

No. 860,885.

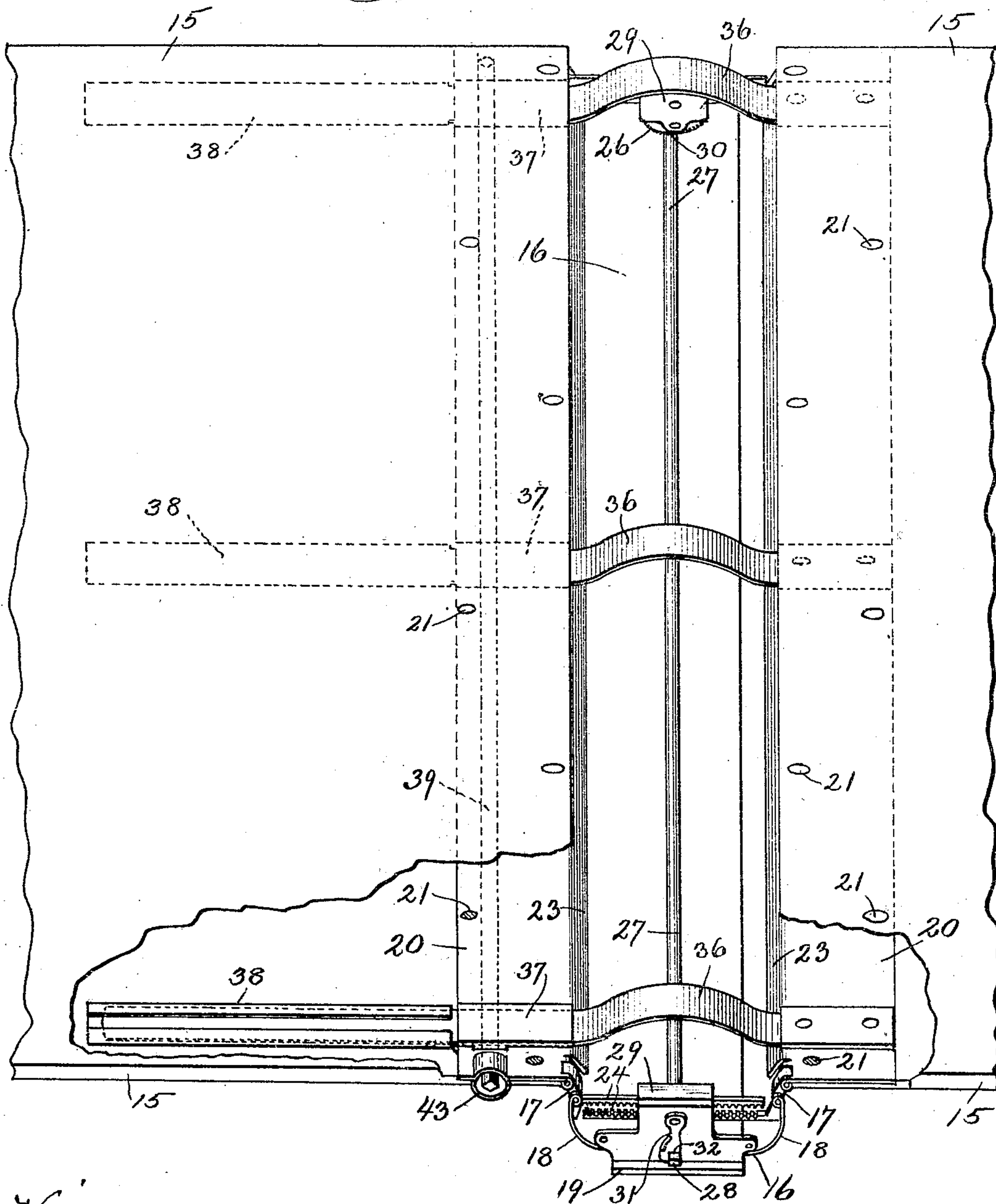
PATENTED JULY 23, 1907.

W. S. PROUDFIT, JR.
LOOSE LEAF BINDER.

APPLICATION FILED OCT. 3, 1903.

3 SHEETS—SHEET 1.

Fig. 1.



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Inventor:

William S. Proudfit Jr.

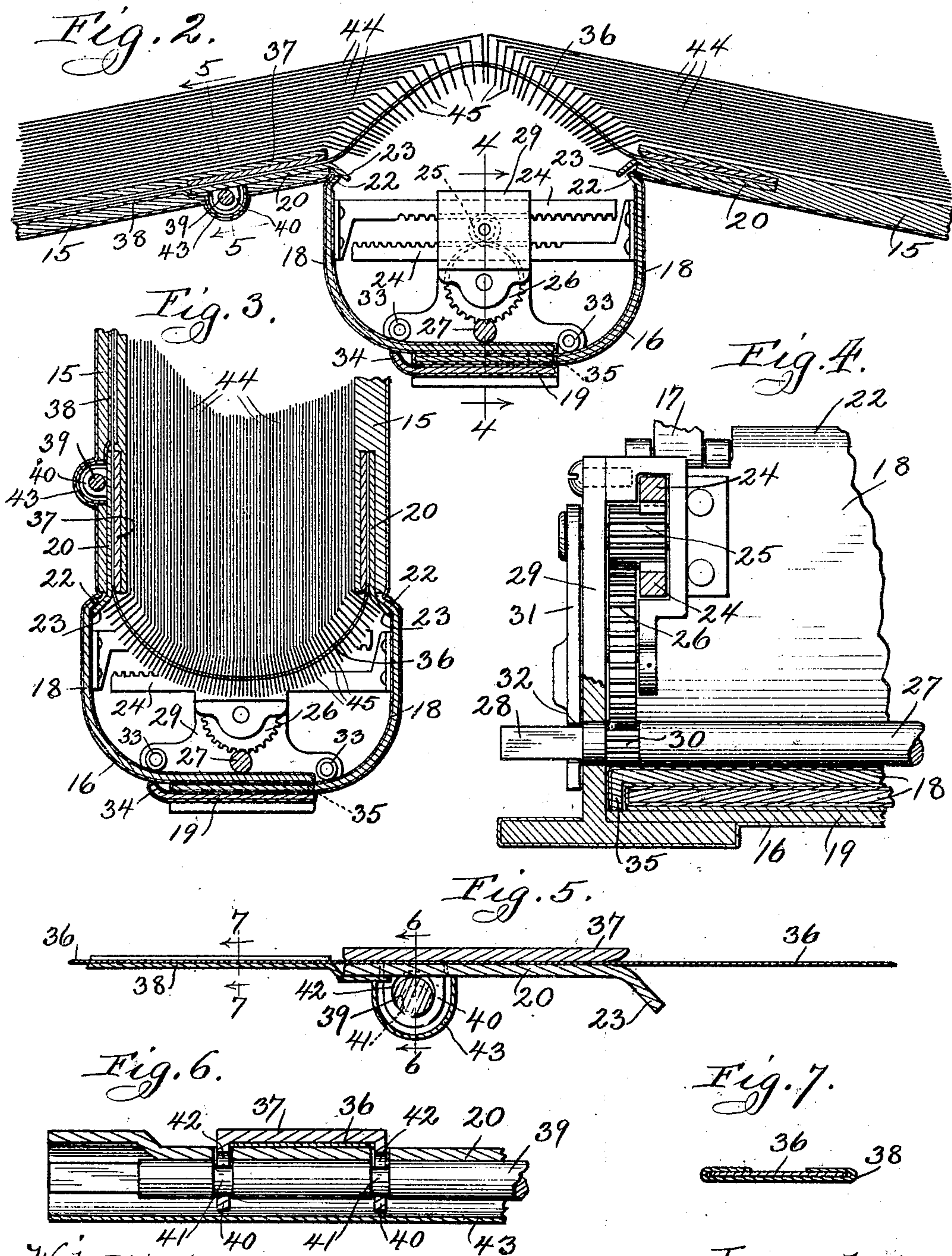
By R. J. Jaeger
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Fig. 7.

36 38

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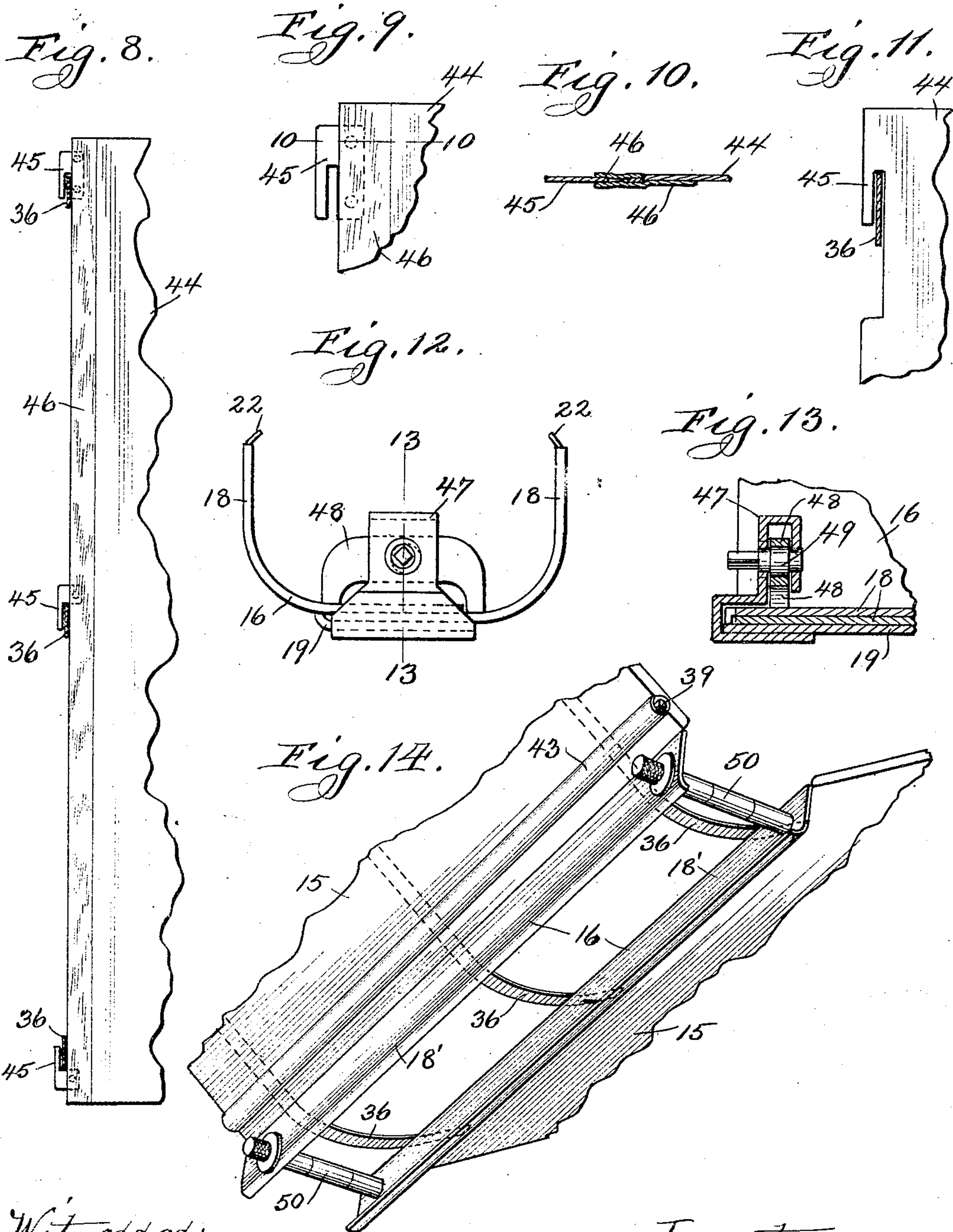
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3 SHEETS—SHEET 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM S. PROUDFIT, JR., OF CHICAGO, ILLINOIS.

LOOSE-LEAF BINDER.

No. 860,885.

Specification of Letters Patent.

Patented July 23, 1907.

Application filed October 3, 1903. Serial No. 175,540.

To all whom it may concern:

Be it known that I, WILLIAM S. PROUDFIT, Jr., a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Loose-Leaf Binder, of which the following is a specification.

My invention relates to improvements in binders which bind separate leaves together to form a book, and at the same time so arranged to enable the user to remove any leaves or to insert a leaf at will; the fastening being operated by a key.

The objects of my invention are, first, to provide means whereby the insertion or extraction of a leaf can readily be made; second, to construct the binder so that the book will be a substantially flat opening book; third, to make the binder adjustable to more or less leaves; fourth to provide positive clamps for the adjusting means; fifth, to afford facilities for the proper securing of the leaves, and sixth to provide a cheap and durable construction.

I am aware that heretofore binders have been made for the purpose of binding together loose leaves, and also made adjustable to more or less leaves; but there has always been some objections to their construction. One of the main objections is, that they do not allow the book to open flat. This most common objection I completely overcome by the construction shown in the accompanying three sheets of drawings.

I construct a back which is sufficiently stiff and rigid, preferably sheet metal, and adjustable to accommodate more or less leaves. To secure the leaves within or to the back in a flexible manner, I provide flat steel springs which are secured to the covers, to extend between the two free edges of the back. The two covers are hinged in any suitable manner to the free edges of the back, and the leaves are provided with suitable hooked projections to be hooked onto the flat springs. While I prefer to make these flat connecting strips of spring steel, they may be made of any suitable material and of any preferred shape.

On account of the flat springs extending between the free edges of the back, it becomes necessary to lengthen and shorten them when leaves are inserted or extracted. To accomplish this I provide in one of the covers means whereby extensions of the said springs can be accommodated and drawn out as required. I also provide in the same cover means for clamping or holding the said extensions of the springs.

To positively have the binder force the book to open flat I make the distance between the free edges of the back less than will easily accommodate all the leaves contained in the book, and so set the flat steel springs that they will be compelled to lie other than in a straight line between said two edges, usually in a semi-circular form either outward or inward. It will be

understood that the length of the steel springs between the free edges of the back is preferably greater than the distance between these edges on a straight line, so that the springs are positively forced to lie in a curved position between the edges of the back. The curve in which the springs lie is determined by the position of the covers because the springs are secured to said covers, and are not attached in any way to the back. When the book is closed the position of the covers force the leaf carrying spring strips into curves, approximately parallel with the curvature of the back, see Figure 3. When the book is opened at any place; it centers at the point of opening, because of the rocking movement of the U shaped back. When the point of opening is at the center of the book the leaf carrying spring strips are forced into curves with their convex surfaces in an opposite direction from that when the book is closed and, their greatest elevation is at the point of opening, see Fig. 2. When in this position, if the leaves are turned toward either cover, the cover approached is elevated and the opposite cover depressed and the leaf carrying spring strips are forced by this change of position of the covers, into compound or S shaped curves, with their greater altitude always at the point of opening, thus allowing the leaves adjacent to the opening to be flat, without obstruction from the leaves beneath.

I will now describe in detail one construction of my device and it will be understood that numerous changes in the construction and material could be made without departing from the scope of my invention.

As far as I know there has never been an adjustable loose-leaf binder made for a book that would open flat at any desired page therein, which would permit of single leaves being firmly bound therein or removed therefrom without disturbing the other leaves of the book, and I therefore make claim to a binder of that nature broadly, the construction shown giving only one way in which this can be accomplished.

Referring to the drawings in which similar reference characters refer to similar parts throughout the several views; Fig. 1, is a perspective view of a binder constructed in accordance with my invention, with the covers open and without any leaves therein, parts being broken away to facilitate the illustrating; Fig. 2, is a cross section through the same in an open position and filled with leaves; Fig. 3, is a similar view of the same in a closed position; Fig. 4, is a section on line 4—4 of Fig. 2; Fig. 5, is a section through one of the fastening devices for the springs; Fig. 6, is a section on line 6—6 of Fig. 5; Fig. 7, is a section on line 7—7 of Fig. 5; Fig. 8, is a face view of a fragment of a leaf showing its fastening hooks; Fig. 9, is an enlarged view of one of the hooks on a leaf; Fig. 10, is a section on line 10—10 of Fig. 9; Fig. 11, is a face view of a modified

form of hook; Fig. 12, is an elevation of a modified form of clamp for the binder back; Fig. 13, is a section on line 13—13 of Fig. 12; and Fig. 14, is a perspective view of a simple form of binder embodying my invention.

Referring to Fig. 1, 15 are the covers made of any ordinary stiff board, and are hinged to the back 16 in any manner, as for instance by the cloth covering which is sometimes used to give the desired finished appearance. I, however, prefer to employ the link hinge 17 besides the cloth or leather connection. The back 16 consists of three pieces, the two sliding sides 18 and the central support 19. The link hinges 17 are pivoted to the ends of the sides 18 and also to the ends of flat braces 20 which are secured to the covers 15 by rivets 21 or otherwise. The sides 18 overlap above the central support and are bent at about right angles to extend substantially parallel upward, making the back 16 of a semi-circular or U shape. The upper edges of the sides corresponding to the top ends of a U, are bent inward slightly on a bevel as at 22, see Figs. 2 and 3. The edges of the braces 20 adjacent to these sides 18 are bent slightly outward as at 23 and cooperate with the bent edges 22. Thus when the book is closed as shown in Fig. 3, the edges 22 and 23 will rest together and the pressure necessary to press the leaves tautly together will be exerted directly against the rigid sides 18 instead of bringing any strain on the hinges 17.

To properly adjust the sides 18 to the number of leaves in the book I provide a clamping device comprising the two rack-bars 24, 24, a pinion 25, idler gear 26 and gear rod 27. The rod 27 is provided at one or both ends with the squared head 28, and has its bearings in supporting frames 29 secured to the ends of the central brace or support 19 of the back 16. The rod 27 is also provided with a small gear 30, which meshes with the idler 26 which meshes with the pinion 25. The pinion 25 is of sufficient width to accommodate the meshing with the rack-bars 24 beside the idler 26. One rack-bar 24 is secured to one of the sides 18 of the back 16 and the other rack-bar 24 is secured to the remaining side 18 of the back 16. The rack-bars 24 are located above and below the pinion 25 so that the rotation of the pinion 25 in one direction will move the sides 18 away from each other, and the rotation of the pinion 25 in the other direction will move the sides 18 toward each other. The rack-bars 24 are guided to be held in constant mesh with the pinion 25 in ways provided in the brackets 29.

To lock the rod 27 and thus the sides 18 in any desired position I provide a pivoted lever 31 on the bracket 29 which has a rectangular recess 32 in its free end to fit over the squared head 28 and prevents its rotation. When it is desired to rotate the rod 27, to adjust the sides 18 of the back 16 a key having a square hole is placed on the head 28 and the lever 31 is swung on its pivot so that the recess 32 is brought out of engagement with the head 28.

To keep the sides 18 in proper position in relation to each other and to the support 19 I provide the antifriction rollers 33 on the frame 29 and the lugs 34 and 35 on the support 19 and one of the sides 18 respectively, or other means.

To one of the braces 20 on the cover 15 are secured the ends of the flat springs 36, I have shown three of

such springs but there may be any number. These springs extend over to and underneath clamps 37 provided on the brace 20 on the remaining cover and as far beyond as is necessary to accommodate the adjustability of the binder. I prefer to have this extra length of the springs 36 to slide into sockets made in the cover 15 and to have uninterrupted passages for the same I provide the slides 38 which may be secured to the brace 20. A cam rod 39 is arranged to pass through the lugs or extensions 40 on the clamps 37, and is provided with the cams 41 to engage the perforations 42 in said lugs 40. The exposed end of the cam rod is squared to enable it to be turned by a key. The cams 41 are constructed eccentric on the rod 39 and as the rod 39 is turned its one side will bear against the face of the brace 20 while all the cams 41 will bear against one side of the perforations 42 so as to pull the clamps 37 firmly against the springs 36 and thus hold them securely. I prefer to place a sheet metal covering 43 over the rod 39 to keep it clear from obstructions.

The leaves 44 are provided with the hook shaped extensions 45 positioned to register with the springs 36. A plurality of hooks 45 open in one direction and preferably the one nearest the bottom of the leaf opens in the opposite direction, to enable the leaves to be inserted or removed in the ordinary manner. The hook 45 may be made of metal and secured with glue or otherwise to the edge of the leaf, as by the strips of cloth 46.

In Fig. 11, I have shown a modification of the leaf fastening hook 45, this being made integral with the leaf. The preferred form is, however, to make the hook 45 of metal as there is a certain amount of friction between the hooks 45 and the strips 36, which would soon cause the hooks to wear and tear if made of other material. To insert a leaf into the book the clamps 37 are loosened by turning the rod 39 with a key and the back 16 is extended by rotating the rod 27 with a key. This permits of sufficient separation of the leaves already in the book to give access to the springs 36 at any point desired, the leaves being pushed along on the springs by hand. The leaf to be inserted is then brought alongside of the other leaves in the desired location and all its hooks 45 save the lowermost one are hooked under the cooperating springs 36; then lastly the lowermost hook is hooked under its cooperating spring 36, and all that remains to be done is to re-adjust the clamps 37 and the back 16, to have the book ready for use.

It will be noticed that to hook the lowermost hook 45 under its cooperating spring 36 it necessarily has to be turned to a position at right-angles to the leaf, because the remaining hooks on said leaf prevent the leaf from being moved down far enough to allow the lowermost hook to pass under the spring 36. I therefore prefer to make the lowermost hook on each leaf of such form that it will not be necessary to bend the metal, but only the connecting cloth portion.

I am not aware that any loose leaves have ever been made with a hook portion as I have shown to secure it into a binding and have therefore made claim to such a construction broadly.

In Figs. 12 and 13 I have illustrated a modified form of clamping device for the back 16, which consists of a bracket 47 of substantially inverted U-shape, and a forked clamp 48 which contacts with the two sides 18,

and is moved down by rotating a cam pin 49 thus clamping the sides 18 together between the clamp 48 and the back support 19.

In Fig. 14, I have shown a binder made substantially the same as heretofore described but with the back open and the two sides 18' secured together by sectional posts 50 to provide for the adjustment of the same.

Having thus described my invention fully, what I claim as my invention and desire to secure by Letters Patent of the United States is—

1. A binder comprising, a back, loose leaves, covers hinged to said back; means between the hinged edges of the covers to bind said loose leaves consisting of a plurality of flat springs secured to said covers and suitable L shaped notches in the edges of the leaves; and means for adjusting the hinged edges of the covers to bind against the edges of the leaves, said covers serving to bend said flat springs into such form when the leaves are opened, as to cause the leaves to lie flat.
2. A flat opening, loose leaf adjustable binder, comprising two nonflexible covers, loose leaves, flat spring metal binding straps secured to said covers and means whereby any single leaf may be inserted or removed without disturbing others, said means comprising L shaped notches in the edge of the leaves to cooperate with said binding straps.
3. A binder including a plurality of spring strips leaves individually detachably secured to said strips by suitable hook shaped notches being provided in the edge of each leaf for the reception of said strips, an adjustable back, and two covers hinged to said back, said spring strips being secured to said covers.
4. A binder comprising a plurality of spring strips leaves individually detachably secured to said strips by L shaped notches being provided in the edge of each leaf for the reception of said strips, an adjustable back and two covers hinged to said back, said spring strips being rigidly secured to one cover and adjustably secured to the other cover.
5. In a binder, a U shaped back, covers hinged to the U shaped back, leaves, longitudinally non-resilient spring strips secured to the covers in such manner that the ends of the springs are always parallel with said covers, and means for independently detachably securing said leaves to said spring strips, said means comprising L shaped notches in the edge of each leaf for the reception of said spring strips.
6. In a binder, a back, covers hinged to said back, steel leaf springs rigidly secured to the covers and leaves independently detachably secured to said springs by L shaped notches provided in the edge of each leaf for the reception of said leaf springs.
7. In a binder, a back, covers hinged to said back, steel leaf springs adjustably secured to said covers, the ends of said springs always being retained in a plane parallel to their respective adjacent cover, and leaves detachably secured to said leaf springs by L shaped notches provided in the edge of each leaf for the reception of said leaf springs.
8. In a binder, the combination of an adjustable back having two covers hinged thereto, a plurality of adjustable spring straps secured to said covers in such manner that the ends of the straps are always held parallel with said covers, leaves independently detachably secured to said spring straps by L shaped notches provided in the edge of each leaf for the reception of said spring straps, means for adjusting said back and means for adjusting said spring straps.
9. In a binder, the combination of two covers hinged to a back, means for adjusting said back, comprising two rack bars and a gear pinion to mesh with the same; flexible strips to support the leaves connected between the covers and means for clamping the free ends of said strips, said means comprising a rock-shaft provided with cams to move clamps against said strips.
10. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a leaf holding strip arranged

to curve toward the front of the book as the covers are opened and to assume an opposite curve as the covers are closed.

11. In a binder, two covers hinged to a back, said hinge comprising links at the extreme end of the hinge, a longitudinal flange on the cover and a longitudinal flange on the back, said flanges overlapping so as to sustain the strain when the binder covers are closed.

12. In a binder the combination of two covers hinged to a back, and a plurality of spring strips having their ends fastened to said covers to always retain them in a plane parallel to said covers, leaves detachably secured to said spring strips by L notches being provided in the edge of each leaf for the reception of said spring strips, all of said parts being so connected and arranged that when the book is opened, the said leaf carrying spring strips are forced to a position to cause the leaves to lie flat at any place of opening.

13. In a loose leaf binder, a plurality of leaf carrying spring strips having their ends rigidly secured to two covers, said covers hinged to a semi-cylindrical back, the said spring strips, covers and back being so connected and arranged to operate when the book is opened that the leaves will lie flat.

14. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a leaf holding strip secured to the covers bridging the space between the same and arranged to curve toward the front of the book as the covers are opened and to assume an opposite curve as the covers are closed.

15. In a binder for a book, the combination of a U shaped back, covers hinged to said back, and resilient strips; means for securing each strip to said covers near the hinge with an intermediate portion between the covers, the intermediate portion of the strips being longer than a straight line between the secured points, the said means being arranged to deflect the intermediate portion of the strips toward the back of the book as the covers are closed and in an opposite direction as the covers are opened.

16. In a binder for a book, the combination of a U shaped back, covers hinged to said back, and a resilient strip; means for securing the strip to said covers near the hinges with an intermediate portion between the covers, the intermediate portion of the strip being longer than a straight line between the secured points, the said means being arranged to deflect the intermediate portion of the strip toward the back of the book as the covers are closed and as the covers are opened to give the secured ends of the strip a direction to snap the intermediate portion of the strip past a straight line between the secured points and away from the back.

17. In a binder for a book, the combination of a U shaped back, covers hinged to said back and spring strips, said spring strips being laterally resilient and longitudinally non-resilient; means for securing each strip to the covers near the hinges with an intermediate portion between the covers longer than the distance between said secured points, said intermediate portion being adjusted to snap back and forth across a straight line between the secured points, as the covers are opened and closed.

18. In a binder for a book, the combination of a back, covers hinged to said back, and strips secured to the covers near the hinges with an intermediate portion between the covers longer than the distance between the secured points, said strips being longitudinally non-resilient and laterally resilient toward the front and back of the book and inflexible toward the top and bottom of the book, and means for deflecting the intermediate portion of the strip toward the back of the book as the covers are closed and toward the front of the book as the covers are opened.

19. In a binder for a book the combination with a back and covers hinged to said back, of resilient strips; and means for securing each strip to the covers, said means being arranged to maintain a part of the strip immediately adjacent to each cover in line with the cover.

20. In a binder for a book, the combination with a back and covers hinged to said back of resilient strips; and means for securing each strip to the covers with an intermediate portion of the strip between the covers, such inter-

mediate portion being longer than the distance between the secured points, when the covers are brought into alinement, said means being arranged to snap the intermediate portion past a straight line between the secured points, as the covers are opened and closed.

21. In a binder for a book the combination with a back and covers hinged to said back, of resilient leaf holding strips; and means for securing each strip to the covers, with an intermediate portion of the strips between the covers longer than the distance between the securing points, said means being arranged to maintain a part of the strip immediately adjacent to each cover in line therewith and to deflect the part between said alined portions toward the back of the book as the covers are closed and in an opposite direction as the covers are opened.

22. In a binder for a loose leaf book the combination of a semicircular adjustable back; covers hinged to said back; resilient strips; means for securing each strip to the cover with an intermediate portion of the strip between the covers longer than a straight line between the secured points, said means being arranged to deflect the intermediate part of the strip toward the back of the book as the covers are closed, and in an opposite direction as the covers are opened, means for adjusting the length of the portion of said strip between the secured points; and means for adjusting the width of said back.

23. A book having covers hinged to a U shaped adjustable back, resilient strips connected to the covers, leaves attached to said strips, the connecting means between the strips and the covers forcing said strips to lie in curved lines parallel with the back when the covers are closed and forcing them away from the back as the covers are opened; and means for adjusting the width of the back.

24. A book having front and back covers hinged to a U shaped back, resilient strips attached to said covers with an intermediate portion of each strip lying between the covers in a curved line parallel with the back when the covers are closed, and arranged to snap away from the back past a straight line between the free edges of the back when the covers are opened; and leaves attached to the intermediate portions of said strips.

25. In a book the combination of a curved adjustable back, covers hinged to the back, resilient strips adjustably connected between said covers in such a manner that an end of each strip will be maintained in alinement with the cover to which it is attached, and the part between the connected points will lie in a curved line parallel with the back and will snap across a straight imaginary line between the free edges of the back when the covers are opened; and leaves individually detachably secured to said strip.

26. A book having a curved adjustable back, covers hinged to the back, resilient strips adjustably connected

between the covers, leaves individually detachably secured to said strips; means for forcing said strips to lie in curves parallel with the back when the book is closed and forcing them away from the back across a straight imaginary line between the top edges of the back when the book is opened.

27. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a resilient leaf holding strip arranged to be flexed as the covers are opened to an arched position extending in front of the plane of the opened covers and to recede from such arched position as the covers are closed.

28. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a resilient leaf holding strip secured to the covers bridging the space between them, and arranged so that an intermediate portion of said strip will be moved to a position beyond the hinged edges of the covers towards the front of the book as the covers are opened and in an opposite direction as the covers are closed.

29. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a leaf holding strip arranged so that an intermediate portion of said strip will be moved to a position beyond the hinged edges of the covers toward the front of the book by the action of the covers as they are opened and will recede from said position as the covers are closed.

30. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a resilient leaf holding strip having its ends secured to the covers and swinging therewith to flex the intermediate portion of said strip.

31. In a book the combination of covers, an intermediate connecting means having flexible connections with the covers and connecting them, and a resilient leaf holding strip having its ends secured to the covers and swinging therewith, the secured ends being distanced to exert compression upon the strip when the ends of the strip are brought into alinement.

32. In a loose-leaf book the combination of a pair of covers having mortises near their back edges, longitudinally non-extensible elastic binding strips adapted to have their ends inserted into the mortises, and means for holding the covers in engagement with the binding strips.

In testimony whereof I have signed my name to this specification this 30th day of September, 1903.

WILLIAM S. PROUDFIT, JR.

Witnesses:

JAMES M. PROUDFIT,

R. J. JACKER.