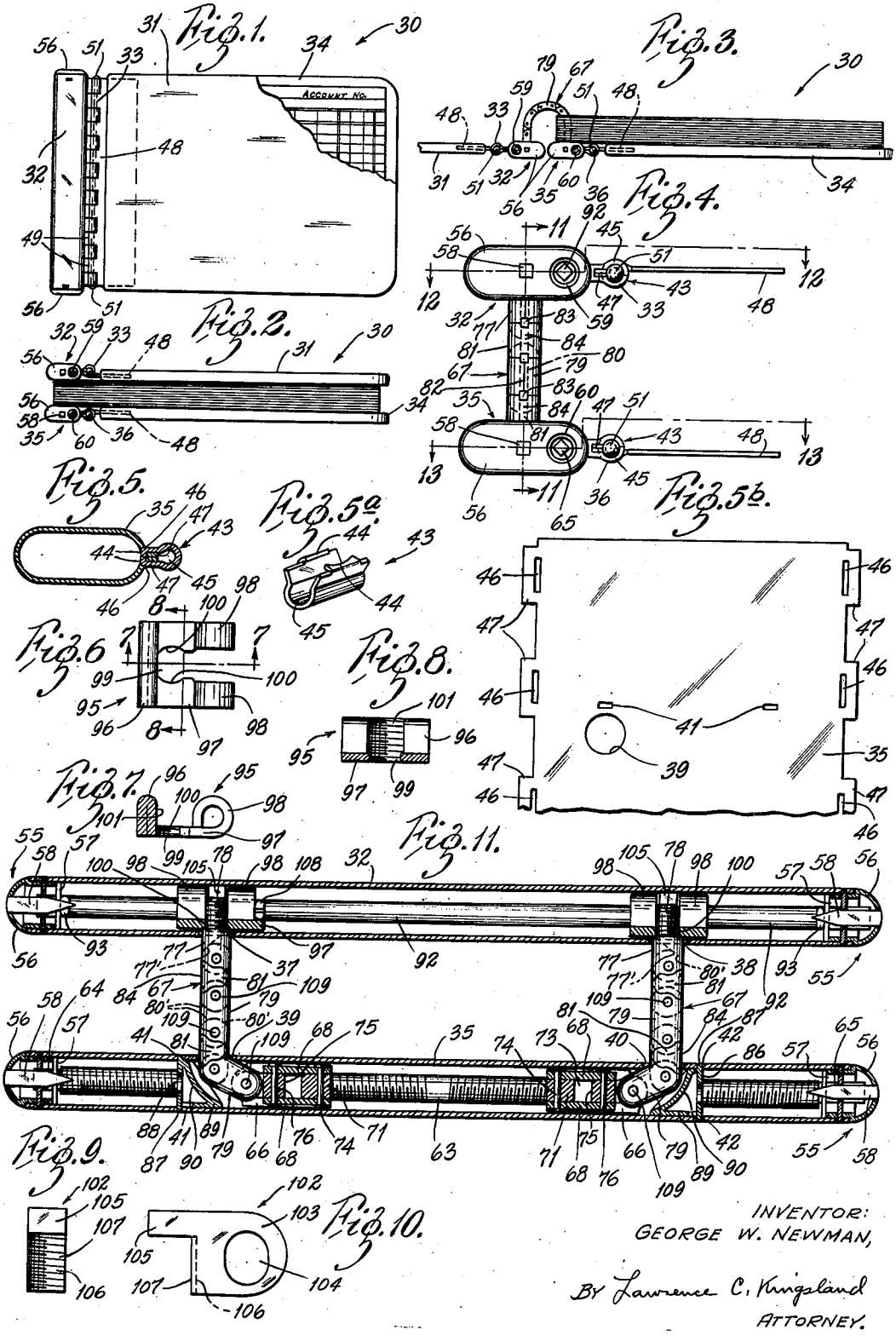
May 14, 1940. G. W. NEWMAN 2,200,364

BOOKBINDER

Filed Dec. 16, 1937 2 Sheets-Sheet 1



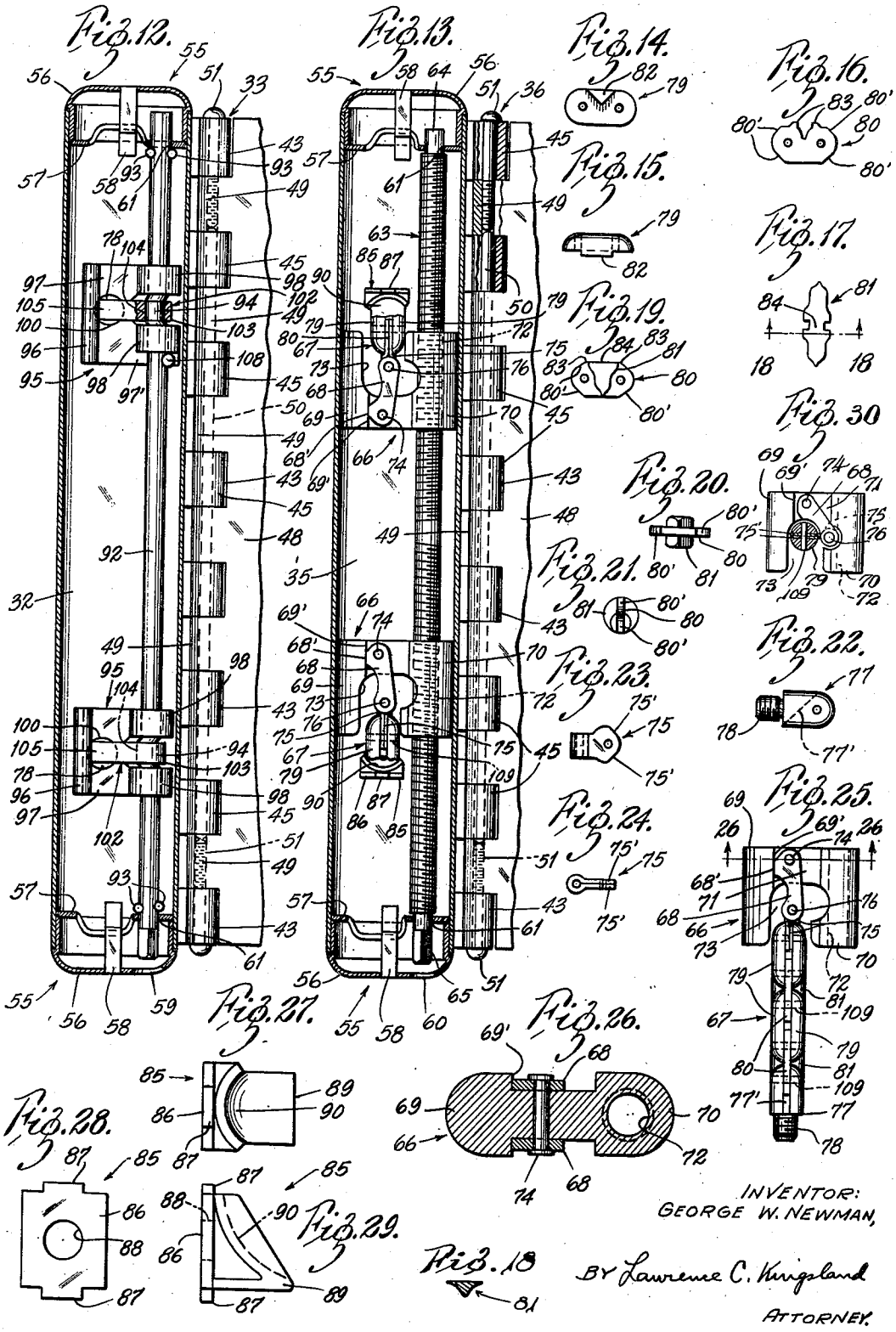

INVENTOR:
GEORGE W. NEWMAN,

By Lawrence C. Kingsland
ATTORNEY.

May 14, 1940. G. W. NEWMAN 2,200,364

BOOKBINDER

Filed Dec. 16, 1937 2 Sheets-Sheet 2



Patented May 14, 1940 2,200,364

# UNITED STATES PATENT OFFICE

2,200,364

## BOOKBINDER

George W. Newman, St. Louis, Mo.

Application December 16, 1937, Serial No. 180,129

16 Claims. (Cl. 129—41)

The present invention relates generally to bookbinders, and more particularly to novel cooperative mechanisms for maintaining the elements of the bookbinder in locked relation and for permitting the covers and the cases of the bookbinder to be substantially disposed in a common plane and in a plane parallel to a working surface for full access to the leaves within the binder.

An object of the present invention is to provide a novel binder assemblage.

Another object is to provide a bookbinder including novel means for maintaining the elements of the bookbinder in operative binding disposition, and for permitting quick release of the upper elements.

Another object is to provide a bookbinder comprising novel means securing the elements thereof in operative disposition including means for disposing the upper and lower elements of the bookbinder in a common plane to permit ready access to leaves bound by the binder.

Another object is to provide a novel bookbinder which is free of external and internal projections.

Another object is to provide a bookbinder including novel mechanism for quickly releasing the upper elements of the binder from the lower elements and for restoring operative connection.

Another object is to provide a bookbinder comprising novel mechanism of the screw and chain type which includes means for bodily rotating the chains to position them to permit movement of the upper elements of the bookbinder into the plane of the lower elements.

Another object of the present invention is to provide a bookbinder which includes a novel chain and screw mechanism for maintaining the upper and lower elements of the binder in operative disposition in one position of the chains and for permitting the upper elements of the binder to be disposed in a common plane with the lower elements of the binder in another position of the chains.

Another object is to provide a bookbinder which is thoroughly efficient in operation, is relatively inexpensive to manufacture, and which is simple and positive in operation.

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

Fig. 1 is a plan view of a bookbinder incorporating the present invention;

Fig. 2 is an end view of the bookbinder shown in Fig. 1, the elements being in closed relation;

Fig. 3 is an end view of the binder shown in Fig. 1, the elements being in open relation, parts being broken away for conservation of space;

Fig. 4 is an end view of the assembled upper and lower cases, together with the hinge mechanism;

Fig. 5 is a transverse section through an assembled case and hinge element, the operating mechanism being omitted;

Fig. 5—*a* is a perspective of a hinge element;

Fig. 5—*b* is a view of a portion of a blank from which a case is formed;

Fig. 6 is a plan view of a stationary locking element;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is a section on the line 8—8 of Fig. 6;

Fig. 9 is an end view of a movable locking element;

Fig. 10 is a side view of the locking element shown in Fig. 9;

Fig. 11 is a section on the line 11—11 of Fig. 4;

Fig. 12 is a section on the line 12—12 of Fig. 4;

Fig. 13 is a section on the line 13—13 of Fig. 4;

Fig. 14 is a view of one side of an external link member forming a part of the novel chain;

Fig. 15 is a top view of the link member shown in Fig. 14;

Fig. 16 is a view of one side of an internal link member;

Fig. 17 is a plan view of a clip member showing its configuration prior to bending into operative engagement with the link member shown in Fig. 16;

Fig. 18 is a section on the line 18—18 of Fig. 17;

Fig. 19 is a side view of the link shown in Fig. 16 with the clip shown in Fig. 17 clamped into operative engagement therewith;

Fig. 20 is a bottom view of the link and clip assemblage shown in Fig. 19;

Fig. 21 is an end view of the link and clip assemblage shown in Fig. 19;

Fig. 22 is a view of one side of one end link;

Fig. 23 is a view of one side of the other end link;

Fig. 24 is a plan view of the end link shown in Fig. 23;

Fig. 25 is a plan view of a rider and a chain in assembled relation;

Fig. 26 is a section on the line 26—26 of Fig. 25;

Fig. 27 is a plan view of a deflector member;

Fig. 28 is an end view of the deflector member shown in Fig. 27;

Fig. 29 is a side view of the deflector member shown in Fig. 27; and;

Fig. 30 is a plan view of the rider and chain shown in Fig. 25, the chain being in vertical ro-

tated relationship to the rider, the chain being shown in section.

Referring to the drawings more particularly by reference numerals, 30 designates generally a bookbinder which incorporates the present invention. The bookbinder 30 includes an upper cover 31, an upper case 32, hinge mechanism 33 between the upper cover 31 and the upper case 32, a lower cover 34, a lower case 35, and hinge mechanism 36 between the lower cover 34 and the lower case 35.

Each of the cases 32 and 35 is of flattened-oval cross-section (Fig. 5). The upper case 32 includes in the lower side spaced apertures 37 and 38. The lower case 35 includes in the upper side thereof spaced apertures 39 and 40 which are aligned with the apertures 37 and 38, respectively. The lower case 35 further includes aligned slots 41 and aligned slots 42 which are disposed endwardly of the apertures 39 and 40, respectively.

Each of the hinge mechanisms 33 and 36 includes a series of hinge elements 43 (Fig. 5—*a*). Each of the hinge elements 43 has opposed projections 44 and a pin-receiving portion 45. The opposed projections 44 of each hinge element 43 are disposed in a pair of opposed slots 46 in the respective case. Each slot 46 is partially in the wall of the respective case and partially in an integral extension 47 (Figs. 5 and 5—*b*). Each slot 46 is of a size to fully receive a projection 44 so that the projections 44 do not extend into the respective case, thereby providing a smooth interior. The hinge elements are machine-closed into the relationship with the respective case shown in Fig. 5, which metal-welds the parts into a rigid construction.

A hinge plate 48 having spaced extensions 49 of loop configuration is disposed with the extensions 49 alternating with the hinge elements 43 (Fig. 13), the extensions 49 of the former and the portions 45 of the latter receiving a pin 50. The pin 50 is maintained in its operative position by end screws 51 which threadedly engage the outermost extensions 49 of the hinge plate 48. The hinge plates 48 are connected to the covers 31 and 34 in any well known manner.

A cap assemblage 55 is disposed in each end of the cases 32 and 35. Each cap assemblage includes a cap 56, a yoke member 57, and a wedge 58. The cap assemblage per se forms no part of the invention claimed in the present application, but forms the subject matter of my copending application Serial No. 179,381, filed Dec. 13, 1937.

One of the caps 56 closing one end of the case 32 (Fig. 12) has an aperture 59 therein. Similarly, one cap 56 of the case 35 (Fig. 13) has an aperture 60 therein. Each of the yoke members 57 includes an aperture 61.

A shaft 63 is disposed within the lower case 35, being maintained in position therein by means of reduced extremities 64 and 65 which extend through the apertures 61 in the yoke members 57, the apertures 61 being of smaller diameter than the diameter of the main body of the shaft 63. The reduced extremity 65 is formed to receive a key (not shown) which is insertable through the aperture 60. The shaft 63 has right-hand threads throughout substantially one-half of its length and left-hand threads throughout substantially the other half of its length.

A rider nut 66 is threaded upon each of the threaded sections of the shaft 65. A chain 67 is connected to each rider 66 by upper and lower links 68 (Figs. 25 and 26). Since the rider and chain assemblages are identical, though oppositely disposed (Figs. 11 and 13), only one will be described in detail. Each rider nut 66 is of a cross-section shown in Fig. 26 in order to effect a snug fit within the case 35, and includes the end sections 69 and 70 and the central section 71. The end section 70 has a threaded bore 72 therethrough. The central section 71 and part of the end section 70 are cut-away to provide the enlarged slot 73 (Fig. 25).

The links 68 are pivoted to the central section 71 by a rivet pin 74. Each link 68 has a straight edge 68′ which contacts a shoulder 69′ and prevents the links 68 from pivoting to the left beyond the off-center position shown in Fig. 25. Contact of the chain 67 with the free extremity of the section 70 prevents buckling at pin 76.

Each chain 67 includes one end link 75 (Figs. 23 and 24) connected to the links 68 by the pin 76 (Fig. 11) and another end link 77 (Fig. 22) which terminates in the threaded extremity 78. The link 75 has straight edges 75′ at 45° to the horizontal, and the link 77 has an internal shoulder 77′ likewise disposed at 45° to the horizontal. The main body of the chain 67 comprises a number of links 79 (Figs. 14 and 15) and 80 (Fig. 16), and clips 81 (Figs. 17–21).

Each link 79 includes a projection 82 which is slightly greater in thickness than one-half of the thickness of a link 80. The edges of the projection 82 internally of the link 79 are straight and converge at substantially 90°. The link 79 is substantially semi-circular in transverse cross-section and is rounded at the ends.

The link 80 is initially of the configuration shown in Fig. 16, having the spaced points 83 disposed above the plane of the upper edge, and is flat, as is shown in Figs. 20 and 21. End portions 80′ are straight and are disposed at an angle to cooperate with the edges of the projections 82 to prevent bending of the chain 67 in one direction. This angle is preferably at 45° to the top edge of the link 80.

The clip 81 is initially formed from a blank to the configuration shown in Fig. 17, being flat on one side, and being built up on the other side from each of the extreme ends or points to the edges of the central connection 84 in the form shown in Fig. 18. The connection 84 is cut away on the side adjacent the flat surface of the clip 81, providing a transverse groove, to reduce the thickness for interfitting with the link 80.

Figs. 19–21 show a link 80 and a clip 81 in assembled relation. The connection 84 of the clip 81 is disposed in the cutout between the points 83 of the link 80, and the clip 81 is bent into the form of a circle with the ends disposed at the bottom of the link 80 (Fig. 21) and with the flat side out, thereby providing undercuts. The points 83 are pressed down against the clip connection 84 and into the plane of the upper edge of the link 80 to effect a metal weld.

The links 79 are disposed in opposed relation and enclose the ends of the links 80, the ends of the links 79 extending beneath the undercuts of the clips 81. Each of the links 75, 77, 79, and 80 includes suitable holes which receive rivet pins 109 to form the chain 67. A smooth round chain is thus provided which can bend in one direction only and which can be maintained in a vertical position, since the cooperation of the edges of the projections 82, the edges 80′, the edges 75′ and the shoulder 77′ effect a straight chain when it is

attempted to bend the chain 67 in the opposite direction.

A diverter member 85 (Figs. 11 and 27–29) is disposed within the case 35 outwardly of and adjacent the apertures 39 and 40. Each of the diverter members 85 includes a vertical portion 86 having oppositely disposed extensions 87 and a central aperture 88, and a slide portion 89 having a suitably dished face 90. The aperture 88 allows the respective wedge 58 to extend therethrough should the diverter member 85 and the wedge 58 be so close together. The diverter members 85 are disposed within the casing 35 with the slide portions in opposed relation, the extensions 87 being disposed within the slots 41 and 42, respectively.

Within the case 32 is an elongated shaft 92 (Figs. 11 and 12). The shaft 92 extends through the apertures 61 in the yoke members 57 and is maintained in its selected position by stop members 93 normally struck therefrom and disposed adjacent the yoke members 57, the free end of the shaft 92 adjacent the aperture 59 being of a configuration to receive a key (not shown). The shaft 92 includes two spaced offsets or crank portions 94 which are disposed to lie adjacent the apertures 37 and 38.

A stationary lock member 95 (Figs. 6–8 and 12) is disposed about the shaft 92 adjacent each offset 94. Each of the stationary lock members 95 includes a vertical portion 96, a horizontal portion 97, and two aligned looped portions 98. The horizontal portion 97 has a keyhole slot 99 which has segmental threads 100. The vertical portion 96 has segmental threads 101 of the same pitch as the segmental threads 100. In the upper lock member 95 (Fig. 12), the vertical portion 96 and the longitudinal portion 97 are extended beyond the looped portions 98 to provide an integral abutment portion 97'. A stop 108 is struck out of the shaft 92 and contacts the abutment 97' in rotation of the shaft 92. The looped portions 98 fit about the shaft 92, one looped portion to each side of the offset portion 94.

A movable locking member 102 (Figs. 9, 10 and 12) is disposed about each offset 94 between the looped portions 98 of the respective stationary locking members 95. Each of the movable locking members 102 includes a main body portion 103 having a vertical slot 104 therein and a projection 105. The main body portion 103 has segmental threads 106 across the vertical side 107 disposed beneath the projection 105. The slot 104 encircles the offset portion 94 to dispose the segmental threads 106 in opposed relation to the segmental threads 100 and 101. In locked relation, the end of the projection 105 contacts the vertical portion 96 of the stationary member 95 to prevent binding engagement of the movable locking member 102 and the stationary locking member 95 with the threaded extremity 78.

It is to be understood that the foregoing elements are constructed of material suitable for the particular part.

*Operation*

The assembly of the bookbinder 30 just described is obvious from the foregoing description and the drawings and, therefore, further assembly details are believed to be unnecessary.

When it is desired to release the upper case 32 and the upper cover 31 from operative connection with the lower case 35 and the lower cover 34 for the purpose of inserting new leaves, removing leaves from the binder, or the like, the shaft 92 is turned through a little over one-half revolution from the position shown in Fig. 12 by means of a key. This rotation of the shaft 92 moves the movable locking members 102 to the right (Fig. 12), thereby releasing the clamping engagement of the movable locking members 102 and the stationary locking members 95 with the threads 78 of the end links 77 of the chains 67. The upper case 32 and its associated upper cover 31 may then be removed.

A reversal of the procedure just set forth effects a restoration of the operative connection between the upper elements of the binder and the lower elements. In this locking action the stop 108, which is substantially at 180° with the offsets 94, is moved into engagement with the abutment 97' (Fig. 12), in which position the stop 108 and the offsets 94 are below and above, respectively, a plane through the center of the shaft 92 parallel with the sides of the case 32. The extension 105 of the movable lock member 102 is moved into engagement with the vertical portion 96 of the stationary locking member 95, the contact occurring just prior to ultimate engagement of the thread segments 100, 101, and 106 with the threads 78 to prevent vise-like engagement therebetween so that the chains 67 can be rotated but not withdrawn from the case 32. The vertical portion 96 gives sufficiently to provide a positive overcenter lock and can give sufficiently to prevent breaking of any of the elements should any of the elements be inaccurately formed. Pull on the chains 67 from the mechanism in case 35 assists in the ultimate locking effect.

When the shaft 63 is rotated sufficiently by means of a key, the riders 66 approach the ends of the case 35. During this movement of the riders 66 the links of the chain 67 are directed outwardly through the apertures 39 and 40 by the diverter members 85. When all links 79, 80 in the chains 67 have assumed vertical positions, continued movement of the riders 66 causes the end links 75 to be moved 90° from the positions shown in Figs. 13 and 25 to that of Fig. 30. This movement is possible, since the links 68 and the end links 75 are maintained in an off-center position during normal operation of the device (Fig. 25) through contact of edges 68' with the shoulders 69' and the chain 67 with the free end of end section 70. The links 68 and the end links 75 of the chains 67 buckle, in effect, the connecting pin 76 moving into the enlarged portion of the slot 73 which is provided for this specific purpose. After the chains 67 have been rotated through 90°, the upper cover 31 and the upper case 32 can be moved into positions relative to the lower cover 34 and the lower case 35, as is shown in Fig. 3, thereby disposing these several elements in a substantially common plane and in a plane parallel to a working surface, such as a desk. It is thus apparent that the full extent of a sheet being worked upon is readily accessible.

In closing the binder, after the chains 67 have been rotated through 90° into the positions shown in Fig. 11 through manipulation of the key, continued rotation of the key draws the chains 67 into the case 35 in the approach of the riders 66 towards each other. The chains 67 are drawn against the relative sharp edges formed by the apertures 39 and 40, requiring less pulling force than were the chains drawn against a rounded guide, since the surfaces frictionally engaged by the chains 67 are substantially reduced. The apertures 39 and 40 are sufficiently large to per-

mit the links of the chains 67 to angle successively as a preceding link passes into the case 35.

The particular construction of the chains permits them to be bent in the one direction shown in Fig. 3, but prohibits bending movement in any of the other three directions. Since the chains 67 are disposed, during normal operation of the device in performing its binding functions, with the direction of bend in opposed relation (Fig. 11), it is apparent that they provide substantially rigid smooth posts about which the work sheets are disposed.

It is apparent that there has been provided a binder which fulfills all of the objects and advantages sought. It is to be understood that the foregoing description and accompanying drawings have been given by way of illustration and example and not for purposes of limitation, the invention being limited only by the claims which follow.

What is claimed is:

1. In a device of the kind described, a lower case, an upper case, means for receiving sheets extending from one of said cases, means within said one of said cases for withdrawing said first means into and for extruding said first means from the said one of said cases, means within said one of said cases for rotating said sheet receiving means after said sheet receiving means have been extended a predetermined amount, locking means within the other case connected to the free extremities of said first means, and means for instantaneously releasing said locking means from engagement with the said first means.

2. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, means for moving said connecting means to selectively space said upper case from said lower case, and means for rotating said connecting means when said cases are in extreme spaced relation to permit the cases to be disposed in a common plane and sheets in parallel planes.

3. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means comprising chains flexible in one direction only, and means for moving said chains into positions to permit the upper case to be disposed in a common plane with the lower case.

4. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means comprising chains flexible in one direction only, and means for moving said chains into positions to permit the upper case to be disposed in a common plane with the lower case, said latter means comprising links connected in off-center relation.

5. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means comprising chains constructed to permit bending thereof in one direction only, said chains normally maintaining said cases in superposed relation, and means for moving said chains into positions to permit the upper case to be disposed in a common plane with the lower case.

6. In a device of the kind described, a bookbinder case, means for receiving work sheets, means within said case for drawing said first means into said case and for extruding said first means from said case, and means within said case for rotating said first means after said first means have been extruded a predetermined amount from said case.

7. In a device of the kind described, a bookbinder case, means for receiving work sheets comprising spaced chains, means within said case for drawing said chains into said case and for extruding said chains from said case, and means within said case for rotating said chains after said chains have been extruded a predetermined amount from said case, said third means including an off-center connection between said chains and said second means.

8. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means including a flexible member terminating in a threaded extremity, and means within one of said cases engaging said threaded extremity, said means including a fixed member and a movable member, said means being substantially instantaneously releasable from said engagement with said threaded extremity, one of said engaging members including means preventing binding engagement of the engaging members with the threaded extremity.

9. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means including a flexible member terminating in a threaded extremity, and means within one of said cases engaging said threaded extremity, said means including a stationary locking member having segmental threads, a movable locking member having segmental threads, and means for moving said movable member into engagement with the threaded extremity and the threaded extremity into engagement with the stationary member to positively hold said threaded extremity therebetween by means of said segmental threads, said movable locking member and said stationary locking member being in pivotal engagement with said last means.

10. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means including a flexible member terminating in a threaded extremity, and means within one of said cases engaging said threaded extremity, said means including a stationary locking member having segmental threads, a movable locking member having segmental threads, and means for moving said movable member into engagement with the threaded extremity and the threaded extremity into engagement with the stationary member to positively grip said threaded extremity therebetween by means of said segmental threads, said last means including a rotatable shaft having an offset portion about which the movable locking member is pivoted and providing means for instantaneously releasing said locking members from gripping engagement with said threaded extremity.

11. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means including a flexible member adapted to receive work sheets and terminating in a threaded extremity, means within one of said cases engaging said threaded extremity, said means including a stationary locking member having segmental threads, a movable locking member having segmental threads, means for moving said segmental threads and said threaded extremity into engaging relation, and means for preventing vise-like engagement of said threaded extremity by said segmental threads to permit said flexible member to be rotated.

12. In a device of the kind described, locking

mechanism for bookbinders comprising a stationary member, a movable member, each of said members including means for engaging with a member to be located therebetween, means for moving said movable member toward said stationary member, and means for preventing vise-like engagement of said stationary member and said movable member with a member to be engaged.

13. In a device of the kind described, locking mechanism for bookbinders comprising a stationary member including segmental threads, a movable member including segmental threads disposed in opposed relation to said first segmental threads, a threaded member between said segmental threads in locked relation therewith, means for moving said movable member towards and away from said stationary member, and means for preventing vise-like engagement of said segmental threads with the threads of the engaged member.

14. In a device of the kind described, a bookbinder case, spaced chains for receiving work sheets, means within said case for drawing said spaced chains into said case and for extruding said spaced chains from said case, and means within said case for rotating said spaced chains after said spaced chains have been extruded a predetermined amount from said case.

15. In a device of the kind described, a bookbinder case, means for receiving work sheets, means within said case for drawing said first means into said case and for extruding said first means from said case, and means within said case for rotating said first means after said first means have been extruded a predetermined amount from said case, said rotating means including an off-center connection between said first means and said second means.

16. In a device of the kind described, a lower case, an upper case, means connecting said upper case to said lower case, said means including a flexible member terminating in a threaded extremity, and means within one of said cases engaging said threaded extremity, said means including a stationary locking member having a vertical portion including segmental threads, a movable locking member including a vertical portion having segmented threads and a horizontal extension overhanging said threaded portion, said horizontal extension being in engagement with said vertical portion of the stationary locking member when said locking members engage the threaded extremity, and means for moving said movable locking member into and out of engagement with the threaded extremity including a rotatable shaft having an offset portion extending through and operative in the movable locking member.

GEORGE W. NEWMAN.