

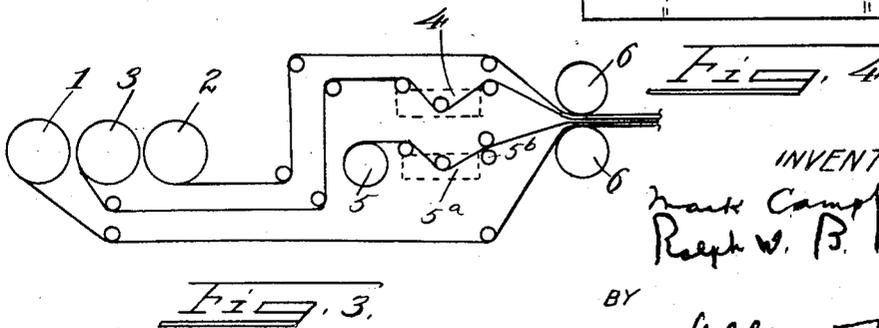
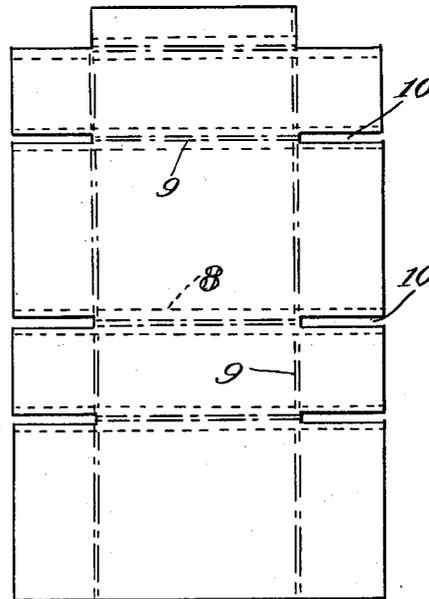
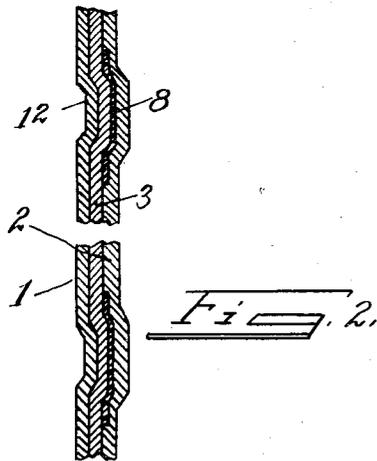
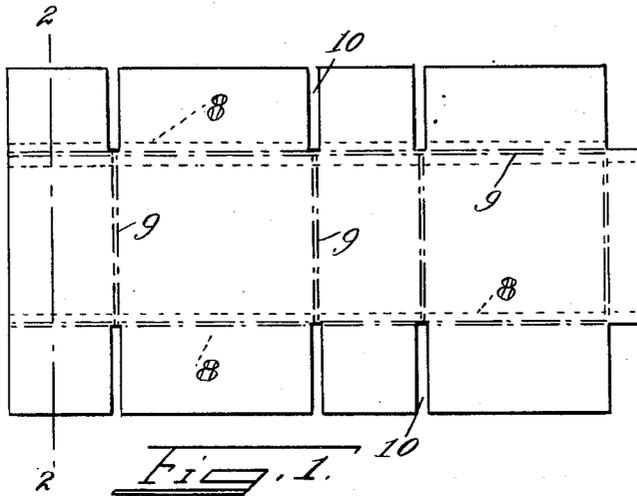
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METHOD OF REENFORCING FIBER BOARD

Filed June 18, 1924



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# UNITED STATES PATENT OFFICE.

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## METHOD OF REENFORCING FIBER BOARD.

Application filed June 18, 1924. Serial No. 720,741.

Our invention relates to methods of re-enforcing fiber board, and corrugated board for use in making shipping cases, cartons, and packing sheets or other folded multiple-  
5 ply blanks.

It will be understood that materials used for fiber shipping cases and cartons, are made up on the paper mill in sheets and these sheets then pasted together, or in the  
10 parlance of the mill when using corrugated paper, the corrugated sheet is "backed" with flat sheets. In other words, the material used is a composite board built up of plies cemented together usually by silicate.

It is usual practice to make cartons and shipping cases from one piece of material having the flaps for closing the ends thereof, separated from each other by slots, and extending along the two sides of the body  
15 portion of the piece. The piece or blank is then formed with score lines, or not, dependent upon the material, and is then folded into a rectangular shape, with the flaps turned in at top and bottom. It is usual to  
20 form an end flap on the body portion which is stitched or cemented in place to form a tubular member of the body portion with the flaps extending at both sides therefrom. In this form the carton is in what is called  
25 knock-down shape. When set up and expanded to rectangular form ready for the insertion of goods to be packed, the carton or case, is referred to as "erected."

To some other forms of cartons made of thin material, and not used for shipment of goods, without other protection, our invention has only a limited application. It applies directly to any solid fiber pasted or  
35 backed corrugated board cartons, and packing and binding sheets, particularly those which are scored with lines to define the fold lines of the flaps and the portions of the main body which are to form the body of the structure.

It is the object of our invention to re-enforce the body of the blank, by inserting between the plies of the board from which the blank is to be cut and scored, lines of fabric or other tape, or the like, which lines  
40 co-incide with the subsequent fold lines of the completed carton.

We are aware that pasted board has been made up in which there is wire gauze or fabric pasted between the plies of fibrous ma-

terial, and are advised this has been done  
55 along definite lines, using tapes of cloth in the same manner that we do. For this last process we refer to the patent of G. W. Swift, Jr., No. 1,425,914, dated August 15, 1922.

We are aware also that some users, tape the edges of the carton after erection but before shipment, but this does not afford the protection from a number of points of  
60 view, that does our novel method of re-enforcement.

In all work along these lines with which we are familiar the difficulty lies in the fact that in forming the score lines in the paper, the bond between the plies is broken, be-  
70 cause of the distortion incident to scoring. In the Swift, Jr., carton the tapes would be free or substantially so, within the plies; and since the paper compresses and stretches, and a tape inserted between the plies at the score line, does not so act, the result in the  
75 scored blank is that the paper and tape are separated and the re-enforcing effect is substantially no more than if the tapes were on the outside or inside of the score.

It is the essential feature of our invention that tapes are so placed into a carton or container blank as to re-enforce the score lines, and the scoring is done while the bond between the tapes and the paper is not dry,  
80 but is free to slip when scoring is done. Thus we obtain by our process a tape re-enforced container blank, wrapping sheet or the like, which is truly re-enforced by a tape that is firmly bonded on both sides to the  
85 paper thereof.

We accomplish our object by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings:

Figure 1 is a plan view of a blank cut and ready to be folded into a carton.

Figure 2 is a section on the line 2—2 of Figure 1, showing the score line lengthwise  
90 of the blank.

Figure 3 is a diagrammatic view showing the method of introduction of the tape in pasting a piece of fiber board and the scoring thereof.

Figure 4 is a view of a blank cut out of a sheet at right angles to the one shown in Figure 1.

Referring first to Figure 3 which is diagrammatic of any familiar pasting machine in the paper board mill, we show rolls 1, and 2 for dry paper, and roll 3 for paper to be coated with silicate in the bath 4. The tape rolls are indicated at 5, it being understood that there will be as many of these rolls as needed. The tapes are covered with a slow drying cement by passing them through a tank 5<sup>a</sup> and squeeze rolls 5<sup>b</sup>. The three plies of paper and the strips of tape are then fed together to the squeeze rolls 6 and then to scoring and cutting rolls not shown. This machine is virtually the same as that used in "backing" and known as a corrugating and double backing machine.

In operating such a machine the paper rolls are handled exactly as in any pasting machine, and the tape rolls are free to revolve and the tape when set between the piles of paper will feed along with them on the line on which the tapes are introduced and the tape rolls set. An important feature of the invention is that the scoring and cutting is done while the tape and paper is not dry and the plies and tape are thus free to move on each other before final adherence.

In Figures 1 and 4 we show blanks ready for folding into cartons made from webs which have been cut and scored to form blanks, the one lengthwise and the other transverse of the webs. In Figure 1 the tapes are shown by dotted lines 8, the score lines by lines 9, 9, and the severed portions at 10, 10, for the side and end flaps.

In Figure 4 the blank has been scored and cut at right angles to the blank of Figure 1 so that the tapes 8 are severed by the cut lines 10 and the tape reinforcement is provided for the side folds of the carton instead of the top and bottom folds.

After pasting the tape between the plies of the paper, and this we prefer over pasting it on the inside or outside of the sheet, although this may be done, we form in the sheet the score lines necessary to permit erecting of the carton without breaking the material thereof. The use of a slow drying glue permits the tapes to retain their bond with the paper. If the blank can be conveniently scored before the silicate bond is fully set, then the use of a special cement for the tapes is not required.

In Figure 2 is shown in section, a piece of material with the tapes in place, and with one form of scoring. This score 12 is of some width so that under the pressure of the scoring dies the paper and tape must give and shift with reference to each other and if the adhesive material has dried, such movement breaks the adhesion and permits separation of the plies and of the tape therefrom.

This is also true where the reenforcing tape is cut through for separation of the

side and end flaps, as shown in Figure 4, where if the tape were dried the act of cutting the slits would loosen up the plies.

The result of the tapes in the blank of Figure 1 is to reenforce the erected carton at the top and bottom edges thereof, which are the weak points of any carton or shipping case. Also the tapes come at the ends of the slits between the tabs, thereby preventing tearing of the board at this point, in erecting the carton or during use thereof. The tapes by their presence when the score lines are formed re-enforce the structure of the paper, and themselves take on a scored shape, so that they act as a hinge in a better manner and so that they will not be separated from the plies in the act of erecting the carton.

In the blank shown in Figure 4, the lengthwise score lines define the body folds of the carton and the tapes 8 extend along the slits between the flaps and re-enforce the raw edges thereof left by slitting. The tapes also lie at the ends of the slits to prevent tearing of the stock at this point as pointed out with regard to the first structure.

The carton in Figure 4 is no different in structure than that of Figure 1 except that it is cut the other way of the direction of feed in the blank cutting machine and scoring machine. The result of this method of cross cutting is to throw the tapes, that are always inserted lengthwise of the piece, to the lines of fold or score lines, not protected by the tapes in the first view.

Thus our process essentially provides for the insertion of reenforcing tapes of any material, prior to the formation of the scored blank, and lengthwise to the piece as it passes through the pasting machine.

It avoids the necessity of providing much heavier board, for any given type of shipping case, and due to the method of cutting out and scoring the blanks is cheap to insert, with practically no additional equipment, and takes care of most of the weak points of any carton or wrapper in a very effective way, at small expense.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A method of forming blanks for containers having articulated closing flaps, which consists in feeding a plurality of plies of fibrous material through a given path while securing them together by a cementing substance, and feeding with the material through said path, the desired number of tapes, said tapes being arranged to extend along that portion of the fibrous material which is later to define the lines of articulation of said closing flaps, and then forming score lines in the material extending along the portion thereof re-enforced by said tape,

before the bond between the tapes and the plies has set.

2. A method of forming blanks for containers having articulated closing flaps, which consists in securing together a plurality of plies of fibrous material, while feeding them in the same path with each other, at the same time feeding between the plies of material, the desired number of tapes, said tapes to extend along the lines which are later to define lines of articulation of said closing flaps, and then scoring the blank along said tape lines before the cementitious bond has set, and then cutting into the sides of the material suitable slits to define flaps for the container, said slits extending from the said lines of articulation outwardly to side edges of the blank:

15 purpose described.

3. A method of forming containers having articulated closing flaps, which consists in

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