Sept. 6, 1927. 1,641,794

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CARTON CLOSING MECHANISM

Filed May 15, 1926 3 Sheets-Sheet 1

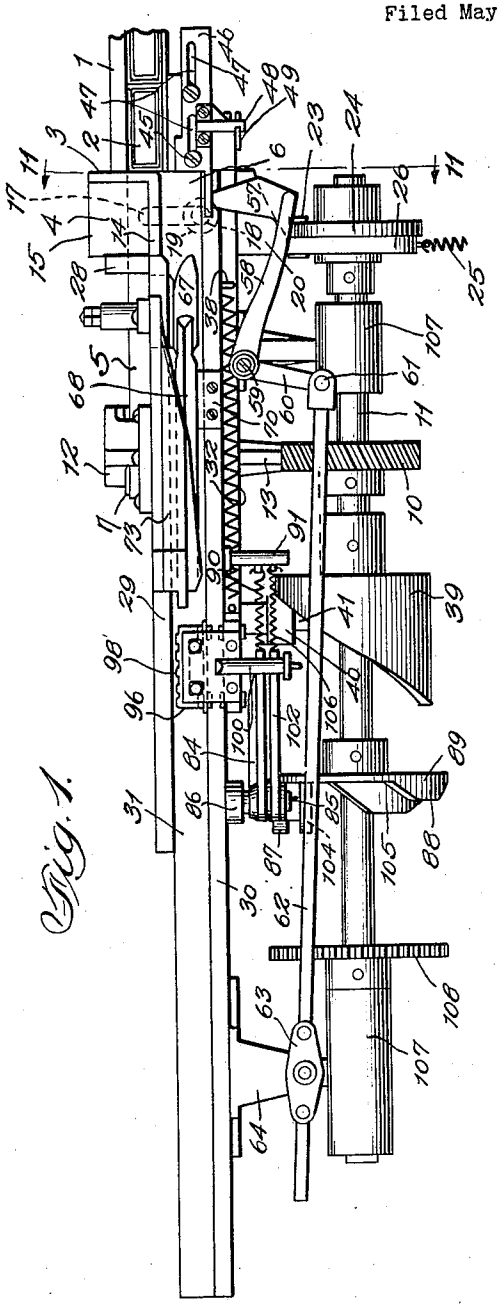


Fig. 1.

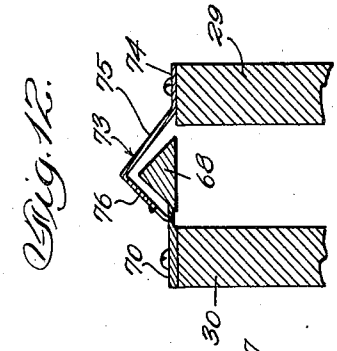


Fig. 1a.

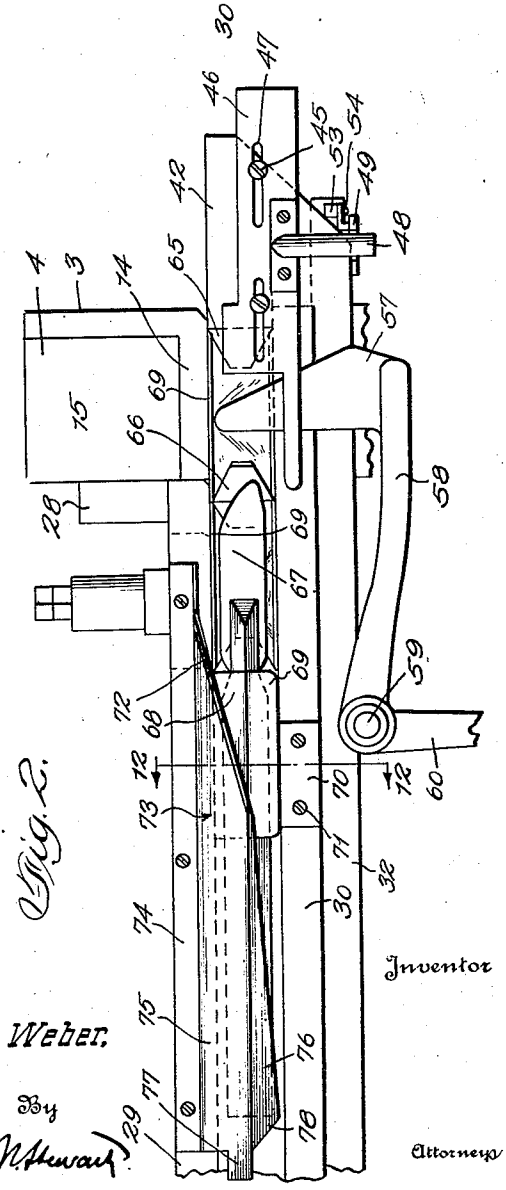


Fig. 2.

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Filed May 15. 1926 3 Sheets-Sheet 2

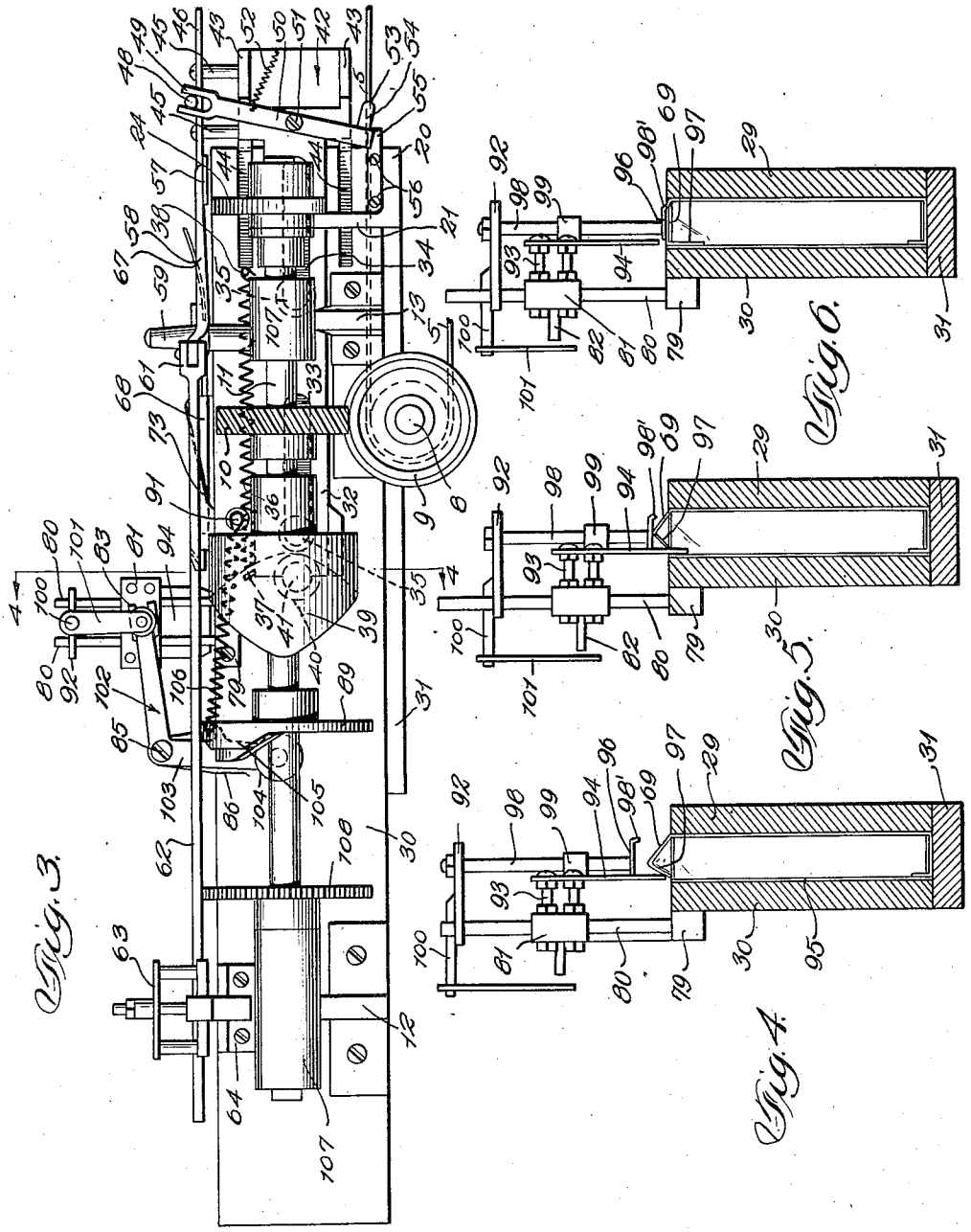


Fig. 3.



Fig. 6.



Fig. 5.



Fig. 4.

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CARTON CLOSING MECHANISM

Filed May 15, 1926 3 Sheets-Sheet 3

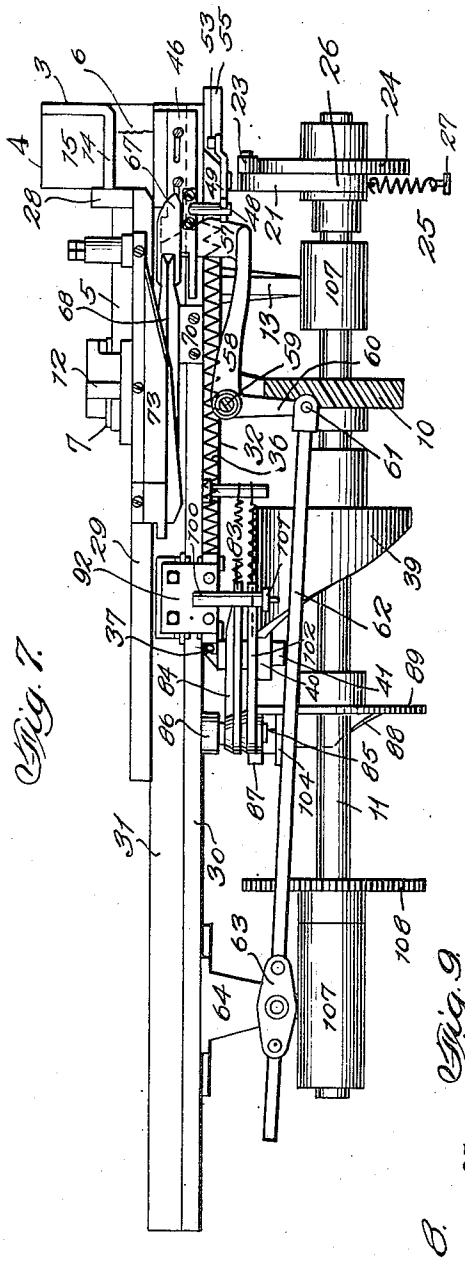


Fig. 7.

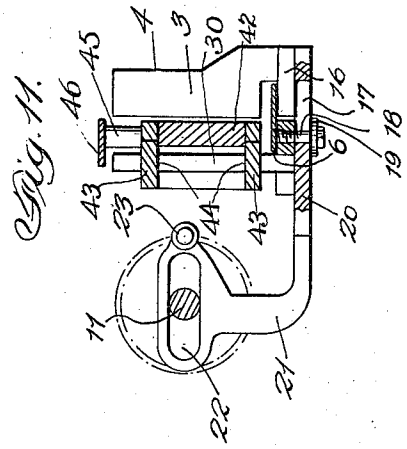


Fig. 11.

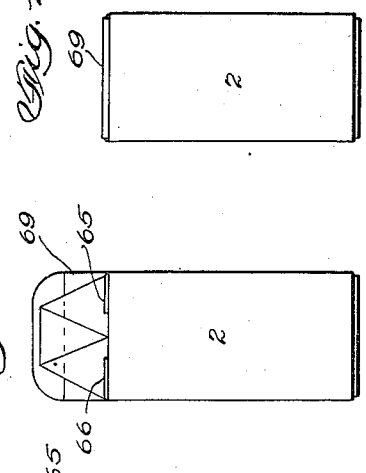


Fig. 10.

Fig. 9.

Fig. 8.

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# UNITED STATES PATENT OFFICE.

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## CARTON-CLOSING MECHANISM.

Application filed May 15, 1926. Serial No. 109,208.

This invention relates to improvements in box or carton machinery, and more particularly to novel mechanism for closing pasteboard cartons after they have been filled with any desired substance. The device is especially useful for closing the small pasteboard cartons used for cough drops and the like.

It is customary in many factories at the present time, to use machinery for filling wax-paper lined cartons with the material to be sold, and to subsequently fold the upper end of the wax-paper lining and close the flaps at the top of the carton, by hand. This latter operation is not only slow and requires manual labor, but it is not as sanitary as might be desired.

The primary object of the present invention is to provide mechanism arranged to receive the open filled cartons from the filling machine, and to sequentially fold in the upper portion of the wax-paper lining; then fold one of the upper end side flaps and the wax-paper; then fold in the upper end of other side flap and the wax-paper; then fold the upper end back flap and the wax-paper; and finally insert the tongue of the back flap into the box and bend the back flap in such manner that said flap will remain in closed position.

Another object of the invention is to provide mechanism for performing these operations on a series of cartons one after the other; the mechanism being so designed that certain parts will be operating on one carton and performing certain operations, while other parts of the mechanism are performing other operations on other cartons of the series.

With the foregoing objects outlined, and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

Referring to the drawings:

Fig. 1 is a top plan view of the improved machine, showing the same arrangement at the end of the discharge runway of a filling machine, (the latter machine is not illustrated as it performs no part in the present invention).

Fig. 2 is an enlarged similar view of a portion of the closing machine, showing certain parts in another position to illustrate the manner of closing.

Fig. 3 is a side view of the machine.

Figs. 4, 5 and 6 are transverse vertical sectional views all taken on line 4—4 of Fig. 3, each showing the back flap closing mechanism in a certain position, to illustrate the manner of closing the back flap.

Fig. 7 is a view similar to Fig. 1, but showing the parts in a different position.

Fig. 8 is a view of the carton before closing the same.

Fig. 9 is a similar view of the carton after the end flaps have been folded.

Fig. 10 is a similar view of the carton after it has been closed.

Fig. 11 is a transverse vertical sectional view taken on line 11—11 of Fig. 1.

Fig. 12 is a sectional view taken on line 12—12 of Fig. 2.

In the drawing, 1 designates the discharge runway of a filling machine through which the open cartons 2 are fed one after the other in abutting relation. The end carton comes to rest temporarily against the vertical wall 3 of the transverse pusher 4 of the closing mechanism. The cartons rest on an endless belt 5, which passes over a stationary plate 6, arranged at the receiving end of the closing machine frame. The belt has one of its ends arranged on a pulley 7, mounted on a shaft 8, which carries a worm wheel 9, driven by a worm wheel 10, fixed on the main driving shaft 11. The shaft 8 is transversely arranged and is supported by depending brackets 12 and 13, carried by the frame of the machine.

The transverse pusher 4, preferably consists of an angular plate which includes the upwardly extending vertical walls 3 and 14, and the horizontal part 15. This angular plate is fixedly mounted on a horizontal stepped plate 16, a portion of which slides beneath the stationary plate 6, when the pusher is reciprocated laterally. The step plate has a transversely arranged slot 17 to receive a supporting pin 18 (see Fig. 11) depending from the frame of the machine. A bearing washer 19 engages the pin, and is arranged on the lower side of the stepped plate 16 to support the latter. The step plate has a bracket 20 projecting beyond one side of the frame and having an up-

wardly extending arm 21 provided with a horizontal slot 22, which receives the shaft 11. Due to this construction, the pusher 4 is adapted to reciprocate transversely and the following means are provided for causing this reciprocation. The arm 21 carries a roller 23 which rides on a cam 24, fixed at one end of the driving shaft 11. This cam will move the pusher in one direction, and a spring 25 will pull the pusher in the opposite direction, the spring has one of its ends connected to the arm 21, at the point 26, and the other end of the spring may be secured to any fixed part, as indicated at 27.

With this construction, it may be seen from Fig. 1 that the belt 5 which continuously moves, forces the cartons 2, toward the closing machine, and when the pusher 4 is moved in one direction a sufficient distance, the wall 3 will be moved out of the path of the end carton of the series, so that the belt will move the line of cartons and cause the end carton to abut against the end wall 28 of one of the vertical side walls 29 of the frame of the machine. Then, when the pusher 4 moves in the opposite direction, it will push the last mentioned carton to one side, and against the opposite vertical wall 30 of the frame. At this time it may be stated that the vertical walls 29 and 30, and horizontal plate 31 of the frame form a channel or guide-way for the cartons as best illustrated in Figs. 4, 5 and 6. The carton which has been moved into the channel or guide-way of the closing machine is now ready to be closed by the mechanism which will now be described.

Arranged at one side of the frame is a longitudinally sliding plate 32, having lengthwise slots 33 and 34 to receive the bearing pins 35, projecting from the side 30 of the frame. This sliding plate is pulled in one direction by a spring 36 having one of its ends connected to the plate at 37, and its other end connected to a pin 38, which is fixed to the side 30 of the frame. The sliding plate is moved in the opposite direction by a cam 39, which is fixedly mounted on the main driving shaft 11, and engages a roller 40, rotatable on a pin 41, which is fixed to the sliding plate 32.

The plate 32, is provided at one end with a longitudinal pusher 42, adapted to feed the cartons along the guide-way of the machine. The pusher includes parallel horizontal plates 43 which when the pusher is reciprocated slide in slots 44, located in the side plate 30 of the frame. Posts 45 extend upwardly from the pusher and function as bearings for a reciprocating folder plate 46, which is adapted to fold down one end flap of the carton with the wax-paper lining at that end. This plate has slots 47 for the pins 45, and an arm 48 projects horizontally from this plate. This arm engages a fork 49, arranged at the upper end of a lever 50, said lever being pivotally mounted at 51 on the pusher 42. A spring 52 has one of its ends connected to the lever, and its other end connected to the pusher for normally holding the plate 46 in the position shown in Figs. 1 and 3. Referring to these figures, it will be understood that when the pusher 42 commences to move toward the left, it will carry the lever 50 along with it, and at this time, a small roller 53, arranged on an arm 54 at the lower end of the lever, will engage a stationary cam 55, fixed by screws 56 on the wall 30 of the frame, so that the lever will be turned in a counter-clockwise direction to move the folder 46 relatively to the pusher, for forcing down the right end flap of the carton being operated upon. However, before this folding takes place, the main folder blade 57 has operated to fold in the upper end of the wax-paper lining, in the manner indicated in Fig. 2. This main folding blade is carried by a bell-crank lever 58, pivotally mounted at 59 on a vertical pin carried by the sliding plate 32. The arm 60 of the bell-crank is pivotally connected at 61 to a rod 62. This rod passes through a friction clamp 63, carried by a bracket 64 which is fixed on the side wall 30 of the frame. The friction clamp permits the rod 62 to yield, if undue resistance is offered to the blade 56, and due to this construction, the blade will be protected and be prevented from breaking.

It will therefore be seen that when the sliding plate 32 and pusher 42, are moving toward the left, the blade 57 will be moved into the position shown in Fig. 2 so as to bend in the upper end of the paper lining of the carton, and immediately after this, the sliding plate 46 will be shifted toward the left, slightly in advance of the pusher 42, so as to bend the end flap 65 of the carton downwardly, and with it, the wax-paper lining at this point.

As the pusher continues to move toward the left, it will push the carton in the same direction, until the other end flap 66 of the carton abuts against the stationary horizontal folding blade 67. When the flap 66 impinges against the blade 67, the latter will fold the flap downwardly, and with it the wax-paper lining at this point. The blade 67 is fixed to the inner folding member 68, which is adapted to fold the back flap 69 of the carton. This member 68 is triangular in vertical transverse cross section, and it is supported by a bracket 70, which is fixed by screws or the like 71, on the upper edge of the side wall 30 of the frame. As the carton moves along the guide-way of the frame, one side edge of its back flap will engage the inclined edge 72 of the outer back flap folding member

73. This member consists of a piece of sheet metal including a horizontal portion 74, an upwardly inclined portion 75, and a downwardly extending inclined portion 76; the portions 75 and 76 forming an inverted V-shaped section at the rear half of the member 73, the edge of which is rounded or beaded to prevent cutting the passing carton. The extremities 77 and 78 of the portions 75 and 76 are specially bent to insure bending the back flap into the position shown in Fig. 4.

From the foregoing, it will be understood that as the cartons are moved along the guide-way, the mechanism is timed to first, fold the wax-paper lining in, by the blade 57, then fold the flap 65 down, and with it the wax-paper adjacent the same, then fold the flap 66 down with the wax-paper beneath the same, and at this time, the spring 36 is beginning to pull the pusher back toward the right, so that the blade 57 is moved outward into position to start the following operation.

After the flaps have been folded, and the carton is in the condition shown in Fig. 4, it is pushed by the following cartons into position beneath the back flap tongue, inserting and creasing device. This is best illustrated in Figs. 4, 5 and 6. It consists of a bracket 79, fixed to the side wall 30 of the frame, and carrying rods 80 on which a carriage 81 reciprocates. This carriage has a projecting arm 82, engaged by a fork 83 on one end of the bell-crank lever 84. This bell-crank lever rocks on a shaft 85, carried by a bracket 86 supported on the side wall 30 of the frame. The depending arm 86 of this bell-crank lever carries a roller 87, which is actuated by a cam 88 arranged on a disc 89, which is fixed on a main drive shaft 11. The cam moves the lever in one direction, and a spring 90 moves it in the opposite direction. This spring has one of its ends connected to the lever, and its other end connected to a pin 91 fixed on the side wall 30 of the frame. As best shown in Figs. 4, 5 and 6, a second carriage 92 is also slidably mounted on the post 80. The carriage 81 has projecting pins 93, to which an opening blade 94 is connected. This blade is adapted to move downwardly into the carton between the front wall 95 of the latter and the paper lining, as indicated in Fig. 5, and then the carriage 92 descends to cause the plunger 96 to press the tongue 97 on the back flap into the carton. This plunger has teeth 98′ at one of its edges which are adapted to press into the back flap near the rear fold line of the same for indenting said flap to prevent the latter from springing out of position after it has been closed. After the plunger 96 has descended its full distance, the blade 94 is withdrawn from the carton and subsequently the plunger 96 is raised, and then the carton is forced on and discharged from the machine.

The plunger 96 is connected to the carriage 92 by rods 98′ and these rods slide through bearings 99 fixed on the blade 94. The carriage 92 also has a projecting arm 100, which is connected by a pivoted link 101 to a bell-crank lever 102, the latter being rockable on the pin 85, and having a depending arm 103 carrying a roller 104. This roller engages a cam 105, mounted on the disc 89. This cam causes the bell-crank lever 102 to move in one direction, and a spring 106 is provided to move it in the opposite direction. This spring connects the arm 103 of the lever to the fixed pin 91.

It will be understood from the above, that the cartons are intermittently fed into the runway of the frame, and that during this intermittent movement there will be rest periods. It is during a rest period that the back flap 69 is closed.

The drive shaft 11 of the machine is supported in bearings 107, and it is driven by a sprocket chain (not shown), which engages the sprocket wheel 108, fixed on the shaft.

From the above, it is believed that the construction, operation and advantages of the invention may be readily understood by those skilled in the art, and it is apparent that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the claims.

What is claimed and desired to be secured by Letters Patent is:

1. A machine for closing the flaps of a carton, comprising a guideway, a member for moving a carton along the guideway, movable means on said member for folding one end flap of the carton, other means for closing the other end flap of the carton as the latter moves along the guideway, means for folding and creasing the back flap of the carton, and means for inserting the tongue of the back flap into the carton.

2. A machine for closing the flaps of a carton comprising means for folding one end flap of the carton, other means for closing the other end flap of the carton, means for folding and creasing the back flap of the carton, and means for inserting the tongue of the back flap into the carton, and for indenting the back flap near its fold line for preventing the tongue of the back flap from subsequently springing out of the carton.

3. A machine for closing an end of a lined carton, comprising a guideway, means for moving a carton along said guideway, means mounted on and movable with the last mentioned means for folding in one side of the lining of the carton, while the latter is in said guideway, means for folding the end flaps of the carton and the portions of the lining adjacent thereto, and means on the guideway for creasing and folding the back

flap and for inserting the tongue of the back flap into the carton while folding the other side of the lining.

4. A machine for closing an end of a lined carton, comprising means for sequentially folding in one side of the lining, folding the end flaps of the carton and the portions of the lining adjacent thereto, creasing and folding the back flap, and inserting the tongue of the back flap into the carton while folding the other side of the lining, the means for inserting the tongue including a device for indenting the back flap near its fold line to prevent the tongue from springing out of the carton.

5. In a machine for closing a lined carton, a guideway, means for moving a carton along the guideway, means mounted on the last mentioned means and coacting therewith to fold one side of the lining and one of the end flaps of the carton while the latter is in the guideway, means on the guideway for folding the other end flap and the back flap of the carton while the latter is moving along the guideway, and means cooperating with the guideway to insert the tongue of the back flap into the carton.

6. In a machine for closing a lined carton, a guide-way, means for moving the carton along the guide-way, means coacting therewith to sequentially fold one side of the lining, the end flaps and the back flap of the carton while the latter is moving along the guide-way, and means cooperating with the guide-way to insert the tongue of the back flap into the carton, said last mentioned means including a device for indenting the back flap to prevent the tongue from subsequently springing out of the carton.

7. In a machine for closing cartons, a first guideway, means for feeding cartons along said guideway, a second guideway arranged parallel to but out of alignment with the first guideway, a pusher movable perpendicularly to said guideways for pushing the cartons from the first guideway to the second, a longitudinally movable pusher for moving the cartons along the second guideway, and means cooperating with the second guideway for folding the flaps of the carton and inserting the tongue of the back flap of the carton into the latter, a part of the last mentioned means being movably mounted on said longitudinal pusher.

8. In a machine for closing cartons, a first runway, means for feeding cartons along said runway, a second runway arranged out of alignment with the first runway, a transverse pusher for pushing the carton from the first runway to the second, a longitudinal pusher for moving the cartons along the second runway, and means cooperating with the second runway for folding the flaps of the carton and inserting the tongue of the back flap of the carton into the latter, said last mentioned means including a toothed member for indenting the back flap of the carton adjacent its fold line to prevent the tongue from subsequently springing out of the carton.

9. In a carton closing machine, first and second runways arranged out of alignment, means for moving cartons along the first runway, a longitudinal pusher for moving the cartons along the second runway, and a transverse reciprocating pusher for moving the cartons from one runway to the other, means for slidably mounting the transverse pusher, a drive shaft, an arm connected to the transverse pusher and having a slot through which the drive shaft passes, and a cam on the drive shaft for moving the arm and transverse pusher in one direction.

10. In a carton closing machine, a guideway for the cartons, a reciprocating pusher for moving the cartons along the guide-way, a folder movably mounted on the pusher, and means for moving the folder relatively to the pusher as the latter reciprocates, for causing the folder to fold the flap of the carton.

11. In a carton closing machine, a runway for the cartons, a reciprocating pusher for moving the cartons along the runway, a sliding plate folder movably mounted on the pusher, a rocking lever mounted on the pusher and engaging the folder, and means engaging the lever when the pusher moves in one direction, for causing the folder to move relatively to the pusher for folding down a flap of the carton.

12. In a carton closing machine, a runway for the cartons, a reciprocating pusher for moving the cartons along the runway, a reciprocating blade for folding in the lining of the cartons as the latter moves along the runway, a bell-crank lever connected to said blade, a pivot for the lever, movable with the pusher, a rod connected to the bell-crank lever, and means for holding the rod to insure rocking of the lever when the pusher reciprocates.

13. In a carton closing machine, a runway for the cartons, a reciprocating pusher for moving the cartons along the runway, a plate slidably mounted adjacent to the runway and carrying said pusher, a roller mounted on said plate, a drive shaft, a cam fixed to the drive shaft and engaging the roller for moving the pusher and plate in one direction, means for moving the plate and pusher in the opposite direction, and folding elements movably mounted on the plate and pusher, and arranged to actuate when the pusher and plate reciprocate for folding portions at one end of the carton.

14. In a carton closing machine, a runway for the cartons, a plunger for forcing the back flap of the carton toward the latter, and means associated with the plunger for

indenting said back flap adjacent to its fold line, as and for the purpose described.

15. In a carton closing machine, a runway for the carton, a reciprocating blade adapted to enter the carton near the front wall of the latter to provide a space in the carton to receive the tongue of the carton flap, a reciprocating plunger cooperating with the blade and adapted to force the flap of the carton toward the latter and to move the tongue of the flap into the carton alongside of the blade, and means controlling the blade and plunger for causing the blade to move into the carton before the plunger engages the flap, and to cause the blade to move out of the carton before the plunger disengages the flap.

16. In a machine for closing wax-paper lined paste-board cartons having end and back flaps, a runway having an entrance end, means for feeding cartons one after the other into the entrance end of the runway, a sliding plate movably mounted adjacent to said runway, a pusher movable with said plate and adapted to move the cartons along said runway, means associated with the plate for folding in one side of the carton, a folder movable with, and movable relatively to the pusher for folding in one end flap and a part of the lining, as the carton moves along the runway under the influence of the pusher, means for folding the other end flap and another portion of the lining at a further point along the runway, creasing and folding means for the back flap of the carton associated with the runway, and means associated with the runway for inserting the tongue of the back flap of the carton into the latter and for indenting the back flap adjacent its fold line.

In testimony whereof I affix my signature.

WALTER S. WEBER.