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H. A. INMAN ET AL

2,099,166

CARTON CONSTRUCTION

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Fig. 1

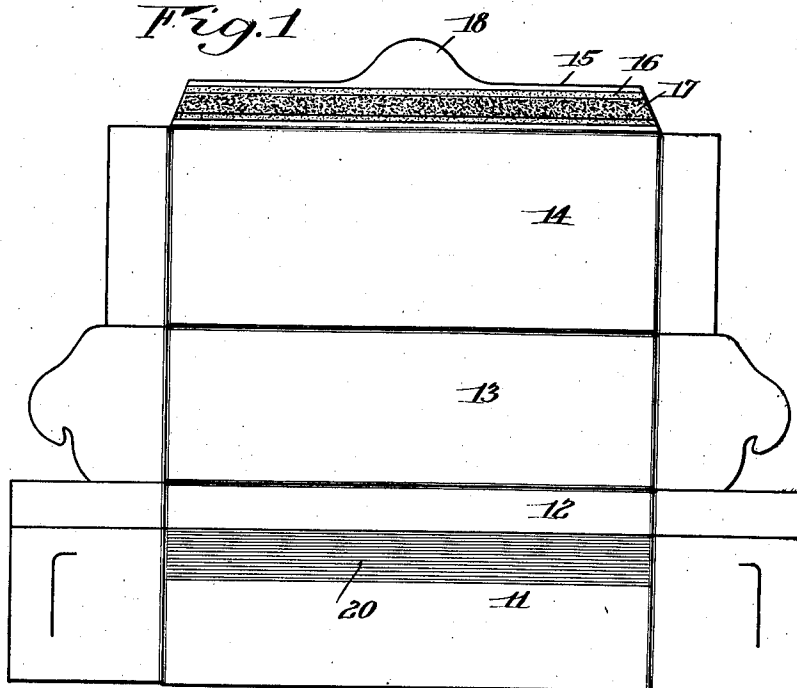


Fig. 2

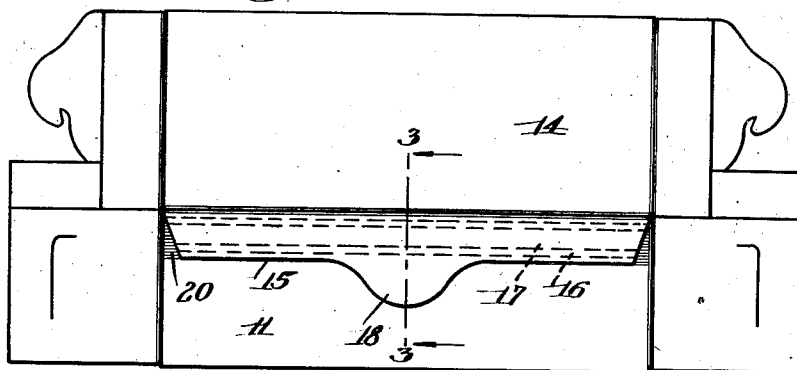


Fig. 3

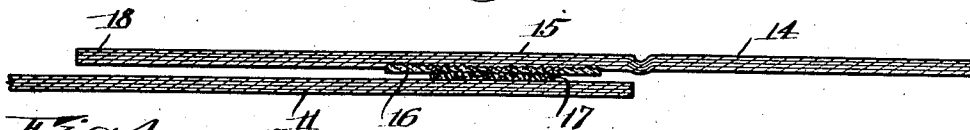
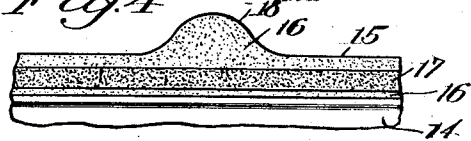


Fig. 4



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CARTON CONSTRUCTION

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14 Claims. (Cl. 229—51)

An object of this invention is to provide an improved carton having two overlapping layers of material adhesively connected with each other and adapted to be pulled apart when desired, and having means for confining or substantially confining the resultant tearing of the sheet material to one of these layers rather than the other.

Another object is the provision of a generally improved and more satisfactory carton of the pull-apart or tear-apart type.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawing:

Fig. 1 is a view of a carton constructed in accordance with a preferred embodiment of the invention, at one stage of its manufacture;

Fig. 2 is a similar view of the carton at another stage of its manufacture;

Fig. 3 is a cross-section substantially on the line 3—3 of Fig. 2, and

Fig. 4 is a view similar to a fragment of Fig. 1, showing a modification of the construction.

The same reference numerals throughout the several views indicate the same parts.

The carton itself may be of any suitable or convenient form, the shape of the carton being immaterial so far as the present invention is concerned. As here shown by way of example, there may be provided a carton blank having panels 11, 12, 13, and 14 to be folded up to make a carton of rectangular cross-section. In Fig. 1, the panel 11 is folded over the panel 12, the other panels being extended in flat position. Suitable end flaps are provided at the ends of the above mentioned panels.

For some purposes, as, for example, when packing ice cream, it is desirable to have a carton which can readily be opened up to a flat condition for the purpose of removing the ice cream in solid block form, to avoid the necessity of having to dig the ice cream out of the carton bit by bit. This flat opening of the carton is usually accomplished by tearing apart along one of the adhesive joints. When this is done, it is difficult or impossible to produce a perfectly clean break or tear at the adhesive joint and almost always the adhesive pulls up some of the surface fibers of the carton material from one or the other of the overlapping layers and perhaps from both layers, and continued pulling of the layers in a direction away from each other causes the

surface fibers of the layers to pull away from the main body of the sheet material in long strips, which are not only unsightly but often interfere with proper and rapid opening of the carton.

To avoid this, the present invention provides simple and effective means for confining the tearing of the surface fibers substantially to one of the two overlapping layers of fibrous sheet material and preferably to that one of the layers which is so positioned that the fibers tear toward an adjacent edge of the material. Obviously the surface tearing can proceed no further than the adjacent edge of the sheet material so that the surface tearing is confined to a relatively small area of one layer and long strips of tearing are thus avoided.

To accomplish this, the carton blank is provided with a flap 15 positioned to overlap with and lie outside of the panel 11 when the carton is made up. The underside of the flap 15 (that is the side which lies next to the panel 11) is treated with means indicated at 16 to render the surface fibers tougher than the surface fibers on the outer surface of the panel 11. The word "tougher" is here used in a broad sense as meaning that the fibers are strengthened or hardened so as to be less likely to tear or break than the untreated fibers. This toughening of the fibers of the flap 15 may be accomplished by treating the area 16 of the flap with a sizing preparation, which sizing may be, for example, a solution of thin and penetrating glue (such as animal or vegetable glue, dextrin glue, hide stock glue, casein glue, etc.) or may be a starch solution, a rosin size, or any other suitable known sizing preparation which will tend to strengthen or toughen the fibers. When the sizing 16 has considerable penetrating power, as is preferably the case, it not only toughens the surface fibers of the sheet or stock to which it is applied, but also penetrates through all or practically all of the thickness of the sheet and performs the important additional function of helping to bind the various layers or laminations of the sheet firmly together. Usually the stock or fiber board of which the carton is made consists of several plies or layers as indicated in Fig. 3, four plies being frequently used. The penetrating sizing 16 helps greatly in holding the plies together, preventing accidental separation of one or more plies from the others.

Over this sizing 16 is applied the regular glue or other adhesive indicated at 17, which may be either in the form of a continuous strip of ad-

hesive, as shown in the drawing, or of a discontinuous strip or other suitable form or design, as desired. After the adhesive has been applied, and while it is still in an adhesive condition, the panel 14 and flap 15 are folded down over the panels 11, 12, and 13, from the position shown in Fig. 1 to the position shown in Fig. 2, so that the adhesive comes into contact with the upper surface of the panel 11 near the extreme edge of this panel, thus securing the parts together to make the completed carton in knocked-down condition.

The cartons are shipped in this knocked-down condition to the user, who erects them to a rectangular cross-sectional shape, places the end flaps properly to close one end of the container, fills the container with ice cream or other desired contents, and then closes the other end flaps to close up the other end of the container.

When the filled container is sold, the purchaser may wish to remove the contents in a solid block, instead of having to dig it out. For this purpose, the flap 15 is provided at some point with a conveniently accessible portion, such as the tab 18, which may be grasped to pull the flap 15 outwardly away from the panel 11 to which it is adhesively secured. As the flap is pulled outwardly, the adhesive connection between the parts 15 and 11 is broken. Because of the sizing or other treatment 16, the fibers of the flap 15 are tougher than the fibers of the flap 11. Therefore, the adhesive 17 tends to pull away from the panel 11 and remain on the flap 15, rather than pulling away from the flap 15 and remaining on the panel 11. As the adhesive pulls away from the panel 11, it pulls up and tears some of the surface fibers of the panel 11. Continued upward and rightward movement of the flap 15 (when viewed as in Fig. 3) relatively to the panel 11 causes the tears in the surface of the panel 11 to extend rightwardly along the upper or outer surface of the panel material. But it is seen that the extreme end or edge of the panel 11 is closely adjacent this adhesive connection so the tears can proceed no further than the edge of the panel material, where the tears will necessarily stop. Little or no tearing is produced in the material of the flap 15.

If it is desired for any reason to apply sizing to the whole surface of the sheet material of which the carton is formed, this may be done without destroying the usefulness of the present invention. In that event, the portion of the flap 15 to which the adhesive 17 is to be applied is simply treated with an additional amount of sizing or other fiber-toughening material so that the fibers on the inner surface of the layer 15 are rendered tougher than the fibers on the outer surface of the layer 11, even though the fibers on the layer 11 may have been rendered somewhat tougher than they were originally.

This invention is especially suitable in, but not confined to, cases where the grain of the paper or fiber board runs in a vertical direction when viewed as in Fig. 1; that is, in a direction extending around the periphery of the carton. When the grain of the paper runs in this way, the surface of the paper is very likely to tear off or pull away in long strips, all of which is obviated by the present invention.

If the adhesive 17 is applied in a discontinuous manner or otherwise than in a single strip, as shown, it is obvious that the toughening preparation 16 can likewise be applied in a discontinuous or other desired manner, since it is only neces-

sary, according to one aspect of the invention, to toughen the fibers of those areas to which the adhesive is applied. But usually it is preferred to apply the toughening preparation 16 in a continuous strip, as shown in Fig. 1, even when the adhesive 17 is discontinuous, in order to obtain the maximum benefit from the material 16 as a penetrating agent helping to hold the different plies firmly to each other. Indeed, it is often desirable to extend the coating 16 all the way to the free edge of the flap 15, placing it also on the tab portion 18, as indicated in Fig. 4. The effect of this, especially in toughening the surface fibers all the way to the edge of the flap 15, and also in holding the various plies more firmly to each other, is to strengthen the extreme edge of the flap 15 in such a way as to reduce the possibility of tearing the sheet material, and more particularly to prevent tearing the sheet material inwardly from the edge thereof at the sides or corners of the tab 18, when stress is applied to this tab to break open the carton.

It will now be seen that the use of the various features of the invention above described results in an improved construction in which the surface fibers of the flap 15 are strengthened and toughened to increase the bond between the adhesive 17 and the flap 15. In most cases this is sufficient to insure that, when the joint is broken, the adhesive 17 will pull away from the panel 11 and remain attached to the flap 15. Sometimes, however, it is desired to go even further than this, and to employ means to weaken the bond between the adhesive 17 and the panel 11, as well as employing the means for strengthening the bond between the adhesive 17 and the flap 15. The use of such bond-weakening means will produce an even greater differential effect, reducing the ratio of the strength of the bond of the adhesive to the panel 11, relative to the strength of the bond of the adhesive to the flap 15.

This bond-weakening means may be in the form of a layer or coating of paraffine or the like on the outer surface of the panel 11. This coating may, and frequently does, cover the whole outer surface of the panel 11, and, indeed, the entire outer surface of the whole carton, if desired. For the purposes of the present invention, however, the bond-reducing or bond-weakening coating may be confined to that part of the surface of the panel 11 with which the adhesive 17 comes into contact. Such a coating of paraffine or the like, covering approximately the area to be engaged by the adhesive 17, is indicated diagrammatically at 20 in Fig. 1. The paraffine or other material has the effect of reducing or weakening the strength of the bond which would otherwise normally exist between the adhesive and the panel 11 if the surface of the panel were uncoated or in its normal plain or original condition.

While certain embodiments of the invention have been disclosed, it is to be understood that the inventive idea may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention or the scope of the appended claims.

We claim:

1. A carton comprising two layers of fibrous sheet material overlapped with each other, adhesive securing said two layers to each other, and sizing applied to one of said layers to toughen the fibers thereof, so that when said two layers are

pulled apart, tearing of the surface fibers will be less likely to occur in said sized layer than in the other layer.

2. A carton comprising two layers of fibrous sheet material overlapped with each other, adhesive securing said two layers to each other, and means applied to one of said layers to render the surface fibers thereof in contact with said adhesive tougher than the surface fibers of the other layer in contact with said adhesive, so that when said two layers are pulled apart, tearing of the surface fibers will be less likely to occur in said one of said layers than in the other of said layers.

3. A carton comprising an inner layer and an outer overlying layer of fibrous sheet material overlapping each other, adhesive securing said two layers to each other, tab means on said outer layer in a position to be conveniently grasped to pull said outer layer outwardly away from the inner layer to break the adhesive connection between them, and means applied to the inner surface of said outer layer to render the surface fibers thereof tougher than the surface of the inner layer, so that when said two layers are pulled apart, the adhesive will tend to pull away from the inner layer rather than the outer layer and tearing of the surface fibers will occur mainly on the outer surface of the inner layer rather than on the inner surface of the outer layer.

4. A carton comprising an inner layer and an outer overlying layer forming parts of the same piece of fibrous sheet material, said two layers being in overlapping relation to each other, sizing applied to the inner surface of the outer layer to render the fibers thereof tougher than the fibers of the outer surface of the inner layer, and adhesive forming a breakable connection between said inner layer and the sized part of the outer layer.

5. A carton comprising an inner layer and an outer overlying layer forming parts of the same piece of fibrous sheet material, said two layers being in overlapping relation to each other, sizing applied to the inner surface of the outer layer to render the fibers thereof tougher than the fibers of the outer surface of the inner layer, adhesive forming a breakable connection between said inner layer and the sized part of the outer layer, and means on said outer layer in a convenient position to be grasped to pull said outer layer away from said inner layer to break the connection between them.

6. A carton comprising two layers of fibrous sheet material overlapped with each other, adhesive interposed between said two layers for securing the two layers to each other, means on one of said layers to strengthen the bond of the adhesive with that layer, and means on the other of said layers to weaken the bond of the adhesive with that layer.

7. A carton comprising two layers of fibrous

sheet material overlapped with each other, adhesive interposed between said two layers for securing the two layers to each other, sizing applied to one of said layers to strengthen the bond of the adhesive with that layer, and means on the other of said layers to weaken the bond of the adhesive with that layer.

8. A carton comprising two layers of fibrous sheet material overlapped with each other, adhesive interposed between said two layers for securing the two layers to each other, sizing applied to one of said layers to strengthen the bond of the adhesive with that layer, and paraffine applied to the other of said layers to weaken the bond of the adhesive with that layer.

9. A carton comprising two layers of fibrous sheet material overlapped with each other, at least one of said layers being laminated, adhesive interposed between said two layers for detachably securing said two layers to each other to hold a portion of the carton in closed position, and sizing applied to at least a part of the adhesive-contacting area of said one of said two layers to toughen the surface fibers thereof so that when said two layers are pulled apart, tearing of the surface fibers will be less likely to occur in said sized layer than in the other layer, said sizing also penetrating a substantial depth into the layer to which it is applied and serving to cement certain of the laminations thereof more firmly to each other.

10. A carton comprising two layers of fibrous sheet material overlapped with each other, adhesive securing said two layers to each other, and means for preventing tearing of the surface fibers of at least one of said layers when said two layers are pulled apart, said means including means for strengthening the bond between said adhesive and one of said layers.

11. A construction according to claim 10, in which said bond-strengthening means includes sizing applied to the layer with respect to which said bond is strengthened.

12. A carton comprising two layers of fibrous sheet material overlapped with each other, adhesive securing said two layers to each other, and means for preventing tearing of the surface fibers of at least one of said layers when said two layers are pulled apart, said means including means for strengthening the bond between said adhesive and one of said layers, and means for weakening the bond between said adhesive and the other of said layers.

13. A construction according to claim 12, in which said bond-strengthening means includes sizing.

14. A construction according to claim 12, in which said bond-weakening means includes paraffin.

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