

Jan. 25, 1927.

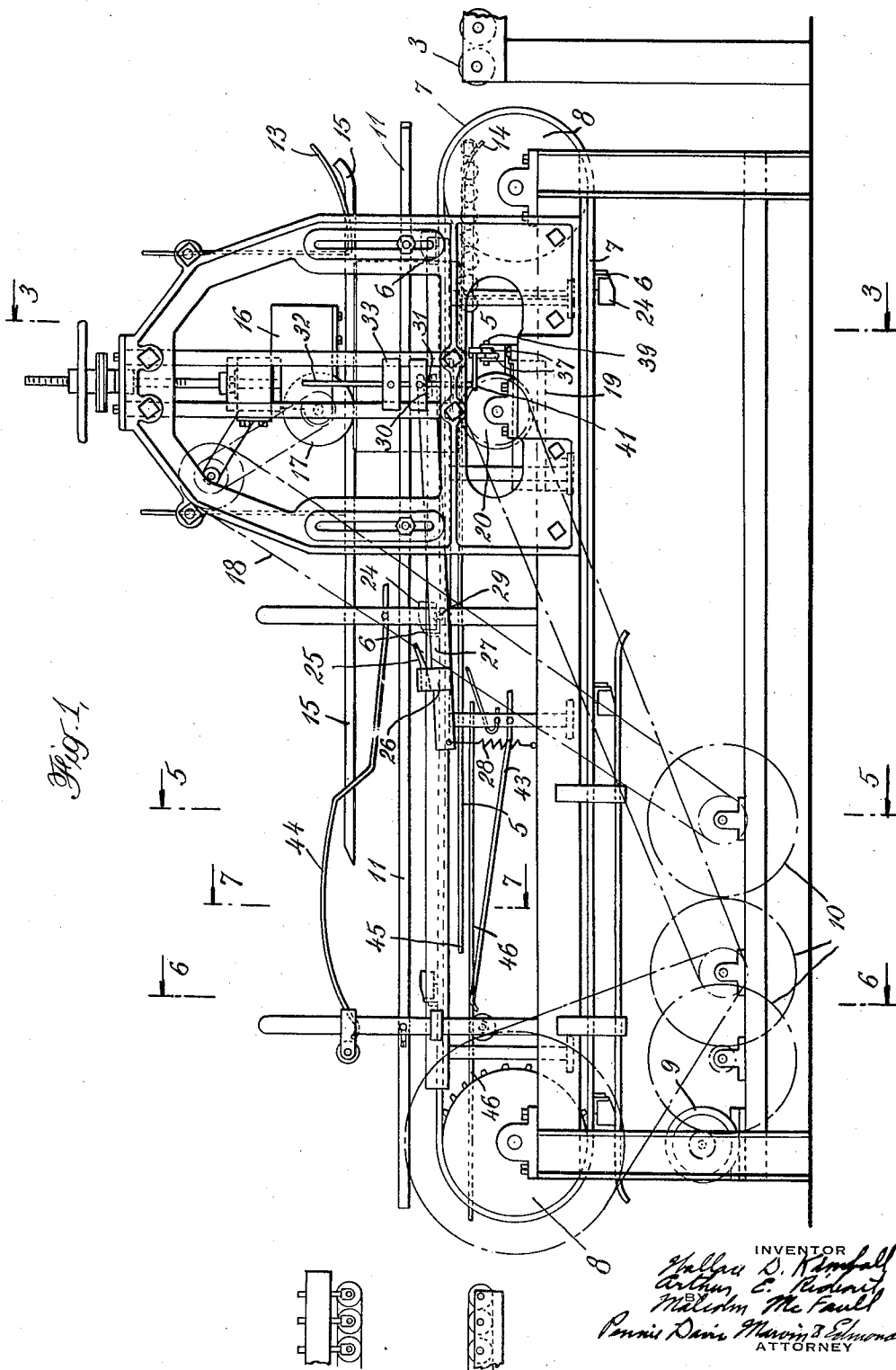
W. D. KIMBALL ET AL

1,615,631

FILLED CARTON CLOSING AND SEALING MACHINE

Filed Nov. 1, 1924

4 Sheets-Sheet 1



Jan. 25, 1927.

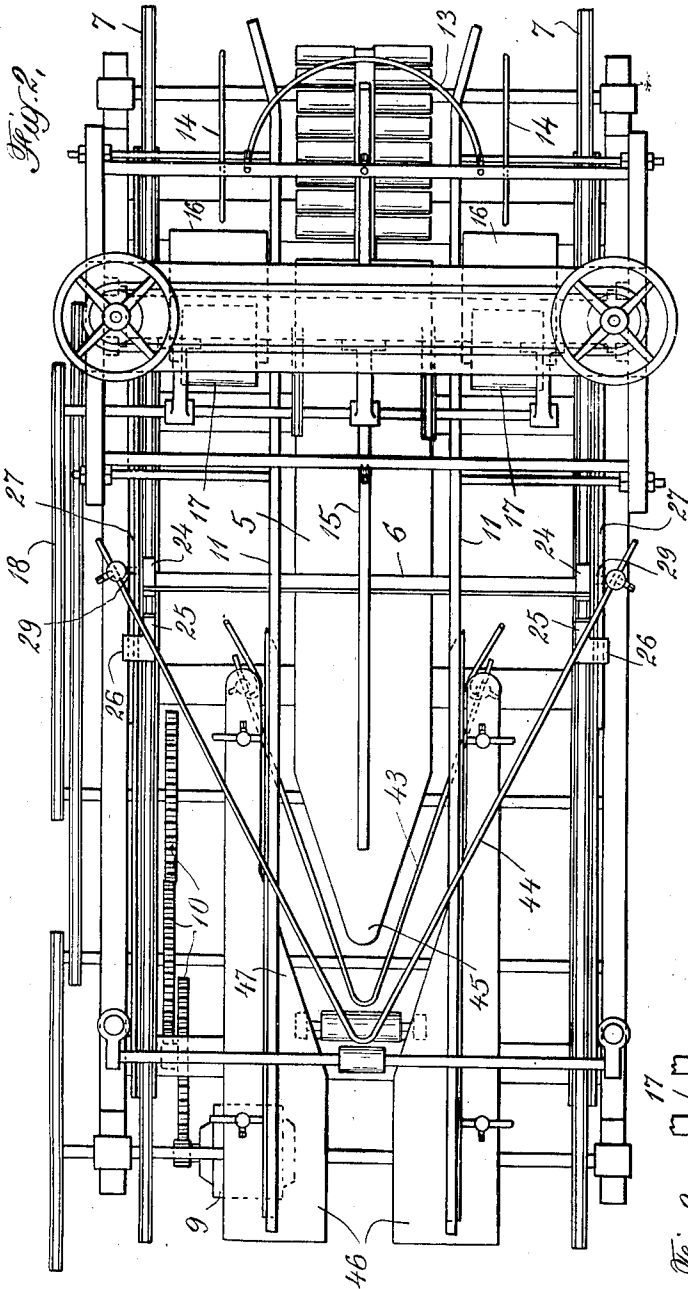
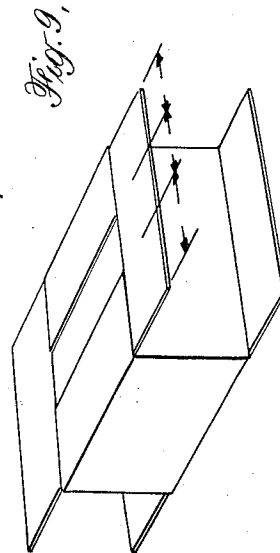
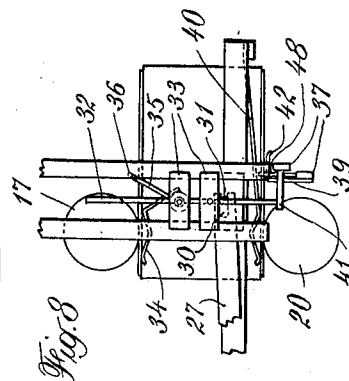
W. D. KIMBALL ET AL

1,615,631

FILLED CARTON CLOSING AND SEALING MACHINE

Filed Nov. 1, 1924

4 Sheets-Sheet 2



INVENTOR
Walter D. Kimball
Arthur E. Ridout
Mabel M. The Paull
Perrin Davis Martin & Edwards
ATTORNEY

Jan. 25, 1927.

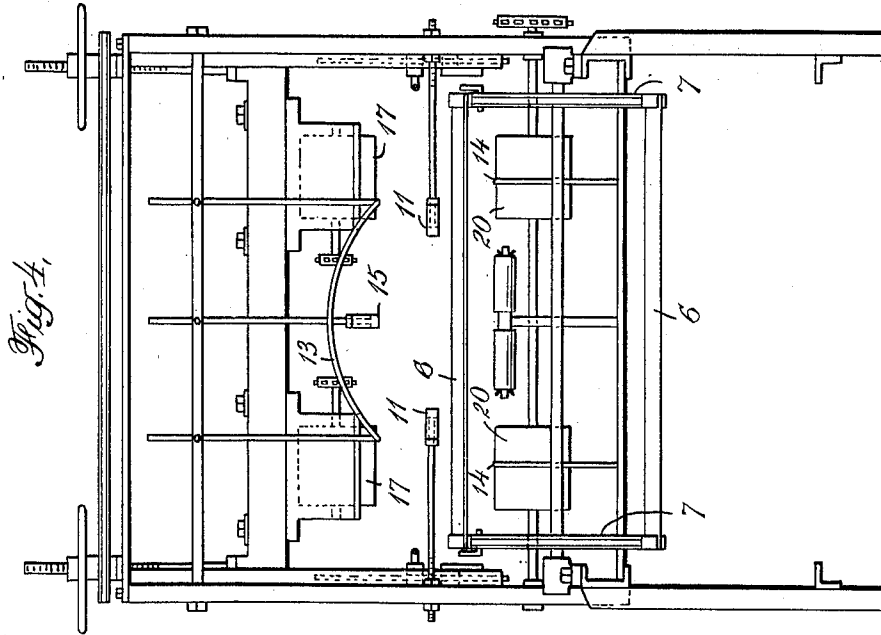
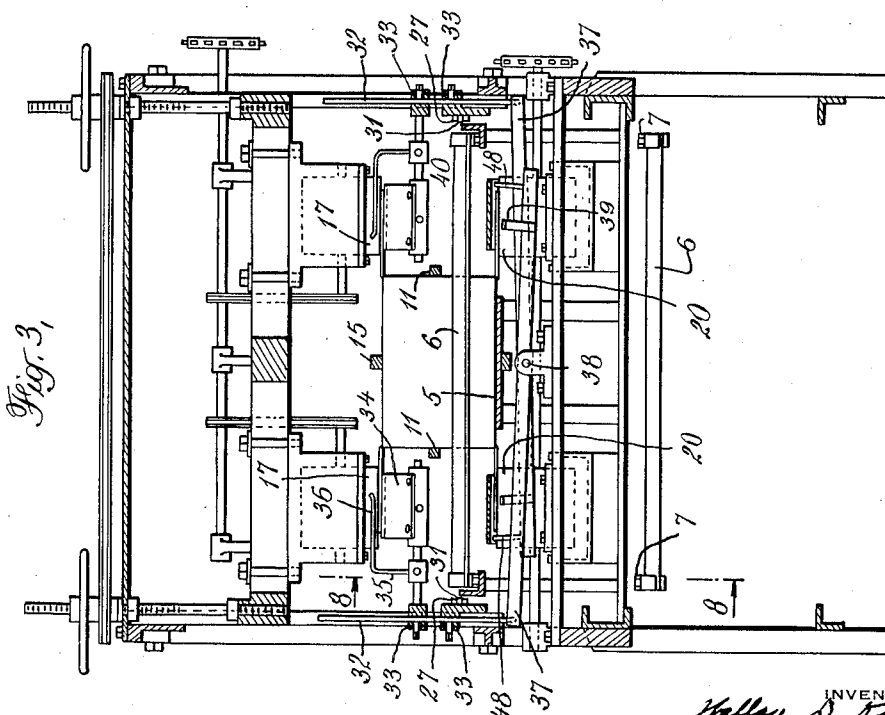
W. D. KIMBALL ET AL

1,615,631

FILLED CARTON CLOSING AND SEALING MACHINE

Filed Nov. 1, 1924

4 Sheets-Sheet 3



INVENTOR
William D. Kimball
Arthur E. Richards
Morton M. Powell
PENNIE DAVID MARIN & EDMONDS
ATTORNEY

Jan. 25, 1927.

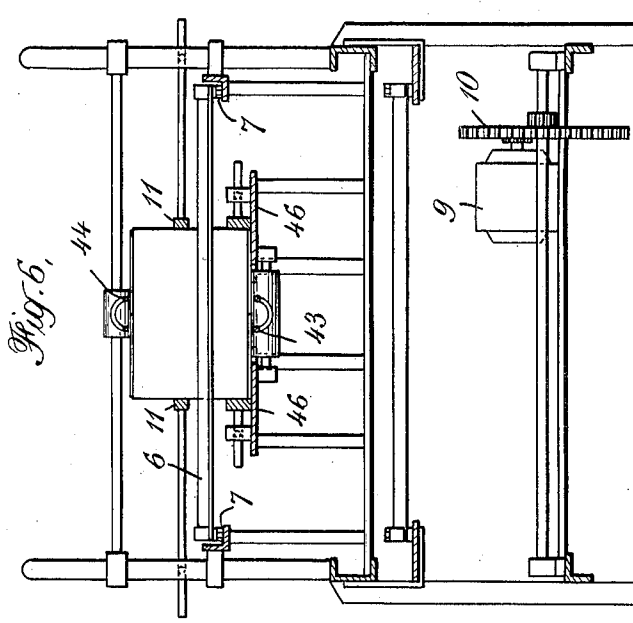
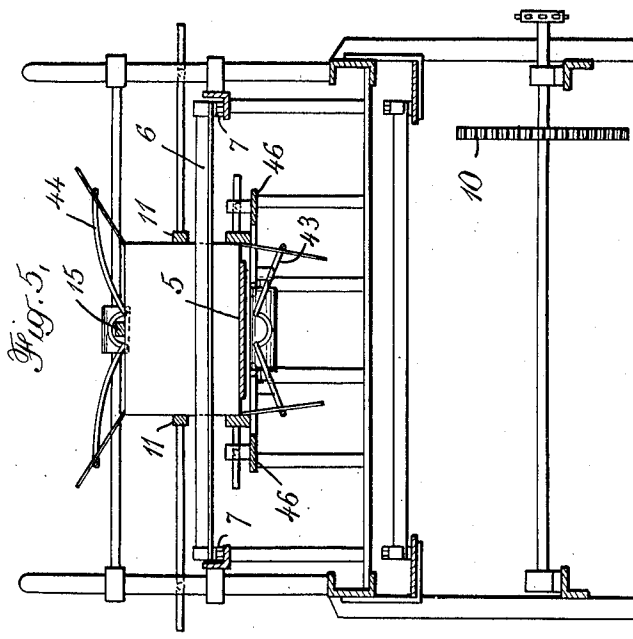
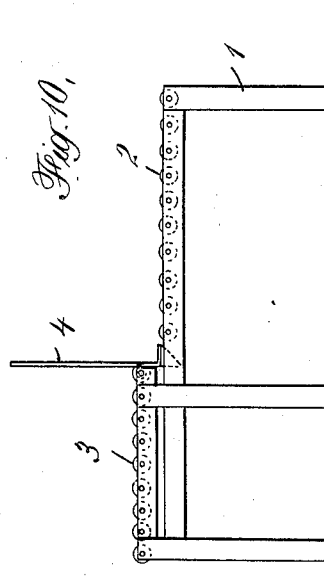
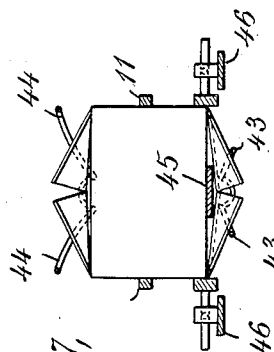
W. D. KIMBALL ET AL

1,615,631

FILLED CARTON CLOSING AND SEALING MACHINE

Filed Nov. 1, 1924

4 Sheets-Sheet 4



INVENTOR
William D. Kimball
Arthur E. Redwood
Marceline McFaul
Pennie & Davis Marvin & Edmund
 ATTORNEY

Patented Jan. 25, 1927.

1,615,631

UNITED STATES PATENT OFFICE.

WALLACE D. KIMBALL, ARTHUR E. RIDEOUT, AND MALCOLM McFAULL, OF NEW YORK, N. Y., ASSIGNORS TO STANDARD SEALING EQUIPMENT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

FILLED-CARTON CLOSING AND SEALING MACHINE.

Application filed November 1, 1924. Serial No. 747,186.

The present invention relates to apparatus for sealing filled cartons and has to do particularly with applying the silicate or other sealing medium to the carton flaps and then folding the silicated flaps into closed position.

Fibre board or composition cartons of the type commonly used in shipping packaged goods are usually closed by applying adhesive or cement to the carton flaps to thus glue the flaps shut. A carton properly sealed in this fashion is stronger and more durable than a carton closed as for instance, by stitching. The carton blanks as supplied to the trade consist of a body portion which is to ultimately constitute the four side walls of the packed carton and a series of cooperating flaps depending from the respective ends of each of the four side walls. These depending portions constitute two inner flaps and two outer flaps designed to be folded over the inner flaps at right angles to them to thus ultimately constitute a closure at the ends of the carton. While the bottom flaps of the carton may be sealed before the carton is packed, such procedure is not commercially practicable, and it is customary to pack the carton with the bottom flaps folded but not sealed and then subsequently silicate and seal both the top and bottom flaps at the same time. The packed carton when it is ready for sealing consists of the carton blank with its bottom flaps folded into position and with its upper flaps loosely folded in such position as they may assume without being subjected to any closing pressure. In order to seal the cartons the outer top and bottom flaps must be unfolded, given a suitable coating of silicate and closed.

It is the intent of the present invention to provide an apparatus for satisfactorily applying the silicate to the carton flaps in the proper fashion and closing and sealing the gummed flaps to form a permanent and durable closure. To this end the apparatus comprises suitable means for passing the carton through the apparatus and for silicating the flaps and closing them without attention on the part of the operator. Suitable provision is made for bringing the carton flaps into outwardly extended relation so that the silicate can be applied to their inner surfaces.

It is a principal object of the invention to provide a suitable means for folding the silicated flaps into closed relation without in any way spreading or otherwise interfering with the layer of moist silicate which has been applied to the flaps.

It is a further principal object of the invention to provide for the application of the coating of silicate to a desired portion of the length of the respective flaps. In the manufacture of cartons, the outer flaps are designed to substantially abut when they are folded into closed position. The length of the inner flaps, however, is determined to a large extent by the amount of material which is available to form these flaps without waste. For this reason the inner flaps frequently do not meet when they are folded into closed position and, if silicate is applied to the entire length of the outer flaps, not only will those portions of the outer flaps which lie adjacent the inner flaps be silicated, but also the portions of the outer flaps which lie opposite the gap between the adjacent ends of the inner flaps. The result is that during the sealing operation when pressure is exerted upon the flaps, those portions of the silicated outer flaps lying above the gap between the ends of the inner flaps will be pressed into contact with the packages contained in the carton with the result that the flaps will be sealed to the packages and the packages will be valueless because they cannot be removed from the carton without being torn or otherwise defaced.

We have illustrated a preferred embodiment of our invention in the accompanying drawings in which Figure 1 is an elevational view showing an apparatus embodying our invention; Figure 2 is a plan view of the apparatus shown in Figure 1; Figure 3 is a sectional view of the apparatus taken on line 3—3 of Figure 1; Figure 4 is an end view of the silicate applying and flap closing machine taken from the end of the machine at which the cartons are introduced; Figure 5 is a sectional view of the apparatus taken on line 5—5 of Figure 1; Figure 6 is a sectional view of the apparatus taken on line 6—6 of Figure 1; Figure 7 is a detail view taken on line 7—7 of Figure 1; Figure 8 is a detail view of a portion of the mechanism shown in Figure 1; and Figure 9 is a perspective view illustrating the filled unsealed

carton in condition for introduction into the flap silicating and folding mechanism; and Fig. 10 is a detail of the pivoted supporting strip on the supporting table.

Referring to the drawings, 1 indicates the frame of the supporting table along which the unsealed filled cartons are passed prior to having their flaps gummed and sealed. Supporting table 1 (as shown in Figure 10) consists of an initial section 2 and an additional section 3 elevated somewhat above the first section. Pivotaly mounted upon the supporting table is a plate or strip 4 normally standing in vertical position as shown. The operator moves along the table 2 a filled carton resting upon its folded unsealed bottom flaps until the forward end of the carton engages with the member 4. He then folds out the outer top flaps and bodily turns the carton up into vertical position so that its upper face rests against the member 4. He then continues to bodily turn the carton over in a forward direction whereupon the strip 4 turns about its pivot and the carton comes to rest with its upper face lying flat against the supporting table 3 and with its outer flaps lying extended against the surface of the table. Strip 4 is provided to retain the contents of the carton in position during the bodily inversion of the carton. The operator then folds out the outer flaps which are now at the upper face of the carton so that the carton assumes substantially the relation indicated in Figure 9.

The carton with its outer top and bottom flaps thus extended is introduced into the flap silicating and folding apparatus. The carton is passed thru the apparatus along a suitable supporting table or platform 5 and is propelled through the apparatus by a carrier comprising cross bars 6 extending between endless chains 7 operating over suitable driving sprockets 8 arranged in such fashion that each of the two driving chains extends longitudinally along one side of the apparatus. The cross bars 6 engage with the rear end of the cartons and push them along through the apparatus at a speed corresponding to the movement of the driving chains. The motive power for operating the apparatus is derived from an electric motor 9 which supplies power to the driven parts of the mechanism through appropriate gearing indicated generally at 10. (Fig. 6.)

As the carton enters the apparatus it is centered in a widthwise direction by means of guides 11 which engage the respective sides of the carton and extend throughout the length of the apparatus so that proper widthwise positioning of the carton is insured at all times during its passage through the apparatus. For the purpose of insuring that the outer top flaps will be held in properly extended relation a guide member 13 is provided to engage these flaps and

maintain them folded out into laterally extended position as shown. Guide members 14 positioned beneath the carton accomplish a like function with respect to the bottom carton flaps and serve to hold these flaps also in horizontally extended relation. A guide member 15 engages with the inner top flaps and presses them down into closed relation during the entire passage of the carton through the apparatus.

The carton with its outer top and bottom flaps extended is then passed under the action of the silicate applying mechanism. The silicate or other suitable sealing medium is contained in suitable reservoirs 16 positioned above the carton from whence it is withdrawn through the medium of rolls 17, which rolls are in contact with the extended top carton flaps and serve to apply a layer of silicate to these flaps. The silicate applying rolls 17 are driven through chain and sprocket connections 18, the driving power being derived from the motor 9. Silicate for application to the lower carton flaps is derived from reservoirs 19 positioned beneath the carton and is withdrawn from the reservoirs and applied to the carton flaps through the medium of rolls 20 which are also driven through a chain and sprocket connection with the other moving parts of the apparatus. Thus in its passage of the carton through the apparatus the flaps receive a coating of silicate after which they are in condition to be folded down into closed position to constitute the sealed carton.

The inner flaps of the cartons as supplied to the trade commonly do not meet when folded into closed position. Frequently a gap of several inches occurs between the adjacent ends of the closed inner flaps. In order to apply silicate only to those portions of the outer flaps which when closed lie in contact with the inner flaps and to omit the application of silicate to those portions of the outer flaps which lie above the gap between the ends of the closed inner flaps, the present invention provides for withdrawing the flaps out of contact with the silicate applying rolls at a predetermined point in the travel of the carton past the rolls and then returning the flaps into contact with the rolls at a predetermined point so that the desired portions of the outer flaps will be skipped by the silicate rolls and will be left dry.

The withdrawing of the flaps out of engagement with the silicate applying rolls in order to leave portions of the flaps unsilicated is effected in timed relation with the passage of the carton through the apparatus. To this end the cross members 6 which serve to propel the carton through the apparatus are provided at their respective ends with cam actuating members 24 which cooperate with cams 25 and serve to lift the cams 25

bodily so that the entire member 24 passes beneath the cam. The length of time during which the cam 25 is maintained in raised position is determined by the length of the cam. By making the cam longer a greater length of time will elapse before the actuating member 24 passes out from beneath the cam and in this way the period of elevation of the cam 25 may be varied. An apparatus of the character referred to herein is commonly employed for sealing a single type of carton and for this reason cams 25 of the proper kind may be supplied with the machine as initially manufactured and no necessity of altering these cams will arise unless the machine is employed to seal a carton which requires that the silicate be applied differently to the flaps. Cams 25, however, are detachable and hence any desired type of cam may be placed on the machine in a few moments time. The cam 25 is carried on an arm or bracket 26 which in turn is supported upon a rod or bar 27 extending along the side of the apparatus and being acted upon at one end by a coil spring 28 which serves to hold the cam 25 in its lowermost position except when it is positively raised by the action of the cam actuating member 24. The arm 27 is pivoted at a point 29 intermediate its ends to the frame of the apparatus. At its end opposite cam 25 the bar 27 is slotted as indicated at 30 to receive a projecting pin 31 movable with the vertically positioned rod 32 which is mounted for reciprocatory movement in the frame of the apparatus. Upon actuation of the cam 25 by reason of the actuating member 24 passing under it, the rod 27 is rocked about its pivot 29 with the result that, through the pin and slot connection, the rod 32 is reciprocated vertically. As the actuating member 24 passes under the cam 25 the rod 32 is moved downwardly. It is held in its lowermost position until the actuating member 24 passes out from under the cam 25 at which point the spring 28 rocks the bar 27 and serves to positively return the rod 32 to its initial position at the uppermost extent of its movement.

The vertical reciprocation of the rod 32 serves to control the position of the carton flaps with respect to the silicate applying rolls. This controlling mechanism is illustrated in detail in Figure 8. A resilient member 34 is fixedly associated with the vertically reciprocating rod 32 and is normally in contact with the underside of the outer top carton flap so that the flap is positively pressed into silicate applying engagement with the rolls 17. An arm 35 carrying a projection or pin 36 is also mounted for movement with the reciprocating rod 32, and the projection 36 extends out over the carton flap so that upon downward movement of the rod 32 and member 35 the pro-

jection 36 will engage with the carton flap and move it out of engagement with the silicate applying roll 17. The projection 36 normally rests somewhat above the carton flap as shown in Figure 8. With this arrangement, downward movement of the rod 32 will result first in removing the resilient member 34 from contact with the carton flap, thus relieving the pressure between the flap and the silicating applying roll, after which the pin 36 will come into contact with the flap and thus positively disengage the flap from contact with the roll 17. There is no appreciable time lag between the relieving of the pressure on the carton flap and the positive withdrawal of the flap from contact with the roll.

Actuation of cam 25, therefore, by reason of the travel of the carton propelling members 6 serves to reciprocate rod 32 at a predetermined point in the travel of the carton through the apparatus and thus withdraw the upper carton flap from contact with the silicate applying roll at the proper point. Cam 25 serves to hold the rod 32 in lowermost position and thus maintain the flap out of silicate applying engagement with the roll 17 for a desired length of time, after which the rod 32 returns to normal position with the carton flap pressed into engagement with the roll 17. The rod 32 with its associated mechanism is duplicated at the respective sides of the machine so that each rod serves to control the application of silicate to one of the outer top flaps of the carton.

At the lower end each of the rods 32 engages with a projection 41 connected to a cross bar 37 which extends transversely of the apparatus and is pivoted at about the center of its length as indicated at 38 in Figure 3. The cross member 37 which is associated with the rod 32 at the left of the apparatus as viewed in Figure 3 carries an upstanding arm 39 which is adapted to engage with the underside of the outer bottom carton flap adjacent the right hand side of the apparatus. A flat spring member 40 positioned above the bottom carton flap normally lies in engagement with the flap and presses the flap into contact with the silicate applying roll 20. Upon reciprocation of the rod 32 downwardly the cross member 37 is rocked about its pivot 38 with the result that the upstanding arm 39 is moved upwardly. As best shown in Figures 3 and 8 the member 37 carries a pin 48 which upon upward movement of the member contacts with the flat spring 40 and moves the spring upward so that it no longer applies pressure to the carton flap. The arm 39 at its turned-over upper end 42 is adapted to come into contact with the bottom of the carton flap and thus positively move the flap upward out of engagement with the silicate applying roll 20. Thus upon rocking

of the members 37 the pressure on the carton flap is first relieved by reason of the projection 48 pushing the spring 40 out of contact with the carton flap and then immediately the portion 42 of the member 39 engages with the carton flap and moves it out of contact with the silicate applying roll 20. This operation occurs upon depression of the vertically reciprocating rod 32 and occurs simultaneously with the removal of the top carton flap out of contact with the silicate apply roll.

Each of the rods 32 controls the movement of one of the top carton flaps and the bottom flap which is attached to the diagonally opposite corner of the carton. In this fashion, actuation of the cams 25 in timed relation with the travel of the carton through the apparatus serves to simultaneously remove all four of the outer carton flaps from contact with the silicate applying rolls at a predetermined point on the flap and, after the carton has been advanced a predetermined distance, to simultaneously return all of the flaps into silicate applying relation with the rolls with the result that a desired space at the middle of the flap is left dry while the remainder of the flap is covered with silicate.

After the carton issues from the action of the silicating rolls, it is propelled along the table 5 until its freshly silicated bottom flaps come into contact with the flap folding member 43 and the top flaps come under the action of the flap folding member 44. Each of the flap folding members 43 and 44 consists of arms spread apart to engage the outstanding flaps of the carton and approaching nearer to each other in the direction of movement of the carton through the apparatus so that as the carton is passed along its flaps will be gradually closed. The table 5 is narrowed down as indicated at 45 for the purpose of affording the bottom flaps an opportunity to close. A table 46 is provided to receive the cartons as they issue from the tapered end 45 of the table 5 with their flaps sealed. The table 46 is preferably provided with wing portions 47 extending out in parallelism with the tapered edges of the tapered end 45 so that adequate support for the carton will be secured upon its issuance from the table 5.

The table 46 is positioned at a somewhat lower level than is table 5. The purpose of this is to permit the rear ends of the bottom carton flaps to remain open after the front ends of the flaps have become completely closed. By this means the bottom flaps of the carton may be sealed without closing the freshly silicated flaps upon the table portion 45 or any other part of the apparatus. Scraping or wiping off of the freshly applied silicate onto the parts of the apparatus is thus avoided. The action of the

apparatus as the carton leaves the table portion 45 is probably best shown in Figure 7. In this figure the carton has proceeded to such extent that the flap folding arms 43 and 44 have completely closed the carton flaps at their forward ends. By reason of the fact that the forward end of the carton is tilted downwardly an amount represented by the distance of table 46 below table 5 the bottom flaps tend to remain open toward the rear of the carton after the fashion shown in the figure. The bottom flaps will not be fully closed until the entire carton is permitted to descend to the level of table 46. The result is that the rear portions of the bottom flaps remain somewhat open until the carton has slid completely off of the table portion 45.

The carton with its flaps silicated and folded is then passed along into a suitable pressure applying apparatus where the cartons are permitted to remain until the silicate has set. Any suitable type of pressure applying apparatus may be used for this purpose, such for example, as that disclosed in U. S. Patent No. 1,482,197, granted January 29, 1924, to Wallace D. Kimball.

It will be understood that in using the term "silicate" in this specification and in the claims which follow we do not intend to restrict its meaning to that of silicate of soda only but, on the other hand, intend to include within the meaning of this term any adhesive material suitable for sealing the flaps of cartons in the manner described.

We claim:

1. Carton sealing apparatus of the class described comprising a carrier for propelling the carton through the apparatus, means for applying silicate to the carton flap, and means actuated by said carrier for moving the carton flap out of silicate applying relation therewith at a predetermined point in the travel of the carton through the apparatus whereby a portion of the carton flap remains unsilicated.

2. Carton sealing apparatus of the class described comprising a carrier for propelling the carton through the apparatus, means for applying silicate to the carton flap, means actuated by said carrier for moving the carton flap out of silicate applying relation at a predetermined point in the travel of the carton and means actuated by said carrier for returning the flap at a predetermined point whereby a portion of the flap intermediate silicated portions of the flap remains unsilicated.

3. Carton sealing apparatus of the class described comprising a carrier for propelling the carton through the apparatus, means for applying silicate to the carton flaps, means actuated by said carrier for effecting positive removal of the carton flaps out of silicate applying relation at a predetermined

point in the travel of the carton through the apparatus and means actuated by said carrier for effecting positive return of the carton flaps into silicate applying relation at a predetermined point of said travel.

4. Carton sealing apparatus of the class described comprising means for applying silicate to the carton flap, resilient means for normally holding the flap in silicate applying relation, means for relieving the flap of the pressure of said resilient means at a predetermined point in the travel of the carton through the apparatus and then effecting a positive withdrawal of the carton flap away from said silicate applying means and for effecting positive return of said flap to silicate applying relation at a predetermined point in the travel of the carton through the apparatus and bringing said resilient means into pressure applying relation.

5. Carton sealing apparatus of the class described comprising means for propelling the carton through the apparatus, means for applying silicate to the carton flaps, means for withdrawing one of the top carton flaps from silicate applying relation with the applying means at a predetermined point in the travel of the carton through the apparatus and means associated therewith for similarly withdrawing a bottom carton flap from silicate applying relation with the silicate applying means.

6. Carton sealing apparatus of the class described comprising means for propelling the carton through the apparatus, means for silicating the carton flaps, means actuated in timed relation to the passage of the carton through the apparatus for withdrawing one of the top carton flaps from silicate applying relation and means associated therewith for removing the opposite bottom flap from silicate applying relation.

7. Carton sealing apparatus of the class described comprising means for passing the carton through the apparatus, means for silicating the carton flaps, and means for applying silicate to the end portions of the carton flaps and leaving the middle portion of said flaps unsilicated, said means comprising members positioned at the respective

sides of the apparatus for alternately bringing the carton flaps into silicate applying relation and withdrawing said flaps from silicate applying relation so that portions only of said flaps are silicated, each of said members controlling one of the top carton flaps and the opposite bottom flap.

8. Carton sealing apparatus of the class described comprising means for propelling the carton through the apparatus, means for silicating the carton flaps, means for closing the silicated bottom flaps, a support engaging the carton within the flaps being closed and a second support arranged in advance of and at a lower level than said first mentioned support, whereby contact of said first mentioned support with the freshly applied silicate is avoided.

9. Carton sealing apparatus of the class described comprising means for propelling the carton through the apparatus, means for applying silicate to the carton flaps, means for closing the bottom carton flaps by first contacting with the forward ends of said flaps and means for tilting said carton forward as it is acted upon by said flap closing means to thereby insure progressive closing of the flaps from the front of the carton toward the rear.

10. Carton sealing apparatus of the class described comprising means for propelling the carton through the apparatus, a support engaging the carton along the middle of its width, a second support for receiving from said first mentioned support cartons having their bottom flaps closed, said second support being arranged at a level lower than that of said first mentioned support, and a member for closing said bottom flaps which extends upward to the level of said lower support whereby the outer bottom carton flaps remain partially open until the carton rests entirely on said lower support.

In testimony whereof I affix my signature.

WALLACE D. KIMBALL.

In testimony whereof I affix my signature.

ARTHUR E. RIDEOUT.

In testimony whereof I affix my signature.

MALCOLM McFAULL.