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(12) # EUROPEAN PATENT SPECIFICATION

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

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DE-C- 945 561
FR-A- 934 655
GB-A- 441 294
US-A-3 840 254

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Description

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

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 requires 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 precede the application of the book cover.

State of the art is further defined by GB—A—441 294, US—A—3 840 254 and FR—A—934 655.

GB—A—441 294 teaches to secure a lining provided with creases or pleats on the spine of a book by gluing it thereon while the spine is flat and to effect the rounding of the spine afterwards.

US—A—3 840 254 concerned with the problem of plastic memory in the adhesives, which upon rounding of the spine has the tendency to flatten the spine generating thereby local stresses. The patent teaches to heat the spine after the rounding thereof to relieve the shape distorting stresses in the adhesive.

FR—A—934 655 teaches to effect the rounding of the spine on which previously a lining has been glued, before complete drying of the glue occurred.

None of the prior art references neither teaches nor suggests the use of headbands.

The prior art shows that when a lining is glued on a spine of a book while the spine is flat and the spine is afterwards rounded, unsatisfactory results are obtained.

The task of this invention is to remove the above drawback and render the use of headbands not only of decorative but also of mechanical nature.

Applicant has found that, contrary to the experience of the prior art, satisfactory results may be obtained also with a flat lining i.e. without the use of a lining provided with creases or pleats and without thermal post treatment of the rounded spine, provided that the headbands are used in addition to the conventional strips and the rounding is effected when the adhesive is in a suitable condition for the rounding operation, which suitable condition may be obtained also by means of heat treatment of the adhesive simultaneously with the spine rounding operation.

The invention is defined by the appended claim 1.

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 bookbinding 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 head-

band 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 flat headbands 3 are positioned onto the flat spine 2 of the pamphlet package 1, with the optional interposition of a flat 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 that the selected condition of the adhesive allows 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 automatically binding books, comprising 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 at least one flat strip (3, 5) directly to the flat spine (2) of said pack (1) and bowing said spine (2) complete with said flat strip (3, 5) characterized in that said flat strip includes at least one headband (3) and said book spine bowing step is effected while the adhesive is in a condition suitable for the bowing step and after the setting in position of the headbands (3) thereby said sheets or pamphlets in said pack (1) are caused to exert a drawing and stretching action on said headbands (3) during said spine bowing step to increase their retentive function.

2. A method according to claim 1, wherein simultaneously with the bowing step the adhesive is heated to put it in said condition.

3. A method according to claim 1, characterized in that it comprises the application to said spine (2), in the flat condition thereof, of a flat gauze between said spine (2) 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.

Patentansprüche

1. Verfahren zum automatischen Binden von Büchern umfassend die aufeinanderfolgenden

Stufen der Bildung eines Packs (1) von losen oder broschürten Blättern, welche ein Buch bilden sollen, wobei der Pack (1) einen flachen Rücken (2) aufweist, Aufbringung eines Klebstoffes und wenigstens eines flachen Streifens (3, 5) direkt auf den flachen Rücken (2) des genannten Packs (1), und Krümmung des mit dem flachen Streifen (3, 5) ergänzten Rückens (2), dadurch gekennzeichnet, daß der flache Streifen wenigstens ein Kapitalband (3) aufweist und die Stufe der Krümmung des Rückens des Buches bei sich in einem für die Krümmungsstufe geeigneten Zustand befindendem Klebstoff und nach der Anordnung der Kapitalbänder (3) in ihrer Lage durchgeführt wird, wobei die Blätter oder Broschüren im Pack (1) veranlaßt werden, auf die Kapitalbänder (3) während der Krümmungsstufe des Rückens eine Zieh- und Streckwirkung auszuüben, um deren Haltefunktion zu erhöhen.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Klefstoff zugleich mit der Krümmungsstufe erhitzt wird, ihn in den genannten Zustand gebracht zu werden.

3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß es die Aufbringung auf den in flachem Zustand vorliegenden Rücken (2) einer flachen Gaze zwischen dem Rücken (2) und den Kapitalbändern (3) umfaßt, welche Gaze die losen oder broschürten Blätter verbindet.

4. Buch, dadurch gekennzeichnet, daß es nach dem Verfahren gemäß den vorhergehenden Ansprüchen gebunden ist.

Revendications

1. Procédé pour relier automatiquement des livres, comportant les stades successifs dans lesquels on forme un bloc (1) de feuilles individuelles ou mises en cahiers prévues pour constituer un livre, ce bloc (1) ayant un dos plat (2), on applique un adhésif et au moins une bande plate (3, 5) directement sur le dos plat (2) de ce bloc (1) et on arrondit le dos (2) équipé de sa bande plate (3, 5), caractérisé en ce que cette bande plate comporte au moins une tranchefile (3) et que le stade d'arrondissement du dos du livre est effectué alors que l'adhésif est dans un état approprié pour le stade d'arrondissement et après la mise en place des tranchefiles (3), d'où il résulte que les feuilles ou les cahiers dans le bloc (1) exercent une action d'étirage et de traction sur les tranchefiles (3) lors du stade d'arrondissement du dos, ce qui augmente leur fonction de retenue.

2. Procédé selon la revendication 1, dans lequel l'adhésif est chauffé pour être amené dans cet état simultanément avec le stade d'arrondissement.

3. Procédé selon la revendication 1, caractérisé en ce qu'il comporte l'application sur le dos (2), à l'état plat, d'une mousseline plate entre le dos (2) et les tranchefiles (3), cette mousseline servant à relier ensemble les feuilles individuelles ou mises en cahiers.

4. Livre caractérisé en ce qu'il est relié selon le procédé des revendications précédentes.

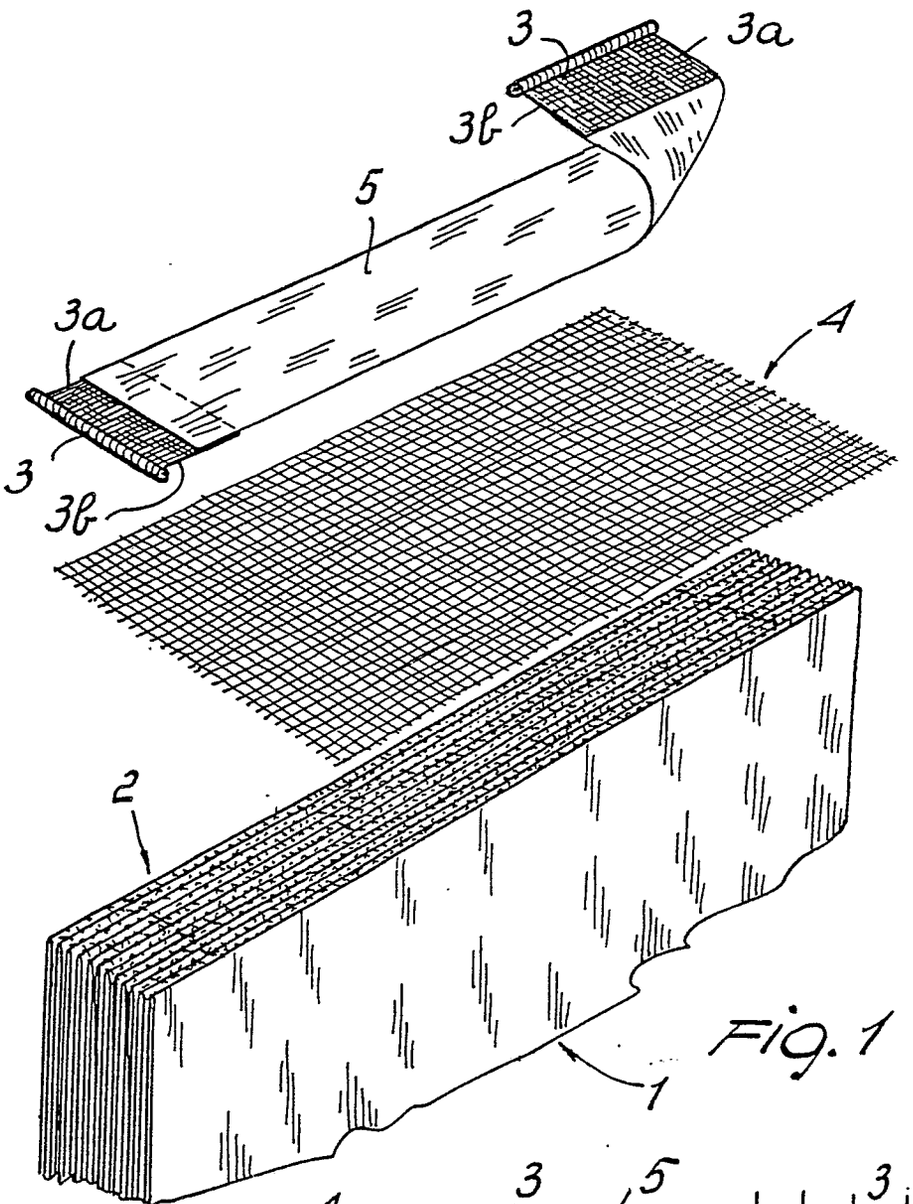

Fig. 1

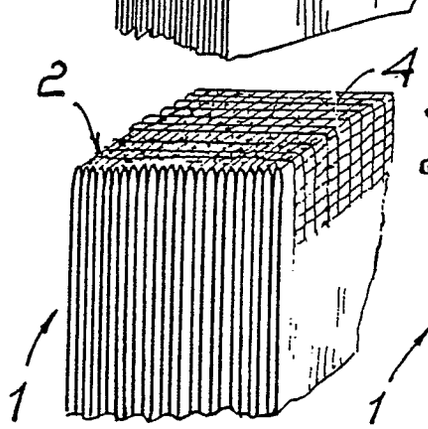

Fig. 2

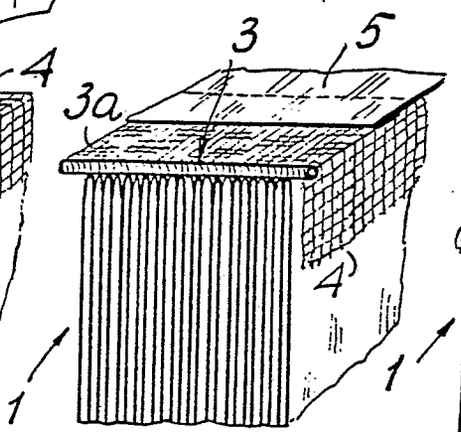

Fig. 3

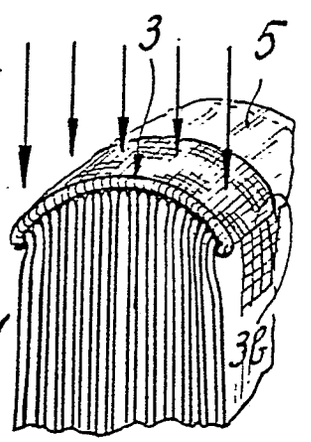

Fig. 4