

[54] **CASED BOOK USING END SHEETS BOUND WITH PLASTIC RETAINERS**

3,749,422 7/1973 Abildgaard et al. 281/2 R

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FOREIGN PATENTS OR APPLICATIONS

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[21] Appl. No.: **381,418**

[57] **ABSTRACT**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 146,648, May 25, 1971, Pat. No. 3,749,423.

An end sheet, which may be reinforced with fabric, paper or other material, is bound along with the pages of the book and the corresponding end sheet for the opposite end of the book by means of plastic strip retainers as disclosed in U.S. Pat. No. 3,730,560. The end sheet is secured to the inside of the cover of the case by adhesive. In preferred forms of the invention, at least one portion of the end sheet extends from under the spine edge of the plastic strip and folds outside the outer surface of the strip. In this form, the cover lies flat when opened. In other preferred forms, the end sheet extends from under the plastic strip in both directions.

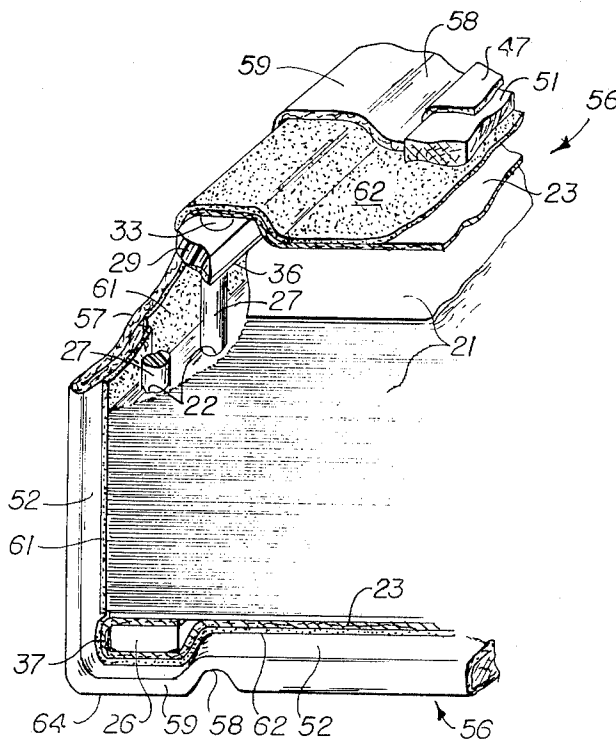
[52] U.S. Cl. **281/21**
[51] Int. Cl. **B42d 1/00**
[58] Field of Search 281/21-29;
11/1, 3, 4

[56] **References Cited**

UNITED STATES PATENTS

1,972,672 9/1934 Alger 281/21 R X
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17 Claims, 7 Drawing Figures



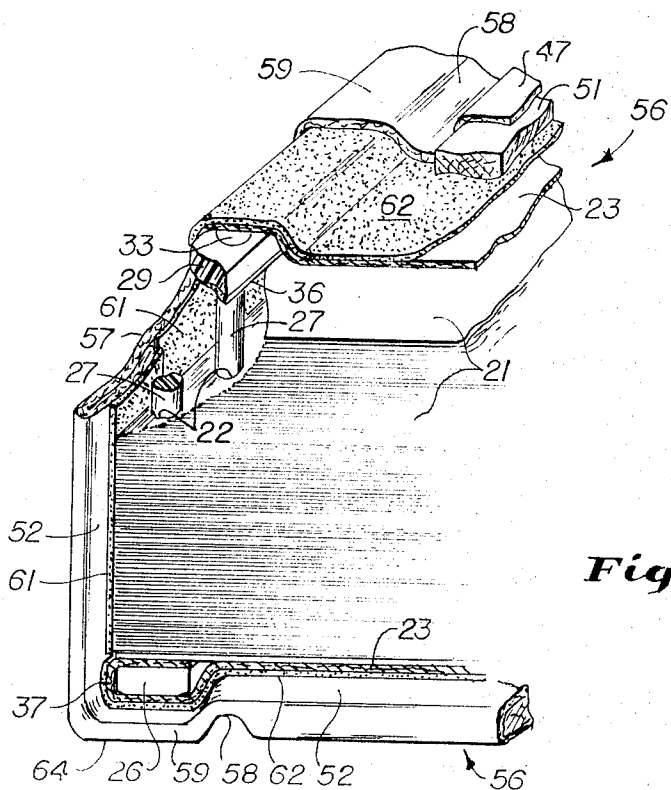


Fig. 1

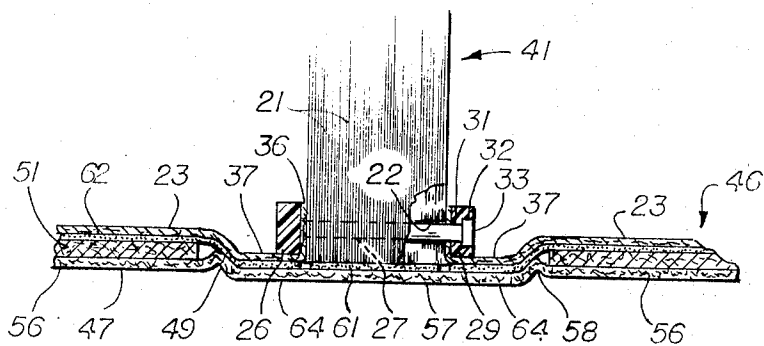


Fig. 2

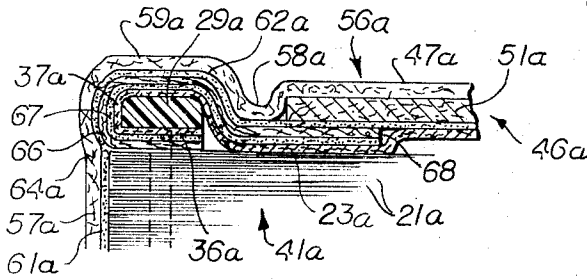


Fig. 3

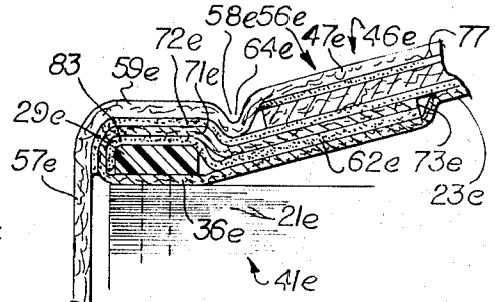


Fig. 6

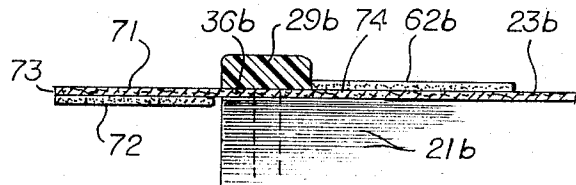


Fig. 4

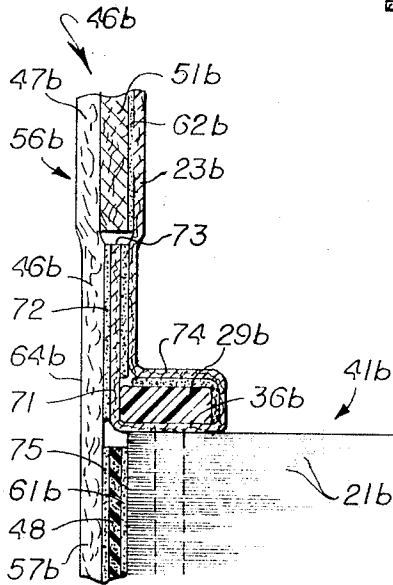


Fig. 5

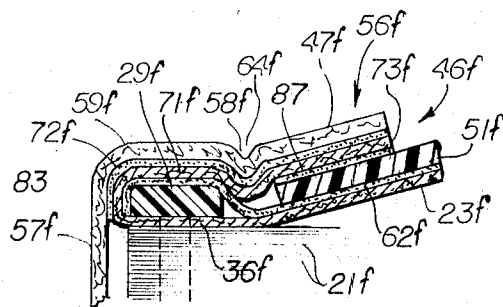


Fig. 7

CASED BOOK USING END SHEETS BOUND WITH PLASTIC RETAINERS

This application is a continuation-in-part of Ser. No. 146,648, filed May 25, 1971, now U.S. Pat. No. 3,749,423 issued July 31, 1973.

This invention relates to a new and improved book using end sheets bound with plastic retainers and to the method of forming same. Reference is made to U.S. Patent 3,730,560 on which the present invention is an improvement. Many of the advantages of said patent also apply to the present invention.

One of the advantages of the present invention is the fact that the book is compatible with standard book manufacture, but there are differences in construction which make for a stronger and more durable book. One of these differences is the fact that the end sheets and their reinforcement strips (when used) are locked under plastic retaining strips which also lock the sheets of the book together. In conventional binding practice, the end sheets are generally not secured to the top and bottom signatures in a durable manner. Hence many bindings fail where the end leaves are joined to the front and back covers of the case. The present invention thus has considerable advantage over prior construction in that these areas are more securely reinforced.

More specifically, the end sheets of the present invention are locked beneath the plastic retaining strips in a manner such that they are not likely to be pulled out when the binding is bent backwards. The construction of some of the modifications of the invention hereinafter explained in detail reduces any tendency of a leverage being exerted when the cover is bent backward which would tend to pull the end sheets out of the retainer.

Another advantage of the present invention is the fact that the uncased book may be attached to the cover by applying adhesive to the end sheets in a variety of ways and also to the reinforcements for the end sheets. The use of pressure-sensitive adhesive is permissible in accordance with the present invention but is not essential to the practice of the present invention.

Another feature of the invention is the fact that in some of the modifications of the invention hereinafter described in detail, when the book is opened, the covers lie flat with the spine.

Another advantage of the invention is the fact that conventional cases may be used to cover the book or special cases having spine pads provided with pressure-sensitive adhesive may be used as is explained in U.S. Pat. No. 3,730,560.

One of the advantages of the invention is reduction in the number of the fabricating operations required to bind an uncased book to a case. Labor required is materially reduced and the use of much existing bindery equipment is almost entirely eliminated. Steps of sewing, glueing, beading and rounding, each of which normally requires specialized equipment, and further, the equipment required in casing in the uncased book are eliminated or reduced or greatly simplified by practice of the present invention.

Further, conventional binding practice requires utilization of large areas of floor space since various parts which are ultimately assembled in the cased book are ordinarily spread out while glue dries and other portions of the book are being completed and assembled.

Hence not only is the amount of labor and machinery reduced by the present invention, but even the floor space required in the bindery is reduced.

Conventional book binding practice collects the sheets of the book in "signatures" which are generally four sheets or multiples thereof folded to page size and sewn and glued to a backing strip. Use of the four sheet and multiple signature limits the versatility of fabrication and makes it well nigh impossible to insert or delete sheets once the makeup of the book has been commenced. In accordance with the present invention, since the sewing and glueing of signatures is eliminated, the individual sheets forming the book may be made up and collated or otherwise assembled as required and changed from time to time as sheets may be added or deleted or altered.

Accordingly, the present invention makes printing more flexible since the formation of the book is not restricted to the four page technique.

Another feature of the invention is the fact that the use of skilled labor is greatly reduced. Extensive training in order to practice the present invention is not required.

An important step in conventional book manufacture is the formation of a bead between the hinge area of each cover and the spine cover. Such bead is desirable in order to facilitate opening of the book without breaking the binding. A preferred form of the present invention automatically provides a bead along each edge of the spine, said bead being shaped by the plastic strips which extend along the top and bottom adjacent to the spine edge of the uncased book formed in accordance with the present invention. The casing material fits around the strips and thus forms the bead.

A still further feature of the invention is the location of a hinge area for each cover which is so located that breaking of the binding or tearing of the end sheets from under the reinforcing strips is reduced.

Another feature of the invention is the fact that the binding is extremely flexible. When the book is open, a very deep "gutter" is achieved. Hence the page is opened flat and is legible as close to the spine as in conventional book construction.

Another feature of the foregoing advantage of the present invention is the fact that since the book opens in a deeper gutter, any selected page will fit on the platen of a copying machine, lying flat on the platen without danger of breaking the binding.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

FIG. 1 is a fragmentary perspective view of one form of book constructed in accordance with the present invention with parts broken away to reveal internal construction, the book being shown closed.

FIG. 2 is a vertical sectional view of the structure of FIG. 1 with the book open.

FIG. 3 is a fragmentary sectional view of a modified book construction.

FIG. 4 is a fragmentary sectional view showing a preliminary stage in the fabrication of a further modified book.

FIG. 5 is a fragmentary sectional view of still another step in the fabrication of the book of FIG. 4.

FIGS. 6 and 7 are fragmentary sectional views each illustrating additional modifications of the invention.

Directing attention to the form of the invention shown in FIGS. 1 and 2, each sheet 21 making up the book is punched or drilled with holes 22 spaced inward from the spine margin of the sheet 21 a distance approximately one-eighth inch. The holes 22 may be formed in the printing of the sheets 21 within the capacity of the press on which the sheets are printed or may be separately punched or drilled. End leaves 23 similarly punched with holes 22 are placed on the top and bottom of the pile of sheets 21 making up the printed matter of the book. By means and methods explained in detail in said U.S. Pat. No. 3,730,560, the uncased book 41 is bound by retaining means comprising two plastic strips 26 and 29 formed of polyvinyl choride or other suitable plastic material. Each strip is approximately one-fourth inch in width and one-sixteenth inch in thickness and of a length approximately equal to the length of sheets 21. At approximately 1 inch intervals, spaced along the length of first strip 26 and indented somewhat from the ends, are studs 27 approximately three thirty-seconds inch in diameter. Second strips 29 are formed with holes 31 at intervals corresponding to studs 27 and of a size to receive said studs. Holes 31 are formed with counterbores 32 on one surface. By means and in accordance with the method which forms no part of the present invention, the excess lengths of studs 27 are cut off and the protruding ends of the studs are deformed as by heat to fill the counterbores 32 and to form heads 33 similar to rivets thereby locking the strips 26 and 29 on opposite sides of the uncased book 41 with an end leaf 23 secured on either side of the latter.

The case 46 to which the uncased book 41 is assembled is subject to considerable variation. Standard cases 46 may be used but considerable variation may also be made therein. The case 46 illustrated in FIGS. 1 and 2 has a covering 47 of cloth, plastic, natural or artificial leather, or other suitable book binding material. The material 47 is cut in a size sufficient to accommodate the page size and spine width of the uncased book 41 with overlaps to form top and bottom turn-ins 52 and outer side edge turn-ins (not shown).

Although not shown in FIGS. 1 and 2, nevertheless, extending longitudinally of the material 47 at the center a strip 48 (see FIG. 5) of a resilient material such as plastic foam which is attached to the inside of covering 47 by an adhesive and which is of a length equal to the height of the completed book and of a width at least equal to the spine thickness of the uncased book, may be used. At either side of strip 48, where used, and in any event extending longitudinally of the material 47 on either side are hinge forming areas 49 of a width to form the completed bead 59 and crease 58 hereinafter described. Outboard of areas 49 are cover boards 51 which conventionally are of cardboard and are of a dimension such as to project beyond the top, bottom and outside edges of the sheets 21 so as to protect the uncased book 41 from damage, all as in accordance with conventional book binding practice. The boards 51 are glued to the inside of covering 47 by adhesive 77 (see FIG. 6). Thereafter, the top and bottom turn-ins 52 are folded over and glued to the insides of the boards 51 as are the edge turn-ins (not shown).

With further specific reference to FIGS. 1 and 2, it will be seen that the end leaves 23 have a tucked-in

portion 36 which fits under each plastic strip 26, 27. Instead of extending from portion 36 away from the spine edge of the book, the end leaf 23 has a folded portion 37 which extends out from the spine edges of strip 26 or 29 along the hinge forming area 49. Spine adhesive 61 adheres the spine edge of the uncased book 41 to the spine covering 57 while adhesive 62 adheres the end leaves 23 to the insides of the cover boards 51 to complete the front and back covers 56. There is a gap between the spine edge of each board 51 and strip 26 or 29 which forms a crease 58 and immediately beyond crease 58 towards the spine of the book is a bead 59. As indicated by reference numeral 64, there is a hinge area 64 where the covers 56 join the spine 57; and in the form of the invention shown in FIGS. 1 and 2, these hinge areas 64 are immediately outside the strips 26 and 29. It will be noted that when the covers are opened in the position shown in FIG. 2, the folded portions 37 extend out away from strips 26, 29, hinging about hinge area 64. Hence when the covers 56 are bent backwards, there is no fulcrum against which leverage is applied which tends to pull the tucked-in edges 36 of the end leaves 23 out from under the strips 26, 29. Further, in open position, the covers 56 lie flat, parallel to the spine 57.

The modification of FIG. 3 resembles that of FIGS. 1 and 2 in many details. However, the end leaf 23a is reinforced by means of reinforcement 66 which may be of gauze, other fabric, plastic sheet, paper or other suitable material. Reinforcement 66 is caught under strips 26a and 29a under the tucked-in portion 36a of end leaf 23a. Adhesive 67 adheres the reinforcement 66 to the tucked-in portion 36a and folded over portion 37a of end leaf 23a while adhesive 62a causes adherence of the outside surface of reinforcement 66 to the inside of spine 57a, bead 59a and crease 58a. Reinforcement 66 terminates in an outside edge 68 and outwardly of said edge 68 the end leaf 23a adheres to the insides of boards 51a by means of adhesive 62a.

In the modification of FIGS. 4 and 5, the major portion of end leaf 23b extends from under the strips 26b, 29b toward the open edge of the uncased book 41b while a rear extension 71 which is preferably integral with end leaf 23b extends out from the spine edge of strip 29b. Adhesive 72 on the outside surface of extension 71 adheres to the hinge forming area 49b of case 46b and the extension 71 terminates at line 73 immediately inward of the spine edge of board 51b. The major portion of the end leaf 23b is formed with a reverse bend fold 74 which adheres to the inner edge and the top of strip 29b by means of adhesive 62b and also to the inside surface of extension 71. In this form of the invention, it is shown that a pad 48 may be caused to adhere to the spine edge of the uncased book 41b and also by means of adhesive 75 to the inside of the spine covering 57b.

The modification of FIG. 6 is similar to that of FIGS. 4 and 5, except that in this version of the book the spine extension 71e is folded around the spine edge of strip 29e and over the outside thereof and adhered thereto by means of adhesive 83 while the major portion of the end leaf 23e projects from strip 29e in a direction opposite the spine edge of the uncased book 41e.

FIG. 7 illustrates a version of the invention similar to FIG. 6. In this version cover 51f is of a relatively stiff plastic or other suitable material. Most of its surface is uncovered. The covering 47f is only a short extension

of spine covering 57f and merely covers extension 71f. Extension 71f of end leaf 23f is located outside the cover 51f and is caused to adhere thereto by means of adhesive 87. The extension 71f terminates at line 73f with only a short distance overlap of the cover 51f.

In many of the details of construction, the elements of FIGS. 3, 4-5, 6 and 7 resemble those of preceding modifications and the same reference numerals followed by the subscripts *a*, *b*, *e* and *f*, respectively, are used to designate corresponding elements.

What is claimed is:

1. A cased book comprising an uncased book having a plurality of sheets, front and back end leaves on the outsides of said uncased book to comprise front and back uncased book covers and binding means binding said end leaves and sheets together so that said end leaves are securely bound to said sheets prior to assembly of said uncased book to a case, said binding means being located along the spine edge of said uncased book, and extending from the outside of one cover of said uncased book, through said end leaves and said sheets to the outside of the opposite cover of said uncased book, at least one portion of each said end leaf extending outward of said binding means beyond said spine edge of said uncased book away from said binding means, over the outside of said binding means, and over the outside of said book; a case for said uncased book having front and back case covers and a spine cover between said front and back case covers having flexible hinge areas at the juncture of said spine cover with the spine margins of said case covers; and adhesive permanently attaching the outside of each said end leaf to the inside of a corresponding case cover.

2. A book according to claim 1 which further comprises adhesive permanently attaching the spine edge of said uncased book to said spine cover.

3. A book according to claim 1 which further comprises a spine strip of resilient material extending longitudinally down the middle of said spine cover, said spine strip adhering to said spine cover and second adhesive permanently adhering the spine edge of said uncased book to said spine strip.

4. A book according to claim 1 in which said sheets and end leaves are formed with first apertures spaced slightly inward from said spine edge of said uncased book and spaced apart at intervals along the length of said spine edge of said uncased book and in which said binding means comprises a first narrow plastic strip overlying the spine edge of one uncased book cover, a second narrow plastic strip overlying the spine edge of the uncased book cover opposite said first narrow plastic strip and a plurality of studs extending through said first apertures spaced at the same intervals as said first apertures, said studs being secured to both said strips.

5. A book according to claim 4 in which said spine cover extends around the outsides of said strips and in which said front and back covers are formed with cover boards having their margins nearest the spine spaced from the adjacent edges of said strips and covering material on the outside of said cover board joined to said spine cover; said spine cover being attached by said adhesive to each said end leaves in a crease between the spine edge of said board and the adjacent edge of said strip, there being a bead formed on said spine cover over the outside of said strip.

6. A book according to claim 5 in which one said end leaf is interposed between the outside of said strip and said bead, whereby said book may be opened with said spine cover flat on a supporting surface and said case covers and said end leaves extending out from said spine over substantially parallel to said supporting surface.

7. A book according to claim 4 in which a second portion of each said end leaf extends out from under said binding means in a direction away from said spine edge of said uncased book, said one portion and said second portion of said end leaf being joined together at the end of said first-mentioned portion remote from said binding means.

8. A book according to claim 7 in which said second portion extends around the edge of said binding strip opposite said spine edge and over the outside of said strip, and second adhesive adheres said second portion to the edge and outside of said binding strip.

9. A book according to claim 8 in which said first portion extends around the spine edge of said strip and over the outside of said strip and which further comprises adhesive causing adherence of said first portion to said strip.

10. A book according to claim 9 in which each said cover has its spine margin spaced away from said strip and covering material on the outside of said cover is joined to said spine cover and in which said one portion of said end leaf extends outside said cover and inside said covering material and which further comprises adhesive adhering the outer edge of said one portion to the outside of said cover and to the inside of said covering material.

11. A book according to claim 1 which further comprises for each side of said book a band of reinforcing material, a portion of said band being tucked under said end leaf and bound by said binding means into said uncased book, said band extending outwardly of the spine edge of said uncased book and around the outside of said end leaf as it extends around the outside of said binding means, said band being permanently adhered to said end leaf, said band terminating in a line spaced from said spine edge of said uncased book toward the outside edge of said uncased book.

12. An uncased book comprising a plurality of sheets, front and back end leaves on the outsides of said uncased book to comprise front and back uncased book covers and binding means binding said end leaves and sheets together so that said end leaves are securely bound to said sheets prior to assembly of said uncased book to a case, said binding means being located along the spine edge of said uncased book and extending from the outside of one cover of said uncased book through said end leaves and said sheets to the outside of the opposite cover of said uncased book, at least one portion of each said end leaf extending outward of said binding means beyond said spine edge of said uncased book away from said binding means, over the outside of said binding means, and over the outside of said uncased book.

13. A book according to claim 12 in which said sheets and end leaves are formed with first apertures spaced slightly inward from said spine edge of said uncased book and spaced apart at intervals along the length of said spine edge of said uncased book and in which said binding means comprises a first narrow plastic strip overlying the spine edge of one uncased book

cover and formed with studs extending through said first apertures, a second narrow plastic strip overlying the spine edge of the uncased book cover opposite said first narrow plastic strip and formed with second apertures at the same intervals as said first apertures and receiving said studs, said studs being secured to said second strip.

14. A book according to claim 13 in which a second portion of each said end leaf extends out from under said binding means in a direction away from said spine edge of said uncased book, said one portion and said second portion of said end leaf being joined together at the end of said first-mentioned portion remote from said binding means.

15. A book according to claim 14 in which said second portion extends around the edge of said binding strip opposite said spine edge and over the outside of said strip, and second adhesive adheres said second

portion to the edge and outside of said binding strip.

16. A book according to claim 15 in which said first portion extends around the spine edge of said strip and over the outside of said strip and which further comprises adhesive causing adherence of said first portion to said strip.

17. A book according to claim 12 which further comprises for each side of said book a band of reinforcing material, a portion of said band being tucked under said end leaf and bound by said binding means into said uncased book, said band extending outwardly of the spine edge of said uncased book and around the outside of said end leaf as it extends around the outside of said binding means, said band being permanently adhered to said end leaf, said band terminating in a line spaced from said spine edge of said uncased book toward the outside edge of said uncased book.

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