cross member 31, one end of which is supported by a vertically extending member 32, the lower portion of which inclines toward and is affixed to the tubular member 20, see Figure 9. The opposite end of the bar 31 is supported by a brace 34 extending laterally from a vertical member 35 also fixed to the tubular member 20.

The side members 27, toward the rear end of the machine, are secured to the upright 32 and the forwardly disposed side members 27 are fixed to the upright 35. The angle stop member 30 is supported by braces 37 depending from a bar 38 which is provided with stems 39 slidably mounted in sockets 40 extending inwardly from vertical members 41, 42 and 43, these members being arranged along the front side of the machine and being comparable in structure and arrangement to the member 32, the stop member 30 and bar 38 being engaged by the lowermost carton in the stack.

The collapsed cartons are yieldingly urged downwardly against the stop 30 and bar 38 by weights 45 secured to flexible members 46 trained over pulleys 47 and secured to clip members 48 which are slotted for frictional engagement with one of the cartons, see Figures 3 and 9. This arrangement permits the supply of cartons to be replenished without stopping the machine.

Means is provided for successively selecting the flat collapsed cartons from the stack formation in the magazine at the left end of the machine, Figure 1, and advancing the selected cartons forwardly to a packing station where the articles or merchandise is packed into the carton which, at that time, is expanded into tubular form.

This carton selecting and advancing means consists of a cylindrical cross head 50 slidably mounted within the tubular member 20 and operatively connected to a second cross head 51 by a link 52. The cross heads are formed with bearing surfaces 53 and are reciprocated by means of a piston mounted in a cylinder 54 having a piston rod 55 connected to the cross head 50, the cylinder 54 being also mounted within the tubular member, the upper side of which is formed with an elongated slot 56 extending from the rear end of the tubular member forwardly.

The cross head 51 has secured thereto a brace 57 extending upwardly through the slot 56 and vertically in juxtaposition to the bar 38. A plate 58 is secured to the upper end of the brace 57 and is formed with hook portions 60 operable to engage the rear edge of the foremost collapsed carton and being effective to move the carton forwardly upon forward movement of the carton advancing means. A second plate 61 of thin spring metal is attached to the brace 57 intermediate its ends and being formed at its forward end with a pair of hook members 62 which straddle the bar 38 and which are operable to engage the leading edge of a collapsed carton and move it rearwardly upon rearward movement of the carton advancing means.

When the cross heads 50, 51, are moved rearwardly by the piston and cylinder 54, the hook members 62 engage the forward edge of the lowermost carton in the magazine and move it a short distance rearwardly, see Figure 23. Upon this rearward movement, the then rearwardly disposed top flaps 63, 64, are folded outwardly over the plate 58 by a roller 65 journaled on a stem 66 depending from a cross member 67 secured to the uprights 32, 41, see Figures 9 and 23. Upon forward movement of the carton advancing member, the hook portion 60 of plate 58 engages the rear edge of the carton and advances it forwardly. Upon this forward movement, the longer side flap 63 engages the curved portion 69 of a rod 70 which extends forwardly. The curved portion 69 curves downwardly and toward the front of the machine whereby the flap is folded outwardly and downwardly slightly below the horizontal, as shown in Figure 24. The rod 70 is secured to a flat plate member 71 secured to the vertical members 41, 72, see Figure 1. When the carton has advanced far enough forwardly to bring the leading edge of the shorter flap 64 into proximity to the folding rod 70, it is out of engagement with the roller 65, permitting it to spring back towards the vertical a sufficient amount so as not to engage the curved portion 69 of the rod and whereby it is not folded outwardly.

The rod 70 extends forwardly to the packing station and maintains the flap 63 folded over the plate 58 of the carton advancing member and thus the carton is supported by this flap during its advancement to the packing station. As the carton is advanced forwardly, the hooked fingers 62 are moved outwardly toward the front of the machine by an elongated cam member 73 affixed to the outer side of the bar 38, see Figures 1 and 24. As the carton approaches the packing station, the inner top side flap 74 is engaged by a spring rod member 75, see Figure 4. This engagement moves the rear side panel portion of the carton inwardly and the leading edge of the carton engages a member 76 extending transversely on the end of a rod 77, the opposite end of the rod being pivoted, as at 78, to one of the side members 27 of the magazine, the rod being bent, as at 79, to position the member 76 in the path traveled by the collapsed carton. As the carton is advanced, the rod 77 moves about its pivot and the carton is expanded during its advancement, see Figures 5 and 25, to rectangular or tubular form, see Figure 26. During this expansion, the side panels of the carton are moved about the corner score lines of the carton, and when the carton has been expanded to full rectangular shape, the corner 80 engages a stop member 81 on the rod 77 to make certain that the carton does not continue past rectangular form.

The expanded carton at the packing station is positioned above a carton support with the top and bottom flaps extending vertically, with the exception of the folded flap 63. The support consists of parallel spaced apart side rails 82, 83, joined together at their rear ends by a plate 84 and being supported by members 85, 86, extending upwardly from the tubular member 20. With the carton thus positioned, a loading platen is elevated into the carton, see Figure 17. The loading platen consists of a U-shaped support having side leg portions 88, 89, extending vertically on opposite sides of the tubular member 20. The legs 88, 89, are formed with elongated slots 90 to slidably receive cap screws 91 threaded into the tubular member 20. The bottom of the support is apertured for sliding engagement upon a rod 92 depending from the tubular member and having its lower end connected to a brace 93 extending forwardly from the leg 21, see Figures 1 and 6.

There is affixed to the upper end of each of the leg portions 88, 89, a plate 94, these plates extending forwardly. There is also pivotally mounted, as at 97, on each of the leg members 88, 89, a member 98. Each of the members 98 carry a plate 100. The members 98 are maintained in vertical position and with the plates 100 extending rearwardly, as shown in Figures 14, 16 and 18, by a tension spring 101 connected at one end to the leg member and at its opposite end to a bracket 102 formed on each of the members 98.

In its lowered position, the plates 94, 100, of the platen are positioned above the rails 82, 83, of the carton support. The platen is elevated into the carton by a piston arranged in a cylinder 104 secured to the under side of the tubular member 20, see Figures 1, 6 and 7. A pulley 105 is mounted on the rear end of the cylinder 104. A flexible strand 106 is secured to the bottom of the platen support and extends upwardly about the pulley 105 and is affixed to the piston rod 107. When fluid under pressure is admitted to the rear end of the cylinder through the conduit 108, the piston moves forwardly elevating the platen support and the platen loading plates 94, 100, into the carton, as illustrated in Figure 16.

With the loading platen thus elevated into the carton, the carton advancing means moves rearwardly. The forward cross head 50, Figure 1, has secured to it and extending upwardly through the slot 56 in the tubular member, a pair of bars 110. These bars are arranged between the side members 82, 83, of the carton support and there is affixed to these bars 110 a plate 111 having a rearwardly extending projection 112 and a forwardly

extending projection 113. The top edge of the plate or fin is positioned in the plane of the top edges of the side members 82, 83, the plate extending downwardly and the projections 112, 113, are positioned below the carton support, see Figures 1 and 13.

A pad 115 is secured to the upper ends of the bars 110 and functions, upon the forward stroke of the carton advancing means, to engage a filled or packed carton and advance it forwardly to a carton sealing station. It will be apparent that this member is reciprocated in unison with the member 57 advancing the flat collapsed carton, and that these members are maintained in fixed spaced apart relation by the tie bar 52, see Figure 1. Accordingly, when the carton advancing mechanism has been advanced forwardly to move a collapsed carton to the packing station, the member 115 has been advanced forwardly from the packing station and is accordingly in forward position when the loading platen is elevated into the expanded carton. Upon the return stroke of the carton advancing means, a flat engaging member 116 engages the forwardly disposed bottom flap 117 of the carton folding it inwardly toward horizontal position and, at the same time, a pin 118 on the extension 112 engages an arm 120 mounted on a pivot 121 fixed on the inner surface of side member 82 of the carton support and being associated with an arm 122 also mounted on the same pivot that when the arm 120 is moved in a clockwise direction, the arm 122 is rotated about the pivot in the same direction, the free end of the arm engaging the rearwardly disposed bottom flap 123, likewise folding it inwardly, see Figure 17. The arrangement between the arms 120, 122, is such that upon forward movement of the pin 118, no motion is imparted to the arm 122. The flap 123 is folded sufficiently by the arm 122 so that it will not spring down after the arm 122 moves out of engagement with the flap to interfere with further return movement of the member 116.

With this mechanism, the forwardly and rearwardly disposed bottom flaps are folded inwardly at a substantial angle so that the carton may be manually moved downwardly into engagement with the carton supporting rails 82, 83, as illustrated in Figure 19. This downward movement positions the plates 94, 100, as indicated in dotted outline in Figure 18, in proximity to the top of the carton. The purpose of the loading platform is to permit the operator to conveniently place packages 128 in layers at the top of the carton.

The fluid pressure is supplied to the cylinders 104, 54, through a control valve 129. This valve is mounted on one of the bottom slats 136 arranged at the right hand end of the machine, Figure 1, and along which the filled cartons are advanced under vertical compression. The valve is supplied with fluid under pressure through conduit 131 and is provided with outlet conduits 132, 133, connected to opposite ends of the cylinder 54 and one of the conduits, as 133, connected to the forward end of the cylinder 54 is also connected to the conduit 108 through a pressure reducing valve. When the carton advancing means has reached the end of its forward stroke, the operating member 134 of the valve is actuated by the extension 113 to supply pressure to the conduit 133, causing the carton advancing means to move rearwardly and the loading platen to move upwardly into the expanded carton at the packing station.

The pressure of the fluid applied to the conduit 108 is adjusted to maintain a balance on the loading platen, whereby it is yieldingly urged upwardly and is moved downwardly against the fluid pressure as the packages or articles 128 are accumulated on the platen while the carton is being packed. When the carton is completely packed, the plates 94, 100, have been moved downwardly in proximity to the bottom flaps 117, 123. The operator then depresses the rearwardly disposed top flap 64 and moves a slide 130 rearwardly and which engages the

forwardly disposed top flap 137 folding it inwardly to horizontal position.

The return or rear movement of the carton advancing means is such as to move the bars 110 against the end plate 84 of the carton support, at which time the pad 115 is positioned rearwardly in spaced relation to the packed carton, see Figure 18.

The slide 130 is slidably mounted upon a plate 140 fixed in the frame of the machine. The forward end of the plate 140 is formed with a lengthwise extending slot 141, the forward end portion of which inclines upwardly, as at 142. The slide 130 carries an angle lever having a downwardly extending leg 144. This lever is pivoted on a stud 145 slidably mounted in the slot 141 of plate 140. The forwardly extending leg 146 of the angle lever is pivotally connected to a link 147, the opposite end of which is pivotally connected to the slide 130.

The slide 130 has affixed to its rearward end a transversely extending member 148, the forward portion of which is provided with a ball handle 149. A chain 150 is connected to the rearwardly extending portion and to the actuating member 134 of valve 129. Accordingly, when the operator moves the slide rearwardly, as shown in Figures 7, 8 and 19, the valve 129 is actuated to supply fluid to the rear end of the cylinder 54, causing the carton advancing means to move forwardly.

A rod 153 is mounted for vertical movement in the frame of the machine and has its lower end affixed to the rear leg 89 of the loading platen support, see Figures 6, 7, 9 and 10. The upper end of the rod extends through a lever 154 pivotally mounted, as at 155, intermediate its ends to a bracket 156. The upper end of the rod 153 is provided with a stop collar 157 and a helical compression spring 158 is interposed between the lever 154 and a collar 159. When the loading platen has been elevated into the carton, the rod 153 is urged upwardly causing the lever 154 to be moved counter-clockwise about its pivot and moving the opposite end of the lever in interference with the member 148 and preventing forward movement of the slide by the operator while the loading platen is in any position above the carton support, see Figure 6. When the loading platen has been moved downwardly to the bottom of the carton, the rod 153 moves lever 154 about its pivot, moving the free end of the lever out of interference, as indicated in Figure 7. The operator is then able to move the slide 130 rearwardly, as previously explained.

The pad 115 is moved into engagement with the packed carton, see Figure 19, and the carton advanced forwardly to the sealing station on the bars 136.

The plate 111 is provided with a U-shaped member 180 secured at its central portion in the plate and extending laterally from each side below the carton support side members 82, 83, the extensions being of rectangular form in plan view, as indicated at 191. During the movement of the bars 110 from the position shown in Figure 18 to the position shown in Figure 19, these extensions 191 engage the brackets 102 of the members 98, moving these members clockwise about their pivots and moving the platen plates 100 underneath the fixed plates 94, as shown in Figure 19. The side members 82, 83, of the carton support are formed with inclined notches 182 to permit the plates 100 to move under the plates 94. The side members are also provided with plates 183 for adequately supporting the carton during packing. There are pivoted on the inner surfaces of the side members 82, 83, arms 199 having angular extensions 200. The depending arms 199 are engaged by a pin 201 extending transversely through the plate 111, this engagement being effective at the time the pad 115 engages the packed carton. Accordingly, further forward movement of the plate 111 causes the arms 199 to be rotated counter-clockwise and the angular extensions 200 to raise the leading edge of the rearwardly disposed bottom flap 123, as shown in Figure 20. This makes certain that the flap 123 will ride over

the top surface of the plate 94. Inasmuch as the forwardly disposed flap 117 is arranged below the plate 94, there is no interference in advancing the packed carton forwardly. During this forward movement of the carton, the opposite bottom side flaps 203, 204, and the top side flaps 63, 74, of the carton are extending in vertical arrangement.

A pair of adhesive applicators 205 are mounted upon brackets 206 secured to a cross piece 207 extending between the upright members 72, 208, see Figure 10. A similar pair of adhesive applicators 209 are mounted upon the forward ends of the side members 82, 83, of the carton support. These adhesive applicators are of the type disclosed in my copending application, Serial No. 35,017 and which function, upon pressure applied to the liquid adhesive, to exude the adhesive and apply the same as a coating to the confronting side of the carton flaps moved into engagement with the applicators. As shown in Figure 10 of the drawings, the carton flaps are maintained in proper engagement with the applicators during the advancement of the carton from the packing station by rollers 210 journaled on stems 211 extending inwardly from the upright members 73, 208. The pressure is applied to the adhesive applicators by a valve 212 mounted upon the tubular member 26. The valve 212, see Figures 2 and 13, is actuated by an arm 213 fixed to a shaft 214 journaled in a bracket 215 and to the opposite end of which is secured a lever 216 having a pin 217 arranged to be actuated by a cam bar 218 secured to and adjustable lengthwise of the plate 111, as by screws 219. The arrangement is such that the forward inclined end 220 of the cam member 218 engages the pin 217 upon forward movement of the carton advancing means, depressing the arms 216, 213, causing the valve 212 to open and apply pressure to the glue applicators 205, 209. On the rearward movement of the carton advancing means, the oppositely inclined end surface 221 of the cam block 218 engages pin 217 moving the arms upwardly, permitting the pin to ride along on the upper surface of the cam and holding arm 213 out of engagement with the valve 212.

It is sometimes desirable to operate the machine through one or more cycles without cartons in the magazine. In order to do this without causing the adhesive applicators to exude the adhesive, means is provided to prevent operation of the valve 212 unless a carton is present at the packing station. This means consists of an arm 223 fixed to the arm 216 and offset toward the rear side of the machine and to which is adjustably secured an angle arm 224 having secured to its outer end a plate 225, the lower edge of which is folded up to form a pocket or recess 226 into which the back side flap 204 of the carton enters as the carton is pushed down on the carton support. The arm 224 is urged upwardly by tension spring 227 to position the arm 216 above the upper edge of the cam block 218, as indicated by dotted outline at 228, Figure 13. When an expanded carton is positioned on the carton support, the rear side flap will engage the member 225 and depress the arm 216 a sufficient distance so that the pin 217 will be engaged by the downwardly inclined end surface 220 of the cam block.

During the advancement of the packed carton, the slide 130 is moved forwardly because of the engagement of the angle member 144 with the forward side of the carton and during this advancement of the carton, the bottom flaps are folded inwardly by folding rods 230 which are inclined upwardly, see Figure 1, and which converge inwardly, see Figures 3 and 8. In like manner, the top flaps are folded inwardly to horizontal position by similar folding rods 231 arranged at the top of the machine. As the side flaps are thus folded inwardly to closed position, the carton is advanced onto the bars 136 and as the pin 145 enters the upwardly inclined portion 142 of slot 141, the angle member 144—146 is moved counter-clockwise about its pivot to move the depending leg 144 out of

engagement with the carton, see Figure 22. The forward stroke of the carton advancing means is sufficient to move the packed carton from the carton support onto the bars 136 and after the carton leaves the carton support, it is supported and advanced by the plate 111.

During the advancement of the carton, it is guided sidewise by the bar 38 and a similar bar 233. While the packed cartons are at rest on the bars 136, they are subject to vertical compression. This is accomplished by bars 235, the forward ends of which are connected to a piston rod 236 of a piston movable in the vertically arranged cylinder 237 mounted on a bracket 238. The rear ends of the bars 235 are supported by a bolt 239 slidably suspended from a bracket 240. As the cartons are advanced to the supporting bars 136, fluid is applied to the lower end of the cylinder 237, moving the piston rod 236 and the bars 235 upwardly. When the cartons come to rest, air is applied to the top of the cylinder 237, moving the bars 235 against the top folded flaps of the carton and compressing the carton against the supporting bars 136, thus maintaining the cartons under vertical compression while the carton advancing means is moving rearwardly and while a succeeding carton is being packed at the packing station to effect a proper sealing of the top and bottom flaps. When the carton advancing member has reached the forward end of its stroke, the projection 113 engages the actuating member 134 of valve 129, effecting the application of fluid to the forward end of the cylinder urging the carton advancing means rearwardly for another cycle of operation.

What I claim is:

1. A carton handling machine comprising an elongated frame member, a magazine mounted on one end of said frame member for supporting a stack of flat, collapsed cartons, a carton packing station arranged on said frame member remote from said magazine, a carton support arranged at said packing station and operable to support a vertically arranged expanded carton, a carton advancing member slidably supported by said frame member for reciprocal movement axially thereof, actuating mechanism operable to effect forward and rearward movement of said carton advancing member, said carton advancing member having means cooperable upon forward movement of said member to simultaneously advance a flat collapsed carton from said magazine to said packing station and to advance an expanded carton from said packing station, said carton advancing member having a portion engaging a bottom flap of an expanded carton at said packing station and being operable upon rearward movement to fold said flap to horizontally closed position, and said carton support having folding means co-operable with said carton advancing member upon such return movement thereof to fold the oppositely disposed bottom flap to horizontally closed position.

2. A carton handling machine comprising an elongated tubular frame member, a magazine mounted on one end of said tubular member for supporting a stack of flat collapsed cartons, a carton packing station arranged intermediate the ends of said tubular member, a carton support arranged at said packing station and operable to support a vertically arranged expanded carton, a carton advancing member slidably supported by said tubular member for reciprocal movement axially thereof, actuating mechanism mounted within said tubular member and operable to effect forward and rearward reciprocation of said carton advancing member, said carton advancing member having means engaging a carton in said stack, and a second means engaging an expanded carton at said packing station, said member and means being operable upon advancement of said member to advance the expanded carton from said packing station, and to advance the collapsed carton to said packing station, said second carton engaging means being operable upon return movement of said carton advancing member to engage and fold a flap of an expanded carton at said pack-

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ing station to horizontally closed position, and said support having a folding member actuated by said carton advancing member upon such return movement thereof to fold the oppositely disposed bottom flap to horizontal closed position.

3. A carton handling machine comprising an elongated frame member, a magazine mounted on one end of said frame member and adapted to support a supply of vertically arranged flap collapsed cartons, a carton advancing member slidably supported in the frame, actuating mechanism operable to effect reciprocation of said carton advancing member lengthwise of the frame, said carton advancing member having means for engaging the leading edge of the carton in the magazine upon rearward movement of said member to effect rearward movement of said carton for selecting the same from said supply, and said advancing member having means for engaging the rear edge of the selected carton and upon forward movement of said member to advance the selected carton to a carton packing station, means operable during the rearward movement of the carton to engage and fold a pair of top closure flaps outwardly from vertical position, a flap folding member positioned to engage one of said out-folded pair of flaps upon advancement of the carton, and operable to fold said flap over said carton advancing member.

4. A machine for handling cartons comprising a frame, a magazine mounted on the frame for supporting a supply of flat collapsed cartons, a carton advancing member slidably mounted in the frame, actuating mechanism operable to effect sliding movement of said carton advancing member from said magazine forwardly to a packing station, and thence rearwardly to said magazine, said advancing member having a portion operable to engage and move a carton rearwardly from said magazine upon rearward movement of the advancing member, and said advancing member having a second portion engaging the rear edge of said carton upon forward movement of said advancing member, and flap engaging means carried by the frame and operable upon rearward movement of the carton to fold certain of the carton end flaps in angular relation to the plane of the carton.

5. A machine as defined in claim 4 wherein the actuating mechanism consists of a piston and cylinder structure for imparting continuous forward and rearward movement to the carton advancing member.

6. A machine as defined in claim 4 wherein the frame includes a tubular member, a piston and cylinder structure mounted in the tubular member for actuating said carton advancing member.

7. A machine for handling cartons comprising a frame, a magazine mounted on the frame for supporting a supply of flat collapsed cartons, a carton advancing member slidably mounted in the frame, actuating mechanism operable to effect sliding movement of said carton advancing member from said magazine forwardly to a packing station, and thence rearwardly to said magazine, said advancing member having a portion operable to engage and move a carton rearwardly from said magazine upon rearward movement of the advancing member, a roller mounted on the frame and being operable to fold certain of the end flaps of the engaged carton outward from the plane of the carton upon such rearward movement thereof, said advancing member having a second portion engaging the rear edge of the carton upon forward movement of said advancing member for advancing the carton to the packing station, and a folding rod extending in juxtaposition to the path of movement of said carton advancing member and operable to engage and fold one of said folded flaps over said carton advancing member.

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8. A machine for handling cartons comprising a frame, a magazine mounted on the frame for supporting a supply of flat collapsed cartons, a carton advancing member slidably mounted in the frame, actuating mechanism operable to effect sliding movement of said carton advancing member from said magazine forwardly to a packing station, and thence rearwardly to said magazine, a flap folder carried by the frame and operable upon such rearward movement of the carton to fold a pair of adjacent end flaps of the carton outwardly from the plane of the carton, said carton advancing member having a second portion engaging the rear edge of the carton upon forward movement of said advancing member to advance the carton to the packing station, a second flap folder carried by the frame and operable upon such forward movement of the carton to fold one flap of said pair at right angles to the plane of the carton.

9. A machine for handling cartons comprising a frame, a magazine mounted on one end of the frame for supporting a supply of collapsed cartons arranged in vertical position, a packing station spaced along the frame from said magazine, a carton advancing member slidably mounted in the frame over a path extending parallel to the plane of the carton in said magazine, actuating mechanism operable to effect movement of said advancing member forwardly from the magazine to said packing station and rearwardly from said station to the magazine, said advancing member having a portion engaging the forward edge of the lowermost carton in the magazine upon rearward movement of said member, said member having a second portion engaging the rear edge of said carton upon forward movement of said member, and said member having a third portion spaced forwardly of said second portion for engaging a carton at said packing station and upon forward movement of said member advancing the carton from said station, said third portion of the carton advancing member being movable upon rearward movement of the advancing member to engage a bottom flap of a carton positioned at said packing station and fold the same horizontally.

References Cited in the file of this patent

UNITED STATES PATENTS

1,376,499	Anderson	May 3, 1921
1,592,767	House	July 13, 1926
1,592,793	Webster	July 13, 1926
1,746,835	Jones	Feb. 11, 1930
1,784,571	Bergstein	Dec. 9, 1930
1,855,638	Lane	Apr. 26, 1932
1,979,207	Milmoe	Oct. 30, 1934
1,991,223	Ledigetal	Feb. 12, 1935
2,045,292	Carey	June 23, 1936
2,050,547	Thayer	Aug. 11, 1936
2,072,667	Coe	Mar. 2, 1937
2,121,186	Crighton	June 21, 1938
2,161,124	Babicz	June 6, 1939
2,362,853	Spiller et al.	Nov. 14, 1944
2,436,168	Gregory	Feb. 17, 1948