May 11, 1948. R. GUYER ET AL 2,441,410

METHOD AND APPARATUS FOR CLOSING CARTONS

Filed Feb. 5, 1945 4 Sheets-Sheet 1

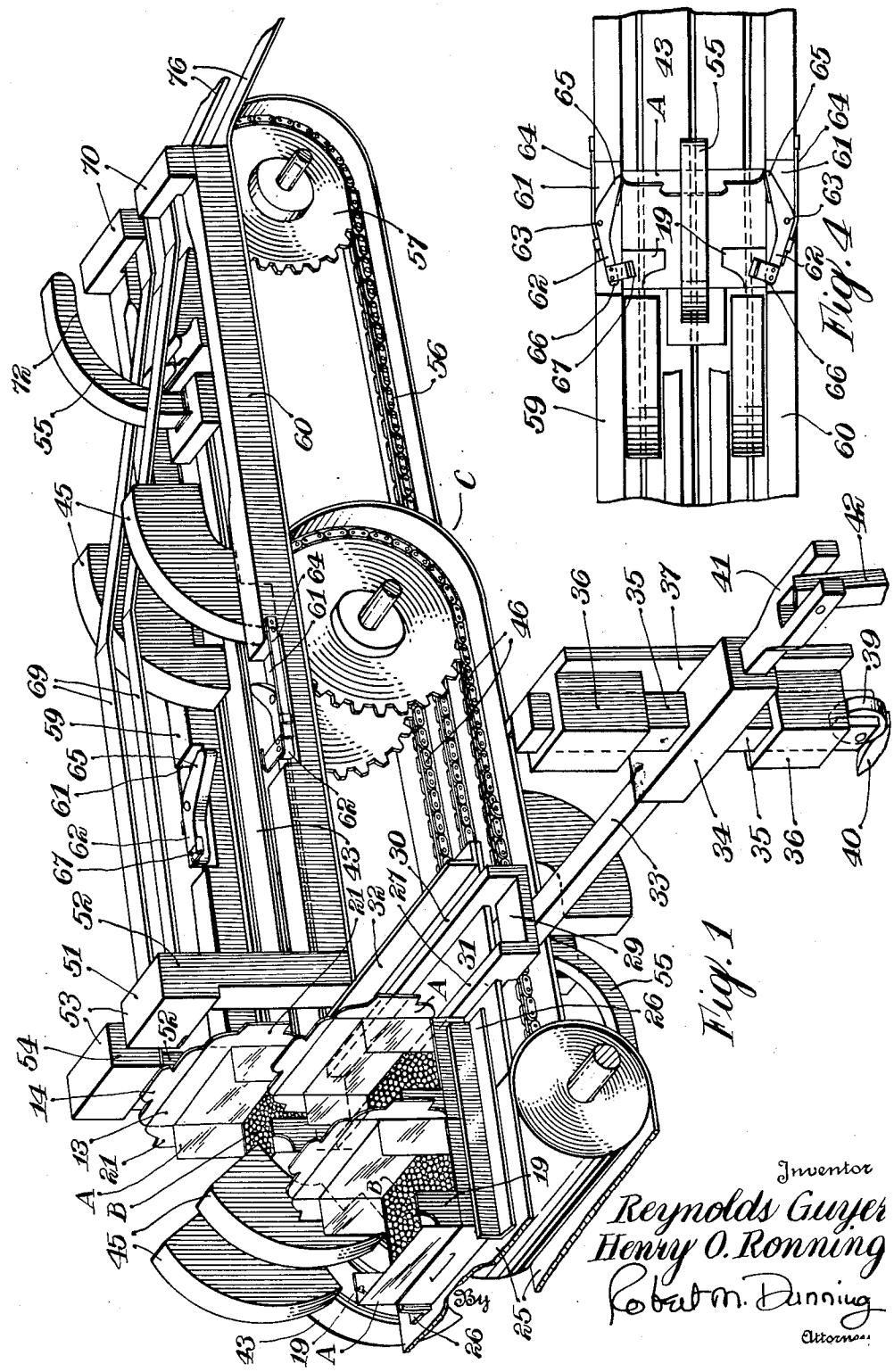


Fig. 1

Fig. 4

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METHOD AND APPARATUS FOR CLOSING CARTONS

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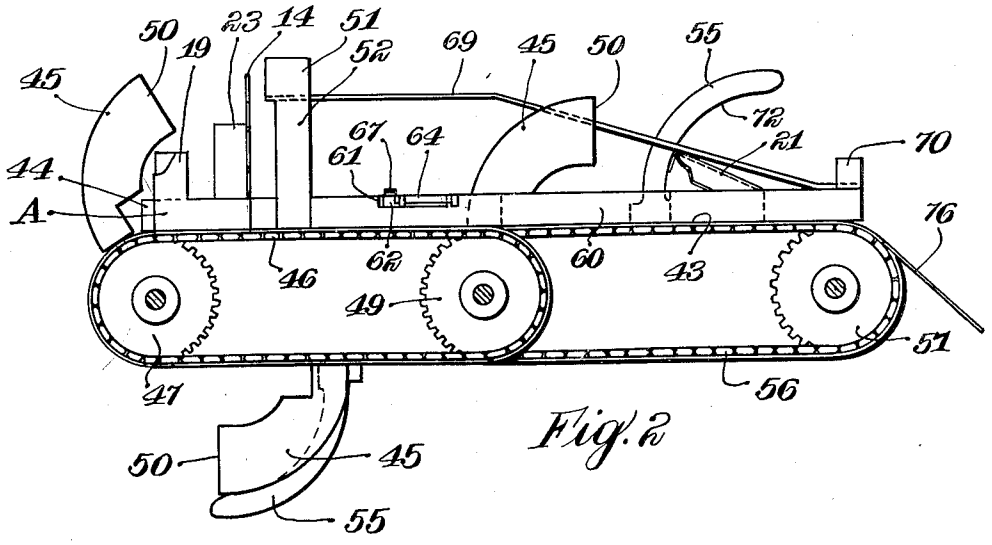


Fig. 2

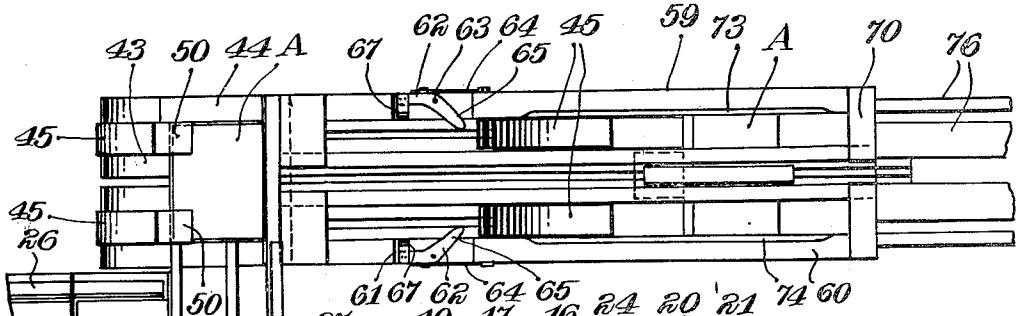


Fig. 3

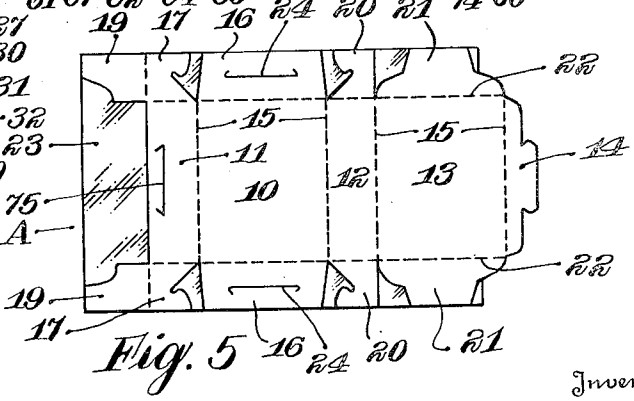


Fig. 5

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METHOD AND APPARATUS FOR CLOSING CARTONS

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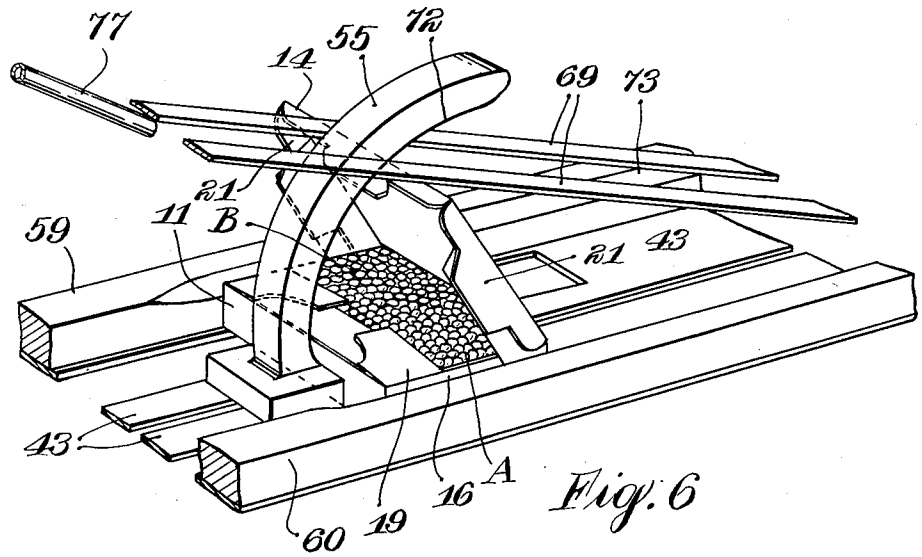


Fig. 6

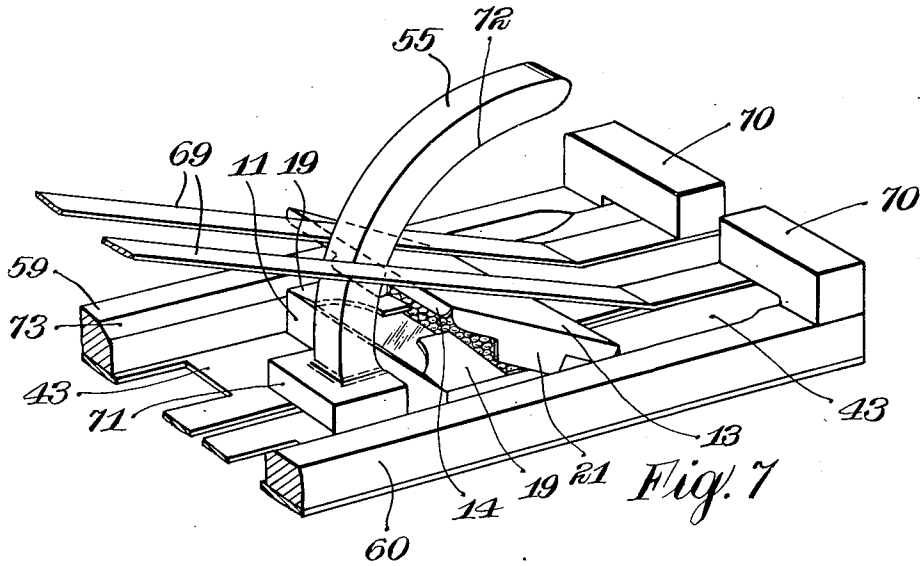


Fig. 7

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METHOD AND APPARATUS FOR CLOSING CARTONS

Filed Feb. 5, 1945 4 Sheets-Sheet 4

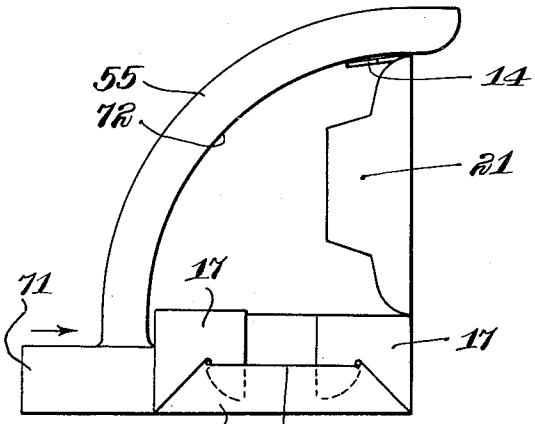


Fig. 8

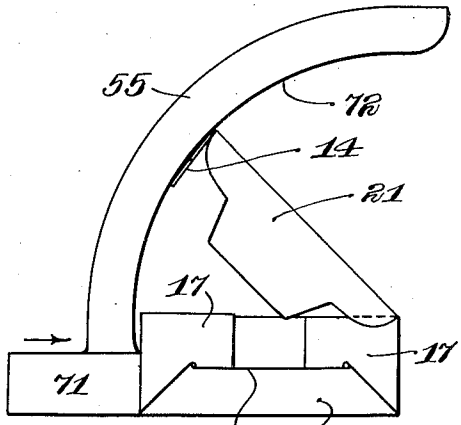


Fig. 9

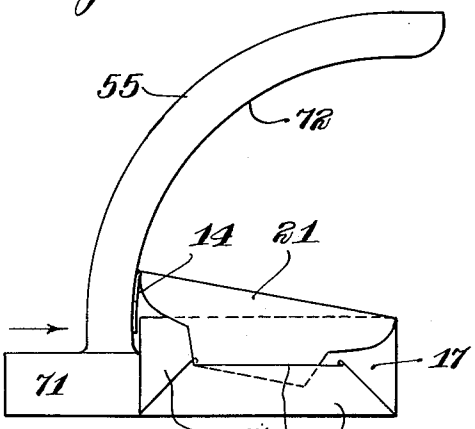


Fig. 10

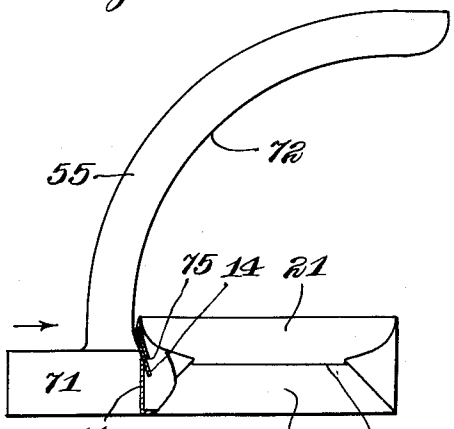


Fig. 11

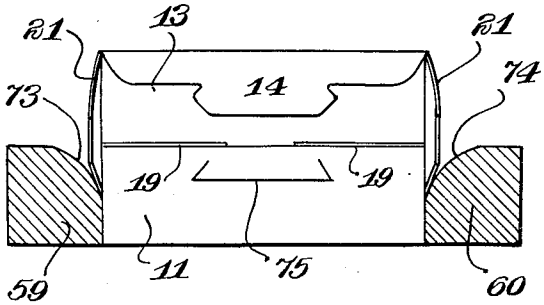


Fig. 12

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UNITED STATES PATENT OFFICE

2,441,410

METHOD AND APPARATUS FOR CLOSING CARTONS

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Application February 5, 1945, Serial No. 576,304

25 Claims. (Cl. 93—7)

1

Our invention relates to an improvement in method and apparatus for closing cartons, wherein it is desired to provide a means of closing set up cartons having an integral cover thereupon.

In the packaging of frozen foods and the like cartons have been developed which include an inner liner of Cellophane or similar material. These cartons include a tray-shaped bottom and an integral top which may be folded down to act as a closure for the top of the carton. The product contained is placed in the open containers, the liner forming a water tight tray which prevents the leakage of moisture from the carton. The top is provided with closing flaps which usually engage in slots in the side walls of the carton. These closing flaps are inserted through the flaps in such a way to lie between the inner surface of the carton and the adjacent portions of the liner.

While it has been common practice to close such cartons manually, this procedure requires considerable time due to the fact that the liner must be folded to overlie the contents of the package, the top must next be folded to overlie the liner covered contents, and the cover flaps must be simultaneously inserted in their respective slots. It is the intention of the present invention to provide a means and method of closing these cartons mechanically so that the packages may be completed in a shorter period of time.

One of the difficulties which exists in the closing of such cartons lies in the fact that the front and rear walls of the carton may fold inwardly to some extent so as to assume an angle of less than ninety degrees relative to the bottom of the carton. Most ordinary carton closing devices would therefore require time to fold these carton walls toward one another, thus distorting the carton and causing the top to become misplaced. It is therefore an object of the present invention to provide a closing apparatus which maintains the front and rear walls of the carton in their correct upright position during the closing operation.

The carton closing method and apparatus is particularly useful in closing cartons having a liner which extends upwardly from the front wall of the carton and is supported by a pair of carton flaps hingedly secured to opposed side walls of the carton. The liner is also attached to the top

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of the carton which is hingedly secured to the rear wall of the carton. In the closing operation it is first desirable to fold the portion of the liner projecting upwardly from the front wall of the carton down to overlie the contents of the carton. The two upstanding flaps on the side walls of the carton are then folded down to overlie the portion of the liner covering part of the carton contents. The carton cover is then folded down to overlie the entire open upper end of the carton and the flaps hingedly attached along three edges of the cover are inserted into slots in the corresponding side walls of the carton.

A feature of the present invention resides in the provision of a means for folding the portion of the liner projecting upwardly from the front wall of the carton into a position overlying the carton contents. This means comprises a plunger member which engages the liner and folds it into the proper position.

A further feature of the present invention resides in providing a plunger element which engages the cover in upright position and forces the same through a frame which acts to pre-break the various flaps hinged to the cover.

A further feature of the present invention resides in means for moving the carton beneath folding arms or means and folding the cover down to overlie the carton contents. This carton moving means includes a means for holding the front and rear walls of the carton in upright position during the folding operation so that the front and rear walls will remain parallel.

A further feature of the present invention lies in the provision of a means for folding the upright flaps supporting a portion of the liner inwardly so as to lie flat over the others before the cover is closed.

A further feature of the present invention lies in the provision of a carton closing apparatus which is continuous in its operation and which completes the entire carton closing operation.

These and other objects and novel features of our invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of our specification:

Figure 1 is a perspective view showing diagrammatically a carton closing apparatus.

Figure 2 is a side elevational view of the struc-

ture shown in Figure 1 with the carton feed mechanism omitted.

Figure 3 is a top plan view showing diagrammatically the carton closing mechanism.

Figure 4 is a top plan view of a portion of the closing mechanism showing the manner of operation of the flap folding apparatus.

Figure 5 is a diagrammatic view of the carton blank before the formation of the carton.

Figure 6 is a perspective view showing one step in the closing operation of the carton.

Figure 7 is a view similar to Figure 6 showing a later stage in the carton closing operation.

Figure 8 is a side elevational view showing diagrammatically the manner in which the cover of the carton is held in position during the folding operation.

Figure 9 shows a subsequent step in the folding of the carton cover.

Figure 10 shows still a later step in the carton closing operation.

Figure 11 is a view of the carton in closed position, a portion of the carton being broken away to illustrate diagrammatically the manner in which one cover flap engages in the front wall of the carton.

Figure 12 is an elevational view of the carton in partially folded position showing the manner in which the side flaps on the cover are guided into locked position.

The carton forming mechanism is designed for closing cartons such as that diagrammatically illustrated in Figure 5 of the drawings. The carton A includes a bottom 10, a front wall 11, a rear wall 12, a cover 13 and a front cover locking flap 14 all connected along parallel fold lines 15. Carton side walls 16 are foldably connected to the bottom 10. Locking flaps 17 having integral upstanding side flaps or ears 19 foldably connected thereto are attached to the front wall panel 11. Locking tabs 20 are foldably connected to the rear wall 12. Cover locking flaps 21 are secured to the cover panel 13. The various flaps 16, 17, 18, 20, and 21 are all connected to their respective panels along parallel fold lines 22. A sheet of lining material, preferably water-proof, extends from the ends of the flaps 19 throughout most of the length of the blank. This sheet 23 is secured in place by any suitable means.

The carton is set up by folding the side walls 16 upwardly into right angular relation with the bottom 10. The front and rear flaps 11 and 12 are folded upwardly relative to the bottom 10 in such a way that the locking flaps 17 and 20 engage in the slots 24 in the side wall panels 16. The ends of the side wall panels 16 are beveled slightly to permit the front and rear walls 11 and 12 to fold beyond vertical position so as to permit engagement of the locking flaps 17 and 20 in the slot. These locking flaps hold the walls from folding outwardly beyond right angular relation with the bottom.

When the cartons have been thus set up they appear as best illustrated in Figures 1 and 2 of the drawings. The upstanding ears or flaps 19 hold the liner 23 extending upwardly from the front wall of the carton. The other end of the liner is secured to the undersurface of the top 13 and the liner is folded down to overlie the contents B of the cartons, the liner overlying the entire surface of the contents.

The cartons A are fed along a slip belt 25, being guided in their travel by side guides such as 26. The forward progress of the cartons is blocked by engagement with one side of the blade 27 of a plunger 29. The blades 27 and 30 of the plunger 29 extend through slots in a table 31 onto which the cartons may be forced by the slip belt 25 when the plunger is not in carton blocking position. When the plunger 29 is out of engagement with the foremost carton A of the line of cartons, this forward carton may be forced against an end stop 32 blocking all forward progress of the cartons.

The plunger 29 is supported by a plunger rod 33 which is supported for transverse as well as vertical movement. The plunger rod 33 extends through a bearing 34 which is provided with a pair of vertically extending guides 35 supported in bearings 36 mounted upon a suitable frame or mounting plate 37. The lower end of the downwardly projecting guide 35 is bifurcated to support a cam roller 39 engageable with a cam 40. In the operation of the apparatus rotation of the cam 40 causes vertical movement of the guide 35, the bearing 34 and the plunger and its supporting mechanism.

The end of the plunger rod 33 is bifurcated at 41 to receive a lever 42 by means of which the plunger arm 33 and the plunger 29 supported thereby may be reciprocated. A slotted table 43 is provided adjacent the table 31 to receive individual cartons forced by the plunger 29 from the table 31 to the table 43. A stop 44 is provided extending upwardly from the table 43 so as to limit the lateral movement of the cartons A. Thus by the plunger means 29 each carton in turn is forced from a line of movement controlled by the slit belt 25 to a parallel line of movement along which the individual cartons are closed.

In order to properly close the cover flaps 14 and 21 secured hingedly along three edges of the top 13 it is desirable that these cover flaps be prebroken along their respective fold lines. Furthermore, before the carton cover is closed it is necesary to fold the upwardly projecting lining at the front edge of the carton over the contents. To accomplish the desired result we provide a plunger which engages the inner or under surface of the cover adjacent the score lines connecting this cover with the respective flaps. The plunger also acts to fold down the liner projecting upwardly from the front wall of the cartons. The plunger mechanism referred to is in the form of a pair of spaced arms 45 which bear upon the slotted table 43 and which extend over the contents of the carton and engage the vertically extending cover 13 of each carton in starting position. The arms 45 are carried by a pair of parallel chains or other conveying elements 46 which are supported by pulleys or sprockets 47 and 49. The arms 45 are moved so that their forward faces 50 engage the inner or undersurface of the carton top 13 near the score lines so as to force the carton through the folding frame 51, which acts to fold the flaps 14 and 21 about their respective fold lines.

The folding frame 51 is preferably made in two parts each comprising an upright standard portion 52 and a laterally extending upper portion 53. The laterally extending frame portions 53 are spaced to provide a central slot 54 for a purpose which will be later set forth in detail. The lateral extending portions 53 project forwardly over the vertical posts 52 so that these frame portions 53 engage the flap 14 prior to the engagement of the flaps 21 by the frame posts 52. This individual folding of the front cover flap 14 is beneficial as less pressure is required to force the cover through the folding frame 51 when the flap 14 is not folded at the same time as the flaps 21.

As the frame 51 is of but slightly larger dimension than the top cover 13, the passage of the cover 13 through the frame acts to fold the flaps 14 and 21 forwardly, thus acting to pre-break these flaps along their respective fold lines.

The plunger arms 45 follow the path of the chains 46, being supported thereby. Thus the arms 45 serve the double purpose of folding downwardly the upwardly projecting forward portion of the liner 23 and plunging the cover 13 through the folding frame 51.

After the cover 13 has been plunged through the frame 51, it is desirable to disengage the cover from the plunger arms 45 so that the cover may be folded down over the others of the cartons. In order to accomplish this result we provide guiding horns 55 which are narrow relative to the width of the carton and which are movable along a path between the arms 45. The horns 55 are supported on the surface of the slotted table 43 and are propelled by the chain 56 which extends between the spaced chains 46. The chain 56 is supported at one end by a sprocket coaxial with the sprockets 47 and is supported at its other end by a sprocket 57. Only the sprocket 57 is visible in the drawings, but it will be understood that the remaining sprocket is coaxial with and identical to the sprockets 47 supporting the chains 46. The chain 56 travels at a speed considerably in excess of the speed of the chains 46. Furthermore the speed of the chain 56 is so timed with relation to the speed of the chains 46 that a horn 55 will engage the forward wall 11 of each carton 10 after it is plunged through the frame 51 and will force the carton ahead of the arms 45 due to the greater speed of the horns 55. Thus while each carton is in engagement with the arms 45 at the time the cartons are plunged through the frame 51, within a short distance of travel the cartons are sufficiently in advance of the arms 45 to permit the folding of the cover 13 down upon the contents of the package. It will be noted that the arms 45 travel through a shorter distance than the horns 55, the sprockets 47 and 49 being substantially closer together than the sprockets supporting the chain 56.

After each carton has passed through the folding frame 51 the forward portion of the liner will have been folded down over the contents of the carton. However, the flaps or ears 19 still project upwardly from the opposite sides of the carton. In order to fold these flaps 19 downwardly we provide the folding mechanism best illustrated in Figures 1 and 4 of the drawings.

Side guides 59 and 60 extend upwardly from the table 43 to guide the cartons along the table. Notches 61 are provided in these guides 59 and 60 in opposed relation. Bell crank levers 62 are supported by vertical pivots 63 to the guides 59 and 60, these bell crank levers 62 being urged in one extreme position by springs 64. The springs 64 tend to hold the levers 62 in the position best illustrated in Figures 1 and 3 of the drawings so that the rear ends 65 of these levers extend in the path of the cartons travelling along the table 43. As the cartons pass the levers 62 the ends 65 thereof are pivoted outwardly by engagement with the side walls of the carton A. This engagement forces the other ends 66 of the levers inwardly toward the rear ends of the cartons. Clips 67 are supported by the lever ends 65 and these clips engage against the upstanding flaps or ears 19 folding these elements wardly to overlie the package contents.

In order to fold the cover 13 downwardly to overlie the contents of the carton a pair of spaced folding rails or guides 69 extend from the laterally extending frame portions 53 to a pair of laterally extending supports 70 at the outlet or discharge end of the carton closing mechanism C. The laterally extending supports 70 are spaced to permit the guiding horn 55 to pass therebetween and are supported at the proper height so that the rails or guides 69 fold the cover flat upon the top of the carton before discharging the carton. Figures 6 and 7 as well as Figures 1 and 2 show a carton in various stages of the closing operation. The rails or guides merely engage the end of the cover 13 hinged to the flap 14 so as to fold the cover downwardly as it travels along the slotted table 43.

The guides or horns 55 are of the proper shape to hold each carton in proper form during the closing thereof. The front wall 11 of the carton is against the base 71 of the horn 55 at all times during the propulsion of the carton by the horn. At the same time, however, the horn is provided with a substantially arcuated inner surface 72 which permits guiding the hinging movement of the cover. As previously explained the ends of the side walls 16 of the carton are cut away or are tapered so that the rear wall 12 may fold past vertical position. Nothing except the weight of the contents of the carton prevents such folding beyond vertical position. Accordingly the drag or friction between the cover and the folding guides 69 would tend to fold the rear wall inwardly thus distorting the carton and preventing the proper engagement of the various locking flaps 14 and 21. To prevent such distortion the inner surface 72 of the horns 55 is arcuated with the fold line between the rear wall 12 and the cover 13 as the center of arcuation. Thus the rear wall 12 is held from inward folding beyond vertical position by engagement of the fold line between the cover 13 and the flap 14 with the inner surface 72 of the horn 55.

The side guides 59 and 60 are provided with beveled or curved edges 73 and 74 as best illustrated in Figure 12 of the drawings. As previously described the flaps 21 are folded along their respective fold lines by passage of the carton through the fold frame 51. As the carton folds downwardly as illustrated by the successive steps shown in Figures 8, 9, 10 and 11, the flaps 21 engage the curved surface 74 and are bent inwardly thereby, thus entering the slots 24 in the side walls 16. The folding of the side walls into upright position creates a natural opening into which the flaps 21 may engage due to the tendency of the side walls to return to flat position. This causes the portion of the side walls between the slots 24 and the fold lines 22 to bulge outwardly, thereby facilitating the insertion of the flaps 21 thereinto.

The portion of the flaps 14 and 21 extending through the cooperating slots 75 and 24 respectively, lie between the liner 23 and the inner surface of the carton. The flap 14 is guided into its slot 75 by the curvature of the horn 55, the flap 14 following the curve of this guide and being guided directly into the slot.

At the outlet end of the carton closing apparatus inclined guides 76 may be provided so that the sealed and closed cartons will travel faster than the horns 70 and thus move out of the path of movement thereof. In the event the cartons are to be filled with material having a high liquid content it is similarly possible to remove the

cartons from the machine by a transverse or diagonal movement so as to move the various cartons out of the path of the horn or guide 55. In the latter event the cartons will be maintained upright so as to eliminate the danger of spilling the liquid contents of the cartons.

As best illustrated in Figure 6 of the drawings the liner 24 is held in place against the inner or under surface of the carton top 13 and against the side flaps 21 by a blast of air blown through a nozzle 11. This nozzle is directed toward the inner surface of the top as the same moves into closed position and a wide enough blast is provided to hold the liner portions against the side flaps 21. This insures the fact that the liner extends over the side walls 16 of the carton as the carton is closed.

In accordance with the patent statutes, we have described the principles of construction and operation of our method and apparatus for closing cartons, and while we have endeavored to set forth the best embodiments thereof, we desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of our invention.

We claim:

1. A carton closing apparatus for use in closing cartons having a bottom, side walls extending upwardly therefrom, and a cover hingedly secured to one of the side walls, a means for moving said cartons in a direction perpendicular to said one side wall, means on said moving means engaging the free edge of the cover to hold the free edge within a radius of curvature about the fold line of the cover when the attached side wall is perpendicular to the carton bottom, and means for folding the cover downwardly to overlie the open top of the carton.

2. A carton folding apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, and a cover hingedly secured to one of said side walls, the apparatus including a means for moving said cartons in a direction perpendicular to said one side wall, a means on said moving means engageable with the free edge of the cover, said last named means having an arcuated surface having its center of arcuation substantially on the fold line connecting the cover to the adjacent side wall when the side wall is perpendicular to the carton bottom, and means for folding the cover downwardly to overlie the open top of the carton.

3. A carton closing apparatus for use in closing cartons having an open topped body and a cover hingedly secured to one wall of said body, the apparatus including a means for moving said cartons in a direction perpendicular to said one side wall, a means on said moving means engageable with the side of the carton opposite that supporting the cover, said last named means including a curved member having an inner surface engageable with the free edge of the cover and having an arcuated surface, the center of arcuation of which lies substantially on the fold line connecting the carton to the cover, and means for folding said cover downwardly while the free edge thereof is in engagement with said arcuated surface.

4. A carton closing apparatus for use with cartons having an open top, and having a cover hingedly secured to one of the side walls adjacent the top thereof, the apparatus including a means engageable with the side of the carton opposite that supporting the cover, means for moving said engaging means to move the carton along a predetermined path, said engaging means including a curved member having an arcuated inner surface engageable with the free edge of the cover, the center of arcuation of said surface being substantially on the line of hinge between the carton and the cover, and means engageable with said cover as said carton moves along said predetermined path to fold the cover over the open top of the carton.

5. A carton closing apparatus for cartons having a bottom and side walls and an open top, a cover hingedly secured to one of the side walls, and locking flap means hingedly secured to the cover, the apparatus comprising a frame through which the carton may pass, means engaging said carton to force the same through said frame, said frame acting to fold said locking flap with respect to said cover, means engageable with the free edge of said cover, said means having an arcuated surface engageable with said free edge, said arcuated surface having its center of arcuation substantially on the fold line connecting the carton cover to its side wall, means for folding said cover downwardly to overlie the open top of the carton, and means for guiding said locking flap to overlie a portion of a side wall of said carton.

6. A carton closing apparatus for use in combination with cartons having a bottom and side walls extending upwardly therefrom, and a cover hingedly secured to one of said side walls, said cover having locking flap means connected thereto along fold lines, said apparatus including plunger means engageable with one surface of said cover, a frame having dimensions slightly greater than said carton and cover through which the carton and cover may be forced by said plunger means, said frame folding said locking flap means along their respective fold lines, and means for pivoting said cover to overlie the open top of said carton.

7. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom and a cover hingedly secured to one of said side walls, said cover having locking flap means hingedly secured thereto, the apparatus comprising plunger means engageable with one surface of said cover and restricted to within the confines of the cover, a frame through which said cover and carton may be forced, said frame engaging said locking flap means to fold the same with respect to said cover, and means for folding said cover to overlie the open top of said carton.

8. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, and a cover hingedly secured to one of said side walls, said cover having locking flap means projecting from a plurality of edges thereof, said apparatus comprising plunger means engageable with one surface of said carton, a frame through which said carton and cover may be forced by said plunger means, said frame engaging said locking flaps to fold the same relative to said cover, said frame means so constructed as to fold certain of said locking flap means before others of said folding locking flap means, and means for folding said cover to overlie the open top of the carton.

9. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, a cover hingedly secured to one of said side walls, a liner within said carton

having one end thereof extending upwardly above the level of the carton side walls, and a pair of flaps hingedly secured to opposed side walls to support the upstanding end of said liner, the apparatus comprising plunger means engageable with a surface of said cover, a frame through which said cover and carton are forced by said plunger, said frame folding said locking flap means relative to said cover, means for folding said upstanding flaps inwardly of the carton to overlie the contents thereof, and means for folding the cover to overlie the contents and said folded flaps.

10. A carton closing apparatus for use with cartons having a bottom, upstanding side walls on said bottom, and a top hingedly secured to one of said side walls, said apparatus including plunger means engageable over the carton contents with the inner surface of the cover, a frame through which said cover and carton are forced by said plunger, means engaging said carton after it has travelled through said frame, said means including a curved surface engageable with the free edge of the cover, said curved surface being substantially arcuated and having the center of arcuation substantially on the fold line between said cover and its supporting carton side wall when said carton side wall is perpendicular to the base, and means for folding said cover while the free edge thereof is engaged with said curved surface.

11. A folding apparatus for cartons having open top carton bodies having a cover hingedly secured along the top edge of a side thereof, and locking flap means hingedly secured to said cover, the apparatus including plunger means engageable over the contents of the carton with the inner surface of said cover, means supporting said plunger to move the same and the carton engaged thereby, a frame through which said carton and cover may pass, said frame engaging said locking flap means to fold the same relative to said cover, a second means engageable with said carton after it has passed into said frame, said second means engageable with the carton to move the same, means movably supporting said second means, an arcuated surface on said second means engageable with the free edge of the cover, the center of arcuation of said arcuated surface being substantially on the fold line between said cover and said carton when the side wall to which the cover is attached is substantially perpendicular to the bottom, and means for folding the cover to overlie the top of the carton while the free edge of the cover is engaged by said arcuated surface.

12. A carton closing apparatus for closing cartons having a bottom, side walls extending upwardly therefrom, a cover hingedly connected to one side wall, and locking flap means hingedly secured to said cover, said apparatus including plunger means engageable with the inner surface of said cover to move said cover and carton, a frame through which said cover and carton may pass, said plunger forcing said carton and cover through said frame, said frame engaging said locking flap means to fold the same relative to said cover, a second means engaging said carton after the same has passed through said frame, said second means including an arcuated surface engageable with the free edge of said cover, the center of arcuation of said arcuated surface lying substantially on the fold line connecting said cover to its side wall, and means for folding said cover to overlie the contents of the carton.

13. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, a cover hingedly secured to one of said side walls, locking flap means hingedly secured to said cover, a liner within said carton having one end projecting upwardly along one surface of said cover and being secured thereto, the other end of said liner projecting upwardly from the opposite side of said carton, upstanding ears on two opposed sides of said carton adjacent the side of said carton supporting said cover, said ears supporting said other end of said liner, the apparatus comprising plunger means engageable with said one surface of said cover, a frame through which said cover and carton may be forced by said plunger, said frame engaging said locking flap means to fold the same relative to said cover, means engaging the upwardly extending portion of said liner on the side of the carton opposite that supporting the cover, said last named means folding said liner to overlie the carton contents, a second means engageable with said carton to move the same, said second means having an arcuated surface engageable with the free edge of said cover, the center of arcuation of said surface lying substantially on the fold line connecting said cover to said carton when the adjacent side wall is perpendicular to the bottom, means for folding said upstanding ears to overlie the contents of the carton, and means for folding the cover to overlie the contents of the carton and said ears while the free edge of the cover is in engagement with said arcuated surface.

14. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, a cover hingedly connected to one side wall, and locking flap means secured to said cover, said apparatus comprising an elongated table along which the cartons may move, plunger means engageable with the top of the carton while the top is in substantially vertical position, said plunger means comprising a pair of spaced arms movable longitudinally of said table, a frame through which said carton and cover may be forced by said spaced arms, a pair of cover folding guides extending along the path of movement of said carton over said table to fold the cover downwardly, and carton engaging means movable longitudinally of the table at a speed greater than the speed of said plunger means engaging said carton after the same has passed through said frame, said second carton engaging means moving said cartons forwardly of said plunger means so that the cover may be folded down by said folding guides.

15. A carton closing apparatus comprising an elongated table, means for feeding said cartons onto said table, plunger means comprising a pair of spaced arms movable longitudinally of said table, a frame extending upwardly from said table through which the carton may be forced by said plunger means, a carton engaging means movable between said spaced arms comprising said plunger means, said engaging means travelling at a greater speed than said plunger means and engaging the carton to force the same forwardly of said plunger means, and means for folding said cover downwardly as the carton is forced longitudinally of the table by said engaging means.

16. A carton closing apparatus for use in closing cartons having an open top body and a cover hingedly secured thereto, the apparatus comprising an elongated table along which cartons may pass, means for feeding cartons singly onto said table with the cover thereof in open position,

plunger means engageable with a surface of said cover to move the carton and cover along the table, a frame through which the carton and cover may be forced by said plunger means, said plunger means comprising a pair of spaced arms, means for moving said plunger means along said table, carton moving means engageable with said carton and movable between the spaced arms of said plunger means, said carton moving means forcing said carton forwardly of said plunger means, means for folding the cover of each carton down over the body thereof as it is carried along the table by said carton moving means, and means for guiding said cartons out of the path of said carton moving means.

17. A carton closing apparatus for use with cartons having an open topped body and a cover hingedly secured thereto, the cover having oppositely disposed locking flaps secured thereto, and the carton body having cooperating slots into which said locking flaps may extend, the apparatus including an elongated table along which said cartons may move, plunger means engageable with said cover to move said cover and carton along said table, a frame through which said carton and cover are forced by said plunger means, said frame folding said opposed locking flaps relative to said cover, carton moving means engaging said carton after the same has passed through said frame, said carton moving means carrying said carton away from said plunger means so the cover thereof may be folded, means for folding the cover down to overlie the open top of the carton, and means for guiding the locking flaps on said cover into the slots in the side walls of said carton during the closing operation.

18. A carton closing apparatus for cartons having an open topped body, a cover hingedly secured to one wall thereof, slots in the remaining carton walls, and locking flaps on the edges of said cover engageable in said slots, an elongated table along which the carton may move, plunger means engageable with the inner surface of said cover to move the cover and carton longitudinally of said table, a frame through which said carton and cover may pass, said frame engaging said locking flaps to fold the same relative to the cover, carton moving means engageable with the carton after the same has passed through said frame, said carton moving means carrying said carton away from said plunger means along said table, means engageable with the cover to fold the same to overlie the open top of the carton, guide means for engagement with the locking flaps on opposite sides of the carton to guide these flaps into their respective slots, and guide means engageable with the locking flap on the free edge of the carton cover to guide this locking flap into engagement with its corresponding slot.

19. An apparatus for closing a carton having a bottom, side walls extending upwardly therefrom, and a top hingedly secured to one of said side walls, the apparatus including a means for moving the carton in a path perpendicular to said one side wall, means engaging the free edge of said cover and holding said free edge within a predetermined radius, and means for folding the cover downwardly into substantially parallel relation with the bottom.

20. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, a cover hingedly secured to one of said side walls, said cover having locking flap means hingedly secured thereto, and a liner within the carton projecting above said side walls, the apparatus including plunger means engageable with the liner to fold the liner over the carton contents, said means engaging the undersurface of the carton cover, a frame into which said cover and carton may be forced by said means, said frame engaging said locking flap means to fold the same with respect to said cover.

21. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, a cover hingedly secured to one of said side walls, said cover having locking flap means hingedly secured thereto, and a liner within the carton projecting above said side walls, the apparatus including plunger means engageable with the liner to fold the liner over the carton contents, said means engaging the undersurface of the carton cover, a frame into which said cover and carton may be forced by said means, said frame engaging said locking flap means to fold the same with respect to said cover, and means for folding the cover to overlie the open top of said carton.

22. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, and a cover hingedly secured to one of said side walls, said cover having locking flap means hingedly secured thereto, and a liner within said carton and extending above said side walls, the apparatus comprising plunger means engageable with the liner to fold the same over the carton contents, said plunger means being engageable with one surface of said cover, a frame into which said cover and carton may be forced, said frame engaging said locking flap means to fold the same with respect to said cover, and means engaging said cover upon further movement of the carton to fold said cover over the carton contents.

23. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, and a cover hingedly secured to one of said side walls, said cover having locking flaps hingedly secured thereto along three edges thereof, and a liner within the carton and projecting above said side walls, the apparatus comprising means engageable with the liner on the side of the carton opposite said one wall to fold the liner over the carton contents, said means being engageable with one surface of said cover, a frame into which said cover and carton may be forced, said frame engaging said locking flaps to fold the same with respect to said cover.

24. A carton closing apparatus for use with cartons having a bottom, side walls extending upwardly therefrom, and a cover hingedly secured to one of said side walls, said cover having locking flaps hingedly secured thereto along three edges thereof, and a liner within the carton and projecting above said side walls, the apparatus comprising means engageable with the liner on the side of the carton opposite said one wall to fold the liner over the carton contents, said means being engageable with one surface of said cover, a frame into which said cover and carton may be forced, said frame engaging said locking flaps to fold the same with respect to said cover, and means for folding said cover to overlie the open top of said carton.

25. The method of closing a carton having a bottom, side walls extending upwardly therefrom, a cover hingedly secured to one of the side walls, and locking flaps issuing from the free edges of said cover, the method consisting of moving the carton in a direction perpendicular to said one wall of the carton, holding the said free edge of

the cover within the radius of movement about the hinge line between the cover and said one wall while moving the carton, and engaging the top of the carton to hinge the same downwardly.

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