Dec. 16, 1947. F. S. SCHADE 2,432,590

CHAIN POST BINDER DEVICE

Filed Aug. 2, 1946 2 Sheets-Sheet 1

Fig. 1.

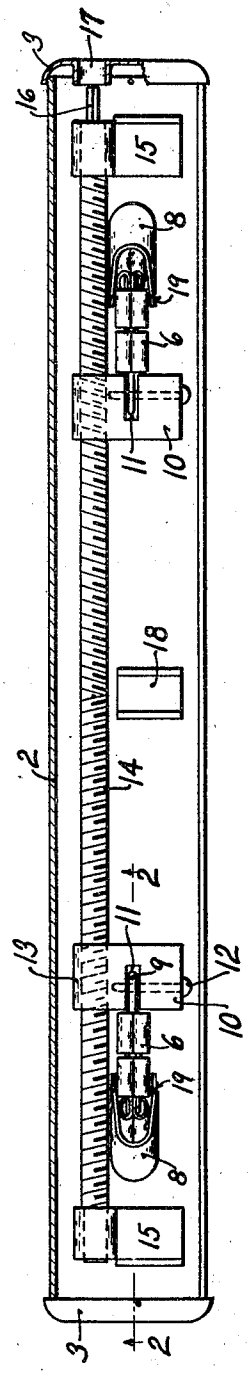


Fig. 4.

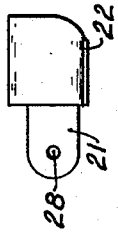


Fig. 6.

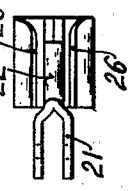


Fig. 3.



Fig. 5.

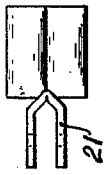
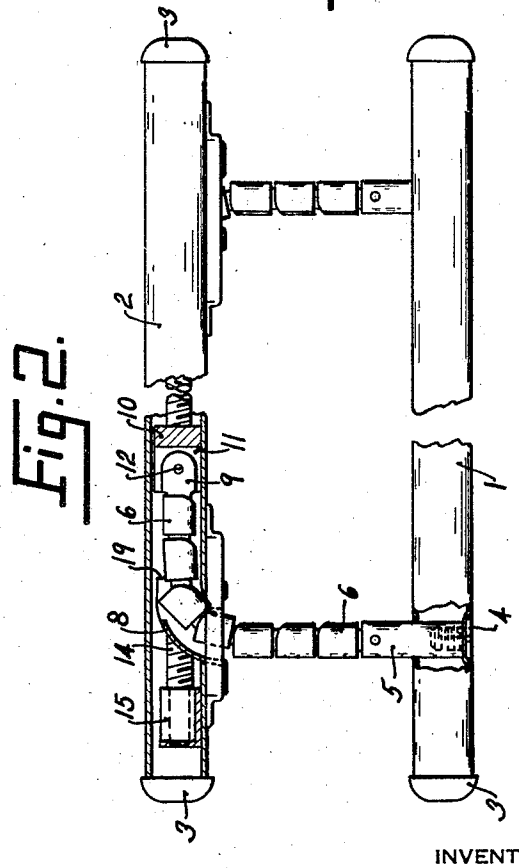


Fig. 2.



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Fig. 7a.

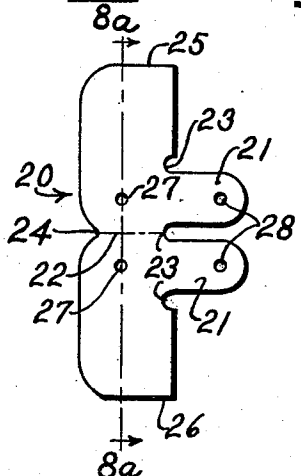


Fig. 7b.

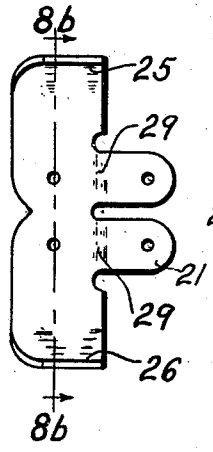


Fig. 7c.

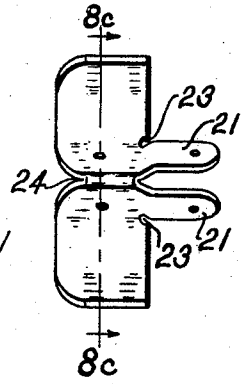


Fig. 7d.

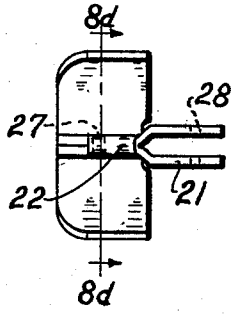


Fig. 8a.

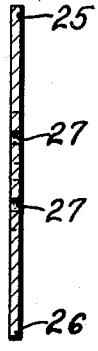


Fig. 8b.

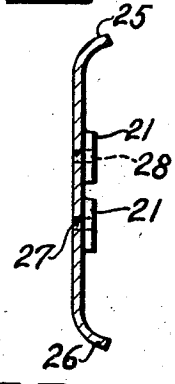


Fig. 8c.

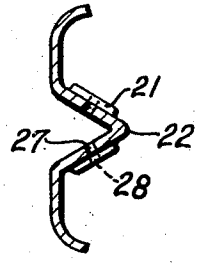


Fig. 8d.

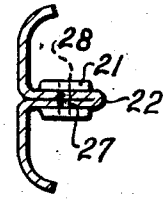


Fig 9.

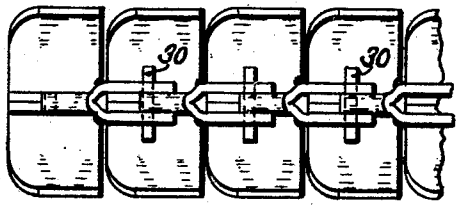
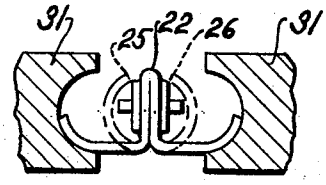


Fig. 10.



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Patented Dec. 16, 1947

2,432,590

UNITED STATES PATENT OFFICE

2,432,590

CHAIN POST BINDER DEVICE

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Application August 2, 1946, Serial No. 687,850

2 Claims. (Cl. 59—78)

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This invention relates to improvements in flexible posts for the type of loose leaf binder known as the chain post binder. A main object of the invention is to provide a new and improved link construction for the flexible posts of such binders.

Flexible posts for loose leaf binders of this type are shown in Patent No. 1,744,274 of 1930 to A. G. Lotter and in Patent No. 1,240,356 of 1917 to H. C. Miller.

So far as I am aware, the nearest prior art with which my invention is concerned is shown in the above patent to Miller. The link construction shown in that patent is similar to the present conception. It consists of a one piece unit of sheet metal formed into a link. However, the disadvantages of that link are readily seen by comparison with the disclosure of the improved link. The features of the improved link will be explained in this disclosure in connection with a further object of the invention which is to provide the first practical sheet metal chain link for a flexible post loose leaf binder.

Inasmuch as this invention in certain important aspects is also closely associated with the method of making the chain links for the post, the manner of forming the links will be also explained in detail. This will best be understood in connection with the following disclosure illustrated by the accompanying drawings in which,

Fig. 1 is a horizontal section of one type of top binder tube shown as an example with a flexible post of the new linkage construction incorporated therein;

Fig. 2 is a side view of a pair of binder tubes showing a vertical section of one end of the tube on line 2—2 of Fig. 1;

Fig. 3 is an end view of a single link of the new construction;

Fig. 4 is a side elevation of the link;

Fig. 5 is a bottom view of the same;

Fig. 6 is a top view of the same;

Figs. 7*a*, *b*, *c*, and *d*, are top views showing successive stages in the formation of the new link;

Figs. 8*a*, *b*, *c*, and *d*, are cross sectional views of the link during the successive stages of Figs. 7;

Fig. 9 is a top view to show how the links are pivotally joined in series; and

Fig. 10 is a view showing the final act of forming the flexible post with the new linkage construction.

Referring now to Figs. 1 and 2 a binder assembly is shown by way of example with a lower binder tube 1 and an upper binder tube 2 with usual caps 3 in their ends. To lower tube 1 is

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fixed as by a retaining screw 4 a post-like anchor piece 5 for the flexible post with links 6.

The opposite end of each chain is received in the upper tube 2 through an opening in the tube provided with a hood 8. End links 9 are pivoted to their adjacent links 6 and to carriage blocks 10, the end of each link 9 being received in a slot 11 of block 10 and pivotally held therein by a pin 12. Blocks 10 are provided with a sleeve portion 13 threaded on a shaft 14 having oppositely turned threads. Shaft 14 is journaled in bearing members 15 fixed at each end of the tube 2. One end of the shaft is squared, as at 16, and projects through a member 15. The end 16 is adapted for the turning of shaft 14 by a suitable key through an opening 17 in the adjacent cap 3, Fig. 1. Shaft 14 is turned to move blocks 10 inwardly for tightening the tubes on a filler pack of loose leaf sheets or to move the blocks apart for loosening the tubes. A stop 18 fixed in the center of tube 1 limits the inward movement of blocks 10. The edge 19 of each hood 8 limits the outward movement.

It will be noted that the hood 8 will guide the movement of the chain linkage as it moves in and out of the binder tube 1 for binding a larger or smaller pack of filler sheets. The chain post binder is commonly used with filler sheets of the type having marginal binding slots which can be singly inserted or removed in the assembly by loosening the binding tubes and sliding the sheets in or out. Where sheets with ordinary post binding holes are used for more or less permanent purposes, the removal and addition of filler sheets is accomplished by removing screw 4 and disengaging the anchor post 5 from tube 1. Extension posts of suitable length may also be added to anchor post 5 as desired to provide for a thicker filler pack.

The details of this structure are well known in the art and the structure is here illustrated as an example of one binder assembly. Other assemblies are as well adapted for the new link construction which is shown in the remaining drawings apart from such binder assembly.

Views of a single link are shown from various elevations by Figs. 3 through 6 inclusive. The steps in making the links and flexible chain for the post are illustrated in Figs. 7 through 10 inclusive.

In Fig. 7*a* the formation of the link commences with a flat plate 20 of a sheet metal stamping, rectangular in form with two extensions 21 spaced on each side of a center line 22. Scalloped indentations 23 on each side of extensions 21 and between them are for making lines on

which the metal is to be bent, the transverse center line of plate 20 being marked on the other side thereof by an indentation 24. The center line 22 is thus parallel to the end edges 25 and 26 of plate 20. Holes 27 are punched in the plate on each side of the center line 22 and two corresponding holes 28 are punched in the end portion of each extension 21. In Figs. 7*b* and 8*b* the edges 25 and 26 have been slightly turned in an upward direction on a line of curvature which is the same as that defined later by the semi-cylindrical post-like body of the finished link. At this stage also the extensions 21 are bent upwardly from the plane of plate 20 as at 29, being offset therefrom substantially the thickness of the metal of plate 20. In Figs. 7*c* and 8*c* the plate is folded upwardly along the center line 22. The central portions of plate 20 on each side of center line 22 are bent upwardly from the plane of the plate 20 on lines parallel to line 22 and marked by each outside indentation 23. The link is then further formed, Figs. 7*d* and 8*d*, by folding the center portions of the plate flatly together, the holes 27 being in registration and the extensions 21 facing each other with the holes 28 in axial registration. The extensions 21 thus form a bifurcated portion of the link with the forked extensions spaced a distance equal to the thickness of the folded central portions.

The above operations on the flat plate 20 of stamped sheet metal are formed by suitable dies. As each link is brought to the form shown by Figs. 7*d* and 8*d*, it is placed in series with other similarly formed links, the forked extensions 21 of each link straddling the central folded portions of an adjacent link. It will be seen from the description of the stamping of holes 27 and 28 that the holes 28 of extensions 21 will then be in registration with the holes 27 of such preceding link. This is illustrated by Fig. 9. At this stage of forming the flexible chain, as many links as are desired are placed in series and pivot pins 30 are pushed through each set of holes 27 and 28. The chain is then placed as shown by Fig. 10 between two die blocks 31 each having a face cut in semi-cylindrical form with a line of curvature conforming to the curvature previously started adjacent the edges 25 and 26 (Figs. 7*b* and 8*b*). The dies 31 are then pushed together causing the bending of the free end portions of plate 20 from the full line position, Fig. 10, to the dotted line position. As shown by the dotted line position of Fig. 10 and the top view of a single link, Fig. 6, the edges 25 and 26 are spaced to permit the pivoting of the forked extensions 21 on each side of the folded center line 22.

The link as shown, see Figs. 3 to 6, thus comprises a flat folded portion surrounded in a post-like casing with forked arms, the extensions 21, extending from one end of the casing. The unit is W-shaped in cross section as shown in Fig. 10 and Fig. 3. It will be clear from the above descriptions that by forming the link in open W-shaped cross section form, the pivot pins 30 may be easily and readily inserted to join a series of links together for the flexible post. The pins need not be swaged or otherwise worked or headed to hold them in position. The cylindrical casing prevents the pins 30 from working out of

the holes 27 and 28 as soon as the casing walls are turned upwardly in the closed up W-shaped cross section form as shown in Fig. 10.

It is to be noted in joining the flexible links in a binder assembly that the forked portions of the links are preferably directed to face the lower binder tube 1, see Fig. 2. This permits the easier movement of the links in the binding holes of the sheets as the chain moves in and out of the tube 2.

The prior art represented by the said patent to Miller consists in a sheet metal plate bent in substantially cylindrical form with the free ends turned upwardly inside the post-like casing of the cylinder and spaced, one end portion from the other, to receive the flat extensions of a similar unit pinned to it. The assembly of links is purportedly made by inserting a pivot pin in the link coincident with the formation of the cylindrical body. The practical difficulties in so assembling the unit will be readily recognized.

The present conception disclosing the new form of one piece sheet metal link is a specific improvement in the art. It is, so far as I know, the first feasible link proposed in the art in which the various parts are formed from one piece of sheet metal in a form for practical manufacture. The new link construction is economical to manufacture and assemble, it is extremely light, and it is more efficient in this form than any prior art proposal.

Having disclosed my invention, I claim:

1. A chain post binder construction characterized by the post forming means, said means comprising a series of pivoted chain links, each link formed from a sheet metal plate, with two portions, on opposite sides of the center line, in a flat fold, each folded portion having an offset extension to form with its complementary extension and the flat folded portions, a forked link arrangement, two other portions, at the sides of the folded portions, bent oppositely each into near semi-cylindrical form with the free edges at about the level of the fold in the two folded portions and spaced enough to pass said offset extensions of the forked link arrangement, and a pivot pin for each chain link passing through aligned openings in the flat folded portions of one link and the two complementary extensions on the flat folded portion of an adjacent link, all for the purpose described.

2. A chain post binder construction characterized by the post forming means, said means including a series of pivoted chain links each link formed from a sheet metal plate with portions folded together on each side of the center line, said portions having extensions one on each folded portion, such extensions being oppositely offset, the extensions and adjacent folded portions together forming a forked link arrangement for the chain, opposite side portions of the plate being bent into semi-cylindrical form with their free edges in proximity to the said fold line and a pivot pin for each chain link passing through aligned openings in the folded portions of one link and said two extensions of an adjacent link, all for the purpose described.

FRANK STANLEY SCHADE.