

March 29, 1938.

C. D. TRUSSELL

2,112,389

SHEET BINDER

Filed April 24, 1935

Fig. 1.

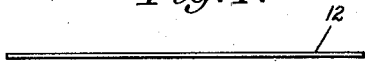


Fig. 2.

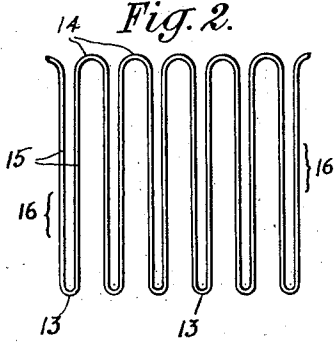


Fig. 4.

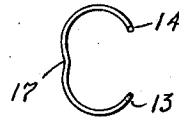


Fig. 3.

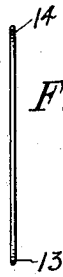


Fig. 6.

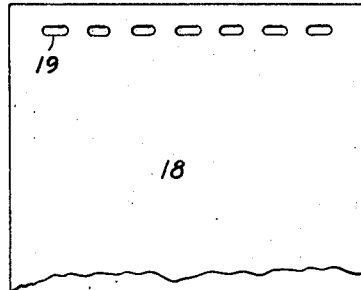


Fig. 12.

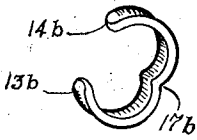


Fig. 5.

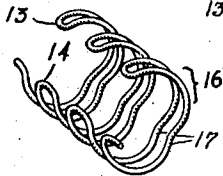


Fig. 13.

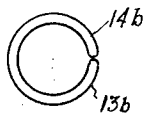


Fig. 8.

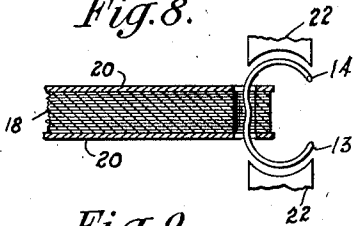


Fig. 7.

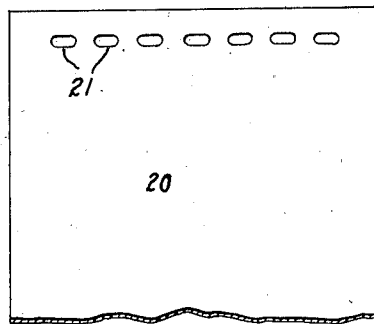


Fig. 9.

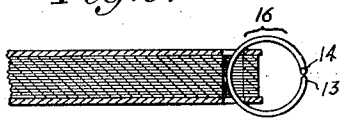


Fig. 11.

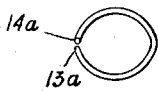
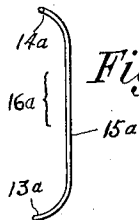


Fig. 10.



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UNITED STATES PATENT OFFICE

2,112,389

SHEET BINDER

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Application April 24, 1935, Serial No. 17,917

7 Claims. (Cl. 281—25)

This invention relates to improvements in ring bound books and more particularly to an improved metal binder for blank books, advertising pamphlets, stenographic note books, and books of a similar character.

It is an object of the invention to provide a simple inexpensive book of the type which includes a plurality of thin sheets bound between suitable covers by means of a metal binder. Preferably the binder is made of wire which may be bent to such form as to be readily passed through perforations in the margins of the sheets and covers which are to be bound; and then further bent to form a plurality of rings which will securely hold the sheets and covers in their proper relation.

It is another object of the invention to so form the wire that when it is finally bent to clasp the sheets together it will provide a plurality of rings which are substantially circular in conformation.

Further objects and features of the invention will be more apparent from the following description to be read in connection with the accompanying drawing, in which

Figure 1 is a plan view of a piece of wire from which a binding element for a book may be made in accordance with this invention;

Fig. 2 is a like view of the wire after it has been bent to form a series of reversely disposed loops all lying in the same plane;

Fig. 3 is an end view of the bent wire of Fig. 2;

Fig. 4 is an end view of the wire illustrated in Figs. 2 and 3 after it has been further bent to form a partly closed sheet binder;

Fig. 5 is a perspective view of the binder illustrated in Fig. 4;

Fig. 6 is a plan view of a fragmentary portion of a sheet of paper or other thin material, any reasonable number of which may be bound together by means of a metal binder formed as illustrated in Figs. 4 and 5;

Fig. 7 is a plan view of a sheet of heavier material, two of which may be used as covers for a plurality of sheets similar to the one shown in Fig. 6;

Fig. 8 is a cross-sectional view through a pad of sheets, a pair of covers, and a partly formed binding device such as is shown in Figs. 4 and 5;

Fig. 9 shows a pad of sheets and covers after the binding device is completely formed;

Fig. 10 is an end view of the wire of Fig. 2 after its end portions only, adjacent the loops, have been bent to circular form;

Fig. 11 is an end view of the wire of Fig. 10

after it has been bent to its final form, the showing of Figs. 10 and 11 forming no part of this invention;

Fig. 12 is a perspective view of a modified form of sheet binder incorporating the principles of the invention; and

Fig. 13 is an end view of the binder of Fig. 12 after it has been bent to final form.

In the drawing, similar designations referring to similar parts, numeral 12 designates a piece of relatively soft wire or other pliable material which may be bent to form a plurality of reversely disposed loops 13 and 14 connected by straight portions 15. As is shown in Figs. 2 and 3, all parts of the wire lie in the same plane. The loops 13 and straight portions 15 form a series of prongs 16 which are disposed in side by side relation. The prongs, as is best seen in Fig. 2, are interconnected at one of their ends by the loops, or connecting elements, 14; and spaced apart at their other ends. It is evident that the radii of the loops 13 may be varied to vary the width of the prongs 16 and that the radius of the connecting elements 14 may be varied to increase or decrease the distance between the prongs. Each of the prongs 16 is then rounded at its ends, adjacent the loops 13 and 14, to a curvature corresponding substantially to the curvature of a circular ring the circumference of which approximates the length of the prong; and reversely bent substantially midway between its ends so as to form a crimp or reentrant portion 17. As can be seen from Figs. 4 and 5, each prong now comprises two substantially semi-circular sheet attaching elements which are interconnected by the crimp or reentrant portion. An end view of the wire (Fig. 4) approximates the shape of the letter E, or if inverted the numeral 3. In any event, where the term E-shape is used, it is intended to refer to a plurality of parallel prongs which are interconnected at one of their ends and spaced apart at their other ends, rounded at both of their ends and provided with a crimp, or reentrant portion, substantially midway between the ends. The wire, when it has been bent to this form, is ready to be used in binding a number of sheets together in a manner which will hereinafter be made clear.

In Figure 6 is illustrated a fragment of one of a number of sheets 18 of paper, or other appropriate material, which may be bound together to form a book as contemplated by this invention. Such sheets may be perforated along one edge as at 19 to provide a series of openings through which the prongs 16 of the binding de-

vice may be passed. The width of the perforations 19, and the spacing therebetween, is of course dependent upon the radii of loops 13 and 14. The perforations may comprise openings of oblong form, as illustrated, or any other appropriate form of perforation may be used.

In Fig. 7 is shown a fragment of a sheet of material 20 which is of suitable thickness and stiffness to be used as a protective cover for a plurality of sheets 18. These sheets, or covers, 18 are perforated along one edge, as at 21, in such manner that when they are superimposed upon sheets 18, the perforations 19 in the sheets 18 will register with the perforations 21 in the covers 20.

In building up a book or pad, any desired number of sheets 18 may be superimposed one upon another and, if desired, enclosed between a pair of covers 20, after which the partially closed prongs, or sheet attaching elements, 16 of the binding device may be thrust through the perforations 19 and 21 of the sheets and covers respectively, as is shown in Fig. 8. The ends of the prongs may then be brought together to form a plurality of completely closed sheet attaching elements or rings which will hold the sheets, and if used, covers, in their proper assembled relation. The necessary bending may be done either by hand or by means of dies 22, as shown in Fig. 8. When force is applied to the rounded portions of the prongs 16 the wire tends to bend about the reentrant portion 17 as a center. In effect the curvature of the reentrant portion is reversed so that it conforms substantially with the curvature of the rounded portions of the prong. Hence, when the ends of the prongs are brought adjacent each other, the resulting closed sheet attaching elements will be substantially circular in conformation (as is shown in Fig. 9).

While a binder which comprises a series of connected sheet attaching elements as shown in Fig. 5 has certain advantages, it is apparent that individual sheet attaching elements may be used if desired. Thus, Fig. 12 shows a single sheet attaching element which is formed by rounding the end portions 13b and 14b of a short piece of wire, sheet metal, or other pliable material, to a desired curvature, and crimping, or reversely bending, the material at some point between its ends to provide a reentrant portion 17b. One, or more, of these sheet attaching elements may be inserted in the perforations of a plurality of superposed sheets and the end portions 13b and 14b then brought into juxtaposition in any desired manner. The resulting sheet attaching elements will be of the desired configuration as shown in Fig. 13.

Fig. 10 shows a sheet binder of the type disclosed in a co-pending application No. 741,360, filed August 25, 1934, by the present inventor and a co-inventor. This binder is formed by bending a piece of pliable material to the shape shown in Fig. 2; and then rounding the loop portions 13a and 14a of the prongs 16a in such manner that an end view of the wire is C-shaped. When this type of binder is inserted in a book of the character herein described, and loops 13a and 14a are pressed together, the resulting sheet attaching elements tend to assume an elliptical or oval shape, as is shown in Fig. 11, unless some special means is resorted to to prevent it. In other words, the metal tends to bend sharply at one point, thus forming a projection on each ring. This oval shape may in some instances be regarded as objectionable because the projections on the rings

tend to impede, or hinder, the proper turning of the sheets in the book. By forming a crimp, or reentrant portion, in the prongs it has been found that this difficulty is substantially overcome; and that the ring formed by pressing the loops together is substantially circular. Consequently, when a binding device of this type is used the appearance of the book is somewhat improved, and no impeding projections are formed on the rings which would tend to hinder the proper turning of its sheets.

It is apparent that a binder of the type contemplated by the present invention is not limited to use in a book precisely as is herein shown, nor is it limited to the precise shape herein shown, but may be used in a variety of ways, some of which are shown in the co-pending application to which reference has hereinbefore been made.

What is claimed is:

1. A partly completed binder for a plurality of sheets having perforations along an edge thereof consisting of a binding wire which is bent to form a plurality of prongs disposed in a side by side relation, each prong being free at one end and connected to a neighboring prong, or prongs, at the other, each of said prongs being bent into a pair of connected substantially semi-circular sheeting attaching elements and crimped approximately midway between its ends in such manner as to cause its end portions to be spaced from each other.

2. A partly completed binder for a plurality of sheets having perforations along an edge thereof consisting of a plurality of parallel metal prongs which are joined together at one set of their corresponding ends, each of said prongs being crimped substantially midway between its ends, and rounded proximate both of its ends to form a pair of connected semi-circular parts the free ends of which are spaced apart.

3. A partly completed binder for a plurality of sheets having perforations along an edge thereof consisting of a plurality of wire prongs which are disposed in side by side relation, joined together at one of their ends, and spaced apart at their other ends, each of said prongs being rounded at its ends and crimped at substantially its midpoint in such manner that an end view of each prong is of E shape.

4. A partly completed sheet binder constructed of pliable material and adapted for use in binding into book form a plurality of superimposed sheets having registering perforations along the edges to be bound, said binder comprising a plurality of but partly closed sheet attaching elements spaced in accordance with the perforations in the sheets to be bound and being disposed in a side by side relation with one set of their corresponding ends united by an aligned series of connecting elements, each attaching element having end portions of the approximate curvature of a circular ring of a circumference equal to the length of the prong and an intermediate portion of reverse curvature such as to form an external reentrant portion between its end portions and cause its free end to be spaced from its opposite end, the binder being thus adapted to have the free ends of its partly closed attaching elements thrust through the perforations in the sheets to be bound and bent to the forms of approximately circular, closed rings by reversing the curvature of the intermediate portions and causing it to conform with that of the end portions.

5. A partly completed sheet binder adapted for use in binding into book form a plurality of su-

perimposed sheets having registering perforations along the edges to be bound, said binder comprising a series of prongs spaced in accordance with the perforations in the sheets to be bound and formed from successive portions of a piece of pliable, metal wire doubled upon themselves and united with each other at corresponding ends by an aligned series of intervening connecting portions, the prongs being bent into partly closed sheet attaching elements, each having end portions of the approximate curvature of a circular ring of a circumference equal to the length of the prong and an intermediate portion of reversed curvature such as to form an external reentrant portion between its end portions and cause its free end to be spaced from its opposite end, the binder being thus adapted to have the free ends of its partly closed loops thrust through the perforations in the sheets to be bound and bent to the forms of approximately circular, closed rings by reversing the curvature of the intermediate portions and causing it to conform with that of the end portions.

6. A partly completed binding device for a stack of sheets having registering perforations along one edge comprising a partly closed ring of substantially uniform thickness and strength throughout having substantially semi-circular end portions joined by an intervening portion of reverse curvature such as to leave the free ends of the ring spaced apart for insertion through the perforations of the sheets.

7. A partly completed binder for a plurality of sheets having registering perforations along an edge thereof comprising a thin strip of material of uniform width, thickness, and strength throughout having substantially semi-circular end portions joined by an intervening portion of reverse curvature such as to leave the free ends of the strip spaced apart for insertion through the perforations in the sheets.

CLARENCE D. TRUSSELL. 20