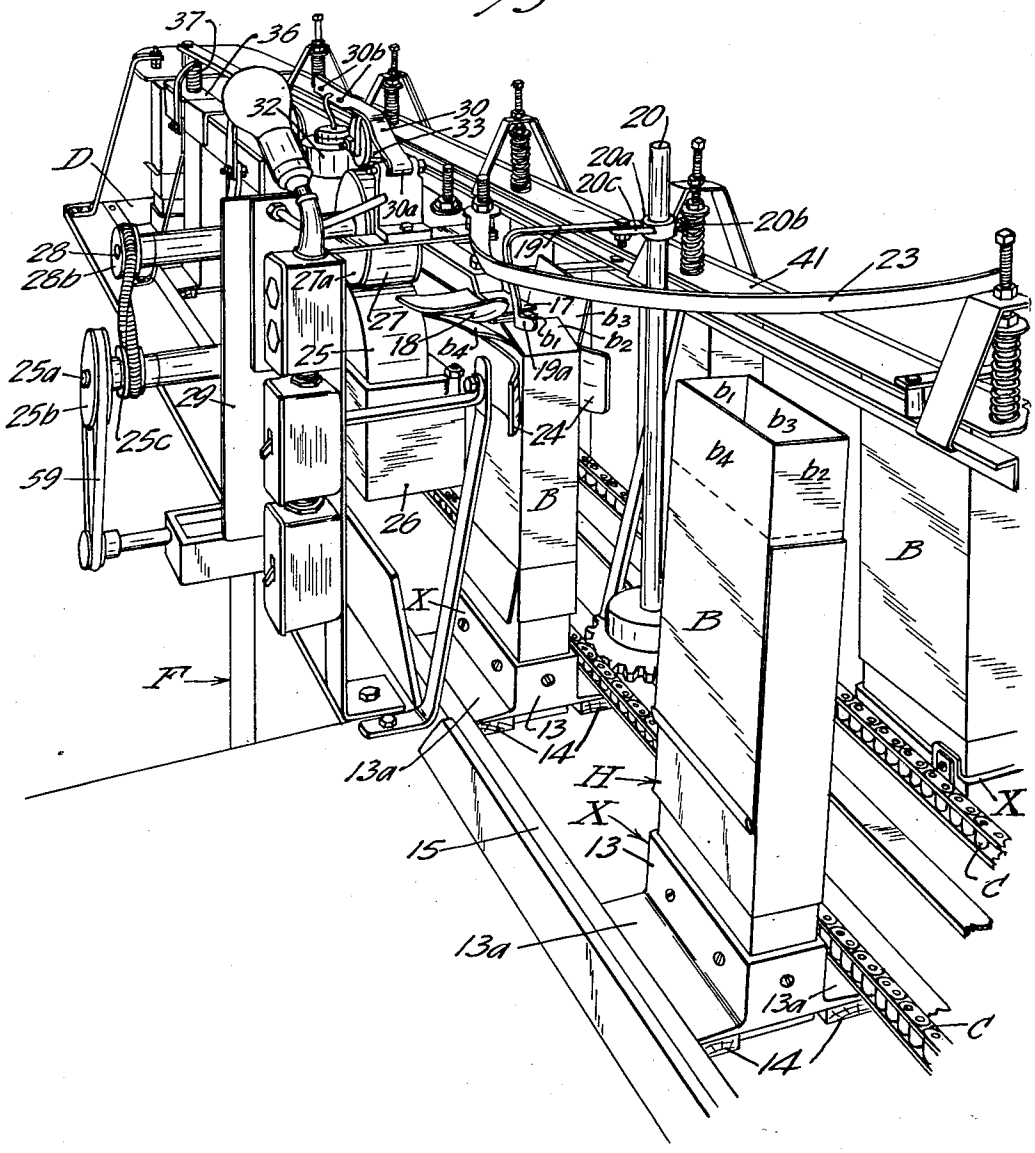
May 29, 1951 A. A. KAEHLER ET AL 2,554,574

BOX FORMING MACHINE

Filed Aug. 4, 1945 4 Sheets-Sheet 1

Fig. 1



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BOX FORMING MACHINE

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Fig. 2

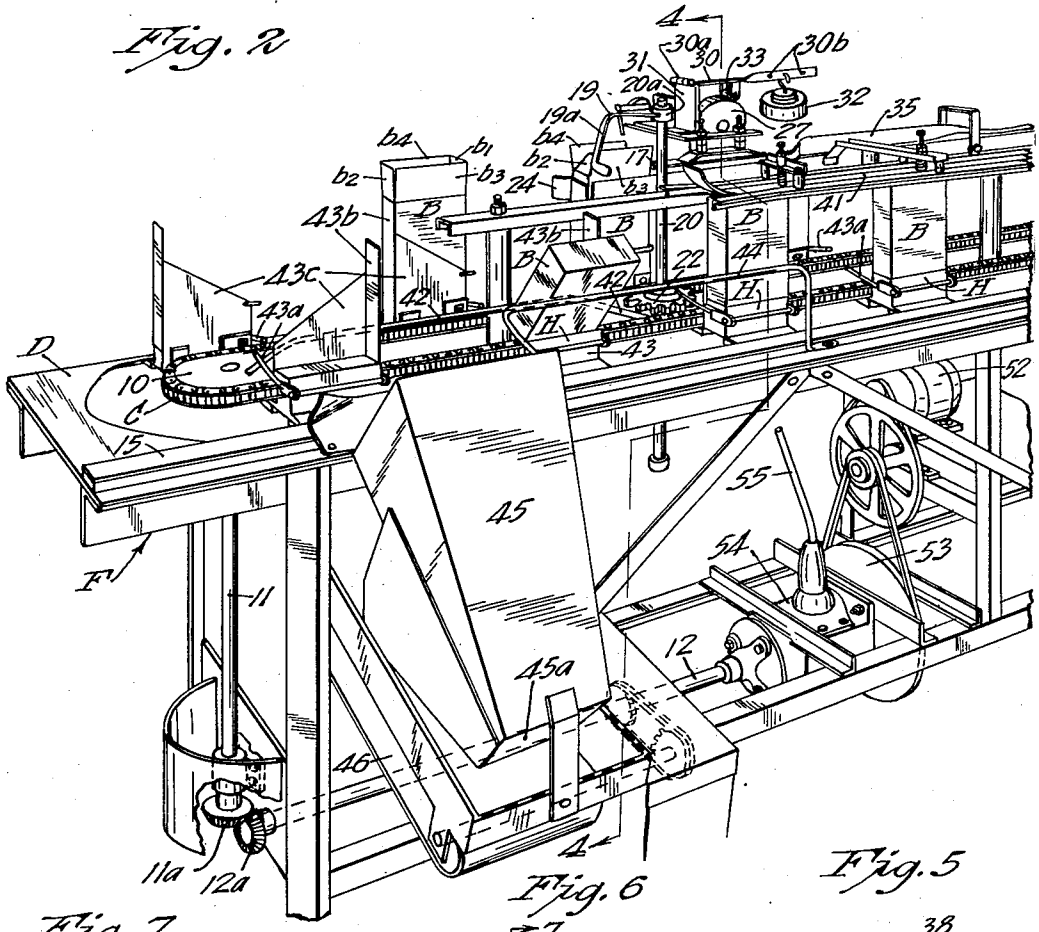
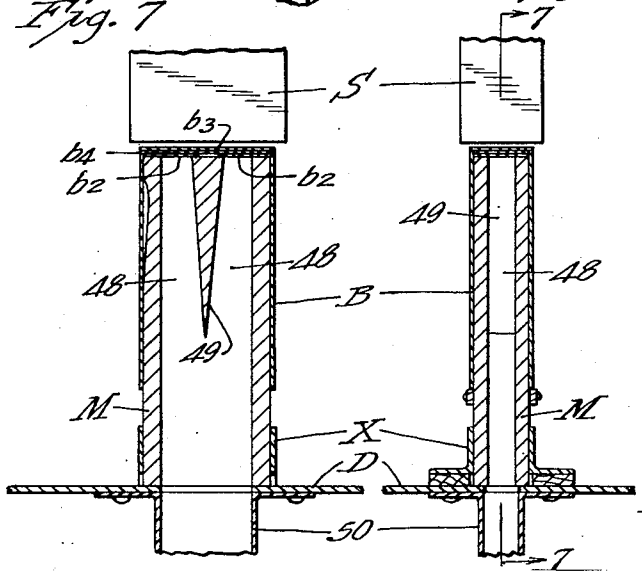
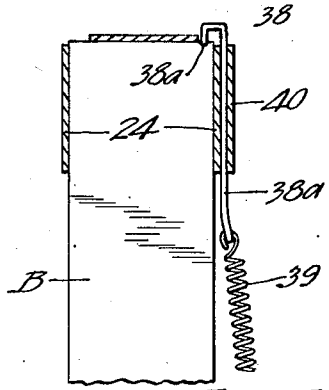


Fig. 6

Fig. 5

Fig. 7





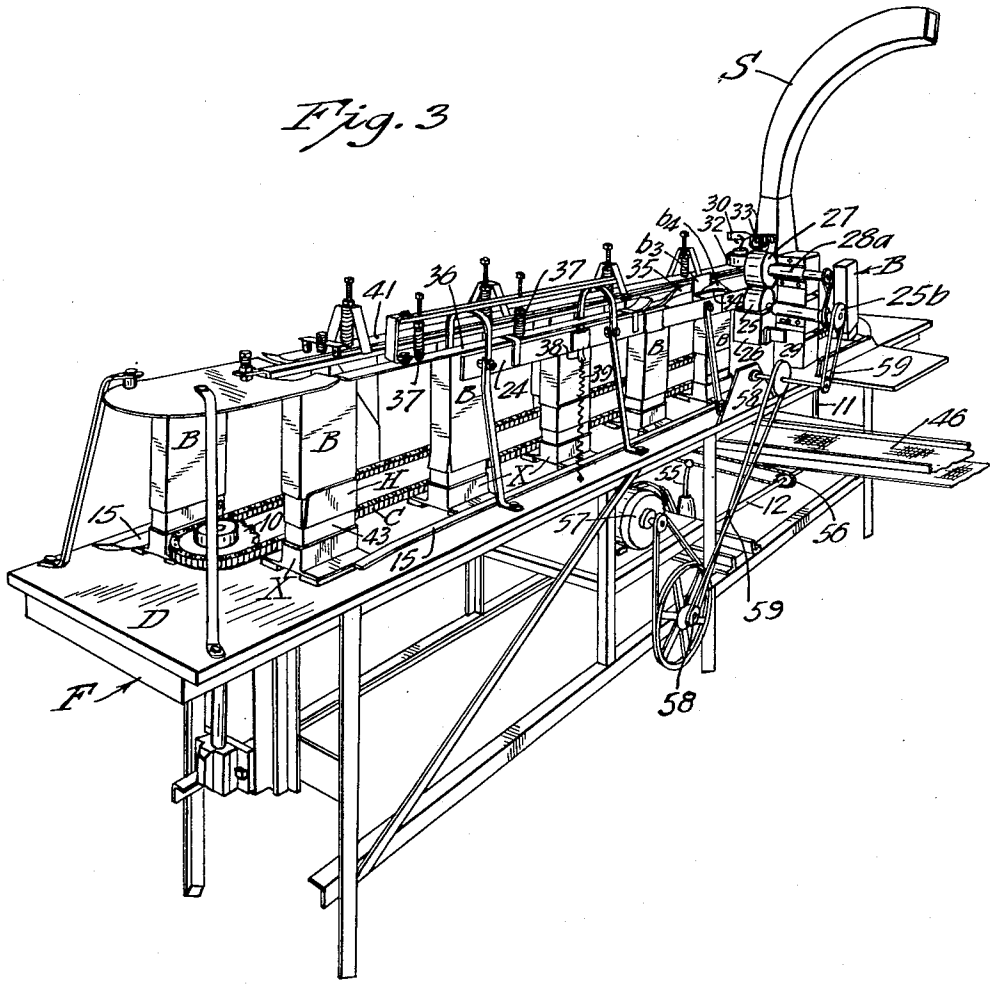
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BOX FORMING MACHINE

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Fig. 3



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BOX FORMING MACHINE

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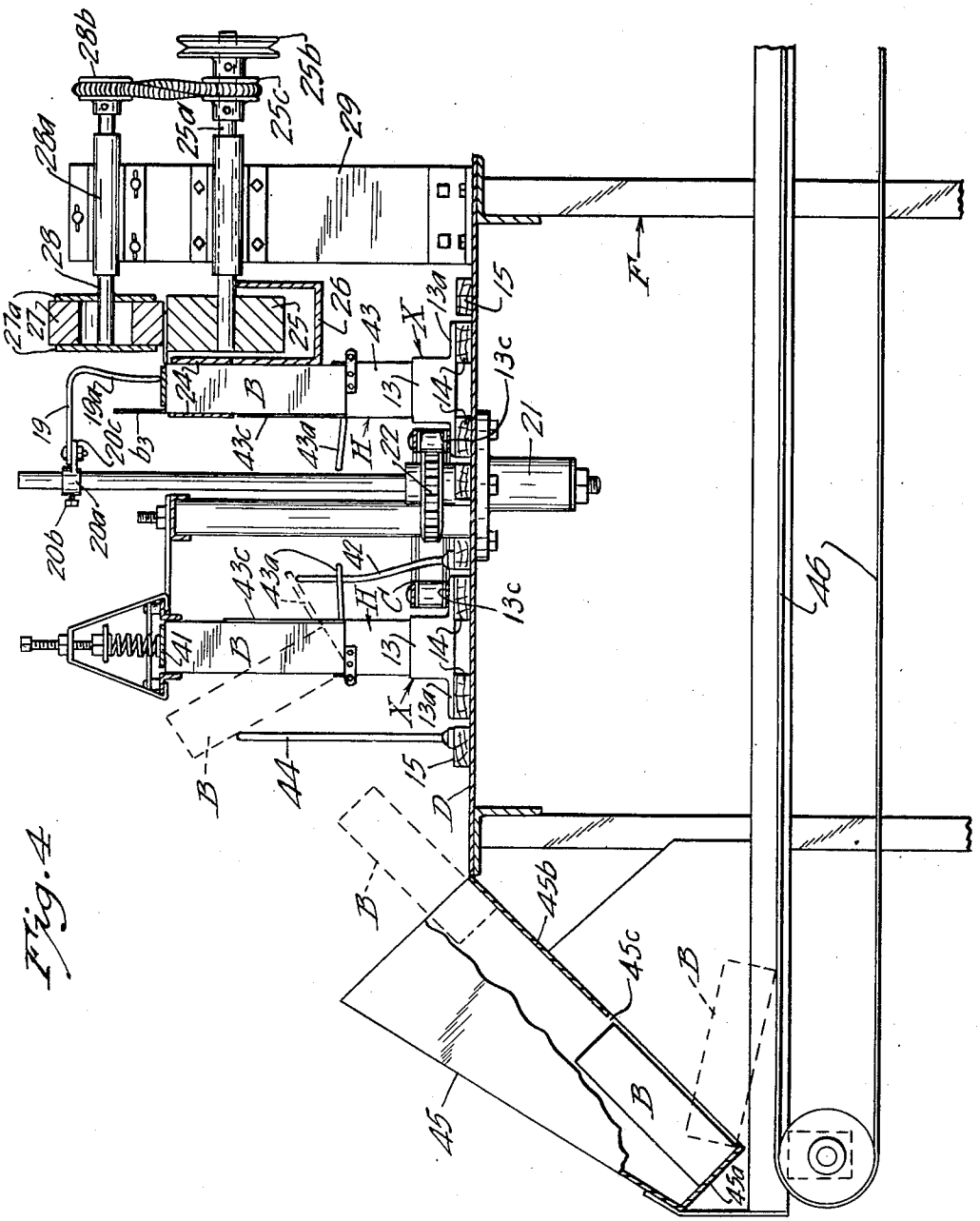


Fig. 4

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UNITED STATES PATENT OFFICE

2,554,574

BOX FORMING MACHINE

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Red Wing, Minn.

Application August 4, 1945, Serial No. 608,982

13 Claims. (Cl. 93—44)

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This invention relates to machinery for closing and sealing the ends of cartons and boxes constructed from foldable material such as cardboard, corrugated paper and the like.

Such cartons and boxes, as very extensively used today, are each constructed from a single, integral sheet of material, scored usually for folding on parallel, longitudinal lines, to form the sidewalls of the container and cut to form end flaps (usually four in number) which are transversely scored to be folded inwardly, one upon the other, for forming the ends of the container when they are properly adhered together.

Our invention particularly relates to automatic machinery for operating upon the cartons or boxes, after the sidewalls have been secured together, to properly fold, crease and adhere end flaps of the container, both before filling and after filling of the same whereby the containers are provided with reinforced, sealed ends.

It is an object of our invention to provide a machine of the class described of marked simplicity as contrasted with prior art devices; adapted for continuous operation and operative to very efficiently adhere the several end flaps of the cartons to substantially eliminate danger of the flaps loosening or opening during subsequent handling, shipping and storage.

A more specific object is the provision, in a machine in the class described, of materially improved mechanism for uniformly applying the glue or other adhesive to both sides of one of the end flaps regardless of irregularities or variances in the thickness of the stock of the carton and for thereafter insuring the adherance of the glue-coated flap with the several other end flaps of the carton.

It is another object to provide a machine of the class described of durable construction, high capacity and employing a minimum number of working parts in view of the many operations accomplished and further, being light in construction and economical in cost of manufacture.

Another object is the provision of a simplified carton-closing and sealing machine wherein the driving and conveying mechanism and supporting media for the various parts, are so coordinated as to eliminate many parts and a substantial quantity of material as contrasted with prior art devices.

With our improved machine, the adhesive is efficiently applied to the end flaps in a novel and materially improved manner and the flaps folded upon one another, are then held and the side flaps creased to more effectively adhere the flaps

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together during preliminary drying of the adhesive and during the cycle of operation, means are provided for applying pressure from within the container outwardly, against the folded, adhered flaps, as well as downwardly against the exterior of the outermost flap.

Another specific object is the provision of improved and efficient means for unloading and discharging both filled and unfilled cartons after an end of the container has been closed and sealed.

These and other objects and advantages of our invention will be more apparent from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the several views and in which—

Fig. 1 is a perspective view of an embodiment of our invention looking toward the receiving end of our machine;

Fig. 2 is a perspective view looking toward the delivery end of our machine when equipped for closing and discharging cartons which have been filled;

Fig. 3 is a perspective view showing most of the working mechanism at one side of the machine and with the machine equipped for closing and discharging by spout, the bottom ends of unfilled containers;

Fig. 4 is a vertical section taken on a jagged line as indicated in Fig. 2 to illustrate both the adhesive-applying rollers and the discharge and impact mechanism for filled containers;

Fig. 5 is a cross section taken through one of the corner edge-creasing mechanisms as a carton is being operated upon thereby;

Fig. 6 is a fragmentary cross section showing one of the carton mandrels for holding and operating upon an unfilled carton;

Fig. 7 is a vertical, fragmentary section taken on the line 7—7 of Fig. 6 showing the dual air discharge passage for removing the sealed, unfilled containers from the machine.

In the embodiment of our invention illustrated, we provide an upstanding, braced table frame, designated as an entirety by the letter F having mounted on the top thereof, a horizontal, substantially planular, elongated deck D, preferably constructed of smooth metal or other rigid material having good wearing qualities. On the top of deck D, an endless conveyor chain C, of preferably roller type, is horizontally mounted, trained about horizontal chain sprockets 10 which are disposed near the respective ends of deck D, a short distance above the same and one of which

is affixed to the upper end of a driven, vertical shaft 11 having its lower end suitably journaled and as shown, provided with a beveled gear which is meshed with the beveled gear on a longitudinally disposed power take-off shaft 12, mounted longitudinally in the lower portion of table frame F.

Chain C has attached to certain of its links and disposed in widely spaced relation, a series of carton-holding carriages designated as entireties by the letter X and each comprising a shallow, box-like holding member 13 provided with longitudinal, out-turned flanges 13*a* which are supported as shown, upon longitudinal skid shoes 14 which bear against the surface of deck D and which may conveniently be constructed of strips of hard wood such as maple or any other material which will wear and freely slide without abrasion, over the smooth surface of the deck. The carton carriages X are laterally connected with the appropriate links of conveyor chain C by suitable means such as angle arms 13*c* formed integrally with certain links of chain C whereby the carriages may freely follow the relatively short radius course of the conveyor chain at the ends of the deck. Longitudinal outer guide strips 15 are secured to the top of deck D, adjacent its longitudinal, marginal edges, to properly guide the carriages throughout the straight line travel of the same in the operation of the machine. Carriages X are adapted to support and be detachably connected with either a carton-receiving mandrel M or a filled carton holder designated as an entirety by the letter H, as will later be more clearly apparent.

The boxes or cartons B are held in upright position by the mandrels or holders, mounted on carriages X and are moved by conveyor chain C, through an elongated, oval course, during the cycle of operation of our machine.

The cartons B, as they are applied to our machine, have been processed to join the free, longitudinal edges of the blank sheets, to form tubular members of rectangular cross section with longitudinal slits cut in the ends thereof, to define end flaps which are to be inwardly folded one upon the other, to form the closed ends of the container. Thus, the longitudinal, end slits define at each end of the box, a forward end flap b_1, a rear end flap b_2, an outer side flap b_3 which is the last flap to be inwardly folded, and a second side flap b_4 which is adapted, on both sides of the material, to receive the adhesive. The several end flaps b_1 to b_4 inclusive, are preferably scored on their outer surfaces, to facilitate the inward folding thereof, along lines disposed transversely of the longitudinal edges of the cartons.

As the boxes or cartons B are moved by carriages X into the operating portions of our machine, the forward end flap b_1 of each, is engaged and folded rearwardly and inwardly, by a stationary folding finger 17 (see Fig. 1) which is secured to suitable cross bracing of the machine and has a free end extending forwardly and disposed substantially horizontally, as shown. Simultaneously to the folding of the front end flap b_1, the side flap b_4 of the same carton, is out-turned in its travel by engagement with the underside of a stationary folding shoe 18, which has a convex working surface, inclined from the vertical, as clearly shown in Fig. 1. Almost simultaneously with the folding of the front flap b_1 and side flap b_4 of the box, the rear end flap b_2 is folded forwardly and inwardly by a depending, revolving, folding arm 19*a* having its shank 19, adjustably fixed to the upper end of a vertical shaft 20 which is suitably journaled at its lower end in a thrust bearing 21 supported from the underside of the deck D. Shaft 20 has affixed to the lower portion thereof, and at the level of conveyor chain C, a chain sprocket 22 which is in constant mesh with the inner side of one leaf of the endless chain, whereby the shaft 20 will be constantly revolved in synchronism with the travel of the containers through the machine. Means for adjustably securing the shank 19 of depending folder arm 19*a*, to shaft 20, is preferably provided as shown, constituting a clamping collar 20*a* surrounding the upper portion of shaft 20 and having a set screw clamping element 20*b* associated therewith. Further adjustment of shank 19 may be obtained by the connection of the inner end of said shank with a radial lug 20*c* integrally formed with collar 20*a* and apertured to receive a clamping bolt for rigid connection of the shank 19. The depending folding arm 19*a* clears the top of the machine in its revolving travel. An arcuate, horizontal guard rail 23 is mounted at the top of the machine, in fixed concentric relationship to the orbit of the folding arm 19*a*.

As each carton travels into the operation portion of our machine, it is properly centered and guided vertically by a pair of spaced, opposed, resilient guide strips 24, having oppositely and outwardly curved, diverging entrance ends. Strips 24 extend longitudinally of the machine throughout the greater portion of the length thereof, at each side, as clearly shown in Figs. 1 and 3.

After inward folding of the front and rear flaps b_1 and b_2 of the box and outward folding of the side flap b_4, the flap b_4 is coated on both upper and lower surfaces with adhesive material such as a suitable semi-liquid glue. To this end, we provide highly efficient and materially improved gluing mechanism comprising a lower glue-applying roller 25 fixed to the inner end of a horizontal, transverse stub shaft 25*a* and having its lower peripheral portion immersed in the liquid glue contained in an open top tank 26. The top of the periphery of roller 25 is disposed in position to tangentially engage the underside of the out-turned flap b_4 applying glue uniformly thereto. Above the roller 25 and having its axis vertically aligned therewith, is an upper roller comprising a floating cylindrical ring 27 loosely mounted between a pair of spaced, vertical discs 27*a*, said discs being affixed to a horizontal stub shaft 28, journaled in a suitable bearing 28*a* mounted on a supporting frame structure 29. The upper roller is adapted to cooperate with the lower roller 25 and to apply adhesive to the upper surface of the out-turned side flap b_4.

The stub shaft 25*a* to which the lower adhesive-applying roller 25 is attached, is driven by any suitable driving means, from a motor or other source of power and as shown in the drawings, is provided with a V-belt pulley 25*b* secured to the outer end thereof. We prefer to positively drive the upper cooperating roller although in some installations, sufficient frictional driving engagement may be supplied from contact with the upper roller with the lower roller and during application of adhesive, by contact with the flap b_4 which is moving through the machine. As shown in the drawings, an endless coil spring twisted through 180° at its medial portion, is trained about a small pulley

25c fixed to lower roller shaft 25a and about a similar pulley 28b attached to the outer end of the upper roller stub shaft 28. To urge upper roller 27 downwardly against the lower roller and a flap passing between the two, we prefer to provide a weight-applying mechanism, which as shown, comprises a lever arm 30 fulcrumed at its forward end by hinge joint 30a to an upstanding lug 31 and carrying at its outer end a detachable weight 32. The outer end of lever arm 30 may be conveniently twisted through 90° and provided with a series of horizontally spaced weight-attachment apertures 30b to permit of adjustment of the weight effect. A small pressure-applying roller 33 is adapted to engage the upper periphery of upper glue roller 27 and as shown, is journaled in depending lugs fixed to the underside of the medial portion of lever arm 30.

With the out-turned flap b_4 uniformly coated on both upper and lower sides with glue, the carton continues its travel through the machine and after leaving the glueing mechanism, the flap b_4 is engaged by a "plow-guide" rod 34 (see Fig. 3) which folds the adhesive covered flap inwardly against the front and rear previously folded flaps. Thereafter, the then upstanding side flap b_3 is engaged by a "plow-guide" strap 35 which folds said flap inwardly over and against the adhesive coated flap b_4, thereby completing the folding of the then, upper end of the carton and further serving to guide the several folded end flaps beneath an elongated, horizontal pressure-applying element which in the form disclosed, comprises an elongated strip 36 suspended above the tops of the several cartons passing through the machine and yielding urged downwardly by resilient means such as a series of horizontally spaced coil springs 37. The "plow-guide" folding mechanism, just described, as well as certain types of pressure-applying means, have been utilized extensively in carton-closing machines of the prior art and therefore, do not need to be illustrated or described in detail here.

To materially assist in the proper adhering of the several overlapped flaps, we apply simple mechanism for creasing the closed end of the container after completion of the folding operation and the application of pressure to the closed end. To this end (see particularly Figs. 5 and 3), we provide a pair of creaser elements 38 comprising as shown, depending edged elements 38a for engaging the closed ends of cartons passing through the machine adjacent the side edges thereof, said elements 38 being urged downwardly by anchoring springs 39 connected with the lower ends of shanks 38a which are slidably disposed in suitable guides 40 supported from the guide strip 24 or any other suitable medium near the top of the machine. The edges 38a of the creasing elements are therefore urged downwardly in the travel of the cartons through the machine, creasing the top or closed end at both sides along lines parallel with the marginal corners and thereby breaking down or loosening the fiber of the carton flaps to overcome the resistance of the carton material and the tendency of the flaps to swing upwardly out of adhering engagement.

As the endless coveyor chain C moves the respective carriages and cartons supported thereby around the arcuate ends of the conveyor, guide means for the outer edges of the flanges 13a of the carriages X, are released as is pressure-applied to the closed ends. Pressure is again applied however, by a second pressure element as shown in the form of an elongated strip 41 disposed at the top of the machine on the opposite side from pressure strip 36.

By reference to Fig. 2, it will be seen that near the delivery end of our machine, a longitudinally disposed but inclined holder-tilting rod 42 is provided, over which tilting arms 43a of the carton holders H are adapted to ride (see also Fig. 4). The carton holders H as illustrated, comprise rectangular bases or skirts 43 constructed and shaped to fit within the rectangular, upstanding portions of carriages X and having hinged to the outer side edges thereof, carton receiving frames 43b (see Fig. 2) comprising a bottom flange, a vertical back flange and an inner, side vertical flange 43c. The arms 43a previously described extend inwardly of the machine, substantially normal to the side wall 43c, in position to engage the said guide rod 42 which is mounted on the deck D. A horizontal supporting rail 44 is fixed to the deck D adjacent its outer marginal edge and is at proper height to receive and support the medial portion of the tilted carton. Rail 44 terminates just before the respective tilted cartons are brought into alignment with a discharge chute 45 which is flared from its lower delivery end, upwardly to its receiving end and which as shown in Figs. 2 and 4, is of rectangular cross sectional shape, having its open, upper end of proper dimensions to receive the package or carton after it moves past its tilted, supported position on rail 44. The lower end of said discharge chute is provided with a bottom 45a disposed perpendicularly to the inclined delivery wall 45b and is positioned to be impacted by the descending filled carton which it will be noted (see Figs. 2 and 4), is tilted in the operation of delivery, end for end, to cause the upper end of the package which has been closed, by the operation of our machine, to strike against the impact bottom 45a whereby the weight and pressure of the contents of the package, produces an impacting action in cooperation with bottom 45a of the several superimposed flaps to materially improve the adhering qualities of the structure. After impact of the package against bottom 45a gravity causes the same to drop through an enlarged, rectangular apperture 45c in the lower portion of inclined guiding wall 45b and the package drops upon a suitable endless conveyor 46, which delivers it to a desired point in the plant.

The previous description of our discharge or delivery apparatus applies to our machine when equipped with the swingable carton or package holders. In closing and sealing the lower end of the package, which of course, is required before filling of the package, mandrels M (see Figs. 6 and 7) are substituted for the package holders H in the several carriages X and are of cross sectional shape to fit within the upstanding, rectangular socket of the carriages. These mandrels M are of hollow construction and of generally rectangular cross section shaped to loosely fit the interior of an open ended carton and having their tubular interiors divided into a pair of spaced ducts 48 by means of a central, transverse divider plate 49 which preferably is of wedge-shape causing the ducts 48 to converge slightly adjacent their discharge ends. The upper end of each of the mandrels M is open as is the lower end, for passage of air therethrough.

An air duct 50 is secured to the underside of deck D at the delivery end of the machine and is aligned with the lower end of a discharge spout S which is supported in spaced relation to deck D and at a sufficient distance thereabove to provide for clearance of the several mandrels in their travelling movement to the delivery end of the machine. Thus, when a mandrel carrying one of the boxes or cartons B with one end thereof closed and sealed, passes into alignment with air duct 50 and discharge spout S, the current of air discharged lifts the carton from the mandrel upwardly, through discharge spout for delivery to a packaging line.

A source or sources of power for driving the conveyor chain C, the rear flap folding shaft 20, the gluing mechanism and the delivery conveyor 46, may be provided in any suitable manner. As shown, for driving the conveyor and through it, the shaft 20, we utilize an electric motor 52 mounted on a suitable base below the deck of the table frame and connected by V-belt and pulley, torque-increasing mechanism to drive a large pulley 53 which is mounted on a stub shaft forming a part of a transmission mechanism 54 which is provided with a gear shift lever 55 for varying the driving gear ratio on the power takeoff shaft 12. The outer end of driven shaft 12 is provided with a beveled gear 12*a* meshed with beveled gear 11*a* fixed to the lower end of the conveyor driving shaft 11. The conveyor 46 is driven from power takeoff 12 by an endless driving shaft 56 (see Fig. 3).

A second motor 57 mounted beneath the deck of the machine is connected for reduction of speed and increase in torque to a transverse stub shaft 58 suitably journaled at the adhesive-applying side of the machine and which in turn, is connected by an endless V-belt 59 with the V-belt pulley 25*b* to which the lower adhesive-applying roller 25 is affixed.

Most of the operation of our improved machine has been made clear from the previous description. If it is desired to utilize the machine for closing the bottom ends of cartons, the mandrels M are detachably connected with carriages X and the semi-formed containers, then in tubular shape, are slipped over the tops of these mandrels, the lower edges thereof abutting stop strips *m* to position the uppermost end flaps, above the tops of the mandrels. In closing the bottoms of the cartons, the flaps are successively inturned and treated as previously described. As the respective cartons move through the machine and upon arriving in alignment with the delivery spout S, they are forcibly blown off the mandrels through the blast of air discharging from deck 50 and upwardly through spout S to a receiving hopper, filling machine or packaging line.

If the machine is to be utilized for closing and adhesively connecting the end flaps of cartons filled with material, then the tiltable package holders H are readily substituted for mandrels M and the operation is as previously described. The delivery of filled and completely sealed packages from the carriages is effected by the riding action of the tilting arms 43*a* over the inclined rod 42, just prior to arrival of the respective packages in lateral alignment with delivery chute 45. By inverting the packages delivered, end for end, the previously sealed upper ends of the packages, forcibly strike the impact plate or bottom 45*a* of the discharge chute and the weight of the material in the packages has a strong impact effect against the overlying flaps, causing the same to be forced together by impact and to materially improve the adherence of the applied glue, then partially dried.

Sometimes it is desirable to alternate on the carriages, the package holders and mandrels, so that in the operation, both the lower and upper ends of containers, may be closed.

In the functioning of our machine, the closing and adhering of the end flaps is very materially improved over the prior art through a number of closely cooperating functions of the machine. In the first place, the adhesive is very uniformly applied to both upper and lower sides of the side flap b_4 since the floating annular member or roller 27, coated with glue from its engagement with lower roller 25, between glue-applying operations, may rise and fall instantaneously in accordance with the variance in the thickness or qualities of the different carton flaps treated, thus always uniformly applying glue to both sides of the side flap b_4 though the thickness of the material varies considerably and though portions of the particular flap are carrying gritty elements in spots. The upper roller 27 is further automatically adjustable by its floating relationship with shaft 28 and its side covering discs 27*a* to readily apply and accommodate adhesive materials varying widely in viscosity.

The next factor in proper closing and adhering of the flaps is the greatly simplified and improved action of our revolving rear flap folding arm 19. Thereafter, the application of pressure through the stationary, resilient, pressure bars 36 is important, but still more important is the improved and novel creasing obtained through use on both sides of each carton of the depending creasing edges 38*a* of our simplified creasing mechanism. These creasing elements break down the fiber of the uppermost flaps along lines parallel with the movement of travel and spaced closely to the side edges of the then top of the carton, the breaking down of this material, substantially overcoming the tendency of the flaps rising and separating due to their previous folding.

Subsequently, all the adhered flaps are kept under pressure long enough for the glue to partially dry and thereafter, in the case of the top end of the container, the container is inverted in delivery and the material therein impacts from the inner side of the package against the superimposed flaps, its impact blow materially aiding in the proper adhesion of the several flaps. In the embodiment of our invention illustrated, adhesion of the super-imposed flaps is further aided by the weight and pressure of the filling material against the inverted end of the containers as the containers are carried on an upwardly inclined path by conveyor 46. (See Fig. 3.)

It will be noted that the only connection of the carriages X with the entire machine is through the angle arm connection with certain of the lengths of the conveyor chain. No rollers, overlying or interlocking flanges or mortises are required and the deck D constituting the main support for much of the working mechanism, constitutes a sliding surface over which the skids of the several carton carriages may slide. The very simplified mounting of the rear flap closing shaft 20 by the single bearing 21, mounted below deck D and its driving from direct meshing of sprocket 22 with the inside of the endless chain, is an important feature.

From the foregoing description, it will be seen

that we have provided a highly efficient, materially simplified machine of the class described, adapted to operate at high speed and capacity and operative to quite perfectly fold, seal and adhere permanently, the several inturned flaps.

It will of course, be understood that various changes may be made in the form, details and arrangements and proportions of the parts without departing from the scope of our invention.

What is claimed is:

1. In a machine for folding and adhering together the end flaps of cardboard cartons and the like, mechanism for moving a series of cartons in spaced, upright position, through a predetermined, substantially horizontal path, means operative upon said end flaps during said travel of said cartons, for successively folding the same inwardly, means for applying adhesive to at least one of said flaps to adhere said several flaps together and means operative after adhering and folding of said flaps to crease the then top end of said carton along lines adjacent the folding lines of two of said flaps and parallel to the direction of travel of said cartons to overcome resistance of the carton material against said folding and thereby, increase adherence.

2. The structure set forth in claim 1, and said creasing means comprising a pair of depending edges and resilient elements for urging said edges downwardly against the tops of the travelling carton.

3. In a machine for folding and adhering together the end flaps of cardboard cartons and the like, a slideway providing an elongated, substantially horizontal track, an endless conveyor element mounted substantially horizontally, a short distance above said slideway, a series of sliding carriages fastened laterally to said endless conveyor element and spaced apart longitudinally thereof, means for driving said endless conveyor member, each of said carriages having carton-holding means connected with the upper portion thereof and adapted to hold a carton in upstanding position with the flaps at one end thereof exposed, folding mechanism mounted above said slideway in the paths of the several end flaps of cartons for successively folding said flaps inwardly and adhesive-applying mechanism having elements disposed in the path of travel of at least one of said flaps during a portion of its operating cycle and operative upon said flap prior to inward folding thereof, said fastening of the several carriages to said endless conveyor element being the only attachment of said carriages to the machine and said slideway being the sole support of said carriages.

4. In a machine for folding and adhering together the end flaps of cardboard cartons and the like, a substantially horizontal deck, an endless conveyor element mounted horizontally a short distance above said deck, a series of carton carriages fastened in spaced relationship to said endless conveyor element and supported for movement over said deck, means for driving said endless conveyor member, folding mechanism mounted some distance above said deck in the paths of the several end flaps of the cartons travelling in said carriages, said folding mechanism including an overhanging arm having a depending flap-engagement element for folding the rear end flap forwardly and inwardly, a rotary shaft, to which said arm is fixed, said shaft extending substantially vertically and having a bearing supported from said deck as its sole means of support and a driven element fixed to said shaft and engaging the inner surface of said conveyor element to be driven therefrom.

5. In a machine for folding and adhering together the end flaps of cardboard cartons and the like, a plurality of carton carriages each provided with means for holding a filled carton in upright position with its end flaps at its open end disposed upright, conveyor mechanism for moving said carriages in spaced relationship through a substantially horizontal course, means for applying adhesive to at least one of the end flaps of each of said cartons during their travel, means for successively folding the end flaps of said cartons inwardly during travel to close said open ends and adhere said flaps, means for tiltably ejecting said cartons successively to laterally drop the same in inverted positions and an impact member, against which the inverted ends of said cartons are delivered for causing a further adherance of said end flaps due to the impact action of the fillings in said carton.

6. The structure set forth in claim 5, and a declined chute for receiving said cartons when ejected, said impact member being disposed at the lower end of said chute and extending substantially perpendicular thereto and said chute having an opening in the lower portion thereof, slightly greater than the length of the filled carton whereby after impact the carton will drop downwardly through said opening.

7. In a machine for folding and adhering together, the end flaps of cardboard cartons and the like, a plurality of carton carriages, conveyor mechanism for moving said carriages in spaced relationship through a substantially horizontal course, each of said carriages having a carton holder mounted thereon for tilting relation on a longitudinal, horizontal axis, said holders being adapted to position a carton upright with its flaps at its open end disposed outwardly, means for applying adhesive to at least one of the end flaps of each of said cartons during their travel, means for successively folding the end flaps of said cartons inwardly during travel to close said open ends and cause adhesion of said flaps, means operative through the travel of said carriages for tilting said holders to eject said filled carton successively after folding of the said flaps, said tilting causing said filled cartons to be dropped in inverted positions and an impact member against which the inverted ends of said cartons are dropped to cause further adherance of said end flaps due to the impact action of the material in said cartons.

8. In a machine for folding and adhering together the end flaps of cardboard cartons and the like, a plurality of carton carriages, said carriages having vertical openings therethrough, a vertical carton holder for a carriage adapted to hold an open ended carton surrounding the same, said holder having an enlarged vertical air passage therethrough, said passage being divided adjacent its upper end to form a pair of discharge ducts at the top of said holder, means for moving said carriages through a substantially horizontal course, means for closing and adhering the flaps at the upper end of cartons held and a source of upwardly directed air under pressure mounted below said carriages in position to momentarily register with the bottom of said carriages after said ends are closed and adhered, whereby the draft of air discharged through the two ducts in the upper portion of said respective holders will cause forcible ejection of said cartons from the machine.

9. In a machine for folding and adhering together the end flaps of cardboard cartons and the like, mechanism for moving a series of cartons in spaced upright position, through a predetermined, substantially horizontal path, means operative upon said end flaps during said travel of said cartons for successively folding the same inwardly, means for applying adhesive to both upper and lower sides of at least one of said flaps to adhere said several flaps together in interfolded relationship, said means including an applicator roller having a floating mounting for efficiently accommodating flaps varying in thickness and regularity and means operative after folding and adhering of said flaps to sharply crease the then top end of said carton along lines adjacent the folding lines of two of said flaps and parallel to the direction of travel of said carton to overcome resistance of the carton material against said folding and to thereby increase adherance.

10. The structure set forth in claim 9 and means for tiltably ejecting said cartons successively to laterally drop the same in inverted positions and an impact member against which the inverted ends of said cartons are dropped for causing a further adherance of said end flaps due to impact action.

11. Mechanism for simultaneously applying adhesive to both upper and under surfaces of a horizontally disposed flap traveling through a substantially horizontal path, comprising a glue tank, a lower applying roller having its lower peripheral portion immersed in said tank and having its upper periphery disposed in position to tangentially engage the underside of a flap during travel, an upper, cooperating applying roller mounted substantially in vertical alignment with said lower roller and having a floating annular element for tangential engagement against the upper side of a flap and means for guiding said annular element for floating action thereof without tilting of its axis and a pivoted, weighted arm mounted above said upper roller, said weighted arm carrying a pressure-applying roller tangentially engaging the upper periphery of said upper applying roller.

12. In a machine for folding and adhering together the end flaps of cardboard containers and the like where a series of cartons are moved in spaced, upright positions through a substantially horizontal path, and the flaps thereof are successively folded inwardly, mechanism for simultaneously applying adhesive to both the upper and under surfaces of a folded, horizontal flap comprising an adhesive tank, a lower adhesive-applying roller having its lower portion immersed in said tank and having its upper periphery disposed in position to tangentially engage the underside of a flap during travel, an upper cooperating adhesive applying and pressure applying roller structure mounted substantially in vertical alignment with said lower roller and comprising a pair of spaced generally circular retaining elements affixed to a driven shaft and a floating annular roller element encircling said shaft and having spaced relation thereto for effecting floating action relative to said first mentioned roller whereby said annular element may engage adhesive on the periphery of said first roller and then float to engage and apply adhesive and weight against the upper surface of a flap.

13. The structure set forth in claim 12 wherein said roller elements are mounted upon parallel shafts and are interconnected for driving in opposite directions.

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