May 3, 1938.

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METHOD AND APPARATUS FOR MAKING CARTONS

Filed June 22, 1936

3 Sheets-Sheet 1

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METHOD AND APPARATUS FOR MAKING CARTONS

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Application June 22, 1936, Serial No. 86,529

5 Claims.

(Cl. 92—39)

This invention relates to the manufacture of cartons, but more particularly to cartons adapted to package lard or similar substances enclosed in sheet material providing a bag or liner disposed inside of the carton.

Hereinafter substances such as lard, because of their inherent characteristics, are packaged in cardboard cartons employing a sizable amount of material which renders the carton comparatively expensive. There is a need for a carton for lard which is considerably less expensive to make and which can be disposed more readily than those which are now in use.

An object of this invention is to produce a new and improved method of making cartons particularly adapted for packaging lard which utilizes a minimum amount of material and which enables the carton to be manufactured efficiently and inexpensively on a production basis.

Another object is to produce a satisfactory apparatus for carrying out the above method, to enable cartons to be produced thereby economically and efficiently on a production basis.

Other objects and advantages of the invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which—

Figure 2 is a diagrammatic view, partly in vertical section of a machine for folding bags or liners and then forming cartons over the liners, the parts being fed to the machine in continuous strip formation;

Figure 3 is a plan view with the fold lines indicated thereon of a sheet from which the bag or liner is formed;

Figure 4 is an enlarged vertical sectional elevation taken substantially on the line 4—4 of Figure 1 showing the manner in which the side tabs on the carton blank are folded;

Figure 5 is a vertical sectional elevation substantially on the line 5—5 of Figure 1 of the mandrel or former, severing and initially folding the carton blank;

Figure 6 is a vertical sectional elevation substantially on the line 6—6 of Figure 1, showing a part of the liner sheet folding means;

Figure 7 is an enlarged vertical sectional elevation substantially on the line 7—7 of Figure 1 showing the mechanism for feeding the end panels to the opposite ends of the carton and securing them thereto;

Figure 8 is a fragmentary plan view of a portion of the continuous strip from which the end panels are severed;

Figure 9 is a perspective view of the bag or liner in folded position upon a former;

Figure 10 is an enlarged perspective view of a former on which is disposed a liner and a carton before which end panels are applied thereto; and

Figure 11 is a view similar to Figure 2 roll to roll with the end panels secured thereto, the bag or liner being completedly folded preparatory to receiving a charge of fluid lard.

The illustrated embodiment of the invention comprises an apparatus for making liners or bags and also for enclosing such bags or liners within a carton of sheet material, such as cardboard. This apparatus is diagrammatically shown on the drawings as comprising an endless chain or carrier 10 which is trained about and driven by wheels 11 and 12 in the direction of the arrows, the latter being driven in any suitable manner so that an intermittent or step by step motion is imparted to the carrier 10. Mounted on the outer side of the carrier 10 and arranged in spaced relation to each other are mandrels or formers 13, in this instance fourteen formers being employed, and each former being of a substantially rectangular form and of a cross sectional area corresponding to that desired for the liner or bag, as will hereinafter appear.

Carried by each former 13 and disposed on the forward and rearward side thereof, with respect to the direction of movement of the chain 10, are fingers 14 and 15 respectively. The fingers 14 and 15 are pivotally mounted at their inner ends and normally are held in engagement with the adjacent side of the former. These fingers are periodically swung away from the former, as will hereinafter appear, by any suitable means (not shown). Detailed description and illustration of the finger-actuating mechanism is not given because it forms no part of the present invention and the provision thereof lies within the province of the skilled mechanic.

Relatively flexible sheet material, substantially impervious to moisture, such as parchment paper, cellulose sheet or the like, is fed from one end of the apparatus. The carton blank body is fed to a point adjacent to the opposite end of the apparatus from supply roll C.

In the operation of the apparatus the sheet material from the roll C is delivered to the adjacent former 13, the upper surface of which is parallel to the sheet, and is then progressively folded to form a bag or container with an end.
open, after that former has moved in step by step manner along with the carrier 10. At the proper position, after the bag or liner has been folded a carton blank, severed from its strip, is forced over the bag or liner and as the carrier continues its advancing movement, the carton is folded and the end panels are secured to the carton as will hereinafter appear.

From the supply roll L the liner sheet material is adapted in pairs of feed rolls 15 and 17, between which is disposed a severing roll 18 having a knife 19 which is adapted to enter a groove 20 formed in its companion roll 21. The knife 19 operates to sever a segment T of proper size from which to fold a bag or liner. The severed segment T is advanced by the feed rolls 17 to the upper side of the former 13, the finger 14 thereof having first been swung away from the former to receive the segment T and then back to grip and hold the segment in place.

Figure 3 shows a segment T, the dotted lines of which indicate a front side panel a and rear side panel c, the panel b designating the bottom wall of the bag. The end folds are designated by the reference d and the lateral folds are designated by the letters e and f.

During the advancing movement of the former 13 to the next station, the portion of the segment T which extends outwardly beyond the outer end of the former 13 is folded against that end by contact with a stationary brush 22 to provide the bottom wall b of the bag. The brush 22 wipes against the forward side of the segment T and folds it against the former as shown on the drawings.

In the next step a roller 23 carried by a rod 24 which reciprocates vertically within a guide 25 engages that portion of the segment T which extends rearwardly beyond the former 13. Substantially at that time the finger 15 is swung outwardly away from the former so that the rod 24 may be moved downwardly with the roller 23 engaging the projecting portion of the segment T forming the same against the adjacent side of the former and providing the side wall c. After the roller 23 commences its retracting movement the finger 15 swings abruptly against the former, holding the side thereagainst.

It will be understood that portions of the segment T (side folds d) extend laterally beyond opposite ends of the former 13 and in order to fold these portions thereof into engagement with the ends of the former, a U-shaped folding member 26, carried by a rod 27 moves downwardly, folding such latterly projecting portions of the segment T against the ends of the former 13, as indicated in Figure 6. It will be seen that the folder 26 is of substantially the same contour as that of the former, with the free end of the U-portions curved outwardly. After that fold has been made the folder 26 moves upwardly away from the former until the next former advances to that station.

At the next station a pivotally mounted arm 28 swings forwardly, folding the side folds f on opposite sides against the former. Then as the former continues its advancing movement the side folds e, which project laterally from the former, are brought into engagement with a stationary finger 29 disposed laterally thereupon, thereby folding these portions upon the side folds f and completing the folding of the bag or liner except for the outer end which remains open.

As shown in Figure 3, lines of adhesive 30 are provided along opposite sides of the liner segment T and when these portions are pressed against other portions of the folded bag the latter is retained in folded condition. The adhesive may be applied in any suitable manner as, for example, it may be applied initially as the material is withdrawn from the roll L and may be applied by the brush 22, in which case, two brushes would be desirable to apply the individual strips of adhesive.

As above mentioned, the carton blank is fed from the supply roll C and, in accordance with this invention, the carton blanks are formed in a continuous strip V, segments of a suitable size to form the carton being periodically severed from the continuous strip. Figure 2 shows in plan a portion of the strip V made up of integral series of carton body blanks. Each blank consists of bottom panel x, side panels y and z disposed on opposite sides of the bottom panel and a closing flap w which is connected the usual tongue w' adapted to be tucked inside the carton. The tongue w' is integrally connected to the succeeding carton body blank, being joined to a side panel y. Extending laterally from the opposite ends of the panels x, y and z are tabs x', y' and z' respectively and end panels for the carton are connected to these tabs, as will hereinafter be described.

Formed in the forward edge of the panel y is a cutout 31 in the form of a half circle and into this opening is adapted to extend a pin 32 on a feed wheel 33. The wheel 33 carries a plurality of pins 32 and is driven in step by step manner in timed relation to the movement of the chain or carrier 10. The wheel 33 cooperates with a pair of feed rolls 35 to advance the carton body strip V to a table 34 adjacent to which is mounted a tab folder 35 which serves to fold the tabs x', y' and z' downwardly at substantially right angles to their respective panels during the advancing movement of the strip V.

The strip V is advanced beyond the tab folder 35 to a position directly above the former 13 on which a bag or liner has been folded. A carton body blank is then severed from the strip by a knife 36 which is carried by an arm 37 connected to a vertically movable rod 38. The arm 38 also provides an edge of the carton body blank disposed in a position opposite to a side fold 39 of the former. The arm 37 folds the panel z downwardly and the arm 39 folds the panel y downwardly against the sides of the former. Relatively short arms 40 are disposed at right angles to the arms 37 and 39, as indicated in Figure 8, for imparting additional folding action with respect to the opposed tabs x'.

It will thus be seen that when a carton body blank is disposed in the proper position the rod 38 moves downwardly and the carton body blank is first severed from the strip V and upon further downward movement of the rod 38 the sides y and z are folded inwardly toward each other about a portion of the previously folded bag or liner. Thereupon the rod 38 moves upwardly away from the former 13 and concomitantly an arm 41 pivotally mounted at its lower end independently of the former, swings forwardly into engagement with the tabs y' and folds them inwardly against the bag or liner and remains in such position of the movement of the chain or carrier 10. The arm 41 holds the tabs y' in such position until the respective former has moved into engagement with a tab retaining plate 42, and then the arm 41 retracts to the next succeeding former.
The tabs on opposite ends of the carton body are then covered with a coating of adhesive, preferably glue. In the next advancing movement of the carrier 10 the tabs $x'$, $y'$ and $z'$ encounter adhesive applying rolls 43 which cover them thoroughly with the adhesive. The coating is arranged so that during the above advancing movements the arms 14 and 15 remain in engagement with the side panels $y$ and $z$ respectively, retaining the same intimate engagement with the folded bag or liner disposed upon a former 13.

The former 13 with its bag or liner and carton body folded as above described advances or is indexed to a station where end panels $p$ are fed to the carton. Two supply rolls $B$ and $E'$ of end panels are disposed on opposite sides of the path of movement of the carton body or former. Each roll contains a continuous strip of end panels $p$, each having an integral extension flap $p'$, the flap $p'$ being integrally connected to the next preceding panel $p$. Since the strips from the rolls $B$ and $E'$ are in the same manner, description of only one will be given. As shown a feed roll 44 is provided with laterally spaced pins 45, which are arranged to engage successively the rear end of each end panel $p$ in the region of the flap $p'$.

The roll 44 is driven in a step by step manner in timed relation to the advancing movement of the carrier 10 and advances the strip to a platen 46 which is normally disposed in an outwardly inclined position and is pivotally mounted at 47. At the proper time a vertically movable slide 47 actuated in any suitable manner by an arm 48, moves upwardly to rock an arm 49 upwardly. The arm 49 actuates the platen 46 toward the strip and against a stationary knife blade 50 to sever the advanced end panel from the strip. Thereupon the platen 46 swings inwardly toward the carton body and is pressed against the end tabs $x'$, $y'$ and $z'$ to which glue has previously been applied, thereby securing the end panel in proper position against the carton body. It will be understood that the end panels on opposite ends of the carton are simultaneously severed and swung into position against the ends of the carton body.

Each of the formers 13 is provided with a longitudinal passage 51 which opens at the outer end. When each former has advanced to the proper station a jet of air is introduced into the passage 51 to discharge the finished carton and its liner. At this time the arms 14 and 15 are swung outwardly to release the carton, and thus the carton is detached from the former 13 and are ready to be introduced to a machine or apparatus which fills the package or liner with lard or other similar material in a fluid state, whereupon the bag and carton are closed.

It will be seen that the relatively simple and inexpensive method of making cartons as well as the liners therefore is provided. Important characteristics of the invention reside in feeding the carton body and end panels in continuous strip formation and in forming the carton about a previously folded bag or liner. As completed the carton is ready to be filled, the liner being open at the upper end and fitting snugly inside of the carton. The amount of material used in making the carton is kept to a minimum and the cost of it is accordingly reduced.

It is to be understood that changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention, especially as defined in the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. Apparatus for making cartons comprising, an endless carrier having a step by step movement, a series of formers mounted upon said carrier, means for feeding to each former a sheet of relatively thin flexible material, a series of means for folding the sheet about the respective former to provide a bag having its outer end closed and inner end open, means for advancing in step a strip of carton body blanks, means for periodically severing a body blank from such strip, each carton body including a bottom panel and a side panel on opposite sides of the bottom panel and tabs projecting from the ends of such panels, a series of means for folding a carton body blank over the folded bag disposed on one side of said formers, means for feeding in timed relation to the movement of said carrier a continuous strip of end panels to the carrier in the path of movement of the formers, means for severing an end panel from each strip, and means for securing a severed end panel to the tabs on opposite ends of the folded carton body blank.

2. Apparatus for making cartons and liners therefor comprising, a former, means to advance a sheet of relatively light flexible material to the former, means for progressively folding the sheet upon the former to provide a bag one end of which is closed and the opposite end of which is open, means for folding a carton body blank over the folded bag, said carton body blank including a bottom panel and a side panel on opposite sides of said bottom panel and tabs extending from the ends of such panels, means to feed a continuous strip of end panels to opposite ends of the folded carton body, means to sever an end panel from each strip, and means for securing a severed end panel to the tabs at each end of the folded carton body blank.

3. Apparatus for making cartons and liners therefor comprising, a former, means to advance a sheet of relatively light flexible material through the former, means for progressively folding the sheet upon the former to provide a bag one end of which is closed and the opposite end of which is open, means for advancing a continuous strip of carton body blanks, each blank including a bottom panel and a side panel on opposite sides of said bottom panel and tabs extending from the ends of said panels, means for severing body blanks from such strip, means for folding a body blank over a folded bag, means to feed end panels to opposite ends of the folded carton body, and means for securing such end panels to the tabs at each end of the folded carton body.

4. Apparatus for making cartons and liners therefor comprising, a former, means to advance a sheet of relatively light flexible material through the former, means for progressively folding the sheet upon the former to provide a bag one end of which is closed and the opposite end of which is open, means for advancing a continuous strip of carton body blanks, each blank including a bottom panel and a side panel on opposite sides of said panels, means for severing body blanks from such strip, means for folding a body blank over a folded bag, means to feed a continuous strip of end panels to opposite ends of the folded carton body, means to sever an end panel from each strip, and means for securing a
severed end panel to the tabs at each end of the folded carton body.

5. Apparatus for making cartons comprising, an endless carrier for a step by step movement, a series of formers on said carrier, means for feeding to each former a sheet of relatively thin flexible material means for progressively folding the sheet upon the former to provide a bag one end of which is closed and the opposite end of which is open, means for advancing a continuous strip of carton body blanks, means for severing individual body blanks from such strip, each carton body blank including a bottom panel and a side panel on opposite sides of the bottom panel and tabs projecting from the ends of such panels, means for folding a carton body blank over the folded bag, means to feed a continuous strip of end panels to opposite ends of the folded carton body, means to sever an end panel from each strip, and means for securing a severed end panel to the tabs at each end of the folded carton body.

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