

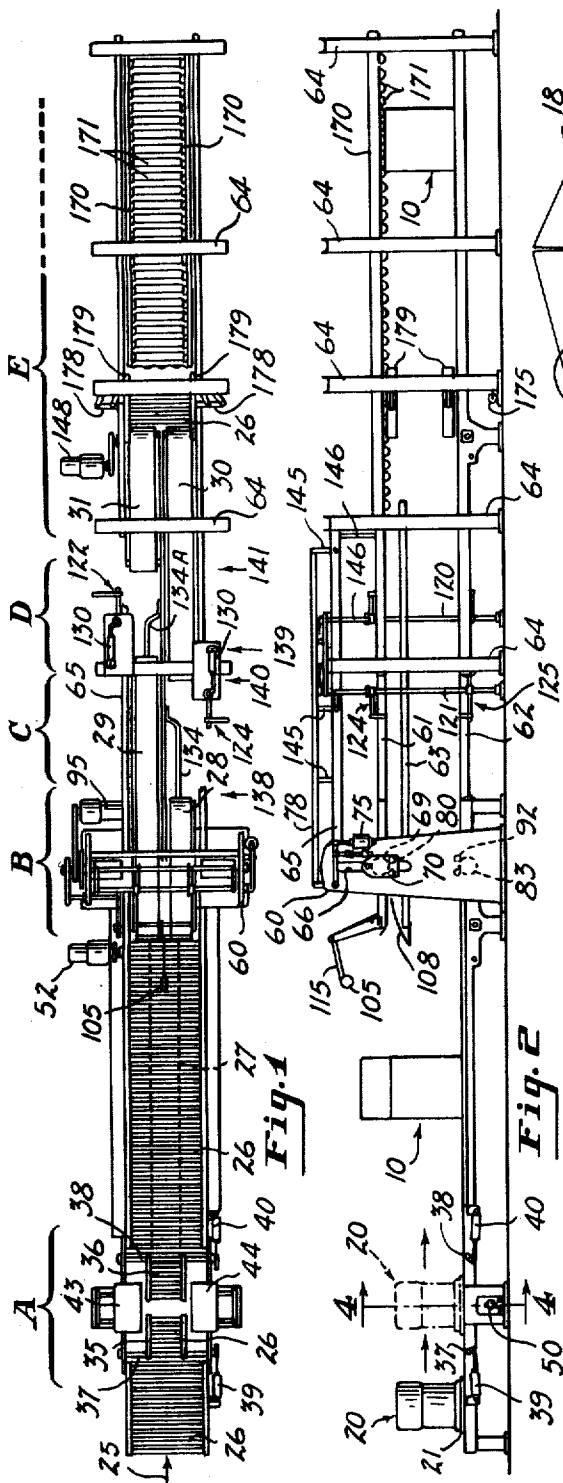
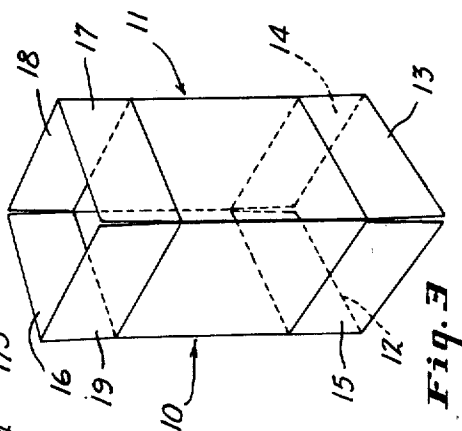
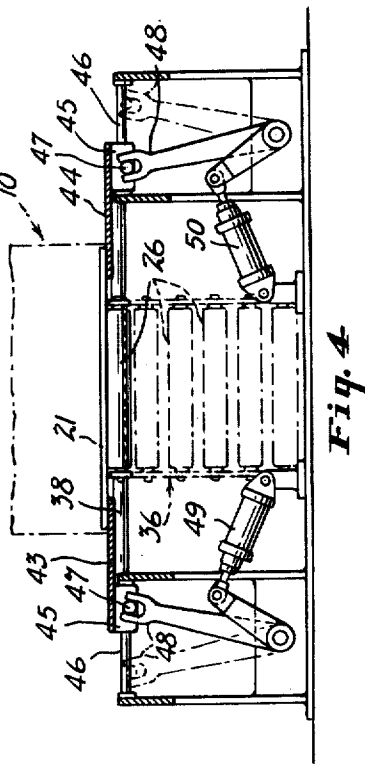
Sept. 3, 1957

M. G. SHENIGO
BOX-SEALING MACHINE

2,804,738

Filed Dec. 8, 1955

7 Sheets-Sheet 1



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7 Sheets-Sheet 2

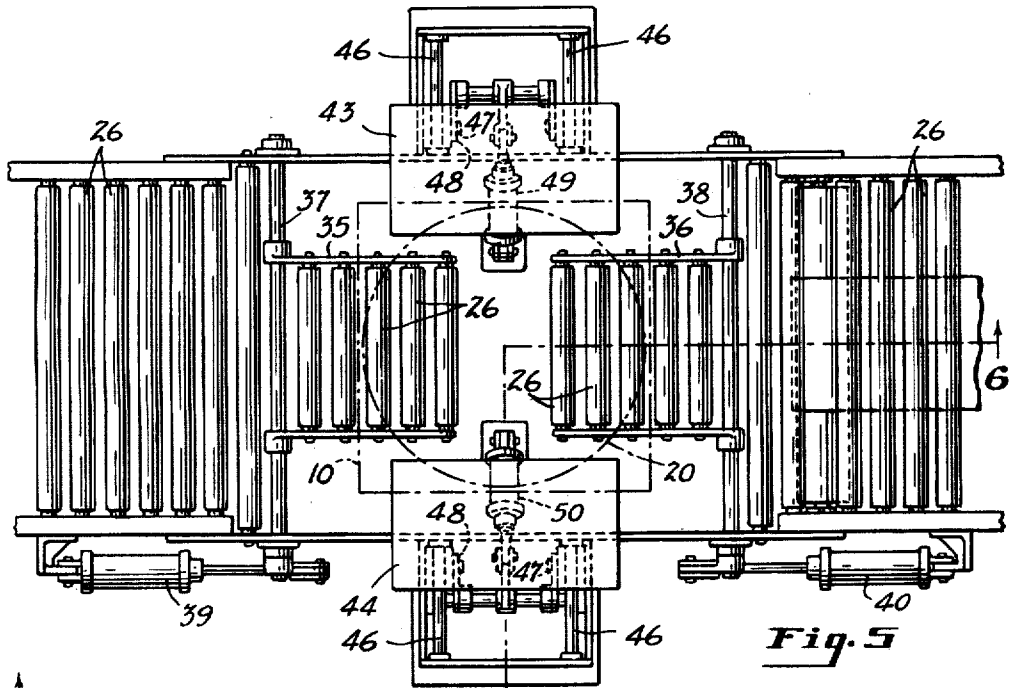
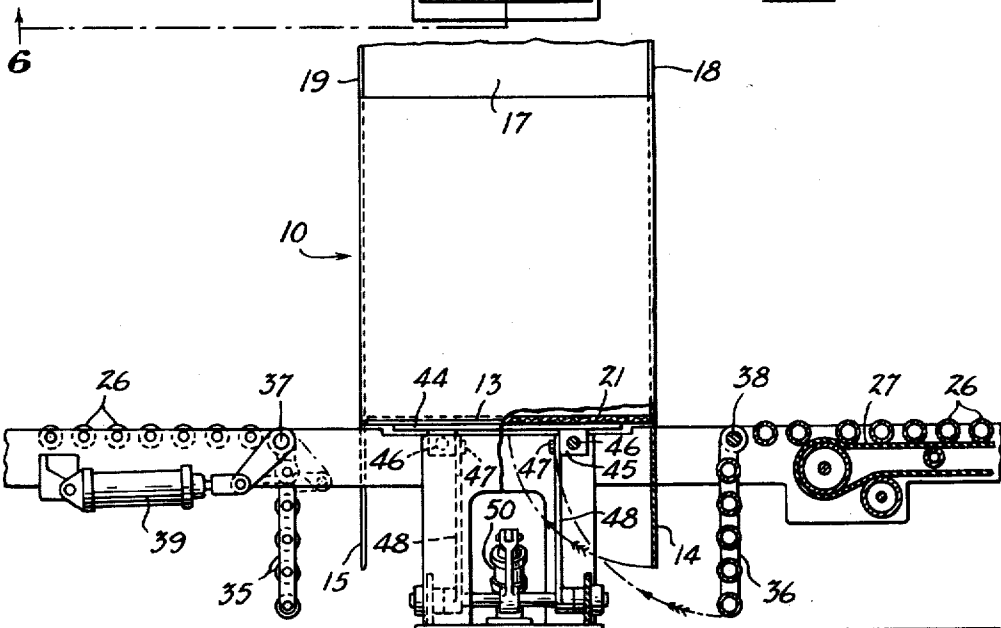


Fig. 6

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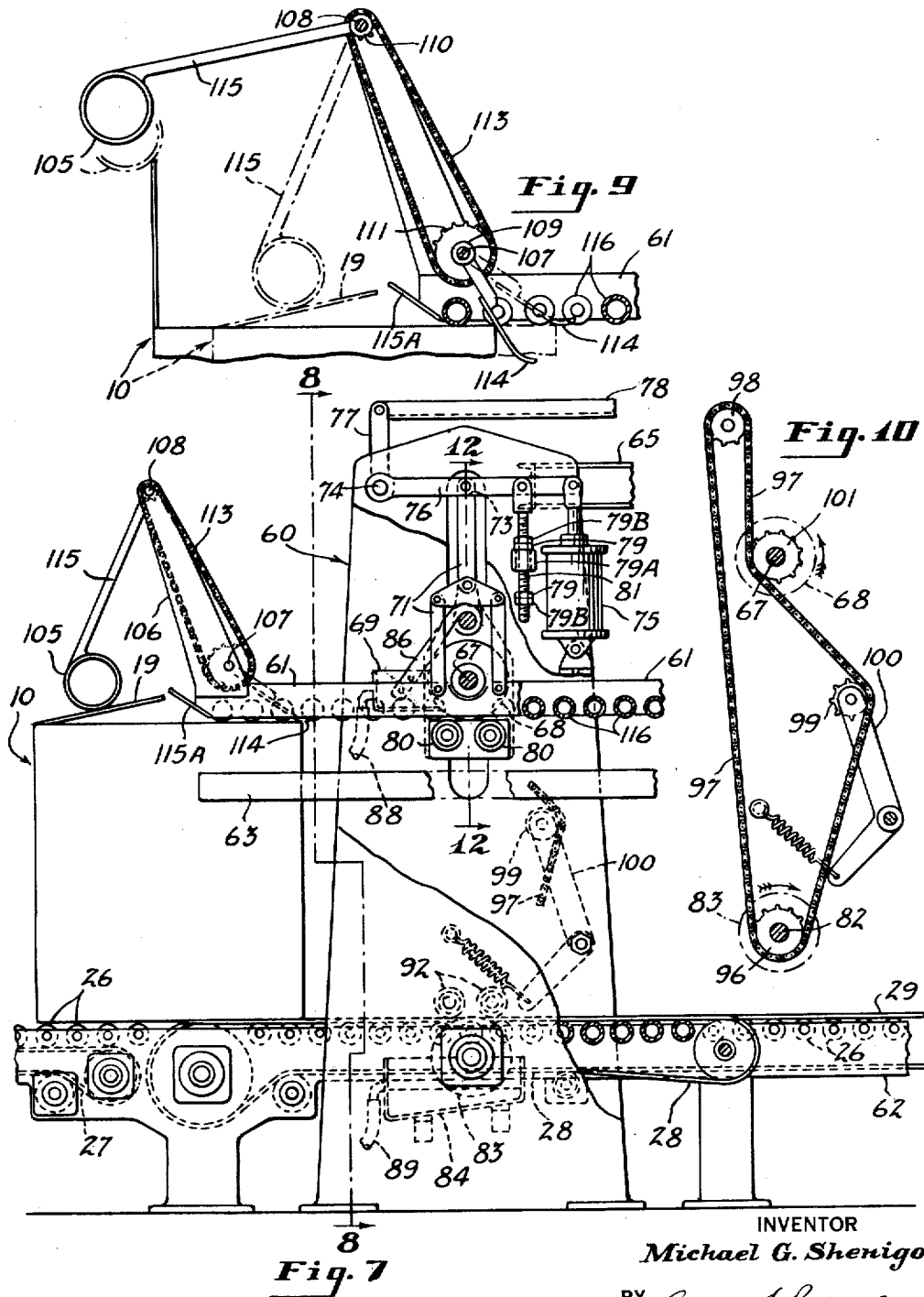
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7 Sheets-Sheet 3



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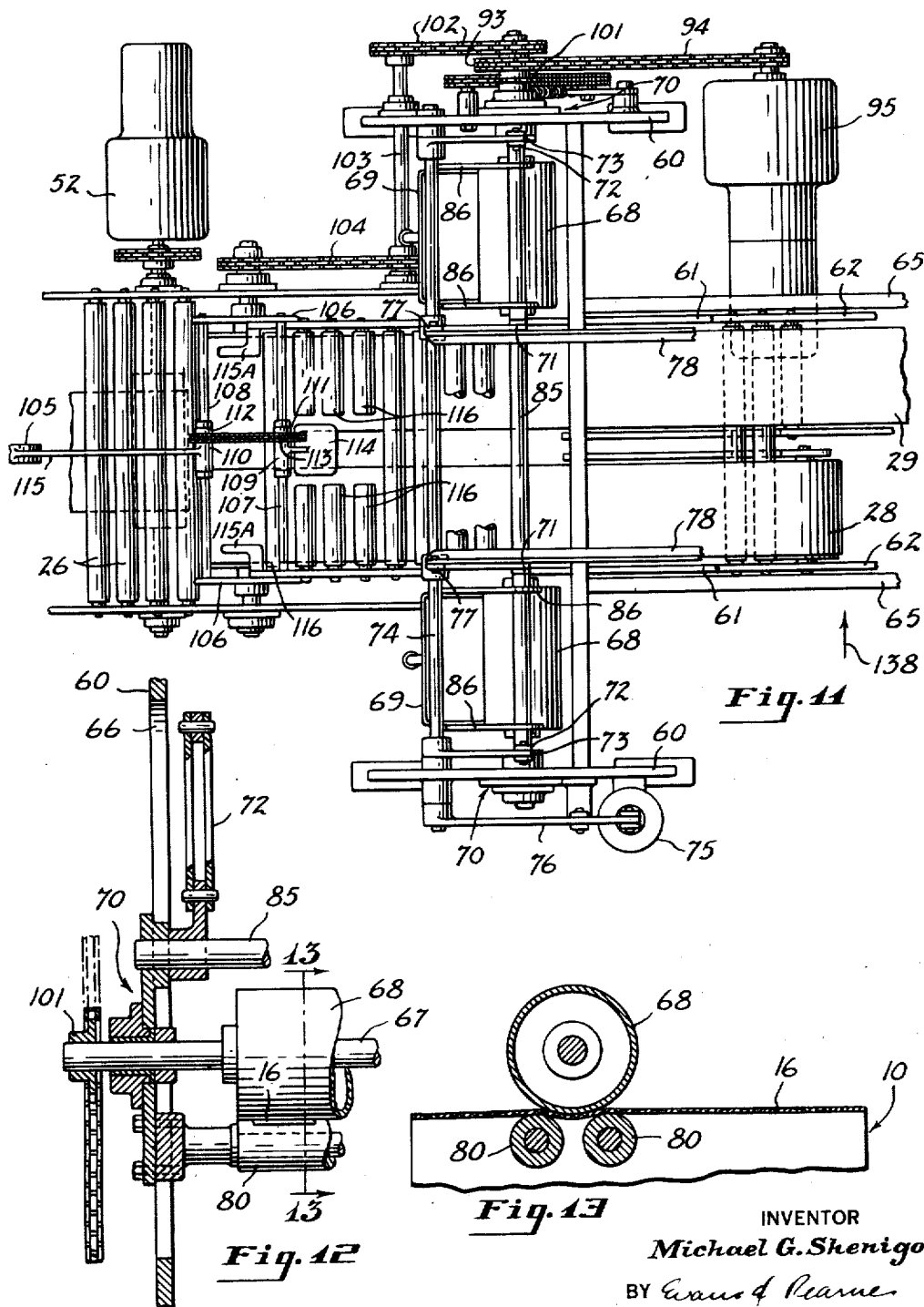
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7 Sheets-Sheet 4



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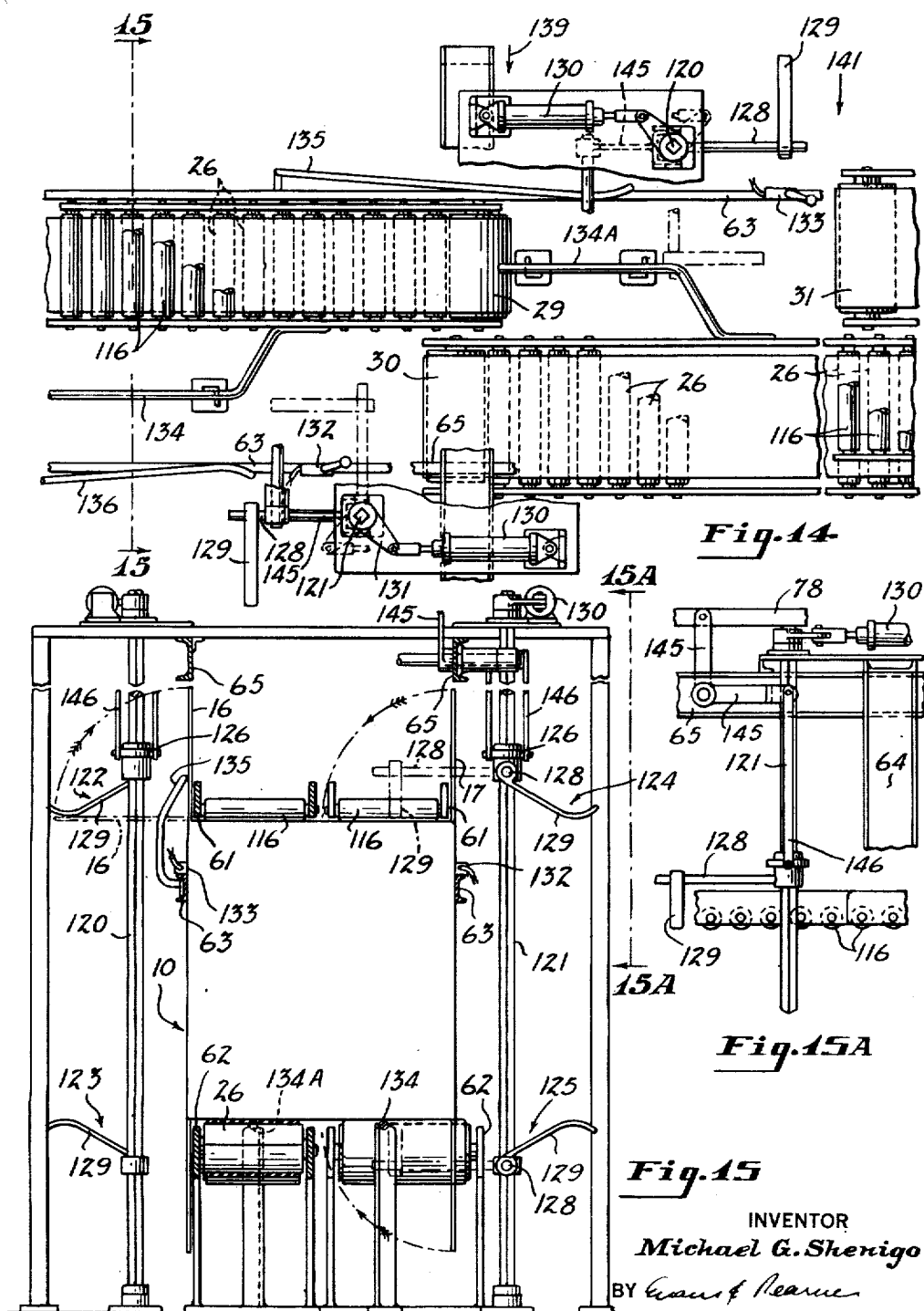
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7 Sheets-Sheet 5



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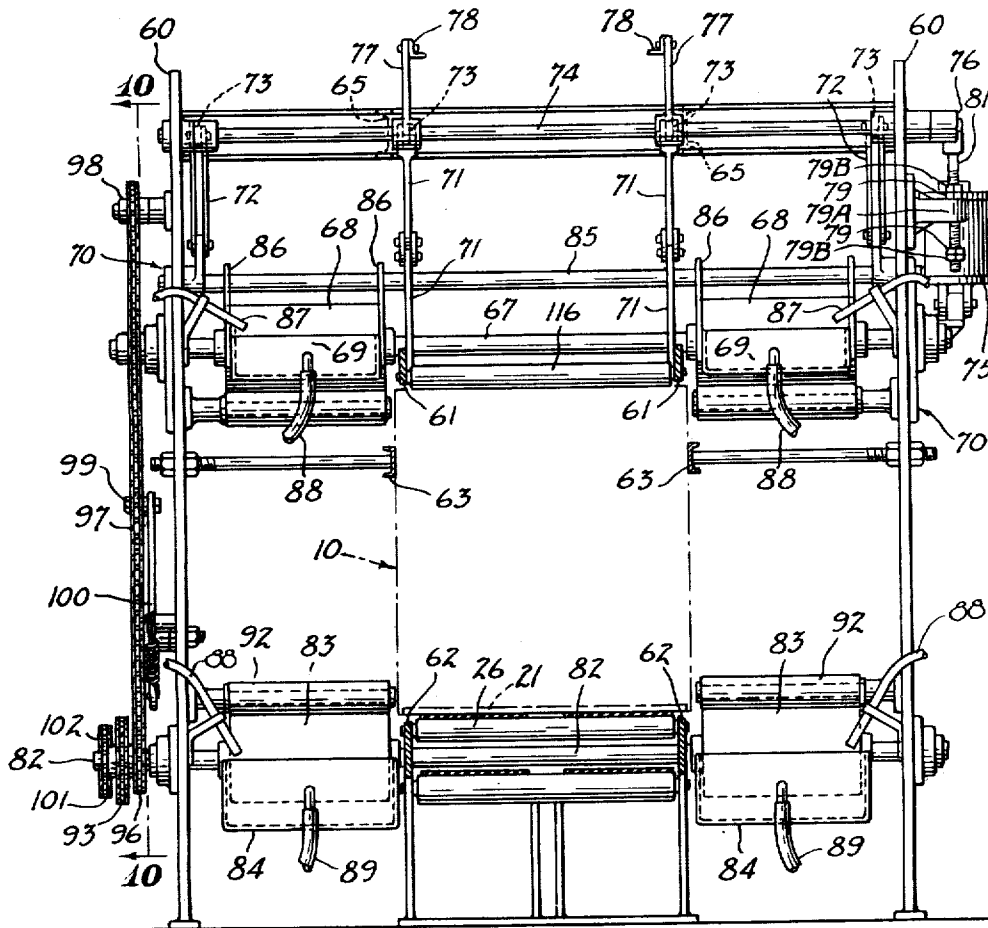


Fig. 8

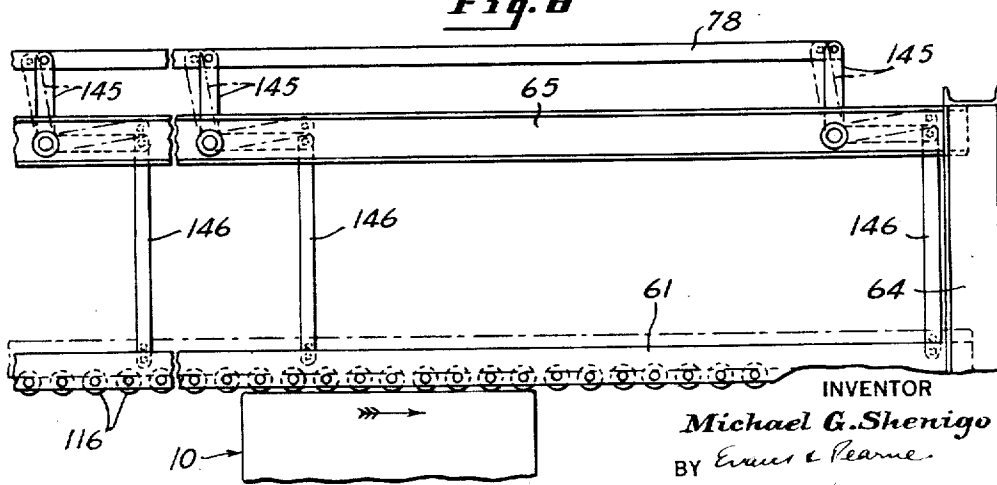


Fig. 16

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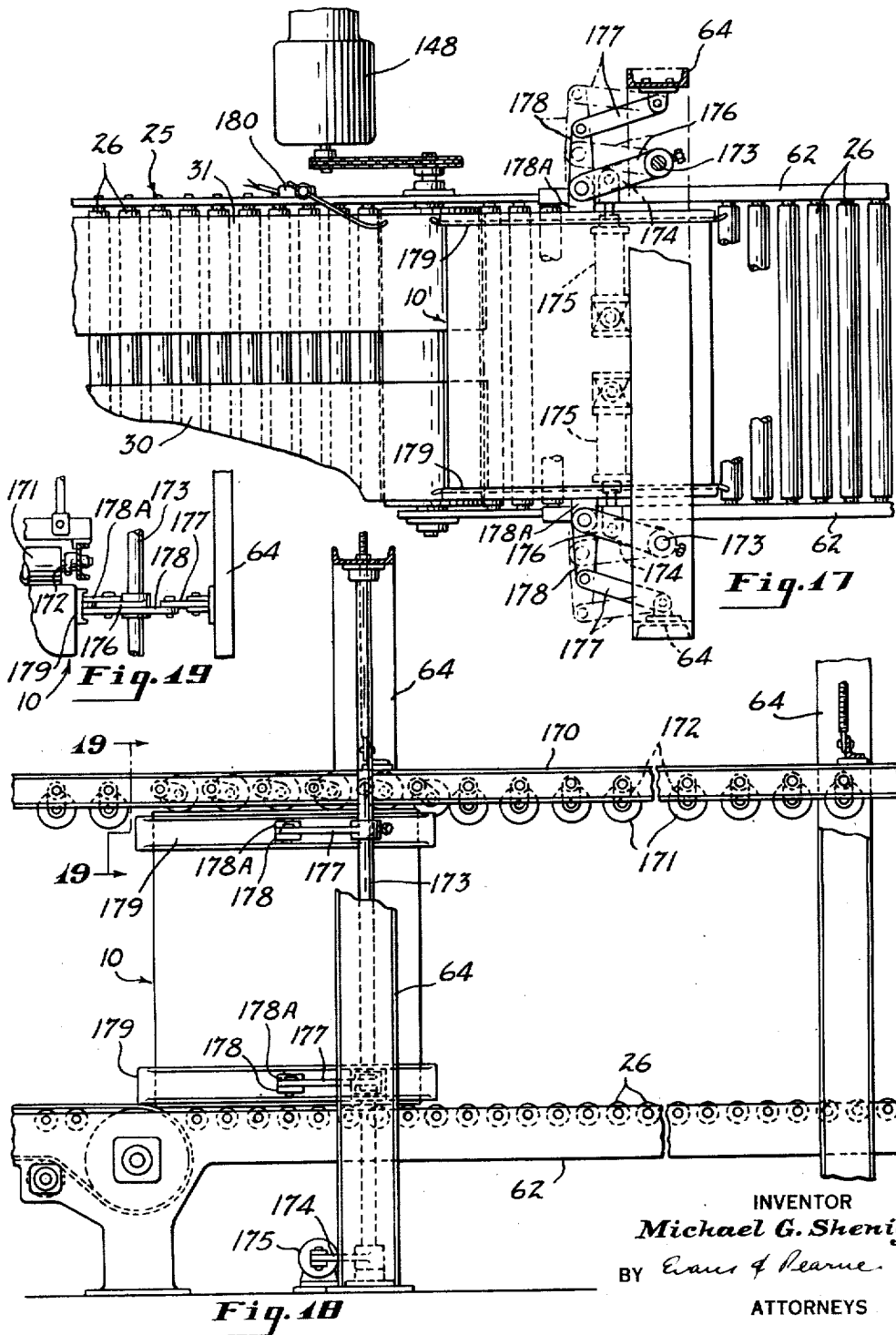
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7 Sheets-Sheet 7



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2,804,738

BOX-SEALING MACHINE

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Application December 8, 1955, Serial No. 551,797

20 Claims. (Cl. 53—374)

The present invention relates to packaging machinery and particularly to a machine for packing large and heavy articles in paperboard cartons.

The advantages of replacing lumber crates and other costly and cumbersome packing containers with paperboard cartons are obvious. During recent years there has been a trend toward use of paperboard for packaging an increasing variety of products. This trend has extended to attempts to efficiently package in paperboard cartons large and heavy mass-produced articles, such as domestic washing machines and other large appliances. An illustration is found in U. S. Patent 2,634,566. However, it has been found that it is difficult to package large and heavy objects in paperboard containers in such a way as to attain a squared and trued filled container. This difficulty largely arises from the problem of closing the bottom closure flaps of the container beneath a contained large and heavy article without lifting the article. The prior art has provided means to effect such closure, but not without attendant bulging and misalignment of the carton, particularly the portions thereof adjacent the lower edge. Such bulging and misalignment seriously reduces the strength and durability of the filled carton and also engenders considerable sales resistance, since the ultimate user expects a neat and "undamaged" package.

The present invention has for its broad object the provision of packaging machinery and procedures to enable a mass-produced heavy and bulky object to be cheaply and efficiently packaged in a paperboard carton without lifting the object to be packaged, while at the same time obtaining a trim, strong and durable final package which is superior to those of the prior art and which is as acceptable from a sales point of view as are the neat small cartons in which small appliances and other objects are conventionally packaged. Furthermore, the invention lends itself to handling of cartons of varying standardized sizes on the same packaging line.

The invention is not only superior from the standpoint of strength and neatness of the final package, but it is also more efficient and economical than the apparatus and procedures of the prior art in that it enables packaging on a production line to be continuously carried out without the necessity of momentarily moving each filled but unclosed package "upstream" in order to initiate closure of the bottom flaps, an awkward and inefficient procedure which has been involved in prior attempts to package bulky heavy articles of the type to which the invention relates.

The present invention contemplates the provision of a loading station provided with drop-out conveyor sections and supplemental retracting article-supporting means, the parts being so interrelated that the article is supported during infolding of the bottom inner carton flaps but interference between the flaps and the loading mechanism is avoided. Supplemental gluing and unfolding operations are carried on in such a way as to secure firm closure by simple mechanical means while avoiding the twisting and carton damage which mere plowing causes when

2

handling extremely heavy objects. Final trueness and neatness of the carton is further assured by compressing and squaring means beyond the gluing and infolding stations. All these elements may cooperate to accommodate articles of various standardized sizes.

The above and other objects and advantages of the invention will become apparent from the following description of one example of the invention. This example illustrates presently preferred means and apparatus and will enable the art to readily practice the invention for purposes of evaluation and trial, either by duplication of the illustrated means and apparatus or models thereof, or by alteration of specific details thereof to provide alternative means embodying the principles and teaching of the invention.

In the drawings:

Figure 1 is a plan view of a packaging machine embodying the invention, with certain parts removed to more clearly illustrate some of the novel features of the invention, particularly at the sealing stations.

Figure 2 is an elevation of the machine shown in Figure 1.

Figure 3 is a sketch of the type of standard paperboard carton which may be employed in the practice of the invention.

Figure 4 is a view on an enlarged scale taken on line 4—4 in Figure 2.

Figure 5 is a plan view on an enlarged scale of the carton-loading station of the machine shown in Figure 1.

Figure 6 is a view taken on line 6—6 in Figure 5.

Figure 7 is an elevation view, partly cut away and on an enlarged scale, of the gluing station of the machine shown in Figure 1.

Figure 8 is a view taken on line 8—8 in Figure 7.

Figure 9 is a detail view on a further enlarged scale of the portion of the apparatus shown on the vertically central left side of Figure 8.

Figure 10 is a view taken on line 10—10 in Figure 8.

Figure 11 is a plan view on an enlarged scale of the gluing station of the machine shown in Figure 1.

Figure 12 is a detail sectional view on an enlarged scale of the upper left-hand portion of Figure 8.

Figure 13 is a view taken on line 13—13 in Figure 12.

Figure 14 is a plan view on an enlarged scale of the sealing stations of the machine shown in Figure 1, certain uppermost elements being cut away or eliminated for purposes of clarity.

Figure 15 is a view taken on line 15—15 in Figure 14.

Figure 15A is a view taken on line 15A—15A in Figure 15.

Figure 16 is a side elevation of upper portions of the apparatus in the vicinity of the sealing stations.

Figure 17 is a plan view on an enlarged scale of the squaring station of the machine shown in Figure 1.

Figure 18 is an elevation view on an enlarged scale of the squaring station of the machine shown in Figure 1.

Figure 19 is a detail view taken on line 19—19 in Figure 18.

In order to facilitate and condense description of the invention, the following discussion of the drawings will specify reference numerals of the various parts and in parentheses will specify by number the figure or figures of the drawings in which such reference numerals may be found. For example, "actuating cylinders 39, 40 (5, 6)" signifies that the particular parts referred to are given the reference numerals 39 and 40 and are to be conveniently found in Figures 5 and 6.

The type of paperboard cartons or containers with which the invention is particularly adapted to be utilized are conventional rectangular cartons which are most economically shipped folded flat with their end flaps folded outwardly in the same planes as the sides of the carton.

3

When such a carton is unfolded or expanded by moving opposing pairs of its sides away from each other, the end flaps most naturally remain in erect or longitudinally extending position. Such a carton 10 (2-9, 13, 15-19) is shown in the drawings. The illustrated carton has a forward side 11, sideward lower flaps 12 and 13, a frontward lower flap 14, a rearward lower flap 15, sideward upper flaps 16 and 17, a frontward upper flap 18, and a rearward upper flap 19. The conformation which such a carton will assume when it is unfolded is illustrated in Figure 3.

Objects to be packaged through use of the invention may comprise various bulky shapes. By way of example, the packaging of washing machines having the general shape of upright cylinders is illustrated. These heavy objects 20 (2, 5) are most preferably mounted on pallets in order to support and distribute their substantial weight. Through the use of the present invention, it has been found possible to employ relatively thin inexpensive paper-board pallets 21 (2, 8).

The illustrated example of the invention comprises a long conveyor, generally extending in the direction indicated by the arrow 25. The conveyor comprises numerous rollers 26 extending transversely of the path on which objects are to be translated along the conveyor. The conveyor also comprises several endless belts 27-31 which either contact the bottom of certain of the rollers 26 to actuate them or are supported thereon in a manner which will be apparent from the several drawings and which will be well-known to those familiar with materials handling and packaging fields.

As indicated in Figure 1, the conveyor 25 leads successively past a carton-loading station A, a gluing station B, first and second sealing stations C and D, and a squaring station E.

Carton-loading station

At the carton-loading station A there is provided a dropaway conveyor portion which comprises conveyor segments 35 and 36 (1, 4-6). These conveyor segments may consist of foreshortened rollers 26 supported in unitary side frames mounted respectively on the shafts 37 and 38. The shafts 37 and 38 are oscillated by the actuating cylinders 39 and 40, to which they are coupled by suitable crank linkages.

At either side of the loading station A are provided oppositely disposed horizontal side plates 43, 44 (1, 4-6). Fixed to the side plates are bushing blocks 45 which slide on fixed guide rods 46. On the bushing blocks 45 are provided bosses 47 which receive yokes 48. The yokes are powered for intermittent oscillation by the actuating cylinders 49 and 50, acting through a suitable crank linkage, in a manner which will be apparent from the drawings. In the illustrated machine, the arrangement of the parts is such that the side plates 43 and 44 are withdrawn entirely out from under the path of passing objects when they are in their withdrawn position and extend substantially transversely across the bottom of such path when they are in their extended position. The conveyor segments 35 and 36 are substantially on a level with the remainder of the conveyor 25 when they are in their raised position.

A motor 52 (11) powers the drive roll for the belt 27.

Gluing station

At the gluing station B there is provided a stand 60 through which extend horizontal frame members 61 and 62, below which are positioned intermediate frame members 63. At points remote from the stand 60, the frame members 61 and 63 and also additional upper horizontal frame members 65 may be supported by arbors 64. The lateral spacing of the members 63 is adjustable, these members being carried by long stud bolts extending from the stand 60 or the arbors 64, as the case may be, this feature being most clearly seen in Figure 8. In each side

4

of the stand 60 there is provided a slot 66 (2, 7, 12). In each slot 66 there is slidably mounted a pillow assembly 70 (2, 12). Rotatably mounted on suitable bushings in each pillow assembly and extending therebetween and therethrough is a shaft 67, upon which are keyed a pair of upper glue rolls 68, each of which has associated with it a glue pan 69. Extending downwardly from the top of the gluing station are the strap assemblies 71 and 72 (7, 8). The strap assemblies 71 support the horizontal frame members 61, in a manner most clearly seen in Figure 7; strap assemblies 72 support the pillow assemblies 70, in a manner most clearly shown in Figure 12. An additional transverse bar 85 extends between the pillow assemblies 70. Hooked straps 86 (7, 8) depend from this bar 85 and support the upper glue pans 69. The strap assemblies 71 and 72 hang from links 73 which are fixed to a shaft 74. The shaft 74 is journaled on the stand 60. The shaft may be oscillated by an actuating cylinder 75, acting through a crank 76. Upward or downward displacement may be governed by the stop nuts 79 which are threaded on a link 81 which is pivoted to the crank arm 76. The stop nuts 79 abut against a boss 79A fixed to the stand 60. Each stop nut is provided with a jam nut 79B. Additional upstanding links 77 are fixed to the shaft 74 and are pivotally fixed at their outer ends to long links 78 (2, 7, 8, 16). Extending as cantilevers inwardly from each pillow assembly 70 are pairs of upper guide rolls 80 which are preferably positioned with respect to the upper glue rolls 68, as indicated in Figures 12 and 13. Journaled on the stand 60 is a lower shaft 82 on which are mounted lower glue rolls 83. Associated with each of the lower glue rolls is a lower glue pan 84. Glue is fed into the upper glue pans by feed lines 87 (8). The glue is emptied from the upper glue pans through overflow lines 88 (7, 8). The overflow lines 88 lead directly to the lower glue pans 84. The lower glue pans are emptied through return lines 89 which lead to a suitable reservoir (not shown). Glue is fed by this reservoir through the feed lines 87 by suitable pumping means (not shown). The glue is continuously circulated through the feed lines 87, the pans 69 and 84, and the return lines 89. Additional drains on the bottom of the glue pans, feeding into the lines 88 and 89, respectively, may be provided, if desired, in order to minimize sedimentation and caking within the glue pans, all as is conventional. Mounted on the stand 60 are pairs of lower guide rolls 92, which are associated with their lower glue rolls 83, in a manner similar to the relationship of the upper glue rolls and guide rolls.

At the end of the shaft 82 on the exterior of the stand 60 is keyed a sprocket 93 (8, 10, 11). This sprocket is driven through a chain 94 by a motor 95 (11). Another sprocket 96 is keyed to the shaft 82 and meshes with a chain 97 (8, 10, 11) which passes over a fixed idler 98 and a spring-loaded idler 99, which is carried on a bell crank 100, pivotally mounted on the stand 60. Keyed to the shaft 67 is a sprocket 101 which engages the chain 97 in the manner shown in Figure 10. It will be clear that a power drive for the shaft 67 is thus maintained, despite raising and lowering of the pillow assemblies 70, for purposes to be later described.

Keyed to the shaft 82 is still another sprocket 101 which, through a chain 102, powers a shaft 103. The drive roll for the belts 28 and 29 is driven from the shaft 103 through the chain 104.

At the end of the horizontal frame members 61 are fixed two upstanding frame arms 106. Extending between these arms are the fixed shafts 107 and 108. The sleeves 109 and 110 are rotatably mounted on the shafts 107 and 108, respectively. A sprocket 111 fixed to the sleeve 109 is coupled by a chain 113 to a sprocket 112 fixed to the sleeve 110. The relative size of the sprockets is such that there is a motion-multiplying drive from the sprocket 111 to the sprocket 112, preferably in the order of about a triple multiplication of rotary motion. Paddle

5

114 is fixed to the sleeve 109 and extends down between the halves of certain of the rollers 116 which have been foreshortened, as mentioned previously. An arm 115 is fixed to and extends radially from the sleeve 110, and a preferably circular paddle or ring 105 is fixed at the outer end of the arm 115. A pair of plowing members 115A extend upwardly from the ends of the horizontal frame members 61. The relation of the parts is such that when a loaded carton 10 contacts the paddle 114 and forces it upwardly as the carton enters the gluing station B, the paddle 105 will be caused to swing downwardly and force the rearmost upper flap 19 forwardly with a swiping motion and will position the flap 19 to be finally inwardly plowed by the plowing members 115A.

Sealing stations

Transversely extending rolls 116 are supported between the horizontal frame members 61 through the gluing station B and on the output side of the gluing station. Three of the rolls 116 are foreshortened (11) to accommodate the paddle 114. The rolls 116 and the rolls 26 are staggered at the sealing stations C and D (14). That is, the rolls are foreshortened so as to extend only over the left-hand side of the conveyor (as viewed in Figure 15) at the station C and only over the right-hand portion of the conveyor at station D. Positioned adjacent the conveyor at sealing stations C and D are vertical squared shafts 120, 121 (2, 14, 15) on which are mounted a plurality of striking members 122—125 each comprising an arm 128 radially extending from the associated shaft 120 or 121 and a canted member 129 disposed with relation to its associated radial arm, in the manner shown in the drawings. The upper striking members, that is, the members 122 and 124, are vertically slidable on the shafts 120 and 121 and are held in adjusted vertical position by the yokes 126. The yokes 126 are hung on straps 146, to be described below, and move upwardly and downwardly therewith. The vertical shafts 120 and 121 are actuated by the actuating cylinders 130, acting through suitable linkages 131. The actuating cylinders 130 are controlled by solenoid-operated valves (not shown) which, in turn, are controlled by the microswitches 132 and 133 (14, 15).

Within the gaps formed by staggering of the conveyor 25 at the stations C and D are located support bars 134 and 134A (14). These members are at the level of the conveyor 25 and serve to prevent containers at the stations C and D from tilting inwardly.

There are preferably provided, at least for the upper sideward flaps of passing cartons, suitable plows 135 and 136 positioned, as shown in the drawings, to guide the flaps from a laterally outwardly folded position to an upward position where they are ready to be most effectively engaged by the striking members 122 and 124. Similar plows may be provided for the lower sideward flaps of passing cartons, but usually such flaps will normally drop to a pendant position without plowing.

The upper reach of the belt 28 terminates at the point 138 (1, 11); the upper reach of the belt 29 terminates at the point 139 (1, 14); the upper reach of the belt 30 starts at the point 140 (1, 14), and the upper reach of the belt 31 starts at the point 141 (1, 14). It is at corresponding points along the length of the conveyor 25 that the rolls 26 and the upper rolls 116 terminate over half the extent of the conveyor width.

Fixed to the long links 78 are bell cranks 145 (2, 16) which are pivotally mounted on the upper frame members 65 and from the output ends of which depend straps 146, which support the horizontal frame members 61 at various point along their length. Two of these cranks in the vicinities of stations C and D (14, 15), one of which two cranks is clearly shown in three views (14, 15, 15A), have their crank arms offset from each other to a degree to enable their output arms which are linked to their associated straps 146 to be positioned over their as-

6

sociated yokes 126. The output arm of the crank 145 shown in Figure 15A may be split as shown in Figure 14, in order to accommodate the square shaft 121. It will thus be clear that actuation of the cylinder 75 will not only vertically adjust the various upper gluing elements at the station B but will also raise and lower the entire length of the frame members 61, which will increase or decrease the vertical spacing between the upper rolls 116 and the conveyor rolls 26 and will also shift the yokes 126 to vertically adjust the upper striking members 122 and 124. The belts 30 and 31, which extend away from the sealing stations, are powered by a motor 148 (17) through a chain drive which is coupled to the drive roll for these belts, as clearly shown in Figure 17.

Squaring station

Extending along the conveyor beyond the termination of the horizontal members 61 are fixed horizontal frame members 170. Supported between these frame members 170 are a series of transverse rolls 171 (1, 18) which depend from short straps 172 (18). Adjacent the squaring station E inwardly of one pair of arbors 64 are provided the shafts 173 (17—19) on each of which is mounted a crank 174 (18) to which is coupled actuating cylinder 175. Fixed to each shaft 173 is an arm 176. Mounted on the associated arbors 64 are links 177 which are parallel to the arms 176. The arms 176 and links 177 are pivoted to the links 178, which are fixed to the squaring bars 179. The actuating cylinders 175 are controlled by solenoid-actuated valves (not shown) which are, in turn, controlled by the microswitch 180 (17) mounted to one side of the conveyor 25 immediately ahead of the location of the squaring bars 179. The links 178 have a short upper bifurcated portion 178A in the particular apparatus illustrated, and the links 176 are pivotally received between the elements 178 and 178A.

Operation

The provision for vertical adjustment of numerous elements by the actuating cylinder 75 makes possible the accommodation of cartons of varying heights. For example, on a washing machine packing line, it is common practice to pack models of two different standard sizes. The height adjustment of the packaging machinery could be accordingly adjusted to accommodate either size package in any order received, either manually or by suitable automatic height-sensing means. It should be noted that it only requires several seconds for any given carton to proceed through the gluing station and the sealing stations C and D to the squaring station E. Accordingly, the machine is free to be vertically adjusted for another height after a very short interval of time following the reception of a machine of a given height. This short time interval is less than that normally required for packing auxiliary equipment in the tops of cartons between the stations A and B.

Objects to be packaged approach on their pallets from the left end of the apparatus as viewed in Figures 1 and 2. Additional drive belts may be provided for this feed, or the feed may be by gravity, a slight slope being provided at the input portion of the conveyor 25, or the feed may simply be manual to allow the backing up of any random number of objects being continuously supplied from a production line. As an object 20, on its pallet, enters the loading station A, the conveyor segments 35 and 36 are in their raised position. The side plates 43 and 44 are extended. After the object is positioned approximately as indicated in Figure 5, the operator grasps the opposite corner of a carton or container 10 and unfolds the container to the conformation shown in Figure 3 and places the container over the object 20. As the operator places the carton on the object, he actuates a manual control which preferably may be any suitable spring-return hydraulic control (not shown) which causes the cylinders 39 and 40 to contract, in turn causing the

conveyor segments 35 and 36 to drop. The flaps 14 and 15 are disposed downwardly in pendant position below the level of the conveyor 25, as shown in Figure 6, while the flaps 12 and 13 are folded outwardly by contact with the plates 43 and 44. At this stage, the full weight of the object is borne by the plates 44. The operator now releases the control to reverse the cylinders 39 and 40 and return the conveyor segments 35 and 36 to raised position. As the conveyor segments 35 and 36 move to their raised position, they force upwardly with them the flaps 14 and 15 and cause these flaps to be folded into closed position against the undersides of the side plates 43 and 44. The operator then actuates a second spring-return control (not shown) to energize the actuating cylinders 49 and 50, causing the plates 43 and 44 to be withdrawn out from under the path of the object 20. When the plates 43 and 44 are withdrawn, the flaps 12 and 13 are fully cleared, and the object 20, together with its container 10 is free to pass along the remainder of the conveyor 25. As the object 20 and container 10 leave the loading station, the second control is released by the operator, causing the plates 43 and 44 to again extend. The loading station A is then ready to receive a succeeding object 20.

In the particular apparatus illustrated, the operator simply pushes the loaded carton 10 off the loading station A, whereupon it contacts the rolls 26 which are energized by the belt 27 and is carried slowly along the conveyor 25 from the station A to the station B. During this part of travel, there may be placed in the top of the container various accessories and literature to accompany the object 20. This is easily accomplished, since the flaps 17—19 are all fully open. As the container 10 approaches the gluing station B, the upper foremost flap 18 is plowed inwardly by the plows 115A. The top front of the container 10 contacts the paddle 114, forcing this paddle rearwardly and upwardly and causing depression of the paddle 105. The paddle 105 swipes forwardly in sliding contact with the outside of the upper rearmost flap 19, shifting this flap to an almost closed position which is maintained until the flap 19 contacts the plows 115A to be fully closed thereby.

Side plows 108 (2) are provided to guide the flaps 16 and 17 to assure that the flaps 16 and 17 enter the gluing station in a laterally outwardly extending position. The flaps 12 and 13 also enter in this position due to their engagement with the top sides of the conveyor 25. The flaps 16 and 17 are glued by the upper glue rolls 68, and the flaps 12 and 13 are glued by the lower glue rolls 83. Each glue roll and its associated guide rolls 80 or 92 are preferably positioned so that a common plane is tangent to each roll or so that the glue roll extends slightly within the plane which is tangent to the pair of associated guide rolls. As each flap passes beyond the leading guide roll and engages the glue roll, it is therefore very slightly bent, and, as it continues and engages the trailing guide roll, it is again very slightly bent in the opposite direction. This provides a highly satisfactory glue-applying action and eliminates any tendency of the flaps to be deformed or sprung or the glue thereon to be splattered by engagement and disengagement with spring-loaded mandrels or similar spring-loaded devices conventionally used to force flaps to be pressed firmly against glue-applying rolls.

As the carton 10, with its sideward flaps now glued, leaves the station B and approaches the station C, it is positioned between the points 138 and 140. At this point, the upper flap 17 is plowed upwardly by the plow 136, and the carton 10 then contacts the microswitch 133, causing the cylinder 130 to be energized and causing the striking members 124 and 125 to swing inwardly. The canted member 129 associated with the striking members 124 and 125 strikes the flaps 17 and 13 with a follow-up action which causes full and complete closure of these flaps. The flap 13 closes "over" the member 134. As

the carton 10 continues to station D, this flap-closing action is duplicated for the flaps 12 and 16. The flap 16 is plowed upwardly by a plow 135. The carton contacts the microswitch 132 causing actuation of the striking members 122 and 123 and accomplishing inward folding of the flaps 16 and 12. The flap 12 closes "over" the member 134A. As the carton leaves each station C or D, the members 134 or 134A are left behind and pass out from "under" the flaps 13 and 12 across the rearmost sides thereof.

All of these above operations occur at either adjusted height of the assembly, depending upon the actuation of the cylinder 75. Thus, leaving the sealing stations C and D may be a relatively short or a relatively tall carton. In either case, the top of the carton will contact the weighted swinging rolls 171 which, as the carton passes under them, will swing upwardly to adjust themselves to whatever height is necessary and at the same time will bear down on the top of the carton 10. As the carton leaves the sealing stations C and D, it ends contact with the microswitches 133 and 132, respectively, causing the various striking members 122—125 to return to their normal position for the reception of a succeeding carton. As the carton 10 enters the squaring station, it strikes the microswitch 180, causing the squaring bars 179 to be shifted outwardly, releasing the carton preceding the carton 10. Driven by the belts 30 and 31, the carton 10 enters between the squaring bars 179 and forces the preceding carton out from therebetween. As the carton 10 fully enters between the sealing bars 179, contact with the microswitch 180 ends, and the sealing bars shift toward closed position. The carton 10 is therefore held in firm and square position by the bars 179 and the weighted rolls 171 until such time as it is displaced by a succeeding loaded carton. The glue is preferably chosen so that its setting time is such that it will still be somewhat fluid after the interval of passage from the station B to the station E but will set by the time the carton is displaced from the squaring station E.

It should be noted that when the carton passes between the stations C and D, that is, when it passes off the belt 29 and onto the belt 30, rapidly shifting the weight of the object and container as a whole from one belt to the other, there is some tendency of the container as a whole to twist. To minimize this tendency, it is advisable to drive the belt 30, and incidentally the belt 31, at a speed very slightly in excess of the speed of the belt 29. At the stations C and D, the carton is prevented from tipping by the horizontal frame members 63, as best indicated in Figure 15.

It will be apparent that many variations in the many details of the illustrated apparatus will be possible without departing from the essential teachings of this disclosure, including the detailed description of one example of the invention set forth above. For example, means may be provided to automatically load the cartons at the station A from a suitable feed chute, or it may be desirable to vary the several plowing arrangements. Accordingly, the invention is not to be limited to these details, but its scope is to be determined by the following claims:

What is claimed is:

1. In a machine for packing large heavy objects in paperboard cartons, a conveyor leading consecutively past a loading station, a gluing station, sealing stations and a squaring station, said conveyor comprising a drop-away portion at said loading station, a pair of oppositely disposed horizontal side plates at said loading station on each side of said conveyor portion, means to extend said side plates toward each other and under the path of passing objects to be packaged and to withdraw said side plates away from each other and out from under the path of passing objects to be packaged, means for dropping away said conveyor portion and then restoring said conveyor portion in conveying position while said side plates are

extended, whereby an object to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor portion is dropped away to allow a carton with open upper and lower flaps to be placed over the object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then re-established in conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of the object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of the carton, means at said sealing stations for closing said upper and lower sideward flaps of the carton, and means at said squaring station for firmly supporting the carton in squared attitude during setting of applied glue.

2. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, a generally horizontal frame extending over said gluing station and said sealing stations, means for vertically translating said frame between first and second levels, means at said gluing station for applying glue to the inner sides of opened upper sideward flaps associated with each passing carton, said last named means being mounted on said frame for vertical translation therewith, means at said gluing station for applying glue to the inner sides of opened lower sideward flaps associated with each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other

half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, said first and second upper striking means each being keyed to its associated vertical shaft but being slidable therealong, yoke means between said first and second upper striking means and said frame for vertically translating said first and second upper striking means with said frame, hanging rotatable rolls extending transversely across said conveyor means between said second sealing station and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls from a first position where the bottom of said rolls are below said first level to a second position where the bottoms of said rolls are above said second level, vertical oppositely disposed pressers at said squaring station on opposite sides of said conveyor means, means for moving said oppositely disposed pressers apart as each successive carton approaches said squaring station and for moving said oppositely disposed pressers toward each other as each successive carton completely enters said squaring station.

3. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said

side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, a generally horizontal frame extending over said gluing station and said sealing stations, means for vertically translating said frame between first and second levels, means at said gluing station for applying glue to the inner sides of opened upper sideward flaps associated with each passing carton, said last named means being mounted on said frame for vertical translation therewith, means at said gluing station for applying glue to the inner sides of opened lower sideward flaps associated with each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, said first and second upper striking means each being keyed to its associated vertical shaft but being slidable therealong, yoke means between said first and second upper striking means and said frame for vertically translating said first and second upper striking means with said frame, hanging rotatable rolls extending transversely across said conveyor means between said second sealing station and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls from a first position where the bottoms of said rolls are below said first level to a second position where the bottoms of said rolls are above said second level, means at said squaring station for firmly supporting each received carton in squared attitude during setting of applied glue.

4. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, means at said loading station for infolding under passing objects to be packaged the foremost and rearmost lower flaps of cartons which are dropped over such objects and thereupon allowing translation of each object and its carton toward said gluing station while at all times supporting such objects from beneath, a generally horizontal frame extending over said gluing station and said sealing stations, means for vertically translating said frame between first and second levels, means at said gluing station for applying glue to the inner sides of opened upper sideward flaps associated with each

passing carton, said last named means being mounted on said frame for vertical translation therewith, means at said gluing station for applying glue to the inner sides of opened lower sideward flaps associated with each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, said first and second upper striking means each being keyed to its associated vertical shaft but being slidable therealong, yoke means between said first and second upper striking means and said frame for vertically translating said first and second upper striking means with said frame, hanging rotatable rolls extending transversely across said conveyor means between said second sealing station and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls from a first position where the bottoms of said rolls are below said first level to a second position where the bottoms of said rolls are above said second level, vertical oppositely disposed pressers at said squaring station on opposite sides of said conveyor means, means for moving said oppositely disposed pressers apart as each successive carton approaches said squaring station and for moving said oppositely disposed pressers toward each other as each successive carton completely enters said squaring station.

5. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, means at said loading station for infolding under passing objects to be packaged the foremost and rearmost lower flaps of cartons which are dropped over such objects and thereupon allowing translation of each object and its carton toward said gluing station while at all times supporting such objects from beneath, a generally horizontal frame extending over said gluing station and said sealing stations, means for vertically translating said frame between first and second levels, means at said gluing station for applying glue to the inner sides of opened upper sideward flaps associated with each passing carton, said last named means being mounted on said frame for vertical translation therewith, means at said gluing station for applying glue to the inner sides of opened lower sideward flaps associated with each

13

passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, said first and second upper striking means each being keyed to its associated vertical shaft but being slidable therealong, yoke means between said first and second upper striking means and said frame for vertically translating said first and second upper striking means with said frame, hanging rotatable rolls extending transversely across said conveyor means between said second sealing station and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls from a first position where the bottoms of said rolls are below said first level to a second position where the bottoms of said rolls are above said second level, and means at said squaring station for firmly supporting each received carton in squared attitude during setting of applied glue.

6. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said front-

14

ward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, hanging rotatable rolls extending transversely across said conveyor means between said second sealing station and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls, vertical oppositely disposed pressers at said squaring station on opposite sides of said conveyor means, means for moving said oppositely disposed pressers apart as each successive carton approaches said squaring station and for moving said oppositely disposed pressers toward each other as each successive carton completely enters said squaring station.

7. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper

15

and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, means at said sealing stations for closing the upper and lower sideward flaps of the carton, hanging rotatable rolls extending transversely across said conveyor means between said sealing stations and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls, means at said squaring station for firmly supporting each received carton in squared attitude during setting of applied glue.

8. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to

16

transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, means at said sealing stations for closing the upper and lower sideward flaps of the carton, hanging rotatable rolls extending transversely across said conveyor means between said sealing stations and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls, vertical oppositely disposed pressers at said squaring station on opposite sides of said conveyor means, and means for moving said oppositely disposed pressers apart as each successive carton approaches said squaring station and for moving said oppositely disposed pressers toward each other as each successive carton completely enters said squaring station.

9. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with

each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, means at said sealing stations for closing the upper and lower sideward flaps of the carton, hanging rotatable rolls extending transversely across said conveyor means between said sealing stations and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls, and means at said squaring station for firmly supporting each received carton in squared attitude during setting of applied glue.

10. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then to a gluing station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station.

11. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position,

whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, a generally horizontal frame extending over said gluing station and said sealing stations, means for vertically translating said frame between first and second levels, means at said gluing station for applying glue to the inner sides of opened upper sideward flaps associated with each passing carton, said last named means being mounted on said frame for vertical translation therewith, means at said gluing station for applying glue to the inner sides of opened lower sideward flaps associated with each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, said first and second upper striking means each being keyed to its associated vertical shaft but being slidable therealong, and yoke means between said first and second upper striking means and said frame for vertically translating said first and second upper striking means with said frame.

12. In a machine for packing heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, means at said loading station for infolding under passing objects to be packaged the foremost and rearmost lower flaps of cartons which are dropped over such objects and thereupon allowing translation of each object and its carton toward said gluing station while at all times supporting such objects from beneath, a generally horizontal frame extending over said gluing station and said sealing stations, means for vertically translating said frame between first and second levels, means at said gluing station for applying glue to the inner sides of opened upper sideward flaps

associated with each passing carton, said last named means being mounted on said frame for vertical translation therewith, means at said gluing station for applying glue to the inner sides of opened lower sideward flaps associated with each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, said first and second upper striking means each being keyed to its associated vertical shaft but being slidably therealong, yoke means between said first and second upper striking means and said frame for vertically translating said first and second upper striking means with said frame.

13. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its car-

ton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons.

14. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, means at said loading station for infolding under passing objects to be packaged the foremost and rearmost lower flaps of cartons which are dropped over such objects and thereupon allowing translation of each object and its carton toward said gluing station while at all times supporting such objects from beneath, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton.

15. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means

leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, means at said sealing stations for closing the upper and lower sideward flaps of the carton, hanging rotatable rolls extending transversely across said conveyor means between said sealing stations and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls, vertical oppositely disposed pressers at said squaring station on opposite sides of said conveyor means, and means for moving said oppositely disposed pressers apart as each successive carton approaches said squaring station and for moving said oppositely disposed pressers toward each other as each successive carton completely enters said squaring station.

16. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means

leading past a carton loading station and then past a gluing station, sealing stations and a squaring station, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons, means at said sealing stations for closing the upper and lower sideward flaps of the carton, hanging rotatable rolls extending transversely across said conveyor means between said sealing stations and said squaring station, hanging means for said rolls comprising journal means yieldingly upwardly translatable against the weight of said rolls, and means at said squaring station for firmly supporting each received carton in squared attitude during setting of applied glue.

17. In a machine for packing large heavy objects in

paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton.

18. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, means at said loading station for infolding under passing objects to be packaged the foremost and rearmost lower flaps of cartons which are dropped over such objects and thereupon allowing translation of each object and its carton toward said gluing station while at all times supporting such objects from beneath, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is con-

structed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, plow means at said sealing stations for initiating inward folding of the upper and lower sideward flaps associated with each passing carton, first upper striking means and first lower striking means comprising a first pair of striking means at said first sealing station for completing inward folding of one upper and one lower sideward flap associated with each passing carton and second upper striking means and second lower striking means comprising a second pair of striking means at said second sealing station for completing inward folding of the other upper and other lower sideward flap associated with each passing carton, said first pair of striking means being mounted for in-and-out movement around a first vertical shaft, said second pair of striking means being mounted for in-and-out movement around a second vertical shaft, said pairs of striking means each being powered for in-and-out movement by their associated vertical shaft, means to oscillate each of said vertical shafts in response to positioning of approaching cartons.

19. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the

25

lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves.

20. In a machine for packing large heavy objects in paperboard containers of rectangular shape and provided with four lower and four upper end flaps, conveyor means leading past a carton loading station and then past a gluing station and sealing stations, said conveyor means comprising a drop-away conveyor portion at said loading station, said conveyor portion comprising conveyor segments mounted for dropping-away movement to below the level of said conveyor means and for restoring movement back to conveying position, a pair of oppositely disposed horizontal side plates cantilevered on each side of said conveyor portion at said loading station, said side plates being mounted for extending movement toward each other and under the path of passing objects to be packaged and for withdrawing movement away from each other and out from under the path of passing objects to be packaged, means for dropping away and then restoring said conveyor segments to conveying position during extension of said side plates and for withdrawing and then extending said side plates during positioning of said conveyor segments in conveying position, whereby objects to be packaged may pass into said loading station on said conveyor to be thereupon supported on said side plates while firstly said conveyor segments drop away to allow a carton with open upper and lower flaps to be

26

placed over each object with the frontward and rearward lower flaps of the carton disposed downwardly and the sideward lower flaps of the carton disposed laterally outwardly and while secondly said conveyor portion is then restored to conveying position to force said frontward and rearward lower flaps upwardly to closed position against the underside of said side plates, and said side plates then withdraw to allow translation of each object and its carton away from said loading station for closing of the foremost and rearmost upper carton flaps of the carton between said loading station and said gluing station, means at said gluing station for applying glue to the inner sides of upper and lower sideward flaps of each passing carton, said sealing stations comprising a first sealing station at which said conveyor means is constructed to transversely extend under and support only one first half of each passing carton to accommodate infolding of the lower sideward flap associated with the other half of the carton, a second sealing station at which said conveyor means is constructed to transversely extend and support only the other half of each passing carton to accommodate infolding of the lower sideward flap associated with the one first half of the carton, guide means to prevent tilting of each passing carton while it is supported by said conveyor means only under one or the other of its halves, means at said sealing stations for closing said upper and lower sideward flaps of each passing carton.

No references cited.