Sept. 27, 1938. A. W. LINDHOLM 2,131,633

CARTON LINING MACHINE

Filed May 20, 1937 4 Sheets-Sheet 1

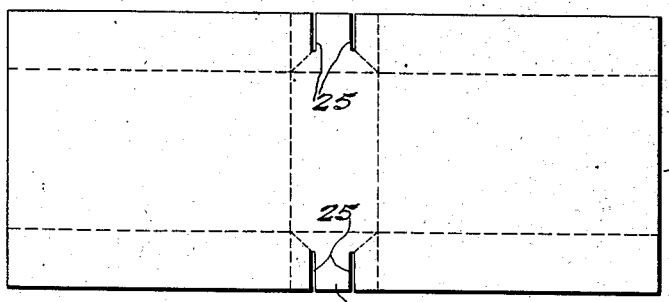


Fig. 1

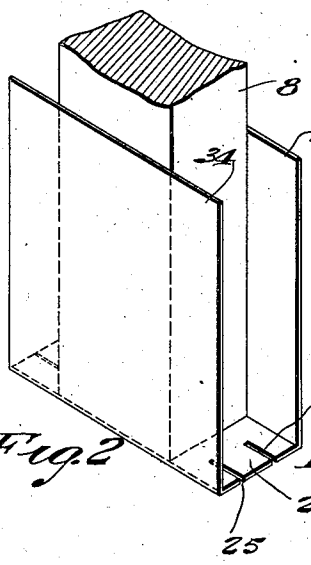


Fig. 2

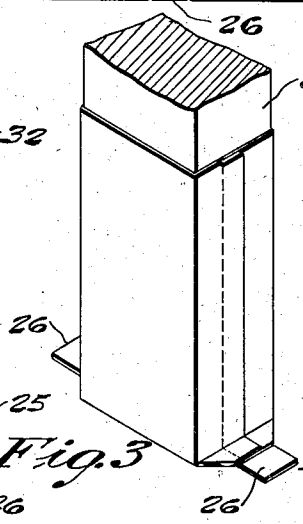


Fig. 3

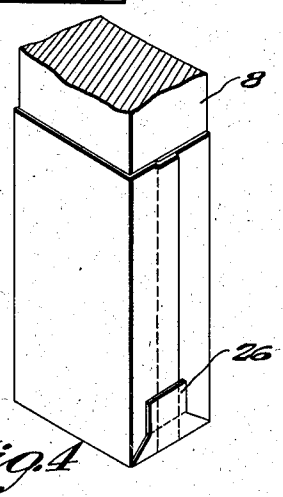


Fig. 4

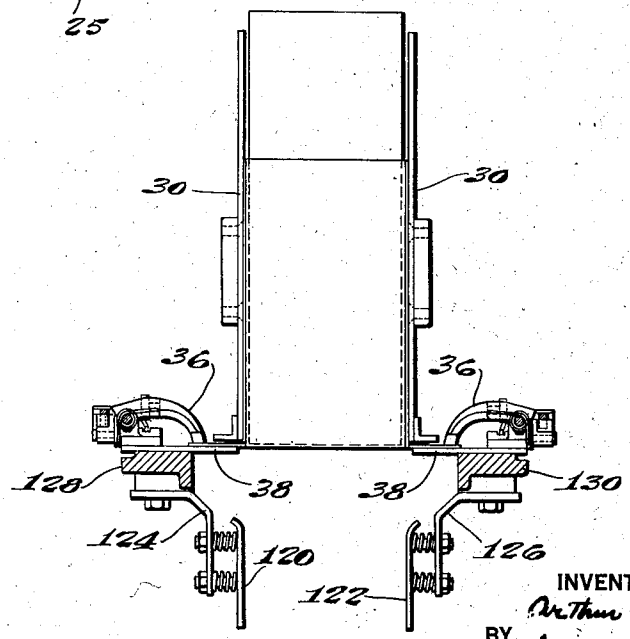


Fig. 5

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CARTON LINING MACHINE

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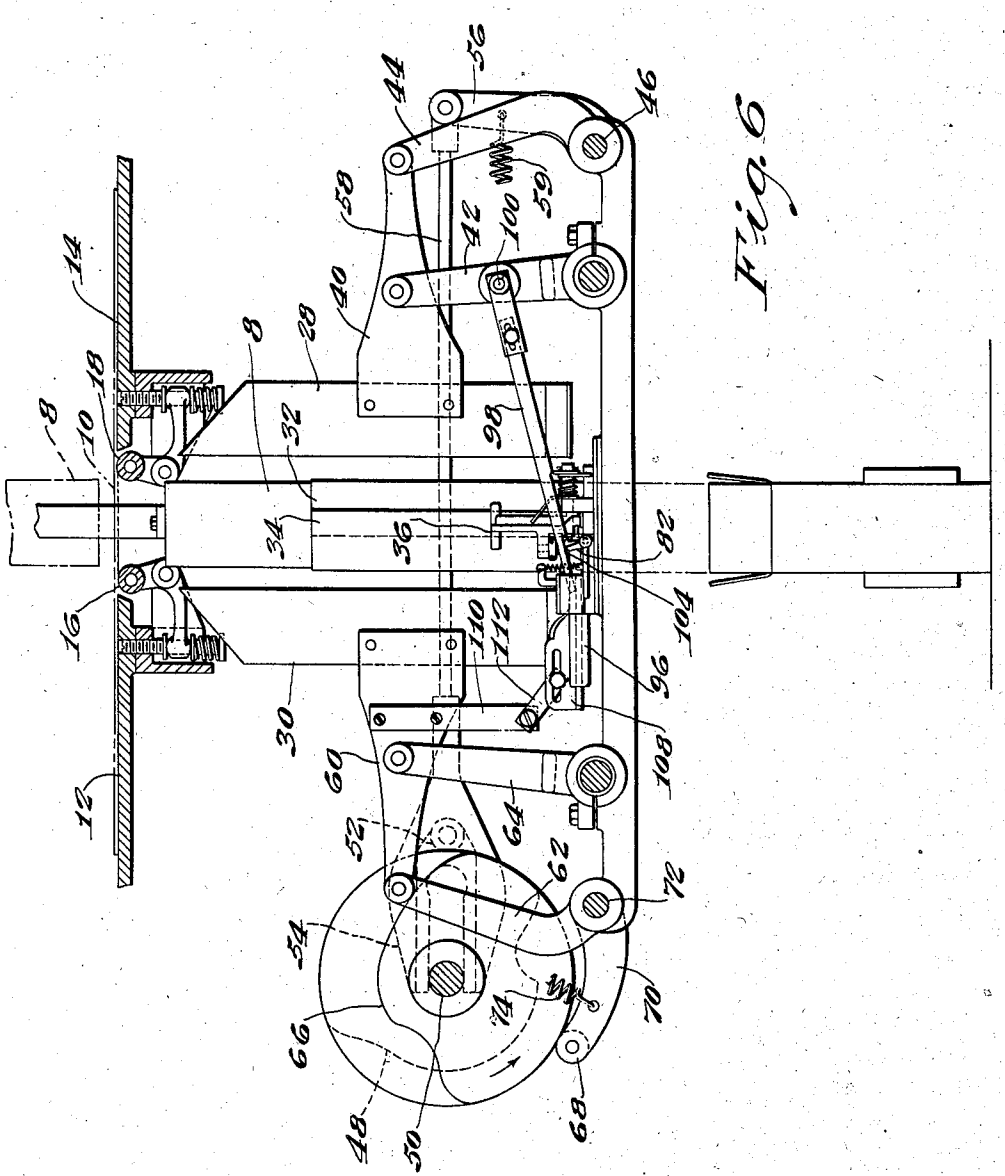


Fig. 9

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CARTON LINING MACHINE

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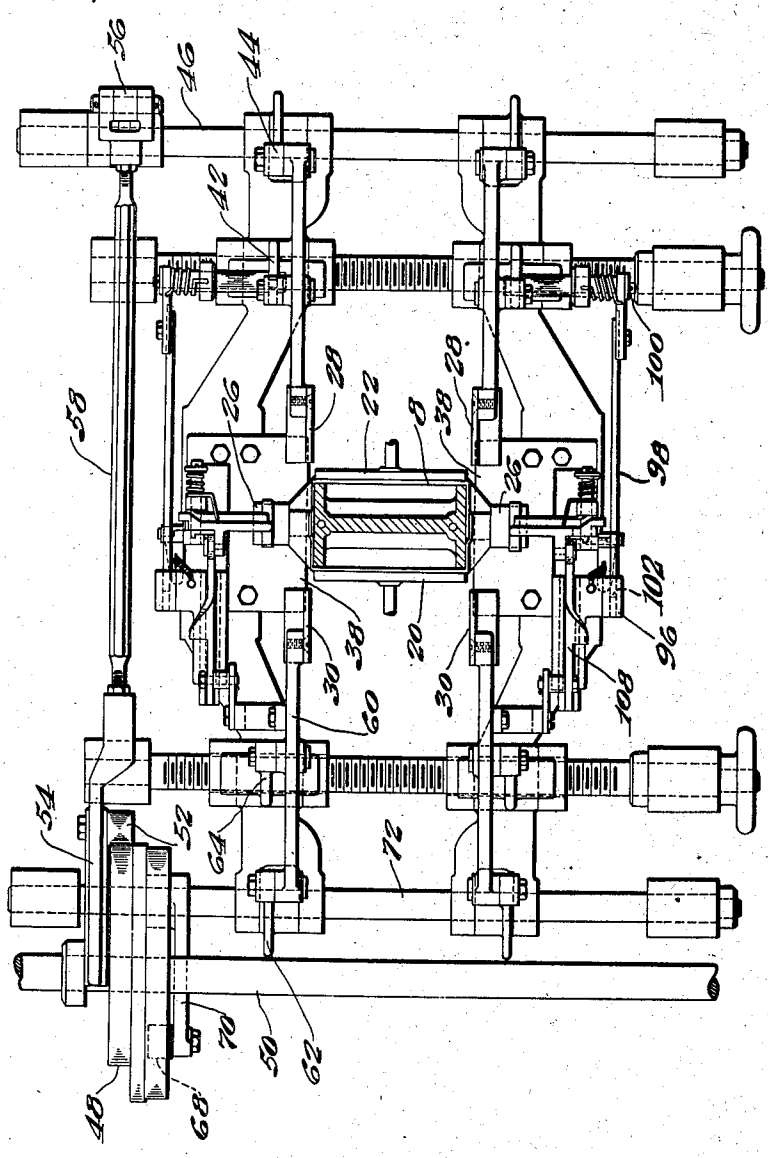


Fig. 7

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CARTON LINING MACHINE

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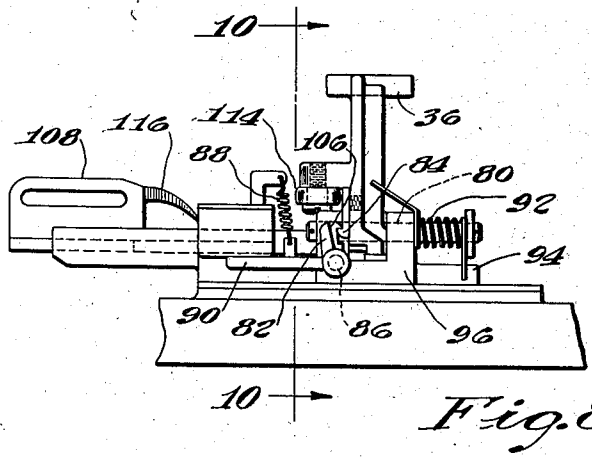


Fig. 8

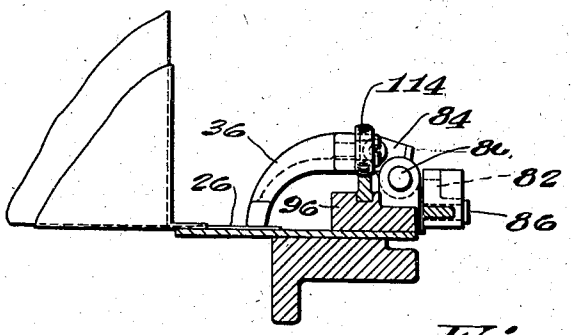


Fig. 9

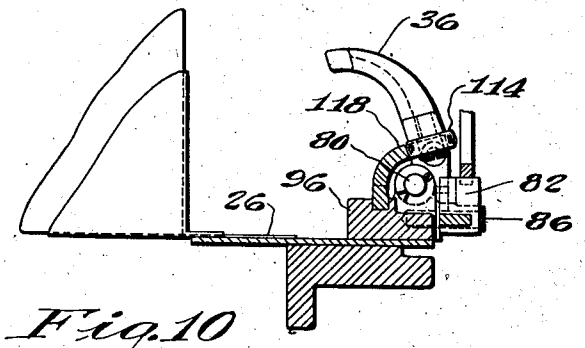


Fig. 10

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Patented Sept. 27, 1938 2,131,633

UNITED STATES PATENT OFFICE

2,131,633

CARTON LINING MACHINE

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Application May 20, 1937, Serial No. 143,747

13 Claims. (Cl. 93—49)

This invention relates to a carton lining machine and particularly to mechanism for producing the bottom fold of a lining for a carton.

The object of the invention is to provide a carton lining machine of novel and improved construction in which provision is made for producing a novel and improved bottom fold for the liner which is neater in appearance and more efficient in its moisture resisting qualities.

With this object in view and such others as may hereinafter appear, the invention consists in the carton lining machine, in the mechanism for producing the bottom fold 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 drawings illustrating the preferred embodiment of the invention, Fig. 1 is a developed view of a blank from which the lining of the present invention is made; Figs. 2, 3 and 4 illustrate in perspective the various steps in the production of the bottom fold; Fig. 5 is a side elevation, partly in cross-section of the mechanism for producing the bottom fold; Fig. 6 is a front elevation of the mechanism shown in Fig. 5 with the operating parts added; Fig. 7 is a plan view of the mechanism shown in Fig. 6; and Figs. 8, 9 and 10 are detail views of the tab holding fingers, to be referred to.

In general, the present invention contemplates the provision of a novel machine for forming a lining and for inserting the lining into a carton in a novel and superior manner and in which provision is made for producing a novel and superior bottom fold on the lining. Heretofore, in previous carton lining machines, of which the applicant is aware, the usual method of forming the bottom fold of a lining has been to fold the extended side portions of the lining blank against the ends of a forming block, leaving triangular shaped tabs or flaps extending outwardly from the bottom and thereafter folding these triangular shaped flaps upwardly against the sides of the forming block. This method of producing carton linings has proved unsatisfactory in many respects, chiefly because the triangular fold presented an unnecessary thickness of lining material to be folded upwardly against the sides of the forming block.

In the case of a paraffin paper lining which is heat sealed along the overlapping edges, this bulky thickness formed by the triangular fold is difficult to seal due to the fact that the heat applied to the forming block does not penetrate through the several thicknesses of the overlapping portions of the bottom fold with sufficient intensity to melt the paraffin, resulting in an imperfectly sealed lining and failing to produce a moisture resisting seal for the bottom of the lining. Also, in the case of an adhesively sealed lining, the bulk of the triangular folds made it difficult to produce a satisfactory seal.

In accordance with the present invention it is contemplated to provide mechanism for producing a lining in which the bottom flaps are constructed so that a major portion of the bottom flaps will comprise but one thickness of lining material which may be easily heat sealed or adhesively sealed against the sides of the lining to produce a carton lining which is neat in appearance and has a maximum moisture resistance.

Referring now to the drawings, the present invention is illustrated as embodied in a machine for lining cartons, and except as to such details as are hereinafter pointed out, the illustrated machine comprises any of the usual forms of carton lining machines now upon the market. Reference is made to the patent to Hiller and Joplin, No. 1,037,005, dated August 27, 1912, as disclosing the details of construction and mode of operation of such prior art carton lining machines. Inasmuch as many portions of the carton lining machine of themselves constitute no part of the present invention, it has been deemed sufficient to illustrate only sufficient portions of the carton lining machine as will enable the present invention to be understood. As is generally known, and as illustrated in the Hiller and Joplin patent, above referred to, these prior art carton lining machines are provided with means for feeding the lining from a continuous web and in the operation of the machine, the lining is cut off to the proper length and positioned beneath a plunger or forming block 8. The lining blank 10 is supported on supporting plates 12, 14 which are spaced apart sufficiently to permit the forming block to descend between them. As the forming block descends, it carries down the lining blank between yieldingly mounted presser rolls 16, 18 which operate to fold the blank around and to hold it against the sides of the block. During its descent, the block with its lining blank thus turned up against its two opposite sides passes between two guide plates 20, 22 which keep the blank folded against the sides of the block while the extended sides of the blank are folded in against the ends of the block as will be described.

In order to produce the bottom fold as shown in Figs. 2, 3 and 4 it is necessary to form slits 25 in the lining blank 10 which result in the tab portions 26 of the bottom flaps when the folding op-

erations are performed. These slits 25 may be formed in the lining blank in any well-known manner such as by knives or cutter bars inserted in the feeding rolls, not shown.

After the forming block has descended to an intermediate position, as illustrated in full lines in Fig. 6, it is caused to remain in this position until the lateral projecting portions or side flaps of the lining are folded over the ends of the block. The folding of the side flaps is accomplished in the manner illustrated in the Hiller and Joplin patent, above referred to, and as herein shown two sets of folder plates 28, 30, one set for each end of the forming block are employed. The folder plates are arranged to be swung toward each other and downwardly in vertical planes to engage the projecting side flaps and to fold them against the ends of the forming block.

While the side folding operations are being performed, the tab portions 26 are arranged to be held in an extended position, as illustrated in Fig. 3, so that when the side portions 32, 34 of the lining are being folded inwardly, the tab portions will not be folded in with them. This is accomplished by tab holding fingers 36 which are arranged to be operated by connections from and in timed relation to the folding plates 28, 30. It will be noted that when the forming block comes to rest in its intermediate position, preparatory to the folding operation, the extended ends of the lining including the tab portions 26 on the bottom of the block are resting on stationary plates 38. When the holding fingers 36 are released to grip the tab portions, the fingers will hold them in an extended position against the plates.

Referring now particularly to Figs. 6 and 7 each folder plate 28 is carried by a link 40 pivotally connected to arms 42, 44. The arm 44 is fast on the rocker shaft 46 which is arranged to be rocked by a cam 48, secured to the cam shaft 50. The cam 48 cooperates with a cam roll 52 carried by a forked link 54 which embraces the shaft 50. The link 54 is connected to a lever 56, fast upon the rocker shaft 46, by a connecting rod 58. A spring 59 is provided for the well-known purpose of holding the follower against the cam.

The opposite set of folder plates 30, similarly carried by a link 60, pivotally connected to arms 62, 64 are arranged to be rocked by a cam 66 secured to the cam shaft 50. A cam roll 68 carried by a lever 70, fast upon the rocker shaft 72, cooperates with the cam 66 to rock the shaft 72 upon which the arm 62 is also secured. A spring 74 is likewise provided to hold the cam roll 68 against its cam 66. The cam shaft 50 may be driven in any usual or preferred manner from the driving mechanism, not shown, of the carton lining machine.

In the operation of the folder plates, the set of folder plates 28 are arranged to be rocked first to fold the extended side flaps 32 against the end of the forming block 8, and while these plates 28 are being retracted, the second set of folder plates 30 are advanced to fold the remaining side flaps 34 in overlapping relationship to the flaps 32.

The tab holding fingers 36, which are actuated by the rocking of the folder plates are arranged in such a manner that when the first set of folders 28 start their inward movement, the holding fingers are released to grip the extended tabs 26 before the plates come in contact with the liner. Through connections from the second set of folders 30, the holding fingers are arranged to be reset at the end of the folding stroke, so that when both sets of plates are withdrawn, the holding fingers will be back in their normal position. As best shown in Figs. 8, 9, 10, each holding finger 36 is pivoted upon a stud 80 and is normally held in its upraised or retracted position by a latch 82 which engages with a latch member 84 secured to the holding finger. The latch 82 is rockingly mounted on a stud 86 and is normally held in latching engagement by a spring 88. The spring is secured to an arm 90 extending from the latch hub, the arm also serving as a stop arm to limit the movement of the latch. The latch retains the holding finger in its upraised position against the action of a coil spring 92 which is wound around the extended end of the holding finger stud 80. One end of the coil spring is retained by the base 94 of the supporting bracket 96 and the other end bears against the finger 36 so that when the latch 82 is rocked counterclockwise viewing Fig. 8, the tension in the spring will cause the finger to be rocked downwardly to hold the tab portions 26 against the plate 38.

In order to rock the latch 82, a bar 98 pivotally connected to a stud 100 secured to an intermediate portion of the arm 42, is provided. The outer end of the bar 98, which is supported in a grooved out portion 102 of the bracket 96, is provided with a cut out portion 104 which is arranged to engage with a flat surface 106 cut in the latch 82 when the folders 28 are rocked inwardly. The cut out portion 104 on the bar 98 is positioned so that very little movement of the folder will cause the holding fingers to be released to grip the tabs 26 before the actual folding operation is performed. Further movement of the folders 28 will fold the flaps 32 against the end of the block, whereupon the folders 28 are partially withdrawn while the second set of folders 30 are rocked inwardly to fold the flaps 34. In order to reset the holding fingers 36 at the end of the stroke of the folders 30, a sliding cam piece 108, slidably mounted in the bracket 96, is provided. The cam piece 108 is connected to the link 60 by a bar 110 and a connecting link 112 so that the cam piece 108 is caused to slide forward with the folder plates 30 during the folding operation. As illustrated in Figs. 8, 9, 10, the holding finger is provided with a cam roll 114 which is arranged to engage with the cam surface 116 on the sliding cam piece 108. It will be apparent that when the raised portion 118 of the cam piece engages the roll 114 at the end of the folder stroke, the holding fingers will be reset by the engagement of the latch member 84 with the latch 82. Both sets of folders are now withdrawn and the lining will be folded in the condition shown in Fig. 3.

After the side flaps have thus been folded, the forming block 8 is caused to descend, and, as it descends the outwardly extending bottom flaps are folded upwardly upon the ends of the forming block by vertical folding plates 120, 122 which are yieldingly supported on brackets 124, 126, mounted upon the frame members 128, 130. The further descent of the forming block carries the block with its lining into the carton previously positioned beneath it whereupon the forming block is withdrawn, leaving the lining within the carton.

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

Having thus described the invention, what is claimed is:

1. In a carton lining machine, in combination, a lining block, means for folding two sides of a lining blank against the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions each being provided with a pair of slits forming a tab therebetween, a pair of successively operating folding members for each end of the block for folding the end flaps, means engaging said tabs for holding out each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps.

2. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions each being provided with a pair of slits forming a tab therebetween, and means for successively folding the end flaps and said tabs and means engaging said tabs while said end flaps are being folded.

3. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions each being provided with a pair of slits forming a tab therebetween, means for successively folding the end flaps of the lining, means engaging said tabs for holding out each bottom tab while the end flaps are being folded and means for thereafter folding the end tabs upon the previously folded end flaps.

4. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions each being provided with a pair of slits forming a tab therebetween, means for successively folding the end flaps of the lining, means engaging said tabs for holding each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps.

5. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions being slit to form tabs, means for successively folding the end flaps of the lining, means for holding each bottom tab until the end flaps are folded, and means thereafter folding the bottom tabs upon the previously folded end flaps, each of said holding means including a spring actuated member and a tab supporting member cooperating therewith.

6. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions being slit to form tabs, means for successively folding the end flaps of the lining, means for holding each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps, each of said tab holding means including a movable tab engaging member, a supporting member cooperating therewith and connections between the movable tab engaging member and the end flap folding means for controlling the operation of the tab holding member.

7. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions being slit to form tabs, means for successively folding the end flaps of the lining, means for holding each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps, each of said tab holding means including a spring actuated member, a latch for holding the spring actuated member in inoperative position and means for releasing the latch to permit said member to be moved into tab engaging position at the start of the end flap folding operation.

8. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions being slit to form tabs, means for successively folding the end flaps of the lining, means for holding each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps, each of said tab holding means including a spring actuated member, a latch for holding the same in inoperative position, and means operatively connected to the end flap folding means for releasing the latch at the start of the end flap folding operation.

9. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions being slit to form tabs, means for successively folding the end flaps of the lining, means for holding each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps, each of said tab holding means including a spring actuated member, a latch for holding the same in inoperative position, means for releasing the latch at the start of the end flap folding operation, and means for resetting said members at the end of the folding operation.

10. In a carton lining machine, in combination, a forming block, means for wrapping a lining blank about the bottom and two sides of the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions being slit to form tabs, means for successively folding the end flaps of the lining, means for holding each bottom tab until the end flaps are folded, and means for thereafter folding the bottom tabs upon the previously folded end flaps, each of said tab holding means including a spring actuated member, a latch for holding the same in inoperative position, means operatively connected with the flap folding means for releasing the latch at the start of the end flap folding operation, and means operatively connected with

said folding means for resetting said members at the end of the folding operation.

11. In a lining machine, lining forming mechanism including end flap folding mechanism including spring actuated members, bottom tab holding mechanism and means for operating the bottom tab holding mechanism to permit the end flaps to be folded before the bottom tab is folded, and means for folding the bottom tabs upon the previously folded end flaps.

12. In a carton lining machine, in combination, a lining block, means for folding two sides of a lining blank against the block with end and bottom flap forming portions of the lining extending beyond the ends of the block, said bottom flap forming portions each being provided with a pair of slits forming a tab therebetween, a pair of successively operating folding members for each end of the block for folding the end flaps, means engaging said tabs for holding out each bottom tab until the end flaps are folded, and means thereafter folding the bottom tabs upon the previously folded end flaps, the major portion of said bottom tabs comprising but a single thickness of the lining.

13. In a lining machine, lining forming mechanism including end flap folding mechanism including spring actuated members, bottom tab holding mechanism and means for operating the bottom tab holding mechanism to permit the end flaps to be folded before the bottom tab is folded, and means for folding the bottom tabs upon the previously folded end flaps, said bottom tabs being slit so that the major portion of the latter folded upon the end flaps comprises but a single thickness of paper.

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