March 12, 1940. F. S. SCHADE 2,193,347

LOOSE-LEAF STRUCTURE

Filed Dec. 3, 1938

Fig. 1.

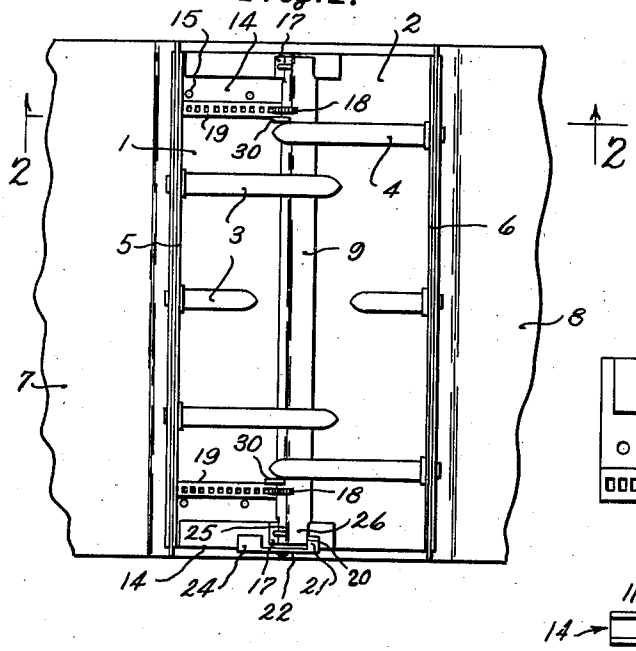


Fig. 4.

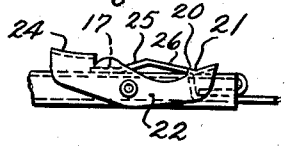


Fig. 5.

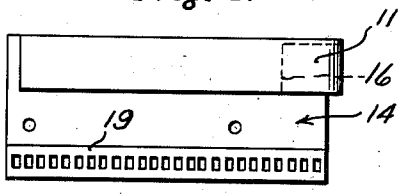


Fig. 6.

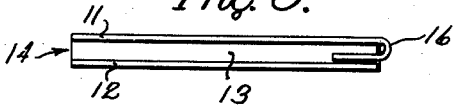


Fig. 7.

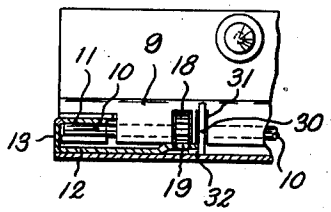


Fig. 2.

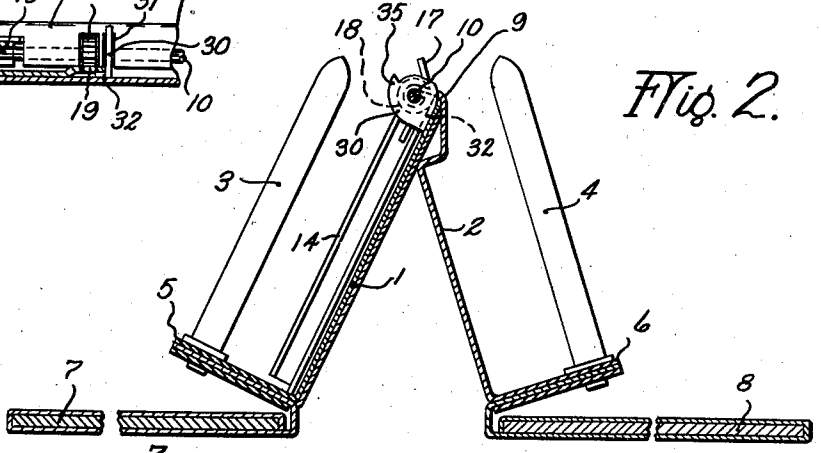
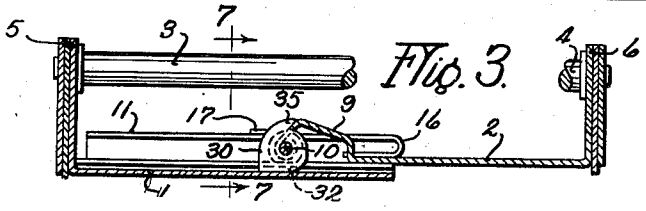


Fig. 3.



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LOOSE-LEAF STRUCTURE

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Application December 3, 1938, Serial No. 243,806

7 Claims. (Cl. 129—8)

This invention relates to improvements in loose-leaf structure for holding a pack or filler of loose-leaf sheets. In its preferred form my improved structure is shown as applied to the type of binder disclosed in Patent 1,990,136 to John Schade, dated February 5, 1935. The features of the present invention cooperate with the structure shown in the prior patent referred to in a manner to substantially improve the reliability of the operation of the mechanism without any substantial increase in cost, and prevent distortion of certain of the parts when the binder is put to rough or careless usage.

In the subsequent description detailed attention will be directed to the specific improvements, the advantages of which will be readily apparent as the disclosure proceeds.

In the drawing,

Fig. 1 is a plan view of the binder structure in reading position with the covers broken away;

Fig. 2 is a section substantially on line 2—2 of Fig. 1, with the binder parts fully opened and positioned for insertion of additional sheets or manipulation of the contents;

Fig. 3 is a view similar to Fig. 2 but with the binder in the reading position;

Fig. 4 is a detail view of the latching mechanism for operation when the binder is moved from reading to fully opened position;

Fig. 5 is a top plan view;

Fig. 6 an end view of one of the guide members; and

Fig. 7 is a sectional view on line 7—7 of Fig. 3.

Referring to Figs. 1 to 3, and 7, the loose-leaf structure consists generally of flat back plates 1 and 2 carrying prong sets 3 and 4 and having upstanding flanges 5 and 6 to which are secured covers 7 and 8. Along its inner edge, plate 2 has an overhanging flange 9 terminating in an eye forming a loose bearing for a rod 10. Rod 10 extends the length of the binder and has its ends confined between the top and bottom surfaces 11 and 12 and end wall 13 of guide members 14 (see Fig. 7), there being a guide member 14 attached as by rivets 15, as indicated, at each end of the back plate 1.

As indicated in Fig. 6, the top surface 11 of each guide member 14 is bent at one end to form a hook 16 and as shown in Figs. 2 and 3 flange 9 has a portion 17 at each end extended parallel to the flat back plate 2. Therefore, as is clearly shown in Fig. 3, when the binder is in reading position plate 2 overlies plate 1 and is supported by portion 17 bearing on the top surface 11 of guide member 14 and by sliding contact between the plates 1 and 2. On the other hand, when the binder is in its fully opened position of Fig. 2, the ends of the rod 10 are carried by hooks 16 and form hinging means for the plates 1 and 2.

Adjacent each end, rod 10 carries gears 18 which are rigidly secured thereto, these gears extending through slots cut in the forward edge of flange 9, see Fig. 7. Gears 18 mesh with racks 19 preferably formed integrally with guide members 14 (see Fig. 5, where the rack is shown as cut out of the metal of the guide members). When the binder is being opened to its reading or fully opened positions the gears 18, rod 10, and racks 19 act as an idler mechanism compelling a uniform sliding action of the overlapped plates 1 and 2 even though the force applied to covers 7 and 8 is not entirely lateral. As is explained in the earlier patent referred to, this action is due to the fact that whatever tendency there is to slide caused by force applied to the covers at one end of the binder is distributed equally by the idler mechanism.

To allow positive control of the binder mechanism so that it will not be inadvertently opened beyond its reading position the latch mechanism of Fig. 4 is provided, the mechanism allowing the binder parts to be released so that they can pass to the fully opened position and then being automatically reset when the binder is again returned to the reading position.

It will be seen from Fig. 4, taken in conjunction with Fig. 1, that the right hand edge 20 of one portion 17 of the flange 9 abuts against a stop 21 of latch 22 in the reading position of the binder. If the latch is depressed by pressure on the finger piece 24 the back plates can be separated laterally. When the binder is closed, surface 25 of the flange 9 passes under finger piece 24 to reset it to lock the binder in reading position when it is again opened. Also, surface 26 serves to insure that the latch is in position by passing under the finger piece 24 as the binder is opened to reading position. This particular latch mechanism being old and described in detail in the patent referred to, will not be further considered here.

As can be seen in the drawing, and as was pointed out in the earlier patent, this type of binder is adapted to be made in quantities at low cost and out of fairly light materials, such as for instance metal stampings. Also, for ease of operation, the parts are fitted with considerable tolerance. With the earlier structure certain difficulties occurred when mass production of this binder was employed.

In particular, it was found that the racks 19

became deformed with rough usage or during assembly and consequently gears 18 would not mesh properly with the racks 19. Thus, the equalizing action was interfered with.

Also, when the binder was being closed from the open position of Fig. 2, the user often would use too much force with the result that portion 17 of the flange 9 would be deformed by contact with upper surfaces 11 of guide members 14. The result was that there would be no bearing surface provided by portion 17 and the latching mechanism of Fig. 4 would fail to function properly.

To prevent these and other difficulties, stop members 30, see Figs. 1 to 3, and 7, are provided. As indicated, such members 30 find a loose bearing on the rod 10 adjacent gears 18 and extend through slots 31 in the flange 9. The lower edge of the member 30 has a tail 32, see Fig. 7, which extends laterally and underlies rack 19 in supporting relation thereto, the tail being of correct dimensions to firmly hold the rack and gear in contact when the back plates are sliding laterally.

The tail 32 acts as an anvil against which the rack constantly bears during the sliding of plates 1 and 2, and this not only keeps the gears and racks in mesh but tends to straighten out any irregularities which may occur in the rack due to deforming of the metal. In this manner action of the equalizing mechanism is positively insured.

There is also provided on member 30 a nose 35 which contacts the face of flange 9, see Fig. 3, when the binder is in all but fully opened position. As is plain by contrast of Figs. 2 and 3, when the binder is closed from the fully opened position, the nose 35 contacts the flange 9 in time to limit the hinging action about rod 10 and thereby prevent deforming of the portion 17 as previously described.

From the foregoing description, it will be seen that by my improved structure I have not only retained all the desirable features of the earlier conception but I have added an additional safeguard to its action which not only improves its reliability, but enables me to produce a definitely superior article without a substantial increase in cost.

I claim:

1. In a loose-leaf structure, two back plates connected together for relative sliding movement, a pivotal connection for the edges of said plates operable for pivotal movement when the plates are separated, gear racks on one plate and idler gears mounted on a single idler shaft on the other plate to engage said racks and means associated with one plate carried by the idler shaft and underlying the racks to constantly support the racks in contact with the gears during movements of the plates.

2. In a loose-leaf structure, two back plates connected together for relative sliding movement, a pivotal connection for the edges of said plates operable for pivotal movement when the plates are separated, gear racks on one plate and idler gears mounted on a single idler shaft on the other plate to engage said racks, and means carried on said idler shaft apart from said pivotal connection to independently maintain contact between the racks and gears during movements of the plates.

3. In a loose-leaf structure two back plates connected together for relative sliding movement in parallel relation, a pivotal connection for the edges of said plates operable for pivotal movement when the plates are separated, gear racks on one plate and idler gears mounted on a single idler shaft on the other plate to engage said racks, and means carried on the idler shaft to limit the pivotal movement in one direction to the parallel position of the back plates.

4. In a loose-leaf structure, two back plates connected together for relative sliding movement in parallel relation, a pivotal connection for the edges of said plates operable for pivotal movement when the plates are separated, gear racks on one plate and idler gears mounted on a single idler shaft on the other plate to engage said racks, and means carried on the idler shaft to limit the pivotal movement in one direction to the parallel position of the back plates and to maintain contact between the racks and gears during sliding and pivotal movements of the plates.

5. In a loose-leaf structure, two back plates connected together for relative sliding movement in parallel relation, a pivotal connection for the edges of said plates operable for pivotal movement when the plates are separated, gear racks on one plate and idler gears to engage said racks mounted on a single idler shaft carried by an eye formed in the edge of an overhanging flange in the other plate, and limiting means carried on the idler shaft, said limiting means comprising two elements, each having a nose to contact the overhanging flange when the plates are in parallel relation at one end of their pivotal movement, and a toe underlying an adjacent rack and maintaining it in contact with the adjacent gear during all movements of the plates.

6. In a structure of the kind described, the combination of two relatively slidable back plates, one of the latter having a gooseneck flange and a shaft mounted for protection at the outer edge thereof, two gears fixed to said shaft, the other plate having side flanges to guide the ends of said shaft and hold the same for rotation of the back plates adjacent their edges when separated, and racks on one plate engaged by said gears on the other plate, and means to hold the gears and racks in operable condition against separation comprising at least one disk mounted on said shaft adjacent one of said gears, said disk having a toe in slidable relation and underlying the rack engaged by said gear.

7. The structure of claim 6 in combination with a disk having a stop to limit the rotation of the back plates in one direction in addition to a toe to underlie the rack on one back plate as the gear on the other back plate moves on said rack.

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