Feb. 20, 1962 W. D. DAYTON 3,022,093

BOOK BINDING MEANS AND BOOKS BOUND THEREBY

Filed April 8, 1959

Fig. 1.

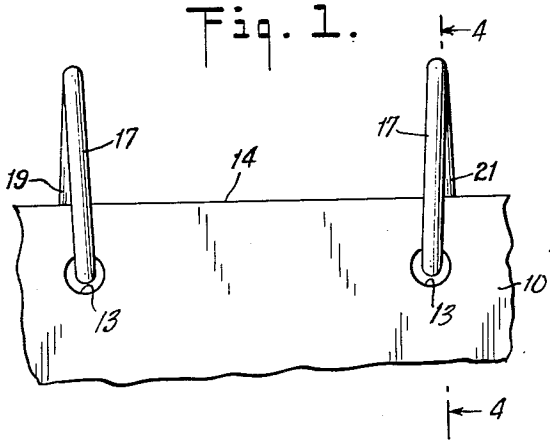


Fig. 4.

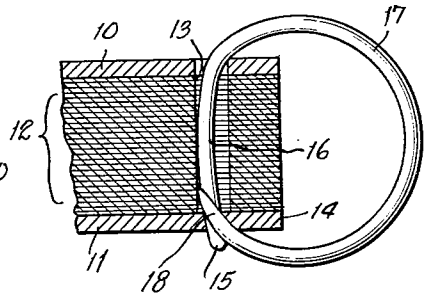


Fig. 2.

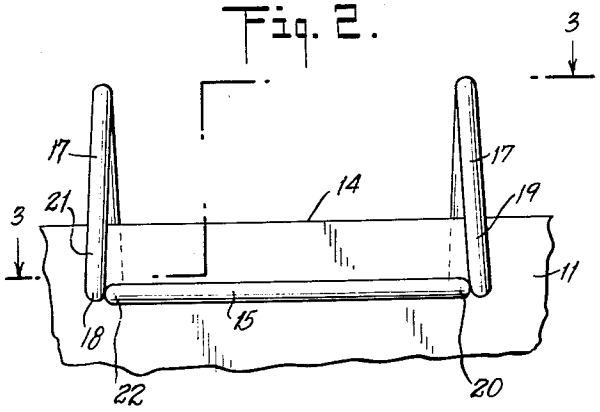


Fig. 5.

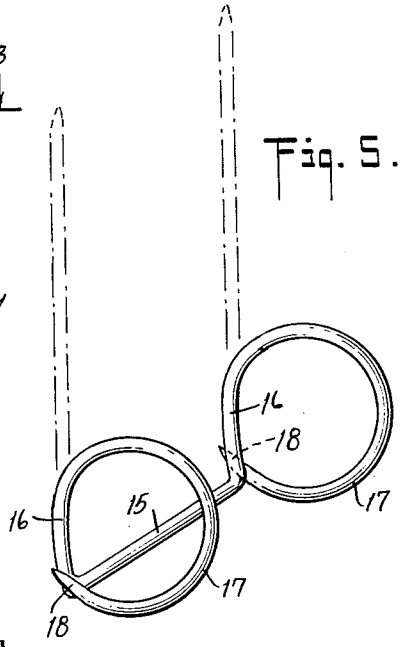
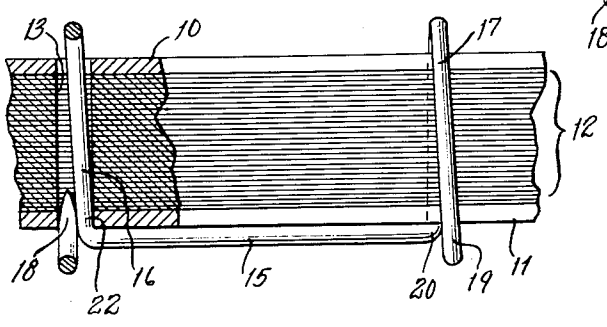


Fig. 3.



INVENTOR.
WARD D. DAYTON
BY Paul M. Phillips,
ATTORNEY

United States Patent Office 3,022,093 Patented Feb. 20, 1962

3,022,093
BOOK BINDING MEANS AND BOOKS BOUND THEREBY

Ward D. Dayton, Morse Lake, Bloomingdale, N.J.
Filed Apr. 8, 1959, Ser. No. 805,081
3 Claims. (Cl. 281—25)

The present invention relates to novel book binding means and books bound thereby, and more particularly to the combination with book-forming elements, including relatively hard and thick front and back covers and a plurality of relatively soft and thin filler sheets, of binding means for said elements, said binding means being initially and/or in the process of formation in the form of wire staples and being formed to their final form incident to the binding operation per se.

In the past it has been customary to bind books, including, for example, stenographers' notebooks and other pamphlets, with spiral wire, which is threaded into suitable perforated cover sheets and filler sheets by a screwing-in operation, and wherein the spiral wire is suitably handled and finished off so as to prevent the cut ends of the wire from injuring persons or things coming into contact with the bound book. This in practice permits all of the sheets of the book being rotated substantially 360° about the binding. It is a general object of the present invention to provide a binding means, usable with books of this general character, which shall be capable of similar use in that the front cover and the filler sheets may be rotated substantially 360° about the binding and with respect to the back cover.

In addition, the present invention affords a somewhat simpler and cheaper manner of binding books of this general nature than that described hereinabove as a part of the prior art, while still retaining the advantageous features thereof.

Summarizing the present invention, it comprises the provision of book-forming elements, including relatively hard and thick front and back covers and a plurality of relatively soft and thin filler sheets, printed or otherwise, and wire binding means for these book-forming elements. The invention particularly pertains to the wire binding means and the manner in which such means are used in connection with the book-forming elements. In accordance with this invention, the front cover and the filler sheets are all perforated with aligned perforations adjacent to the rear or back edge of the book and at spaced intervals to receive the staple binding means, while the back cover is initially imperforate. When the staple-like wire binding means is applied, with the leg portion of each staple-like wire element piercing and extending through the back cover, these leg portions will be in close frictional contact with the back cover, while extending freely through the perforations in the other elements of the book. The extended leg portions of each staple-like wire element may then be curled around, substantially in planes perpendicular to the cross portion of each wire element, so that the free ends of the leg portions may be extended into and preferably through and in any event in close frictional contact with the back cover adjacent to the points in the back cover through which the leg portions initially extended respectively. Thus the ends of the wire binding elements, which are relatively sharp, will be prevented from injuring persons or property and may come into contact with the bound book as a whole.

As a further detailed feature of the present invention, it is contemplated that in a book having a substantial length of back or binding edge portion, there will be a plurality, rather than a single one of the staple-like wire elements used; although it is contemplated that for certain purposes only one such element may be needed. In the event that a plurality of such elements are used, the cross portions of each of the staple-like elements will usually be used in a single line along and parallel with the back of the book.

Further features of the present invention involve the provision of two separate but cooperating means for preventing rotation of the wire members with respect to the back cover with which such wire members are intended to be substantially rigid. The first of these means comprises a torsional prestressing of the loop portions which are formed by the legs of the staple-like wire elements. To this end the legs of these staple-like elements, once they have initially passed through the back cover and have passed through the perforations in the filler sheets and in the front cover, will be formed into a substantially helical form, so that in an unstressed condition the ends of these leg portions would be disposed a substantial distance from the points through which the leg portions initially pass through the back cover. However, the ends of the leg portions are in fact passed into and preferably through the back cover at points closely adjacent to the points through which these leg portions initially pass through the back cover. This results in a torsional stress or prestress on the loop portions, tending to move them from their unstressed helical form toward a torsionally stressed substantially circular form. This in effect causes a lateral force effective upon the end portions of the wires which penetrate through the back cover and tends to assist in anchoring these portions in the back cover, so as to prevent rotation of the wire elements with respect to this back cover and about the loop portions.

The second feature, also tending to hold the wire elements from rotating with respect to the back cover, is that the end portions of the legs of the wire-like or staple-like elements are passed through the back cover in directions with substantial angles to the directions through which these same leg portions initially pass through the back cover respectively. The angularity between these two passes is practically effective to prevent any substantial rotation of the wire-like elements with respect to the back cover and about the loop portions.

Other and more detailed objects and advantages of the present invention will become apparent from the detailed description of a preferred embodiment thereof, which is illustrated in the accompanying drawings, in which:

FIG. 1 is a fragmentary view of a portion of a book bound in accordance with the present invention as seen from the top above the front cover;

FIG. 2 is a view similar to FIG. 1 as seen from the bottom and particularly showing the back cover;

FIG. 3 is a fragmentary view, with parts broken away and in vertical section substantially on the broken line 3—3 of FIG. 2;

FIG. 4 is a fragmentary view, substantially in vertical section on the line 4—4 of FIG. 1; and

FIG. 5 is a view substantially in perspective, showing one of the staple-like wire elements in its final form in full lines and also showing in broken lines an earlier form of the leg portions of this element.

Turning now to the accompanying drawings, there is illustrated book-forming elements such as are used in making up a stenographer's notebook, for example, and including a top cover **10**, a back cover **11** and a plurality of filler sheets **12**. The top and back covers **10** and **11** are relatively thick with respect to the filler sheets and also are relatively hard with respect to these filler sheets As shown, the top cover **10** and the filler sheets **12** are perforated with aligned holes indicated at **13**, while the back cover **11** is initially imperforate, the perforations **13**

being arranged adjacent to the back or binding edge of the book, which is indicated in the accompanying drawings at **14**.

The present invention provides binding means for the elements **10—12**, this binding means comprising at least one wire member which at one stage in its formation is of staple-like form, i.e. with a cross-portion shown at **15**, and a pair of initially substantially parallel leg portions **16**, these leg portions as indicated in FIG. 5 in broken lines extending substantially parallel to each other and substantially at right angles to the cross-portion **15**. While in this substantially staple-shaped position, each wire member is forced through the back cover **11**, so that the parallel leg portions pierce the back cover as shown best at the left in FIG. 3; while being in close frictional contact therewith and so that the cross-portion **15** of each wire member will be disposed closely adjacent to the back cover and substantially parallel to the back edge **14** of the book. The holes **13** are of substantially greater diameter than the outside diameter of the wire of which the wire member **15—16** is formed, so that the leg portions **16** extend freely through the holes **13**.

Following, or possibly as a part of the insertion of each wire member as foresaid, the leg portions **16** thereof are formed into loops as shown at **17**. These loops, when the book is laying on a horizontal surface, will be disposed substantially in vertical planes perpendicular to the cross-portion **15** and perpendicular to the rear **14** of the book. As such, the outer ends **18** of the leg portions will extend at least into and preferably completely through the back cover at points adjacent to those where the respective leg portions extended through the rear cover as aforesaid. The ends **18** of the leg portions preferably extend completely through the back cover **11**, so as to be anchored therein in a special manner as hereinafter described so as to preserve the relatively rigid relationship with the back cover of the book. In this way, the ends **18**, which are likely to be sharp and could injure persons or property with which they came into contact, are protected from contact with such persons or property, so as to render the binding safe in use and so as to protect persons using the so-bound book from injury by the ends **18** of the leg portions **16**.

While it is contemplated that there may be some books or booklets which will require only one wire member **15—16** as aforesaid in effecting a minimum-type binding, it is contemplated that many books, including particularly those having relatively long back edges **14**, will require the use of a plurality of such wire-binding means, each of which may be constructed generally as aforesaid and each of which is inserted and operates as previously particularly described. Under such circumstances the cross-portions **15** of all the wire binding means used will usually be disposed in a single line along the back of the book substantially parallel to the back edge **14** thereof.

Means are provided in accordance with the present invention as generally set forth hereinabove for assuring that the wire members **15—16** will be substantially rigidly anchored with respect to the back cover **11** of the book. These means are two-fold in character, but actually both operate to secure the same common result and to some extent at least both cooperate together in securing that result.

The first of these means is that the leg portion **16** of the wire members are curved around, not exactly in planes perpendicular to the cross-portion **15** thereof, but are in fact each curved in a substantially helical manner when the wire is unstrained. Thus, in this condition, the ends **18** of the leg portions would be spaced at a substantial distance from the points at which the same leg portions pass through the rear cover **11** respectively. This is generally indicated in FIGS. 1 and 2 wherein the right hand leg portion (FIG. 1) is formed in a loop **17** which has a substantially left hand thread-type helical twist; while the leg portion shown at the left in FIG. 1 is arranged so that in its unstrained condition, it has a right hand thread-type helical twist. Thus, the rear portion of the loop **17** at the right in FIG. 2 has a portion **19**, which is disposed to the right of the point **20** where the leg portion first passes through the rear cover **11**. Similarly, the loop **17** shown at the left in FIGS. 2 and 3 has a portion **21**, which is disposed to the left of the point **22** where this leg portion first passes through the rear cover **11**. If the leg portions were left in their unstrained condition, the ends **18** thereof would be spaced laterally a substantial distance from the points **20** and **22** respectively. However, the ends **18** are shown penetrating through the rear cover at points closely adjacent to the points **20** and **22**, which is accomplished by imparting a torsional stress to the wire forming each loop portion **17**. This torsional stress or prestressing, as it may be termed, results in there being a force effective on the end portions **18** tending to move them laterally away from the points **20** and **22** respectively. This lateral force assists in practice in anchoring the wire ends **18** with respect to the back cover **11** and hence assists materially in preventing relative rotation between the wire member **15—16** as an entirety and the back cover **11** about the loops **17**.

The other feature of the invention which also cooperates in securing this same desirable result is that the ends **18** of the wires extend through the back cover **11** in directions which are at substantial angles to the directions at which the same wires or leg portions thereof extend initially through the back cover. This is best shown in FIG. 4, in which the leg portions **16** extended initially through the back cover **11** in a substantially vertical direction; whereas the ends **18** which are later extended through the back cover, are disposed at an angle of about 30° therewith. The angularity of the directions in which these two portions of the same wire extend through the back cover of the book is effective practically to retard, and most cases, substantially to prevent any relative rotation between the wire-like elements and the back cover of the book about the loops **17**. Thus, while the front cover **10** and the filler sheets **12** may be freely rotated about the loop portions **17** and with respect to the back cover throughout substantially 360°, the provisions hereby made will result in the binding wires **15—16** being substantially stationary or rigid with the back cover, so that there is no relative rotation or other movement therebetween. This results in a more permanent and desirable binding construction than would be had if rotation of the wires with respect to the back cover were permitted.

The whole arrangement provides a relatively cheap, easily and quickly applied binding means for books, such for example, as stenographers' notebooks, but is not limited to this type books (or even to unprinted books), while still permitting the freedom of movement of the pages with respect to the back cover throughout a substantially 360° swing, which is characteristic of some of the presently available, but more expensively-bound books with which the art is now familiar as aforesaid.

While an attempt has been made to point out equivalents as the description proceeded, it is recognized that still other equivalents will occur to those skilled in the art from the present disclosure. I do not wish to be limited, therefore, except by the scope of the appended claims, which are to be construed validly as broadly as the state of the art permits.

What is claimed is:

1. The combination with book-forming elements including relatively hard and thick front and back covers and a plurality of relatively soft and thin filler sheets, of binding means for said elements, comprising at least one wire member, each said wire member including a cross portion and two leg portions, each said wire member having its leg portions extended through and in tight frictional contact with said back cover and having its cross portion closely adjacent to the outside of said back cover, aligned holes formed in said front cover and in

said filler sheets of a size substantially greater than the diameter of the wire of which each of said wire members is formed, and perforations in said back cover at the binding edge of said book-forming elements through which portions of said members extend said leg portions of each said wire member extending freely through said aligned holes but are in tight frictional contact with said back cover and being formed into loop portions, each of which is disposed substantially in a plane perpendicular to the cross portion of each said wire member, and the ends of each of said leg portions extending at least a substantial distance into and in close frictional contact with said back cover at points respectively closely adjacent to those through which said leg portions extended as aforesaid, so as to protect persons using the so-bound book from injury by the ends of said leg portions and so that the frictional contacts between each said wire member and said back cover will tend to prevent relative movement of these parts.

2. A binding means for book-forming elements in accordance with claim 1, each of said loop portions having the ends of its said leg portions normally spaced a substantial distance from the leg portions, said leg portions

and said ends being extended through said back cover respectively closely adjacent to each other, so as to introduce torsional stresses into said loop portions and so that the torsional stresses thus introduced into said loop portions will exert a lateral force on the ends of said leg portions, tending to anchor them more firmly with respect to said back cover.

3. A binding means for book-forming elements in accordance with claim 1, in which the ends of said leg portions are at substantial angles with respect to the said leg portions, so that the angularity between the two passes of each of said leg portions through said back cover will serve to oppose any tendency to rotate said wire members with respect to said back cover and about said loop portions.

References Cited in the file of this patent

UNITED STATES PATENTS

808,652 Hackmann et al. ---------- Jan. 2, 1906

FOREIGN PATENTS

164,798 Australia ---------- Aug. 25, 1955