

Dec. 10, 1940.

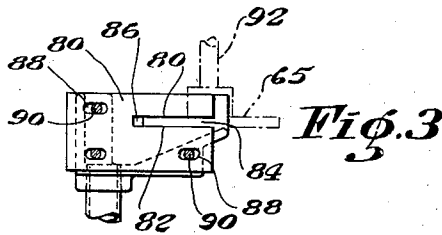
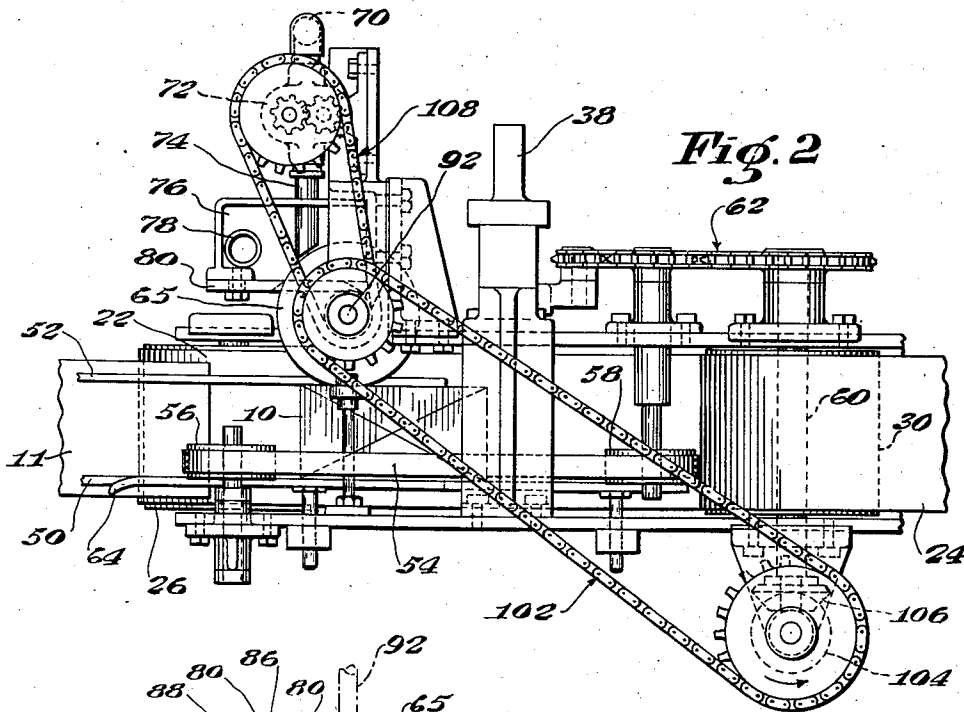
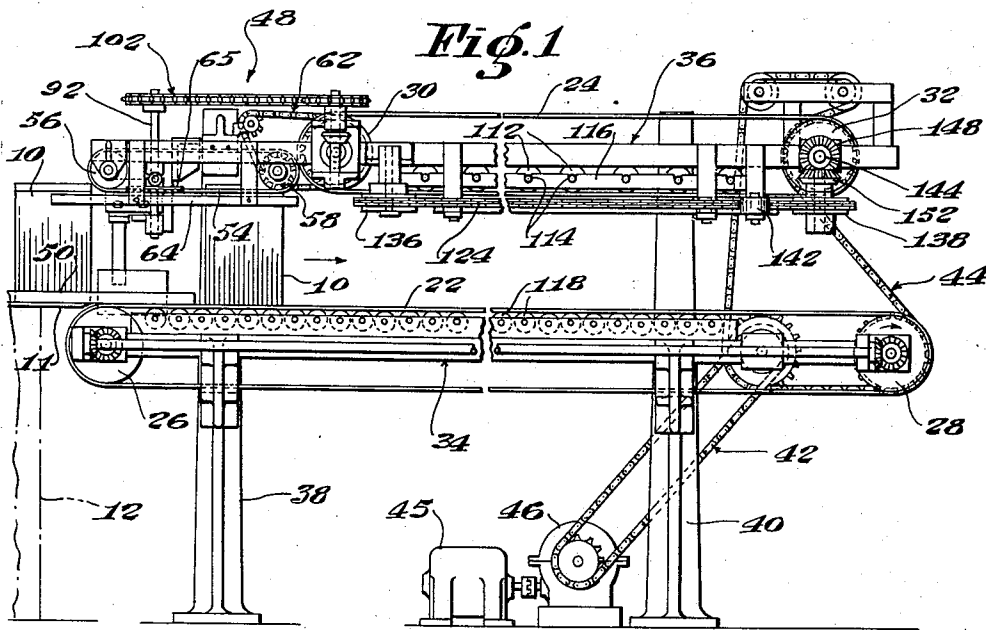
G. W. ANDERSON

2,224,716

CARTON SEALING MACHINE

Filed Nov. 15, 1938

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

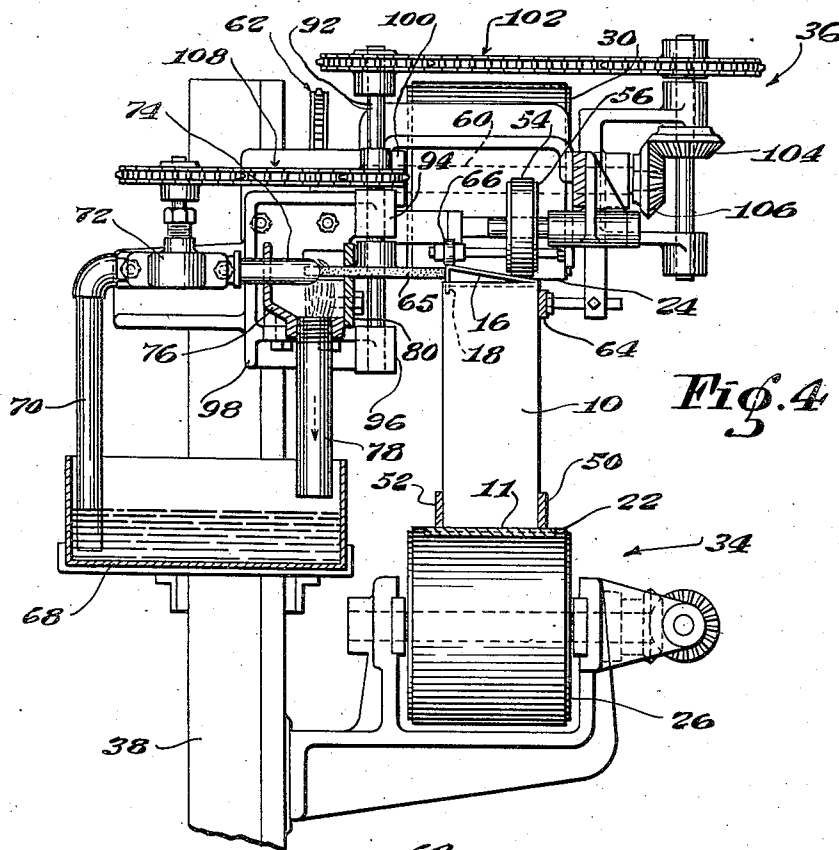


Fig. 4

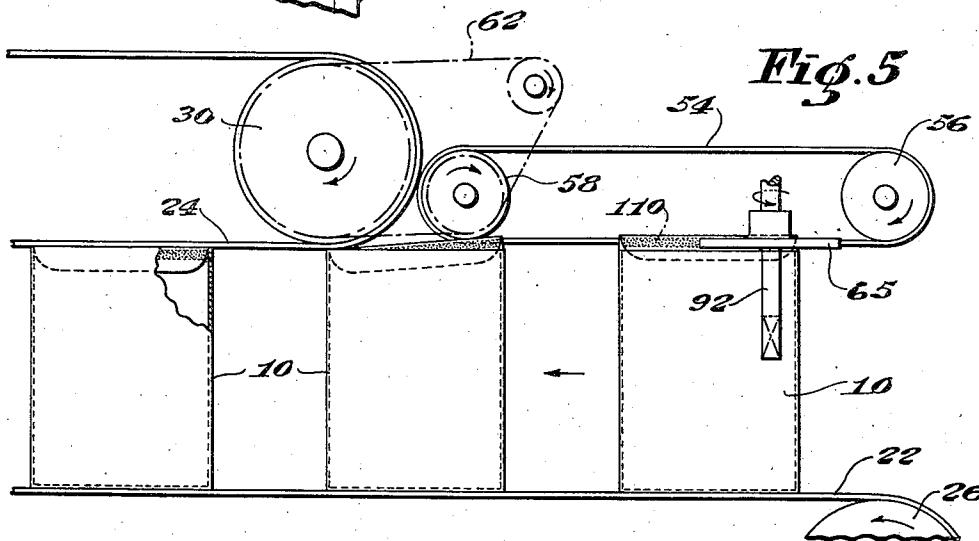


Fig. 5

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3 Sheets-Sheet 3

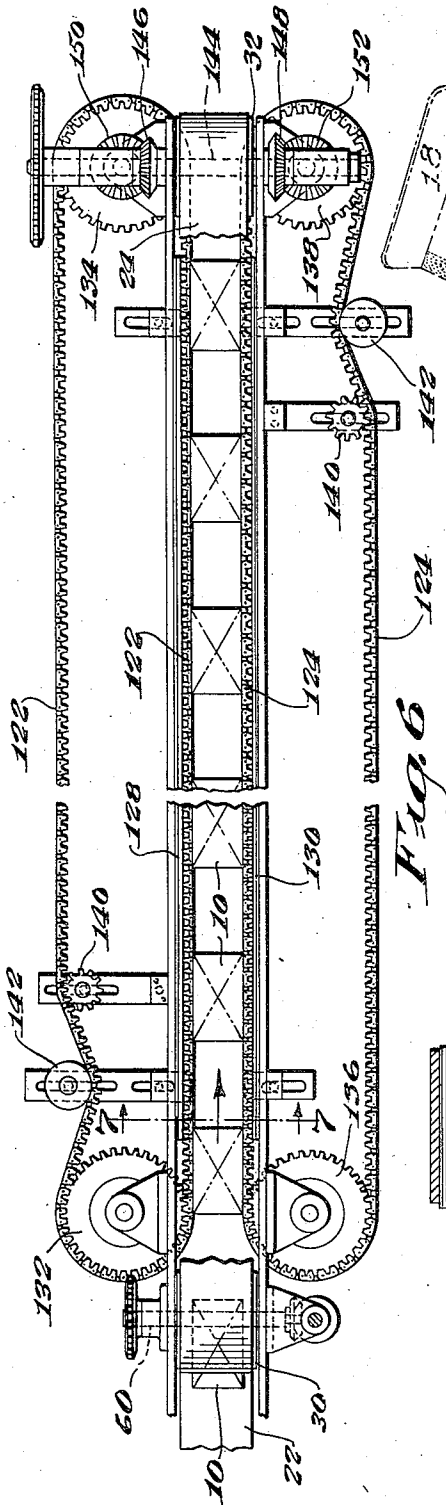


Fig. 6

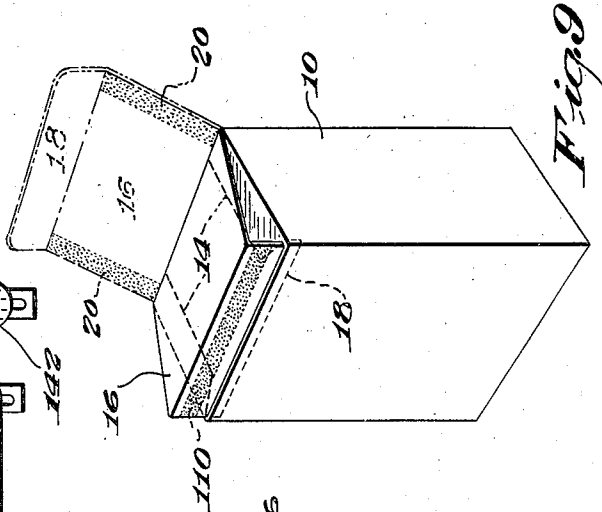


Fig. 9

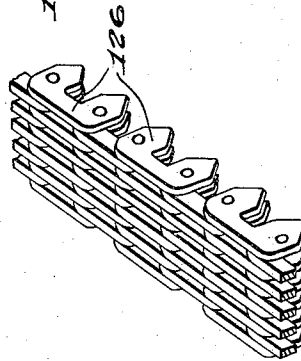


Fig. 8

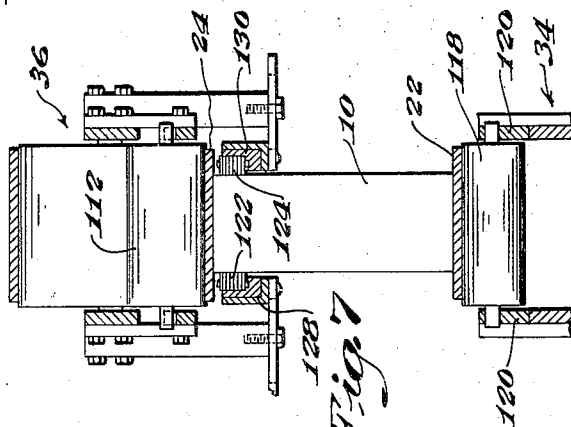


Fig. 7

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UNITED STATES PATENT OFFICE

2,224,716

CARTON SEALING MACHINE

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Application November 15, 1938, Serial No. 240,481

7 Claims. (Cl. 93—6)

This invention relates to a carton sealing machine.

The invention has for an object to provide novel and improved apparatus for sealing cartons of the type having a top closure provided with a tucking flap and in which provision is made for applying adhesive to the face of the tucking flap, for then moving the flap into its completely closed position, and for thereafter applying and maintaining pressure against the glued flaps to seal the same during the progress of the cartons through the machine.

Another object of the invention is to provide a novel and improved machine for sealing cartons in which provision is made for applying adhesive to the vertically disposed portion of a tucking flap while in its partially closed position in a novel and superior manner.

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

In the drawing illustrating the preferred embodiment of the invention, Fig. 1 is a side elevation of apparatus embodying the present invention; Fig. 2 is a plan view of a portion of the apparatus shown in Fig. 1, illustrating the adhesive applying device on an enlarged scale; Fig. 3 is a detail view of a portion of the adhesive applying device to be referred to; Fig. 4 is an end view of the adhesive applying device, partly in cross-section; Fig. 5 is a diagrammatic side elevation illustrating the adhesive applying and top closing operations; Fig. 6 is a plan view of the carton closing and pressure applying apparatus; Fig. 7 is an end view in cross-section on the line 7—7 of Fig. 6; Fig. 8 is a perspective detail view of a portion of the side pressure chains, to be referred to, and Fig. 9 is a perspective view of a carton showing the tucking flap partially closed and adhesive applied to the face thereof.

In general, the present invention contemplates a carton sealing machine for handling tuck flap cartons, and in which provision is made for applying adhesive to the face of the tucking flap and for thereafter closing the tucking flap and maintaining the top and sides of the closed carton under pressure for a suitable length of time until the glue has had time to set during the progress of the carton through the machine. In the preferred embodiment of the invention, the present carton sealing machine includes novel mechanism, preferably a horizontally disposed adhesive applying roller, for applying adhesive to the exposed face of the partially closed tuck flap of the carton as the latter is moved past the adhesive applying mechanism. Provision is also made for supplying

adhesive to the horizontally disposed roller and for maintaining a film of adhesive of suitable thickness upon the periphery thereof in a novel and superior manner.

The operations of inserting and partially closing the tuck flaps of the cartons passage thereof through the present apparatus may be performed in any of the usual or preferred machines now upon the market, not shown, or such operations may be performed manually if desired. It will be understood that in practice the carton may also be provided with the usual end flaps in addition to the top tucking flap, the end flaps have already been folded in under the tucking flap prior to the introduction of the carton into the present carton sealing machine. In addition, the under side of the top flap may have been supplied with a coating of adhesive to be adhesively affixed to the end flaps when the carton is completely closed, as will be described.

Referring now to the drawing, the cartons may and preferably will be delivered to the present carton sealing machine from a packaging machine, indicated generally in dotted lines at 12, in which the carton has been filled and prepared to be received by the present apparatus. As illustrated in Fig. 9, the filled carton is delivered into the carton sealing machine with its end flaps 14 folded under the partially closed top flap 16, having its tucking portion 18 partially inserted into the top of the carton. The undersurface of the top flap 16 may also have been provided with strips of adhesive 20 applied thereto in a position such as to engage the end flaps 14 when the top is closed down, as clearly shown in Fig. 9. As hereinbefore stated the carton may be prepared in this manner if preferred. In any event, the carton flap 16 is maintained in its partially closed position simply by the frictional engagement of the tucking portion 18 with the upper portion of the front wall of the body portion of the carton.

As illustrated in Fig. 1 the cartons 10 are delivered to the carton sealing machine across a bridge plate 11 and the cartons are supported and continuously advanced through the present machine upon a lower conveyor belt 22 which co-operates with an upper pressure belt 24 to apply pressure to the top of the carton to set the glued flaps after the adhesive applying operation. The driven belts 22, 24 are arranged to run over pulleys 26, 28 and 30, 32 respectively, carried upon separate frame units 34, 36. The frame units are supported upon standards 38, 40 and the upper unit 36 is preferably arranged to be raised or lowered upon the standards 38, 40 to conform to the height of the cartons being operated upon. The belts 22 and 24 may be driven through the chain and sprocket drives 42, 44 from a motor 46 and gear reduction unit 48, as clearly shown in Fig. 1.

Such apparatus for applying and maintaining pressure to the ends of the cartons as they pass therethrough may be of conventional form, commonly known in the trade as a "dryer" and constitutes of itself no part of the present invention.

It will be observed that the upper belt 24 is disposed in a position to engage the cartons after the latter have passed the adhesive applying mechanism. In passing to and from the adhesive applying mechanism, indicated generally at 48, the cartons are guided between lower guide rails 50, 52 and a short narrow upper belt 54, running over pulleys 56, 58 and driven at the same rate of speed as the lower belt 22. The narrow upper belt 54 cooperates with the lower belt 22 in advancing and supporting the carton past the adhesive applying device 48 and as herein shown, see Fig. 4, the narrow upper belt 54 is disposed in a position such as to engage the top of the cartons adjacent the rear wall thereof so that any pressure applied to the end of the carton by the belt 54 will merely flex the flap 16 slightly without operating to close the top down. As herein shown, the belt 54 is driven at the same rate of speed as the belt 22 through connections from the driven shaft 60 upon which the pulley 30 is mounted, and which connections include a chain and sprocket drive, indicated generally at 62, as illustrated in Figs. 1 and 2. An upper guide rail 64 is also provided which serves to support the top of the carton laterally during the application of adhesive to the flap 18 as will be described. In order to assure that each flap is tucked down a uniform depth into the carton and to prevent the flaps from riding up out of the carton under the influence of the adhesive applying roller 65, a guide roller 66 is provided, disposed above the carton in alignment with the tucking edge and which is arranged to engage the top of the flap above the tucking portion thereof.

As illustrated in Figs. 2 and 4, the mechanism for handling and applying the fluid adhesive includes a supply tank or reservoir 68 mounted upon the frame of the machine. The glue is pumped from the tank 68 through an upright pipe 70 preferably comprising a standard form of centrifugal pump and the glue is delivered from the pump 72 through a horizontal pipe 74 directly onto the edge of the horizontally arranged glue applying roller 65.

In the preferred embodiment of the invention, provision is made for removing the surplus adhesive deposited upon the horizontally arranged roller 65 and for returning the excess adhesive to the supply tank 68 in order to provide a continuous circulation thereof thus maintaining the same in a uniformly mixed and thoroughly fluid condition. As herein shown, see Fig. 4, the excess fluid is received in a drain pan 76 from which it flows by gravity through the horizontal pipe 78 to be returned to the supply tank. As illustrated in detail in Fig. 3, one side of the drain pan 76 comprises a scraper 80 which effects removal of the surplus adhesive from the opposite faces of the adhesive applying roller 65 as the latter is rotated between the edges 80, 82 of the slotted portion 84 which embraces the roller. A beveled edge 86 at the end of the slot 84 is arranged to engage the periphery of the applying roller 65 which operates to control the thickness of the film of glue deposited thereon. As shown in Fig. 3, provision is made for adjusting the beveled edge 86 with relation to the periphery of the roller, the side 88 being provided with horizontally

arranged slots 88 through which the fastening bolts 90 extend. Thus, in a simple and efficient manner a constant and uniform film of adhesive is supplied to the horizontally arranged adhesive applying roller 65 without the necessity of additional or intermediate rollers for controlling the thickness of the adhesive, and without any drip or leakage of the adhesive from the roller.

In the illustrated embodiment of the invention, provision is made for continuously driving the centrifugal pump 72 and the glue applying roller 65 during the operation of the machine, through connections from the driven shaft 60. As shown in Fig. 4, the adhesive applying roller 65 is mounted upon a vertical shaft 92 which is journaled in bearings 94, 96 in a bracket 98 attached to the side rail 100 of the upper frame unit 36. The vertical shaft 92 is rotated through the chain and sprocket drive 102 and through bevel gears 104, 106, the latter of which is fast upon the driven shaft 60. A second chain and sprocket connection 108, between the vertical shaft 92 and the pump 72, operates to drive the latter.

It will be observed that the path of travel of the vertically disposed face of the tucking flap 18 tangentially disposed with relation to the adhesive applying roller 65 so that in operation, the roller 65, being rotated in timed relation to the movement of the cartons through the machine, operates to apply a strip of adhesive 110 upon the face of the flap 18.

After leaving the adhesive applying station 48 the carton passes under the pressure belt 24 which engages the forward edge of the top flap 16 and operates to force the tucking flap 18 down into its completely closed position as the carton passes thereunder. As illustrated in Fig. 1, pressure is applied to the belt 24 by weighted rollers 112 which are loosely mounted in vertical slots 114 provided in the supporting rails 116 attached to upper frame unit 36 of the machine frame. The pressure belt 24 as hereinbefore described, is driven at the same rate of speed as the lower belt 22 and cooperates therewith to advance the carton through the machine, and the belts are of a suitable length in order to maintain pressure upon the closed and adhesively secured tops of the cartons for a sufficient length of time to firmly set the glued top flaps. The lower belt 22 is supported on its under side by rollers 118 journaled in the supporting rails 120, attached to the lower frame unit 34 of the machine frame.

Referring now to Figs. 6 and 7, in addition to the application of pressure to the tops of the cartons, provision is also made in the preferred embodiment of the invention for applying side pressure to the upper portion of the longitudinal side walls of the carton in order to firmly set the glue of the inserted and adhesively secured flap 18. As herein shown, side pressure is applied by endless driven chains 122, 124 which are arranged to move along with the cartons and at the same rate of speed as the conveyor belts 22, 24. Each chain, as illustrated in detail in Fig. 8, is made up of a plurality of links 126 of a type designed to present a substantially flat surface against the sides of the carton. Each chain 122, 124 is arranged to run in longitudinal side guides 128, 130 respectively, which guides or runners are supported from the upper frame unit 36 of the machine frame, and which are arranged to be adjusted laterally to provide the desired pressure against the sides of the carton. The driven chains 122, 124 are arranged to run over sprock-

ets 132, 134 and 136, 138 respectively and each chain is provided with the usual idler sprockets 140 and rollers 142 in order to maintain the chains in a taut condition. As illustrated in Figs. 1 and 6, the side pressure chains are driven through connections from the driving shaft 144, upon which the pulley 32 is mounted, including the bevel gears 146, 148 secured to the shaft 144, and which are in mesh with the bevel gears 150, 152 respectively.

From the above description it will be observed that the present carton sealing machine enables the cartons of the type provided with a tucking flap top closure to be adhesively secured in a simple and practical manner, and in a manner such as to reduce to a minimum any liability of damaging or marking the external surface of 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. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, adhesive applying mechanism mounted and adapted to apply adhesive to a partially inserted tucking flap as the carton is moved therepast, and means movable with the carton for supporting and moving the latter during the adhesive applying operation including a lower conveyer belt upon which the carton is supported and an upper relatively narrow belt adapted to engage the rear edge of the top of the carton.

2. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, adhesive applying mechanism mounted and adapted to apply adhesive to a partially inserted tucking flap as the carton is moved therepast, and means movable with the carton for supporting and moving the latter during the adhesive applying operation including a lower conveyer belt upon which the carton is supported and an upper relatively narrow belt adapted to engage the rear edge of the top of the carton, and means for completing the closing of the top closure while the carton is moving including a second upper belt under which the cartons pass after the adhesive applying operation.

3. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, a horizontally disposed driven glue applying roller mounted and adapted to apply adhesive to the front portion of a partially inserted tucking flap as the carton is moved thereby, means movable with the carton for supporting and moving the latter during the adhesive applying operation, said glue applying roller being driven at a rate such as to provide a surface speed equal to the linear speed of the cartons being moved therepast.

4. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, a horizontally disposed driven glue applying roller mounted and adapted to apply adhesive to the front portion of a partially inserted tucking flap as the carton is moved thereby, means movable with the carton

for supporting and moving the latter during the adhesive applying operation including a lower conveyer belt upon which the carton is supported and an upper relatively narrow belt adapted to engage the rear edge of the top of the carton, said glue applying roller being driven so as to have a surface speed equal to the linear speed of said upper and lower belts.

5. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, a horizontally disposed driven glue applying roller mounted and adapted to apply adhesive to the front portion of a partially inserted tucking flap as the carton is moved thereby, means movable with the carton for supporting and moving the latter during the adhesive applying operation including a lower conveyer belt upon which the carton is supported and an upper relatively narrow belt adapted to engage the rear edge of the top of the carton, said glue applying roller being driven so as to have a surface speed equal to the linear speed of said upper and lower belts, and means for completing the closing of the top closure while the carton is moving including a second upper belt under which the cartons pass after the adhesive applying operation.

6. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, a horizontally disposed driven glue applying roller mounted and adapted to apply adhesive to the front portion of a partially inserted tucking flap as the carton is moved thereby, means movable with the carton for supporting and moving the latter during the adhesive applying operation including a lower conveyer belt upon which the carton is supported and an upper relatively narrow belt adapted to engage the rear edge of the top of the carton, and means for maintaining said tucking flap in its partially inserted position in the carton during the adhesive applying operation comprising a roller mounted to engage the top flap at a point adjacent the top of the tucking flap as the carton is carried therepast, said glue applying roller being driven so as to have a surface speed equal to the linear speed of said upper and lower belts.

7. A carton sealing machine for sealing cartons having a top closure provided with a tucking flap having, in combination, a horizontally disposed driven glue applying roller mounted and adapted to apply adhesive to the front portion of a partially inserted tucking flap as the carton is moved thereby, means movable with the carton for supporting and moving the latter during the adhesive applying operation including a lower conveyer belt upon which the carton is supported and an upper relatively narrow belt adapted to engage the rear edge of the top of the carton, said glue applying roller being driven so as to have a surface speed equal to the linear speed of said upper and lower belts, means for completing the closing of the top closure while the carton is moving including a second upper belt under which the cartons pass after the adhesive applying operation, and means movable with the carton for applying side pressure adjacent the sealed and closed tucking flap whereby to press the adjacent side wall of the carton against the adhesive tucking flap.

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