Jan. 27, 1931. R. FITZ POWER 1,790,441

METHOD OF CUTTING LEAVES AND BINDING MECHANISM THEREFOR

Filed Jan. 29, 1926 2 Sheets-Sheet 1

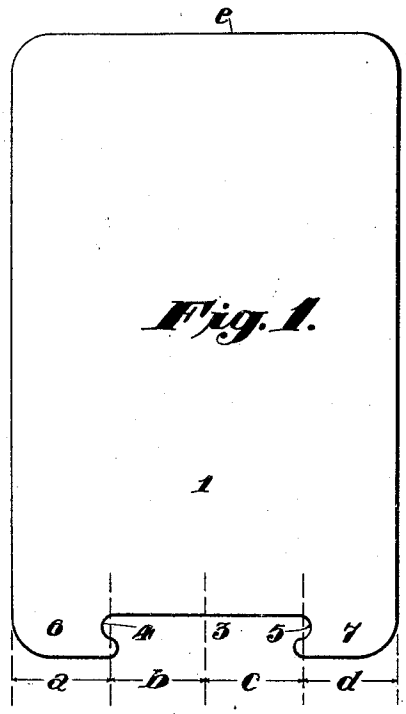


Fig. 1.

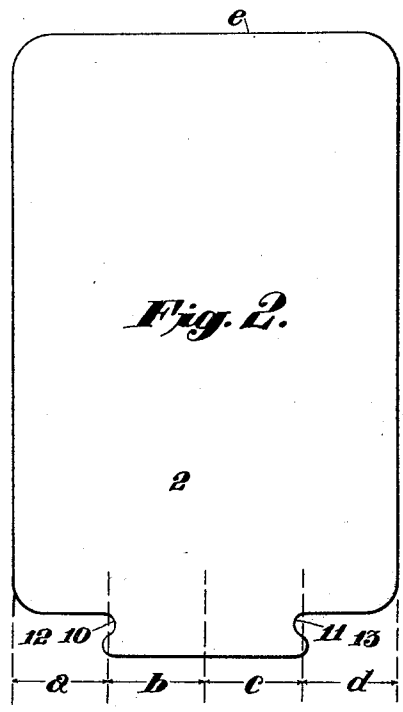


Fig. 2.

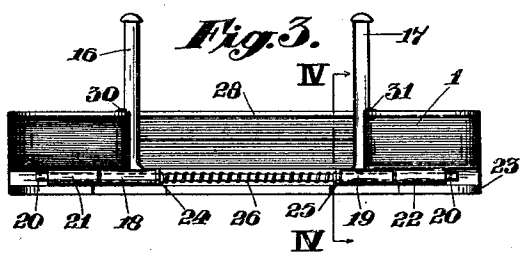


Fig. 3.

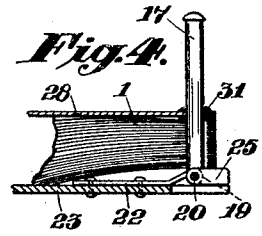


Fig. 4.

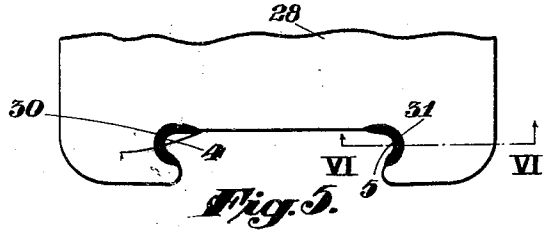


Fig. 5.

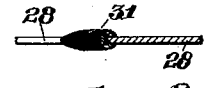


Fig. 6.

Inventor
R. F. POWER.
per P. A. Blair
Attorney.

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METHOD OF CUTTING LEAVES AND BINDING MECHANISM THEREFOR

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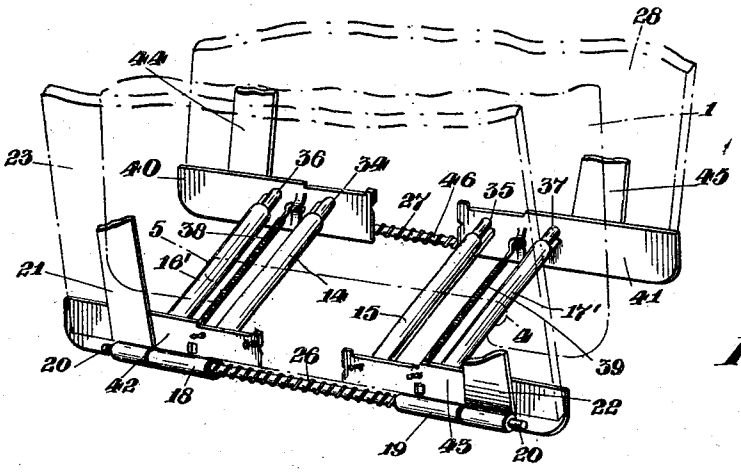


Fig. 7.

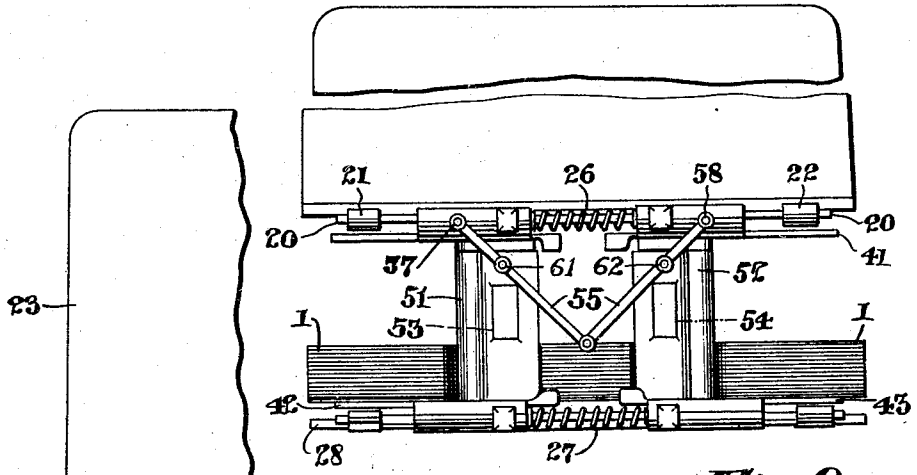


Fig. 9.

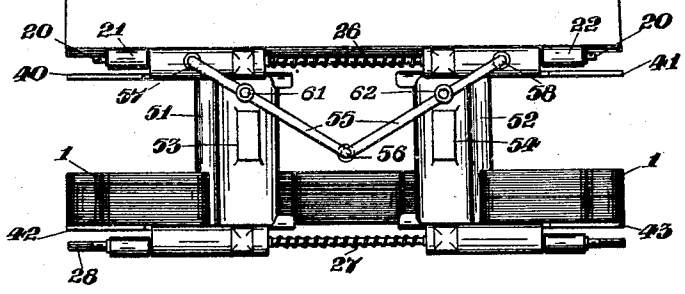


Fig. 8.

Inventor
R. F. POWER
per P. A. Blair
Attorney.

Patented Jan. 27, 1931 1,790,441

UNITED STATES PATENT OFFICE

RICHARD FITZ POWER, OF LONDON, ENGLAND, ASSIGNOR TO MORLAND & IMPEY LIMITED, OF BIRMINGHAM, ENGLAND

METHOD OF CUTTING LEAVES AND BINDING MECHANISM THEREFOR

Application filed January 29, 1926, Serial No. 84,598, and in Great Britain May 25, 1925.

My invention relates to improvements in loose leaf securing mechanism in which loose leaves may be secured either in file form or in book form, and the objects of my invention are:—

First: to provide a leaf of such a form that it may be cut from a long strip without any waste of paper.

Second: to provide that such a leaf may be readily and quickly put into place and abstracted from a bunch which is bound in file or book form.

Third: to provide means by which this securing of the leaves may take place both by an automatic anchoring mechanism and a binding mechanism.

My invention relates to the type of loose leaf binders which have employed leaves with undercut notches. Heretofore it has been a known practice to employ therewith telescopic projecting posts carried by clamping plates of the binder, and means by which they can be manually projected into the notches. A disadvantage of the type of loose leaf binder referred to is that a material addition to the space occupied beyond the area of a single leaf has been necessary to accommodate the binding mechanism, and it has further been possible to leave the binding mechanism open when the person handling the binder is careless, so that the leaves may drop out of the binder and necessitate laborious and time-consuming re-assortment and securement. My present improvements obviate these disadvantages by providing that the mechanism for locking the sheets is automatic in the locking direction when free, and is substantially contained within the area of the leaves or the covers, regarded sideways, that is, within the area of the mass of leaves lying upon their face upon a table, and also within the limits of maximum cover or mass thickness. By this means, considerable space is saved, and the binder is never in condition to allow leaves to come out except it is purposely operated by a bookkeeper or clerk. It should be noted particularly that whereas a number of binders are known with what may be called notches of undercut form, there is a material difference in that the cut out spaces in my invention are long recesses occupying generally at least half of the end of a page, whereby the necessary space is obtained for the manipulation of the locking means without any material excrescences beyond the volume of the binder represented in area by a leaf and in thickness by the covers of a binder.

In this application I describe the method of securing the leaves by a manual operation of the securing device.

In the drawings annexed to this specification:

Fig. 1 is an outline of a leaf arranged with a central recess at one end;

Fig. 2 is a view showing the leaf having the recessed ends formed by cutting away the corners of the leaf;

Fig. 3 is an end view looking from the anchoring end showing a bunch of leaves on a filing structure;

Fig. 4 is a sectional view of Fig. 3 on the line IV—IV;

Fig. 5 is a plan view of a stiff sheet or cover board provided with rubber grips on each side of its recess;

Fig. 6 is a section of Fig. 5 on the line VI—VI;

Fig. 7 is a perspective view showing a securing means with both anchoring and binding means for the leaves; and

Fig. 8 is the end view from the back of a binder showing anchoring and binding means in a modified form of the invention.

Fig. 9 is a view similar to Fig. 8 but showing the parts in leaf-releasing position.

Referring to Figs. 1, 2, 3 and 4 of the drawings, 1 is a leaf formed in accordance with this invention with a recess 3 in one end of the leaf, the boundaries of the recess 3 being formed by the undercut portions 4, 5 undercut in a transverse direction of the leaf. Preferably such a leaf will be formed with dimensions a, b, c, d all equal so that when cutting the leaf from a long strip, say, a strip of a width equal to double the length of a sheet as illustrated in Fig. 1, sheets may be cut therefrom without any waste by dividing the strip by transverse lines from either side of the strip alternately, the said lines extend-

ing to the middle of a slit forming the recess in a sheet opposite; by thus cutting the strip, all the sheets will have the recess transversely as shown in Fig. 1. Should sheets as shown in Fig. 2 be desired, transverse cuts will be made, starting from the opposite side of the sheet to that just named, and extending to the middle of a slit forming the end of the projection represented by B—C of Fig. 2 of a sheet opposite. In any event if the sheets are to be cut without waste the sum of the dimensions A and D must always equal the sum of the dimensions B and C.

Fig. 2 shows a leaf which may be used for the same purpose, but with the undercut ends 10, 11 forming boundaries to recessed portions 12, 13 cut out of the corners of the leaf.

Figs. 3 and 4 show a heap of leaves such as 1 secured on anchoring bars 16, 17, the bars being attached to eyes 18, 19 respectively, and the eyes sliding on the spindle 20; this spindle 20 is supported by hinge pieces 21, 22 attached to the base board 23, and riding on the spindle 20 between the eyes 18 and 19 is a helical spring 26 tending to press the eyes 18, 19 apart.

24, 25 are lugs integral with the eyes 18, 19 respectively, and it will be seen that owing to the action of the spring 26, the bars 16, 17 are pressed firmly into the corners such as 4, 5 (see Fig. 1) of the leaves 1, and thus hold them from being dislodged. When it is desired to remove a leaf or leaves, the lugs 24, 25 are pressed together by the fingers, and the bars 16, 17 consequently moved towards each other, being attached to the eyes 18, 19.

A leaf can thus be withdrawn by a straight pull on the end *e*. To hold the leaves down so that they do not inadvertently come loose, a top board 28 cut out in the same way as the leaf 1 is employed, being furnished, for example, with rubber bindings 30, 31 around the undercut corners 4, 5. Thus when the bars 16, 17 are allowed to expand into the said corners, the frictional effect of the linings 30, 31 keeps the top board pressed down on the bunch of leaves 1 beneath it.

Referring now to Fig. 7, this device in addition to the anchoring bars 16′, 17′, in this case made double by the addition of the inner bars 14, 15, is also made telescopic, spindles 34, 35, 36, 37 attached to binding plates 40, 41 being arranged to slide within the portions 14, 15; 16, 17 respectively, and springs 38, 39 being employed to draw the binding plates 40, 41 always towards the binding plates 42, 43 respectively. As before, eyes 18, 19 fixed to the anchoring bars (by being attached to binding plates 42, 43 which carry the latter) slide on the spindle 20 carried by the hinge pieces 21, 22, which secure it to the cover board 23, and form stops which limit the outward movement of the eyes 18, 19 actuated by the spring 26.

A top board 28 in this case is connected by other hinge pieces 44, 45 with a spindle 46 carrying another spring 27, and working in precisely the same way as the spring 26.

The binding plates 40, 41 actuated by the springs 38, 39 thus clamp the sheets between themselves and the binding plates 42, 43, and hold them in place.

In the binder illustrated in Figs. 8 and 9 the anchoring bars are formed by casings 51, 52 which enclose the springs 38, 39 and the inner sliding pins or posts 34, 36, and 35, 37 respectively these latter elements being the same as before. The bars may be opened by the finger plates 53, 54, and opening of the binding plates 40, 41, and 42, 43 may be achieved by links 55 pivoted together at 56 and pivotally mounted on casings 51, 52 at 61, 62 respectively, and connected at 57, 58 to the binding plates 40, 41 respectively.

The action is that by pressure of the finger plates 53, 54 (or by any operation of the casings 51, 52) towards each other, the links 55 pivoted at 61, 62 to the anchoring bar casings and with an unfettered hinge at their joint, cause the binding plates 40, 41 (attached by the pivot points 57, 58) to move apart from the opposite plates 42, 43. This action is really opposed by the tension of the springs 38, 39, and also by the compression of the springs 26, 27 so as to achieve the automatic locking of the casings 51, 52 when free in the undercut ends of the sheet recesses.

By this means pressure on the finger plates 53, 54 both draws in the anchoring bars and at the same time removes the pressure from the binding members which clamp the leaves together. Any leaf, therefore, may be released or inserted by grasping its end *e* and manipulating it as required.

Fig. 9 shows the binder in expanded position after operation by the finger plates 53, 54, the anchoring bar casings 51, 52 being thereby retracted into the leaf recesses and the binding plates simultaneously moved out of leaf engagement. Removal or replacement of any leaves 1 mounted on the binder as will be seen can be readily effected with the binder, in this position, while resecurement of the leaves is automatic on the release of the finger plates 53, 54, which permit the binder to reassume the position shown in Fig. 8.

What is claimed is:—

1. Apparatus for securing loose leaves of the kind having open recesses with undercut ends on one edge, comprising members contained within the limits of maximum cover or mass thickness which occupy said undercut ends to secure the leaves, and means for withdrawing the said members from the undercut ends thereby releasing the leaves.

2. Apparatus for securing loose leaves of the kind having open recesses with undercut ends on one edge comprising link members contained within the limits of maximum

cover or mass thickness which occupy said undercut ends and a pair of binding elements associated with each of said members to bind the leaves between them in a direction at right angles thereto.

3. A loose leaf or sheet having parts of one end cut away so as to form projections with ends undercut transversely of the sheet, the parts cut away being substantially equal in width transversely to the parts remaining.

4. A loose leaf or sheet having parts of one end cut away so as to form projections with ends undercut transversely of the sheet, the parts cut away being substantially equal in width transversely to the parts remaining, and in which the equal projections with undercut ends are arranged on either side of a central recess.

5. A loose leaf or sheet having parts of one end cut away so as to form projections with ends undercut transversely of the sheet, the parts cut away being substantially equal in width transversely to the parts remaining, and in which projections with undercut ends are arranged on either side of a recess between them.

6. A loose leaf or sheet having parts of one end cut away so as to form projections with ends undercut transversely of the sheet, the parts cut away being substantially equal in width transversely to the parts remaining, and in which the relative width and the relative form of the parts cut away and the parts remaining are such that leaves may be cut in two adjacent rows from a strip with substantially no waste of material.

7. The method of making leaves having parts of one end cut away so as to form projections with ends undercut transversely of the sheet, the parts cut away being substantially equal in width to the parts remaining, which consists in cutting a web or strip of paper into sections longitudinally in a continuous zigzag line adapted to form the necessary recesses in the ends of sheets made from the sections from either side of the said line, and cutting up a said section divided from a whole strip by transverse lines proceeding from an outer edge so as to terminate at the other or cut edge at a predetermined point thereon, whereby sheets are cut from a strip without any waste of material.

8. Loose leaf securing mechanism comprising leaves having open faced end recesses whose width transversely is a substantial proportion of the total width of the leaf, and having undercut ends, in combination with anchoring members disposed substantially within the recessed space formed by a mass of said leaves, cover boards for said leaves, bars attached to said cover boards and slidably carrying said anchoring members, and springs mounted on said bars and forcing said anchoring members into said undercut ends to secure the leaves.

9. Loose leaf securing mechanism comprising leaves having open faced end recesses whose width transversely is a substantial proportion of the total width of the leaf, and having undercut ends, in combination with a pair of anchoring members disposed substantially within the recessed space formed by a mass of said leaves, cover boards for said leaves, bars attached to said cover boards and slidably carrying said anchoring members, and a pair of spring elements between said anchoring members one on each bar, so that the action of the springs compresses the said anchoring members transversely into said undercut ends to secure the leaves.

10. Loose leaf securing mechanism comprising leaves having open faced end recesses whose width is a substantial proportion of the total width of the leaf, and having undercut ends, in combination with a pair of anchoring members disposed substantially within the recessed space formed by a mass of said leaves, cover boards for said leaves, bars attached to said cover boards slidably carrying said anchoring members, a pair of spring elements between the said anchoring members and forcing them transversely into the said undercut ends, and means for withdrawing said anchoring members within the recess to release the leaves.

11. Loose leaf securing mechanism comprising leaves having open-ended recesses with undercut ends, in combination with anchoring bars disposed within the area of such recesses, a spindle disposed adjacent one end of the said anchoring bars at right angles thereto, binding means attached thereto having eyes adapted to slide on the said spindle, a spring member on the said spindle arranged to press the anchoring bars into the said undercut ends, and means for manipulating the said spring to open and close the said anchoring bars.

12. Loose leaf securing mechanism comprising leaves having open-ended recesses with undercut ends in combination with anchoring bars disposed within the area of such recesses, spindles disposed adjacent each end of the said anchoring bars at right angles thereto, binding plates attached to the said anchoring bars having eyes adapted to slide on the said spindles, spring members on the said spindles arranged to press the anchoring bars into said undercut ends, spring members operating to draw together the said binding plates, stop members attached to the said spindles so as to form stops limiting the movement of the said eyes on the said spindles, and means for manipulating the said springs to open and close the said anchoring bars and the said binding plates respectively.

13. Loose leaf securing mechanism comprising leaves having open-ended recesses with undercut ends in combination with tele-

scopic anchoring bars disposed within the area of such recesses, spindles disposed adjacent each end of the said anchoring bars at right-angles thereto, binding plates attached to the said anchoring bars, those on one side to the outer telescopic members, and those on the other side to the inner telescopic members, eyes on the said binding plates slidably engaging said spindles, tension springs connecting pairs of said binding plates, helical compression springs on said spindles disposed between the said eyes, cover boards attached to said spindles and forming stops limiting the movement of said eyes, and means for actuating the said anchoring bars and binding plates to withdraw them from binding engagement with the leaves against the action of said springs.

14. Loose leaf securing mechanism comprising leaves having open-ended recesses with undercut ends in combination with a pair of telescopic anchoring bars disposed within the area of such recesses, binding plates attached to each anchoring bar, a tension spring connecting each pair of binding plates, one binding plate being connected to the outer member of a said telescopic bar, which outer member also encloses the said tension spring when at minimum distance apart, and the opposite binding plate being connected to an inner in-sliding member of the telescopic bar, spindles disposed adjacent each end of the said anchoring bars and at right angles thereto, eyes on two binding plates engaging one of the said spindles, and eyes on two binding plates engaging the other spindle, helical compression springs on the said spindles tending to separate the said eyes, covers attached to the said spindles by hinge members thereon so as to form stops limiting the movement of the said anchoring bars, and means for operating the said springs to open and close said anchoring bars and said binding plates respectively.

15. Apparatus for securing loose leaves of the kind having open recesses with undercut ends on one edge, comprising members contained within the limits of maximum cover or mass thickness which occupy said undercut ends, pairs of binding elements and hinged levers connecting said members with said binding elements in such manner that manual withdrawal of said members from anchoring position effects separation of said binding elements to permit of the removal of the leaves.

16. A loose leaf or sheet cut away in parts at one end transversely of the sheet to form undercut projections, those parts cut away being substantially equal in width transversely to the parts remaining.

17. A loose leaf or sheet cut away in parts at one end transversely of the sheet to form undercut projections, those parts cut away being substantially equal in width transversely to the parts remaining, the parts of the cut edge of the sheet on opposite sides of the longitudinal medial line of the sheet being substantially symmetrical.

18. A loose leaf securing mechanism comprising leaves cut away in parts at one end transversely of the sheet to form undercut projections, those parts cut away being substantially equal in width transversely to the parts remaining, in combination with anchoring bars disposed within such cut-away parts, spindle means disposed adjacent one end of said bars at right angles thereto, binding plates attached thereto having eyes adapted to slide on said spindle means, resilient means on said spindle means arranged to move the anchoring bars behind said projections, spring means operating to urge the binding plates towards each other, and means for manipulating said spring means to open and close said anchoring bars and said binding plates respectively.

19. An apparatus for securing loose leaves of the kind cut away in parts at one end transversely of the sheet to form undercut projections, comprising members adapted to be contained within the limits of maximum cover or mass thickness and which occupy the cut away parts to secure the leaves, and means for moving said members out of effective interlocking engagement with said cut-away parts thereby to release the leaves.

20. An apparatus for securing loose leaves of the kind cut away in parts at one end transversely of the sheet to form undercut projections, those parts cut away being substantially equal in width transversely to the the parts remaining, comprising members adapted to be contained within the limits of maximum cover or mass thickness and which occupy the cut-away parts to secure the leaves, and means for moving said members out of effective interlocking engagement with said cut-away parts thereby to release the leaves.

21. An apparatus for securing loose leaves of the kind having open recesses with undercut ends along one edge comprising members adapted to be contained within the limits of maximum cover or mass thickness which occupy said under-cut ends to secure the leaves, and means for moving said members out of effective interlocking engagement with said undercut ends thereby to release the leaves.

In testimony whereof I affix my signature.

RICHARD F. POWER.