Feb. 9, 1932. W. D. KIMBALL ET AL 1,844,661

CARTON SEALING MACHINE

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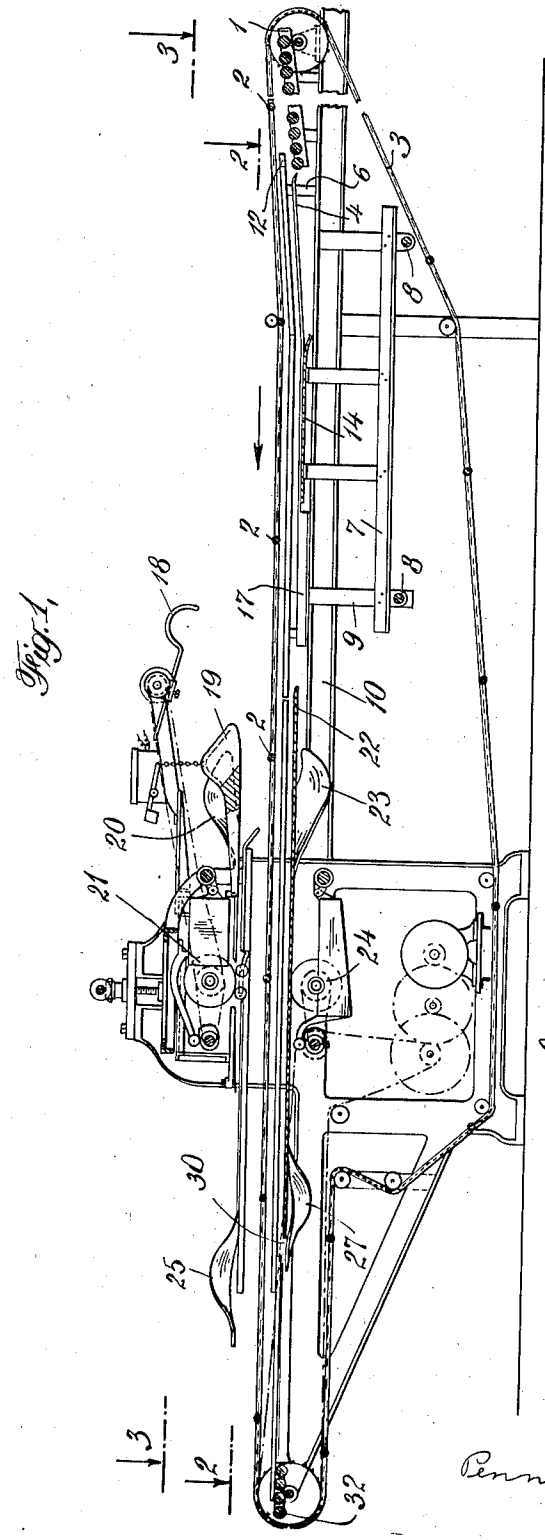


Fig. 1.

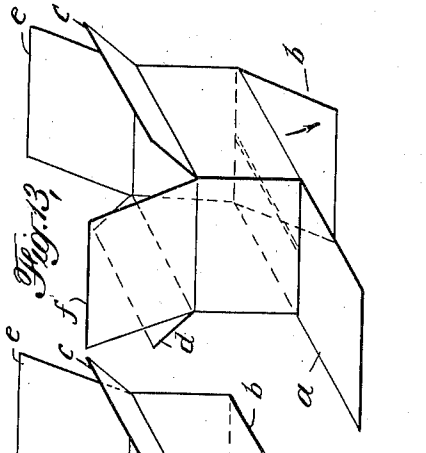


Fig. 13.

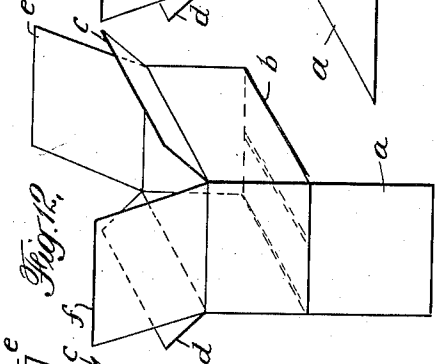


Fig. 12.

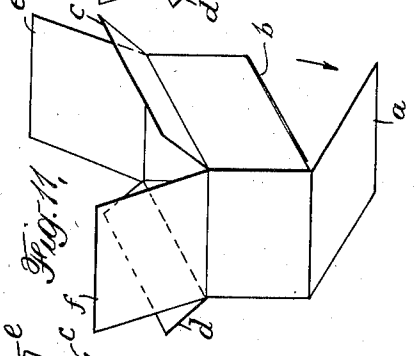


Fig. 11.

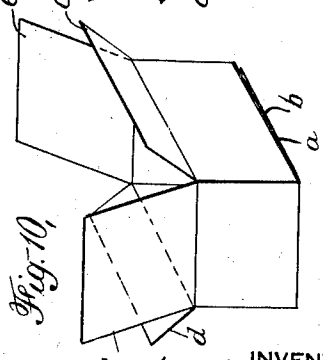


Fig. 10.

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CARTON SEALING MACHINE

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Fig. 2.

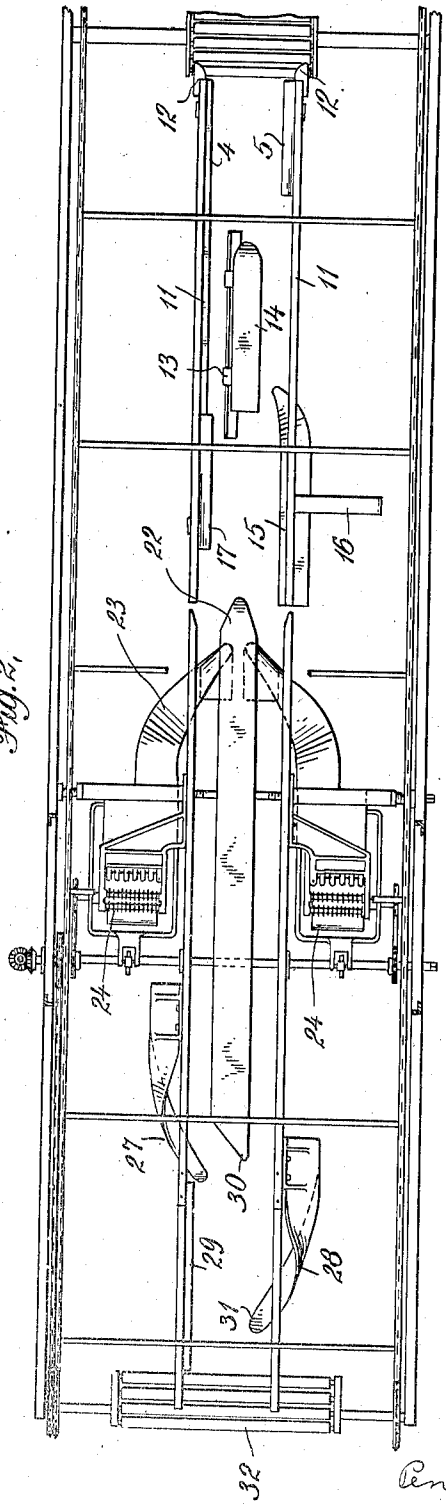
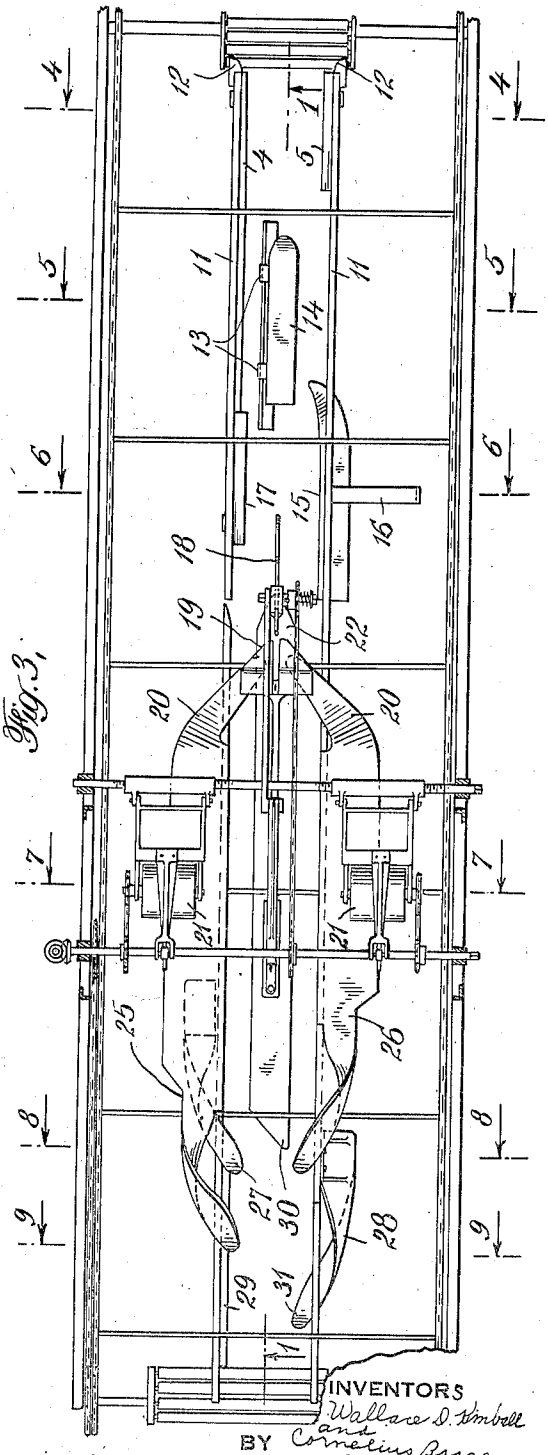


Fig. 3.



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CARTON SEALING MACHINE

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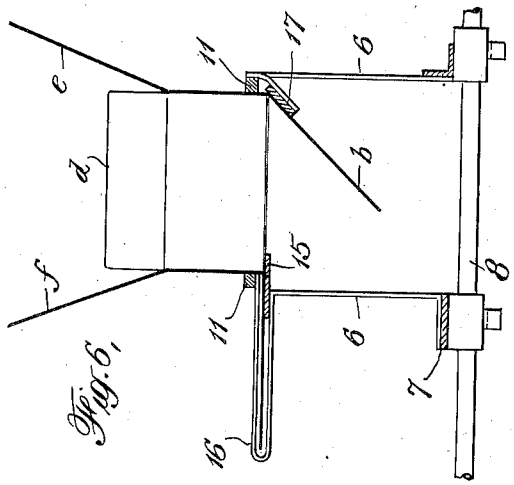


Fig. 6.

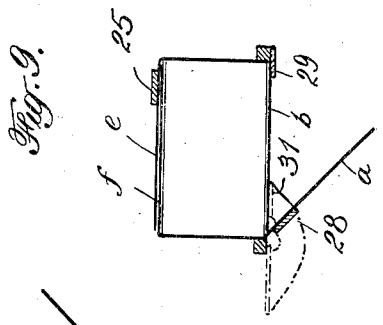


Fig. 9.

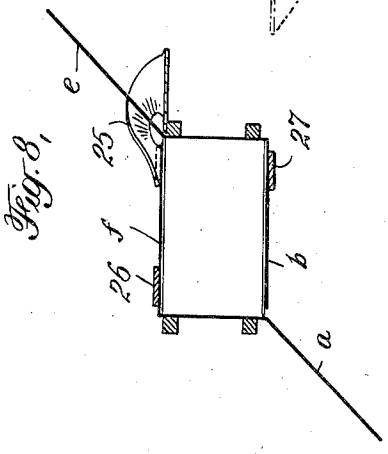


Fig. 8.

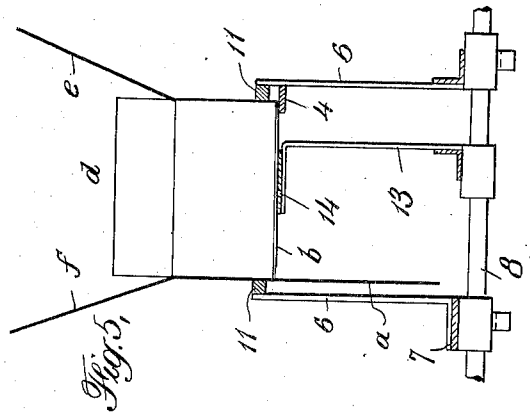


Fig. 5.

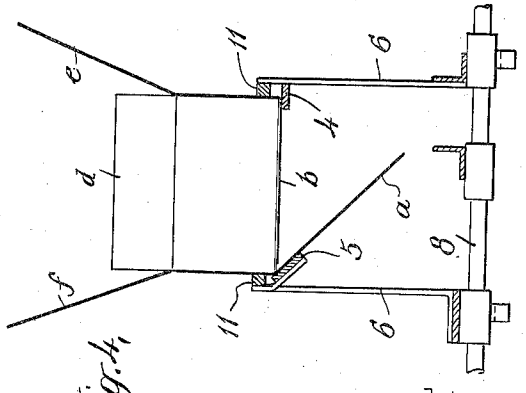


Fig. 4.

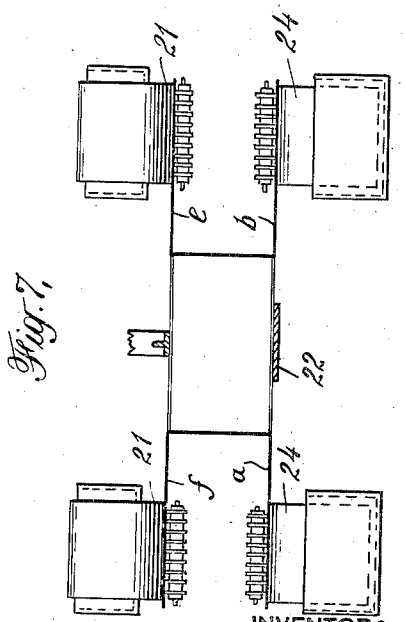


Fig. 7.

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Patented Feb. 9, 1932 1,844,661

UNITED STATES PATENT OFFICE

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CARTON SEALING MACHINE

Application filed March 27, 1929. Serial No. 350,200.

This invention relates to improvements in machines for folding and sealing the flaps of cartons, particularly large cartons which are used as packing cases for canned goods, soap, cereal packages and the like. The cartons or packing cases usually employed for this purpose have their outer flaps but half the width of the top of the carton so that when the flaps are closed they do not overlap, the edges of the flaps meeting along the middle line of the carton. In some instances, however, it is desirable to use cartons in which the upper flaps are overlapped, each flap being substantially equal to the cross sectional dimension of the carton to thereby provide an extra layer of material at the bottom and top of the carton.

In the procedure followed in most houses in shipping goods in paper cartons and goods are packed in the cartons with the bottom flaps of the cartons folded into overlapping relation but unsealed. The upper flaps are usually left projecting upwardly at an angle to the sides of the box. The present machine is designed to receive filled cartons in this condition from a feed conveyor, roller chute or otherwise, and to open up the carton flaps both top and bottom, apply adhesive to the flaps and then fold the flaps together and eject the sealed carton onto a dryer or onto a discharge conveyor.

In U. S. Patent No. 1,618,440, granted February 22, 1927, and in application Serial No. 151,663, filed November 30, 1926, there is disclosed a machine for folding and sealing cartons having narrow outer flaps which do not overlap. The machine of the present application constitutes a modification of the machine disclosed in detail in the above-mentioned application whereby the machine is adapted to seal cartons having overlapping flaps, the machine, however, being capable of operating on both types of cartons.

In the accompanying drawings we have illustrated our modified machine but have not shown in detail the parts which are the same as the parts employed in the earlier machine.

In the said drawings

Figure 1 is a longitudinal sectional view along line 1—1 of Figs. 2 and 3;

Fig. 2 is a plan view partly in section along the line 2—2 of Fig. 1;

Fig. 3 is a similar view along line 3—3 of Fig. 1;

Figs. 4, 5 and 6 are transverse sectional views on the correspondingly numbered lines of Figs. 2 and 3 showing the operation of the bottom flap-opening means; Fig. 7 is a sectional view on line 7—7 of Fig. 3, showing the adhesive-applying devices;

Figs. 8 and 9 are similar views along lines 8—8 and 9—9 of Fig. 3 showing the flap-closing devices; and

Figs. 10–13 inclusive are perspective views showing the carton in various stages of the operation of the machine.

The filled carton to be sealed enters the machine at the right as shown in Figs. 1, 2 and 3 and in the usual arrangement the cartons are allowed to enter the machine one at a time from an inclined chute or feed belt through an escapement (not shown) which is timed to allow one carton at a time to descend onto the roller bed 1 at the end of the machine immediately in advance of the flights 2 of the feed chains 3 which advance the cartons continuously through the machine. The machine is sometimes fed by hand and in this event the operator places the filled carton with the flaps in the position shown in Fig. 10 on the roller bed in advance of the flights of the conveyor.

The conveyor advances the carton off the roller table 1 onto the machine bed, which as shown particularly in Fig. 4 comprises two tracks 4 and 5, respectively, supported on uprights 6 extending upwardly from angle members 7 which in turn are supported on cross rods 8 carried by hangers 9 depending from the side members 10 of the main frame as shown in detail in Fig. 1.

Referring again to Fig. 4, it will be noted that rails 11 are provided at the ends of the upright 6, these rails being positioned apart exactly the width of the carton so as to accurately position the carton with respect to the tracks 4 and 5. The rails 11 as shown in Figs. 2 and 3 are provided with curved extensions as shown at 12 to guide the cartons from the roller bed between the rails and

onto the tracks 4 and 5. The track 4 projects beyond the face of the rail 11 a sufficient distance to just engage under the corner of the carton and support the same, but not far enough to engage under the edge of the bottom flap *a*. The flap *a* in cartons of this type is purposely made not quite wide enough to extend all the way to the opposite corner in order to avoid the possibility of projecting beyond the corner, which would make the carton liable to be torn open in handling. The margin allowed is usually an inch or three-quarters of an inch, and the track 4 is made narrow enough to clear the edge of the flap *a*.

The track 5 is inclined as shown so that as the carton advances off the roller bed 1 onto the tracks 4 and 5, the flap *a* can drop to the partly open position as shown in Fig. 4. The flap drops as soon as the carton clears the roller bed, and drops far enough for the edge of the flap to clear the vertical supports 13 projecting upwardly from one of the frame members 7 upon which the horizontal tongue 14 is supported. The face of this tongue is in the same plane as the top surface of the track 4 and its nose is turned down so that the carton as it advances along the tracks 4 and 5 will pass onto the tongue 14 and be supported thereby. The track 5 is terminated somewhat short of the end of the tongue 14 but extends near enough to the tongue 14 for the carton to be fully supported by the tongue before it passes off of the track 5. As soon as the carton clears the track 5 the flap *a* is free to drop into vertical position as shown in Fig. 5.

As the carton is advanced along the tongue 14 the edge of the flap *a* will be engaged by a stationary folder 15 which is supported as shown in Fig. 6 from the rail 11 by a horizontally extending U-shaped member 16, which member is also supported by an upright 6 from the adjacent underlying angle member 7. The free end of the folder 15 is of the usual "plowshare" formation and has its end turned inwardly near enough to the center line of the machine to certainly engage the under surface of the flap *a* even though it may not have dropped to fully open position and turn the same upwardly into horizontal position where it may pass through the U-shaped member 16 as shown in Fig. 6.

The track 4 terminates at a point about opposite the rear end of the tongue 14 and immediately beyond the end of the track 4 there is provided an inclined track 17 similar to the track 5. As the carton passes off of the tongue 14 it will be supported by the track 17 and by the edge of the folder 15 which projects just sufficiently beyond the inner face of the rail 11 to engage the corner of the carton without engaging the edge of the flap *b* which, like the flap *a* is purposely cut to a width somewhat narrower than the top of the carton. As soon as the entire carton clears the tongue 14 the flap *b* will drop into partially open position as shown in Fig. 6.

The machine from this part on through the paste-applying mechanism is substantially the same as the machine employed for narrow-flap cartons. This common mechanism will be but briefly described. As in the other machine, a rotating top flap closer 18 is provided for closing down the rear top flap *c*. There is also the normally stationary middle flap closer 19 for closing the flap *d* and stationary top flap spreader 20 for spreading out the top flaps *e* and *f* into horizontal position to receive the adhesive from the adhesive-applying mechanism which we have indicated generally by the reference numeral 21. In like manner the bottom of the machine is provided with a stationary tongue 22 onto which the carton is advanced by the conveyor with its contents resting on the two closed inner flaps. Below the tongue 22 and at each side of the machine are stationary flap-spreaders 23 for spreading the partially open bottom flaps into position to pass through the pasting mechanism 24 for the lower flaps. The stationary flap-spreader 23 on the side of the machine having the folder 15 may be dispensed with as this flap has already been opened to horizontal position and the folder 15 may be continued into close proximity to the pasting mechanism to guide the flap directly from the folder 15 into contact with the pasting rolls. We prefer, however, to employ a shorter folder 15 and duplicate the flap-spreader of the so-called standard machine.

The cartons are carried through the pasting mechanism by the conveyor while supported on the tongue 22 which extends to a point well beyond the pasting mechanism, so as to support the carton during the initial operation of closing the flaps.

The top flaps of the cartons may be opened simultaneously as the cartons enter the machine with the flaps upstanding, but the upper flaps have to be closed successively in order to cause them to overlap in the same manner as the lower flaps. We preferably arrange the machine so as to close the upper flap on one side of the carton simultaneously with closing the lower flap on the other side. The two upper flap-folders which are marked 25 and 26, respectively, are of the plowshare type and substantially identical in shape, the folder 25, however, extending further toward the rear of the machine so as not to affect the folding movement of the flap until after the folder 26 has folded the other flap into substantially horizontal position. The bottom flap-folders are substantially the same shape as the top flap-folders, and, like the top flap-folders, are arranged one in advance of the other so as to properly overlap the flaps. The

lower flap-folder 27 for folding the inner lower flap is preferably arranged alongside of the tongue 22 to fold the flaps into almost horizontal position, while the carton is still supported on the tongue. As the carton passes off the tongue the weight of the carton will be carried by the end of the folder 27 from which it is transferred to a track section 29 similar to the track section 4. At this point there is no track section on the opposite side of the machine, but the rear end 30 of the tongue 22 projects far enough to the rear to support the weight of the box until the flap-folder 28 has turned the outer bottom flap in sufficiently for the corner of the box to be supported by the folder as indicated in Fig. 9.

The end of this folder as shown in this figure terminates in a horizontal portion, indicated at 31, and this horizontal portion and the track 29 support the carton as it is advanced out of the machine onto the discharge conveyor 32 by means of which it may be carried into the dryer or otherwise disposed of.

We are aware that it is old to open the flaps on the under side of a carton successively instead of simultaneously as shown, for example, in the patent to Shawver, et al., No. 1,434,230, granted October 3, 1922, but this machine is not designed to handle cartons in which the bottom flap is overlapped through substantially the entire width of the carton. In fact, the Shawver machine is intended primarily to operate on standard cartons in which the flaps are not overlapped. In our improved machine the outer bottom flap is opened completely out of the way of the inner flap, so that an inner flap of substantially the entire width of the carton may be opened in horizontal position. In like manner the machine operates to completely close the inner flaps before closing the outer flaps.

It will of course be understood that the machine may within the scope of the invention be modified as to its details.

We claim:

1. In a machine of the class described, means for advancing filled cartons having closed and overlapped bottom side flaps substantially greater in area than one-half the area of the bottom of the carton, means for opening the outer side flap, means for thereafter opening the inner side flap, means for spreading the upper side flaps and applying adhesive to the opened flaps, and means for thereafter successively closing the two upper flaps and the two lower flaps into overlapping position.

2. In a machine of the class described, a bottom flap opening mechanism comprising means for supporting the carton at its corners while permitting the outer side flap only to partially open, means for thereafter engaging the under side of the inner side flap for supporting the carton, means for fully opening the outer flap, means for thereafter supporting the carton at the hinge of its opened flap for permitting the inner flap to partially open, and means for thereafter fully opening the inner side flap while supporting the carton on its end flaps.

3. In a machine of the class described, the combination of means for advancing the cartons through the machine, a support at one side adapted to engage the corner of the carton and hold the inner side flap closed while permitting the outer side flap to drop into partially open position, a tongue positioned at the middle of the machine in position to engage the advancing carton and support the same, a folder for opening the outer flap while the carton is passing over the tongue, said folder comprising a horizontal part extending rearwardly beyond the rear of the tongue and adapted to support the carton while leaving the inner side flap free to open.

4. In a machine of the class described, means for advancing filled cartons having closed and overlapped bottom flaps substantially greater in area than one-half the area of the bottom of the carton, means under the bottom of the carton for supporting the carton, and means for successively opening the overlapped outer flaps.

5. In a machine of the class described, means for continuously advancing filled cartons having closed and overlapped bottom flaps substantially greater in area than one-half the area of the bottom of the carton, means under the bottom of the carton for supporting the carton, and means for successively opening the overlapped outer flaps while said carton is in motion.

6. In a machine of the class described, means for advancing filled cartons having closed and overlapped outer bottom flaps, means for supporting said cartons at the bottom corners only and while so supported causing said outer overlapped flap to be partially opened, a middle support in advance of said corner supports, and means for moving the carton in this condition onto said middle support, means for further opening said first flap while so supported, and means for thereafter opening said inner side flap.

7. In a machine of the class described, means for advancing filled cartons having closed and overlapped outer bottom flaps, means for supporting said cartons at the bottom corners only and while so supported causing said outer overlapped flap to be partially opened, a middle support in advance of said corner supports, and means for moving the carton in this condition onto said middle support, means for further opening said first flap while so supported, and means for thereafter opening said inner side flap, said means comprising a second pair of corner supports onto which said carton is advanced with its outer side flap fully opened.

8. In a machine of the class described,

means for advancing filled cartons having closed and overlapped outer bottom flaps, means for supporting said cartons at the bottom corners only and while so supported causing said outer overlapped flap to be partially opened, a middle support in advance of said corner supports, and means for moving the carton in this condition onto said middle support, means for further opening said first flap while so supported, means for thereafter opening said inner side flap, said means comprising a second pair of corner supports onto which said carton is advanced with its outer side flap fully opened, a second middle carton support, and means for fully opening said second side flap while the carton is carried by said support.

In testimony whereof we affix our signatures.

WALLACE D. KIMBALL.
CORNELIUS BRAREN.