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3,149,636

LATCH MEANS FOR LOOSE-LEAF BINDER

Filed May 6, 1959

FIG. 1

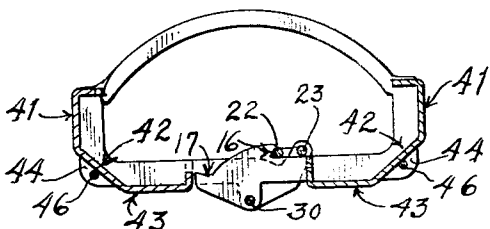
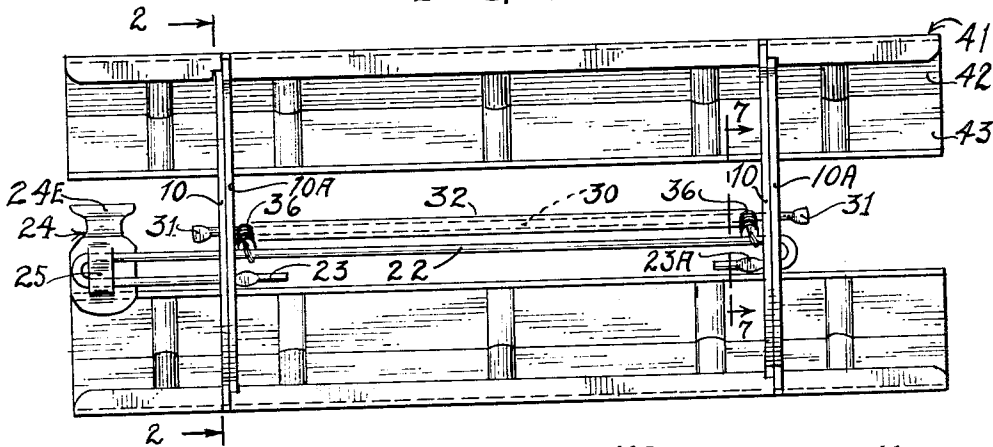


FIG. 2

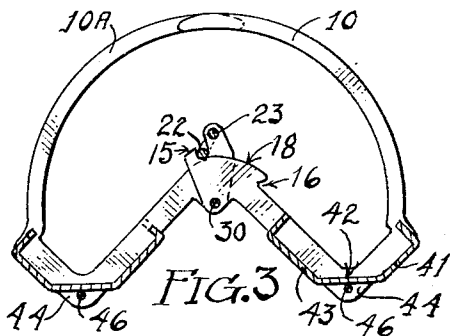


FIG. 3

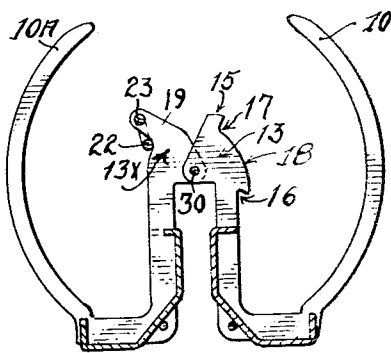


FIG. 4

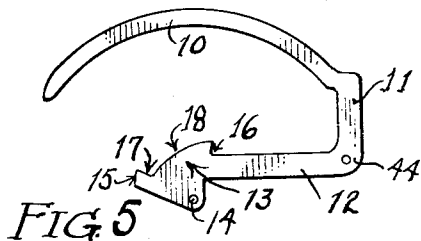


FIG. 5

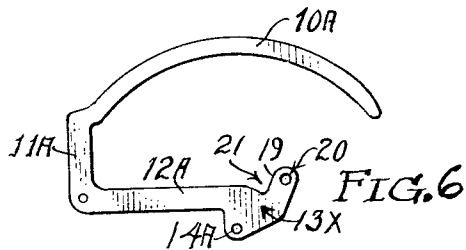


FIG. 6

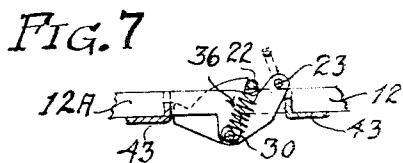


FIG. 7

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3,149,636

LATCH MEANS FOR LOOSE-LEAF BINDER

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5 Claims. (Cl. 129-17)

This invention pertains to loose-leaf binders of the type disclosed in U.S. Patent No. 2,907,332 and a co-pending application Serial No. 120,860, which have been termed "floating ring" binders by reason of the fact that opposite binding rings or prongs float pivotally about a common central hinge rod, and metal channel members, attached to the ring assembly and adapted in turn to be secured to the backbone of the covers, likewise float with the rings about the hinge rod and the rings can be operative for sheet-binding purposes regardless of whether their metal members are attached to covers or not.

In the constructions disclosed in the aforesaid patents the opening action of the floating rings is limited by a latch means coacting with extended parts of the floating rings in the region of the common hinge axis and capable of releasably stopping such opening action at a predetermined position which is reached before the rings separate. This position is a reading position in which the rings are as close as feasible to fully opened condition in order to spread the pages as far apart as possible to give an easy reading gutter at the page hinges.

The present improvements relate to the aforesaid latch means and provide a change in the construction of the extended end portions of the floating rings and certain latch rod means cooperable therewith to provide two latched positions for the rings, one of which is a fully-closed condition and the other of which is a nearly-open or reading position; the latter being available, however, only in response to a releasing operation of the special latch rod means, the construction and operation of these parts being more fully set forth hereinafter in view of the annexed drawing, in which:

FIG. 1 is a plan view of the binding mechanism and "metals" or prongs in closed condition, but without covers;

FIG. 2 is a cross section along lines 2-2 of FIG. 1;

FIG. 3 is a section like that of FIG. 2 showing the prongs in (nearly open) reading position;

FIG. 4 is a section like that of FIG. 3 showing the prongs in fully-open or loading position;

FIG. 5 is a plan detail of one of the floating rings or prongs with improved latch parts;

FIG. 6 is a plan detail of a companion latching type floating ring for the ring shown in FIG. 5;

FIG. 7 is a fragmentary sectional detail of the latch portion of a pair of prongs or rings as seen along lines 7-7 of FIG. 1.

Referring first to FIGS. 5 and 6, each ring of a latching pair comprises an arcuate prong portion 10 attached at one end to a chordally directed leg 11, which in turn has a reentrantly-directed or turned-in radius member or foot 12 terminating in an enlarged toe portion 13 which is pierced for a pivot axis at 14 for engagement with a long pintle or hinge rod 30 later referred to. The axis at 14 is concentric with the radius of curvature of the arc of prong 10.

The enlarged toe portion 13, on one prong of each latching pair, is provided with at least two radially-disposed notch formations 16 and 17 joined by an arcuate dwell 18 leading outwardly from the peak of the inner notch 16 down into the root of the outer notch 17 for the purpose of affording a directed glide path for a latch or detent rod means hereafter described. In general, the notches 16 and 17 and dwell 18 are radially disposed with respect to the axis through 14.

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As viewed in FIG. 6, the companion prong unit has substantially the same basic structure as the unit depicted in FIG. 5 and includes an arcuate prong 10A terminating at one end in a chordal leg 11A, with a reentrant foot or radius member 12A terminating in an enlarged toe portion 13X pierced as at 14A for engagement with the common pintle rod.

The toe 13X differs from the companion structure 13 in that it has an upwardly and somewhat outwardly directed tab 19 pierced as at 20 to receive the latch or detent rod means 22-22A (FIGS. 1 and 3), there being a stop notch 21 formed by the angle of the tab with the foot, in which the detent rod may seat at certain times, as in FIG. 3.

As seen in FIG. 1, two or more sets of binding prong pairs may be joined to a common pintle rod 30, the ends of which are pinched as at 31 to secure the assembly. Preferably this rod is provided with a tubular plastic shield 32 to protect the paper sheets loaded into the binder (not shown).

In order to secure the prongs in paired sets so that the whole assembly floats about and upon the common hinge rod 30, there are provided C-shaped channel piece "metals" 40 having the special cross section seen in FIG. 2 to provide angular flanges or walls 41, 42, 43, the latter constituting a pitched wall between the remaining two flanges.

Slots (not detailed) are formed in the pitched channel walls or flanges through which the heel portions 44 (FIGS. 2, 3) are snugly projected to expose the rod passages 45 thereon at the opposite or outside face of the appertaining pitched channel wall.

Retaining rods 46 are passed through all of the exposed rod passages 45 in the heels of prongs lying on the same side of the hinge axis through pintle rod 30, these rods tightly pulling-in and securing all of the prongs engaged thereby to the corresponding "metal," as such channel devices are commonly called in the trade.

The latter assembly features and other important aspects of the slotting and construction of the special channel members are covered in detail in the aforesaid patents, it being sufficient for present purposes to point out that, in effect, each channel member is attached to all of the prong units lying on one side of the hinge axis, and all prong units are engaged with the one common pivot rod, so that the rings and metals may be said to float about the axis of rod 30.

In the usual loose-leaf binder, there will be a set of book-type covers (not shown) attached to the two channel members, as in the aforesaid patents, the covers being omitted herein since they do not relate to the present improvements which will operate identically when the prong and channel assembly is used in its true "floating" character independently of any covers. It may be noted, however, that such covers have a backbone hinged in the middle beneath the common prong-hinging axis through pintle rod 30, in addition to having hinges at the juncture of each cover board with the backbone.

This peculiarity is of interest here only because it gives rise in older non-locking binders to accidents when the volume is squeezed in a manner to cause movement at the middle hinge so that the volume collapses and escapes from the grasp. This type of cover construction is well known in the art under the appellation "middle-break" cover, backbone, or binder, and details of this type of cover are found, for example, in the aforesaid patent and copending application.

Referring to FIG. 1, the latch rod 22 has opposite end portions 23, 23A turned or looped back for entry into the latch-rod pivot holes 20 in the tab, and the loop 23 is made larger to form a handle which is completed by attachment thereto of a thumb plate 24 secure at the right

of the rod loop by means of a sheared-out strap of the plate metal 25 under which the rod loop is passed and thereafter the strap is knocked down into the rod loop behind the bight or bend and thereby retained firmly in place.

The long continuous latching portion 22 of the latch rod is disposed radially of the rocking axis through the looped ends 23, 23A, and the end 24E of the finger tab or thrust plate is even farther removed radially from this axis so that a slight lifting effort applied to the handle tab at 24E will rock the long latch portion 22 of the rod upwardly and clear of any of the notches 16, 17, or 21.

In many binders having large capacity (e.g., prongs of 3-inch radius), additional pairs of prongs may be distributed along the length of the common axis rod 30 and such additional pairs may have latching notches which will cooperate readily with the long latch rod portion 22.

Spring means 36 (FIGS. 1 and 7) are provided at opposite end of the latch rod, as detailed in FIG. 7, wherein one end of each spring is looped onto the common pintle rod 30 while the opposite ends thereof are looped onto the radially offset parts 22 of the latch rod to rock the latter on the latch-rod axis through looped rod ends 23 into the normal latching positions shown in FIGS. 2, 3, and 7.

FIGURES 2 and 7 show the fully-closed lock-shut condition of the binding prongs. This is, in a manner of speaking, a safety condition and not a reading condition. When the prongs are heavily loaded in large volumes disposed on shelves, and a volume is grasped for removal at its backbone, it happens (as previously alluded to) in old style binders that the centrally-hinged backbones in this class of binder will fold or collapse under a resultant weight of the contents and squeezing grasp in a sort of rolling action which causes the volume to slip from the hand and do damage to itself or the person dropping it. This kind of accident usually happens to women whose hands are not large enough and strong enough to seize the volume and keep it squeezed closed. Once the backbone yields in an opening action under a loose grasp the volume is very likely to slip away.

When a binder employing the disclosed lock-shut means is shut from any open condition (whether fully open for loading, or partially open for reading) the radial disposition of the notches 16 and 17, and interconnecting gliding edge 18, will lift the latch rod parts 22 and the latter will be snapped home by spring means 36 into the notches 17 or 16 as they are reached, and in case of notch 16 the volume will be automatically locked shut in a safe condition.

In order to open the volume from the lock-shut condition, handle tab 24 is lifted to free the rod part 22 from notch 16 and at once released, so that as the volume continues to open, the rod part 22 will automatically drop into the reading notch 17, as in FIG. 3.

Should it be desired to remove or add pages, the tab 24 is held up until notch 17 is passed and the prongs are separated fully in the open loading condition of FIG. 4.

The operation of the latch means both in open and closing actions is smooth and easy. The mechanism is quite simple and the latching action is of a jamming type, as can be visualized from FIG. 3 wherein it will be seen that the rod part 22 is securely jammed in between the converging edge parts of notch 17 and tab notch 21 in the reading position, wherein the greatest load is likely to be applied to the latch.

In the fully closed or lock-shut condition of FIG. 2, the locking thrust is almost entirely radial of the axis through 23 and latch rod part 22 lies down against the foot portion of the prongs so that there is also great latching strength against both opening and closing forces, it being important to note that forces tending to crush the floating prongs beyond normally closed condition are dangerous and commonly encountered in shipping loaded binders and in dropping accidents, and the aforesaid patents emphasize other cantilever structural features of the

prong structure and channels especially adapted to resist such over-closing forces, so that the contribution of the strength of the latch means in this respect in the lock-shut condition is of great practical significance.

When the prongs are to be closed from the fully-open loading condition of FIG. 4 no attention need be paid to the latch member because the latter will be automatically rocked up out of the way owing to provision of a cam formation 15 on the end of that one of the foot formations in which the several stop or latching formations 16 and 17 are provided, and the cam edge 18 will perform a similar transient releasing function as the inner notch 16 is approached in closing the rings in the lock-shut condition.

I claim:

1. In a loose-leaf binder having sets of juxtaposed opposite acting arcuate prong units each having a diametrically-directed foot part which is joined to a common central hinge axis at a point on the said foot parts which is concentric of the respective prong arcs, latching means comprising, namely: a long latch member rockably supported by and between the foot parts of two or more of said supporting prong units which are all disposed on one particular side of said hinge axis so that the rocking axis of the latch member is substantially parallel to said hinge axis, said latch member having a portion offset radially of its own rocking axis to move in a direction approximately radially toward and away from said hinge axis; and a latch formation on an endwise foot portion of at least one companion prong to one of said supporting prongs and providing at least one latching stop formation removably engageable by said latching member in movement of the latter a predetermined amount toward said hinge axis, whereby to prevent pivotal movement of said prongs in a given direction beyond a predetermined angular relation; and spring means acting on said radially offset portion of the latch member yieldingly urging the same in a direction to engage and latch in said latch formation.

2. A construction according to claim 1 further characterized in that there are a plurality of said latch stop formations on the said companion prong each located to latch the coacting prongs in at least two different angular positions one of which is a fully closed-together relation of the prongs, and another of which is a nearly spread-apart reading position, said latch member being further releasable to permit full opening apart of said prongs for loading.

3. A construction according to claim 2 further characterized in that an arcuate glide path is provided on the foot portion of the companion prong as aforesaid for engagement by the latch member in substantial concentricity with the hinge axis and interconnecting the appertaining latch stop formations whereby the offset part of the latch member is cammed into latching engagement with a stop formation in the fully closed condition of the prongs.

4. A construction according to claim 2 in which that one of the stop formations which is the last in the direction of opening movement of the prongs has a cam formation disposed in the path of the offset part of the latch member to be engaged by the latch in relative closing movement of the prongs from said fully open loading position to automatically cam the latch transiently into release condition and permit continued closing movement of the prongs.

5. In a binding mechanism of the type having arcuate prong members juxtaposed in pairs for closing and opening pivotal movement relative to each other and forming an assembly on a common central pivot rod with which the prong arcs are concentric and wherein each prong has a reentrant diametrically-directed foot joined thereto by a chordal leg and traversed by said rod, the combination with at least two of said pairs of prongs situated in spaced relation along said rod, of prong-latching means forming

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a part of said assembly and comprising, namely: the provision on the foot of each prong member of an endwise foot portion which is circumambient of said pivot rod; at least two angularly separated latch formations situated radially of the rod axis on the circumambient foot portion of a first one of the prong members in a said pair; an elongated latching member having offset parts rockably supported on the endwise foot portions of the second prong members of at least two of said spaced pairs whereby to support said latching member in parallelism with said rod for rocking movement into and out of engagement with said latch formations when the appertaining prong members in each pair are disposed in predetermined

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angular positions; spring means carried by said assembly and acting upon said latching member to urge the latter into position for latching action as aforesaid; and means carried by said latching member to extend eccentrically of the rocking axis thereof providing an operating leverage handle.

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