This invention relates to loose-leaf devices more particularly of the binder type including prong-holding means in the form of a toggle device and a supporting member such as a binder back providing a support for the toggle for free movement thereon.

Binders of this type which are generally of large size, should be easily manipulated to close or spread the prongs and should at the same time provide a firm and non-collapsible support for the leaves to be written upon, while affording a flat writing surface as flat as possible. Heretofore these objects have been sought in some instances by maintaining the support or binder back against tilting and, in other instances, by permitting the support or binder back to tilt. In each case, whether with the tilting or non-tilting support, it has been important to prevent collapsing of the support. Supporting means of the first-mentioned type is disclosed in my Patent No. 1,722,810 of July 30, 1929; and in my copending application Serial No. 752,219 filed November 8, 1934, I have described and claimed an improved device of the tilting type.

My present improvement, among other objects, aims to combine advantages of both the non-tilting and the tilting types referred to and thus retaining the greater advantages in stability and flexibility peculiar to each type.

Other objects and advantages will be apparent from the following description taken together with the accompanying drawings, in which—

Figure 1 is a partial end view of a binder constructed in accordance with my invention, the binder being shown in closed position;

Figure 2 is an end view of the binder of Fig. 1 in normally open position for the making of entries on the loose-leaf sheets or for reference thereto;

Figure 3 is a similar view of the binder in normally open position for the removal or insertion of sheets; and

Figure 4 is a similar view of the binder in extreme open position.

Referring in detail to the illustrative construction shown in the drawings, I have indicated, in general, a binder 10 of the class described, it being sufficient for present purposes to designate the binder, which includes the leaf or sheet-engaging means such as the prongs, and the support or binder back which supports the prongs for movement thereof when the binder is open. Furthermore, it is deemed sufficient to show merely end views of the construction referred to, as these best illustrate my novel improvement, and it will be understood that the corresponding plan views, if shown, would in general depict the usual book formation.

In accordance with my present invention, the improved construction includes broadly, a binder back embodying an inner normally trough-like element 11 and an outer normally trough-like element 12, these two elements, as shown in Figs. 1 and 2 being in telescoping or nesting relation, the element 11 constituting the means for directly carrying the leaf-impaling prongs 13, 14 and the element 12 constituting the support therefor, and in this instance, the binder back proper.

The element 12 in this instance constituting the binder back proper is, in accordance with my invention, formed of two angularly displaceable sections such as the metallic members 15, extending longitudinally of the binder back, that is, away from the observer referring to the views of the drawings. Each of these members 15 has, in this instance, an upright portion 16 and an integral portion 17 extending at right angles to the portion 16, the portions 17 of each member extending toward each other, normally in a common plane, to meet adjacent a median line running longitudinally of the binder back. Each of the said angular portions provides a base for the binder extending for a material distance transversely of the binder back. The angle between the portions 16, 17 as at 18 desirably forms a relatively sharp, square corner for purposes presently pointed out, this corner being relatively sharp and square in the sense that it is a right angle but being exteriorly slightly rounded by reason of the resilient facing 22 to permit rotation on the table top or the like 23. Secured to each of the portions 17 is a hinge-leaf 19 extending, in effect, longitudinally of the binder, each of these hinge-leaves having aligned hingelugs 20 through which is passed the usual hingeprod or pintle 21 thus flexibly connecting the angular members 15 medially of the binder back for free relative angular movement of these members. In this instance, the members 15 are permitted relative angular movement on the hinge 21, so that these members may move about the hinge as a pivot in either direction. By this is meant that the hinge may be either buckled upwardly as shown in Fig. 2, in which event the hinge 21 is disposed on one side of a plane passing through the corners 18, or, as shown in Fig. 4, the members 15 may be buckled in the opposite direction so that the hinge is disposed upon the opposite side of a plane passing through these corners.
some circumstances, it might be desirable to limit relative angular rotation of the members 15, as will be readily understood. These members are desirably faced with leather or fiber, as at 22, to prevent scratching of the tabletop 23, the facings 22 being spaced apart as at 24 in the vicinity of the hinge 21 so as to avoid interference with the hinge, but being desirably of sufficient thickness so as to be flush with the hinge-lugs 20, thus providing that the members 15, in effect, may rest firmly upon the tabletop or other working surface 23, with the portions 27 parallel therewith as shown in some of the views of the drawings.

The element 11, as here shown, is the usual toggle device similar to the corresponding element shown in my prior disclosures above referred to and also includes two complementary members 26 medially hinged as at 28 upon a hinge-pin parallel with the hinge-pin 21 and also each having the normally upright portion 27 and right-angularly directed portions 28 which meet adjacent the common plane of the hinges 21 and 26, the portions 28 being advantageously of box-like formation, for housing any suitable locking or catch mechanism which may be employed, to prevent, until released, relative angular rotation of the parts. Also since the parts 28 are of box-like formation, the members 26 of the toggle device can be buckled in only one direction, that is, upwardly, or away from element 12, thus preventing collapse of the structure.

Further in accordance with my present invention, the elements 11, 12 are flexibly connected at their outer edges, in this instance by aligned hinge-lugs 23 some of which are formed integrally with the portions 16 of the members 15 and some formed integrally with the parts 27 of the element 11, the usual hinge-pins 30 rotatably connecting the parts together, on lines parallel with the hinges 21 and 26. One set of sheet-impaling prongs 13, which may be appropriately spaced apart longitudinally of the binder back, are carried by a bar 31 suitably secured to one of the parts 27 of the toggle. The other set of prongs 14 are similarly carried by the other part 21, the prongs 13, 14 being staggered longitudinally of the binder back so as to be moved into and out of overlapping position as shown in Figs. 1 and 2, and being desirably curved on an arcuate substantially concentric with the hinge 26. Thus the leaves or other record sheets 32 may substantially fill the binder extending from end to end of the prongs, as shown in Fig. 1.

The usual stiff covers 33 are provided which, as here shown, are desirably hinged at 34 (parallel with the other hinges mentioned) on the parts 26 respectively of the toggle device.

The operation of my present improvement is as follows:

In the position shown in Fig. 1, the binder is ready to be opened for any purpose. In this position, both parts 11 of the back members 15 are parallel with the tabletop and rest squarely thereon, thus providing a firm support for the remainder of the binder.

Upon opening the binder, the prongs 13, 14 may be permitted to come into less overlapped relation, as seen in Fig. 2, thus affording flatter surfaces 36 upon the uppermost leaves or sheets 32 facilitating reference to the sheets or writing thereupon. To permit the prongs to move in a direction apart, the toggle mechanism 11 is buckled upwardly causing its outer edges, as at the hinges 33, to move laterally in a direction apart. In accordance with my invention, such spreading movement of the toggle device is permitted by my novel provision for hinging the supporting members 15 of the binder back 12 at 21, thus permitting the supporting members 15 to hinging movement which spreads them apart corresponding in the vicinity of the upright portions 16 upon which the hinges 33 are carried. Further to accommodate this movement, the corners 18 may move slightly inwardly in a direction towards each other on the tabletop 23. The toggle is thus supported for free movement of its medial hinge 26, the hinge 21 of the supporting means being responsive to the movement of the toggle and permitting the supporting means to automatically adjust itself to the movement of the toggle. The parts as shown are so balanced and the movement of the corners 18 on the tabletop is so slight that little effort is required to spread the prongs apart to the position shown in Fig. 2. At the same time the parts are in stable equilibrium and non-collapsible, so that any normal amount of pressure may be placed upon either side of the record leaves without causing the binder back to tilt or move around, for this reason ensuring a firm, smooth, writing surface. Any downward pressure exercised on a hinge 34 of one of the covers laterally outwardly of the base or binder-back member which might tend to cause the adjacent member 15 to rotate, is counteracted by the opposite member 15 which tends to resist further upward movement of the hinge 21, due not only to its own weight but also to the weight of the toggle device and the record leaves therein.

When it is desired to remove or insert record sheets 32, by a relatively slight effort the prongs 13, 14 may be further rotated to spread them completely apart as shown in Fig. 3. During this movement, the toggle device is buckled still further upwardly, the medial hinge 26 moving in this same upward direction to a point where it is spaced a materially great distance above the hinge 21. During this movement also the outer edges of the toggle device are permitted to move laterally in a direction apart to their maximum distance, the upright portions 16 of the supporting means moving corresponding apart, whereupon after having reached its maximum spread, the toggle device will again contract in the sense that the hinge-points 30 connecting the toggle device and the supporting means will move laterally inwardly. When this has occurred, the members 15 of the supporting means will be rotated in a direction opposite to that first described for them, so that the hinge 21 of the binder back is moved downwardly until it reaches the tabletop whereupon the parts 11 of the supporting members 15 will be flat or parallel with the tabletop (Fig. 3). This being the position of greatest stability for the supporting means, an unusually firm and non-collapsible support is provided for the leaves 32 during the critical steps of removing and replacing leaves from the prongs or impaling leaves therein. Also if the binder be of the type in which one of the toggle parts may move longitudinally with respect to the other, on its respective hinges, in accordance with the well-known shift type of binder, a markedly firm support is provided for this operation which is usually performed in the position of the binder shown in Fig. 2. Also the normal weight may be placed upon either side of the binder in this position without causing the back members 15 to rotate or collapse since the parts 75.
counterbalance each other and the square corners further resist any turning movement of the supporting members. When, for example, a majority of the leaves are all on one side of the binder and it may be deeper than normally desired, the angle between the prongs and the prong-carrying means in the form of a two-part medially hinged toggle pivoted on both said upright portions for free movement of the medial hinge, relative angular movement of the supporting members being responsive to movement of the toggle and the hinge of the supporting members being free to buckle on either side of a plane normal to the said angular portions.

2. In a loose-leaf binder, the combination including a binder back embodying two supporting members hinged together medially of the binder back for relative angular movement of the members, a set of prongs for each of said members in parallel arrangement, each set of prongs being individually pivotally mounted on a longitudinal axis on said members respectively, and means connected with said prongs serving when one set of prongs is swung upwardly and outwardly with respect to the other set to give said members a slight relative angular movement to cause the medial hinge of the members to move upwardly.

3. In a loose-leaf binder of the class described, the combination with a trough-shape binder back, of prong-holding means in the form of a trough-shape toggle device normally nested within the back and having a medial hinge, said back comprising means for supporting the toggle for free movement of the medial hinge, said means including a pair of supporting members carrying the toggle device, hinge connections between the toggle and said supporting members at their upper outer sides respectively, and hinges operatively connecting said members medially of the binder back whereby the supporting members are free to move angularly but relatively of the toggle device in response to movements of the medial hinge of the toggle.

4. In a loose-leaf binder, the combination including a binder back embodying two internested normally trough-like elements flexibly connected at their outer edges, each comprising a pair of right-angular members, each member having rigid portions forming between them a relatively sharp square corner and each element having its respective members hinged together medially of the binder back for free relative angular movement whereby the elements may be buckled into and out of internested relation and the medial hinges may move in the same or opposite directions responsive to relative movements of the said elements.

5. In a loose-leaf binder, the combination including a binder back embodying two internested normally trough-like elements flexibly connected at their outer edges, each comprising a pair of right-angular members, each member having rigid portions forming between them a relatively sharp square corner and each element having its respective members hinged together medially of the binder back for free relative angular movement whereby the elements may be buckled into and out of internested relation and the hinges may move in the same or opposite directions responsive to relative movements of the said elements, a set of curved prongs carried by each of the members of the inner element concentrically with the hinge individual thereto, and a cover hinged to each of said members of the inner element.

6. In a loose-leaf device, a jointly trough-shape pair of angular directly connected relatively
angularly displaceable supporting members, angularly displaceable sheet-engaging means pivoted to said members at each side thereof, a connection between said means so that movement of the means on one side causes movement of the means on the other side, said members being angularly adjustable in response to movements of the sheet-engaging means, and a pair of covers one hinged directly to each of the sheet-engaging means apart from the pivots of the said means on said members.

7. In a loose-leaf device, the combination including a trough-shape binder back comprising two angularly formed back sections pivoted together medially of the binder back, and trough-shape sheet-engaging means in the form of a two-part toggle device hinged at each side to one of said sections and normally nested therein, said toggle device having a medial hinge parallel with the hinge of the back sections, both said hinges being freely movable transversely of the binder back in either direction, and said sections being angularly movable in response to movements of the medial hinges.

8. In a loose-leaf device, a jointly trough-shape pair of relatively rotatably connected supporting members, at least one of said members having a normally upright portion and another portion extending rigidly toward the other of said members, and a normally trough-shape toggle device normally nested within the supporting members pivotally connected at both sides to said members, said members being automatically angularly adjustable in response to movements of the toggle device.

9. In a loose-leaf binder of the class described, the combination with a trough-shape binder back, of prong-holding means in the form of a trough-shape toggle device normally nested within the back and having a medial hinge, said back comprising means for supporting the toggle for free movement of the medial hinge, said means including a pair of supporting members carrying the toggle device, hinge connections between the toggle and said supporting members at their upper outer sides respectively, and a single hinge operatively connecting said members whereby the supporting members are free to move angularly but relatively of the toggle device in response to movements of the medial hinge of the toggle.

ALFRED M. MARTIN.