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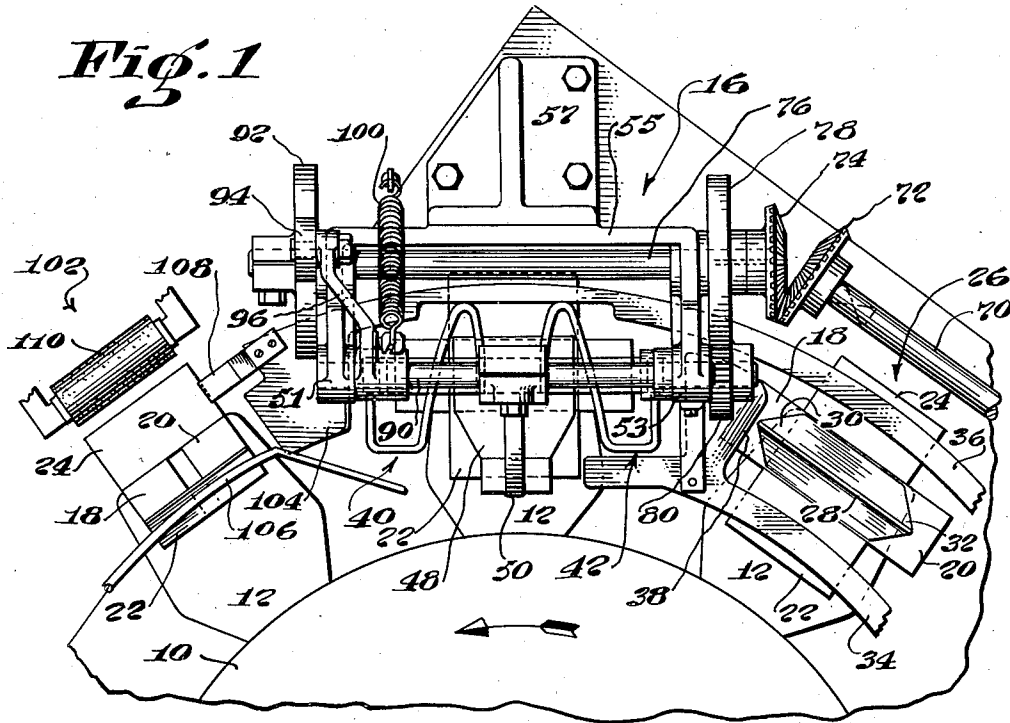
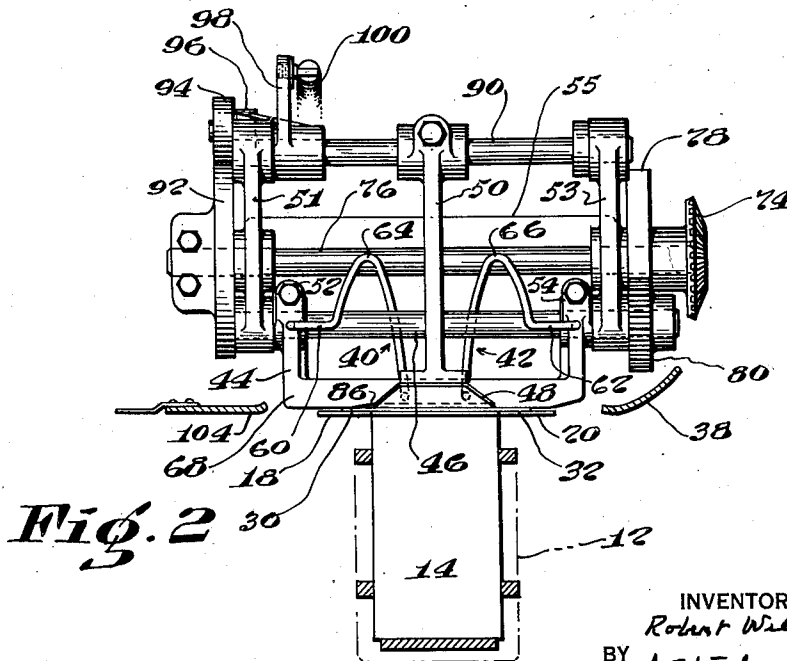
R. W. VERGOBBI

2,328,758

PACKAGING MACHINE

Filed Jan. 15, 1942

2 Sheets-Sheet 1



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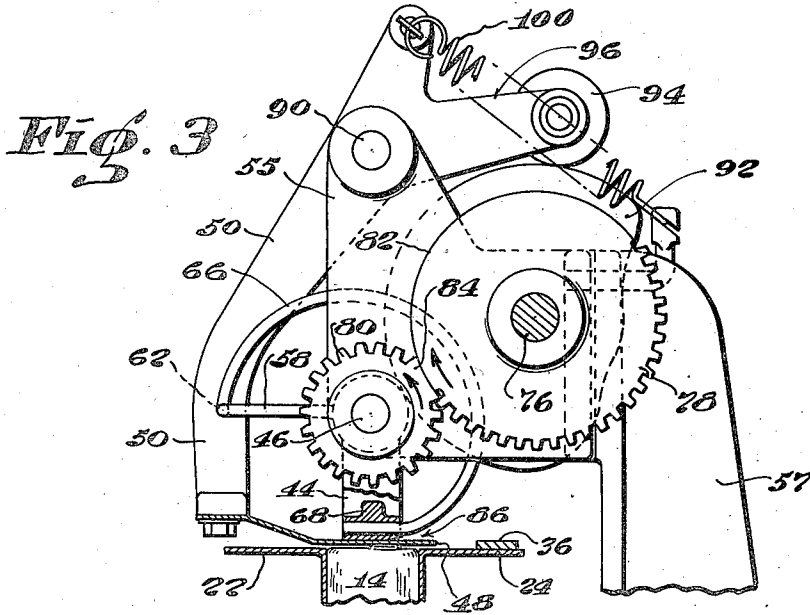
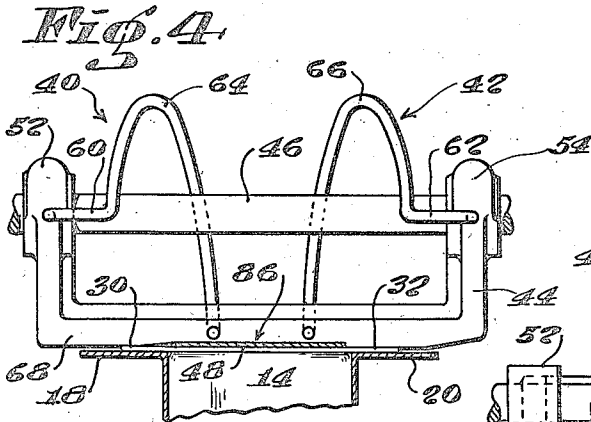
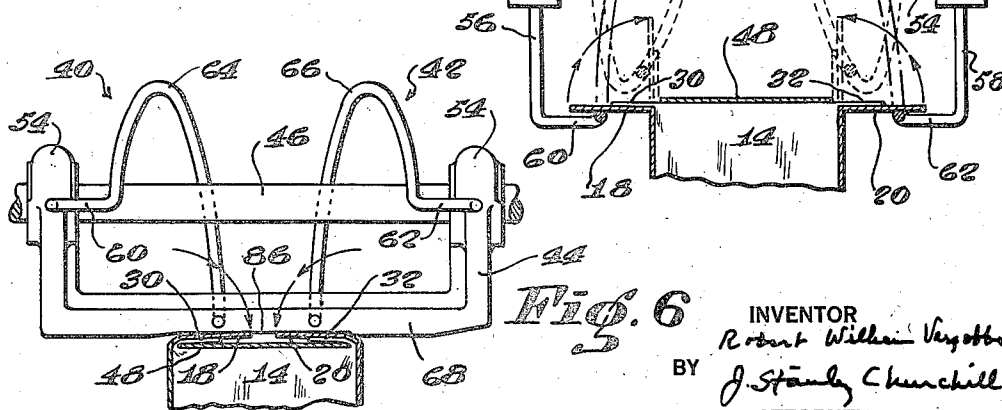
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PACKAGING MACHINE

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,328,758

## PACKAGING MACHINE

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14 Claims. (Cl. 93—6)

This invention relates to a packaging machine.

One object of the invention is to provide a novel and improved packaging machine in which provision is made for closing the flaps of a carton in a novel and improved manner.

Another object of the invention is to provide a novel and improved packaging machine having provision for closing the top flaps of a carton provided with an extended liner by which adjacent portions of the liner top closure may be folded in with the top flaps of the carton in a novel and superior manner.

With these general objects in view, and such others as may hereinafter appear, the invention consists in the packaging machine, and in the various structure, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a plan view of the flap folding mechanism of the present packaging machine, a sufficient portion of the machine being shown to enable the invention to be understood; Fig. 2 is a front elevation of the flap folding mechanism shown in Fig. 1; Fig. 3 is an end view of the same, some of the parts being shown in cross section; and, Figs. 4, 5 and 6 are detail views in front elevation of the flap folding mechanism shown in different positions of operation.

In general, the present invention contemplates a packaging machine of the type having provision for filling, closing and sealing containers such as cartons and particularly lined cartons, having novel and improved mechanism for performing the top closing operation. In the illustrated embodiment of the invention the carton liner is provided with an elongated top closure formed by bringing together two opposed walls of the extended mouth portion of the liner and spreading outwardly the other two opposed walls to form a straight line closure having an upstanding portion extending across the top of the carton and forming triangular tabs extending over the outspread end flaps of the carton. It will be understood that the lining top closure shown is merely illustrative of various closures having portions extended over the closing flaps of the carton. Provision is made for flattening down the upstanding portions of the lining top closure to substantially the level of the top of the carton and for thereafter folding inwardly the carton flaps together with the portions of the lining closure extended thereover in a novel manner

such as to produce an efficient and superior top closure for the carton.

Referring now to the drawings, in general, the invention has been illustrated as embodied in a packaging machine having provision for filling a lined carton, providing a top closure for the liner, and then closing the top flaps of the carton, only sufficient portions of such machine being illustrated herein as will enable the present invention to be understood. The filling mechanism and the mechanism for producing the lining top closure may comprise any of the usual instrumentalities now embodied in commercial packaging machines and have been omitted from the illustrated machine since, of themselves, they form no part of the present invention.

The illustrated packaging machine is provided with a rotatable disc 10 having a plurality of pockets or carriers 12 mounted thereon in which the cartons 14 are supported. The rotatable disc 10 is adapted to be intermittently rotated to present the cartons into operative position with relation to the various instrumentalities forming part of the packaging machine for performing the various operations to produce a filled and sealed package. In the operation of the packaging machine, before arriving at the flap closing station indicated generally at 16, the lined carton may be filled, and the mouth of the liner provided with its elongated top closure while the carton is supported in the carrier 12. During these operations the top flaps of the carton comprising the end flaps 18, 20 and side flaps 22, 24 are preferably maintained in an outspread condition as illustrated at station 26 wherein 28 represents the upstanding portion of the lining top closure, and, 30, 32 represent triangular portions or tabs formed by the closure and which extend over the end flaps 18, 20 respectively. Stationary rails 34, 36 serve to hold the side flaps 22, 24 in their outwardly extended position, and, during movement of the carton from station 26 to station 16 the upstanding portion 28 of the lining closure is folded down flat by engagement with a curved portion 38 of the rail 34 extended in the path of movement of the top of the carton so that when the carton arrives at station 16, the lining closure is flush with the top of the carton, all four flaps of the carton are extended outwardly at substantially right angles to the body of the carton, and the triangular tabs 30, 32 of the lining closure are flattened out and extended over the end flaps 18, 20 of the carton preparatory to being folded in with the end flaps as will now be described.

As herein shown, the end flap folding mechanism 16 comprises a pair of helically or spirally wound folding members 40, 42 symmetrically arranged and supported in a U-shaped member 44 mounted to rotate with a cross shaft 46, and arranged to cooperate with a flat folding plate or retaining member 48 carried on an arm 50 adapted to be rocked to present the plate 48 into and out of cooperating relationship with the helical folding members 40, 42 and with the top of the carton. The cross shaft 46 is journaled in arms 51, 53 of a supporting bracket 55 extending from a standard 57 attached to the machine frame.

As shown in Figs. 2 and 3, the helical folding members 40, 42, which may comprise bent wires or rods, are held at one end in hubs 52, 54 of the U-shaped member 44 and are provided with radially extended portions 56, 58, horizontally extended portions 60, 62 parallel to the shaft 46, and helically or spirally wound portions 64, 66 extended through substantially 270 degrees and terminating in and secured to the connecting bar 68 of the U-shaped member 44. The spirally wound portions 64, 66, as best shown in Fig. 3, are arranged to wind about the center of the shaft 46 and to follow a scroll-shaped path thereabout gradually decreasing in distance from the center of the shaft 46 from a maximum distance adjacent the horizontally disposed portions 60, 62 to a minimum distance adjacent the connecting bar 68.

It will be observed, see Fig. 5, that the radially extended portions 56, 58 are spaced apart to straddle the carton and its outstretched end flaps 18, 20, and that, in operation, as the folding members 40, 42 are rotated in a counterclockwise direction, viewing Fig. 3, the horizontally disposed portions 60, 62 pass under the flaps 18, 20, and, as the rotation is continued, engagement of the helically extended portions 64, 66 with the end flaps operates to progressively turn the flaps through 180 degrees, first raising them up into a vertical position, as shown in dotted lines in Fig. 5, and then folding them inwardly to dispose the flaps in their closed position as shown in Fig. 6.

The shaft 46, carrying the helically wound folding members 40, 42, is arranged to be rotated through one revolution for each cycle of operation of the machine through connections from a continuously driven shaft 70 forming a part of the driving mechanism of the packaging machine. As herein shown, the shaft 70 is provided with a bevel gear 72 arranged to mesh with a bevel gear 74 fast on a cross shaft 76 also carried in the arms 51, 53 of the supporting bracket 55. The continuously rotated shaft 76 is connected to the shaft 46 by gearing designed to rotate the shaft 46 intermittently in timed relation to the movement of the carriers 12 so as to effect one revolution of the shaft 46 during the idle period of operation of the carrier 12. As herein shown a gear 78 fast on the continuously rotated shaft 76 is arranged to mesh with a pinion gear 80 fast on the shaft 46, the larger gear 78 being twice the diameter of the pinion 80 and being provided with a blank portion 82 for substantially one-half of its circumference. The blank portion 82 is arranged to be received in a concave portion 84 formed in the pinion 80 to lock the pinion in its idle position, as shown in Fig. 3, during the carrier moving cycle of operation of the machine. The number of teeth in the remaining one-half circumference of the larger

gear 78 corresponds to the number of teeth in the pinion 80 so that in operation, when the gear teeth are in mesh the pinion is rotated one complete revolution and then comes to rest and remains in its locked position until a succeeding carton is brought into position to be closed.

From the description thus far, it will be observed that in operation, the carton is moved into folding position while the helical folding unit is at rest, as illustrated in Fig. 3, with the connecting bar 68 in its lowermost position. Thus, the bar 68 serves to hold the folded portion 28 of the lining closure down in its flat condition, and, to retain the flaps 18, 20 and the triangular portions 30, 32 in their extended position. As the carton is thus held, and before the helical folding unit starts to rotate, the flat plate 48 is arranged to be rocked under the connecting bar 68 and on top of the carton in order to retain the folded portions of the lining closure intermediate the flaps in their folded condition during the flap folding operation. It will be observed that the undersurface of the connecting bar 68 is provided with a grooved portion 86 arranged to receive and provide clearance for the plate 48 as it is rocked between the underside of the bar and the top of the carton.

The width of the folding plate 48 is substantially the same as the width of the body of the carton so as to provide a firm edge at each side of the carton over which the end flaps and the extended triangular portions of the lining closure may be folded, as above described, whereby to provide a sharp crease at the folded edges of the latter. As herein shown, the arm 50 is mounted fast on a shaft 90 rockingly mounted in the bracket 55 and is arranged to be rocked through connections including a cam 92, fast on the continuously driven shaft 76, and a cooperating cam roller 94 carried on an arm 96 secured to the shaft 90. A second arm 98 formed integrally with the arm 96 is connected by a spring 100 to the standard 57 in order to retain the roller 94 in engagement with its cam 92.

In the operation of the device, after the plate 48 has been rocked into operative position, as above described, the helical folding unit is rotated to fold the end flaps and the extended portions of the lining over the plate, the latter remaining in its operative position until the fold is completed so that when the folding unit has made its revolution the plate 48 is interposed between the top of the carton and the folded flaps. At this time, the connecting bar 68 is again in its lowermost position as shown in Fig. 6 and operates to retain the end flaps in their folded position while the plate 48 is rocked out of the flaps and away from the carton preparatory to movement of the carton to the next succeeding station 102 where provision is made for applying adhesive to the flaps for the sealing operation.

As the carton passes from the end flap folding station 16 to the adhesive applying station, it is arranged to pass under a stationary guide plate 104 to retain the end flaps in their folded position whereupon the inner side flap 22 is engaged by a stationary folding member, such as the bent wire 106, which operates to raise such side flap and to partially fold it into its closed position as indicated at station 102 during the movement of the carton while the outer side flap 24 is retained in its extended position by the plate 104 and an extension 108 thereof.

The adhesive applying mechanism may be of any usual or preferred form and as herein shown

includes an adhesive applying roller 110 adapted to be moved into and out of engagement with the extended side flap 24 whereupon, during subsequent movement of the carton, the side flap 22 is completely folded down on top of the end flaps 18, 20 and the adhesively coated flap is closed by a similar stationary folding member to complete the sealing of the carton. Thereafter, pressure may be applied to the top of the carton to firmly set the sealed flaps and the carton is then discharged from the machine.

From the above description, it will be observed that the present flap closing mechanism, as embodied in a packaging machine, enables a carton having extended lining closure portions to be closed by folding in such extended portions with the adjacent flaps of the carton in a simple, efficient and rapid manner, forming a neat appearing and efficient top closure for the carton.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention what is claimed is:

1. In a packaging machine, in combination, carton supporting means arranged to support a carton with its top flaps extended outwardly substantially at right angles to the body of the carton, and flap folding means comprising a rotatable member arranged to engage the underside of a flap and upon rotation to turn it through substantially 180 degrees to close the flap upon the carton.

2. In a machine of the character described, in combination, flap folding means comprising a rotatable helical member arranged to engage the extended flap of a carton and operative upon rotation to turn the flap through at least 90 degrees to close the same upon the carton.

3. In a packaging machine, in combination, carton supporting means, flap folding means including a helical member, and means for rocking said member to cause it to engage the extended flap of a carton and to move the same at least 90 degrees into its closed position.

4. In a packaging machine, in combination, carton supporting means arranged to support a carton with its top flaps extended outwardly substantially at right angles to the body of the carton, and flap folding means comprising a pair of rotatable helical members arranged to engage the underside of a pair of opposed flaps and upon rotation to turn them through substantially 180 degrees into their closed positions.

5. In a packaging machine, in combination, carton supporting means arranged to support a carton with top flaps extended, flap folding means comprising a rotatable helical member arranged to engage an extended flap and upon rotation to turn it through at least 90 degrees into its closed position, and a folding plate having an edge disposed adjacent the turning point of said flap and over which the flap is turned during the closing operation.

6. In a packaging machine, in combination, carton supporting means arranged to support a carton with its flaps extended, flap folding means including a pair of rotatable helical members arranged to engage a pair of opposed flaps and to turn them through at least 90 degrees into their closed position, and a flat plate having edges disposed adjacent the turning point of said opposed flaps and over which said flaps are turned during the closing operation.

7. In a packaging machine, in combination, carton supporting means arranged to support a lined carton with flaps extended outwardly substantially at right angles to the body of the carton and having portions of a preclosed lining extended over said flaps, flap folding means including a pair of rotatable helical members arranged to engage the underside of each of a pair of opposed flaps and upon rotation to turn them together with the portions of the lining extending thereover through substantially 180 degrees into closed position, and a retaining member movable into position on top of the carton to retain those portions of the lining closure intermediate the flaps in a flat condition during the closing operation.

8. In a machine of the character described, in combination, flap folding means comprising a rotatable member arranged to engage an extended flap of a carton and upon rotation to turn it through at least 90 degrees into closed position, and a flat member having an edge disposed adjacent the turning point of said flap and cooperating with said rotary folding member during the closing operation.

9. In a packaging machine, in combination, carton supporting means arranged to support a lined carton with flaps extended and having portions of the lining folded on top of the carton, flap folding means including a pair of rotatable helical members arranged to engage a pair of opposed flaps and upon rotation to turn them through at least 90 degrees into closed position, and means for retaining the folded lining portions on top of the carton in their flat condition during the flap closing operation.

10. In a packaging machine, in combination, a movable carrier provided with a plurality of carton holding members each arranged to hold a carton with its top flaps extended, flap folding means comprising a pair of helical members arranged to engage two opposed flaps and upon rotation to turn them at least 90 degrees to close them upon the carton, and means operated in timed relation to said carrier for rotating said flap folding members one revolution to perform the folding operation when a carton is presented thereto.

11. In a packaging machine, in combination, an intermittently movable carrier provided with a plurality of carton holding pockets each arranged to support a carton with top flaps extended, flap folding means comprising a pair of helical members arranged to engage two opposed flaps and to close them upon a carton held in said pocket, and means for rotating said flap folding members in timed relation to the operation of said movable carrier including a continuously driven shaft, and a pair of cooperating gears provided with locking surfaces arranged to hold said folding members stationary during movement of said pockets and to permit said flap folding members to make one revolution when said carrier is stationary.

12. In a packaging machine, in combination, carton supporting means arranged to support a carton with top flaps extended, flap folding means including a pair of helical members arranged to engage a pair of opposed flaps and to turn them into their closed position, and means for intermittently rotating said folding members including a continuously rotated shaft, and a pair of cooperating gears provided with locking surfaces arranged to hold said folding members

stationary during substantially one-half cycle of operation of said continuously moving shaft and to effect rotation of said folding members through one revolution during a succeeding half cycle of operation of said shaft.

13. In a packaging machine, in combination, carton supporting means arranged to support a lined carton with its flaps extended outwardly and having portions of a lining extended over two opposed flaps of the carton, flap folding means including a pair of rotatable members arranged to engage said two opposed flaps and upon rotation to turn them together with the extended lining portions into closed position, and a relatively thin flat plate movable into position on top of the carton to retain those portions of the lining closure intermediate the flaps in a

flat condition and to provide a firm edge adjacent the turning point of each of said opposed flaps and their extended lining portions over which the latter are folded during the closing operation.

5 14. In a packaging machine, in combination, movable carton supporting means, and flap folding means cooperating therewith to close flaps of successive cartons presented thereto, including an oscillatory flap turning member for en-  
10 gaging the outer surface of an extended flap and upon oscillation to turn the flap through at least 90 degrees to a closed position, and means operatively connected with the movable carton supporting means for effecting oscillation of said  
15 flap turning member.

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