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(54) **Method of binding books at an industrial production level and book thereby obtained.**

(57) A method for industrially binding books comprises the steps of forming a loose sheet pack (1) having a flat spine (2), applying an adhesive and headbands (3) directly to the flat spine and bowing this latter with the headbands (3) thereon, thereby causing the pack sheet to exert a draw action on the headbands (3) during the spine bowing step. Thus a complete and precise adhesion of the headbands to the book spine is obtained while conferring to the headbands a mechanical retention function as well.

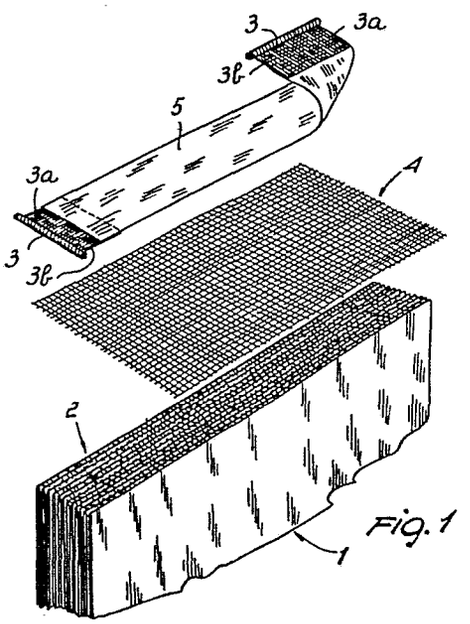

Fig. 1

EP 0 052 673 A1

This invention relates to a method of binding books at an industrial production level.

A well known and widely used method of binding books industrially comprises the following sequential steps: a spine bowing step wherein the spine of a package of stacked pamphlets or loose sheets intended for forming a book is bowed or rounded under a high pressure, e.g. by passing it under pressure rollers; an adhesive and gauze or cloth application step, following said bowing step; a step wherein the so-called headband is applied to the spine over the adhesive coating, usually along with the paper backing of said gauze; and a step wherein the headband is caused to closely adhere to the spine by means of a pressure roller. As a final step, the book is provided with a rigid or semirigid cover which is made to adhere to the first and last pages or sheets of the stacked pamphlets, with the exception of the spine region thereof.

That known method is a universally employed one, but is rather critical to carry out in practice because those operations which affect the spine of the book imply work on an arcuate surface, both for the application of the adhesive and of the headband, as well as the adhesion of the latter.

In fact, that method not only re uires the availability of a machine for bowing the book spine, but also one for working on the bowed spine and operative to drive and move along an arcuate path

the adhesive-applying rollers and cylindrical pressure rollers. As an alternative to the cylindrical rollers being made to roll over the book spine, in a transverse direction thereto, grooved rollers are employed having an arched groove, which are caused to run longitudinally over the book spine. Such grooved rollers can be driven without difficulty, since their axes are only required to move linearly, but their grooves must have width and depth dimensions which are exactly adjusted to fit the size of the book being processed. Thus, several sets of grooved rollers must be available, one for each spine configuration anticipated, and replaced every time that a variation occurs in the thickness of the book to be bound. This evidently results not only in an appreciable equipment cost increase but also in considerable downtime for starting the machine which drives the rollers and for replacing the rollers.

Another deficiency of the cited known method resides in that when working on a bowed surface, such as in applying the headband, it is impossible to exert any high pressure, in order not to distort the previously bowed and shaped spine. This implies for the headband, firstly a prevailingly ornamental function rather than a mechanical and sheet-retaining one, as resulting from the reduced contact pressure. Secondly, the headband and its paper backing tend to become distorted and to be displaced over the

book spine during the contact application step, as due to the reduced pressure exerted thereon and concurrent entraining or drifting effect brought about by the reciprocating motion of the pressure roller intended for binding them firmly to the spine by rolling over them.

In the bookbinding industry, therefore, a long felt need is the availability of a bookbinding method which can better suit the requirements of industrial-size bookbinding, while simplifying the bookbinding processes which preceed the application of the book cover.

Thus, this invention sets out to provide such an improved bookbinding method.

Within that general aim, it can be arranged that the method according to this invention affords a complete and precise adhesion of headbands to the spine of a book, while conferring to such headbands a mechanical retention function as well.

It is further possible to arrange that the method of this invention can be readily implemented with a simple equipment, thereby both machine times and production costs can be cut down.

According to one aspect of the present invention, there is provided a method for binding books on an industrial basis, which comprises at least the sequential steps of: forming a pack of loose or pamphletized sheets intended for making up a book, said pack having a flat spine; applying an adhesive and headbands directly to the flat spine

of said pack; and bowing said spine complete with said headbands, thereby said sheets or pamphlets in said pack are caused to exert a draw action on said headbands during said spine bowing step.

The accompanying drawing illustrates schematically and by way of example only the main steps of the method according to the invention, and shows:

in Figure 1, an exploded perspective view of a few components which are to be assembled in the course of the book binding process;

in Figure 2, a schematical view of a pamphlet pack or package having a flat spine;

in Figure 3, a view similar to Figure 2, wherein a headband is positioned on the package spine; and

in Figure 4, the bowed package with its headband stretched and in close contact therewith.

With reference to the drawing figures, the numeral 1 designates a pack or package of pamphlets intended for forming a book. The package 1 has a flat spine 2. To the spine 2 are applied those elements which usually bind or hold together the pamphlets or sheets which make up the package 1.

Then, in a conventional manner, a cover is made to adhere to the first and last pages of the package 1, said cover being of any desired type, e.g. a rigid or "hard" type with weakening or fold lines pre-formed adjacently the spine 2 and with

a middle portion set away from the spine 2.

With the method according to this invention, which is unrelated to the application of a cover, all those elements, known per se, which contribute to holding the pamphlets or sheets of the package 1 together, at the spine 2 of the package, are assembled while the spine 2 is still in its flat condition.

In fact, to the yet flat spine 2, an adhesive is first applied by means of any suitable instrument.

Thereafter, as shown in Figure 3, two headbands 3 are positioned onto the flat spine 2 of the pamphlet package 1, with the optional interposition of a gauze 4 and an additional adhesive coating over the gauze 4.

In a quite conventional manner, the headbands 3 are then joined to a paper strip 5 which interconnects them together and overlies the optional gauze 4.

As may be seen in Figure 3, the headbands 3 and strip 5 have longitudinal edges 3a and 3b which protrude, cantilever-fashion, beyond the thickness of the package 1. The extent of this protrusion of the edges 3a and 3b beyond the package 1 will be commensurate to the final dimensions of the spine after it has been bowed.

Lastly, following the application of all such elements, the spine 1 is conventionally bowed, in a manner known per se, by exerting a high pressure on the flat spine and the elements previously

engaged therewith. Where the selected adhesive is of the hot-melt type, simultaneously with the bowing of the spine, heat may be conventionally delivered to the adhesive such as to ensure full adhesion of the headbands 3, and of the gauze 4 if any, to the package bowed spine (Figure 4).

The invention achieves its objects. In fact, during the spine bowing step, a relative sliding movement takes place between the spines of the individual pamphlets forming the package 1 and the headbands 3, to result in a headband drawing and stretching effect prior to their setting in position. Thus, the headband 3 advantageously serves a mechanical retentive function as well as an aesthetical one.

The contact pressure applied to the headbands against the spine, as exerted during the spine bowing step, is, owing to the high pressure levels involved, adequate to ensure a permanent bond of the headbands with all the other elements and the pamphlets. Moreover, with the method of this invention, in order to engage all the necessary elements with the flat spine, it is no longer necessary to arrange contoured adhesive-applying and pressure rollers, nor is it necessary to move the cylindrical rollers along arcuate paths, in a transverse direction to the main direction of said spine. Cylindrical rollers arranged to move longitudinally to the spine, of an ample size to accommodate any spines, is all that is required. Alternatively, simple flat biasing surfaces

may be employed. Furthermore, the application of the aforementioned elements to a flat spine may be carried out at a low pressure and without inducing distortion, since the contacting is effected concurrently with the spine bowing. Advantageously, the latter step may be carried out in a technically similar manner to conventional techniques.

On the whole, the usual bookbinding method has been considerably simplified, by virtue of the adhesive, headbands and paper strip being, with this invention, applied to a flat spine, by means of simple standard devices, without involving any downtime for equipment adaptation. Also, the resulting bound book is better than conventionally bound ones, thanks to the perfect and stronger adhesion of the headbands to the book spine.

CLAIMS

1. A method for binding books on an industrial basis, which comprises at least the sequential steps of: forming a pack (1) of loose or pamphletized sheets intended for making up a book, said pack (1) having a flat spine (2); applying an adhesive and headbands (3) directly to the flat spine (2) of said pack (1); and bowing said spine (2) complete with said headbands (3), thereby said sheets or pamphlets in said pack (1) are caused to exert a draw action on said headbands (3) during said spine bowing step.

2. A method according to Claim 1, characterized in that said book spine (2) bowing step comprises the incorporation to said spine (2) of the elements applied thereto.

3. A method according to the preceding claims, characterized in that it comprises the application to said spine (2), in the flat condition thereof, of a gauze between said spine and said headbands (3), said gauze being effective to bind said loose or pamphletized sheets together.

4. A book, characterized in that it is bound with the method of the preceding claims.

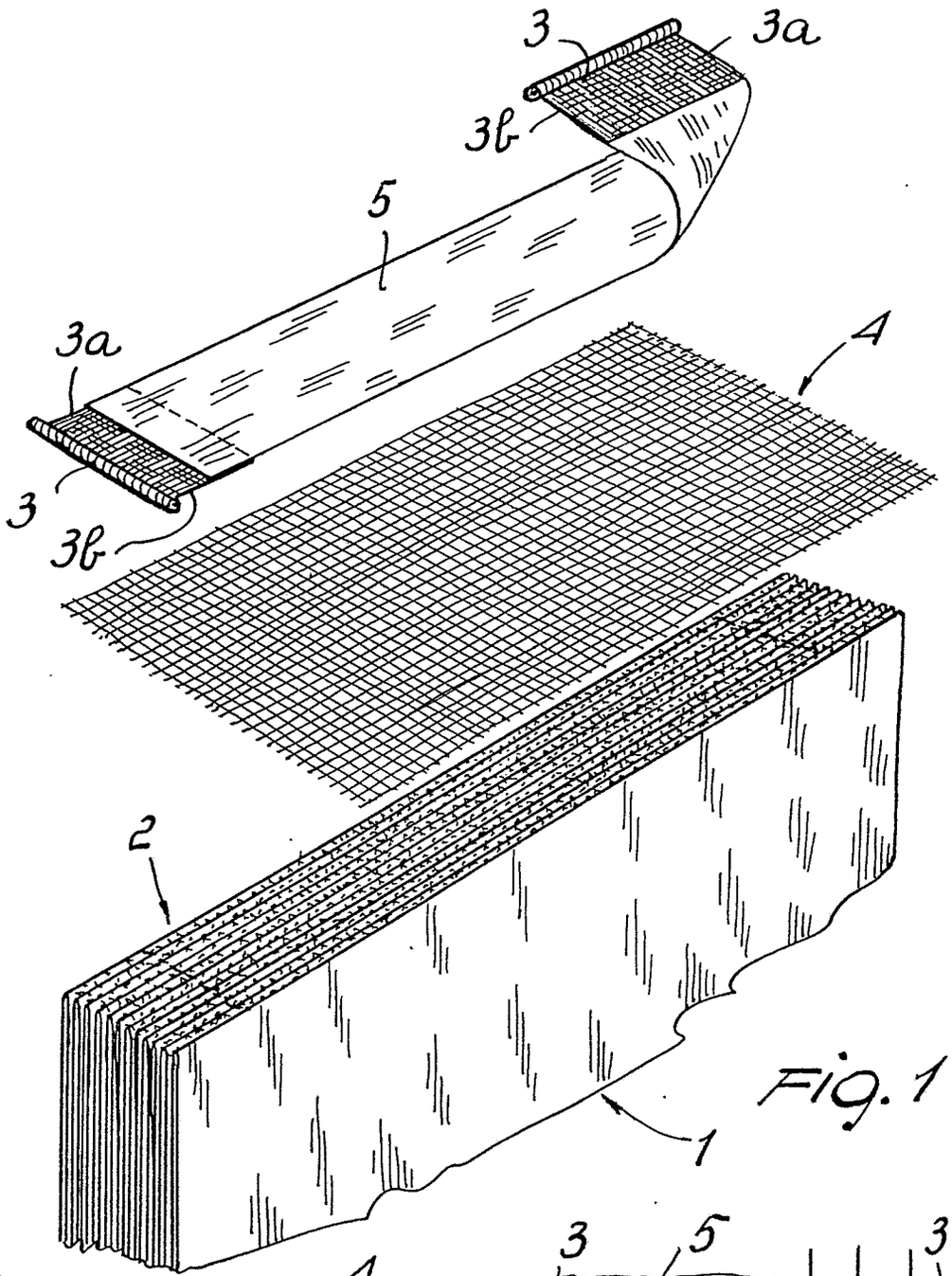

Fig. 1

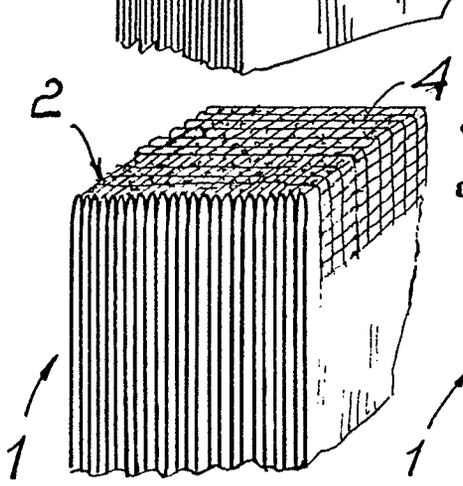

Fig. 2

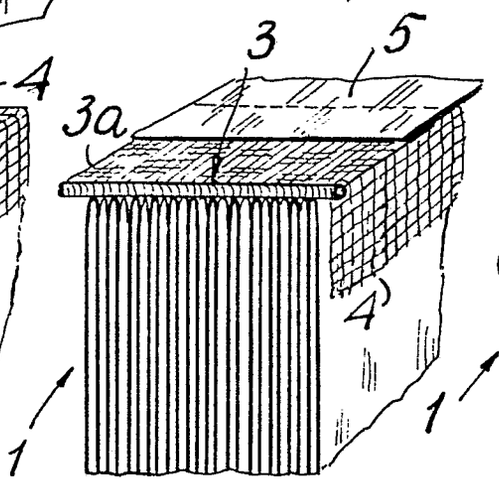

Fig. 3

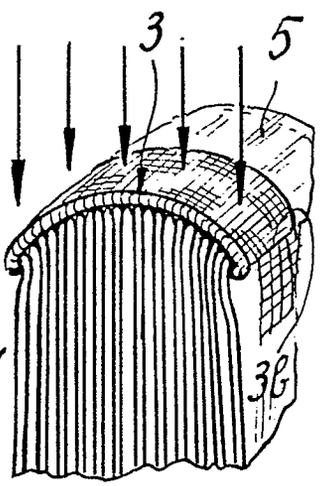

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 80 20 1105

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	GB - A - 441 294 (KITCAT) * Page 2, line 53 to page 3, line 117; figures 1,2,3 *	1
	FR - A - 934 655 (BONNET-MADIN) * Complete description *	1
	US - A - 3 840 254 (HELLER) * Column 5, line 66 to column 6, line 18; figures 3A,3B *	1
A	DE - C - 945 561 (HOCH) * Complete description *	1

CLASSIFICATION OF THE APPLICATION (Int Cl ³)

B 42 C 5/02

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

B 42 C
B 42 D

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22-07-1981	LONCKE