Feb. 17, 1942. C. E. GARDNER 2,273,470

METHOD OF LINING CARTONS

Filed April 8, 1941

Fig. 1

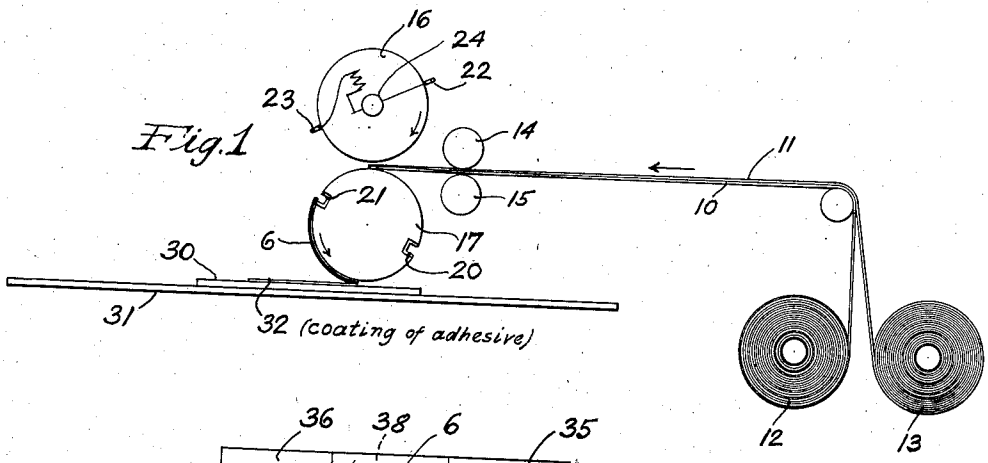
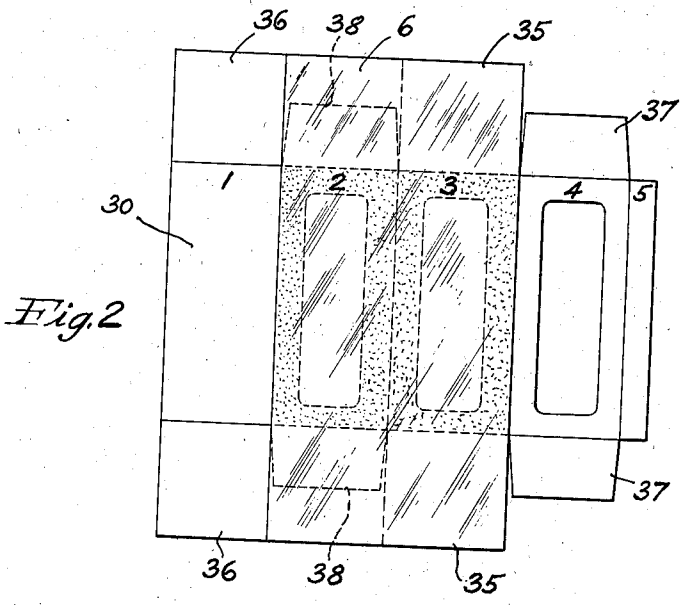



Fig. 2



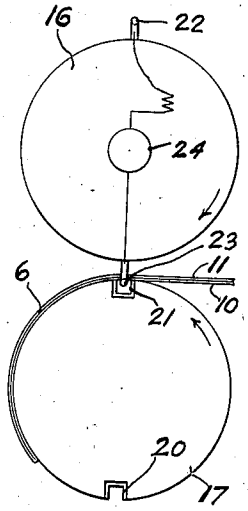
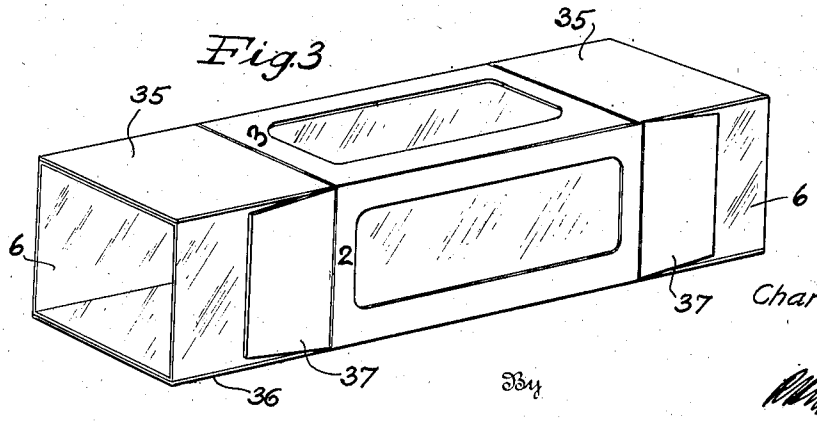




Fig. 4

Fig. 3




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## METHOD OF LINING CARTONS

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Application April 8, 1941, Serial No. 387,406

1 Claim. (Cl. 93—36.01)

This invention relates to the manufacture of cartons. More particularly it relates to the formation of a tubular liner for a carton from two sheets of liner material and the application of the liner thus formed to the carton blank. The preferred liner material of this invention is rubber hydrochloride film. This is now marketed as Pliofilm. A plasticized or unplasticized Pliofilm may be used. Any heat-sealable liner material may be employed.

It has previously been suggested that two sheets of Pliofilm may be cut and united at the cut by using a heated knife which not only cuts the film but fuses the cut edges together. Instead of a knife a hot wire may be used for this purpose. According to this invention the tubular liner is made from two sheets of film by cutting them to width with any suitable heated element which at the same time fuses the edges of the cut sheets together, and the tubular liner thus formed is applied directly to the carton blank.

The invention will be further described in connection with the accompanying drawing in which Fig. 1 shows diagrammatically equipment which may be used for forming the liner and applying it to the carton blank. Fig. 2 is a plan view of the carton blank with the liner glued to it. Fig. 3 is a view in perspective of the finished carton. Fig. 4 is an enlarged detail of a part of the equipment shown in Fig. 1, but a different stage of the operation from that shown in Fig. 1.

The carton blank comprises four panels 1, 2, 3 and 4 and the flap 5, which when the carton is finished will be glued to the panel 1. The Pliofilm liner 6 is the width of two panels. If the carton is to be used for packaging a liquid, care should be taken to see that the liner is sufficiently wide to be supported on all sides by the panels of the carton so as to relieve the liner from most of the strain imposed upon it.

The liner is made from two sheets of Pliofilm 10 and 11 which are taken from the two rolls 12 and 13 respectively. These two sheets are fed between the driven rolls 14 and 15 and over supports (not shown) are fed by these rolls between the cutting roll 16 and transfer roll 17.

These rolls 16 and 17 are driven at the same speed. They are separated somewhat so that the two sheets of Pliofilm are not placed under pressure as they pass between these two rolls and the cut ends of the two sheets 10 and 11 may be allowed to rest in place between the two rolls 16 and 17 without being drawn forward by these rolls. The feed of the two sheets 10 and 11 is controlled by the rolls 14 and 15.

There are two notches 20 and 21 in the roll 17. These extend the width of the roll. They cooperate with the raised heated wires 22 and 23, which are supported by the roll 16. These wires are heated electrically through the commutator 24. As the rolls 16 and 17 rotate the raised wires 22 and 23 mesh with the notches 20 and 21 respectively so that each wire dips in and out of a notch with each revolution of the rolls. Of course, it is not necessary that the wires 22 and 23 be supported by a roll 16 as any adequate mechanism for rotating the wires may be used. If preferred a single heated wire may be used which does not rotate but is held near the top of the roll 17 and is dipped into the notch 20 and then into the notch 21 at each rotation of the roll 17. The number of notches in the roll may vary. The roll may, for example, contain a single notch, or it may contain several notches depending upon the design of the apparatus for any particular job.

As the two sheets of Pliofilm are drawn over one of the notches and a heated wire is pressed down against these sheets the wire melts its way through the sheets and simultaneously fuses the two sheets together on each side of the wire. The operation is shown in greater detail in Fig. 4 where one of the heated wires and one of the notches are in the position in which they cooperate to cut the two sheets of film and seal them together. The two plies 10 and 11 are fed to the cutting device from the right. The surface of the roll 17 is equipped with means for holding the formed liner 6 to the surface of the roll until the liner comes in contact with the carton blank. Vacuum and static means for this purpose, either of which may be employed, are common in the art. The two sheets of film are thus held taut against the opening of the notch 21 as the hot wire 23 comes down into the notch and contacts first the upper and then the lower film and heats these to the melting point. The wire melts the two sheets of film along a straight line and separates the finished liner 6 from the two films 10 and 11. As the heated wire cuts the film it fuses the ends of the two films together and thus completes the liner 6, and the ends of the two films 10 and 11 are fused together so that on completion of the next operation when two other lengths of film are similarly cut from the sheets 10 and 11, both edges of the two sheets will be united to form the desired tubular liner.

The width of the liner is controlled by the movement of the rolls 14 and 15. They feed any given length of film between the rolls before the

cutting wire 22 or 23 cuts the plies. It will be noted that the liner 6, as shown in Figs. 1 and 4, does not extend from the notch 21 to the notch 20 but extends only a part of this distance. The width of the liner is controlled by the feed rolls 14 and 15. They preferably do not feed any film between the rolls 16 and 17 just after a section has been cut from the end of the sheets 10 and 11, but they wait until the rolls 16 and 17 have made a partial revolution, and then they preferably feed the films at the same rate as the surface speed of the roll 17. The lower film 10 is then held to the roll 17 by vacuum or static or any other known way, and there is no movement between this ply 10 and the surface of the roll 17.

The carton blank 30, shown in Fig. 1, is supported by the table 31. If the machine is operated automatically individual blanks 30 are fed in spaced relation along the table 31 or are carried by a suitable conveyor which may replace the table 31 and are supplied at such a rate and at such a time that the liner 6 is applied directly to the blank in the position which it is desired that the liner finally assume. For this purpose the panels 2 and 3 of the carton blank are preferably glued before the liner comes in contact with them. Fig. 2 shows the surface of these panels 2 and 3 dotted to indicate that these surfaces are coated with adhesive. This adhesive is indicated by the coating 32 on the blank 30 in Fig. 1. The pressure between the roll 17 and table 31 is advantageously sufficient to form a good bond between the liner and the adhesive.

Fig. 2 illustrates a usual type of carton in which longer flaps 35 and 36 are provided at opposite ends of the panels 1 and 3 and shorter flaps 37 and 38 are provided at the opposite ends of the other panels 2 and 4. Fig. 3 shows the carton after completion. After leaving the apparatus shown in Fig. 1, glue is applied to the panels 1 and 4 and to the flap 5, and the panels are then folded over the panel 1 being folded on top of the liner which covers the panel 2 as shown in Fig. 2, and the panel 4 is folded over onto the liner which covers the panel 3 and the flap 5 is glued tightly to the panel 1 and with pressure the liner 6 is thus united firmly to the inner surface of the panels 1 and 4. The non squaring up the carton the liner will adhere to the four sides, and when the carton is squared it will appear as in Fig. 3.

One or more of the panels may have windows as indicated in the drawing. The flaps 35—8 may be of any suitable design. Instead of placing the liner 6 on the panels 2 and 3, it may be placed on the panels 1 and 2 or on the panels 3 and 4. Various modifications of the invention are possible as will be evident to the man skilled in the art.

What I claim is:

The method of forming liners for cartons and affixing them to carton blanks, which comprises applying adhesive to one side of each carton blank feeding two sheets of heat-sealable film to a roll while carrying the sheets on the roll, severing them at intervals with a hot instrument along a line perpendicular to the direction of travel of the sheets and fusing them together on both sides of the line of severance by heat from the instrument thus forming tubular liners of the film, carrying the liners as formed on the roll and transferring each directly from the roll to the coated side of a carton blank and pressing the liners to the carton blank by the roll as it transfers the liner to the blank so as to bond the liner to the blank in the position in which it is transferred to the blank from the roll.

CHARLES E. GARDNER.