April 19, 1966 W. W. SEXTON 3,246,653

BINDER FOR PERFORATED LEAVES

Filed Aug. 9, 1962 2 Sheets-Sheet 1

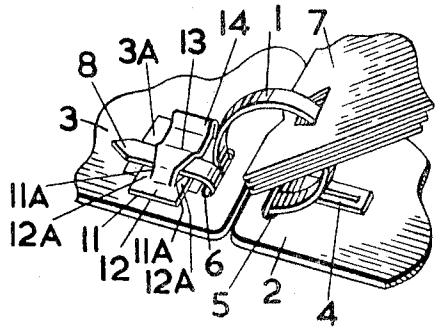


Fig.1

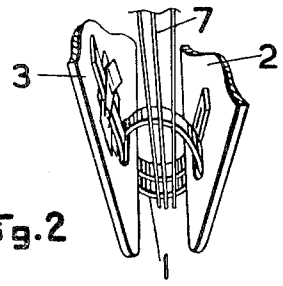


Fig.2

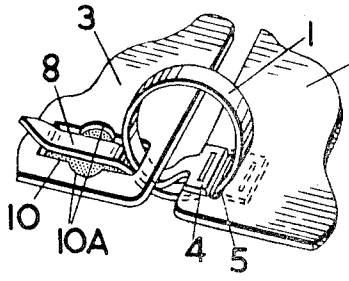


Fig.3

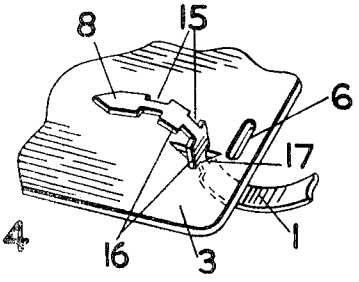


Fig.4

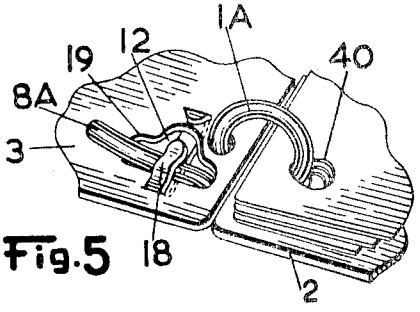


Fig.5

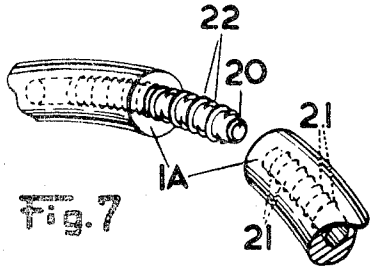


Fig.7

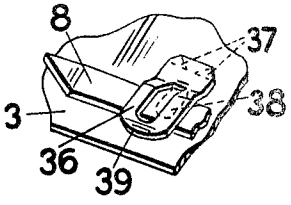


Fig.6

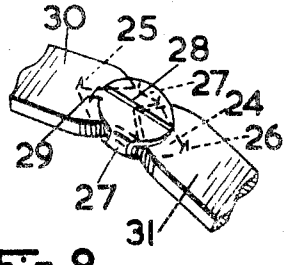


Fig.8

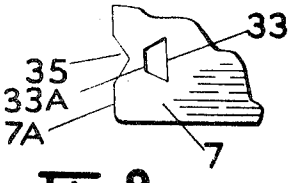


Fig.9

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BINDER FOR PERFORATED LEAVES

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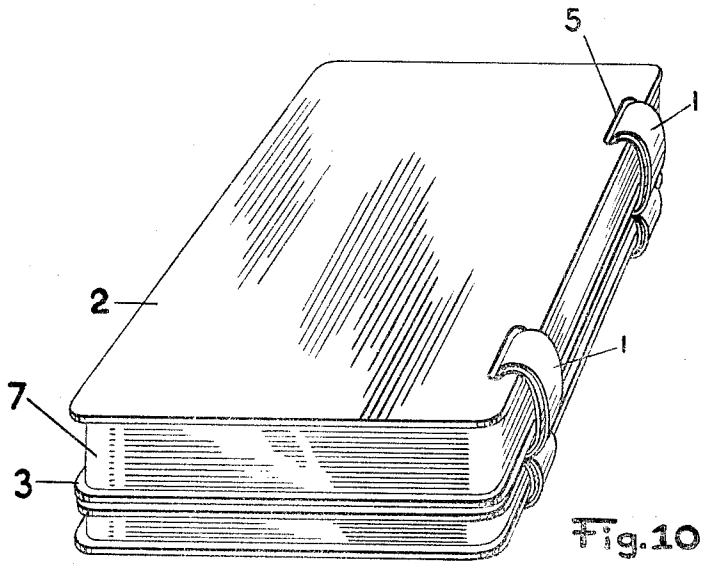


Fig.10

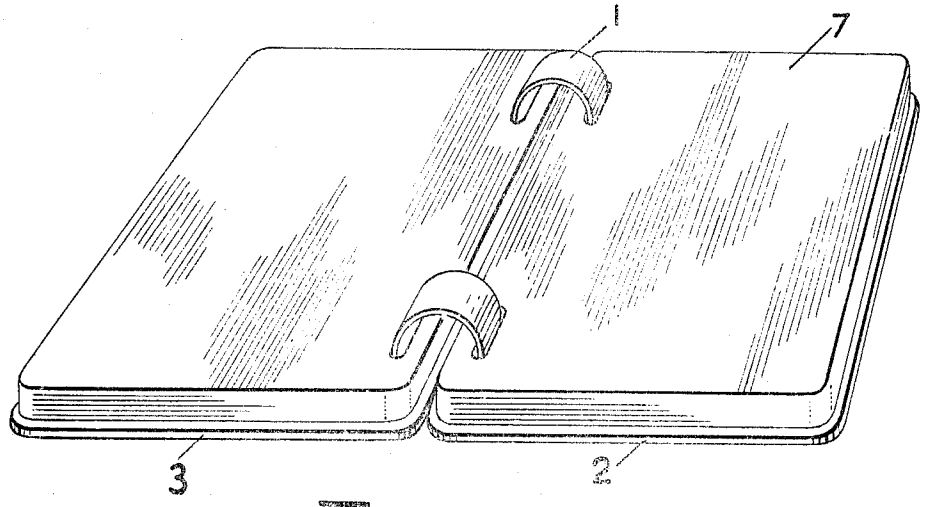


Fig.11

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3,246,653

BINDER FOR PERFORATED LEAVES

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Filed Aug. 9, 1962, Ser. No. 215,812
2 Claims. (Cl. 129—41)

This invention relates to improvements in binders for perforated leaves, and the application is a continuation-in-part of my United States patent application No. 32,365, filed May 27, 1960, now abandoned.

It is common practice to use stiff binder rings of fixed diameter to retain perforated leaves in loose leaf and book form. Such binders require rings considerably larger in diameter than the combined thickness of the leaves they bind in order to provide free movement of the leaves around the rings and reduce tearing of the leaves at their perforations. Large rings have the disadvantage of increasing the thickness of the binder along the bound edge resulting in very uneven stacking and waste space when storing. Another disadvantage of using rings of fixed diameter is their inability to adjust to varying numbers of leaves.

The primary object of this invention is to provide a binding band for perforated leaves and covers which automatically contracts in diameter when the covers are closed, to bind the leaves closely together for even stacking and compact storage.

A further object of this invention is to provide a resilient binding band which will pull closely against the covers when the covers are closed without any detrimental effect on the leaf transporting properties of the binding band.

A further object of this invention is to provide a binding band which automatically expands in diameter when the covers of the binder are opened to allow free movement of the leaves around the band, to reduce tearing at the leaf perforations.

It is a further object of this invention to provide the binder band with releasable and adjustable attachments to one or both covers for inserting and removing perforated leaves and for adjusting the binder band to varying numbers of leaves.

A further object of this invention is to provide couplings for sections of binder bands so that the sections can be separated and reconnected for the insertion and withdrawal of perforated leaves.

A further object of this invention is to prevent parallel edges of leaves and leaf perforations from catching and tearing when leaves are being turned.

A further object of this invention is to provide a binder which will allow the top cover and leaves to be turned around and under the bottom cover through a complete circle.

A further object of this invention is to provide leaves with specially shaped perforations for easy threading with the binder bands and also to facilitate registering the leaves to keep them neatly bound.

Other objects of this invention such as simplicity of construction and resulting savings in cost of production will become apparent from the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a fragmentary perspective view of a binder embodying this invention and shown in an open position;

FIG. 2 is a fragmentary perspective view of the binder illustrated in FIG. 1 shown in an almost closed position;

FIG. 3 is a fragmentary perspective view of a binder embodying this invention showing an alternative means of looping a binder band and of releasable attachment of an end of the binder band to the cover;

FIG. 4 is a fragmentary perspective view of a binder

embodying this invention illustrating another means of releasable attachment of one end of a binder band to the binder cover;

FIG. 5 is a fragmentary perspective view of a further alternative means of releasable attachment of one end of a binder band of circular cross-section to a binder cover by means of a spring clip; FIG. 5 also shows leaves with egg shaped perforations for use with binder bands of circular cross-section;

FIG. 6 is a fragmentary perspective view of yet another means of releasable attachment of one end of a binder band;

FIG. 7 is a fragmentary perspective view of sections of a binder band illustrating a means of joining such sections;

FIG. 8 is a fragmentary perspective view of a means of joining sections of a flat binder band;

FIG. 9 is a fragmentary plan view of a leaf or cover illustrating a trapezoidal perforation and a notched edge;

FIG. 10 is a perspective view of two binders of different thicknesses stacked one upon the other; and

FIG. 11 is a perspective view of a binder in an open condition.

Referring to FIGS. 1, 2 and 3, a smooth resilient elongated band is attached to a pair of binder covers **2** and **3** and is looped through perforations **5** and **6** adjacent one edge of the binder and through perforations in loose leaves **7** between the covers, the perforations of the leaves registering with the perforations **5** and **6** when the covers are closed. Referring to FIG. 2 it will be seen the diameter of the loop formed by the band automatically contracts as the covers **2** and **3** are closed to lie against the interposed leaves **7**. The contracting and expanding action of the binder band loop, as the covers move together and apart provides a tight binding when the covers are closed (FIG. 10), and free movement of the leaves around the expanded loop when the covers are opened (FIG. 11).

The ends of the band **1** may be permanently attached to covers **2** and **3** where perforated leaves are to be permanently bound in book form, or the attachments of band **1** may be releasable or adjustable or both for loose leaf binding. The attachments are adjacent the edge of the binder about which the covers swing. The resilient band **1** may be made of flat strip material, FIG. 2, or of material having a tubular or substantially round cross-section as at **1A**, FIG. 5.

Referring in more detail to the drawings herein, the adjustable expanding loose leaf binder of FIG. 1 has a flat smooth resilient band **1**, with end **4** permanently attached to cover **2** by any suitable means such as by stapling or glueing. The resilient band **1** defines a loop extending outward from its attached end **4** through perforation **5** in cover **2**, thence inward through perforation **6** in cover **3**, thence through perforations of the leaves **7** and again through perforations **5** and **6** to an adjustable and releasable attachment **13** for its end **8**. The attachment **13** for the end **8** is made of a thin flexible strip **11** coated on its under surface with non-drying pressure sensitive adhesive. The strip **11** is attached at its end **12** to the inside of cover **3** with its own said adhesive or by other suitable means. A portion of the opposite end of strip **11** is folded under and fastened with its own said adhesive to form a lifting tab **14**. Small cuts **11A** at the sides of the strip **11** form anchors **12A** against complete removal of the fastener when lifted by its tab. The length of the loop formed by the binder band **1** (and thus the relative positions of the covers) is varied to accommodate different numbers of leaves by adjusting the point along the length of the free end **8** at which the band is held between the adhesive surface of the strip **11** and the

cover 3. Thus, as indicated in FIG. 10, the size of the loop can be indefinitely adjusted within the limits of the length of the band to accommodate a large number of leaves, as in the top binder of FIG. 10, or a smaller number of leaves, as in the bottom binder, the covers of the binder being free to lie flat against the leaves despite variations in the numbers of the leaves, so that several binders can easily be stacked one upon another. If more leaves are to be inserted into a binder, the loops are lengthened, thus adjusting the relative positions of the covers to accommodate the additional leaves. Preferably the lengths of the bands between the points of attachment to the covers are such that when the covers are closed the bands are pulled flat or nearly flat against the outside surfaces of the covers.

Each binder illustrated in FIG. 10 has two bands 1 for binding the covers and leaves together, and the bands 1 constitute a hinge which is the sole connections between the covers. The bands must be sufficiently flexible that the covers of a binder can lie closed against the leaves of the binder without swinging apart, as in the case of the top binder in FIG. 10, and the bands must also be sufficiently flexible to allow the covers to be swung away from each other through the position of FIG. 1 to a position where the covers are back to back. Furthermore the material of the bands should be capable of repeated flexing without breaking. On the other hand, the bands must be sufficiently stiff and resilient that as the covers are swung open from the closed position the loops expand, retaining a generally circular form rather than merely collapsing or folding upon themselves. Bands of dimensional (high density) polyethylene, or of polyester film (sold for example by E. I. du Pont de Nemours & Co. under the trademark Mylar), have been found to have these desired properties. The bands should have smooth surfaces so as to pass freely through the perforations without catching.

If one wished to make the cover 2 of the same material as the bands, the latter could of course be attached to the cover as integral parts of the cover.

As shown in FIG. 1, a smooth releasing base 3A is cemented to the cover 3 or applied as a varnish under the adhesive strip 11 to provide, for the cover 3, a smooth compact surface which prevents the adhesive of the strip 11 from picking up loosely packed fibres from cover 3 when the cover is made of cardboard and the like. This will lengthen the useful life of the attachment 13. This attachment could be located on the outside of cover 3 to hold the end 8 without passing it through perforation 6.

An alternative attachment for the end 8 is shown in FIG. 3, in which an aperture 10 hase been cut out of the cover 3, and a piece of tape is secured to the outside of the cover with its adhesive side facing inwardly, the adhesive being a non-drying pressure sensitive adhesive. The end 8 is received within the depression, formed by the aperture 10, and the end becomes secured to the adhesive at the bottom of the depression. The aperture 10 is widened at 10A for inserting the finger nail when releasing the end 8. If end 8 extends past the depression 10 it can be gripped with the fingers. The end 4, FIG. 3, can be glued or stapled adjacent the edge of cover 2 as shown in full lines or it can be widened and perforated for passage of the band 1 and attached to the upper or lower side of cover 2 as shown in broken lines.

An alternative releasable and adjustable attachment for one or both ends of binder 1 is shown in FIG. 4, where the end 8 is attached to cover 3. Spaced apart notches 15 are provided along the length of one or both sides of end 8 and are adapted to engage in a longitudinal slot 17 located in cover 3, adjacent to binder band perforation 6, said slot 17 being closed at both ends and extending, away from the edge of the binder about which the covers swing, parallel to the longitudinal axis of end 8 when in

attached position. The slot 17 is of a length greater than the width of the band 1 and of a maximum width less than the width of the band save at the notches. To attach end 8 to cover 3 the end 8 of the resilient band is twisted so that its width is along the length of the slot, and the end is advanced through slot 17 until a desired notch 15 is reached. The end is then released and it twists approximately 90 degrees into normal position across the slot 17 to engage a pair of its projections 16 with the cover 3, as shown in FIG. 4. The diameter of the loop defined by the binder band 1 is easily varied by locating the desired notches 15 in slot 17. A single notch may be placed at one end of a binder strip for a releasable attachment in a slot 17 in one cover and a series of notches placed at the opposite end for an adjustable and releasable attachment in a slot 17 in the other cover for an inexpensive binder kit.

A releasable and adjustable attachment for a resilient binder band 1A of circular or tubular cross section is shown in FIG. 5 in which a spring clip 18 is attached to the cover 3 and extends across an aperture 19 in cover 3 to hold the binder end 8A at any position for adjusting the diameter of the loop of the band 1A. FIG. 6 shows a spring clip 36 for adjustably attaching, to the cover 3, the end 8 of a band formed as a flat strip. The clip has prongs 37 embedded in the cover and a pressed out reinforcing finger 38 extending through the cover, the prongs and finger fixing the clip to the cover 3. The clip can be lifted at its free end 39 to release the binder band from the cover.

Referring to FIG. 7, a means is shown of joining and separating sections of a binder band 1A of tubular cross-section (as in FIG. 5) and made of resilient plastic material. A metal pin 20, with a plurality of sharp annular rings or projections 22, is provided coaxially with the sections to grip the interior tubular surfaces of the sections by indenting grooves 21 in the resilient material of the band 1A, as the pin is twisted into the sections. The sections can thus be connected end to end by the pin to provide a loop that is free of lateral projections that might catch on the covers or leaves, and the frictional gripping action of the pin increases as the loop of the band 1A is tightened and its diameter decreased upon covers 2 and 3 being closed. A strong pull on the sections will, however, release the pin from at least one of the sections to permit the insertion or removal of binder leaves. The plastic material of the band must of course be sufficiently tough that it is not torn by the removal and insertion of the pin.

FIG. 8 shows an alternative device for joining and releasing sections of a binder band made of resilient flat material similar to the band in FIG. 1. It consists of a clamp having a lower diamond-shaped plate 24, of stiff material, with upwardly bent teeth 25 and 26 and two connecting sections 27 merging upward into a split circular top plate 28 having a downwardly projecting tooth 29. The plates 24 and 28 constitute minor lateral projections of the completed loop. One section 30 of the binder band is held permanently between top plate 28 and bottom plate 24 by means of teeth 29 and 25, fitting into the corresponding grooves in the section 30. The other section 31 of the binder band is detachably held in position between top plate and lower plate 24 by tooth 26 of the bottom plate fitting into a corresponding groove in section 31. Lateral movement of the two sections 30 and 31 relative to each other is prevented by notching the section 30 to fit the pointed end of section 31. The sections 30 and 31 can be separated by pressing downward on plate 28 and lifting section 31 free of tooth 26. The sections are connected by inserting section 31 between the plates 24 and 28 in a downward direction till the tooth 26 engages its corresponding groove in section 31.

Referring to FIG. 9, a trapezoidal or tapered perfora-

tion 33 can be used to assist in threading loose leaves and covers with the band end 8. The wider portion of the perforation provides for easier threading when leaves are out of register, while the narrower portion 33A nearest the bound edge 7A of the leaf or cover is made equal to the width of the binder band and serves to register all the leaves after they are threaded on the binder band, simply by holding the binder with its bound edge upward. An egg shaped perforation 40, FIG. 5, or a large and a small circular perforation overlapping may be used for bands of circular cross-section so that adjacent the bound edge the perforations conform to the size of the bands. It will be noted that in FIG. 9, the edge 33A of the perforation 33 is parallel to the edge 7A of the leaf, the edge 7A being along the bound edge of the binder. Where the edges of the perforations nearest to such edges of the leaves are parallel to such edges of the leaves it is found that, as the leaves are turned, there is a tendency for such edges of some leaves to catch such parallel edges of the perforations of other leaves. This tendency can be avoided by notching the edges of the leaves adjacent the edges 33A, as at 35, FIG. 8, the notches decreasing in width from the edges of the leaves towards the perforations, and the notches at their widest points being wider than the adjacent edges 33A, of the perforations.

What I claim is:

1. A binder comprising a pair of covers, each cover having at least two perforations adjacent one edge of said cover to register with perforations of variable numbers of leaves between the covers, and at least two elongated bands constituting a hinge which is the sole connection between the covers, each band being rigidly attached to one cover adjacent the perforated edge, each band defining a loop extending from the point of attachment of the band to said cover outward from said cover, thence passing inward through one of the perforations of the second cover to extend through perforations of leaves, thence passing outward through a perforation of the first cover past the point of attachment of the band to said first cover, thence passing inward through the perforation of the second which was previously passed through, and thence passing through a releasable clasp attached to the inside of said second cover through which said band is stiffly slidable in the direction of its length to allow infinite adjustment of the loop diameter within the limits of the length of the band, the band being sufficiently flexible that the covers can lie parallel to each other at different distances apart when closed against different numbers of leaves and can swing away from each other about the hinge, the bands being capable of repeated flexing without breaking but the bands being also sufficiently stiff and resilient that the loops expand as the covers swing away from each other, and said bands having smooth loop surfaces to pass freely through the perforations of the covers and of the leaves.

2. A binder as claimed in claim 1, wherein the releasable clasp is a thin flexible strip coated on its undersurface with a non-drying pressure sensitive adhesive, one end of said strip being attached to the inside of the second cover, the other end of said strip having a lifting tab.

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