

March 8, 1938.

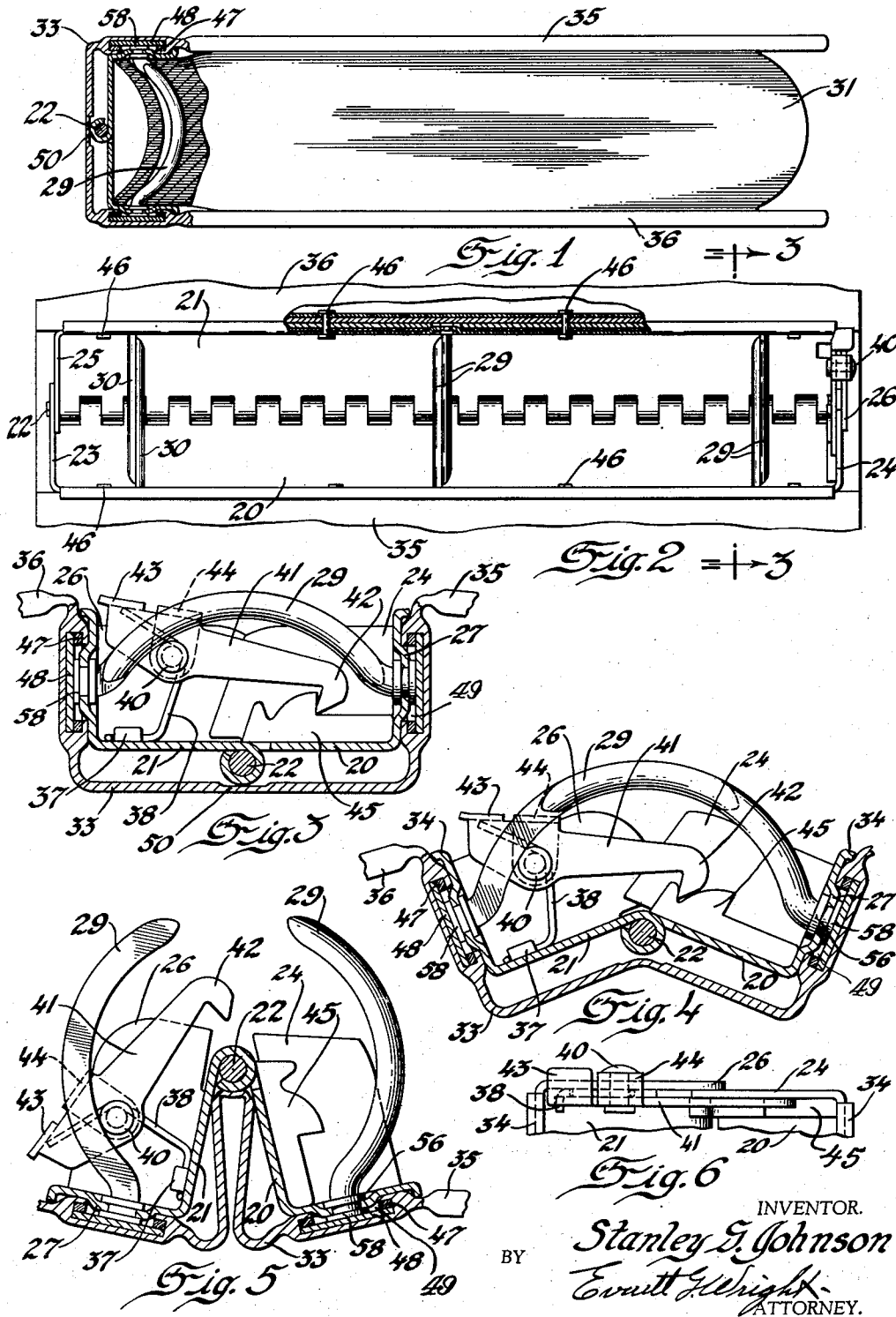
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LOOSE LEAF BINDER

Filed Feb. 8, 1936

2 Sheets-Sheet 1



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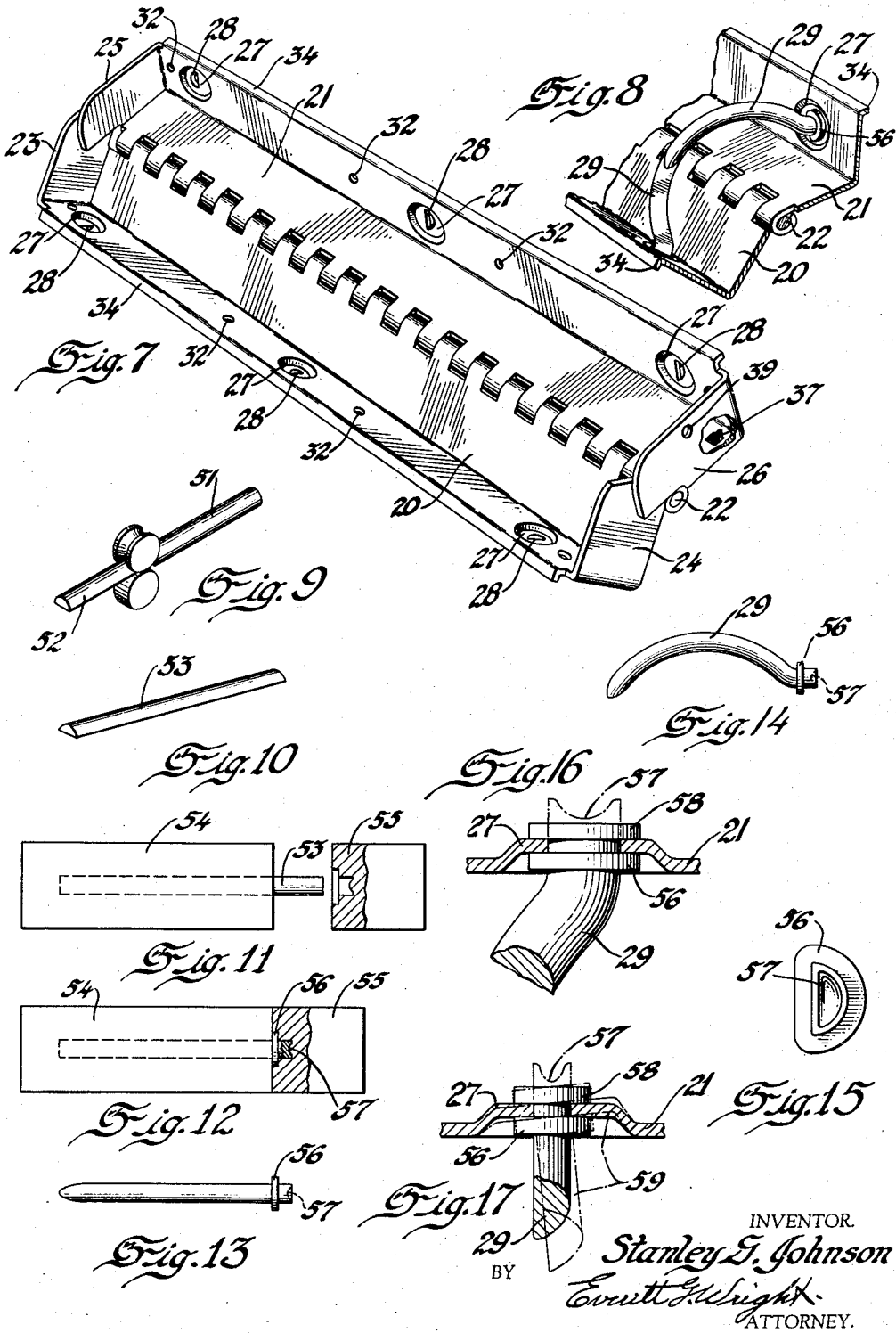
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2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE

2,110,366

## LOOSE LEAF BINDER

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## 1 Claim. (Cl. 129—17)

This invention relates to angle back loose leaf binders of the split prong type and in the method of making the same.

One object of this invention is to provide a sturdy inexpensive split prong binder of such construction that its prongs offer no obstruction to the retaining of filler sheets between the angle back thereof.

Another object of this invention is to provide an inexpensive split prong binder of such construction that the rivet shoulders of the prongs thereof are positioned so as to eliminate interference with filler sheets at the punched holes therein when the filler sheets are urged in compressed relation by the angle back of the binder as the binder is closed under conditions of the binder being filled near or at its maximum capacity.

Another object of this invention is to provide a light weight inexpensive split prong angle back binder of such construction that the inwardly disposed shoulders of the prongs thereof are positioned so as to eliminate interference with punched filler sheets when the binder is filled and closed, the usual inwardly disposed finishing strip on the inside of the upstanding leg of each angle of the angle back being eliminated together with the accompanying weight and cost of construction.

Another object of this invention is to provide a light weight inexpensive split prong angle back binder having a positive acting locking device which occupies a minimum of space and offers a minimum of interference with the filler sheets.

Another object of this invention is to provide a light weight inexpensive split prong angle back binder having a positive acting multi-position locking device in which the operating lever thereof is suitably located so that direct downward pressure on the locking lever at one upstanding leg of the angle back and direct downward pressure on the opposite upstanding leg of the angle back coupled with natural upward finger pressure at the center of the back of the binder will open the same without distortion and excessive wear on the binder and locking device.

Another object of this invention is to provide a light weight inexpensive split prong angle back binder having a positive acting locking device straddling the lapped end pieces formed at the end of the upstanding legs of the angle back in such a manner as to eliminate distortion and wear when the binder is being opened.

Another object of this invention is to provide a novel method of accurately making and as-

sembling light weight inexpensive split prong angle back binders including the prongs thereof; the herein disclosed method of making the prongs prevents warping and twisting of the same during assembly into the binder metal and at the same time provides for a prong of the desired cross section throughout its entire length.

Other objects of this invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a view part in cross section and part in end elevation showing a loose leaf binder embodying this invention.

Fig. 2 is an inside plan view of the binder with the front and back covers broken away and the loose leaf filler sheets removed; a portion of the view being shown in section to better illustrate the construction.

Fig. 3 is an enlarged cross sectional view taken on the line 3—3 of Fig. 2 showing the binder locked in a closed position.

Fig. 4 is an enlarged cross sectional view similar to Fig. 3 except that the binder is shown locked in a partly open position.

Fig. 5 is an enlarged cross sectional view similar to Fig. 3 except that the binder is shown unlocked and in an open position.

Fig. 6 is an enlarged plan view showing the locking device on the binder in its closed position.

Fig. 7 is a view in perspective showing the hinged angle back construction formed and assembled ready to receive the leaf impaling prongs and locking device.

Fig. 8 is a fragmentary view in perspective showing the leaf impaling prongs secured to the formed angle back construction.

Figs. 9, 10, 11, 12, 13 and 14 are views indicating the method of making and forming prongs of the desired cross section and detail.

Fig. 15 is an enlarged view showing the butt end of a finished prong.

Figs. 16 and 17 are enlarged detailed views showing a finished prong secured in a formed depression of the angle back construction.

Referring particularly to the drawings wherein like numerals designate like and corresponding parts throughout the several views, the embodiment of the invention disclosed herein comprises two metal angles 20 and 21 hinged together along the center of the back of the binder around a hinge pin 22. As best illustrated in Fig. 7 the upstanding legs of angles 20 and 21 are provided with end pieces 23 and 24 on angle 20, and end pieces 25 and 26 on angle 21; the said end pieces

are preferably integral with the angles 20 and 21, however, they may be formed separate therefrom and secured thereto in any suitable manner.

It will be noted that the end pieces 23 and 25, and the end pieces 24 and 26 cooperate with each other to form end closures at the U-shaped back 33. The said pairs of end pieces also serve as a stiffening and guide means to maintain the upstanding legs of the hinged angles in their normal position. The end closure comprising end pieces 24 and 26 are straddled by a novel anti-racking locking lever as hereinafter described, the said locking lever being pivotally mounted on the end piece 26.

The upstanding legs of angles 20 and 21 are provided with a plurality of substantially frusto-conical shaped depressions 27 having half round apertures 28 punched through the base of the said depressions 27. The said apertures 28 are preferably arranged in the staggered relation indicated in Fig. 7 in order that left hand prongs 29 and right hand prongs 30 may be secured to angles 20 and 21 in such a manner that opposed prongs cooperate with each other to form a ring when the binder is partially or fully closed and the extreme or outside prongs of the binder are opposite hand. When extreme prongs of the binder are opposite hand and positioned in oppositely facing directions the punched filler sheets 31 are more readily and surely guided and maintained in stacked relationship during use of the binder in its closed, partly opened and open position.

The upstanding legs of angles 20 and 21 of the metal angle back are also provided with apertures 32 through which the U-shaped back 33 is secured to the said angle back as hereinafter described. Each upstanding leg of angles 20 and 21 is bent outward at its upper edge to provide a longitudinally disposed outstanding strip 34 by means of which a neat abutment is made between the metal angle back and the flexible joint securing the front and back covers 35 and 36 respectively to the U-shaped back 33.

The hinge leg of the angle 21 is provided with an inwardly disposed tab 37 used to retain the spring 38 of the locking device in its proper position. An aperture 39 through the end piece 26 of the angle 21 is suitably disposed to receive a rivet 40 which secures the locking lever 41 in pivotal relationship to the end piece 26.

Referring now particularly to Figs. 2, 3, 4, 5 and 6, the novel locking device comprises a locking lever 41 having a locking finger 42, an operating key 43 and an inverted U-shaped central portion 44 through which the rivet 40 secures the said locking lever 41 in pivotal relationship to the end piece 26. The central portion 44 of the said locking lever 41 bridges over or straddles the end piece 26 in such a manner that the spring 38 coiled around the rivet 40 maintains the locking finger 42 of the said locking lever in sufficient spaced relationship to the end piece 26 as to permit the end piece 24 to rotate between the said finger 42 and the end piece 26 when the binder is being opened and closed. The spring 38 coiled around the rivet 40 has one end retained in a fixed position against the hinge leg of angle 21 between the inwardly disposed tab 37 thereof and the end piece 26 thereof, while the other end of the spring 38 constantly urges the locking lever 41 to rotate toward its locked position by means of the constant pressure exerted on the bottom

of the horizontally disposed operating key 43 of the said locking lever 41. A suitably disposed ratchet type detent 45 secured to the angle 20 or end piece 24 is engaged by the locking finger 42 as the binder is closed from the position shown in Fig. 5 to the positions shown in Fig. 4 and Fig. 3. When closing the binder the locking finger 42 of the locking lever 41 acts as a pawl or click riding over the ratchet type detent 45. Any number of ratchet teeth may be used in the detent 45 in order to provide a like number of partially opened positions of the binder.

The cover assembly comprising front and back covers 35 and 36 respectively and the U-shaped back 33 are secured in the proper relationship to the metal angle back by means of rivets 46 punched through the said U-shaped back into registry with apertures 32 in the upstanding legs of angles 20 and 21. The top and bottom sides of the U-shaped back 33 are each provided with a punched binder board filler strip 47 and a securing strip 48 preferably of pressed fiber board. The filler strip 47 has suitably spaced apertures 49 therein to receive the protuberances on the outside of the upstanding leg of the angles 20 and 21 and the head 50 formed on the butt end of the leaf impaling prongs 29 and 30, thereby permitting the filler strip 47 and the securing strip 48 to be secured to the said metal angle back in parallel relationship thereto as best illustrated in Figs. 1, 2, 3, 4, and 5. The center of the U-shaped back 33 is preferably notched on the inside thereof as indicated by the numeral 50 in the drawings to permit sharp central concaved flexing of the said U-shaped back as best shown in Figs. 4 and 5.

In the manufacture of loose leaf binders having half round opposed leaf impaling prongs which cooperate with each other to form a ring when the binder is partially or fully closed, the difficulty of adjusting the opposed prongs into a position of accurate cooperation with each other has caused great expense in the manufacture. A material lessening of cost of parts and the percentage of rejects in the manufacture and assembly of loose leaf binders of the split prong type has been accomplished by the herein disclosed structure and method of manufacture of prongs and angle backs, and the assembly of the prongs into the angle backs followed by a final adjustment of the position of the entire prong in respect to the angle back after assembly.

In the angle back, as hereinbefore described, the upstanding legs of the angles 20 and 21 are provided with a plurality of substantially frusto-conical shaped depressions 27 having half round apertures 28 punched through the base of the said depressions 27. Referring to Figs. 16 and 17 it will be noted that in forming the frusto-conical depressions that the metal at the periphery thereof has been drawn thinner than the metal at the base of the depression 27 and thinner than the metal of the angle back 21. After the prongs 29 and 30 are secured to the base of the depressions their position in relation to the surface of the upstanding legs of angles 20 and 21 may be adjusted by gripping the prongs 29 and 30 near the shoulders 56 at the butt end thereof and changing the plane of the base of the frusto-conical depressions 27, an example of said adjustment being best illustrated by the dot and dash lines 58 in Fig. 17.

It is essential that a pliable accurate prong is provided inasmuch as the aforementioned adjustment of the position of the prongs in relation to

the surface of the upstanding legs of angles 20 and 21 is not the only adjustment required after assembly to assure the perfect registry of opposed prongs; in many cases the prongs per se must also be bent. It is impossible to mill the prongs flat from an upset round wire without leaving an undesirable fillet between the flat surface and upset head thereof. Die castings do not lend themselves to pliability. Also, milled and die cast prongs have been found to be from four to six times as expensive as the making of half round arcuate prongs by the method herein disclosed.

Referring now to Figs. 9 to 15 inclusive, round wire stock 51 is either rolled or extruded into stock of the desired cross section which, in the embodiment of the invention disclosed, is substantially half round as indicated by the numeral 52 in Fig. 9. The stock is then cut into blanks 53 of the proper length as shown in Fig. 10.

The blanks 53 are then inserted into a holding die 54 while a female shouldering and heading die 55 is brought against the end of the blank 53 protruding from the holding die 54 to form a shoulder 56 and a concaved butt 57 as indicated in the drawings. The concaved butt 57 is preferred to the usual flat butt inasmuch as it aids in forming a symmetrical prong securing head 58 without excessive heat when the prongs are secured by means of resistance welding. When upsetting the concaved butt 57 into a prong securing head 58 as in a riveting operation, it has been found that the use of a concaved butt 57 materially aids in providing tightly secured prongs.

The preferred method of manufacture of prongs and assembly into hinged angle back metals disclosed herein and the two adjustments of the position of prongs after assembly provides an improved method of inexpensive quantity production of split prong loose leaf binders with opposed leaf engaging prongs in accurate relation to each other.

The frusto-conical shaped depressions provide an essential function of adjustability of prongs

in relation to the angle back and at the same time remove the shoulders at the base of the prongs from interference with the punched filler sheets. The locking device is of a novel character which minimizes racking and distortion when opening and closing the binder, the minimizing of distortion of the parts of the binder being essential to long life and maintenance of the opposed leaf-impaling prongs in operating relationship to each other for accurately guiding and engaging filler sheets.

Although but one embodiment of this invention and one particular application of this method has been shown and described, it will be understood that numerous variations of the method may be had, and that numerous changes including the size, shape, arrangement and details of the various parts hereof may be made without departing from the spirit of my invention, and it is not intended to limit the scope thereof other than by the terms of the appended claim.

**I claim:**

In a hinged angle back loose leaf binder having impaling prongs adapted to engage punched filler sheets when the binder is partially or fully closed, the combination of end pieces on the angle back in pairs cooperating to form end closures, a locking lever pivotally mounted on one end piece laterally spaced therefrom and having a portion thereof straddling said end piece of one end closure, a detent on the other end piece of said end closure, a spring around said pivotal mounting between the lever and the end piece to which it is pivoted constantly urging said locking lever into registry with said detent also adapted to maintain the said locking lever in sufficient spaced relation to the end piece on which it is mounted to permit the other end piece to rotate therebetween when the binder is being opened and closed, and an operating key adjacent said straddling portion of said locking lever therefor for manually releasing said locking device.

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