April 5, 1966 W. McKOWEN 3,244,436

BOOK BINDING

Filed July 6, 1964

Fig. 1.

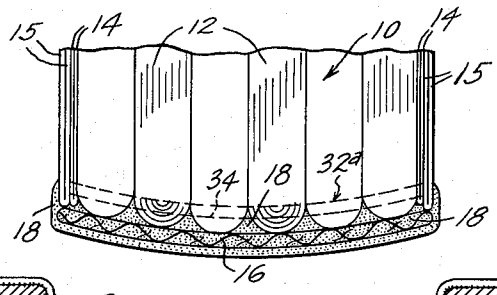


Fig. 2.

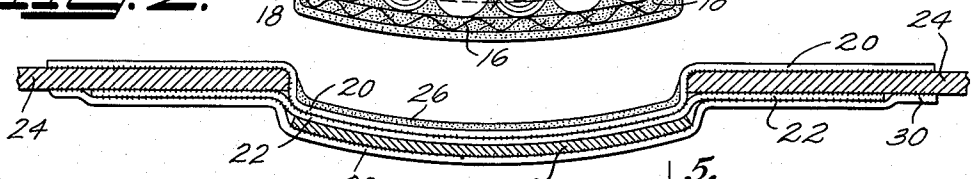


Fig. 3.

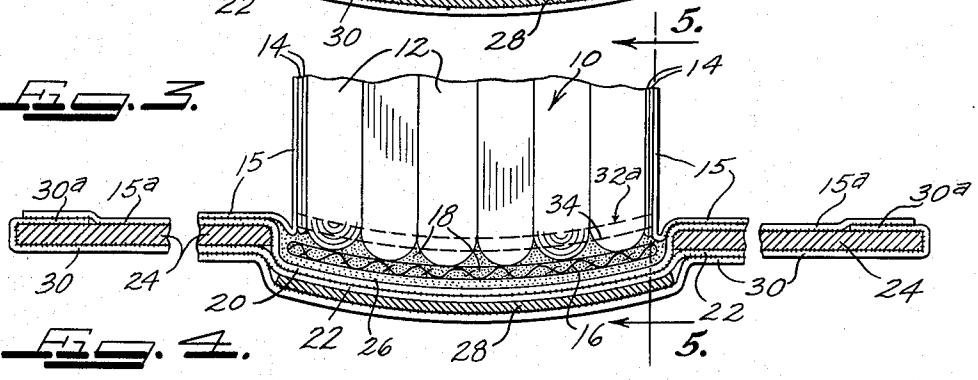


Fig. 4.

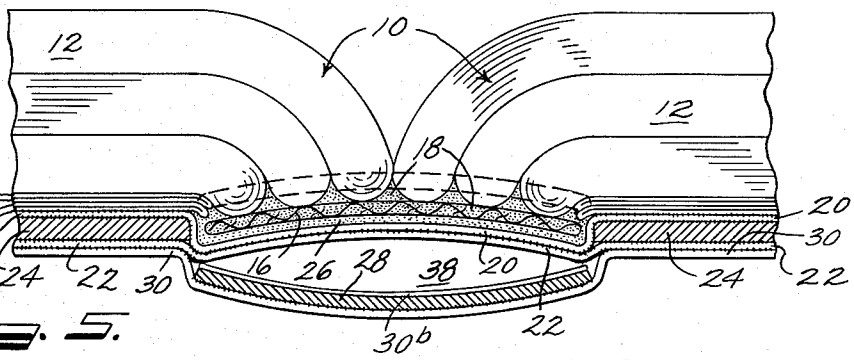
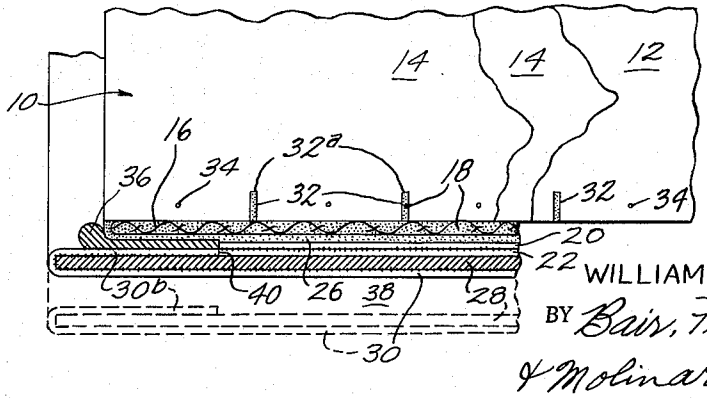


Fig. 5.



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BOOK BINDING

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This invention relates to a book binding of simpler construction than the conventional type, yet which is stronger and thereby provides a longer lasting book.

One object of the invention is to provide a book binding in which a book body has a body of glue along the back thereof, and a book cover includes inner and outer hinge tapes wherein the inner hinge tape has a coating of glue fused with the body of glue along the back of the book body.

Another object is to provide inner and outer hinge tapes which are adhered together along their central portions and have their marginal portions adhered to the inner and outer surfaces of cover boards, thereby providing a superior hinged cover arrangement.

Still another object is to provide a cover sheet for the cover boards which is adhered to them thus reinforcing the hinge tapes and their connection to the cover boards, reinforcement for the back of the book cover being further provided in the form of a backbone board adhered to the inner surface of the cover sheet.

A further object is to provide greater anchoring power for the body of glue along the back of the book body in the form of slots across the back thereof which receive portions of the body of glue.

Still a further object is to provide a double end sheet construction for the book body wherein inner end sheets are also slotted for increased book body anchorage and outer end sheets serve to cover the ends of the slots and as a further anchoring means by adhering the outer leaf of each to the inside of its cover board.

An additional object is to provide a superior means for incorporating head bands into the book binding by adhering them to the body of glue along the back of the book body.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my book binding, whereby the objects above contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in detail on the accompanying drawing, wherein:

The figures of the drawing are in section but only a back fabric, cover boards, backbone board and head bands are shown sectioned in order to avoid confusion of details.

FIG. 1 is a sectional view through a book body, the upper portion being broken away to conserve space on the drawing;

FIG. 2 is a sectional view through an opened book cover, the outer portions of the cover boards being broken away;

FIG. 3 is a cross section of both the book body and the book cover of FIGS. 1 and 2 shown assembled together, intermediate portions of the book covers being broken away in order to illustrate the outer edges of the book covers;

FIG. 4 is a similar sectional view showing the action of the components of the book binding when the pages of the book are opened; and

FIG. 5 is a vertical sectional view on the line 5—5 of FIG. 3 showing only one end of the book in the area adjacent the back thereof.

On the accompanying drawing I have used the reference numeral 10 to indicate in general a book body.

The book body 10 is comprised of a plurality of signatures 12 and end sheets 14 and 15 collated in the usual way on a gathering machine and thereafter trimmed to size. At 16 a back fabric is illustrated and by means of stippling a body of glue (preferably hot melt glue) 18 is illustrated in association therewith, the fabric serving as a base for the body 18.

The terms "glue" or "hot melt glue" as used herein is meant to designate a thermoplastic vinyl resin adhesive, preferably a copolymer of vinyl acetate and ethylene in admixture with waxes and compounding agents. These adhesives are commercially available. The copolymer base is sold by E. I. du Pont de Nemours under the name Elvax. Hot melt glue of this character is a "one shot" material which after initially applied will cure or set after heat is subsequently applied thereto. When applied to fabric tapes or the like it penetrates and affixes itself to the fibers of the fabric and is almost impossible to remove. Subsequently when heated by rollers or the like to a temperature of approximately 360° F. it becomes a "hot melt" (liquid of lubricating grease-like consistency) which upon contact with a cold hot melt, will weld thereto and the two become one body having excellent strength.

FIG. 2 illustrates a book case or cover comprising an inner hinge tape 20, an outer hinge tape 22, cover boards 24, a backbone board 28 and a cover sheet 30. A coating of hot melt glue 26 is illustrated on the central portion of the inner surface of the inner hinge tape 20. The central portions of both tapes between the areas of the cover boards 24 are adhered together down the backbone of the book as with glue indicated by stippling along the line of separation between them shown on the drawing. The marginal portions of the tapes 20 and 22 are adhered to the inner and outer surfaces of the cover boards 24 as also indicated by stippling. Thus when the book body is cased in with respect to the book cover, it is reinforced and affixed to each side of the cover boards which is an improvement over the conventional binding methods and adds strength to the book body. The inner and outer tapes are preferably pre-glued with hot melt glue which, due to the penetrating of the fibers, makes for great holding power. The outer tape 22 may have hot melt glue applied on its inner side either in strips or solid coverage. The inner tape 20 may have hot melt adhesive applied on its inner side as at 26 to be affixed to the book body and on its outer side along its marginal edges to be affixed to the cover boards 24.

Additionally, I have used stippling to indicate the inner surface of the cover sheet 30 of cloth, paper or the like adhered to the outer surfaces of the backbone board 28 and the cover boards 24. The backbone board 28 is flexible and is placed between the outer tape 22 and the cover material 30 to keep the cover from wrinkling at the back or spine of the book. As shown at 30^a in FIG. 3, the cover sheet 30 extends around the outer edges of the cover boards for a neat finish. The inner and outer tapes 20 and 22 reinforce the book body to a degree heretofore unachieved.

In assembling the book body 10 in the book cover, heat is applied in order to fuse the coating 26 of glue to the body 18 of glue. This is best accomplished by having the glue 26 pre-applied to the tape 20 and at the time of assembly the glue 18 is applied hot by a roller or the like to meter and mold the body of glue with respect to the book body back. The hot body of glue 18 is then contacted with the cold coating of glue 26 and the two immediately weld together and thereafter remain set but of sufficient flexibility to permit the book to be readily opened and closed. The inner tape is thus affixed to the book body as well as to the inner edges of the cover

boards 24. The resulting structure appears as in FIG. 3 which also illustrates the outer leaves of the outer end sheets 15 glued to the inner surfaces of the cover boards as indicated at 15a to produce a finished appearance for the cover boards. The inner leaves of the outer end sheets act as fly sheets for the book body. The book binding process involves the end sheet glued or affixed with respect to the inner tape after which tape and end sheet together are glued to the inside of the cover boards, front and back, and thus the book is cased in.

As shown in FIG. 4 when the book is open, the final body of glue 18–26, and both hinge tapes 20 and 22, bow with the back of the book to a concave position instead of the convex position shown in FIG. 3. The outer surface of the outer hinge tape 22 leaves the inner surface of the backbone board 28 (see space 38 in FIG. 4) which facilitates opening of the book and permits it to lie open flat on a table or desk. At the same time the book back assembly consisting of the fabric 16 and the central portions of the inner and outer hinge tapes provide a rugged structure that resists breaking down and permits unlimited flexing of the book between open and closed positions. When the book is closed the additional reinforcement to the back afforded by the backbone board 28 and the cover sheet 30 produces a book free of wrinkles at the back or spine of the book. This also will provide a round back with good contours and will permit the book body to arch when the book is open or closed. The result is a book which retains its shape and the contour of its spine indefinitely and, therefore, a book that looks good throughout its life.

I provide means for further reinforcing the back of the book body comprising slots 32 as shown in FIG. 4 (their upper limits being shown at 32a in FIG. 1) in the form of saw kerfs which receive portions of the body of glue 18 as illustrated. The backs of the book bodies may be rounded by first sewing as at 34 (either Smyth or Singer), then prior to sawing the kerfs or applying the glue placing the trim edge of the book body opposite from the spine against a round rod or tube to produce a rounded back. The book body back becomes permanently round when cold which takes only about ten seconds. The back is flexible and eliminates the rounding and backing operations of conventional book binding. The hot melt glue in the slots 32, applied as a liquid when hot, readily fills the slots and serves, in addition to the usual threads 34 for sewing the signatures together, to anchor each page of each signature as well as the inner end sheets 14 with respect to the body of glue and thus produce perfect binding plus sewing as a superior binding method. The shanks of the head bands 36 also prevent hot melt glue from coming through and sticking to the cover portions 30b.

The slots 32 are located between the threads 34 as shown. This construction provides that sections or signatures of the book will be held as well as individual pages with stronger page adherence relative to the book cover. The outer end sheets 15 serve, in addition to the body of glue 18–26, as a reinforcement to more firmly anchor the book body 10 in the book cover and provide a neatly finished appearance.

My arangement also permits firm anchorage of a head band having a long body for the affixation to each end of the book body at the spine quickly after the hot melt glue is applied. Its purpose is to cover glue area of the inner tape so it won't stick to the inside of the book cover, thereby permitting the book body to raise and curve as the book is opened (FIG. 4). This is also for decorative purposes.

Books have two kinds of gathering techniques. The signatures are Smyth or side sewn first. Then the backs are slotted with a saw between stitches so that when I perfect bind with hot melt glue, the glue will affix itself to each sheet of a signature. Thus I have a combination of two types of binding sewn with thread; also hot melt glue or perfect bound. This makes a book of much higher quality that will be much stronger and will take much more punishment during use.

As shown in FIG. 5 the tapes 20 and 22 are stopped at the point indicated 40 and the head band 36 is adhered to the body of glue 18. The cover sheet 30 extends around the end of the cover board as indicated at 30b to also terminate at 40. Thus, the head band is reinforced by its position against the backbone board 28 at the time a person's fingernail is engaged therewith to withdraw the book from the shelf.

From the foregoing specification it will be obvious that I have provided a well reinforced book binding construction wherein the back of the book body is effectively anchored with respect to the spine of the book cover yet is capable of freely flexing in relation to the backbone board 28 as shown in FIG. 4 when opening the book. The pages of the signatures are additionally anchored over and above the mere contact of the body of glue 18 with the outer surface of the back of each by entering the slots 32 wherein the glue anchors each page of each signature to the body of glue. The result is a much longer lasting book than when the usual type of book binding is used.

Some changes may be made in the construction and arrangement of the parts of my book binding without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may reasonably be included within their scope.

I claim as my invention:

1. In a book binding, a book body comprising signatures having a body of glue along the back thereof, a book cover comprising cover boards, inner and outer hinge tapes having their central portions adhered together and their marginal portions adhered to the inner and outer surfaces of said cover boards, the inside of said central portion of said inner hinge tape having a coating of glue fused with said body of glue for binding said book body into said book cover, a backbond board outside said central portions of said hinge tapes, and a cover sheet for said cover boards having said backbone board adhered thereto.

2. A book binding according to claim 1 wherein head bands are provided which are adhered to the ends of said body of glue.

3. A book binding according to claim 2 wherein said hinge tapes stop short of said head bands.

4. A book binding according to claim 1 wherein two sets of end sheets are provided for said book body, and said book body and the inner set of end sheets only are provided with slots across the back thereof which receive portions of said body of glue.

5. A booking binding according to claim 1 wherein said glue is a one-shot hot melt type.

6. A book binding according to claim 1 wherein said glue is a thermoplastic vinyl resin adhesive.

7. A book binding according to claim 1 wherein said glue is a copolymer of vinyl acetate and ethylene in admixture with waxes and compounding agents.

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