

folding the fiberboard along the score line so that it is flexed through an angle of 180 degrees, reversing the fold so that the fiberboard is flexed 360 degrees in the opposite direction, and then repeating with successive 360 degree folds in alternating directions until the test sample has been flexed a total of twenty times. The appearance of the material at the score is then observed and found to be in good condition with no visible tears.

A duplicate piece of corrugated fiberboard is scored and impregnated with a waterproofing agent comprising a mixture of 94.7 weight percent paraffin wax melting between about 130° F. and about 134° F., 5.0 weight percent of polyethylene polymer and 0.3 weight percent of a flexibility improving additive. Impregnation is accomplished by submerging the board in a body of molten waterproofing agent maintained at 250° F. for 60 seconds, and then draining for 3 minutes at a temperature of 230° F. Waterproofing agent absorption is 51.8 weight percent of the original board. The impregnated board is subjected to the above flexibility test with the result that it tears along the fold prior to completion of the test.

Another duplicate piece of the corrugated fiberboard is scored and impregnated as above; however, prior to impregnation the board is preflexed by folding 180 degrees in one direction along the score, reversing the fold 180 degrees in the opposite direction, and then straightening the board to its original configuration. The board is impregnated by the above method, with an absorption of 52.5 weight percent of the original board. The impregnated board is subjected to 20 flexures without tearing of the paper fibers or rupture of the waterproofing agent.

EXAMPLE 2

Commercial water resistant corrugated fiberboard boxes constructed of single wall corrugated fiberboard having 42 pound faces and 33 pound type B-flute medium are found to suffer cracking on all scores when folded. A commercial shell of this box is treated by preflexing all scores prior to impregnation. The flaps are folded 180 degrees outwardly, then reversed folded 360 degrees inwardly, and finally straightened to their original position. The panel scores are preflexed by opening the box and collapsing it in the opposite direction. It is found that the scores can be flexed a number of times without tearing of the paper or rupture of the waterproofing material.

EXAMPLE 3

A 4 inch by 4¾ inch specimen of the corrugated fiberboard tested in Example 1 is scored normal to the flutes and preflexed by folding along the score line 90 degrees in one direction, reversing the fold by folding 90 degrees in the opposite direction, and then straightening the board to its original configuration. The board is impregnated with a mixture of 82.6 weight percent paraffin wax melting between 130° F. and 134° F., 11.9 weight percent petrolatum, 5.0 weight percent terpene polymer, and 0.5 weight percent of a flexibility improving additive by submerging the board for 45 seconds in a molten body of the mixture maintained at a temperature of 230° F., and then draining for 3 minutes at a temperature of 230° F. The impregnated board is subjected to the flexibility test of Example 1 with no observed tearing of the paper or rupture of the waterproofing material.

EXAMPLE 4

Commercial water resistant corrugated fiberboard boxes constructed of single wall corrugated fiberboard having a 42 pound outer face, a 69 pound inner face and a 33 pound type B-flute medium are found to suffer cracking at the flap scores when the top and bottom flaps are folded. A commercial shell is removed from the production line and treated by preflexing the top scores by folding the top flaps 90 degrees outward, and then straightening them to their original configuration. The bottom flaps are not preflexed. The shell is then returned to the produc-

tion line and impregnated with a waterproofing material in conventional manner.

Upon subjecting the top and bottom flaps to the flexibility test of Example 1, it is found that the top flaps can be flexed 20 times without tearing or rupture, but that the bottom flaps not subjected to preflexing prior to impregnation fail at the score line and are completely torn from the shell.

Formerly, the selection of paperboard stocks and impregnating materials used in the manufacture of water resistant corrugated paperboard had to be carefully controlled to minimize the problem of poor bending quality. Some manufacturers have found it necessary to employ a special premium grade of paper for facing material. Preflexing of the folds prior to impregnation sufficiently improves the bending quality of corrugated paperboards subsequently impregnated with a solidifiable material that less expensive paperboard stocks and impregnating materials heretofore considered unsatisfactory can be employed. Thus, not only can the method of this invention improve the appearance and increase the strength of a water resistant corrugated paperboard product by eliminating cracking at the folds, it can also effect economics by permitting the use of lower cost raw materials.

Having fully described the method and product of my invention, I claim:

1. A method of manufacturing self-enclosing water resistant corrugated paperboard boxes, which comprises: cutting a corrugated paperboard to obtain a substantially rectangular box blank; forming two parallel spaced flap score lines normal to the flutes of said corrugated paperboard and extending the length of said blank, said score lines defining two outer spaced flap sections and an intermediate panel section therebetween; preflexing said corrugated paperboard at said flap score lines by bending said flap sections along said score lines through an angle sufficient to impart flexibility to the paperboard at said score lines; slotting said blank normal to said flap score lines to define four flaps on either side of said intermediate panel section, said slots extending from the outer edge of said blank to said respective score line, each of said slots being situated opposed to a corresponding slot in said other flap section; folding said blank along one or more lines extending between said opposed slots so that the two opposite ends of said panel section are mated; fastening said panel section at the mated ends; and impregnating said paperboard with a waterproofing material selected from the group consisting of wax and wax-polymer compositions by dipping said paperboard into a liquid reservoir of said material maintained above its melting point.
2. The method defined in claim 1 wherein said preflexing comprises bending said flap sections along said score lines through an angle of up to 180 degrees.
3. The method defined in claim 1 wherein said flap sections are straightened to their original configuration prior to impregnation.
4. The method defined in claim 1 wherein said preflexing comprises bending said flap sections along said score lines through an angle of up to 180 degrees and reverse bending said flap sections through an angle of up to 180 degrees in the opposite direction.
5. The method defined in claim 1 wherein said preflexing comprises bending said flap sections along said score lines through an angle of about 90 degrees and then reverse bending said flaps through an angle of about 90 degrees in the opposite direction.
6. The method defined in claim 1 including forming spaced panel scores parallel to said flutes and extending across said panel section between said opposed slots prior to the folding of said blank.

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ENVELOPE FOR LETTERS, PACKAGES OR THE LIKE AND A METHOD
FOR MAKING SUCH ENVELOPES
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Fig. 1

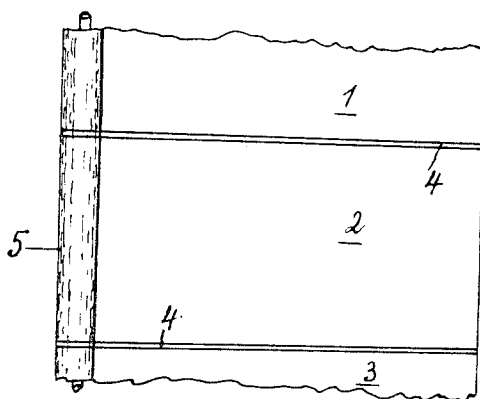
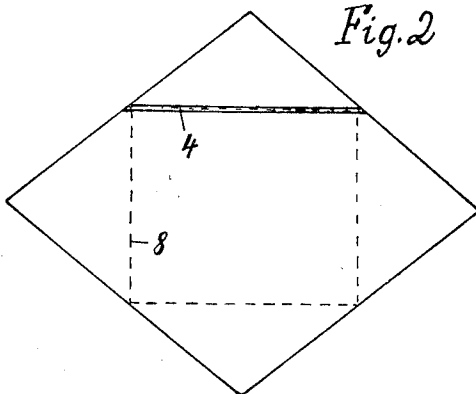


Fig. 2



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