Feb. 22, 1944. C. E. EMMER 2,342,130

PLASTIC BINDING SEALING MACHINE

Filed Jan. 2, 1940

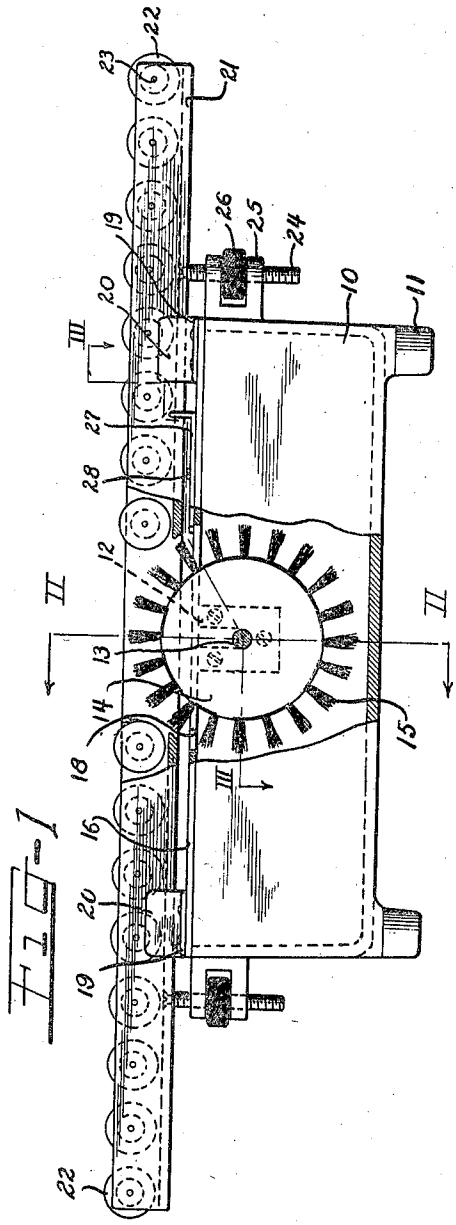


FIG-1

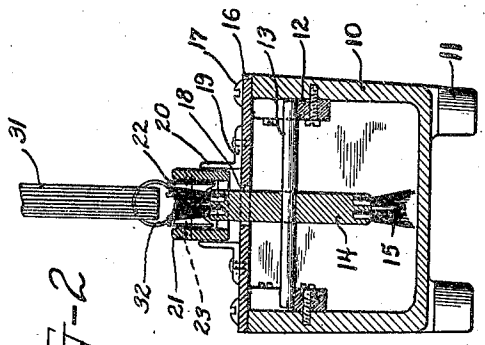


FIG-2

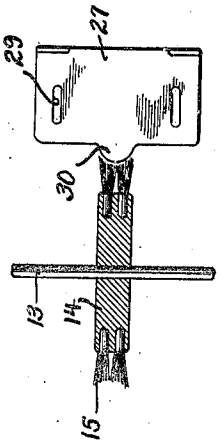


FIG-3

Inventor

Charles Edward Emmer

by Charles Edward Emmer Atty

Patented Feb. 22, 1944

2,342,130

UNITED STATES PATENT OFFICE

2,342,130

PLASTIC BINDING SEALING MACHINE

Charles Edward Emmer, Chicago, Ill., assignor to General Binding Corporation, Chicago, Ill., a corporation of Illinois

Application January 2, 1940, Serial No. 311,961

4 Claims. (Cl. 91—41)

This invention relates to plastic bindings such as are shown in the United States patent to Douvry No. 1,970,285 entitled "Binding arrangement," and in my copending application Serial No. 227,242 entitled "Plastic binding," and has as one of its principal objects, to provide a means for strengthening these bindings and enabling them to be made of lighter material in order to decrease their cost.

Another object of this invention is to provide a means for overcoming a certain defect present particularly in the plastic binding shown in the Douvry patent mentioned above, this defect being a tendency for the end pages or the covers of the book to work in between the fingers and the backbone of the binding.

The chief forms of plastic binding which have been in commercial use up until the present time consist of the two forms referred to above, and each of these comprises a longitudinally extending backbone having a plurality of fingers extending from one edge thereof and curling around to form rings, the ends of the fingers overlapping the backbone. The pages which are bound by the plastic binding are provided with a row of perforations along one edge, and the rings of the binding extend through these perforations. The rings formed by the fingers are, in effect, split rings and remain closed only because of the stiffness of the material of which they are formed. This necessitates the use of Celluloid, cellulose acetate, or other plastics of substantial thickness in order to secure the necessary stiffness. Obviously, if the overlapping portions of the rings were cemented together, the rings would thus be held closed and could be made of substantially lighter and less expensive material.

In the form of plastic bindings shown in the Douvry patent mentioned above, the ends of the fingers lie on the inside of the backbone and the end pages often work in between the fixed fingers and the backbone near the top and bottom of the pages and become disengaged from the rings. This trouble occurs rarely, if at all, with the form of plastic binding shown in my above mentioned copending application, but it can be prevented in both forms of plastic bindings by cementing the ends of the fingers either to the backbone in the case of the Douvry type or to the overlapped portion of the fingers in the case of the other type of plastic binding.

My invention, in its broadest aspects, provides a new and extremely simple means for cementing the parts of plastic bindings together at the points described above, and consists in applying a small amount of solvent to the overlapping portion of the binding after the binding is assembled upon a book and allowing the solvent to be drawn in between the overlapping portions of the binding by capillary attraction, and then allowing it to evaporate. Before the solvent evaporates, it has dissolved enough of the plastic material to form a cement and, upon evaporation, leaves the portions of the binding firmly cemented together.

Another phase of my invention, in its broader aspects, consists of a guideway along which the back of the book bound with a plastic binding is moved and a device, such as a rotary brush dipping into a reservoir of solvent, for lightly applying solvent to the binding.

My invention itself, however, both as to the organization and manner of construction of the apparatus and the specific manner of operating the same, together with further objects and advantages thereof, may best be understood by reference to the following description and to the accompanying drawing, in which:

Figure 1 is a side view of one of the preferred forms of apparatus for carrying out the invention, a portion of the side of the apparatus being broken away to more clearly show its construction;

Figure 2 is a cross section on the line II—II of Figure 1;

Figure 3 is a view of some of the parts seen on looking down from the line III—III in Figure 1.

The particular form of the apparatus shown in the drawing comprises a rectangular receptacle 10 mounted upon four rubber feet 11 which will prevent it from slipping when it is placed upon a table top or other smooth surface.

Each of the two longer sides of the receptacle 10 carries a U-shaped bearing 12 secured to it on its inner side just below its upper edge. The two bearings 12 are in alignment and serve to support the shaft 13 of a narrow cylindrical brush 14. The brush 14 is a press fit upon the shaft 13, and the latter is freely rotatable in its bearings 12 so that the brush 14 is freely rotatable. The diameter of the brush 14 is such that it projects down almost to the bottom of the receptacle 10 and also projects up a substantial distance above the receptacle 10. The ends of the brush bristles 15 are trimmed so that the brushing surface formed by the ends of the bristles is concave, as shown in Figures 2 and 3.

The receptacle 10 is provided with a cover

16 secured to it in any suitable manner, as by screws 17, and covering the entire receptacle except for a slot 18 through which the brush 14 projects. At each end, the cover 16 carries a pair of guide brackets 19 having upwardly extending flanges 20 between which a guide roller support 21 fits.

The guide roller support 21 is a deep channel member having a plurality of guide rollers 22 journaled upon pins 23 extending across between the flanges of the guide roller support 21. Each of the guide rollers 22 is spool shaped or concave in profile, and the rollers 22 are closely spaced together in a single plane so that their concave sides form, in effect, a roller trough.

At the center of its length, the bottom of the guide roller support 21 is cut away, as shown in Figure 1, and the guide rollers 22 are spaced apart at this point in order to allow the brush 14 to project up within the guide roller support as shown in Figures 1 and 2.

It will be noted that the concave edge of the brush 14 lies in line with the concave sides of the rollers 22 so that, if an elongated object is moved along on the rollers 22 from one end of the guide roller support 21 to the other, it will roll on the top of the brush as well as on the guide rollers 22.

In order to secure accurately this relationship between the guide rollers 22 and the brush 14, the guide roller support 21 is vertically adjustable. The adjustable mounting comprises a pair of studs 24 secured to the bottom of the guide roller support 21 and projecting down through lugs 25 on each end of the receptacle 10. The lugs 25 are slotted and contain large knurled nuts 26 through which the studs 24 are threaded and by means of which the height of the guide roller support may be adjusted.

A splatter guard 27 is provided at one end of the opening 18 through which the brush 14 projects. The guard 27 is adjustably secured on the top of the receptacle cover 16 by means of a pair of screws 28 extending through slots 29 in the guard, and the edge of the guard next to the brush 14 is formed with a curved projection 30 whose shape conforms to the concave edge of the brush. The splatter guard 27 can be adjusted so that its nose or projection 30 just clears the bristles 15 of the brush so that any drops of solvent which are thrown off by the rotating brush 14 will be caught by the guard 27, instead of being thrown up onto the work, and will drain back into the receptacle 10.

In using the device which has been described, a group of sheets 31 held together by a plastic binding 32 is placed upon the guide rollers 22 at the right side of the machine as seen in Figure 1 with the binding 32 resting upon the guide rollers. Care is taken to see that the overlapping portion of the binding 32 is underneath, and then the book formed by the leaves 31 and binding 32 is moved on the guide rollers and across the brush 14 and onto the guide rollers 22 at the other end of the machine. During this operation, the bristles 15 of the brush carry solvent from the lower portion of the receptacle 10 and apply it to the edges of the overlapping portions of the binding 32 whereupon capillary attraction draws the solvent in between the overlapping portions. The book is then placed flat upon a suitable support and is allowed to rest undisturbed until the solvent has evaporated. During this period, the solvent, which may suitably be acetone if the material of the plastic binding is Celluloid or cellulose acetate, dissolves the adjacent surfaces of the overlapping portions of the binding and forms a cement which, upon drying, fastens the overlapping portions together securely.

While I have described the operation of the device as being carried out with a pure solvent, such as acetone, the solvent may have a certain amount of the plastic or other cementing material already dissolved in it before it is applied to the plastic binding, so that it will of itself constitute a cement. Other types of adhesives as may be found suitable may be used, especially if the binding is made of some other material than a plastic.

While I have described my invention as being applied to plastic bindings, it is to be understood that the term "plastic bindings" is to include both bindings formed of plastic material and bindings formed in the same general manner from other materials which may be cemented by some suitable solvent or adhesive. It is also to be understood that the term "plastic binding" as used in the claims, is to be given this broad meaning and that the term "cementing liquid" is to include both a pure solvent which will result in the cementing together of the overlapping parts of a binding and also liquids which are in themselves cements suitable for this purpose. It is also to be understood that the device which has been illustrated and described is only one form of the invention and that I claim as my invention any apparatus falling qsuarely within the terms of the accompanying claims.

I claim as my invention:

1. A device for applying a liquid to the back of a book comprising a stationary rectilinear guideway, rotatable elements spaced longitudinally along said guideway and having their peripheries shaped for receiving said back in seated relation thereon, a liquid receptacle below said guideway, and a rotary brush extending into said receptacle and into said guideway between a pair of adjacent rotatable elements for transferring liquid from the receptacle to said back as the book passes over said pair of rotatable elements.

2. A device for applying a liquid to the back of a book, comprising a receptacle, a guideway extending across said receptacle and having a series of concave rollers, and a rotary brush extending into said receptacle and into said guideway.

3. A device for applying a liquid to the back of a book, comprising a receptacle, a guideway extending across said receptacle and having a series of freely rotatable concave rollers, and a freely rotatable brush extending into said receptacle and into said guideway.

4. A device for applying a liquid to the back of a book, comprising a receptacle, a guideway extending across said receptacle and having a series of freely rotatable concave rollers arranged in a plane with their axes parallel, said rollers being arranged with a substantial space between two of said rollers, and a freely rotatable rotary brush extending into said receptacle and into said gap between said rollers, the axis of said brush being parallel to the axes of said rollers and the periphery of said brush being substantially on a line with the upper surfaces of said rollers.

CHARLES EDWARD EMMER.