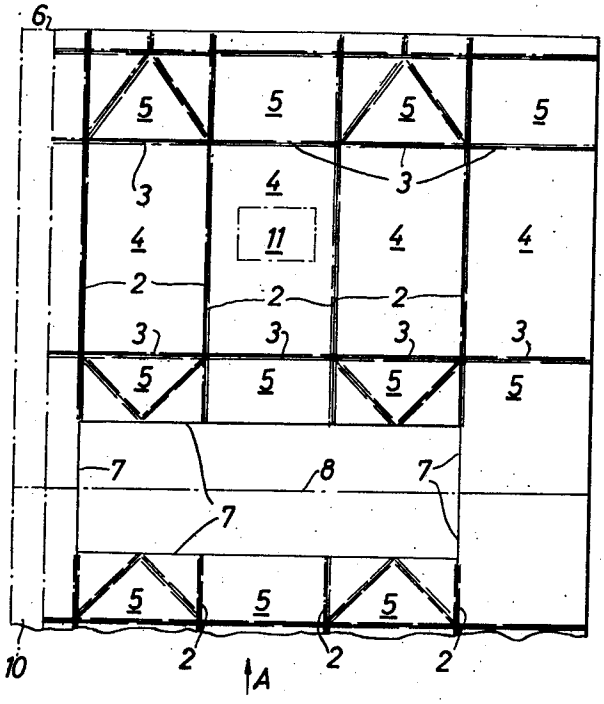
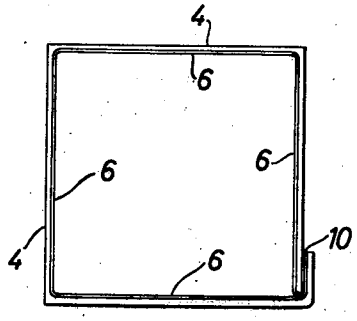
Jan. 15, 1963 T. N. GAUNT 3,073,216

LIQUID PROOF CONTAINERS

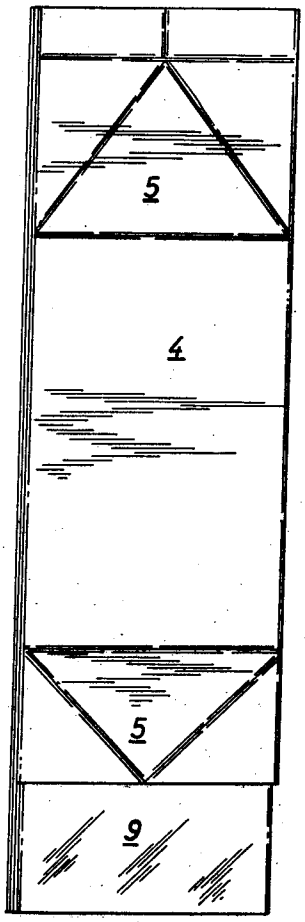
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-FIG. 1.-



-FIG. 2.-



-FIG. 3.-

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LIQUID PROOF CONTAINERS

Thomas Norman Gaunt, 179 Wetherby Road, Shadwell, Leeds 17, England

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1 Claim. (Cl. 93—36.01)

This invention relates to liquid proof containers and the method of producing such containers. The commercially successful liquid proof paper containers have hitherto been manufactured by shaping or forming a paper carton then immersing the shaped carton in a bath of suitable molten wax. These packages whilst they have enjoyed considerable success for the packing of milk, fruit squash and other liquids and commodities, they suffer from a number of serious disadvantages. For example:

(1) The wax melts at a low temperature and food stuffs may not be packed into the container at a temperature greater than the softening point of the wax.
(2) The wax dissolves or allows the penetration of oils and fats which are frequently present in food stuffs.
(3) The wax imparts an undesirable finish to the cartons which are unpleasant to handle and collect dust, and after a short display in shops become very unsightly.
(4) Penetration of wax into carton board causes discolouration of the board.
(5) Wax, being very brittle tends to give a very poor protection to paper when the paper is folded.
(6) Very large quantities of wax are required to obtain a sufficient degree of impermeability and the process is therefore very costly.

The following suggestions have been made:

(1) A proofing agent such as polythene is coated on to the carton board and the treated board then cut and creased and formed into shape. In this method it is difficult to design a package of satisfactory appearance which does not have unprotected edges which are readily attacked by the material being filled. Furthermore, the proofing agent tends to be damaged during the forming and creasing process.

(2) By treating the shaped carton with a solution of plastic and subsequently removing the solvent from the solution by evaporation, a leak proof package may be obtained. Although many ingenious suggestions have been made it is difficult to obtain a uniform even coating without having considerable penetration into the board, and it is also difficult to rapidly evaporate the solvent from the inside of the package.

(3) It has several times been suggested to loosely and irregularly fix a separate sheet of plastic or coated paper to the inside of the carton and then to seal the inner liner into a leak proof unit. Such forming and folding machinery has been very complicated and difficult to use at the high speeds required in commerce. Also the separate liner tends to come away from the body board and the inner liner is not of sufficient bursting strength by itself to withstand the considerable handling required in the transport of the filled packages.

I have found that these problems can be economically and satisfactorily solved by coating paper or paper board in continuous web-form or individual blanks in such a way that the coating layer will substantially overlap the body area of the carton to be formed in at least two directions, i.e. one side and end. The coating will be a thermoplastic material such as polyethylene, polyvinyl chloride or the like which can exist as a self-supporting film. In this way it is possible by folding the overlapping portion of the coating layer along the side edge, and causing it to adhere to the reverse side of the paper or card, to provide a satisfactorily proofed longitudinal side edge and seam when the carton tubed or erected from the paper or board is glued.

Such a film-lined or overwrapped cartons may be made by forming a film-covered web by the steps of scoring a web of carton stock to provide a continuous web of stock scored longitudinally and transversely for fold lines defining side walls and closure flaps of undetached carton blanks successively disposed longitudinally of said web and moving said web through a film forming or film applying device to form a continuous flexible lining film covering a surface of said web and thereafter tubing said film covered scored stock and severing said successive carton blanks from said web.

Prior to forming or applying a film on the scored web, said web may be cut to define openings therein and said film is formed or applied over said openings. The carton blanks may be severed from said web across the openings so that the film formed or applied over the openings provides end portions of the film free of said web and available for sealing to other end portions of the carton blank.

The stock may be tubed to locate the film as either an internal liner or as an external overwrap.

In order that the invention may be clearly understood and readily carried into effect the same will now be more fully described with reference to and by the aid of the accompanying drawings, wherein:

FIGURE 1 is a portion of web of carton stock sufficient to form one carton.

FIGURE 2 is an end view of a carton tubed in accordance with the invention.

FIGURE 3 is a plan view of FIGURE 2.

Referring to the drawings.

A web **1** of carton stock is scored longitudinally and transversely at **2** and **3** defining side walls **4** and closure flaps **5** of undetached carton blanks successively disposed longitudinally of said web. The scored web is moved through a film forming device of known form (not shown) in the direction of the arrow A to form a continuous flexible lining indicated at **6**.

The film-covered scored stock is then tubed as shown in FIGURES 2 and 3.

Prior to forming a film on the scored web, the web **1** can be cut at **7** to define openings therein and the film **6** is formed over said openings. When the blank is severed from the web at **8**, the film over the opening **7** provides end portions **9** (FIGURE 3) of film free of said web and blank and available for sealing together and to other end portions.

The film **6** formed on the scored web may be wider than the said web so that a free margin **10** (FIGURE 1) is formed. When the blank is tubed, as shown in FIGURE 2, the free margin of film **10** is folded back so as to lie on the outside of the tube and the film of opposite edge of the blank can be sealed on to this free marginal portion of film.

One of more windows **11** may be provided in the side walls of the web so that the contents can be viewed through the film.

The coating layer or film may be produced in any suitable manner, such as for example:

(1) By hot extrusion of a plastic such as polythene.
(2) By cast coating the plastic, e.g. polyvinyl chloride.
(3) By calendering the plastic film e.g. polyvinyl chloride.
(4) By forcing the plastic through heated rollers rotating at different speeds.

The coating layer or film resulting from any of the above processes is forced to adhere either to separate cut-out flat cartons or by laminating to a reel of carton stock paper, having a substantial punched margin between each carton blank portion. The coating layer or film is also caused to extend beyond the carton flat in at least one

longitudinal direction. The cartons are then separated, cut from the web and are ready for proceeding by conventional heat sealing technique into a leak proof form.

As an alternative method of manufacture, it is possible to coat paper bearing a repellent coating such as silicone resin, and then laminating the film on to the carton flats, or punched out web by heat, or solvent transfer process.

In a still further alternative, the coating layer may be supported on a suitably prepared backing sheet of paper treated with a repellent such as silicone resin and the punched and/or creased web of paper or cardboard laid on to the supported coating layer which is caused to be transferred to and adhere to the paper or card-board.

In yet a further alternative, the continuous web of stock may be passed through a film forming device and emerge therefrom coated in the manner described.

The carton blanks and their coating layers after severing from the laminated strips are ready for erection and finally processing by conventional heat sealing techniques into a leaf proof form.

I claim:

A method of manufacturing liquid-proof, thermoplastic synthetic foil-lined paper board cartons comprising the steps of scoring a continuous web of paper board in the longitudinal direction of said web and in the transverse direction to said web to form fold lines defining side walls and closure flaps of a plurality of undetached carton blanks thus successively disposed longitudinally along said web, cutting openings in said web in areas beyond the fold lines forming closure flaps and side walls and between successive carton blanks to facilitate later severing separation of said carton blanks, further cutting openings in sidewall areas of successive undetached blanks to adapt the blank laminated to a liner film to form a window

in the sidewall of each carton, then superposing a web of a preformed self-supporting liquid-proof liner film selected from the group consisting of polyethylene and polyvinyl chloride over said paper board web to overlap the openings and body areas at the side and ends of each scored blank of the paperboard web, said thermoplastic liner film web having parallel sides and being wider than said paper board web to overlap said paper board web at one side thereof to form a continuous longitudinal free side margin while being flush at the other parallel side thereof and to cover the cut out openings between scored undetached carton blanks in said paper web, laminating said preformed liner web by heat sealing thereby to said paper board web forming the laminated assembly into a continuously lined tube while simultaneously folding back said margin of said liner web so as to cause said margin to lie on the outside of said tube, severing the carton blanks on the paper web side and separating each of the blanks after severing while leaving end portions of said liner web over said openings uncut to provide free ends of said liner for sealing to the opposed end portions of said tubed laminated carton blanks and to thereby provide an overwrap for the carton and sealing the opposite flush edge of film liner to the free side margin of said liner.

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