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54 **Binding apparatus.**

57 Apparatus for binding papers or other sheet material (32) having two apertures therein comprises a longitudinally extensible member (20) and two threading rods (24) attached to the ends of the extensible member. The points of attachment (28) are near to but spaced from one end of the rods so as to form projecting tails (30). When the rods have

been pulled fully through the apertures in the stack of papers, they are folded down on to the stack. The projecting tails (30) prevent the rods (24) from being withdrawn through the apertures. The apparatus may be used without or with covers having apertures in the spine for the extensible member (20).

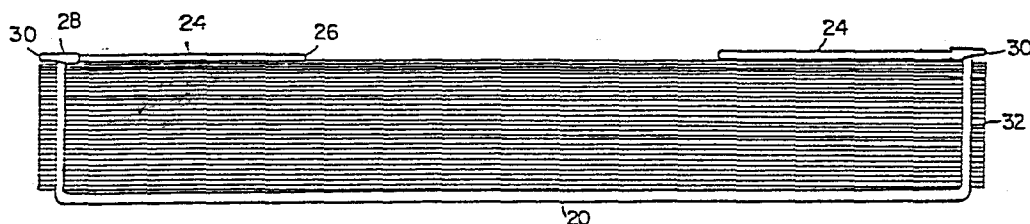


FIG. 3

BINDING APPARATUS

The present invention relates to binders in general and, in particular, to binders for filing pages of paper or other sheet material having holes punched therein.

Many methods of filing papers are known in the market place. Most of these include punching holes of a certain size and at a certain distance from one another and inserting the pages in the desired order into a binder. Conventional binders include a hard cardboard or plastic cover and a metal fastening member comprising two or three selectably openable rings spaced from one another. Paper to be bound is inserted one page at a time onto the rings and the pages can be flipped one after the other as in a book.

With the advent of the computer, different binding needs arose. Continuous computer paper, which is provided with a plurality of holes along each edge for movement through a tractor, folds in an accordion-like fashion and must be bound in such a way as to permit reading of each page without turning the binder over. Special binders for continuous paper have been developed to meet these needs.

Standard continuous paper binders include a front and a back member, each of which defines a flap having generally two apertures therein. The paper to be bound is placed between the flaps with the holes of the paper aligned with the apertures in the front and back members. One end of an elongate metal or plastic fastener having rounded or pointed ends is inserted into

each of the apertures of the back member, through the papers to be filed and through the corresponding apertures in the front member. An elongate track element slightly shorter than the flap of the front member and having apertures corresponding to the apertures of the front member lies on the flap and the fastener ends pass through the apertures thereof. The track element generally defines an elongate recess wherein two retaining elements are slideably mounted. The protruding ends of the fastener are bent or folded to lie within the recess in the track element and one of the retaining elements is slid over each end to retain it in place by frictional engagement therewith. Ordinarily a second track member is also placed on the flap of the back member to provide support for the fastener.

These binders suffer from a number of disadvantages. First, the fasteners tend to slip back through the apertures thereby releasing the papers in the file. Second, due to the fixed length of the fastener, only a certain maximum number of pages can be bound in the binder. If one attempts to exceed the maximum, the fastener ends become too short to be retained by the retaining element.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide fasteners and binders which overcome the disadvantages of the prior art.

There is thus provided in accordance with an embodiment of the present invention apparatus for binding papers or other

sheet material having at least two apertures therein comprising a longitudinally extensible member, threading apparatus coupled to each end of the extensible member and retaining means associated with the threading apparatus.

According to a preferred embodiment, each threading apparatus includes an elongate finger element adapted for threading through the apertures in the paper to be bound.

Further in accordance with a preferred embodiment, the retaining means comprises a projection integrally formed with the threading apparatus.

Still further according to a preferred embodiment the extensible member includes elasticized material. The elasticized material may include flexible rubber, fiber covered elastic or any other suitable material.

There is additionally provided in accordance with the present invention a binder including a track element defining at least two apertures and binding apparatus including a longitudinally extensible member, threading apparatus coupled to each end of the extensible member and adapted for threading through the apertures, and retaining means associated with the threading apparatus.

According to a preferred embodiment, the binder further includes front and back cover members.

BRIEF DESCRIPTION OF THE DRAWINGS

The apparatus of the present invention will be further understood and appreciated from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a plan view illustration of a fastener constructed and operative in accordance with an embodiment of the present invention;

Fig. 2A is a plan view illustration of a fastener constructed and operative in accordance with an alternate embodiment of the present invention in an inserting orientation;

Fig. 2B is an illustration of the fastener of Fig. 2A in a retaining orientation;

Fig. 3 is a sectional illustration of a binder constructed and operative in accordance with an embodiment of the present invention; and

Fig. 4 is a sectional illustration of a binder constructed and operative in accordance with an alternate embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

With reference to Fig. 1 there is shown binding apparatus constructed and operative in accordance with an embodiment of the present invention and comprising a longitudinally extensible portion 10 and two threading means 12 affixed to either end of extensible portion 10. Extensible portion 10 preferably comprises an elasticized material which is stretchable under tension but which returns to its original length and shape when the tension is released. Extensible member 10 may comprise flexible rubber, fiber covered elastic or any other suitably flexible material.

Affixed to each end of extensible member 10 is means 12

for threading or insertion through the holes in the papers to be bound. Threading means 12 comprises an elongate finger element 14 preferably defining a rounded or pointed tip 16 for ease of insertion. It may comprise a semi-flexible plastic material, or metal or any other desired material having sufficient rigidity to permit threading.

Threading apparatus 12 is affixed to extensible member 10 by conventional means whereby the joint is permanent and extensible member 10 will not separate from threading apparatus 12. Threading apparatus 12 may be formed of a solid or hollow rod of plastic material, a rolled cylinder of metal such as aluminum, a flat metal strip, or any other suitable material.

It is a particular feature of the binding apparatus of the present invention that the fastener itself includes retaining means for preventing the fastener from disengaging from the pages to be bound. According to a preferred embodiment of the invention, the threading apparatus 12 defines a projecting stop member 18. Stop member 18 may be integrally formed with elongate finger element 14, as illustrated in the embodiment of Fig. 1. The operation of stop member 18 will be described hereinbelow with reference to Fig. 2B.

Referring now to Figs. 2A and 2B there is shown binding apparatus constructed and operative in accordance with an alternate embodiment of the invention. Similarly to the embodiment of Fig. 1, the apparatus of Figs. 2A and 2B includes an extensible member 20 and a pair of threading members 22 (only one of which is illustrated). Extensible member 20 may be identical to extensible member 10.

Threading members 22 comprise an elongate insertion member 24, preferably defining a rounded or pointed tip 26, and a clamping portion 28. Insertion member 24 is adapted for threading through the holes in the pages to be bound, and may comprise a rod of plastic material. Clamping portion 28 serves to permanently affix extensible member 20 to insertion member 24 and may comprise a crimped metal cylinder or any other affixing means.

Clamping portion 28 may also include retaining means for preventing disengagement of the insertion members from the papers to be bound. According to a preferred embodiment, clamping portion 28 defines a projecting stop member 30 which is selectably engageable with bound papers.

Operation of the binder of the present invention will now be discussed with further reference to Figs. 2A and 2B and with reference to Fig. 3 which illustrates the binder of Fig. 2A in operative engagement with bound papers, generally designated 32. Like elements have like reference numerals.

When it is desired to bind a number of pages of loose leaf paper or continuous paper, two holes must be present or provided at a distance from one another along one edge of the paper where it is to be bound. The necessary holes may be pre-punched in the paper, i.e., the tractor holes in continuous paper formed during production of the paper, or they may be punched manually. The pages to be bound are now aligned such that the holes are in alignment with one another. It is a particular feature of the present invention that the pre-punched holes of

various kinds of papers, including continuous computer paper and looseleaf paper and so on, may be bound with the binder of the present invention without requiring the punching of additional binding holes.

The binding apparatus is arranged in the insertion orientation illustrated in Fig. 2A wherein the threading members 22 are aligned with the extensible member 20. The rounded tip of one threading member is inserted through one set of holes in the papers to be bound and threaded therethrough until the entire threading member has passed through all the papers, leaving the extensible member extending through the papers. The threading member is now bent into the retaining orientation illustrated in Fig. 2B and Fig. 3 wherein finger element 24 is rotated with respect to extensible member 20 causing projecting stop member 30 to protrude in a direction perpendicular to the extensible member.

The second threading apparatus 22 is now inserted in a similar manner into the second set of holes in the paper to be bound, threaded through all the papers, and bent into the retaining orientation, as shown in Fig. 3. It will be appreciated that tension placed on extensible member 20 causes it to stretch during insertion. However, upon bending of the threading apparatus, the elasticity of the extensible member 20 causes it to shrink as much as possible back to its original length, thereby creating tension on the threading apparatus. Due to the perpendicular orientation of the finger element 24 and the stop member 30 relative to extensible member 20, the threading apparatus cannot be pulled back through the holes and disengaged

from the papers.

It will be appreciated that binding of additional papers can be easily effected in the same manner. Stretching the extensible member by pulling the threading apparatus into alignment therewith will permit the addition of papers. It will also permit removal of previously bound pages since, in this orientation (i.e., Fig. 2A), projection 30 does not act as a stop member and does not bar removal of the threading apparatus from the pages. Furthermore, it is relatively easy to add or remove pages from the middle of the bound pages, not merely from one end.

It is a particular feature of the present invention that the capacity of the binder is limited solely by the extensibility of the extensible member. Thus, additional pages may be bound in merely by further tensioning the extensible member.

Referring now to Fig. 4, there is shown a binder constructed and operative in accordance with an alternate embodiment of the present invention. The binder includes a fastener 40 similar in all respects to that illustrated in Fig. 1 and including an extensible member 42 and two threading members 44 affixed thereto. The binder further includes a flat protective element 44 which may be any standard apertured piece of cardboard or other stiff material for providing a surface against which the threading members are retained in the bound orientation of Fig. 4. A similar protective element is optionally provided on the other end of the papers being bound to prevent unintentional

tearing or folding of the bound pages. According to one preferred embodiment illustrated in Fig. 4, the protective element is the folding flap of a conventional binder cover 46. Alternatively, the protective element may be a separate unit which may be utilized with or without binder covers.

Alternatively or in addition to flapped binder covers, a conventional apertured track element 48 may be provided wherein the threading members are seated when in the retaining orientation of Fig. 4.

It is a particular feature of the present invention that little or no printing on the bound pages is obscured by the binder or the binding method. This is often a serious problem in prior art binders wherein a relatively large margin must be left along one edge of the paper for binding purposes. It is a further particular feature that the binders of the present invention are inexpensive and simple to manufacture.

It will be appreciated that the binders of the present invention are suitable for binding any sheet material in which two holes can be or are punched, whether paper of any sort, fabric or any other web or sheet material.

CLAIMS

1. Apparatus for binding sheet material having at least two apertures therein, comprising a longitudinally extensible member (20), a pair of threading means (12), one coupled to each end of the extensible member, and means (30) for preventing disengagement of the extensible member from the apertures.
2. Binding apparatus according to claim 1, characterised in that the means (30) for preventing disengagement are associated with the threading means (12).
3. Binding apparatus according to claim 2, characterised in that the means (30) for preventing disengagement comprise projections (30) integrally formed with the threading means (12).
4. Binding apparatus according to claim 1, 2 or 3, characterised in that each threading means (12) comprises an elongate finger element (14) adapted for threading through the apertures in the sheet material.
5. Binding apparatus according to claim 4, characterised in that each finger element (14) is attached to the extensible member (20) at a point near to but spaced from one end of the finger element.
6. Binding apparatus according to any of claims 1 to 5, characterised in that the extensible member (20) comprises an elastic material.
7. Binding apparatus according to any of claims 1 to 5, characterised in that the extensible member (20) comprises a flexible rubber material.
8. Binding apparatus according to any of claims 1 to 5, characterised in that the extensible member (20) comprises a fiber covered elastic material.
9. A binder comprising apparatus according to any of claims 1 to

8, and at least one protective member (44) having two apertures through which the extensible member (42) passes.

10. A binder according to claim 9, characterised by front and back cover members (46) adapted for engagement by the binding means.

11. A binder according to claim 9 or 10, characterised in that the or each protective member (44) includes an apertured track element.

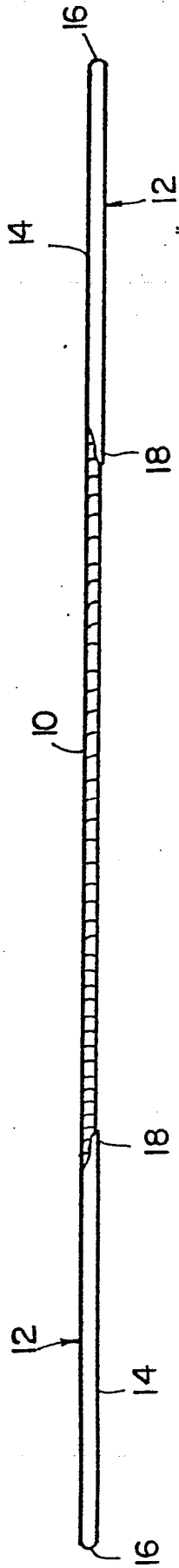


FIG. 1

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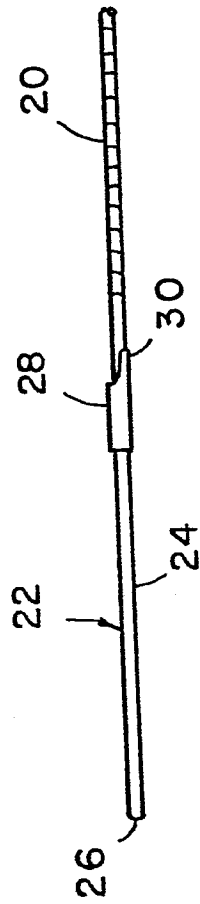


FIG. 2A

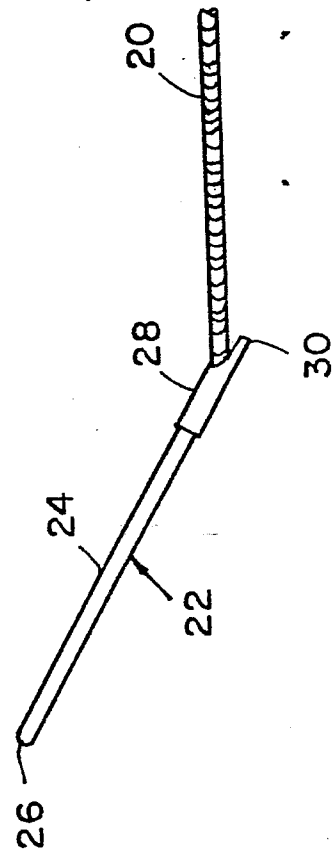


FIG. 2B

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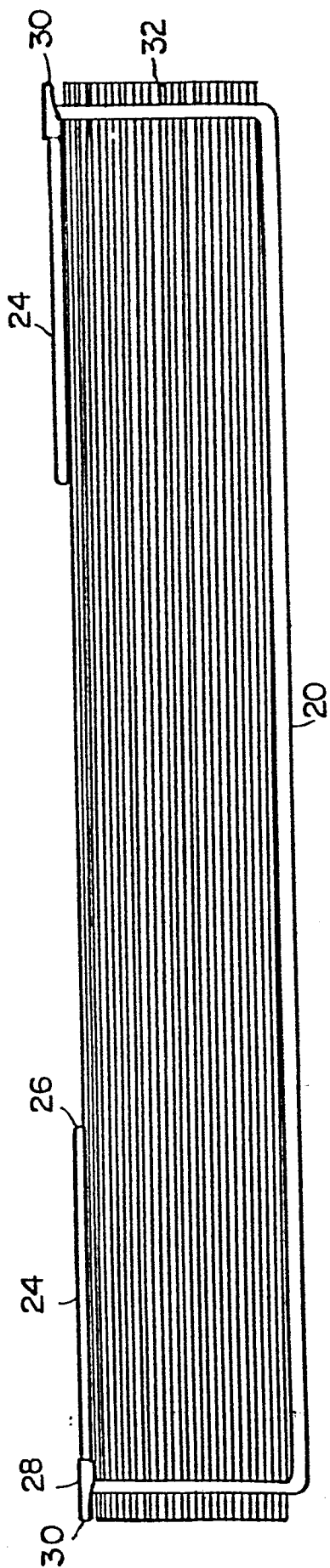


FIG. 3

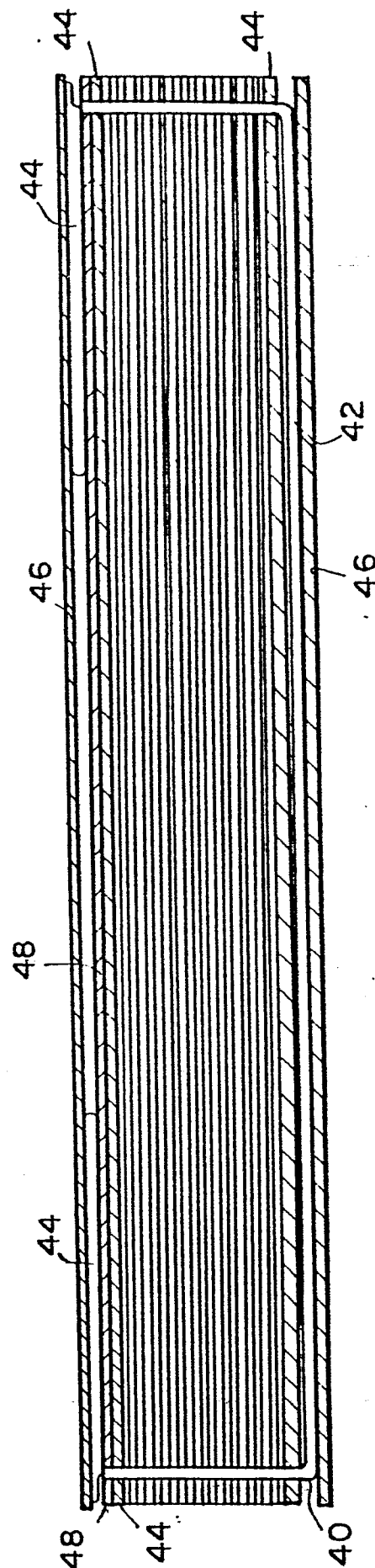


FIG. 4