

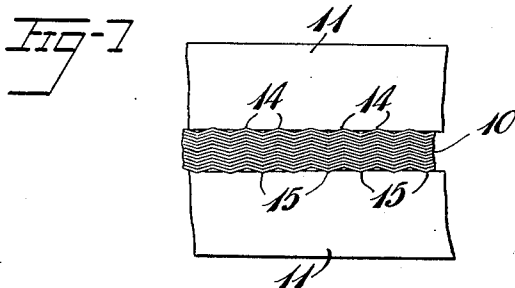
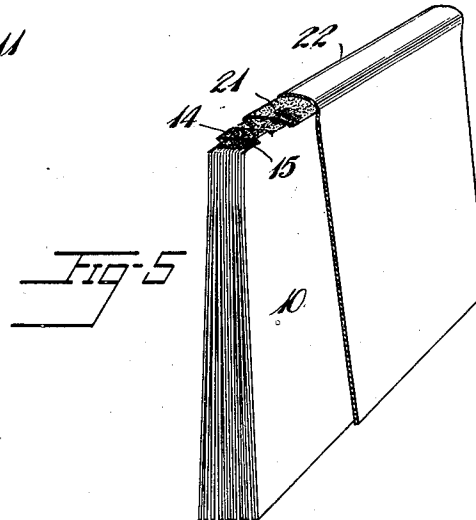
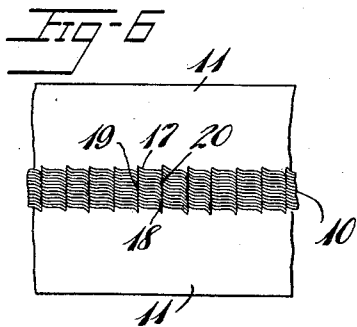
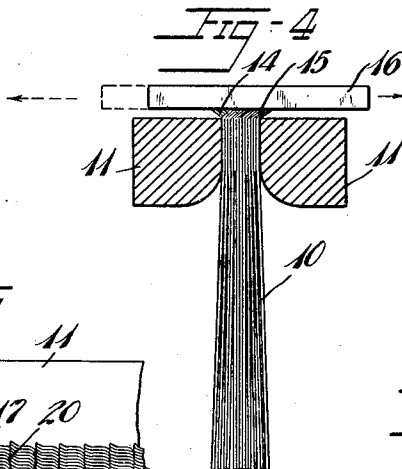
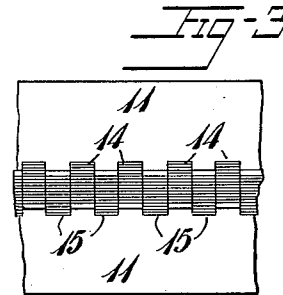
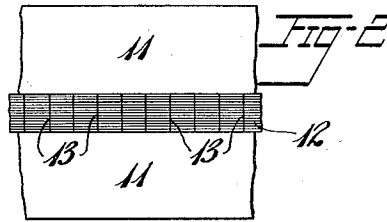
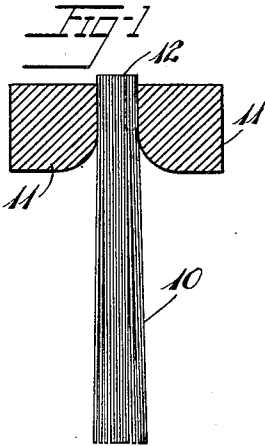
May 17, 1932.

W. L. SEMON

1,858,685

METHOD OF BINDING BOOKS

Filed April 18, 1929



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UNITED STATES PATENT OFFICE

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METHOD OF BINDING BOOKS

Application filed April 18, 1929. Serial No. 356,228.

This invention relates to the art of binding books or similar publications, such as pamphlets, brochures, periodicals, etc.

Heretofore most books have been printed on large sheets of paper, each containing 4, 8, 12, 16, or more pages. The relationship of the respective pages on each sheet must be very carefully planned in advance in order that they may fall in the proper sequence when the sheets are folded and the book assembled. Brochures and periodicals are frequently printed on sheets twice the size of the page, one sheet containing, for example, the first page on one end of the sheet and the last page on the other end. The respective sheets are superimposed and stitched or stapled together in the middle. The manufacture of books, etc. from single sheets, each of which may be printed separately, and each constituting only a single leaf of the completed book, offers important advantages over the hereinabove described processes, but has not found universal favor because of the lack of a suitable strong and flexible means of fastening together the edges of the sheets and securing them to the cover.

This invention consists in distorting or bending the leaves of a book or similar publication adjacent to the back edge thereof in such a manner that the leaves interlock with one another mechanically, and fixing the distorted edges of the leaves by means of an adhesive or otherwise to provide a secure anchorage against separation or removal of any or all of the leaves. In order to provide a structure with the maximum degree of flexibility it is preferred to manufacture the book from separate leaves, which are superimposed and trimmed to a smooth surface on their common back edge, the edge of the bundle of leaves being distorted and treated with an elastic adhesive as hereinafter more fully described. That is, portions of the back edge of each leaf are bent out of the plane defined by the remainder of the leaf, each successive leaf being bent in the same manner, the complete stack or bundle of leaves being united to a permanent whole by an adhesive substance applied to the back edge. The edge of each leaf may be treated sepa-

ately, the book being built up by superimposing the leaves after their edges are distorted, but preferably the leaves are first assembled and the edges of all the leaves are treated simultaneously while they are maintained in their final positions relative to one another. The adhesive may be applied after the back edge of the bundle of leaves is distorted, but if it is of such a nature as to soften the paper, it may be found desirable to apply the adhesive first in order to facilitate the distortion of the edge.

The method of this invention will be readily understood from the following descriptions of specific embodiments thereof, reference being had to the accompanying drawings. Fig. 1 and Fig. 4 are sections through the leaves of a book in the process of manufacture. Figs. 2, 3, 6, and 7 are views of portions of the back of a book. Fig. 5 is a perspective view of a finished book bound by the method of this invention, portions being broken away to show the construction.

In Fig. 1 the leaves 10 of a book are shown assembled in their proper order, supported by a clamping device 11, the back 12 of the leaves projecting a slight distance, say $1/16$ in. to $1/8$ in., above the clamp 11. If the edges of the leaves are ragged, or if they do not all project the same distance above the clamp, they should be carefully trimmed to a smooth surface.

The trimmed back 12 is then cut or scored across at fairly close intervals, say $1/8$ in. to $1/4$ in., with a sharp knife or other suitable instrument, as shown at 13, 13 in Fig. 2, which represents diagrammatically a portion of the back 12. The cuts 13 are most conveniently made perpendicular to the plane of the edge 12, but may also be made at an angle thereto, in which case an additional advantage is secured by reason of the dovetailing of adjacent sections of the edge.

The edges of the sections of paper between successive cuts are bent in opposite directions, as shown in Fig. 3, either at the same time that the cuts are made, or subsequently. For example, alternate sections 14, 14 are bent in one direction, while intervening sections 100

15, 15 of the edge are bent in the opposite direction.

The manner in which the sections 14 and 15 of the leaves 10 may be bent is illustrated in Fig. 4. The bending is preferably accomplished by moving an instrument with a smooth surface, such as the metal bar 16, across the back of the leaves with a considerable downward pressure thereon. The bar 16 in Fig. 4 is shown moving in the direction of the arrow and bending section 15 of the back of the leaves at a sharp angle to the right. The immediately following section 14 is similarly bent to the left.

The back so treated is coated with a layer of an adhesive composition and the cover is applied thereto. The adhesive serves to unite the pages permanently and to secure them to the cover. If desired, a strip of fabric may be inserted between the treated back of the leaves and the cover, further to reinforce and strengthen the binding. Thus, in Fig. 5, which shows a preferred construction of a completely bound book, a fabric strip 21 is secured to the treated back of the leaves 10 by means of a suitable adhesive, a second layer of the adhesive being used for attaching the cover 22.

An alternative modification is illustrated in Fig. 6, the opposite corners 17 and 18 of each section between adjacent cuts 19 and 20 being bent in opposite directions, instead of the whole section being bent in the same direction, each section of the edge thereby acquiring an S shape.

It is not even always necessary to cut across the edge of the leaves. The leaves may be bent at a considerable angle in opposite directions without severing the edges of the sheets, especially if a soft paper is employed or if the edge is softened by moistening or otherwise. Fig. 7 represents the edge of a binding prepared in such a manner, 14, 14 and 15, 15 being the respective portions bent in the opposite directions as before. However, it will usually be preferred to cut the edge, since the cut sections can be bent at a sharper angle and produce a somewhat stronger binding.

The adhesive employed for securing the leaves and the cover in their permanent relationship may be any of the well-known adhesives which have a sufficiently great tenacity and elasticity. For example, glue admixed with sufficient glycerine or other equivalent substances to render it permanently somewhat elastic is commonly employed in binding books. However, more elastic adhesives are preferably employed. Latex, for example the ammonia-preserved and/or concentrated latex of the *Hevea brasiliensis*, which yields the ordinary rubber of commerce, is one of the best known adhesives for this purpose, especially when admixed with a colloidal substance such as egg or blood albumen, case-

in, glue, sodium silicate, sodium alginate, etc. Such an adhesive may be prepared by dissolving 20 parts by weight of glue in 100 parts of latex which has been concentrated to a rubber content of about 50%. The thick adhesive is smeared over the back of the book, the binding strip and covers are applied and the adhesive is dried. The finished book is quite flexible; the book can be bent to a considerable extent without breaking it; and the leaves are so firmly united that it is impossible to remove the individual leaves without tearing the paper.

The tough balata-like rubber isomers prepared by the reaction of sulphonic acids with rubber, and described by Harry L. Fisher in the United States Patent No. 1,605,180, November 2, 1926, are remarkably effective adhesives for the purpose of this invention. They may be employed either in solution in a suitable solvent such as benzene or carbon tetrachloride, or finely dispersed in water, or may be softened by heat. The latter is usually preferable, since the adhesive sets much more rapidly upon cooling than adhesives which set upon evaporation of a solvent.

The adhesive, for example, may be applied to the back in the form of a thin calendered strip, which is softened and pressed into the paper by means of a hot iron. The rubber isomer need not be prepared according to the specific disclosure of the above-mentioned patent. The term "tough heat-plastic rubber isomer" is intended to include tough, somewhat elastic, heat-plastic products, isomeric with rubber, but chemically less unsaturated than rubber, whether prepared by the method of the above patent or by any other method. It is to be understood that the specific methods hereinabove described are only illustrative and that numerous other modifications are possible within the spirit and scope of this invention. It is therefore not intended to limit this invention except as may be required by the prior art and as indicated in the appended claims.

I claim:

1. A book comprising a plurality of leaves, sections of the back edge of said leaves being bent alternately in opposite directions.
2. A book comprising a plurality of leaves united at one edge by an adhesive, successive short sections of the said edge being bent alternately in opposite directions.
3. A book comprising a plurality of leaves united at one edge by a tough, heat-plastic rubber isomer, the said edge of the leaves being divided by a plurality of transverse cuts into short sections which are bent alternately in opposite directions.
4. A book comprising a cover and a plurality of leaves united at one edge by an adhesive, successive short sections of the said edge being bent alternately in opposite directions.

5. A book comprising a plurality of leaves united at one edge to each other and to a fabric reenforcing strip by an adhesive, and a cover affixed to the reenforcing strip, successive short sections of the said edge of the leaves being bent alternately in opposite directions.

6. A book comprising a plurality of leaves united at one edge to each other and to a fabric reenforcing strip by a tough, heat-plastic rubber isomer, and a cover affixed to the reenforcing strip, the said edge of the leaves being divided by a plurality of transverse cuts into short sections which are bent alternately in opposite directions.

In witness whereof I have hereunto set my hand this 13th day of April, 1929.

WALDO L. SEMON.

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