UNIVERSAL STATES PATENT OFFICE

ALAN M. OVERTON, OF CINCINNATI, OHIO, ASSIGNOR TO THE RICHARDSON COMPANY,
OF LOCKLAND, OHIO, A CORPORATION OF OHIO

CARTON AND CONTAINER

Application filed July 31, 1930. Serial No. 472,082.

My invention relates to cartons and containers made of pasted stock, particularly stock which is made up of or contains an impervious felted structure. By an impervious felted structure I refer to a felted sheet, board or panel of fibrous material including a binder substance, generally a binder substance of heat plastic nature. The impervious felted structure may or may not be air-tight. The main reason why such boards or layers are desirable in cartons and containers is either to render the carton or container itself durable under adverse surrounding conditions such as moisture and the like, in which case the air-tight characteristic of the board is of relatively secondary importance, or to facilitate the production of a carton or container which will protect its contents both from within and without against the loss or addition of moisture or deleterious substances in the surrounding atmosphere or conditions. In the latter case the air-tight characteristic of the board must be completely, and the so-called waterproof or moistureproof containers fall within this class. In order to gain complete moistureproofness or air-tightness of the containers it is advantageous to use air-tight or moistureproof membranes of an adhesive, for example asphalt, to paste the various plies of a container together.

Felted webs or boards containing fibers and a binder substance have been made in a number of different ways. The particular material which I prefer to use in my cartons and containers is a web or board felted from a bituminous pulp, the making of which is described and claimed in Patent No. 1,771,150, July 22, 1930, to Earl P. Stevenson and Harry A. Buron. A bituminous pulp is a pulp of fibrous material in water suspension, with which there is incorporated in stable association, a heat plastic binder substance in minute, uncoated particles. In such bituminous pulps the binder content may have very wide limits and feltable pulps have been made containing a binder substance, such as asphalt, in amounts as great as 80% of the total solids to 20% of fibers. These pulps are particularly advantageous both from the manufacturing and from the product standpoint, and when the amount of binder substance in them is relatively large, they partake not only of the nature of a saturated felt web, but also of a plastic composition, in that they may be deformed and caused to flow under heat and pressure.

My invention is not, however, restricted to the use of boards or plies made of the felted product of such bituminous pulps, but is equally applicable to boards consisting of or comprising plies of other felted webs containing bitumen or other binder. It is common to all of such webs in which the binder substance is in appreciable amounts, that when they are relatively dense, and for that reason tend to score in, a somewhat different way from ordinary carton or container board, as will presently be described. I shall describe my invention in connection with the employment of webs or plies of the felted product of bituminous pulps, as referred to hereinafore, it being understood, however, that my invention is equally applicable to other webs containing binder substances, which webs exhibit the same problems in connection with the formation of cartons and containers.

As hereinafore indicated, my invention applies to plural ply webs. In the manufacture of cartons or containers where a relatively thick board or panel is desired, the usual practice is to form upon a paper machine webs of paper or board of such thickness as can economically be made thereon, and then to combine a number of such webs into a composite panel or board of the desired character by pasting them together with a suitable adhesive. In this way the so-called solid fiber board is made by pasting together, usually with silicate of soda, one or more filler plies between liner plies, the liner plies usually being sized on their outer surfaces. In making cartons or containers from such boards, it is the practice to score them with dies, knives, bars or equivalent mechanism, so as to facilitate their bending upon predetermined lines. Particularly where the board is of relatively great thickness, a wide and deep score is employed. Such a score results by necessity in a sepa-
ration of layers in the board or panel, which separation is accentuated when the board is bent upon the score line. It is this separation of the layers which prevents the disrupting of the several plies of the board in the scoring operation and in the subsequent bending operation.

Layers or plies of felted webs containing appreciable amounts of binder substances are relatively denser than paper board, and are consequently themselves somewhat harder to score. Further, the binder substance cements the fibers together in part at least, so that the board is less likely to split apart into layers during the scoring and bending operations. The greater the amount of binder in the web, the more dense and compact the web becomes and the greater the difficulty is in scoring it. In the felted products of bituminous pulps referred to, where the binder content may be made very large indeed, the scoring operation becomes more difficult. When an adhesive used comprises membranes of an adhesive such as asphalt, the problem of scoring becomes still more complex.

It has been proposed, as set forth in a co-pending application of Charles L. Keller, Serial No. 329,955, filed July 2, 1928, to form cartons and containers of board consisting of or comprising a felted product of a bituminous pulp by heating the board at the score lines and forming scores therein while the board is heated, thus utilizing the locally plastiscizable character of said boards. This method of scoring is successful but it is relatively expensive; and from the cost standpoint it would be preferable in many instances to follow with boards of this character the scoring operations usually practiced with the so-called solid fiber board.

The object of my invention is the provision of a plural ply board containing or comprising a layer or layers of a felted web containing a binder substance which can be scored in the usual way. It is another object of my invention to provide a means for making cartons and containers from boards containing a relatively dense layer and a relatively less dense layer by ordinary scoring operations. It is still another object of my invention to provide a method for making cartons and containers from board containing the felted product of a bituminous pulp by ordinary scoring operations. Another object of my invention is to provide a method for scoring cartons and containers made from a plural ply board containing in one or more of its plies a felted product of a bituminous pulp, the various plies being cemented together by air-tight moistureproof membranes of an adhesive such as asphalt and the like.

These and other objects of my invention which will be set forth hereinafter, or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts and by that certain process of which I shall now describe an exemplary embodiment, reference being made to the accompanying drawing in which—

Figure 1 is an exaggerated view in section of a ply of felted material containing a binder substance.

Figure 2 shows in section a composite board made by pasting together a number of plies of felted webs.

Figure 3 shows such a web scored by ordinary scoring operations.

Figure 4 shows the scored web of Figure 3 bent upon its score line.

Figure 5 shows the same web reversely bent upon its score line.

I shall take as exemplary, but without limitation, a board for cartons and containers of say caliper of 0.080 to 0.085 inches and comprising a central relatively thick ply of a paper machine product containing a bituminous pulp made in accordance with the teachings of said Patent No. 1,771,180, and outer relatively thinner liners of say kraft. Such boards have been made comprising a filler ply of caliper 0.048 inches formed on a multi-cylinder paper machine of bituminous pulp containing, for example, 60% of asphalt to 40% of fiber to which has been pasted, by means of bitumen, sodium silicate, or other adhesive, kraft liners of caliper 0.016 inches. Such boards, while excellent from the standpoint of strength and imperviousness have not been susceptible to ordinary scoring operations. To score such boards results, by reason of the great density of the body, in a breaking of the liners. This is due to the fact that there is, in such a board, no provision for the necessary separation of layers during the scoring operation, and also to the fact that scoring of the relatively dense body of the board in the position of Figure 3 results in a tensioning of the upper liner beyond its strength. The upper liner splits along the scoring line, making the score unsightly and weakening the board.

In the practice of my invention I provide means whereby the board itself may separate into layers during the scoring and bending operations very much as the so-called solid fiber board does. To accomplish this where generally there are used plies of boards which are homogeneous in their character, instead of providing a ply board or layer such as that shown in Figure 1, and comprising a filler 1 of binder containing board and outer liners 2 of clear fibers. In the preferred practice of my invention, I make the ply board of
Figure 1 on a multi-cylinder paper machine. If the paper machine has, say, seven cylinders, I may introduce the bituminous pulp into the central five cylinder vats, at the same time introducing into the first and seventh vats a pulp of clear fibers. Preferably the clear fibrous pulp will be of such character as to form a liner of relatively weak character for purposes hereinafter to be described, and I have been using with excellent results liners on the ply board of Figure 1 of chip. In making up a board or panel for cartons and containers, I may use either one or more of the ply boards of Figure 1, and combine them with a suitable adhesive into a composite finished board.

I have illustrated in Figure 2 a composite board comprising the ply board of Figure 1 having the bituminous pulp body 1 and the chip liners 2. This is pasted by means of an asphaltic adhesive 3 between outer liners of kraft paper 4, thus making up a board suitable for use in cartons and containers. Other adhesives are, of course, equally suitable, and excellent boards have been manufactured by me with sodium silicate, for example, as the adhesive between plies. Such a board may contain as many different plies as may be found desirable. It will be noted, however, that the adhesive layer 3 is effective between the liners 4 and the chip liners 2 of the ply board of Figure 1. If more than one of the ply boards of Figure 1 are used as between such ply boards, the adhesive will be effective upon the respectively adjacent chip liners. This is collaterally advantageous in that the adhesive bonds itself on both sides to a clear fibrous surface which it may penetrate sufficiently to provide a satisfactory attachment.

But the chief advantage which I gain by this construction in the manufacture of cartons and containers is, that when the board is scored by ordinary scoring devices as shown in Figure 3, the board may split into layers by the separation of the chip liners 2 at and adjacent the score line. When such a board is bent, as shown in Figure 4, the separation of the plies or layers becomes more evident, and it will be seen that the outer liner 2 pulls away from the body 1 of the ply board, leaving interspaces 5 adjacent the edges of the score. A similar separation of the lower liner 4 facilitates the sharp ends necessary within the score. It will be noticed also that the splitting occurs in the chip liners 2 on the ply board, and that a portion of the chip liner together with the adhesive layer 3 follows the liner ply. This is still clearer in Figure 5 in which the scored board of Figure 3 has been reverse bent at the score line and in which the complete separation of the layers is visible, leaving interspaces 6 and 7.

The separation of the layers as just described permits the scoring of the board without rupture of the liner plies, and where the board comprises more than one filler ply, either of the plyboard illustrated in Figure 1 or of this ply board plus one or more layers of other types of boards, the necessary separation of the filler plies can take place.

Where I have attempted to use filler ply boards containing or comprising felted webs with appreciable amounts of binder substances therein, I have only been able to effect such scores by ordinary scoring operations through the practice of my invention as just described. I am obviously not restricted to the specific example which I have given, since my invention is equally applicable to composite boards of other characters than that specifically illustrated in Figure 2, and to different characteristics of filler plies, nor are the specific materials used a limitation upon my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A composite board comprising a filler ply of felted fibers containing a binder substance in appreciable amounts and a flangeable liner, the said filler ply joined by means of said flangeable liner to a liner ply of felted material by an adhesive stronger than said flangeable liner.

2. A filler ply for composite boards comprising a body of the felted substance of a bituminous pulp and a flangeable liner of clear fibers joined together with greater strength than that of the flangeable liner.

3. A filler ply for scoreable composite boards comprising a body of the felted substance of a bituminous pulp and a liner of such joined together with greater strength than that of said chip liner.

4. A composite board susceptible of scoring having a filler ply comprising a body of the felted substance of a bituminous pulp, a liner of felted material, and a flangeable liner of clear fibers, said filler ply joined by said flangeable liner to said liner ply of felted material with greater strength than that of said flangeable liner.

5. A scoreable composite board comprising a relatively dense body of felted fibers containing a binder substance and a liner ply, and a layer of flangeable material therebetween joined to both with greater strength than that of said flangeable material.

6. A scoreable composite board comprising plies of relatively dense felted material and layers of relatively flangeable felted material therebetween, one at least of said relatively dense layers being a layer of the felted substance of a bituminous pulp.

7. A scored container comprising layers of a relatively dense felted fibrous substance, one of said layers at least, containing a binder substance and intermediate layers of relatively flangeable fibrous substance, said...
scored container characterized at the scores by a separation of said dense layers effected through the splitting of said fragile layers.

8. A process of making cartons and containers which comprises providing a filler ply having a body of felted fibrous substance containing a binder in appreciable amount, providing liners of clear fiber, combining such a filler ply with liner plies of felted webs by means of a suitable adhesive stronger than said clear fibers, scoring the composite board thus formed in scoring dies, thereby splitting said clear fiber liners without breaking the felted plies, and forming the carton or container from the scored board.

9. A process of making cartons or containers which comprises providing a ply of felted fibers containing a binder substance in appreciable amounts, providing a fragile liner, cementing said filler ply to said liner ply with adhesive stronger than said fragile liner, binding said liner ply to said fragile liner, scoring the composite board thus formed, whereby said fragile liner is caused to separate to prevent the rupture of said liner ply, and forming the carton or container from the scored board.

ALAN M. OVERTON.