Feb. 3, 1948. I. SPINNER 2,435,561

BINDER RINGS AND METHOD OF MAKING SAME

Filed Dec. 16, 1942

Fig. 1

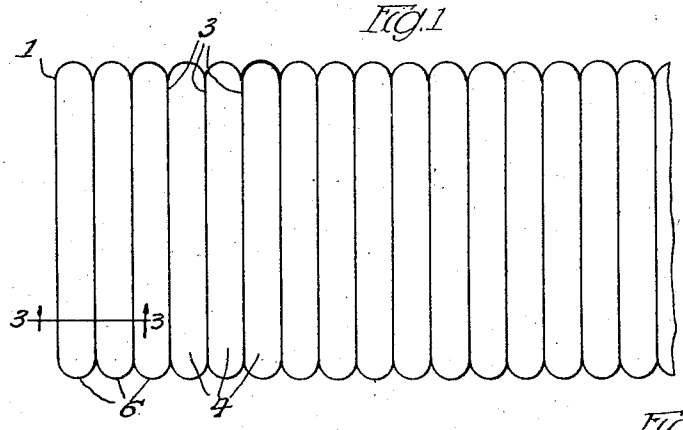


Fig. 2

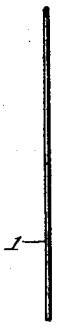


Fig. 3

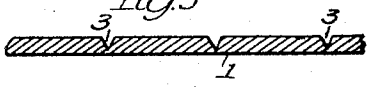
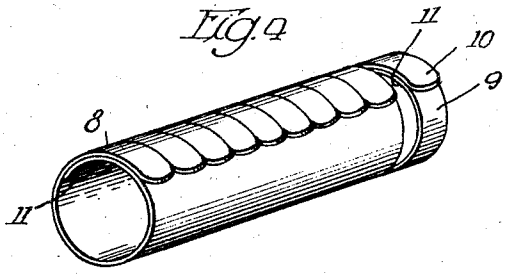


Fig. 4



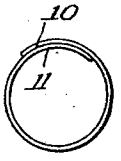


Fig. 5

Fig. 6

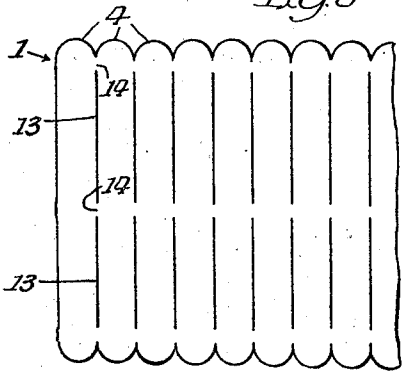


Fig. 7

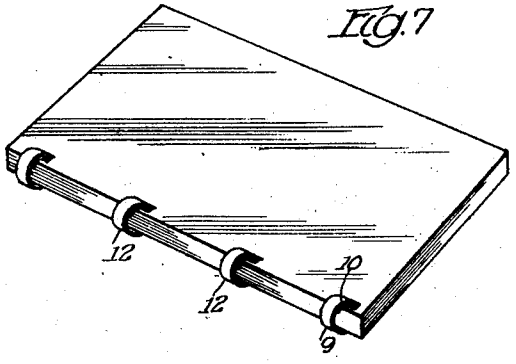
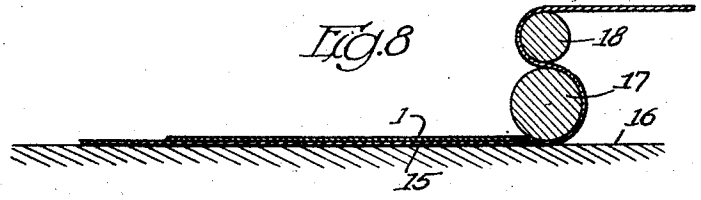


Fig. 8



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2,435,561

BINDER RINGS AND METHOD OF MAKING SAME

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Application December 16, 1942, Serial No. 469,255

8 Claims. (Cl. 18—48)

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This invention relates to binder rings and to a method of making the same, particularly to binder rings of resilient plastic material for use in binding a stack of papers, or for holding curtains, draperies or the like on a rod, or for other purposes.

It is one of the objects of the present invention to provide a method of making binder rings whereby a large number of such rings may be made in a single operation and at a low cost. It is a further object of the present invention to provide a method of making binding rings whereby a group of rings which are made at the same time are held together as a unit, from which the individual rings may be physically separated one at a time as it becomes desirable to use them.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a plan view of a blank from which a plurality of rings is to be made simultaneously;

Figure 2 is an end view of the blank of Figure 1;

Figure 3 is an enlarged sectional view taken along the line 3—3 of Figure 1;

Figure 4 is a perspective view of the blank of Figure 1 curled into tubular form, and illustrating the end ring severed from the rest of the tube;

Figure 5 is an end view of one of the rings of Figure 4;

Figure 6 shows a modified form of blank;

Figure 7 is a perspective view of a stack of pages bound by the rings of the present invention; and

Figure 8 is a diagrammatic view illustrating the manner of curling the blank of Figures 1 or 6 into the tubular form of Figure 4.

In the accompanying drawing like reference numerals designate like parts throughout.

Reference may now be had more particularly to Figures 1, 2 and 3. The blank 1 is formed of Celluloid, cellulose acetate, "pyroxylin," or other plastic resilient material which, when heated, can be formed to the desired shape and retains its thus formed shape upon cooling. The blank 1 of Figure 1 is of generally rectangular shape and weakened along a series of parallel lines 3—3 uniformly spaced apart and extending transversely across the strip. These lines 3 are formed by cutting, scoring or perforating the sheet and

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they constitute lines of severance along which the blank is later to be severed. The cuts or perforations 3 are such that the minimum amount of material is left to hold the blank together. There is thus produced a series of strips 4—4 lightly held together and readily severable one from another along the lines of cleavage 3. The ends of the blank 1 are curved, as indicated at 6, so that the end of each strip 4 is curved along a smooth curve devoid of sharp corners. The blank 1 is then to be curled into cylindrical or tubular form. This is done by placing the blank on a flexible sheet that rests upon a heated table and then, while holding the flexible sheet taut, the sheet with the blank 1 thereon is rolled around a mandrel to curl the blank into tubular form, the blank being held by the sheet around the mandrel for a length of time sufficient to permit the plastic material to cool to a temperature such that it retains its tubular shape.

Figure 4 shows the blank 1 curled into tubular shape. The blank is curled through an arc exceeding 360° so that the longitudinal edges of the blank 1 overlap one another, as illustrated in Figure 4. The maximum temperature to which the material is heated preceding or during the curling operation is insufficient to cause the material to become tacky, and therefore insufficient to cause the material to become additionally bonded together at the previously formed lines of cleavage 3. The lines of cleavage 3 extend circumferentially around the cylinder 8 and form lines of cleavage for facilitating breaking the cylinder into a plurality of separate rings.

The cylinder 8 of Figure 4 constitutes an article of manufacture and sale. The purchaser or user of this cylinder may then break off the rings, one at a time, as individual rings are needed. One such ring broken from the rest of the cylinder is indicated at 9. It is broken from the rest of the cylinder along the line of cleavage 3. The ring 9 may be used for binding a stack of sheets of paper together. This may be accomplished by merely manually opening the end 10 of the ring and then threading the ring through aligned perforations in a stack of pages. When the end 10 is released it springs back to the position of Figure 5, due to its own resiliency, and is in pressure contact with the part 11 of the ring overlapped thereby, thus holding the ring closed. A plurality of rings, indicated at 12—12, may be threaded through separate groups of aligned perforations in a stack of pages to bind a group of pages together, as illustrated in Figure 7.

Figure 6 shows a modified form of blank cor-

responding to the blank of Figure 1. This blank is the same as that of Figure 1 except that the lines of cleavage or weakening, indicated at 13, which corresponds to the scored lines 3 of Figure 1, are in this instance cut through the entire thickness of the material. The lines 13 are discontinuous, leaving narrow uncut portions 14 for holding the series of strips 4—4 together. After the blank of Figure 6 is curled in the same manner as is the blank illustrated in Figure 4, the respective rings may be severed from one another by cutting or breaking the very narrow connecting parts 14 between adjacent strips or rings. The severed rings are then the same as the ring 9 of Figure 4.

Figure 8 illustrates one method of making the binder cylinder 8 of Figure 4. The blank 1 rests on a flexible cloth sheet 15 upon a heated table 16. The sheet 15 is rolled around a mandrel 17 and passes around a rod 18, the two ends being held taut. The mandrel 17 and the rod 18 roll from right to left upon the table 16 to curl the binder. A machine for thus forming a binder is illustrated in the patent to Christian B. Nelson and myself, No. 2,211,743, issued August 13, 1940, to which reference may be had.

While I have herein shown a binder that is curled into cylindrical form 8, the blank 1 of Figure 1 may be curled into a tube of a cross section other than circular. For instance, the tube may be of oval cross section, or it may be of a D-shaped section, which is the shape of the section of the binder of my Patent No. 2,277,834, issued March 31, 1942. It is understood, however, that the particular shape of cross section of the tube 8 of Figure 4 is variable as desired, but in any event the lines of cleavage which divide the tube into uniform separate binders extend around the entire periphery of the curled or formed blank.

The individual rings or binders 9 may be used to bind stacks of pages to constitute a book, or may be used to support or hold other articles such as, for instance, curtains, drapes, or the like.

In compliance with the requirements of the patent statutes I have here shown and described a preferred embodiment of my invention. It is, however, to be understood that the invention is not limited to the precise construction here shown, the same being merely illustrative of the principles of the invention.

What I consider new and desire to secure by Letters Patent is:

1. A plurality of joined separable binder rings comprising a continuous sheet curled into tubular form with the edges of the sheet overlapping, the extent of overlap being less than 360°, the sheet being of resilient material and held in tubular shape by its own resiliency, the overlapped portions being physically separable to open the tube and the material being sufficiently resilient so that upon release of the opened overlapped portions of the tube those portions spring back under their own resiliency to complete the tube, the tube being weakened along a plurality of spaced lines of cleavage extending through substantially the entire thickness of the material and around substantially the entire periphery of the tube to divide the tube into a plurality of side by side contacting rings and to facilitate separating the tube into a plurality of such rings, the opposite edges of the sheet between adjacent lines of cleavage being curved and merging with the lines of cleavage along smooth curves.

2. A plurality of side by side joined separable

binder rings each adapted to be opened to be inserted through an article to be held thereby, said joined rings comprising a continuous sheet curled into tubular form with the edges of the sheet overlapping, the extent of overlap being less than 360°, the sheet being of resilient material and held in tubular shape by its own resiliency, the overlapped portions being physically separable to open the tube and the material being sufficiently resilient so that upon release of the opened overlapped portions of the tube those portions spring back under their own resiliency to complete the tube, the tube being weakened along a plurality of uniformly spaced lines of cleavage each of which extends through almost but not the entire thickness of the material and around substantially the entire periphery of the tube and in a plane substantially at right angles to the longitudinally axis of the tube thereby dividing the tube into a plurality of side by side rings joined together at their contacting edges.

3. A plurality of side by side joined separable binder rings each adapted to be opened to be inserted through an article to be held thereby, said joined rings comprising a continuous sheet curled into tubular form with the edges of the sheet overlapping, the extent of overlap being less than 360°, the sheet being of resilient material and held in tubular shape by its own resiliency, the overlapped portions being physically separable to open the tube and the material being sufficiently resilient so that upon release of the opened overlapped portions of the tube those portions spring back under their own resiliency to complete the tube, the tube being weakened along a plurality of uniformly spaced parallel lines of cleavage each of which extends through substantially the entire thickness of the material and around substantially the entire periphery of the tube, and in a plane substantially at right angles to the longitudinal axis of the tube to facilitate separating the tube into a plurality of binder rings, the opposite edges of the sheet between which the adjacent lines of cleavage extend being curved and merging with the lines of cleavage along smooth curves.

4. The method of forming a plurality of plastic resilient binder rings which comprises providing a continuous plastic sheet, slitting the sheet to form a plurality of parallel strips substantially in contact with one another for their entire length and almost but not completely severed from one another so that the strips remain together as a continuous sheet, rolling the sheet into cylindrical form about an axis at right angles to the said lines of cut and maintaining the material at a temperature sufficiently elevated to impart a permanent set thereto upon subsequent cooling of the cylinder so that the respective strips are formed into rings, and then after cooling severing the contacting rings from one another.

5. The method of forming a plurality of plastic resilient binders which comprises providing a continuous plastic sheet, weakening the sheet along a plurality of spaced lines of severance extending almost but not completely through the sheet and across the full width thereof, then rolling the sheet to form a tube, and applying heat to the material to impart a permanent set thereto upon cooling, and then holding the tube in its rolled condition until the material thereof has cooled sufficiently to retain its rolled shape.

6. The method of forming a plurality of plastic resilient binders which comprises providing a continuous plastic sheet, weakening the sheet

along a plurality of uniformly spaced parallel lines of severance across the sheet, then rolling the sheet to form a tube having its longitudinal axis at right angles to the lines of severance, maintaining the material at an elevated temperature sufficient to impart a permanent set thereto upon subsequent cooling, and after cooling of the tube then severing the tube along the lines of severance.

7. The method of forming a plurality of plastic resilient binder rings which comprises providing a continuous plastic sheet slit along a plurality of parallel lines transversely of the sheet to form a plurality of strips almost but not completely severed from one another and almost in contact with one another along their entire longitudinal edges, heating said sheet, preparatory to curling of the same, to a temperature sufficiently high to impart a permanent set to the subsequently curled sheet upon cooling of the same, curling the sheet into tubular form about a longitudinal axis at right angles to said parallel lines of cut, and then permitting the curled sheet to cool to form the strips into rings almost but not completely severed from one another.

8. The method of forming a plurality of plastic resilient binders which comprises providing a continuous plastic sheet weakened along a plurality of spaced parallel slits which extend across the sheet for substantially the full width thereof

thereby forming lines of severance, heating the sheet, then rolling the hot sheet to form a tube, the temperature to which the sheet is heated being sufficient to impart a permanent set to the rolled sheet upon subsequent cooling, and holding the sheet in its rolled form until it has cooled sufficiently to retain its rolled form, thereby forming a plurality of connected rings each between adjacent weakened lines of severance.

ISIDORE SPINNER.

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