Oct. 22, 1963 R. O. RAGAN 3,107,586

PREVENTING EDGE WICKING IN PAPERBOARD CARTONS

Filed Jan. 16, 1962

3 Sheets-Sheet 1

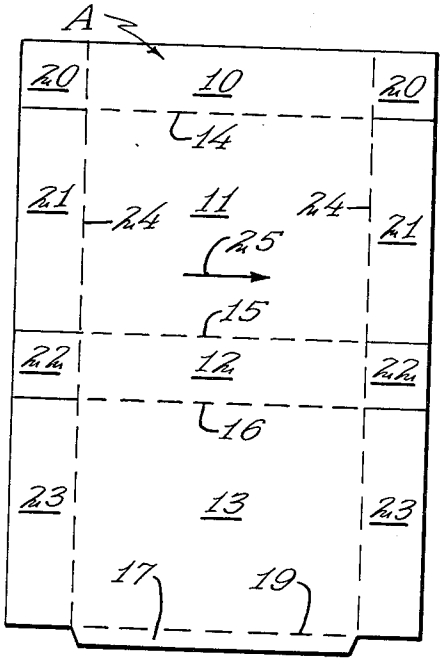


FIG. 1

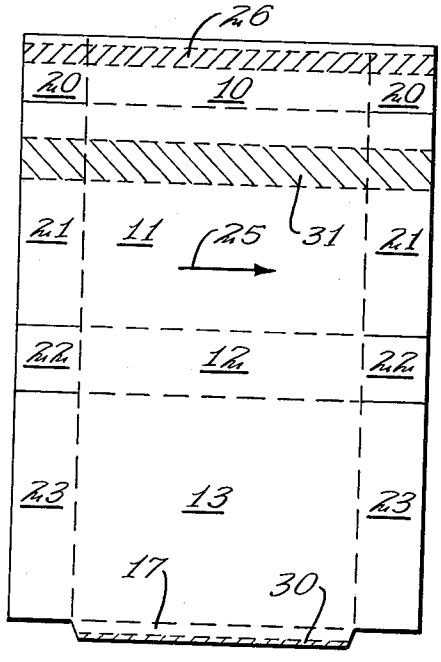


FIG. 2

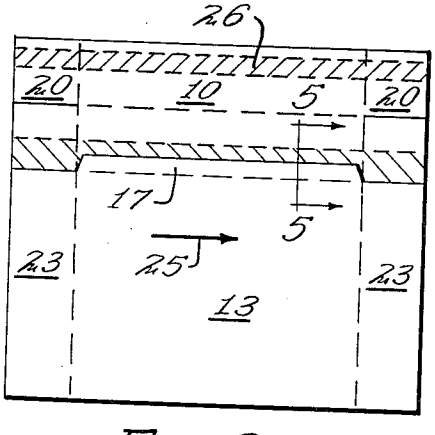


FIG. 3

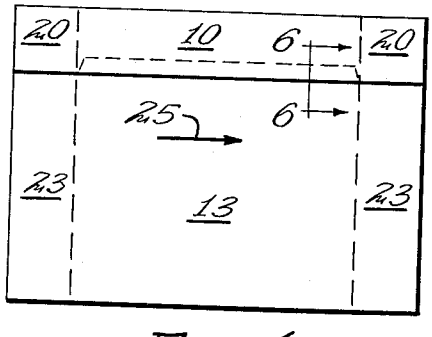


FIG. 4

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3 Sheets-Sheet 2

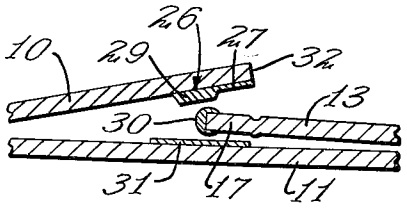


FIG. 5

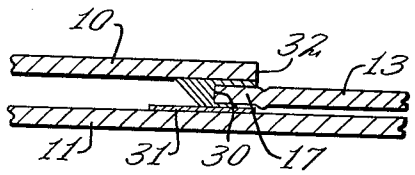


FIG. 6

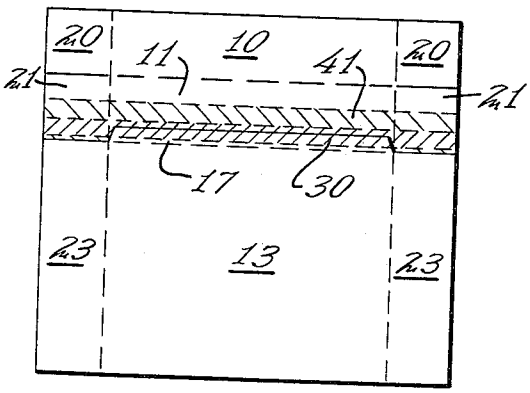


FIG. 7

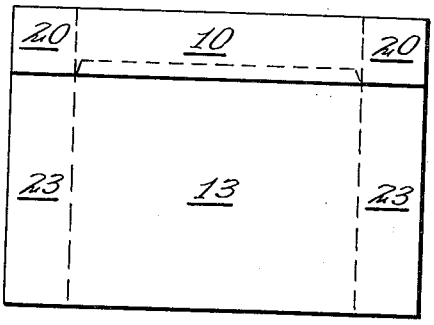


FIG. 8

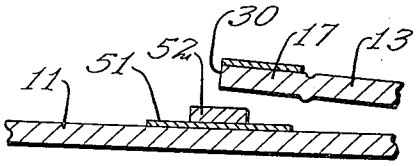


FIG. 13

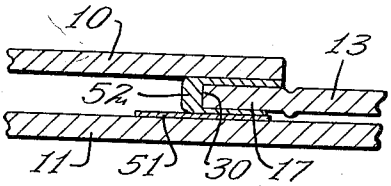


FIG. 14

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3 Sheets-Sheet 3

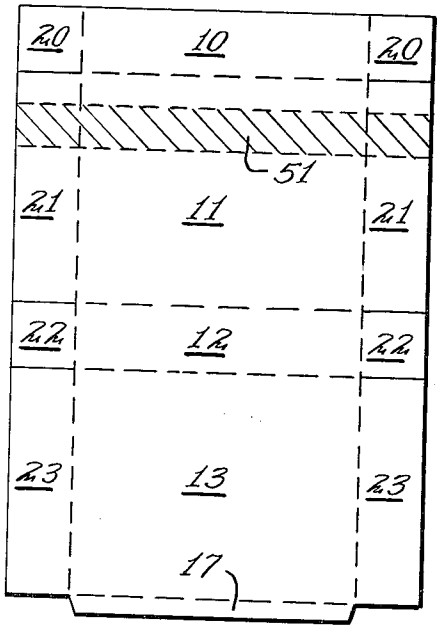


FIG. 9

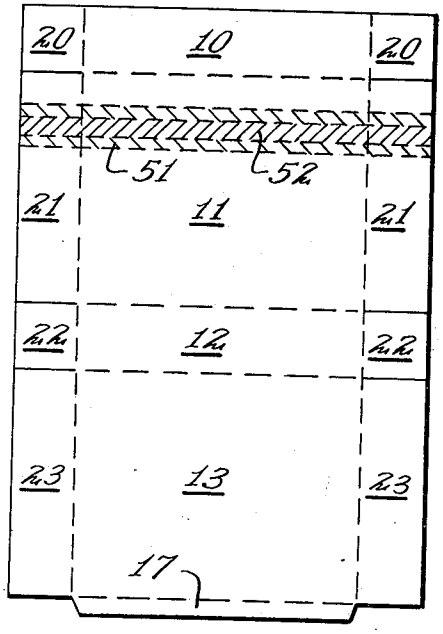


FIG. 10

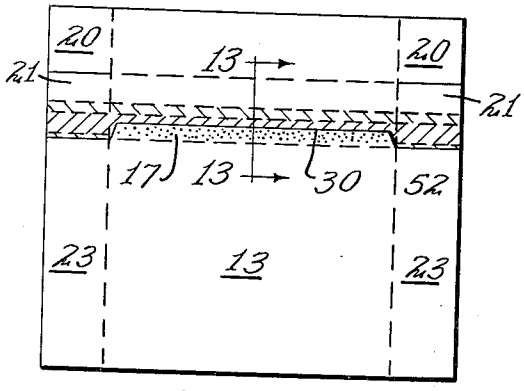


FIG. 11

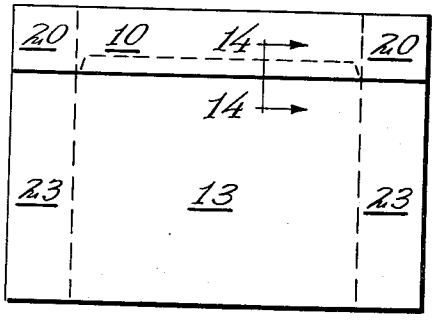


FIG. 12

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Patented Oct. 22, 1963

3,107,586
PREVENTING EDGE WICKING IN PAPERBOARD CARTONS

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Filed Jan. 16, 1962, Ser. No. 166,595
10 Claims. (Cl. 93—36)

This invention relates to an improvement in method of preventing edge wicking in paperboard cartons and deals particularly with a method of protecting the marginal edge of a glue flap or overlapping panel to prevent the wicking of grease, moisture vapor and the like to the outer surface of the board.

During recent years there has been a growing tendency to package products which are greasy or which are likely to change quality with a change of moisture content in paperboard cartons, thereby eliminating the inner bags which were previously used.

Coatings and coating processes have improved to the extent that the resultant board is highly impervious to the transmission of grease or moisture vapor directly through the board. However, one of the problems which has been experienced in the packaging of such products in cartons lies in the tendency for grease and moisture vapor to wick through the interior of the board from the cut edges which are exposed to the product. For example, grease will wick through the paperboard outwardly of the inner coating from the edge of the glue flap to the outer surface of the package, causing the board to be stained and disfigured. It is an object of the present invention to provide a simple and effective means of sealing the cut edge of the glue flap to prevent wicking therethrough.

Various methods have been attempted to accomplish this result. For example, the edges of the glue flaps have been sprayed with a protective material or some such material has been applied with a brush when the carton blanks are in stacked relation. While such methods have decreased the amount of wicking, it is virtually impossible to coat the edges uniformly and the results obtained are spotty. Furthermore, such processes include an additional step in the production of the cartons, thus increasing the cost of production. A further object of the present invention resides in the provision of a method of effectively coating the glue flap edges which requires no increase in the number of steps required to produce the cartons.

Attempts have been made, at least experimentally, to treat the edge of the glue flap just prior to gluing the carton at the manufacturer's joint. However, it has been necessary to complete the treatment sometime before the carton is folded to prevent the edge of the glue flap from adhering to the opposite wall of the flat carton and sealing the folding carton in flattened form. As a result, such a process very materially reduced the speed of the gluing operation to a point where it is usually impractical to coat the edge and glue the carton in a single operation.

I have found that by applying a hot melt or similar adhesive coating to certain of the overlapping parts of the carton, and by simultaneously applying a release agent material to the surface of the carton against which the overlapping parts engage, the edge of the glue flap can be effectively coated to prevent wicking without causing the adhesive to glue the carton together so that it cannot be opened up. In the preferred form of my invention, I apply an excess of material to the edge of the blank which overlaps the glue flap, and apply a strip of release agent to the surface of the carton against which

the glue flap is folded. When the carton is folded and pressure is applied to the overlapping areas, the excess of adhesive is forced from between the overlapping parts and forms an effective seal for the cut edge of the glue flap. As a result, the wicking through the glue flap is effectively stopped.

A feature of the present invention resides in the application of a material such as hot melt adhesive to the overlapping surfaces of the carton in such a manner as to simultaneously seal the manufacturer's joint and seal the edge of the glue flap against wicking. The adhesive is preferably applied so that an excess of the adhesive is provided along the free edge of the glue flap. When pressure is applied, this excess adhesive is extruded along the cut edge of the glue flap to seal the cut edge. The opposite walls of the carton are prevented from adhering together by the release agent.

A further feature of the present invention resides in the method described and including, if desired, an additional narrow strip of adhesive applied along the cut edge of the glue flap and which will be forced by the sealing pressure from beneath the glue flap to insure the complete sealing of the cut edge.

Another feature of the present invention resides in the method described using a release agent which will form a temporary coating for a portion of the carton wall and which will then evaporate or else will be dispersed in a thin film which will not affect the carton contents when the carton is used. For example, the release agent could consist of glycerine, glycol, or even water.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

FIGURE 1 is a diagrammatic view of a typical carton before treatment.

FIGURE 2 is a view of the carton after the adhesive and release agent have been applied thereto.

FIGURE 3 illustrates the carton after the first folding operation.

FIGURE 4 illustrates the completely sealed carton.

FIGURE 5 is an enlarged sectional detail through the overlapping portions of the carton just before the edges are sealed together.

FIGURE 6 is an enlarged section showing the manufacturer's joint of the carton after the sealing operation, the position of the section being indicated by the line 6—6 of FIGURE 4.

FIGURE 7 is a diagrammatic view of a partially folded blank showing an alternate method of applying the adhesive.

FIGURE 8 is a diagrammatic view of the carton of FIGURE 7 after it has been closed.

FIGURE 9 shows a carton blank after the first step of a second alternate sealing method.

FIGURE 10 shows the carton of FIGURE 9 after the adhesive has been applied.

FIGURE 11 shows the blank of FIGURE 10 after the first folding operation.

FIGURE 12 shows the blank of FIGURE 11 after the second folding operation.

FIGURE 13 is an enlarged section view through the partially folded carton blank, the position of the section being indicated by the line 13—13 of FIGURE 11.

FIGURE 14 is a sectional view through the sealed carton in enlarged form, the position of the section being indicated by the line 14—14 of FIGURE 12.

The preferred form of my invention is indicated diagrammatically in FIGURES 1–6 of the drawings. FIGURE 1 illustrates a carton blank for forming a conven-

tional paste end carton, the carton A including an end wall panel 10, a side wall panel 11, an end wall panel 12, and a side wall panel 13, hingedly connected along parallel fold lines 14, 15, and 16. A glue flap 17 is hinged to the side wall panel 13 along the fold line 19. Closing flaps 20, 21, 22, and 23 are foldably connected to the ends of the panels 10, 11, 12, and 13, respectively, along parallel fold lines 24. This type of carton blank is only shown for the purpose of illustration as it is the most common type of tubular foldable carton blank.

FIGURES 1, 2, 3, and 4 show four steps of a continuous process of forming the flat blank into a tubular carton by adhering the manufacturer's joint. These steps may be performed on an apparatus such as a straight line gluer, and the direction of movement of the blank from one step to the next is indicated by an arrow 25.

As the carton moves from the position indicated in FIGURE 1 to the position shown in FIGURE 2, a band of adhesive such as hot melt adhesive is applied to an end of the blank along the marginal edge of the panel 10 and its attached closing flaps 20. It would be preferable to omit the adhesive on the closing flaps 20, but this requires the use of spot gluing equipment. The band of adhesive which is indicated in general by the numeral 26 is preferably applied as is best indicated in FIGURE 5 of the drawings with a relatively thin coating 27 along the marginal edge of the panel 10 and a thicker strip 29 of coating on the portion of the panel 10 which overlies the free edge 30 of the glue flap 17. At the same time, a strip 31 of a release agent is applied to an area of the side wall panel 11 and the connected closing flaps 21 which underlies the glue flap 17 and the band 26 of coating on the panel 10 and attached flaps 20. This release agent may be any material which prevents the adhesive from bonding to the panel 11 and flaps 21, and which will not affect the product which is to be packed in the carton. A film of glycerine wiped or rolled on to the inner surface of the carton has been found effective for producing the desired result, and glycol has been similarly used. In some instances, even water may be used to prevent the adherence of the adhesive to the coated surface.

As indicated in FIGURES 5 and 6 of the drawings, when the panel 10 is folded into overlapping relation with the glue flap 17, the relatively thin strip 27 will act as an adhesive to adhere the panel 10 to the flap 17 without any appreciable extrusion of the coating beyond the edge 32 of the panel 10. However, when pressure is applied to seal the overlapping areas together, the excess adhesive from the thicker strip 26 of the adhesive will be extruded beyond the free edge 30 of the glue flap 17, creating a continuous seal to the edge 30 extending throughout the length thereof. If the process is properly carried out, the cut edge 30 may be completely enclosed and protected from direct contact with the carton contents to protect wicking of grease or moisture vapor thereto. The release agent 31 protects the surface of the opposite carton panel 11 until the adhesive has set or hardened and accordingly the cartons may be opened up in the usual manner.

When the adhesive band 26 extends across the flaps 20 as well as the panel 10, the adhesive sets on the undersurfaces of the flaps 20. In practice, this causes no problem as the flaps 20 and 22 are normally folded down into a common plane inwardly of the remaining flaps so that the adhesive deposited upon the flaps 20 will have no affect on the normal sealing of the ends of the carton.

FIGURES 7 and 8 illustrate a modified manner of sealing the carton A. In view of the fact that the blank sealed is identical to that illustrated in FIGURE 1, the same identifying numerals have been used to identify the carton parts. In the method shown in FIGURES 7 and 8, an area 41 of the release agent, similar to the area 31 previously described, is applied to the surface of the side wall panel 11 and the adjoining flaps 21. The carton is

then folded along the fold line 16 so that the glue flap 17 overlies the coated area of the panel 11. A strip 42 of pressure sensitive adhesive is then applied to the upper exposed surface of the glue flap 17 and adjoining portions of the coated area of the panel 11 and flaps 21. The panel 10 and its connected flaps 20 are then folded into sealing position as indicated in FIGURE 8, the marginal edge of the panel 10 being adhered to the upper surface of the glue flap 17. Due to the fact that the adhesive band extends beyond the free edge 30 of the glue flap, and as an amount of adhesive which is preferably in excess of the amount actually necessary to form the seal is employed, the cut edge will be coated to prevent wicking.

This method has the disadvantage over the first described method as a string of material might be left on the surfaces of the flaps 21, although most of the adhesive will adhere to the flaps 20 due to the coating of the release agent.

FIGURES 9–14 of the drawings disclose a second alternate means of sealing the carton blanks A. As a first step of the operation, the side wall panel 11 and associated end flaps 21 are coated with a strip 51 of release agent along the area underlying the juncture between the glue flaps 17 and in panel 10 in the folded condition of the carton. As a second step of the operation, illustrated in FIGURE 10, a band 52 of adhesive is applied to the release agent 51, the band 52 being narrower than the release agent band 51 and intermediate the longitudinal edges thereof. As a third step of the operation, the carton blank is folded along the fold line 16 into the position illustrated in FIGURE 11, the glue flap overlying a portion of the adhesive band 52, the adhesive band extending beyond the free edge 30 of the glue flap. During the operation, adhesive of any suitable type is applied to the uppermost surface of the glue flap 17. As a final step of the process, the carton is folded along the fold line 14 to fold the panel 10 over the glue flap 17 and sealing pressure is applied to adhere these parts together. This sealing pressure tends to extrude the hot melt adhesive in the band 52 from beneath the free edge of the glue flap 17, acting to coat the free edge of the glue flap.

This latter method has not been found as effective as the other methods due to the fact that the hot melt adhesive does not actually form the manufacturer's joint, and as the coating of a thick band of hot melt adhesive directly to the wetting agent has a tendency to cause foaming or bubbling of the material unless the conditions are carefully controlled. However, it can comprise a modified method of accomplishing the result.

The present method is particularly adaptable to cartons formed with a coated inner surface, such as cartons having a coating of polyethylene or other grease resistant or moisture vapor resistant materials. With such coated surfaces, a minnor amount of release agent may be used with effective results. The method may, however, also be used on cartons having a fibrous inner surface if sufficient release agent is applied.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in method of preventing edge wicking in paperboard cartons, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. The method of preventing wicking through the glue flap of a tubular carton from the cut edges thereof, the carton including side and end walls hingedly connected together in a series along parallel fold lines and a glue flap hingedly connected to a wall at one end of the series and adapted to be secured in overlapping relation with the wall at the other end of said series by folding the carton along alternate fold lines between said walls, the method including the steps of applying a release agent

which is resistant to adhesive to the inner surface of the carton walls over which the glue flap folds, and applying adhesive to the cut edge of the glue flap and between the glue flap and the portion of the wall at the other end of the series overlying the glue flap, the release agent preventing the adhesive from adhering to the wall to which it is applied.

2. The method of claim 1 and in which an excess of adhesive is applied between the glue flap and the wall at the other end of the series, and including the step of applying pressure to the overlapped portions of the carton to force some of the adhesive beyond the cut edge of the glue flap.

3. The method of claim 1 and in which the adhesive is applied with a bead of increased thickness in the area adjoining the cut edge of the glue flap.

4. The method of preventing wicking through the glue flap of a tubular carton from the cut edges thereof, the carton including side and end walls hingedly connected together in series along parallel fold lines, and a glue flap hingedly connected to a wall at one end of the series and adapted to be secured in overlapping relation with the wall at the other end of said series by folding the carton along alternate fold lines between said walls, the method including the steps of applying a release agent which is resistant to adhesive to the inner surface of the carton walls over which the glue flap folds, applying an excess of adhesive to the portion of the wall at the other end of the series which folds into overlapping relation with the glue flap, folding the carton to position the glue flap over the area coated with release agent folding the adhesive coated wall over the glue flap, and applying sealing pressure to the overlapped blank ends, thereby forcing a portion of the adhesive beyond the cut edge of the glue flap and against the wall surface coated with release agent.

5. The method of claim 4 and in which the adhesive is a hot melt adhesive applied in molten form.

6. The method of preventing wicking through the glue flap of a tubular carton from the cut edges thereof, the carton including side and end walls hingedly connected together in series along parallel fold lines, and a glue flap hingedly connected to a wall at one end of the series and adapted to be secured in overlapping relation with the wall at the other end of said series by folding the carton along alternate fold lines between said walls, the method including the steps of applying a release agent which is resistant to adhesive to the inner surface of the carton walls which the glue flap folds, applying adhesive to the surface of the other end wall of the series which may be folded to overlie the glue flap, applying a bead of adhesive of increased thickness at the area of said other end wall which may be folded to overlie the cut edge of the glue flap, folding the carton to position the glue flap over the

surface coated with release agent, folding the wall at the other end of the series to overlap the glue flap, and applying sealing pressure to the overlapped ends to force the adhesive of the bead along the cut edge of the glue flap.

7. The method of claim 6 and including the step of applying adhesive to the cut edge of the glue flap prior to folding it against said surface coated with release agent.

8. The method of preventing wicking through the glue flap of a tubular carton from the cut edges thereof, the carton including side and end walls hingedly connected together in series along parallel fold lines, and a glue flap hingedly connected to a wall at one end of the series and adapted to be secured in overlapping relation with the wall at the other end of said series by folding the carton along alternate fold lines between said walls, the method including the steps of applying a release agent which is resistant to adhesive to the inner surface of the carton walls over which the glue flap folds, folding the carton to position the glue flap over the area coated with release agent, applying adhesive to the glue flap and beyond the cut edge thereof, folding the other end wall of the series in overlapping relation to the glue flap and applying sealing pressure to the overlapped portions to bond the glue flap and other end wall and to coat the cut edge of the glue flap.

9. The method of claim 8 and in which the adhesive is of the hot melt type applied in molten form.

10. The method of preventing wicking through the glue flap of a tubular carton from the cut edges thereof, the carton including side and end walls hingedly connected together in series along parallel fold lines, and a glue flap hingedly connected to a wall at one end of the series and adapted to be secured in overlapping relation with the wall at the other end of said series by folding the carton along alternate fold lines between said walls, the method including the steps of applying a release agent which is resistant to adhesive to the inner surface of the carton walls over which the glue flap folds, applying a strip of adhesive to the portion of the surface of the carton coated with release agent which will underlie the cut edge of the glue flap when the carton is folded, folding the carton to position the cut edge of the glue flap on the adhesive, applying adhesive to the glue flap, and folding the other end wall of the series into engagement with the glue flap.

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