A. RUBIN.

LOOSE LEAF BINDER.

APPLICATION FILED APR. 16, 1917.

1,271,228. Patented July 2, 1918.

Fig. 1.

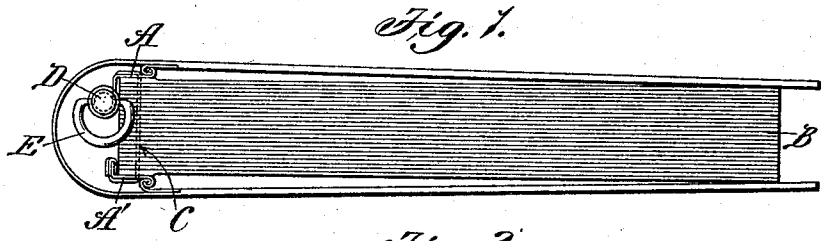


Fig. 10.

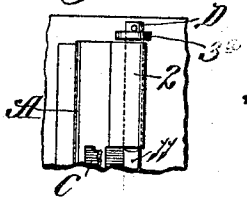


Fig. 2.

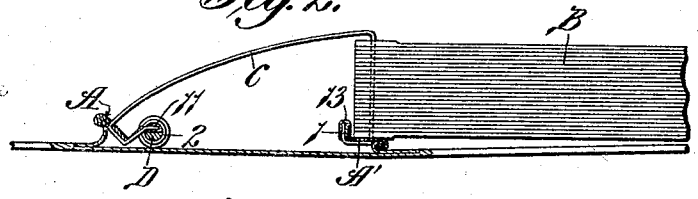


Fig. 3.

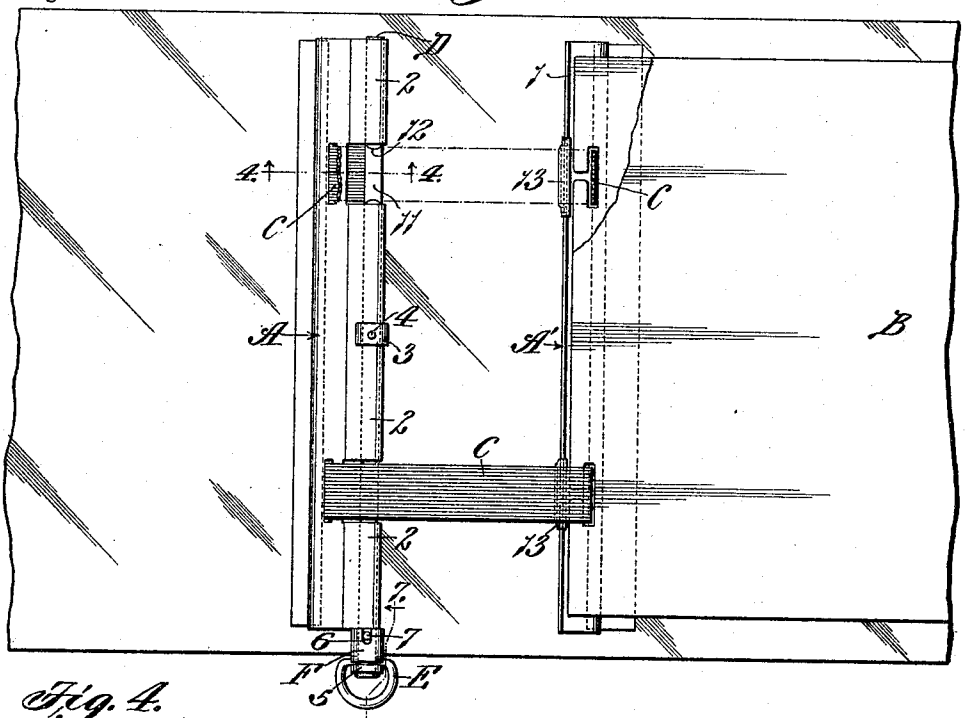


Fig. 4.



Fig. 5.

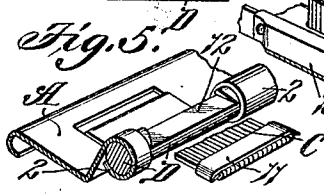


Fig. 6.

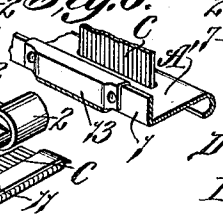


Fig. 7.

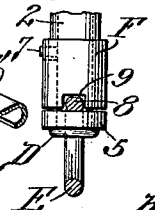


Fig. 8.

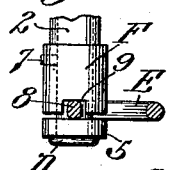
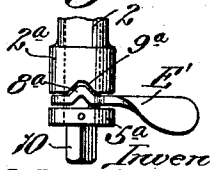


Fig. 9.



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UNITED STATES PATENT OFFICE.

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LOOSE-LEAF BINDER.

1,271,228. Specification of Letters Patent. Patented July 2, 1918.

Application filed April 16, 1917. Serial No. 162,497.

To all whom it may concern:

Be it known that I, ADOLPH RUBIN, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Loose-Leaf Binders, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to loose leaf binders of the type in which the leaves are retained in position by tapes, bands or cords that are connected to a winding shaft which can be turned in one direction to draw the tapes taut.

The main object of my invention is to provide a loose leaf binder of the general type referred to that is equipped with an efficient means of simple construction for locking the winding shaft after the tapes have been tightened.

Another object is to provide a locking means for the purpose described that is superior to a pawl and ratchet mechanism, in that it does not comprise a spring; it will not wear out quickly and it can be manufactured at a low cost.

Another object is to provide a loose leaf binder of the general type referred to, in which the winding shaft is provided with a finger piece or member that is adapted to be used to turn the winding shaft and also to lock said shaft after the tapes have been tightened.

And still another object is to provide an inexpensive means of simple construction for securing the tapes of a loose leaf binder to the winding shaft. Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is an end elevational view of a loose leaf binder constructed in accordance with my invention, showing the tapes tightened.

Fig. 2 is a similar view, showing the tapes slackened.

Fig. 3 is a top plan view of the binder, showing the tapes slackened.

Fig. 4 is a detail sectional view, taken on the line 4—4 of Fig. 3.

Fig. 5 is a perspective view, illustrating the means used for securing the tapes to the winding shaft.

Fig. 6 is a perspective view, illustrating the means for securing the opposite ends of the tapes to one of the leaf-clamping members of the binder.

Fig. 7 is an elevational view, taken on the line 7—7 of Fig. 3.

Fig. 8 is a similar view, showing the winding shaft locked.

Fig. 9 is an elevational view, illustrating a shaft locking means of slightly different form from that shown in Figs. 7 and 8; and

Fig. 10 is a detail plan view, illustrating a modified form of winding shaft.

Referring to the drawings which illustrate the preferred form of my invention, A and A′ designate two leaf-clamping members between which the leaves B are arranged. C designates tapes or bands of flexible material that pass through slots in the leaves B and D designates a winding shaft to which one end of the tapes C are connected, the opposite ends of said tapes being connected to a flange 1 on the leaf-clamping member A′. The winding shaft D is rotatably mounted in bearings 2 on the leaf-clamping member A, and means is provided for securely locking said shaft after it has been turned in a direction to draw the tapes taut and cause the leaf-clamping members A and A′ to clamp the rear edge portions of the leaves together, as shown in Fig. 1. Said locking means consists of coöperating friction elements on the winding shaft D and on the part in which said shaft is mounted and means for causing said friction elements to snugly engage each other when it is desired to lock the winding shaft.

It is immaterial, so far as my broad idea is concerned, how the coöperating friction elements are constructed and arranged, or what means is used to move said elements into engagement with each other. I prefer, however, to mount the winding shaft D in a bearing or a number of bearings on the member A in such a manner that said shaft can be moved longitudinally of its bearings, provide said shaft with one or more friction elements that coöperate with said shaft bearing or bearings to lock the shaft and provide means for moving the shaft longitudinally of its bearings, so as to cause said coöperating friction elements or parts to engage and remain in engagement with each other, thereby preventing the winding shaft from turning in a direction to slacken the tapes C. In the form of my invention shown in Figs. 1 to 8, inclusive, the winding shaft D

is provided intermediate its ends with a collar 3 permanently connected thereto by a pin 4 or in any other suitable manner and arranged in a slot in one of the shaft bearings 2, said slot being a trifle wider than the thickness of the collar 3, so as to permit the shaft to move slightly longitudinally of the bearings in which it is mounted. In the form shown in Fig. 10, the winding shaft D is provided at its upper end with a collar 3^a that is adapted to engage or impinge against the end of the upper bearing 2 when the shaft is moved longitudinally in one direction. The means employed for effecting the longitudinal movement of the winding shaft consists of a device E, preferably of substantially ring shape, that is combined with a sleeve F arranged on the lower end portion of the shaft D between the bottom shaft bearing 2 and a flange or abutment 5 on the lower end of the winding shaft, as shown in Fig. 3. The sleeve F is provided with an elongated slot or notch 6 for receiving a pin 7 on the winding shaft, and the ring E is provided with trunnions 8, as shown in Figs. 7 and 8, that fit in notches 9 in the lower end of the sleeve F, said trunnions 8 being of such cross-sectional form that when the ring E is turned from its vertical position shown in Fig. 7 into its horizontal position shown in Fig. 8, said trunnions 8 will exert pressure on the abutment 5 and on the sleeve F, and thus force the winding shaft D downwardly and the sleeve F upwardly, thereby causing the collar 3 on the winding shaft to bear tightly against one side of the slot in which it is arranged and also cause the upper end of the sleeve F to bear tightly against the bottom shaft bearing 2. When the ring E is turned from its horizontal position shown in Fig. 8 into its vertical position shown in Fig. 7, the trunnions 8 will cease to exert pressure on the sleeve F and on the abutment 5, thus releasing the winding shaft and permitting it to be turned in its bearings. The ring E not only serves as an actuating device for moving the coöperating friction elements on the winding shaft and on the part in which it is mounted into snug engagement with each other, but, in view of the fact that the sleeve F in which the ring E is mounted is connected to the winding shaft by a pin 7 that fits in a slot in said sleeve, said ring can be used as a finger piece to rotate the winding shaft either to tighten or slacken the tapes C. After the ring E has been turned into the position shown in Fig. 8 to lock the winding shaft, said ring will remain in this position, on account of the fact that the trunnions 8 on same are then wedged tightly between the abutment 5 on the winding shaft and the inner ends of the slots 9 in the sleeve in which said trunnions turn. While I prefer to use a means of the character above described for moving the coöperating friction elements of the structure into snug engagement with each other, I wish it to be understood that my invention is not limited to a loose leaf binder of the exact construction above described, for various other means could be used for causing the coöperating friction elements of the structure to snugly engage each other. For example, any other suitable form of cam or wedging device could be used for moving the winding shaft longitudinally of its bearings, and therefore, in Fig. 9 of the drawings I have illustrated a structure in which the means employed to move the winding shaft longitudinally consists of a device E′ rotatably mounted on the lower end of the winding shaft between the bottom shaft bearing 2^a and an abutment 5^a on the shaft and provided with a cam 8^a that fits in a notch 9^a in the bearing 2^a when the winding shaft is unlocked. When it is desired to lock the winding shaft it is only necessary to rotate the device E′ sufficiently to move the cam 8^a thereon out of the notch 9^a. This rotary movement of the device E′ results in an endwise thrust on the winding shaft D, which causes the collar 3 on said shaft to be forced snugly into engagement with the lower side of the slot 4 in which said collar is arranged, the winding shaft remaining securely locked until the device E′ is turned in the opposite direction, so as to position the cam 8^a thereon in its notch 9^a. In the structure shown in Fig. 9 the winding shaft is turned by means of a key (not shown) that is arranged on a non-circular shaped portion 10 on the lower end of the winding shaft.

Each of the tapes C is connected to the winding shaft D by means of a wedge-shaped device 11, shown in Fig. 5, that is arranged in a dove-tail shaped notch or recess 12 in the winding shaft. The device 11 is preferably formed from a thin piece of sheet metal that is bent into substantially U-shape, so that the end of the tape can be introduced between the overlapping portions of same, as shown in Fig. 4. Thereafter, the portions of said U-shaped member at the side edges of the tape are bent or deformed in such a way as to securely lock the tape in said member and also convert said member into a substantially wedge-shaped device that can be slipped into the dove-tail-shaped recess 12. To connect the tape to the winding shaft the tape is partially wrapped around the member 11 to which it is connected, and said member is then slipped into the dove-tailed notch 12 provided for same in the winding shaft, thus causing a portion of the tape to be positioned between the underside of the member 11 and the bottom of the dove-tailed notch in which said member is arranged, as shown in Fig. 4. The tape leads for-

wardly from the contracted end of the notch 12 in the winding shaft, and consequently when the tape is being tightened, it will exert pressure on the member 11 in a direction tending to force it tightly into the dove-tailed seat or slot provided for same in the winding shaft. By eliminating screw-threaded fastening devices for connecting the tapes to the winding shaft I materially reduce the cost of making the binder, and another desirable feature of a tape-securing means of this construction is, that the tapes can be quickly connected to or disconnected from the winding shaft. The opposite ends of the tapes C are connected to the flange 1 on the leaf-clamping member A′ by means of clips 13 arranged over the end portions of the tapes and over the flange 1, shown in Fig. 6, and connected to said flange in any suitable manner.

My improved loose leaf binder is of such construction that it can be manufactured at a low cost, owing to the fact that it does not comprise springs or toothed members for locking the winding shaft so as to hold the tapes taut and it is more efficient than a loose leaf binder in which a pawl and ratchet locking mechanism is used for locking the winding shaft, owing to the fact that the shaft locking means consists of friction elements and a cam that are not subjected to wear when the winding shaft is being turned either to tighten the tapes or to slacken the tapes. Still another desirable feature of my improved binder is that a single element, namely the ring E, is used to turn the winding shaft and also to lock said shaft after the tapes have been tightened.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is:

1. In a loose leaf binder of the type described, a winding shaft, a part in which said shaft is rotatably mounted, coöperating friction elements on said shaft and part, and means for moving said shaft longitudinally of said part so as to cause said friction elements to snugly engage each other and thus lock said shaft.

2. In a loose leaf binder of the type described, a winding shaft, a part in which said shaft is rotatably mounted, a friction locking element on said shaft, and means for exerting an endwise thrust on said shaft so as to cause said friction element to engage said part and thus lock the shaft.

3. In a loose leaf binder of the type described, a winding shaft, a part provided with a bearing in which said shaft is rotatably mounted, and coöperating friction elements that are adapted to be moved into engagement with each other so as to lock the shaft by exerting an endwise thrust on said shaft.

4. A loose leaf binder of the type referred to, comprising a winding shaft, a part having a bearing in which said shaft turns, means for exerting an endwise thrust on said shaft, and coöperating friction surfaces that are brought into engagement with each other so as to lock said shaft when said shaft is subjected to an endwise thrust.

5. In a loose leaf binder of the type described, a winding shaft, a part having a bearing in which said shaft turns, coöperating means on said shaft and bearing that are brought into frictional engagement with each other when said shaft is subjected to an endwise thrust, and means arranged between a portion of said bearing and an abutment on said shaft for exerting an endwise thrust on the shaft.

6. In a loose leaf binder of the type described, a winding shaft, a part in which said shaft turns, coöperating friction elements on said shaft and part, and a cam for moving said coöperating friction elements into engagement with each other.

7. In a loose leaf binder of the type described, a winding shaft, a part in which said shaft is rotatably mounted, a collar on said shaft that fits in a slot in said part, and means for exerting an endwise thrust on said shaft so as to cause said collar to bear against one edge of said slot and thus lock the shaft.

8. In a loose leaf binder of the type referred to, a winding shaft, a part in which said shaft is rotatably mounted, coöperating friction surfaces on said shaft and part that are adapted to be moved into locking engagement with each other when said shaft is subjected to an endwise thrust, and a device for turning said shaft and also exerting an endwise thrust on same.

9. In a loose leaf binder of the type described, a winding shaft, a part having a bearing in which said shaft is rotatably mounted, a collar on said shaft that fits in an opening in said bearing, a sleeve arranged on one end of said shaft between said bearing and an abutment on the shaft, and means arranged between said sleeve and abutment for exerting an endwise thrust on said shaft so as to cause said sleeve and said collar to be clamped tightly against said bearing and thus lock the shaft.

10. In a loose leaf binder of the type described, a winding shaft, a part having a bearing in which said shaft turns, coöperating friction elements on said shaft and bearing that are adapted to be brought into locking engagement with each other when the shaft is subjected to an endwise thrust, a sleeve connected to said shaft by a slot and pin connection and arranged between the lower end of said bearing and an abutment on the shaft, and a device oscillatingly mounted on said sleeve and having a portion that engages said abutment and exerts an

endwise thrust on said shaft when said device is turned in one direction.

11. In a loose leaf binder of the type described, a winding shaft, a part having a bearing in which said shaft turns, a collar on said shaft that fits in a slot in said bearing, a sleeve arranged on said shaft between one end of said bearing and an abutment on said shaft, a slot and pin connection between said shaft and sleeve, and a substantially ring-shaped member provided with trunnions arranged between one end of said sleeve and said abutment and formed in such a manner that when said device is turned in one direction said trunnions cooperate with said abutment to exert endwise pressure on the shaft and also force said sleeve into snug engagement with said bearing.

12. In a loose leaf binder of the type described, a winding shaft, a part having a bearing in which said shaft turns, an abutment on said shaft, a cam oscillatingly mounted on said shaft between said bearing and abutment, and coöperating friction surfaces on said shaft and bearing that are brought into locking engagement with each other when said cam is turned in one direction.

13. A loose leaf binder, comprising leaf-clamping members, tapes or bands that pass through slots in the leaves, a winding shaft for said tapes rotatably mounted on one of said leaf-clamping members, coöperating friction elements on said shaft and on the leaf-clamping member on which it is mounted for locking said shaft after the tapes have been tightened, and a device at one end of said shaft that is adapted to be used to turn said shaft and also to cause said friction elements to snugly engage each other.

14. A loose leaf binder, comprising leaf-clamping members, tapes or bands that pass through slots in the leaves, a winding shaft for said tapes rotatably mounted on one of said leaf-clamping members, coöperating friction elements on said shaft and on the leaf-clamping member on which it is mounted for locking said shaft after the tapes have been tightened, a substantially ring-shaped member arranged at one end of said shaft in such a manner that it can be turned into a position substantially parallel to the shaft or into a position substantially at right angles to the shaft, and means for causing said coöperating friction elements to snugly engage each other and thus lock the shaft when said ring is turned into a position at right angles to the shaft.

15. In a loose leaf binder of the type described, a winding shaft, a tape, and a substantially wedge-shaped device connected to said tape and arranged in a tapered recess in said shaft.

16. In a loose leaf binder of the type described, a winding shaft, a tape, a tapered recess in said shaft in which a portion of said tape is arranged, and a substantially wedge-shaped device permanently connected to the end of the tape and arranged in said recess above the portion of the tape that lies in the recess.

ADOLPH RUBIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."