

Dec. 23, 1958

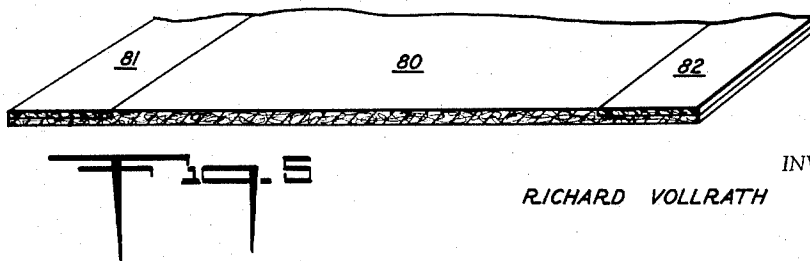
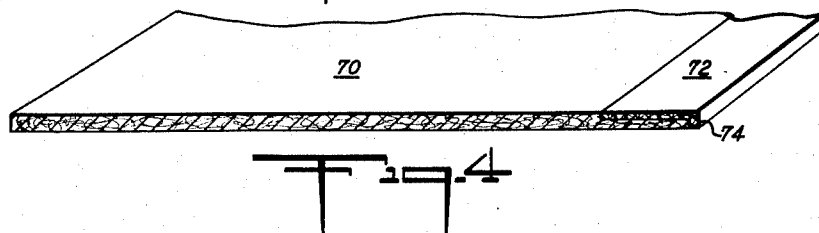
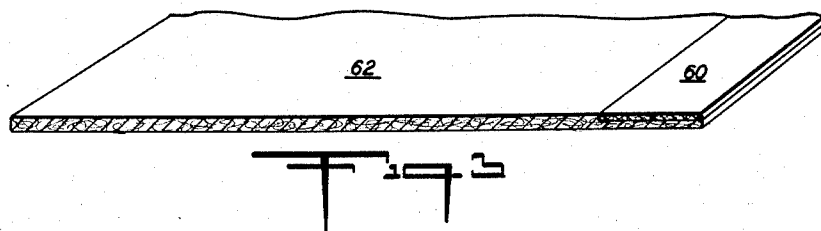
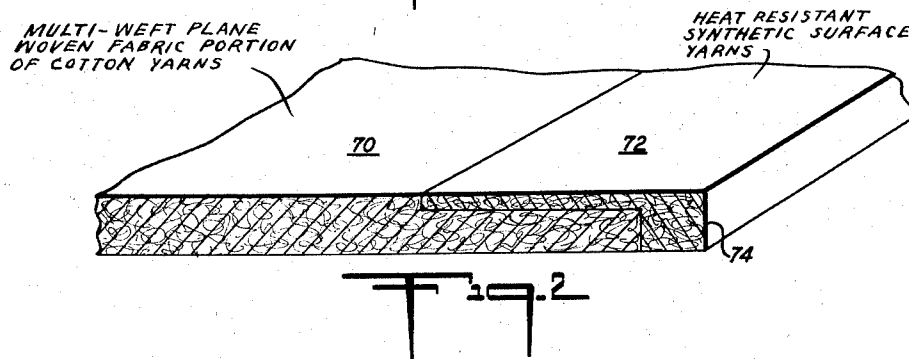
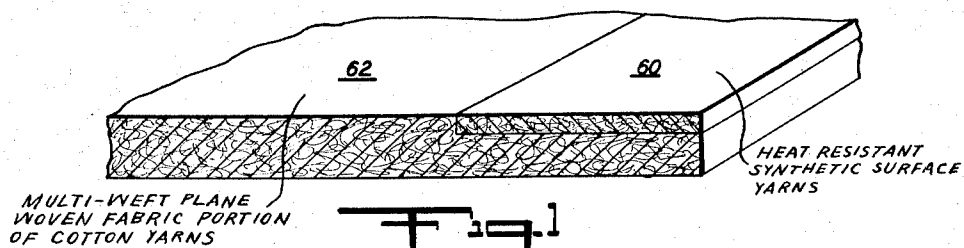
R. VOLLRATH

2,865,408

CORRUGATOR DOUBLE-BACKER BLANKET

Filed Nov. 15, 1955

2 Sheets-Sheet 1



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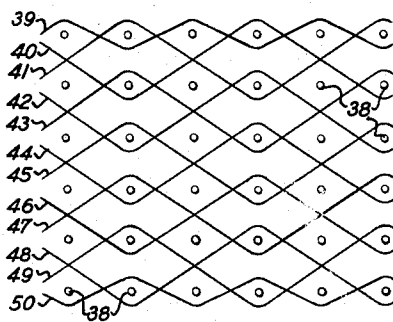
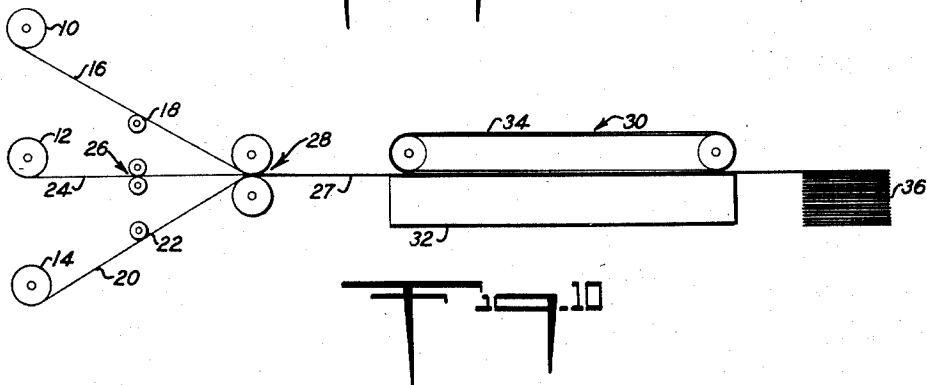
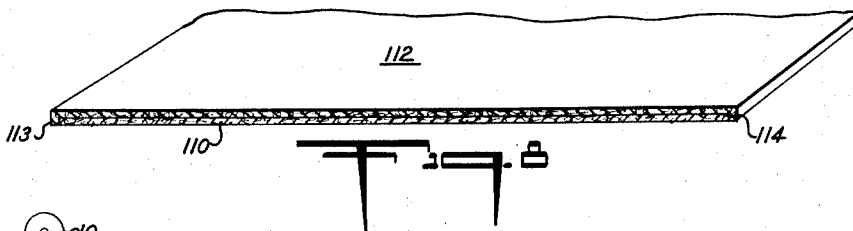
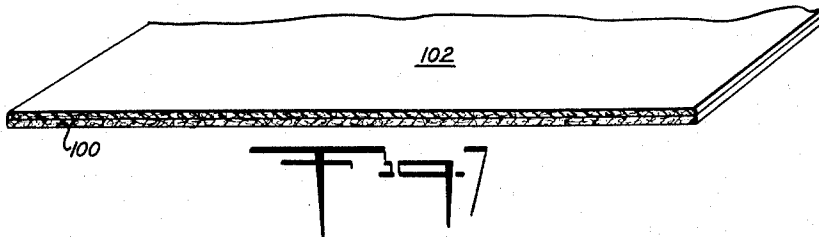
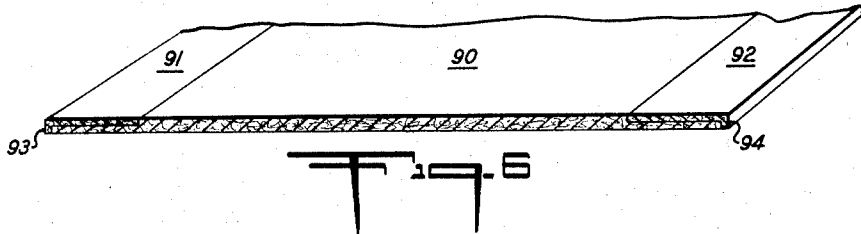
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CORRUGATOR DOUBLE-BACKER BLANKET

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2 Sheets-Sheet 2



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2,865,408

CORRUGATOR DOUBLE-BACKER BLANKET

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5 Claims. (Cl. 139—408)

The present invention relates to the manufacture of corrugated paper board and more specifically to an improved interwoven blanket for use in the manufacture of such board.

According to one prior art practice, corrugated paper board is formed by adhesively securing a corrugated paper web between two paper liners. Each liner comes from a separate roll and each has adhesive coating applied to the inner side thereof. The adhesive material is usually applied as an aqueous solution containing sodium silicate and other ingredients. A third sheet from a third roll is corrugated and brought together with the liners to form a wet laminated board which is forthwith passed through a drying device, called a "double-backer." This device comprises a heating bed made up of a series of upwardly-faced, steam-heated hot plates and an endless corrugator blanket above the bed with its lower run adapted to overlie the heated plates. This blanket serves the several purposes of transporting the corrugated board over the heated plates, absorbing moisture from the wet board and weighting the board to hold it in firm contact with the heated plates while the adhesive is being set and dried.

In practice, the blanket is made in two sections with a pair of belts of equal width running side by side to cover the full width of the heating plates. To hold the belts in proper running position, vertical guide rolls are arranged on the outside edges of the two blankets and a metal plate divider is arranged between the two belts to prevent doubling up or over-riding of the belts.

In manufacturing corrugated paper board in accordance with this prior art, one difficulty is that the blankets on any one machine are necessarily of standard width, whereas the board being formed is of varying width. Thus, in fabricating the narrower widths of corrugated paper board the outer portions of the blanket come into direct contact with the face of the hot plates and its outer or marginal portions are thus subjected to unreasonably high temperature and to abrasion resulting from deposits of the adhesive on the face of these hot plates. Over a period of time, ordinary all-cotton blankets become badly worn at their marginal portions; they also tend to be charred in the same area. As a result of this, the water-absorbing qualities of the blanket are seriously reduced and there is a change in the thickness of these marginal portions. The decreased water absorbing qualities causes blistered and defective board, and the uneven thickness interferes with the even iron-down effect which is required for producing smooth, constant thickness, high quality corrugated paper board. Another difficulty is that the guide rolls and the divider continually abrade the edges of the blanket, causing ravelling of the edge yarns.

One object of the present invention is to provide a method of producing uniform corrugated paper board which is free of blisters and one which is smoothly ironed down. Another object of this invention is to provide a corrugator blanket which has a greatly increased wear life. Still another object of this invention is the substantial elimination of charring of the marginal portions

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of corrugator blankets during the production of corrugated board of a width less than the width of the blanket being used. Another object of the invention is the elimination of ravelling of the edges of corrugator blankets. Another object of the invention is the realization of the aforementioned objects without substantially reducing the water absorption characteristics of any portion of the corrugator blanket. Other objects of the invention will be more readily apparent from the following description and the accompanying drawings.

The objects of this invention are accomplished by the use of an interwoven corrugator blanket in which marginal portions of the plate-engaging faces are surfaced with heat resistant, abrasion resistant, synthetic yarns, and the remainder of the interwoven blanket is constructed of cotton yarns for the purpose of retaining the water absorptive characteristics required for corrugator blankets. Inasmuch as the surface of interwoven corrugating blankets is normally composed of only warp yarns, all of the synthetic material used in corrugator blankets in accordance with this invention is incorporated in the warp yarns. Inasmuch as it has been found desirable to maintain the water absorbency characteristics of the belt, the synthetic yarns are included only in such warps as come to the surface of the interwoven structure. Ordinarily, corrugator blankets are interwoven with about ten to twelve warp yarns in any given vertical plane, and with binder warps extending from bottom to top throughout the interwoven structure. In such constructions, only three of the top warps in any vertical plane come to the surface. In accordance with this invention, only these three surface warp yarns are composed of synthetic, heat resistant material, whereas the other nine warp yarns as well as the binder yarns and the filling yarns are made of cotton. Accordingly, it will be seen that even in the marginal portions where the heat resistant yarns are incorporated, about 75% to 80% of the yarns are made of cotton for the purpose of retaining the water absorptive capacity of the blanket as a whole.

The width of the heat resistant marginal facing is determined by the variation of widths of corrugated material being fabricated in any given plant. Some manufacturers will prefer to have the entire face of the blanket composed of heat resistant yarns, whereas others prefer to have only marginal portions so constructed. It has been found that a practical minimum width for these marginal reinforcements is about 25% of the total width of the blanket.

In another form of the invention, ravelling of the blanket edges is prevented by also using Dacron in all the warp yarns for a distance extending inwardly for about an inch or less. Thus, a blanket constructed in accordance with the present invention will include multi planes of cotton filling yarns, cotton binder warps and multi planes of interwoven warps, all composed of cotton with the sole exception of surface warp yarns extending inwardly from the margin of the blanket for at least 25% of its width, and possibly with the additional exception of the extreme edge on selvage warp yarns to prevent ravelling from abrasion by the guide rolls and the divider.

Any of the several known heat resistant synthetic yarns may be used in the marginal surface warps of the corrugator blanket made according to the present invention. Such materials include yarns made wholly or partly from filament Dacron, filament nylon, filament Orlon, spun fibrous Dacron, spun fibrous nylon, spun fibrous Orlon, spun mixtures of these materials and other such materials. One difficulty to be avoided is the use of yarns which have different shrinkage and stretch properties from those of ordinary cotton yarns. It has been found that the preferred material is spun Dacron (a polyester fiber).

Although this specification is directed primarily to "interwoven" corrugator belts, it is possible to use the teaching of this invention in the manufacture of "multiply" belts wherein separate plies are held together by binder yarns. In such constructions only the warps of the surface ply would be made of Dacron and the remaining warps would be composed wholly of cotton fibers. Likewise, it is possible to provide heat resistant marginal faces at both sides of the blanket to make it reversible. Those skilled in the art will realize that other modifications of the invention may be made without departing from the scope of the appended claims. The gist of this invention is the incorporation into a corrugator blanket of a minimum number of heat resistant, abrasion resistant synthetic warp yarns to provide resistance to charring and abrasion while retaining a maximum number of cotton yarns to retain the absorbency characteristics required for a corrugator blanket. Thus, the relationship between the amount of cotton yarn and the amount of Dacron or other similar yarn is a critical factor in the present invention.

It will also be realized by those skilled in the art that the provision of all Dacron yarns at the extreme edge of selvage of the corrugator blanket is a separate, though related, improvement with respect to the heat resistant surface at the marginal portions of the corrugator blanket.

The invention will be better understood by reference to the accompanying drawings in which:

Fig. 1 is a schematic representation of a portion of a corrugator blanket having one marginal surface made of heat resistant, abrasion resistant yarns.

Fig. 2 is a schematic representation of another form of the invention showing a portion of a corrugator blanket provided with both an edge portion and a marginal surface composed of heat resistant, abrasion resistant materials.

Fig. 3 is a schematic representation of the entire blanket partially shown in Fig. 1.

Fig. 4 is a schematic representation of the entire blanket partially shown in Fig. 2.

Fig. 5 is a schematic representation of a blanket having both margins constructed in accordance with the disclosure of Figs. 1 and 3.

Fig. 6 is a schematic representation of a blanket having both margins and edges constructed in accordance with the disclosure of Figs. 2 and 4.

Fig. 7 is a schematic representation of a blanket having one entire surface composed of heat resistant yarns.

Fig. 8 is a schematic representation of a blanket having one entire surface and both edges made of heat resistant yarns.

Fig. 9 is a schematic cross sectional view illustrating the exact weaving construction of the marginal portion of a corrugator blanket made in accordance with the present invention.

Fig. 10 is a schematic representation of a corrugating process and apparatus embodying the improvement of the present invention.

Referring now to the schematic representation of a corrugating operation illustrated in Fig. 10, it will be seen that three rolls of paper 10, 12 and 14 feed individual paper webs to a corrugating assembly. Liner web 16 has its underside coated with an aqueous adhesive by means illustrated diagrammatically at 18 while liner 20 has its upperside coated with adhesive by means illustrated at 22 and web 24 is corrugated by means illustrated diagrammatically at 26. These three webs are brought together to form a wet laminated board 27 by means illustrated diagrammatically at 28. Board 27 is then passed through an apparatus known in the trade as a "double backer" and indicated generally at 30. The double backer includes a bed of steam heated plates 32 and an endless corrugator blanket 34. The corrugator blanket is made up of two belts of equal width

running side by side and is held in proper operative relationship by a divider between the two belts and a series of guide rolls at the edges of the belts, not shown. The double backer smooths the laminated board and at the same time dries and sets the adhesive. The heat for this operation is supplied by the plates on bed 32 and much of the moisture is taken off by being absorbed into blanket 34. Finished board 27 is cut into sheets and stacked for use.

The preferred weaving construction for corrugator blankets 34 is illustrated diagrammatically in Fig. 9. A plurality of weft or filling ends indicated at 38 are interwoven with a plurality of warp yarns 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 and 50, whereby there are no plies as such, but there are in effect six weft planes. It will be noted that only warps 39, 40 and 41 come to the upper surface of the blanket, the remaining warps being either buried inside the body of the blanket or exposed on the lower side. In this preferred construction the total thickness of the belt is about $\frac{3}{8}$ of an inch and the weaving is quite tight to make a firm, hard, boardy structure. Such a belt is desirable in weighting down the corrugated board both for firmness of the adhesive board and for proper contact with heated plates. The hardness of the blanket also serves to iron down or smooth the corrugated board. Although the illustration shows only one warp end in any vertical portion of the weaving pattern, the actual weave includes three warp ends running as one, a practice which is sometimes referred to as weaving "three ends up." In the construction according to this invention all of the filling yarns 38 and all of the warp yarns 42 to 50, inclusive, are composed of cotton as are all of the warp binder yarns, not illustrated. Warp ends 39, 40 and 41 are composed of spun Dacron yarns or other similar heat resistant, abrasion resistant materials if desired.

Referring now to Figs. 1 and 3 it will be seen that in this form of the invention warps 39, 40 and 41 are composed of Dacron at one margin of the blanket for a distance extending inwardly several inches to form a heat resistant marginal surface 60. The remaining portion of the blanket forms a body 62 composed of cotton for the purpose of retaining the moisture absorbency characteristics of the blanket and this has the added advantage of keeping the cost of this improvement at a minimum level.

Similarly in Figs. 2 and 4 there is a corrugator blanket having a cotton body 70 provided with a heat resistant, abrasion resistant marginal portion 72 and an edge portion 74 in which all of the ordinary edge warps are made of Dacron for a distance extending inwardly for about $\frac{1}{2}$ inch.

Another closely related structure is shown in Fig. 5 where a blanket is provided with a cotton body 80 and two heat resistant, abrasion resistant marginal portions 81 and 82. Yet another form of the invention, illustrated in Fig. 6, shows a corrugator blanket having a cotton body 90, two heat resistant, abrasion resistant marginal portions 91 and 92, and two heat resistant, abrasion resistant edge portions 93 and 94.

Another satisfactory form of the invention is shown in Fig. 7 where a corrugator blanket includes a cotton body 100 and a heat resistant, abrasion resistant surface 102 extending all the way across its entire width. In the modification of Fig. 8, a blanket is provided with a cotton body 110, a heat resistant, abrasion resistant surface 112 extending across the full width of the blanket and two heat resistant, abrasion resistant edges 113 and 114. Other modifications along these same lines will be obvious to those skilled in the art.

I claim:

1. A corrugator blanket comprising an interwoven multi-weft-plane fabric having a thickness of more than one-quarter of an inch and less than one inch, said fabric being woven from cotton yarns with the exception of

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the surface yarns thereof adjacent its edges, the surface yarns at one side of the fabric adjacent at least one of said edges being warp yarns and consisting of heat resistant, abrasion resistant, synthetic, organic, polymeric yarns, said fabric having a plurality of cotton yarns underlying said synthetic yarns to provide absorbency.

2. A corrugator blanket comprising binder warp yarns, warp yarns and filling yarns interwoven into a fabric of multiweft planes having a uniform thickness of between about $\frac{1}{4}$ inch and 1 inch, all of said yarns comprising cotton with the exception of the surface warp yarns adjacent the edges of the fabric, and the surface yarns on at least one side of the fabric adjacent at least one of said edges of the said fabric being warp yarns and consisting of heat resistant, abrasion resistant, synthetic, organic, polymeric yarns.

3. A corrugator blanket comprising cotton and heat resistant, abrasion resistant, synthetic, organic, polymeric yarns interwoven into a hard fabric having multi-weft planes with said cotton yarns forming one entire side surface of said blanket, a major portion including at least the lateral center of the other side of the blanket and the yarns not appearing at any surface of the blanket, and said polymeric yarns forming a portion of said other

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surface extending laterally inwardly from at least one side of said blanket, all of said polymeric yarns being warp yarns and there being no filling yarns at the side surfaces of said blanket.

4. A blanket as set forth in claim 3 wherein the width of the surface formed by said polymeric yarns is from about 8 to 12 inches.

5. A blanket as set forth in claim 3 wherein said polymeric yarns form a portion of said other surface extending laterally inwardly from each edge of said blanket.

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