No. 831,969. PATENTED SEPT. 25, 1906.

L. M. MORDEN & L. R. HITCHCOCK.

ADJUSTABLE LOOSE LEAF BINDER.

APPLICATION FILED MAR. 21, 1904.

Fig. 1.

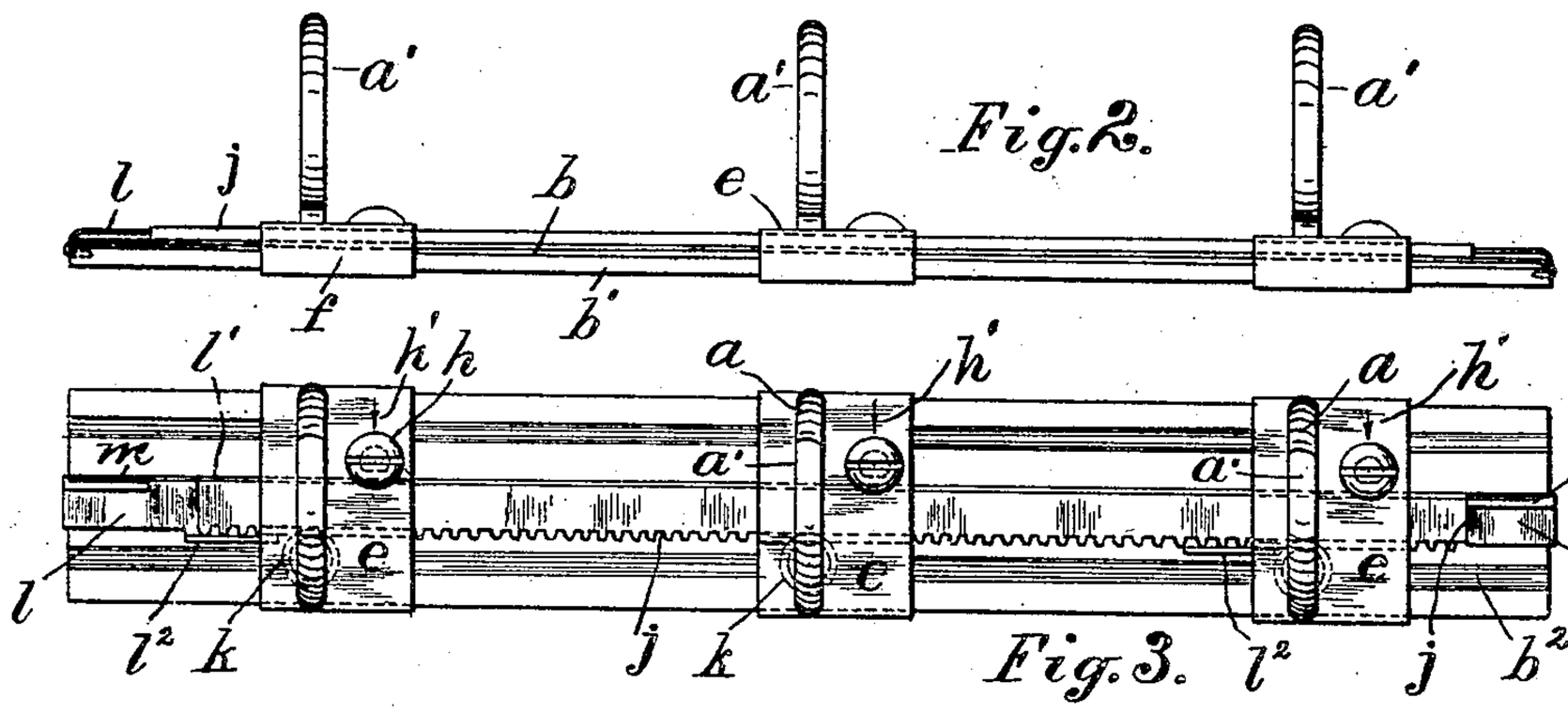


Fig. 2.

Fig. 3.

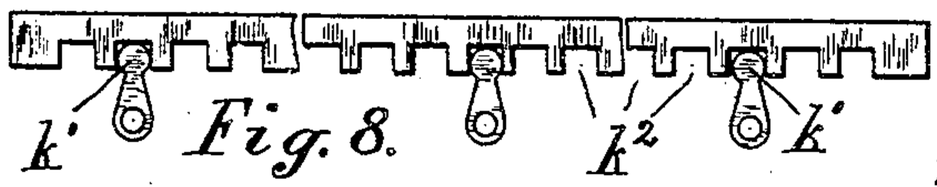


Fig. 8.

Fig. 7.

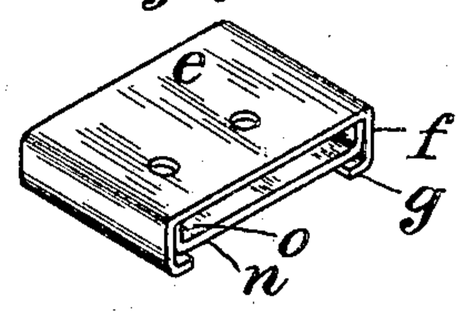
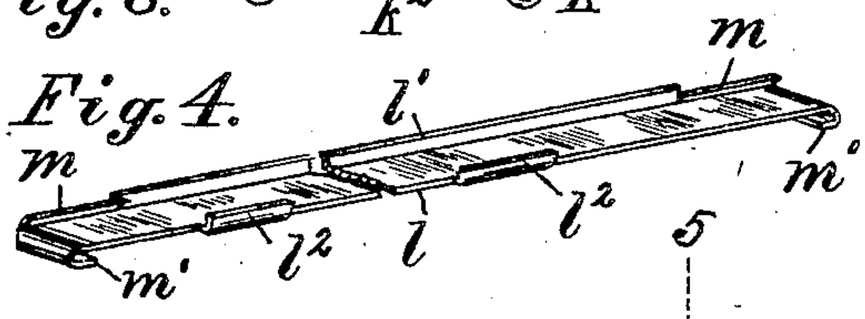


Fig. 4.



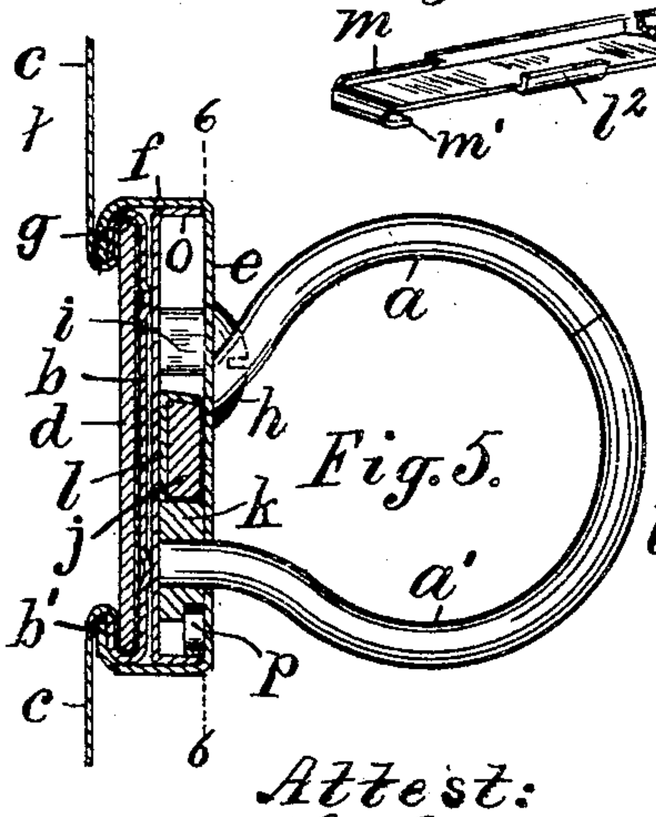


Fig. 5.

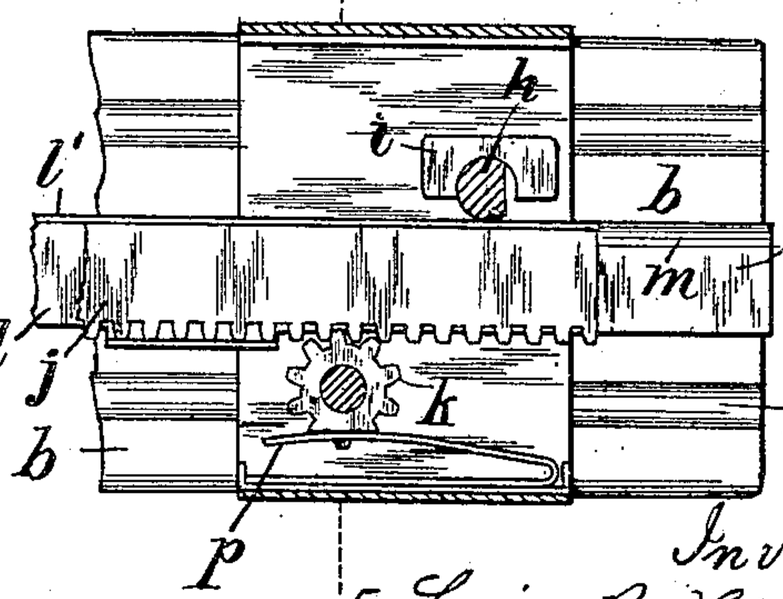


Fig. 6.

Attest:
L. Lee.
Arthur F. Beaton

Inventors.
Lucien R. Hitchcock,
Lucena M. Morden,
per Thomas L. Crane, atty

UNITED STATES PATENT OFFICE.

LUCENA M. MORDEN, OF WATERBURY, AND LUCIEN R. HITCHCOCK, OF WATERTOWN, CONNECTICUT; SAID HITCHCOCK ASSIGNOR TO SAID MORDEN.

ADJUSTABLE LOOSE-LEAF BINDER.

No. 831,969. Specification of Letters Patent. Patented Sept. 25, 1906.

Application filed March 21, 1904. Serial No. 199,296.

To all whom it may concern:

Be it known that we, LUCENA M. MORDEN, whose residence and post-office address is 59 Grand street, Waterbury, county of New Haven, State of Connecticut, and LUCIEN R. HITCHCOCK, whose residence and post-office address is Watertown, county of Litchfield, State of Connecticut, citizens of the United States, have invented certain new and useful Improvements in Adjustable Loose-Leaf Binders, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to that class of loose-leaf binders or files in which sheets of paper have perforations applied to rings or arches over which the sheets can be turned successively to expose any of the lower sheets for inspection. In such binders it is common to make a part of each arch movable, so as to insert or remove the leaves, and in some files the movable parts of all the arches are connected together by suitable mechanism to move simultaneously, so that the hand can be applied to any one of the arches for opening them all at the same time. Heretofore such connecting mechanism has been non-adjustable and has necessitated the pivoting of the movable parts at fixed points upon a suitable base, and the entire structure could only be used with leaves having perforations at a specific distance apart.

The object of the present invention is to make the arches adjustable to and from one another upon a given base, so that the structure may be adapted for a greater range of usefulness by adaptation to sheets having the holes punched at various distances apart. For instance, in a loose-leaf binder having a back or base eight inches in length and provided with two of the arches such arches may be set an inch apart or six inches apart, and the base may therefore be used with leaves eight inches in width, whatever the distance in the perforations within the limits mentioned, and the movable parts of the arches possess a mechanical connection by which both may be opened simultaneously by manipulating either. This result may be attained, as shown in the annexed drawings, by providing the base with a series of adjustable carriers to support each of the arches movably and employing a coupler-bar adapted to engage the lever-arms in various adjustments of the carriers. The lever-arms are readily adapted to engage a coupler in various positions by forming the coupler of a continuous rack of gear-teeth and furnishing the lever-arm with a pinion or segment of gear-teeth adapted to mesh with the coupler-bar in various adjusted positions of the carriers.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is an end view of a binder-file formed with hinged covers. Fig. 2 is an edge view of the base with the adjustable arches thereon. Fig. 3 is a plan of the same. Fig. 4 is a perspective view of the coupler-box with a portion broken away for want of space. Fig. 5 is a cross-section of the base on line 5 5 in Fig. 6, and Fig. 6 is a plan of a portion of the base and one of the carriers with the surface of the carrier cut away on line 6 6 in Fig. 5 to expose the interior of the carrier. Figs. 5 and 6 are drawn upon an exaggerated scale to show the details clearly. Fig. 7 is a perspective view of the carrier detached from the base. Fig. 8 shows an alternative construction for the lever-arms and coupler-bar. The details of guide-bar are omitted from Fig. 1.

Fig. 1 shows binder-covers A united by a flexible back B, which is connected with the base by the means shown in Fig. 5. In this figure the base *b* is shown with inwardly-turned flanges *b'* at the edges, into which a flexible fabric *c* is crowded by a locking-strip *d*. The base forms a guide-bar upon which the carriers are adjusted and is stamped with ridges b^2 to stiffen the same. The carrier is formed as a rectangular box having a top plate *e*, with edges *f* bent at right angles and furnished with flanges *g* to embrace the edges of the guide-bar. The plate *e* of the carrier is spaced or held outwardly from the guide-bar by flanges *o*, fitted within its opposite edges and projected from a plate *n*, resting upon the guide-bar. The plates *n* and *e* are secured together by a screw *h*, which is inserted through the plate *e* into a boss *i* upon the plate *n*. The arches or so-called "book-rings" have a fixed portion *a'*, secured upon the carrier-plate *e*, and a movable portion *a'*, having shank journaled in the plate and pro-

vided inside the carrier with a pinion *k*, which represents the lever-arm. The carriers are adjustable to and from one another upon the guide-bar by sliding them thereon, the plate *n* contacting with the front side of the guide-bar, while the flanges *g* contact with the rear side.

To connect the pinions *k* in various positions of the carriers, a toothed rack *j* is provided, which forms the coupler-bar and is held movably in a coupler-box *l*, having a flange *l'* at the rear edge. The screw *h* is inserted through the carrier in a suitable position to contact with the rear side of the coupler-box when the coupler-bar is engaged with the teeth upon the pinion *k;* but one side of the screw is flattened, so that when turned with the flat next to the coupler-box the coupler-box with the coupler-bar may be moved laterally within the carrier, so as to release the coupler-bar from the pinions. Ribs l^2 serve to guide the rack upon the coupler-bar. In this adjustment the carriers with the pinions and arches may be moved into the desired adjustment, so that the arches may fit the perforations in the sheets with which they are to be used. The turning of the screws then forces the coupler-box laterally and brings the teeth upon the coupler-bar again into mesh with the pinion-teeth, so as to couple the pinions and arches together. The flat on the screw *h* is turned to clear the coupler-box by an index *h'*.

Through the agency of the coupler-bar the turning of any of the movable parts *a'* operates to turn the others simultaneously.

To prevent the coupler-box from longitudinal movement, its ends are formed of bent flanges *m'*, which embrace the ends of the guide-bar *b*. The flange or rib *l'* at the rear edge of the coupler-box is constructed by cutting and bending forwardly to form stops *m* near opposite ends of the coupler-bar to limit its movement. The stops are so adjusted that when the pinions are suitably engaged with the coupler-bar one end of the coupler-bar will contact with the adjacent stop when the movable parts *a'* of the arches coincide with the fixed parts *a*.

A portion of the pinion-teeth for one-half the length of the teeth is flatted, and a leaf-spring *p* is fitted to the same so as to engage the flatted surface when the arch or book-ring is closed by the coincidence of the parts *a a'*.

When the part *a'* is turned, the rotation of the pinion forces the leaf-spring backwardly; but the engagement of the spring with the flatted portion serves to retain the arch closed when the movable part is restored to its normal position opposite the part *a*. It is evident that the pinions in all the carriers occupy a certain position when the arches are closed, and the teeth upon such pinions can be meshed with any of the teeth upon the coupler-bar or rack *j* by shifting the carrier repeatedly through the space of one tooth upon such bar.

By making the teeth of relatively fine pitch the carriers can be adjusted within such small spaces that the arches may in practice fit holes punched in the sheets at any distance apart.

A modification of the lever-arms and coupler-bar is shown in Fig. 8, a portion only of the coupler-bar being shown for want of space. In this figure each lever-arm is formed with a flat circular head *k'*, attached to the lever-arm by a narrow neck, and the edge of the coupler-bar is formed with a series of suitable notches k^2, adapted to fit the heads of the lever-arms. With this construction the carrier must be shifted so as to move the lever-arm from the center of one opening to the center of the next when coupling the various lever-arms together, and the adjustment of the arches to and from one another cannot, therefore, be effected within such small spaces as with the rack-bar and the toothed pinions which constitute the lever-arms shown in Fig. 6.

The essential feature of the invention is the provision of adjustable carriers upon a guide-bar to sustain the arches and means for connecting the movable parts of the arches in various adjustments of the carriers, and the invention is not, therefore, limited to the particular construction shown in the drawings.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In a loose-leaf binder, the combination, with a suitable guide-bar, of a series of carriers mounted adjustably thereon and provided each with a divided arch or ring to receive the perforated leaves, one part of each arch being movable, and means upon the guide-bar for connecting such movable parts of the arches in various adjustments of the carriers, whereby the arches may be set at different distances apart and opened and closed simultaneously.

2. In a loose-leaf binder, the combination, with a suitable guide-bar, of a series of carriers mounted adjustably thereon and provided each with a divided arch or ring to receive the perforated leaves, one part of each arch being movable and provided with a lever-arm, a coupler for the lever-arms, and means for holding the coupler in engagement with the arms in various adjustments of the carriers.

3. In a loose-leaf binder, the combination, with a suitable guide-bar, of a series of carriers mounted adjustably thereon and provided each with a divided arch or ring to receive the perforated leaves, one part of each arch being movable and provided with a lever-arm, a coupler-box movable laterally upon the guide-bar within the carriers, and a

coupler-bar movable longitudinally in such coupler-box and provided with means for engaging the lever-arms in various adjustments of the carriers.

4. In a loose-leaf binder, the combination, with a suitable guide-bar, of a series of carriers mounted adjustably thereon and provided each with a divided arch or ring to receive the perforated leaves, one part of each arch being movable and provided with a lever-arm having pinion-teeth, a coupler-bar furnished with rack-teeth to engage the series of pinion-teeth, means for retracting the coupler-bar from such pinion-teeth, when adjusting the carriers, and means for holding the coupler-bar in engagement with such pinion-teeth in various adjustments of the carriers.

5. In a loose-leaf binder, the combination, with a sheet-metal guide-bar, of sheet-metal carriers with flanges fitted movably to the edges of such guide-bar, a divided arch or ring upon each carrier with one part journaled to turn in the same, and having a toothed pinion within the carrier, a rack fitted longitudinally upon the guide-bar within the carriers and fitted removably to the several pinions, and means for holding the rack in engagement with the pinions in various adjustments of the carriers.

6. In a loose-leaf binder, the combination, with a sheet-metal guide-bar, of sheet-metal carriers with flanges fitted movably to the edges of such guide-bar, a divided arch or ring upon each carrier with one part journaled to turn in the same, and having a toothed pinion within the carrier, a coupler-box extended longitudinally upon the guide-bar within the carriers, and having flanges at the ends fitted movably to the ends of the guide-bar, a rack fitted to move longitudinally upon the coupler-box, and means upon each carrier for locking the coupler-box in position when the rack is adjusted to the pinion-teeth.

7. In a loose-leaf binder, the combination, with the hinged cover of the binder, of the base attached thereto, a series of carriers fitted adjustably upon the base and provided each with an arch or ring having movable part, and means for connecting such movable parts of the arches to move simultaneously in various adjustments of the carriers, whereby the carriers may be adjusted to suit variously-perforated leaves and the arches opened simultaneously by the connecting means.

8. In a loose-leaf binder, the combination, with a suitable guide-bar and means for attaching the same to a flexible fabric for attachment to the binder, of a series of carriers mounted adjustably upon the guide-bar and provided each with a divided arch or ring to receive the perforated leaves, one part of each arch being movable and provided with a lever-arm, a coupler-bar for the lever-arms with means for engaging the same in different adjustments of the carriers, and means for moving the coupler-bar laterally upon the guide-bar to engage and disengage it with the lever-arms.

9. In a loose-leaf binder, the combination, with a suitable guide-bar, of a series of divided arches or rings adjustably mounted thereon to receive perforated leaves, one part of each arch being movable with respect to the other and provided with a lever-arm, a rack provided with a continuous series of notches upon the edge, and the lever-arms having their extremities fitted detachably to such notches, whereby they may be engaged with the notches in various adjustments of the rings upon the guide-bar.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

LUCENA M. MORDEN.
LUCIEN R. HITCHCOCK.

Witnesses:
L. LEE,
THOMAS S. CRANE.