Aug. 5, 1941. A. N. HANNA ET AL 2,251,878

LOOSE-LEAF BINDER

Filed Jan. 25, 1939

Fig. 1.

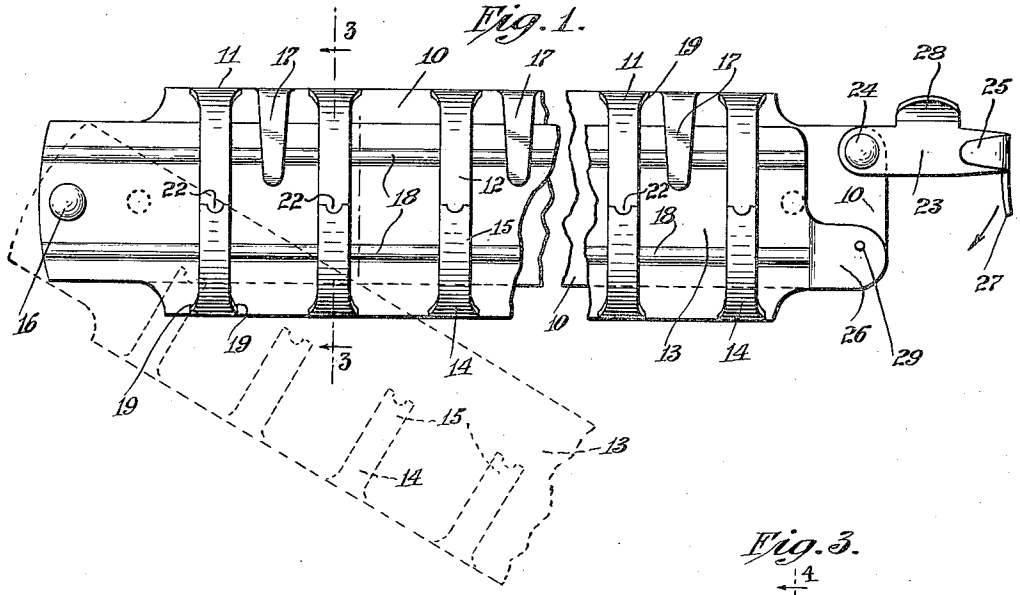


Fig. 2.

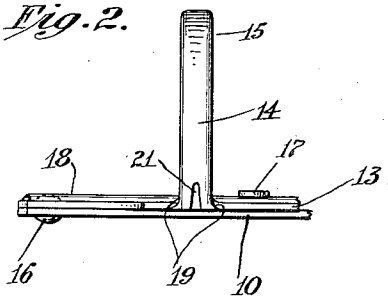


Fig. 3.

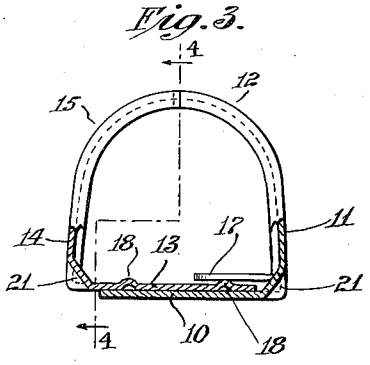


Fig. 4.

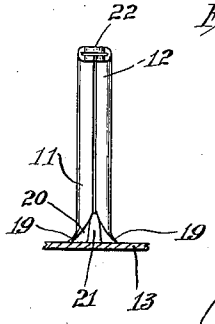
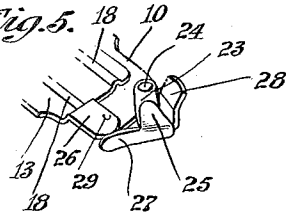


Fig. 5.



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LOOSE-LEAF BINDER

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Application January 25, 1939, Serial No. 252,710

9 Claims. (Cl. 129—10)

The invention relates to loose leaf binders, and more particularly to a binder of the type in which arcuate post carrying members are superimposed one upon the other and pivotally connected at one end so as to permit the simultaneous separation of all of the posts for the purpose of inserting and removing sheets from those collected upon the loops formed by said arcuate posts.

The general type of binder above referred to is old and well known in this art. In some such binders the posts have been formed by round wire, riveted or otherwise secured to the base strip or member carrying same, while in other such binders, flat arcuate posts integral with the base strip have been formed from a sheet metal blank bent to the desired configuration by forming dies.

In actual practice it has been found that in binders in which the loops formed by the arcuate posts have a diameter of approximately one-half an inch or less, there is little or no tendency of the edges of the loops to cut the paper adjacent the openings through which the loops pass, and no tendency toward the deformation of the loops from the weight of the sheets of paper collected thereon.

It has been found, however, that with loops of more than one-half an inch in diameter using the same thickness of soft drawing metal stock as is employed with the smaller loops, there is a tendency of the material of the loops to bend from the weight of the paper collected thereon, thus forming a gap where the arcuate posts meet, tending under some conditions to tear a sheet running upon the loops, and under other conditions to permit the escape of paper between some of the loops. Furthermore, with larger loops, there is a longer run of the sheets when turning them and sharp edges of the posts tend to cut or tear the paper. There is also, with binders having larger loops, greater difficulty in closing the arcuate posts, particularly when inserting a sheet in a binder in which a number of sheets have already been collected.

It has been found in actual practice, that the difficulties above referred to cannot be satisfactorily corrected by using thicker metal, since such metal cannot be readily formed with the necessary accuracy to produce a properly workable binder.

With the above conditions in mind, we have provided a binder composed of a base strip and a movable strip to be superimposed thereon, which strips have formed integrally therewith a plurality of posts having arcuate ends, the material forming these posts having the opposite side edges thereof upset or turned upon the other portion of the posts so as to provide posts having rounded edges possessing sufficient rigidity to withstand all of the stresses occurring during the use of the binder from a considerable number of large sheets of paper.

In turning the edges of each post in the manner described, each post will have a single thickness of metal where it joins the base or movable strip, and to impart the desired rigidity at this point, the metal of the post and of the adjacent portion of the strip is pressed inwardly to form a reinforcing rib, which has been found to effectively prevent bending of the material of any post at this point.

Preferably, the portion of each post leading from the base is substantially perpendicular to the plane of the base, so that when a binder is either opened or closed, the major portion of the leaves will not only lie perfectly flat upon each other, but will be stacked without any substantial irregularity in the positioning of the free edge of the leaves opposite the edge adjacent which they are connected with the binder posts. With this construction, a greater number of leaves can be accumulated in the binder, and the curved portion of each post is utilized mainly when turning the leaves from one post to its complementary post of each loop.

With an increased number of leaves or sheets in the book, particularly if heavier paper be used, the closing of the posts is more difficult, particularly when the length of the binder metal is from ten to twelve inches, since the posts nearer the point of pivotal connection of the base and the movable strip, engage each other slightly in advance of those more remote from this point when all of the leaves are of the same size.

With this condition, the locking means used for connecting the two strips is so constructed that one portion thereof will draw the two strips into approximately the closed position, and another portion thereof will immediately complete this closing movement, both portions of the locking member and the portion of the movable strip member co-operating therewith being so formed as to develop a camming action during the closing of the locking member.

It is essential to provide in a binder embodying the invention, a sequence of tongues upon the base member, formed integrally therewith along the same edge thereof from which the posts project, these tongues overlaying the base

strip, being spaced therefrom a distance substantially equalling the thickness of the movable member, and being of a length to project across both members to an extent to support the edge of the sheet away from the base member a distance to permit the free movement of the movable member when opening and closing the loops, without likelihood of the movable member engaging and tearing the edge of the sheets.

The invention consists primarily in a loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having a single thickness of metal adjacent said strip and its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from the single thickness of metal adjacent the strip to the extremity of the post, the single thickness portion of the post adjacent the strip being of relatively greater width than the post and extending in a triangular form upwardly of the post, and a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawing,

Fig. 1 is a condensed plan view of a binder embodying the invention;

Fig. 2 is a side view at the left of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 3; and

Fig. 5 is a perspective view of the mechanism for closing and locking the base and movable strips.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention shown in the drawing, the base strip 10 is made of sheet metal having along one edge thereof a series of posts. Each of these posts is formed integrally with the metal of the strip, a substantially right line portion 11 extending upwardly in a direction substantially perpendicular to the strip for substantially one-half the height of the post, and an arcuate end 12 extending substantially halfway across the base strip. Preferably, these posts are arranged three to the inch, although this number may be greater or less according to the thickness of the metal used.

Mounted for pivotal movement in relation to, and superimposed upon, the base strip 10 is a movable strip 13 having a sequence of posts complementary to the posts 11—12, the straight portions of these posts being indicated at 14 and the arcuate ends thereof at 15. Said posts 14—15 are made integral with the strip 13, project upwardly therefrom at substantially right angles thereto in the same manner as the portions 11 of the posts of the base strip and, like said last named posts, the arcuate portion 15 of each post extends substantially halfway across the movable strip 13.

The base strip and the movable strip are connected at one end for relative pivotal movement in any desired manner, as by the pivot 16.

The base strip 10 is provided with a plurality of flat tongues 17 formed integrally therewith and projecting from the same edge of the strip as the posts 11—12. These tongues overlay the base strip, as shown more particularly in Figs. 2 and 3, and are parallel therewith, being spaced from the strip a distance substantially equalling the thickness of the movable strip 13, so that when said strips are brought together to close the posts, the movable strip will be firmly held in close abutting relation to the base strip. Furthermore, the engagement of the free edge of the movable strip with the curved portion of the tongues will limit the closing movement of the movable strip and said tongues prevent lifting of this movable strip and a consequent separation of the ends of the complementary posts upon the two strips while the binder is in use.

The tongues 17 are of a length to extend across the movable strip 13 to an extent to support the sheets inserted in the binder from the base strip a distance to permit the movable strip to pass freely below the accumulated or collated sheets without engaging the lowermost sheet. Otherwise this might result in not only interference with the closing of the binder, but the mutilation of the lowermost sheet or sheets adjacent the edge thereof having the openings for receiving the posts.

In actual practice it has been found that these tongues may be located between alternate pairs of posts, and that it is desirable to have tongues between adjacent end posts at each end of the binder.

To permit the rapid and economical production of binders embodying the invention, thin gauge sheets or strips of drawing metal must be employed, and in the production of binders employing posts of more than one-half an inch in diameter for use in binding large sheets of paper, such thin metal stock has been found to possess inadequate strength to impart sufficient rigidity throughout the structure to withstand the stresses resulting from the use with the binder of a large number of such sheets.

By the use of ribs 18 extending longitudinally and formed upwardly of the movable strip, it is possible to not only adequately stiffen this movable strip, but to secure a tight fit between it and the various tongues 17. The use of ribs extending along the posts, however, has been found to be inadequate to secure such desired rigidity in these posts. It has also been found that with a long run of the sheets when turning them in a binder, the raw edges of the posts have a tendency to cut the paper, a condition not found with binders having posts of less than one-half an inch in diameter.

To sufficiently stiffen the posts to permit their use with binders of larger sizes and to prevent cutting of the paper by the edges of the posts, we have developed a special form of posts which, in addition to possessing high rigidity, has rounded edges throughout substantially the entire portion thereof which contacts with the

edges of the openings in the sheets of paper. Each post is also so constructed as to avoid weakening of the material of the post where it merges into the base or the movable strip, and also is provided with a reinforcement at this point compensating for any weakness of the material due to the thinness of the gauge of the metal or the bending of the material in forming the posts.

The sheet metal blank used in producing the base and the movable strips and the integral posts and tongues carried thereby, is blanked out by suitable dies, leaving rectangular projecting portions at one edge thereof to be used in forming the posts and, as to the base strip, intermediate projections for forming the tongues. The opposite edges of each of the rectangular projecting portions are turned by suitable dies and folded down upon the portion intermediate these edges, so as to meet along the medial line of the projection.

In turning the metal, the portions of the edges adjacent the base or movable strip proper have a peculiar formation or flow, due to the fact that this portion of the projection retains its original width notwithstanding the folding of the edges in the manner described. This results in an outward flare at each side of each post, as indicated at 19, and a triangular opening within the post, indicated at 20, adjacent and above these flared portions, as shown more particularly in Fig. 4 of the drawing. This affords a single thickness of metal facilitating the upward bending of the post forming projection, which is desirable for manufacturing purposes but would leave a weak spot in the post which might result in the bending of the metal at this point from stresses upon the posts while the binder is in use, were not means provided to stiffen or reinforce each post at this point.

To strengthen each post at its base, we bump up the metal to form a reinforcing rib 21 extending throughout substantially the entire triangular portion 20 of the post and into the contiguous portion of the base strip itself, as shown more particularly in Figs. 3 and 4 of the drawing. With posts constructed as described, the desired rigidity is secured and there is no tendency toward the separation of the ends of the complementary posts as a result of the yielding of any post from stresses thereon. Each post is of double thickness throughout, except at the base thereof, has rounded edges and is reinforced adjacent the base thereof notwithstanding that the strip and its posts are integrally formed of a single metal blank.

The ends of the complementary post members are so formed, as indicated at 22, that when the posts are closed, the ends will overlap and form a continuous run for the sheets of paper in passing them around the loops formed by the posts when turning the sheets.

In a loose leaf binder of the type to which the invention relates, locking means are provided to secure the free ends of the base and the movable strips when the complementary posts are closed. With large loops, such as are used in the present device and in which the binders may be ten inches or more in length and are designed for a considerable number of large sheets, difficulty may be experienced in completely closing the loops, particularly by the users of the binders. Those posts nearest the point of pivotal connection of the base and the movable strips engage each other slightly in advance of the engagement of the loops more remote from this point of pivotal connection, the loops at the extreme right of the binder, as shown in Fig. 1, sometimes separating to the extent of three-thirty-seconds of an inch with a loop having a diameter of five-eighths of an inch.

With locks as heretofore used, it might be necessary to manually close the loops before actuating the locking mechanism. To avoid possibility of an improper closing of the loops and locking of the strips carrying the posts forming same, we provide a special form of locking mechanism which will now be described.

This locking mechanism comprises a plate 23 pivoted at 24 to the base strip 10. The free end of this strip 23 is provided with an overlaying keeper 25 adapted to straddle a tongue 26 projecting from the movable strip 13. This tongue has a symmetrically rounded end, as shown, although only the outer portion of this rounded end is necessary to the operation of the device.

Projecting forwardly from the bend of the keeper 25 in the direction of movement of the plate 23 for locking the binder strips, is an outwardly flared tongue 27.

The plate 23 is turned by means of a finger piece 28.

When locking the base and the movable strips together, the plate 23 is turned by means of the finger piece 28 and, with continued movement of the plate, the forwardly projecting tongue 27 will engage the outer rounded surface of the extension 26 and develop a strong camming action which will overcome any resiliency of the loops adjacent the pivot 16 and not only completely close all of the loops, but press the movable strip into engagement with the curved portion of the various supporting tongues 17. Said tongue 27 will also guide the keeper 25 into engagement with the extension 26.

The tongue 26 is upwardly offset from the movable strip 13 to permit the plate 23 to pass between it and the base strip 10. If desired, the material of the extension 26 may be struck up to form a nub 29 to ensure against accidental disengagement of the keeper from said extension.

The action of a binder embodying the invention will be obvious from the foregoing description.

It is not our intention to limit the invention to the thickness of the sheet metal stock used in producing the parts of the binder.

In the accompanying drawing the dimensions of parts are grossly exaggerated, and the particular details of parts may be varied without departing from the spirit and scope of the invention.

Having described the invention, what we claim as new and desire to have protected by Letters Patent, is:

1. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having a single thickness of metal adjacent said strip and its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from the single thickness of metal adjacent the strip to the extremity of the post, the single thickness portion of the post adjacent the strip being of relatively greater width than the post and extending in a triangular form upwardly of the post, and a plurality of tongues formed in-

tegrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder.

2. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from a point closely adjacent the strip to the extremity of the post, whereby each post is outwardly flared adjacent the strip and a triangular opening is formed within the post, an inwardly directed reinforcing rib extending longitudinally of the post substantially throughout said triangular opening and into the adjacent portion of the metal of the strip, and a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder.

3. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post extending substantially perpendicularly to the plane of the strip and merging into an arcuate portion adjacent the end thereof and having a single thickness of metal adjacent said strip and its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from the single thickness of metal adjacent the strip to the extremity of the post, the single thickness portion of the post adjacent the strip being of relatively greater width than the post and extending in a triangular form upwardly of the post, and a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder.

4. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post extending substantially perpendicularly to the plane of the strip and merging into an arcuate portion adjacent the end thereof and having its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from a point closely adjacent the strip to the extremity of the post, whereby each post is outwardly flared adjacent the strip and a triangular opening is formed within the post, an inwardly directed reinforcing rib extending longitudinally of the post substantially throughout said triangular opening and into the adjacent portion of the metal of the strip, and a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder.

5. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having a single thickness of metal adjacent said strip and its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from the single thickness of metal adjacent the strip to the extremity of the post, the single thickness portion of the post adjacent the strip being of relatively greater width than the post and extending in a triangular form upwardly of the post, a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder, and co-operating locking members carried by the free ends of said base and said movable strips respectively.

6. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having a single thickness of metal adjacent said strip and its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from the single thickness of metal adjacent the

strip to the extremity of the post, the single thickness portion of the post adjacent the strip being of relatively greater width than the post and extending in a triangular form upwardly of the post, a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder, a tongue having a rounded end projecting from the free end of said movable strip, a plate pivotally connected adjacent the free end of said base strip, a keeper member formed upon said plate adapted to straddle said tongue, an outwardly flared tongue projecting from said keeper member in the direction of movement of said plate when actuating the pivotal plate, whereby as said plate is moved into the locked position said keeper is guided into engagement with said tongue, and means whereby said plate may be manually actuated.

7. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from a point closely adjacent the strip to the extremity of the post, whereby each post is outwardly flared adjacent the strip and a triangular opening is formed within the post, an inwardly directed reinforcing rib extending longitudinally of the post substantially throughout said triangular opening and into the adjacent portion of the metal of the strip, a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder, and co-operating locking members carried by the free ends of said base and said movable strips respectively.

8. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from a point closely adjacent the strip to the extremity of the post, whereby each post is outwardly flared adjacent the strip and a triangular opening is formed within the post, an inwardly directed reinforcing rib extending longitudinally of the post substantially throughout said triangular opening and into the adjacent portion of the metal of the strip, a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance substantially equalling the thickness of said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder, a tongue having a rounded end projecting from the free end of said movable strip, a plate pivotally connected adjacent the free end of said base strip, a keeper member formed upon said plate adapted to straddle said tongue, an outwardly flared tongue projecting from said keeper member in the direction of movement of said plate when actuating the pivotal plate, whereby as said plate is moved into the locked position said keeper is guided into engagement with said tongue, and means whereby said plate may be manually actuated.

9. A loose leaf binder embodying therein sheet metal base and movable strips, means adjacent one end of said strips permitting pivotal movement of the latter strip, a plurality of complementary posts formed integrally with and projecting upwardly from one edge of, and partway across, said strips, each post having its opposite edges turned inwardly and downwardly and closed upon the intermediate portion thereof from a point closely adjacent the strip to the extremity of the post, whereby each post is outwardly flared adjacent the strip and a triangular opening is formed within the post, an inwardly directed reinforcing rib extending longitudinally of the post substantially throughout said triangular opening and into the adjacent portion of the metal of the strip, upwardly formed ribs upon said movable strip, a plurality of tongues formed integrally with, and projecting from the edge of, said base strip, said tongues overlaying, being parallel with and spaced from said base strip a distance ensuring engagement with a rib upon said movable strip, whereby said movable strip will be firmly held in close abutting relation to said base strip, turning movement thereof in one direction is limited, lifting of the posts thereon in relation to the posts upon the base strip is prevented, said tongues are interposed between said movable strip and the leaves in the binder, and both strips contribute toward the rigidity of the binder, a tongue having a rounded end projecting from the free end of said movable strip, a plate pivotally connected adjacent the free end of said base strip, a keeper member formed upon said plate adapted to straddle said tongue, an outwardly flared tongue projecting from said keeper member in the direction of movement of said plate when actuating the pivotal plate, whereby as said plate is moved into the locked position said keeper is guided into engagement with said tongue, and means whereby said plate may be manually actuated.

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