July 16, 1929. D. S. McCHESNEY 1,720,847

LOOSE LEAF BINDER

Filed March 14, 1927 2 Sheets-Sheet 1

FIG. 1.

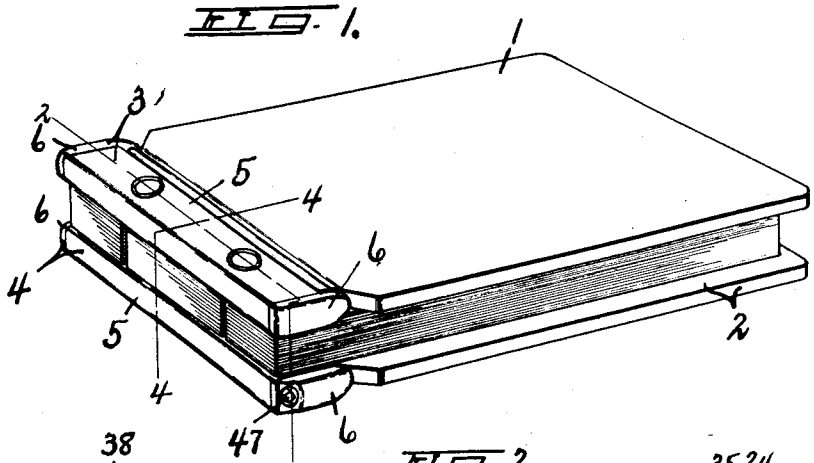


FIG. 2.

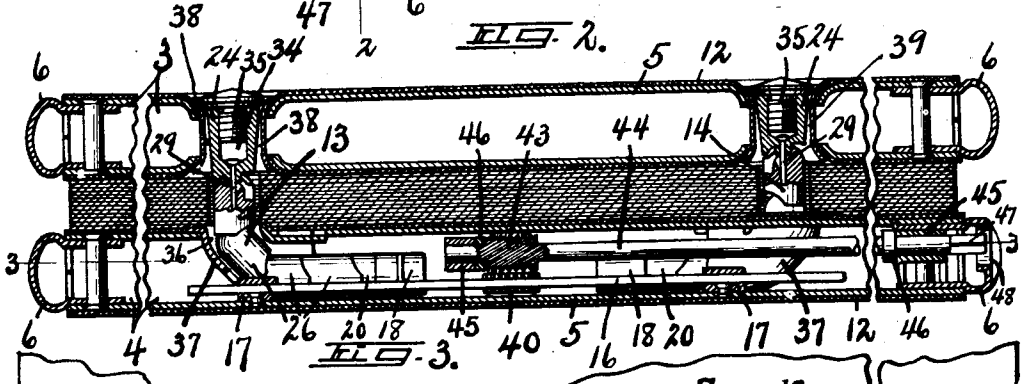


FIG. 3.

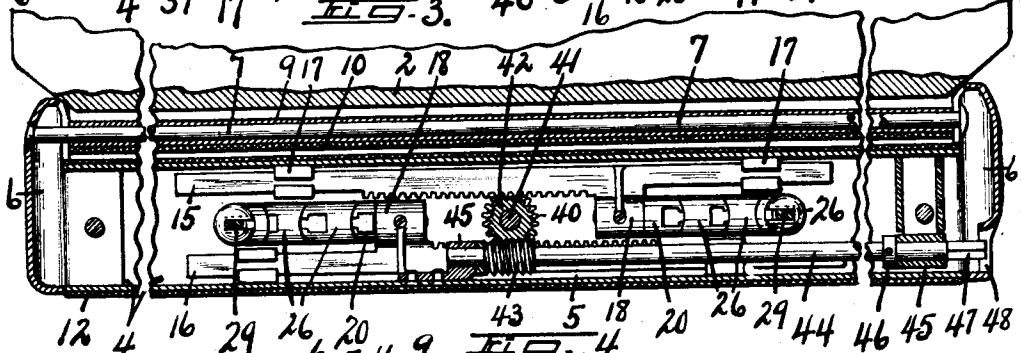
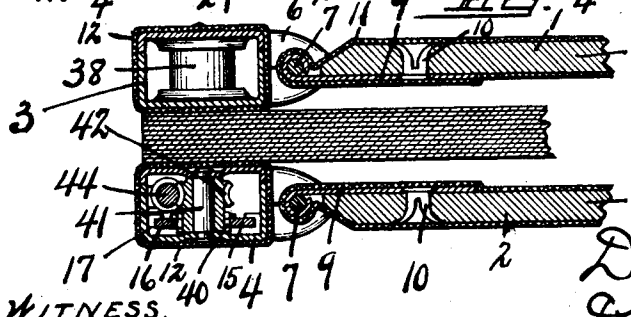


FIG. 4.



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Filed March 14, 1927 2 Sheets-Sheet 2

FIG. 5.

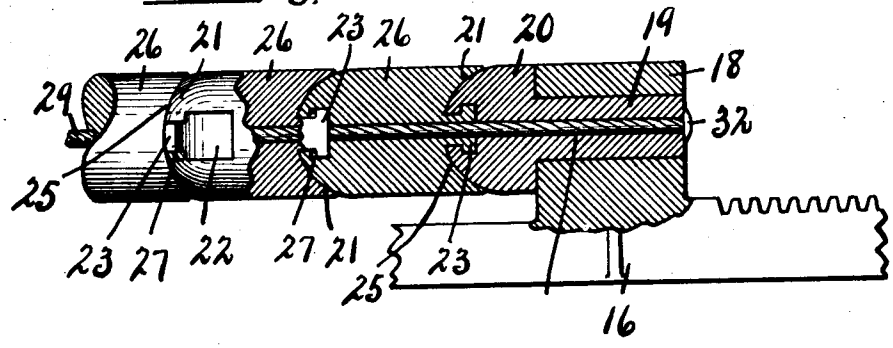



FIG. 6.

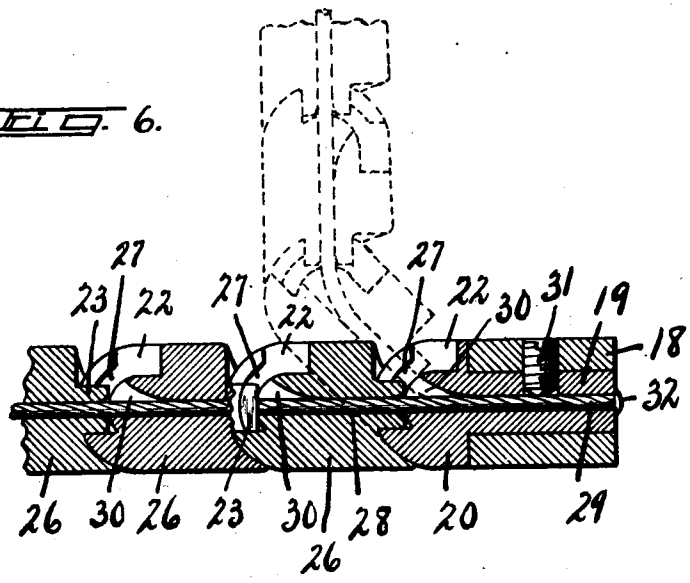
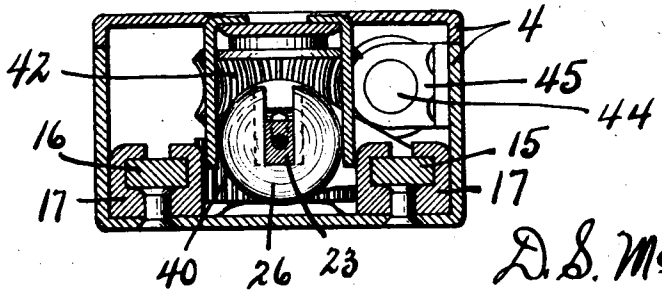



FIG. 7.




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# UNITED STATES PATENT OFFICE.

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## LOOSE-LEAF BINDER.

Application filed March 14, 1927. Serial No. 175,188.

This invention relates to certain new and useful improvements in loose leaf binders.

The main object of the invention is the production of a loose leaf book in which the posts, by reason of a novel and flexible construction, are readily capable of being extended or retracted to permit a tight confinement of the loose leaves in the book without regard to the number of leaves inserted or removed.

A further object resides in the fact that the flexible posts are movable in the end head of one of the book covers, and means is provided for readily and simultaneously moving the posts to a greater or less extent through openings in the end head to permit the insertion of additional leaves by extension of the posts or the retraction of the posts when leaves are removed from the book.

A further advantage resides in the particular form and construction of the flexible posts and the individual sections thereof.

Other objects and advantages relate to the details of the structure and the form and relation to the parts thereof, all as will more fully appear from the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of a book of this invention.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is a section on line 3—3, Figure 2.

Figure 4 is a section on line 4—4, Figuse 1.

Figure 5 is a view partially in section showing a portion of one of the flexible posts and one of the racks.

Figure 6 is a sectional view through one of the posts taken at right angles to Figure 5.

Figure 7 is a sectional view through the end head of one of the covers showing the mechanism for retracting and extending the posts.

The loose leaf book as illustrated comprises two covers —1— and —2— pivotally mounted upon respective binder heads —3— and —4—. These binder heads are preferably of similar form and shape, and each comprises a tubular body portion —5— and end caps —6— secured to the opposite end of the tubular body portion —5—, and extending forwardly therefrom, and the forwardly extending portions support pivot rods —7— extending between the caps —6— and upon which the rear end of covers —1— and —2— respectively are pivotally mounted.

These covers —1— and —2— may be formed of cardboard sheets —8— to which a metallic strip —9— is secured as by rivets —10— and the strips —9— extend rearwardly from the cardboard sheets —8— and are return-bent to form bearings for the pivot rods —7— so that the covers —1— and —2— can be turned about the pivot rods —7— to expose the bound leaves.

Preferably the sheet —8— and strip —9— have a suitable covering —11— of leather or other suitable material, and in like manner the tubular portions —5— of the binder heads —3— and —4— have a covering —12— of leather or other suitable material.

The binder head —4— in this particular illustration contains the mechanism for moving the flexible posts —13— and —14— and for this purpose racks —15— and —16— are arranged lengthwise of the binder head —4— near its front and rear sides, and are slidably mounted in similarly formed channel members —17— secured to the inner side of the wall of the binder head —4—.

Each rack in this particular disclosure includes an integral boss —18— adapted to receive a reduced cylindrical extension —19— upon the end of the first section —20— of the flexible post. These posts are of similar form, shape and construction, and a description of one constitutes a description of both. The first section —20— has its upper portion formed with a curved surface —21— preferably of spherical form, and this spherically formed upper portion is provided with a T-slot which extends up one side of the section and across the top of the section to a point beyond the axis of the section, and at the base of the T-slot there is an opening —22— permitting the sliding of a T-head —23— into the slot.

The remaining sections of the flexible post, except the last one —24—, are preferably of similar form and shape, and each comprises a concave spherically formed lower end —25— provided with a depending T-head —23— adapted to slide in the T-slot in the section next below it.

The upper end of the additional sections —26— is formed with a convex curved surface preferably of spherical form, and the upper end of each section is in turn formed with a T-slot, and an opening leading to the slot of the same form and shape as the T-slot —27— and the opening —22—.

In order to secure all of the sections together in a manner to permit movement of the T-heads in the T-slots to produce a flexible post, each section is formed with an axial conduit —28—, the upper end of which conduit opens into the T-slot in the upper end of the section and the lower end of which extends through the T-head. This conduit is flared outwardly at its upper end on the side toward the opening —22— so that the next above T-head can slide in the T-slot in the section when all of the sections are secured together, as for instance by a wire cable —29—, the enlargement —30— of the conduit on the side adjacent the opening —22— permitting free movement of the cable —29— with the next above section as the post is flexed by the movement of the T-heads in the T-slots.

The cable —29— may be secured to the first section —19— in any suitable manner, as by set screw —31— and by having its end headed or riveted at —32— against the lower end of the section. The upper end of the cable —32— may be provided as best shown in Figure 2 with a headed end —33— engaging the base of a threaded recess —34— in the upper section —24—, and this upper section may be closed by a headed screw —35— threaded into the recess in the section.

By removing the screw —35—, additional rigid extension sections may be threaded into the upper section —34— to lengthen the post, the extensions, however, being non-flexible. Each of the flexible posts is adapted to move longitudinally in opposite directions in the binder section —4— and are turned upwardly through openings —36— in the upper side of the binder section —4—, which binder section has its wall bent downwardly to form a curved guide —37— for guiding the flexible post into and out of the binder section —4—, and in like manner the other binder section —3— is formed with openings or passageways —38— and —39— through which the upper ends of the posts —13— and —14— are adapted to extend, the heads of the screws —35— being of larger diameter than the passageways to thereby secure the upper ends of the posts from downward movement through the openings when loose leaves are clamped between the binder sections in the use of the book.

For the purpose of extending and retracting the flexible posts —13— and —14—, means is provided for reciprocating the racks —15— and —16— in opposite directions, and in this illustration this means takes the form of a gear —40— mounted upon a shaft —41— journaled in the upper and lower walls of the binder head —4—, the gear —40— meshing with the oppositely disposed racks —15— and —16— for sliding the racks within the binder head as the shaft —41— is rotated.

For the purpose of rotating the shaft —41— a worm gear —42—, integral with gear —40—, is mounted on the shaft and meshes with a worm —43— formed on the shaft —44— journaled in bearings —45— carried from the interior of the binder head —4—. This shaft is formed with collars —46— which prevent longitudinal movement of the shaft and the end —47— of the shaft is preferably square and is aligned with an opening —48— formed in the end cap —6— of binder head —4— so that by the use of a key, the worm —43— can be manually rotated to thereby actuate the racks to move the flexible posts —13— and —14— to a greater or less extent into or out of the binder head —4—.

It will be apparent that with this form of device it is only necessary that the posts should flex in one direction, and that by the use of the cooperating concave and convex portions on the sections of the posts, the concave sections being provided with the T-heads and convex sections being provided with T-slots, that a comparatively permanent and rigid structure is produced which is capable of freely flexing in a direction to permit the posts to be pushed into or out of the binder head —4— along the guides —37— to extend or retract the posts in accordance with the thickness of the leaves to be bound in the book.

Altho I have shown and described a specific construction of apparatus as constituting a perhaps preferred embodiment of the invention, I do not desire to restrict myself to the details of form, construction or arrangement of the apparatus or the parts thereof, except as the same may be specifically included in the claims hereto appended.

I claim:

1. A loose leaf book comprising binder heads, covers pivotally connected to the binder heads, each of said binder heads being formed with openings, and flexible posts having end portions positioned in one binder head and projecting outwardly therefrom and through the other binder head, and a pair of racks and a gear permanently mounted in the first of said binder heads for simultaneously extending and retracting the posts.

2. A loose leaf book comprising binder heads, covers pivotally connected to the binder heads, each of said binder heads being formed with openings, and flexible posts

having end portions positioned in one binder head and projecting outwardly therefrom and through the other binder head, a pair of racks and a gear mounted in the first of said binder heads for simultaneously extending and retracting the posts, and a worm shaft extending through the first of said binder heads having an exposed end adapted to be operated for driving said gear.

3. A loose leaf book comprising a flexible post including a section having a curved head formed with a T-slot and a base formed with a T-head adapted to engage a T-slot in the next successive section.

4. A loose leaf book comprising a flexible post including a section having a convex curved head formed with a T-slot and a concave curved base formed with a T-head adapted to engage a T-slot in the next successive section.

5. A loose leaf book comprising a flexible post including a section having a convex spherical head formed with a T-slot and a concave spherical base formed with a T-head adapted to engage a T-slot in the next successive section.

6. A loose leaf book comprising a flexible post including a plurality of sections having curved head portions formed with T-slots and curved base sections having depending T-heads, the T-heads of one section being slidably inserted in the T-slots of the next section, and means for securing the sections together to permit sliding movement of the T-heads in the T-slots.

7. A loose leaf book comprising a flexible post including a plurality of sections having curved head portions formed with T-slots and curved base sections having depending T-heads, the T-heads of one section being slidably inserted in the T-slots of the next section, said sections provided with a conduit extending from top to bottom thereof, and a cable extending through said conduit for connecting the sections together.

8. A loose leaf book comprising a flexible post including a plurality of sections having curved head portions formed with T-slots one end of said slots being cut away to permit the insertion therein of a T-head and curved base sections having depending T-heads, the T-heads of one section being slidably inserted in the T-slots of the next section, each of said sections formed with a conduit extending from top to bottom thereof, the upper end of the conduit adjacent the T-slot flaring toward the cut-away end of the T-slot, and means extending through said conduit for securing the sections together in a manner to permit the T-heads to slide in the T-slots.

In witness whereof I have hereunto set my hand this 11 day of March 1927.

DONALD S. McCHESNEY.