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ATTORNEYS

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3,420,723 METHOD OF FORMING AND APPLYING TUBULAR BACK LININGS TO FILLERS James H. Thorp, West Hartford, Conn., assignor to The Smyth Manufacturing Company, Bloomfield, Conn., a corporation of Connecticut Filed Nov. 30, 1964, Ser. No. 414,725 U.S. Cl. 156-201 2 Claims Int. Cl. B42b 5/00; B31f 5/00

#### ABSTRACT OF THE DISCLOSURE

A two-part tubular back-liner is formed from a conventional flat back-liner with subadjacent headband segments attached and a second paper back-liner with inwardly <sup>15</sup> folded side edge portions. The marginal side edge portions are adhesively attached to the flat back-liner.

This invention relates to a method for back lining book 20 fillers, and deals more particularly with an improved method for forming and applying a tubular back lining to a filler.

The general object of the present invention is to provide a method of forming and applying tubular back linings <sup>25</sup> to fillers, which method is particularly well adapted to use in automatic machines which can act upon a large number of fillers in succession.

Another object of the present invention is to provide a method of forming and applying tubular back linings <sup>30</sup> to fillers, which method uses a minimum amount of backlining material.

Still another object of the present invention is to provide a method of forming and applying tubular back linings to fillers, which method is particularly well suited <sup>35</sup> to the simultaneous application of headbands to the backs of said fillers adjacent the end portions thereof.

The drawing shows a preferred form of the method of the invention and such method will be described, but it will be understood that various changes may be made from the method disclosed, and that the drawing and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

FIG. 1 is a diagrammatic prespective view of an apparatus for practicing the method of the present invention.

FIG. 2 is a sectional view of a strip of back-lining paper as it is fed from its supply roll and is taken along 50 the line 2-2 of FIG. 1.

FIG. 3 is a sectional view of the strip of back-lining paper of FIG. 2 after it has been folded and is taken along the line 3-3 of FIG. 1.

FIG. 4 is a perspective view of the book filler of FIG. 55 4 showing parts of the tubular back lining in disassembled relation to reveal the method by which it is constructed.

FIG. 5 is an end view, partly in section, of a filler which has had a tubular back lining applied thereto according  $_{60}$  to the present invention.

Turning now to the drawings in greater detail, a plurality of book fillers 10, 10 are shown in FIG. 1 as being fed along a generally horizontal longitudinal path by suitable carrier means, indicated generally at 12. As shown, the fillers are carried edgewise in side-by-side spaced relationship with their backs facing upwardly. It will be appreciated, however, that such orientation is not essential and that other configurations may be adopted without departing from the scope of the present invention. 70

At a first station, indicated generally at 14, a glue applying roller 15 passes generally horizontally across

the filler back to deposit a thin film of glue thereupon. The roller 15 may be coated with glue by any one of several well known methods and as shown the roller 15 has a concave peripheral surface to conform at least approximately to the rounded back of the filler 10.

At the next succeeding station in the schematic apparatus shown in FIG. 1, the glue filler 10 is provided with a flat segment of back-lining paper, indicated generally at 16, by a vertically reciprocable conveyor 18. While the segment 16 may be fed to this station from a magazine or hopper filled with similar segments; preferably and as shown, suitable mechanism is provided for forming the segment immediately above the station. The mechanism shown comprises a first roll of paper back-lining material indicated generally at 30 and two rolls of relatively narrow headband material indicated generally at 28, 28. Suitable means are provided for rotating these rolls in the directions indicated.

According to the preferred method of forming the flat back-lining segment 16, the roll 30 is unrolled into a flat sheet 26 and two thin stripes of glue are applied to the marginal side edge portions, indicated generally at 26a, 26a by glue rollers 32, 32. Continuous strips of headband material 22, 22 are fed from the rolls 28, 28 and adhesively attached to the paper sheet 26 as shown. The paper sheet 26 and the roll 30 from which it is fed, are approximately equal in width to the length of the book filler to be glued.

A knife blade 34 is movable in timed relation with the movement of the conveyor 18, and with the movement of the sheet 26, so that the latter is successively cut to produce segments 16, 16 approximately equal in length to the thickness of said fillers. The conveyor 18 moves each such segment 16 into registered engagement with the glued back of the filler 10 positioned therebelow.

It will be apparent that the flat paper back-lining segment 16 can be pressed onto the filler back by suitable means (not shown).

At a succeeding station, indicated generally at 36 in FIG. 1, two axially thin glue rollers 38, 38 pass along the back of the filler 10 to provide narrow bands of glue adjacent the side edges of the back of the segment 16. Preferably, and as shown, the axes of rotation of these rollers are canted so that the peripheries of the rollers 38, 38 properly engage the rounded back portion of the filler 10.

At still another subsequent station, indicated generally at 40, a second or outer section of back-lining paper 42 is applied to the back of the filler. Preferably, and as shown, this paper back-lining section 42 is formed in the machine above the station 40 and is lowered into position by a second conveyor 44. A second roll of back-lining paper 46 is unrolled into a sheet 48 and is drawn through a plow, indicated generally at 50, to form a continuous strip of back-lining paper having inwardly folded marginal side edge portions 52, 52 which are folded through approximately 180° so that the resulting strip has the same width when folded as the thickness of said fillers 10, 10. In accordance with the present invention, the sheet 48 and the roll 46 from which it is fed are wider than the thickness of said fillers but no wider than twice this dimension. It has been found that a width of approximately one and one-half times the thickness of the fillers to be back lined has provided marginal side edge portions 52, 52 of optimum width.

A knife blade 54 is adapted to cut the folded sheet of back-lining paper 48 into sections 42, 42 which are at least approximately equal in length to that of said fillers. The back-lining section 42 is then moved downwardly into registered engagement with the back of the filler 10 by the conveyor 44. The marginal side edge portions 52, 52 are thus adhesively attached to the marginal side edges

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of the flat back-lining segment 16 by the films of glue deposited at the station 36. In this manner, a tubular back lining is formed by a process which lends itself particularly well to use in an automatic machine which can act upon a large number of fillers in succession.

Here too, it will be apparent that the folded paper backlining section 42 can be pressed onto the filler back by suitable means (not shown).

FIG. 4 shows the various parts of the book filler in disassembled relation and illustrates some of the advantages achieved in constructing a tubular back lining according to the method of the present invention. The individual registering of the headband strip segments 22a, 22a with respect to a filler back is avoided by applying the continuous strips 22, 22 to the sheet 26 and subsequently cutting such sheet into segments 16, 16 such as that shown in FIG. 4. Further, the folded back-lining section 42 is registered with the flat segment 16 to provide a tubular back lining which is well adapted to low cost quantity production. 20

The invention claimed is:

1. The method of forming and applying two-part tubular back linings to fillers, which method comprises the steps of unrolling back-lining paper from a first roll which has a width approximately equal to the length of the fillers, attaching two continuous strips of headband material to an inner surface of said back-lining paper adjacent the marginal side edges thereof, cutting said backlining paper and the headband strips attached thereto into segments approximately equal in length to the thickness 30 of said fillers, adhesively attaching said segments to the backs of said fillers, unrolling back-lining paper from a second roll which is wider than the thickness of said fillers but no wider than twice this dimension, folding the marginal side edge portions of said last mentioned back-lining 3 paper inwardly through substantially 180° to form a continuous strip having a folded width approximately equal to the thickness of said fillers, cutting said strip of folded back-lining paper into second paper back-lining sections approximately equal in length to the lengths of said fillers, 40 adhesively attaching said folded side edge portions of said

sections to said filler backs in registered relation with said segments to provide two-part tubular back linings on said fillers.

2. The method of forming and applying two-part tubular back linings to fillers, which method comprises the steps of feeding fillers of uniform size along a predetermined path applying glue to the back of each filler, unrolling back-lining paper from a first roll which has a width approximately equal to the length of said fillers, attaching two continuous strips of headband material to an inner surface of said back-lining paper adjacent the marginal side edges thereof, cutting said back-lining paper and the headband strips attached thereto into segments approximately equal in length to the thickness of said fillers, moving said segments of back-lining paper into 15 registered engagement with the backs of said fillers, unrolling back-lining paper from a second roll which has a width of approximately one and one-half times the thickness of said fillers, folding the marginal side edge portions of said last mentioned back-lining paper inwardly to form 20 a continuous strip of back-lining paper having the same width when folded as the thickness of said fillers, cutting said strip of folded back-lining paper into second paper back-lining sections approximately equal in length to that of said fillers, and adhesively attaching said folded side edge portion of said sections to said filler backs in registered relation with said segments to provide two-part tubular back linings on said fillers.

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