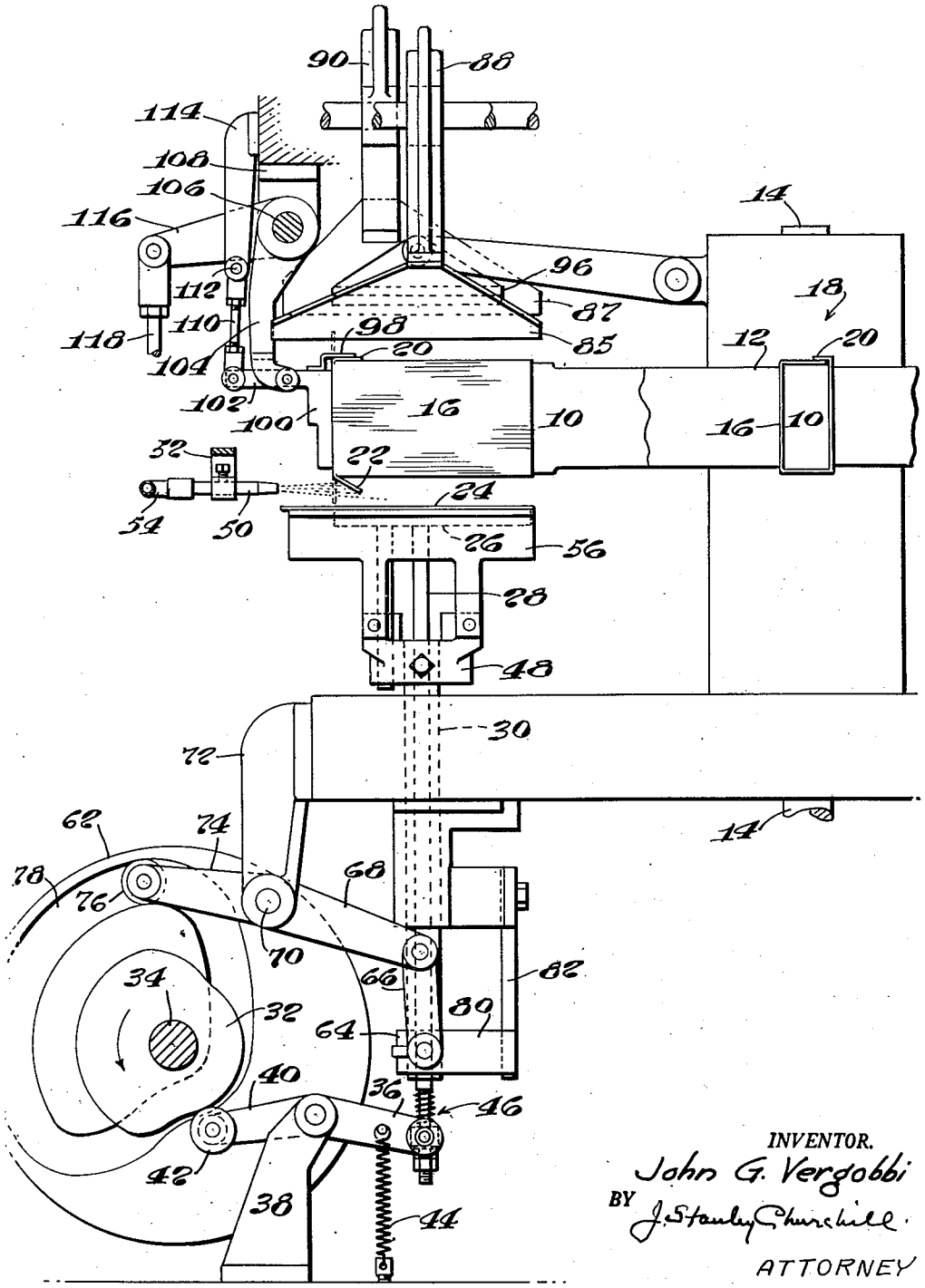
Dec. 12, 1950 J. G. VERGOBBI 2,533,642

LINED CONTAINER FORMING MACHINE

Filed Jan. 19, 1949 2 Sheets-Sheet 1

Fig. 1



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Fig. 2

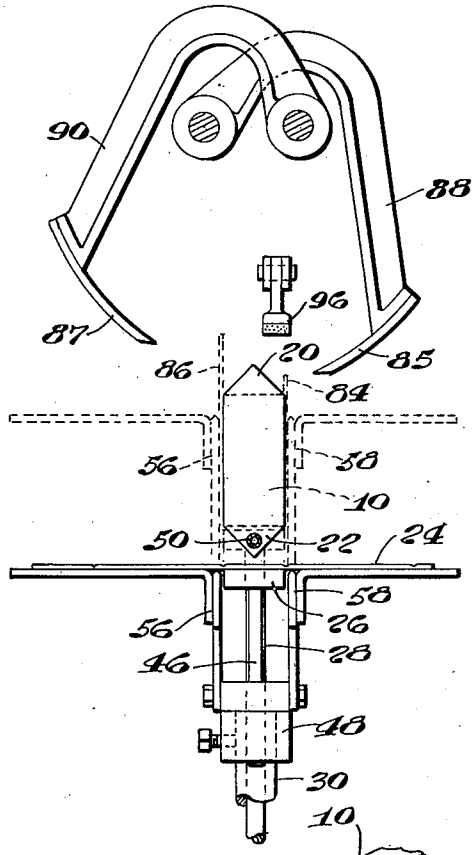
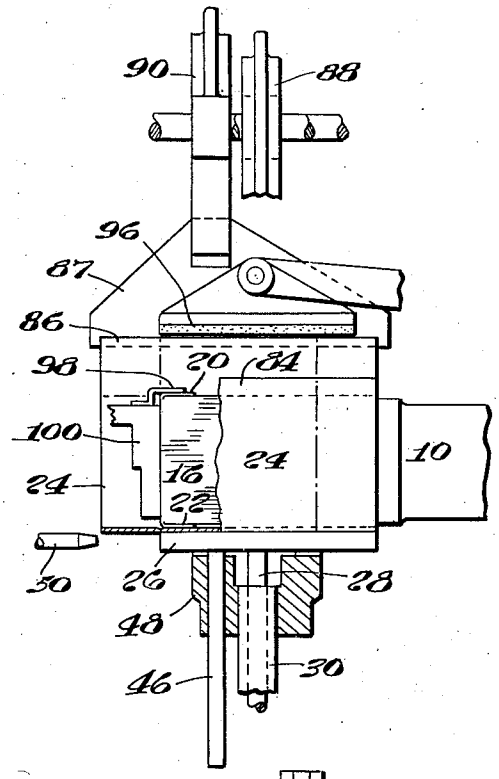


Fig. 3



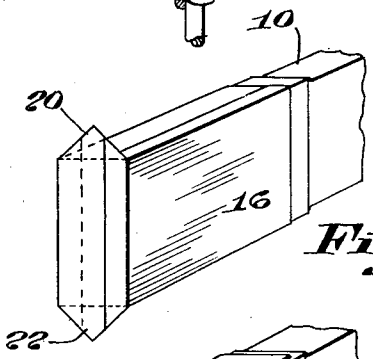


Fig. 5

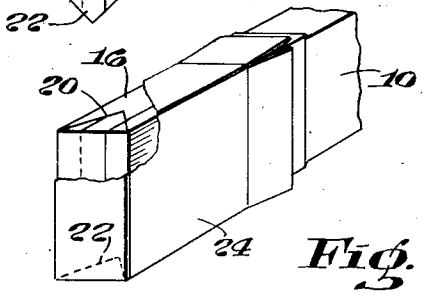


Fig. 6

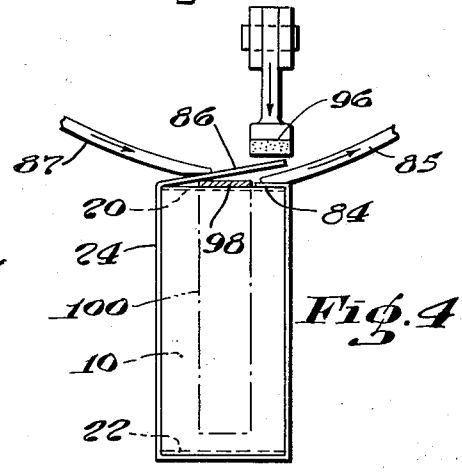


Fig. 4

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LINED CONTAINER FORMING MACHINE

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Application January 19, 1949, Serial No. 71,577

3 Claims. (Cl. 93—36.01)

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This invention relates to a container forming machine and particularly to a machine for making a lined carton.

The invention has for an object to provide a novel and improved container forming machine of the type embodying one or more forming blocks around which the liner and the carton are successively formed wherein provision is made for maintaining the bottom folded portions of the liner in operative position in a novel and improved manner while the carton is being formed thereon whereby to eliminate difficulties formerly encountered.

With this general object in view and such others as may hereinafter appear, the invention consists in the container forming machine and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a side elevation of a sufficient portion of a container forming machine embodying the present invention to enable it to be understood; Fig. 2 is a front elevation of the container forming mechanism, as viewed from the left in Fig. 1; Fig. 3 is a side elevation of the mechanism illustrated in Fig. 2, partly in cross section, and shown in a different position of operation; Fig. 4 is an end view of a forming block showing a carton blank being wrapped thereabout; Fig. 5 is a perspective view of a liner formed on the block with portions of the bottom closure extended laterally; and Fig. 6 is a perspective view of the completely formed lined container on the block, portions of the outer carton being broken away to show the disposition of the extended portions of the liner bottom closure.

The present invention is shown as embodied in a carton forming machine adapted to form a lined carton upon a forming block and which may comprise a machine of the general type illustrated and described in the United States patent to Vergobbi, No. 2,364,406, December 5, 1944. Such prior container forming machines are provided with a plurality of forming blocks arranged to be intermittently moved to present the forming blocks successively to the various lining and carton forming stations of the machine.

In the operation of such a prior machine a lining blank is first folded about a forming block to form a tube, the overlapping portions of the blank being secured together to form a side seam for the liner. At a succeeding station of operation, portions of the lining blank extending beyond the end of the forming block are folded over the block to form the bottom of the liner. At subsequent stations, the carton blank is wrapped about the lining and block in a similar manner

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and the bottom closure completed and then the lined carton is stripped from the forming block ready to be filled and top sealed. In practice, selected marginal portions of the liner and carton blanks may be provided with strips of adhesive for securing the overlapping portions of the side and bottom fold seams, or in some instances, heat sealable container forming material may be used in which event the forming block may be heated so as to form a heat sealed seam when pressure is applied to the overlapping portions of the material.

A preferred form of bottom fold for the extended end of the tubular liner may be formed by folding one pair of opposed extended portions of the tube inwardly against the end of the forming block and adhesively securing the marginal edges of the extended portions in overlapping relation. This operation causes the other pair of opposed extended portions of the tube to extend laterally from the end of the forming block in the form of triangular tab or flap portions. The triangular tab portions, which are free of adhesive, are subsequently loosely folded flat against the adjacent side walls of the liner and held in operative position against the liner side walls by the subsequently applied outer carton blank.

In practice, the loosely folded triangular tab portions of the liner bottom closure have a tendency to spring back to their original laterally extended form after leaving the bottom closure forming station, particularly when relatively small triangular tabs are formed in the production of a narrow lined carton, so that when the outer carton is wrapped around the liner and block at a succeeding station of operation, the triangular tab portions are likely to become bent or crushed during the carton blank applying operation thus forming an imperfectly lined carton.

In accordance with the present invention, provision is made for causing the loosely folded triangular tab portions of the liner bottom closure to be maintained in such a position as to avoid the aforesaid crushing thereof and preferably in a position substantially flat against the opposed side walls of the liner at the carton blank applying station so that when the carton blank is wrapped about the liner on the forming block, the triangular tab portions will be retained in operative position by the carton blank. In the illustrated embodiment of the invention, one of the tab portions comprising the tab folded against the upper surface of the horizontally extended liner and block may be engaged by a reciprocal folding plate at the carton blank applying station arranged to hold the tab flat until a portion of the carton blank is folded into a position to engage the tab. The other tab portion, comprising the one folded against the un-

dersurface of the liner and block, does not lend itself to the provision of a reciprocal folding plate because of the high speed of operation of the machine and because of the limited space available between the underside of the block and the carton blank elevating and wrapping mechanism. Accordingly, in the illustrated embodiment of the invention, an air jet is provided for directing a stream of air against the lower tab to cause the tab to be maintained in such position as to avoid its being crushed by the carton blank as the latter is moved against the undersurface of the block. Preferably the flap is maintained in a substantially flat or inwardly folded angular position sufficient to enable the elevated carton blank to engage and retain the tab in operative position without deforming or crushing the same during the carton blank applying operation.

Referring now to the drawings, 10 represents the forming blocks secured to a spider 12 mounted upon a central shaft 14 arranged to be intermittently rotated to present the forming blocks to successive stations in the formation of a lined carton. Inasmuch as machines of this type which are provided with mechanisms for first wrapping the liner about a forming block and subsequently the outer wrapper or carton thereabout are well known in the packaging art, only sufficient portions of the machine have been herein illustrated and will be hereinafter described as will enable the present invention to be understood.

In the operation of the container forming machine, a lining blank 16 is wrapped about a block 10, as indicated at 18 in Fig. 1, overlapping portions being adhesively secured together to form a side seam 20, thus forming a tube on the block with portions of the tube extended beyond the outer end of the block. At a succeeding station of operation, the portions of the liner tube extended beyond the forming block are folded against the end of the block to form a bottom closure. A preferred form of bottom closure, as shown in Figs. 5 and 6, may be formed by known means which may include a pair of reciprocal folding plates, not shown, arranged to fold one pair of opposed extended portions inwardly against the end of the block with the marginal portions in overlapping relation and adhesively secured together, this operation causing the other opposed extended portions to take the form of laterally extended triangular tab portions 20, 22.

While disposed at the bottom closure forming station, the laterally extended and adhesive free tabs 20, 22 may be loosely folded back against the side walls of the liner and block by any usual or preferred folding mechanism, not shown, to give the tabs an initial set or crease, and in the continued operation of the machine, when the intermittently operated forming block leaves the bottom closure station, the loosely folded multiple ply tab portions 20, 22 have a tendency to spring back to their original laterally extended position in varying degrees of angularity depending upon the resiliency of the container forming material and the size of the tabs.

In order to control the disposition of the loosely folded triangular tab portions 20, 22 of the liner during the carton blank applying operation so as to assure that the tabs will lie flat between the liner and the carton walls in the completed container, provision is preferably made at the carton blank applying station for causing the tabs to be maintained in a flat or substantially flat angular position against the side walls of the liner

until engaged by portions of the carton blank to maintain the tabs in operative position. As illustrated in Figs. 1 and 2, the outer carton blank 24, which may be provided with adhesive along selected marginal portions thereof for forming the side seam and for sealing the bottom flaps, is advanced into operative position beneath the forming block and on top of vertically reciprocal folding plates arranged to elevate and wrap the carton blank about the liner and forming block in a manner similar to the liner forming operation. As herein shown, the carton blank 24 is elevated against the underside of the horizontal forming block by an elevating plate 26 mounted on the upper end of a vertical rod 28 slidably supported within a tubular shaft 30 mounted in the machine frame. Provision is made for operating the plate 26 in timed relation to the intermittent movement of the forming block 10 so as to effect elevation of the plate 26 as soon as the forming block comes to rest at the carton blank applying station, through connections from a cam 32 fast on a main cam shaft 34 of the container forming machine. As illustrated in Fig. 1, the lower end of the vertical rod 28 is connected to one arm 36 of a two-armed lever pivotally mounted in a bracket 38 and the second arm 40 of the lever is provided with a cam roll 42 for cooperation with the cam 32. A spring 44 connected to the arm 36 is arranged to hold the roller 42 against its cam, and a yieldable connection 46 between the arm 36 and the rod 28 is arranged to maintain the elevating plate 26 in pressing engagement with the underside of the forming block during the wrapping operation. As illustrated in Fig. 3, a second rod 46 depending from the underside of the plate 26 is slidingly engaged with a cooperating member 48 fast on the tubular shaft 30 to prevent rotation of the plate 26 and its elevating rod 28.

As illustrated in Figs. 1 and 2, the space between the underside of the forming block 10 and the upper surface of the elevating plate 26 is relatively small, and in operation as soon as the forming block comes to rest, the carton blank 24 is immediately elevated into engagement with the underside of the liner and block. Accordingly, an air jet 50 is supported in a bracket 52 adjacent the lower end of the block and is arranged to direct a stream of air against the tab portion 22 to cause the same to be maintained in an inwardly bent and in an angular position as shown in Fig. 1 until the carton blank 24 is elevated and engages the tab to completely fold it flat against the side wall of the liner, as shown in Fig. 3. The air jet 50 may be arranged to blow a continuous stream of air during the operation of the machine through any usual or preferred source of supply of air under pressure connected to the pipe 54.

Simultaneously with the operation of the elevating plate 26 to move the carton blank against the underside of the liner and block, a pair of side folding plates 56, 58 are elevated to wrap the blank against the sides of the block, as indicated in dotted lines in Fig. 2. The side folding plates are attached to the hub 48 fast on the upper end of the tubular shaft 30 slidingly mounted in the machine frame and the tubular shaft is arranged to be reciprocated through connections from a cam 62 fast on the cam shaft 34. As illustrated in Fig. 1, the lower end of the tubular shaft 30 is provided with a collar 64 fast thereon which is connected by a link 66 to one arm 68 of a two-armed lever pivotally

mounted at 70 in a bracket 72 attached to the machine frame. The second arm 74 is provided with a cam roller 76 arranged to follow a cam path 78 in the cam 62. Extensions 80 from the collar 64 are arranged to slidingly cooperate with a stationary guide bar 82 to prevent the folding plate unit from rotating.

After the side folding operation, the extended ends 84, 86 of the carton blank 24 are folded into overlapping relation against the upper surface of the block by folding members 85, 87 carried by rocker arms 88, 90 respectively to form the side seam of the carton which may be subsequently engaged by a side seam presser member 96 to firmly set the seam. As herein shown, the loosely folded upper tab 20 of the liner bottom closure is arranged to be engaged by a reciprocal folding plate 92, carried by an end seam presser 100, as soon as the intermittently operated forming block 10 comes to rest at the carton blank applying station in order to hold the tab flat against the liner side wall until such time as the side seam forming portions 84, 86 of the carton blank are folded down into an angular position such as to retain the tab in operative position, as illustrated in Fig. 4, whereupon the end presser and folding plate unit is retracted. As illustrated in Fig. 1, the end presser 100 is provided with an extended portion 102 and is arranged to be reciprocated in a substantially horizontal plane through linkage including an arm 104 fast on a rocket shaft 106 journaled in a bracket 108 attached to the machine frame, and a link 110 pivotally mounted at 112 in a bracket 114 attached to the machine frame. The shaft 106 may be rocked in timed relation to the movement of the spider 12 and the folding arms 88, 90 through cam operated connections including an arm 116 fast on the rocker shaft 106 and a connecting rod 118, whereby to effect forward movement and retraction of the tab folding and end presser unit at the proper times in the cycle of operation of the machine.

The forming block 10 is now intermittently moved to successive stations of operation to effect folding and pressing of the bottom flaps of the carton against the end of the block whereupon the lined carton is removed from the block to be delivered from the machine.

From the above description it will be observed that the present construction of container forming machine is adapted to assure proper disposition of the laterally extended lining tabs during the carton blank applying operation whereby to cause the tabs to lie flat between the liner and the carton in the completed container, as shown in Fig. 6.

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 container forming machine of the character described, in combination, a forming block about which a blank of lining material and an outer carton blank may be successively wrapped to form a lined container, the bottom closure for the liner being formed to provide laterally extended flaps, means for applying the carton blank about the liner including an elevating plate for supporting and elevating the carton blank into engagement with a side wall of the forming block and the liner, and means for directing a stream of air against the adjacent laterally extended flap to cause the same to be maintained in an inwardly extended angular position until the carton blank is elevated and engaged with the flap to be folded thereby flat against the side wall of the liner whereby to assure that the flap will lie flat between the liner and the carton walls in the completed container.

2. In a container forming machine of the character described, in combination, a forming block about which a blank of lining material and an outer carton blank may be successively wrapped to form a lined container, the bottom closure for the liner being formed to provide laterally extended tab portions, means for applying the carton blank about the liner including an elevating plate for supporting and elevating the carton blank into engagement with a side wall of the forming block and the liner, and a pair of cooperating folding members arranged to fold extended portions of the carton blank into overlapping relation to form the side seam, an air jet for directing a stream of air against one of said tab portions to cause the same to be maintained in an inwardly extended angular position until the carton blank is elevated against said one side wall, and a reciprocal folding plate arranged to fold and retain a second tab portion against its adjacent side wall until the seam forming portions of the carton blank are folded into a position to engage and retain the second tab portion whereby to assure that the tab portions will lie flat between the liner and the carton walls in the completed container.

3. In a container forming machine of the character described, in combination, a forming block about which a blank of lining material and an outer carton blank may be successively wrapped to form a lined container, the bottom closure for the liner being formed to provide a pair of laterally extended tab portions, means for applying the carton blank about the liner, and means for causing said laterally extended portions to be maintained in a substantially flat angular position relative to the side walls during the carton blank applying operation, said last named means including an air jet arranged to direct a stream of air against one of said tab portions, and a reciprocal folding plate arranged to engage the other of said tab portions, said air jet and said folding plate being arranged to maintain their respective tab portions in said substantially flat angular position until portions of the carton blank are wrapped into a position to engage and retain the tabs in their flat condition whereby to assure that the tabs will lie flat between the liner and the carton walls in the completed container.

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