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1,978,543

LOCKING MEANS

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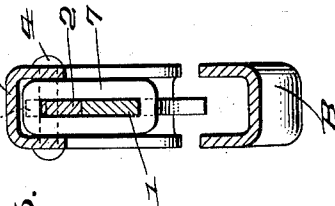
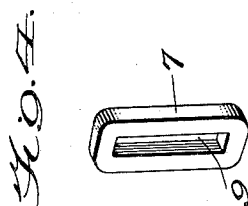
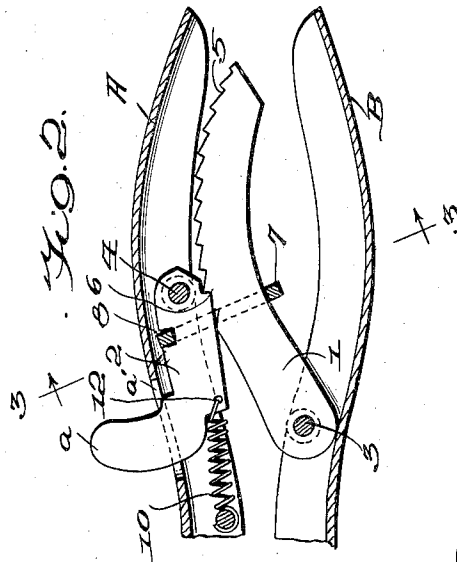
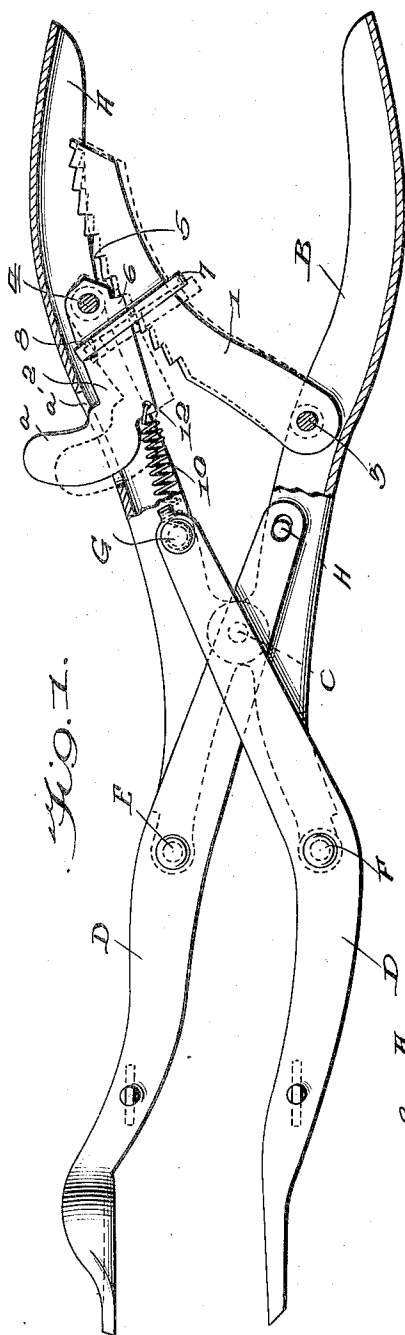
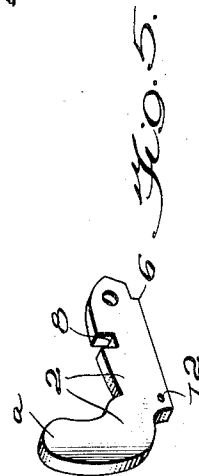


Fig. 5.



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LOCKING MEANS

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6 Claims. (Cl. 29—86.3)

This invention relates to releasable locking means particularly adapted and intended for one-hand plier type tools, such, for instance, as valve-spring lifters wherein the spring acting on the lifter jaws tends to move the handles of the tool relative to each other.

The primary objects of this invention are, to provide a locking means similar to that shown in the Kulp and Dellinger Patent No. 1,461,275 granted July 10, 1923 wherein the locking means except for the releasing thumb piece lies entirely between the handles; to provide in a locking means of this general type a rack bar in combination with a releasable locking pawl; to provide a locking means of this general type having a rack bar and locking pawl, both of which may be formed of sheet metal, with means at all times maintaining said pawl and rack in proper alignment and binding said elements together while permitting relative movement between the pawl and rack incident to the relative movement of said handles or incident to the movement of said pawl.

In this application I show and describe only the preferred embodiment of my invention simply by way of illustration of the practice of my invention as by law required. However, I am aware that my invention is capable of other and different embodiments, and that the several details thereof may be modified in various ways, all without departing from my said invention. Therefore, the drawing and description herein are to be considered merely as illustrative and not as exclusive.

In the accompanying drawing:

Figure 1 represents a side elevation, partially in section, of a tool embodying my invention with the pawl and rack being shown in full lines in locked relation and in broken lines in disengaged or released or unlocked relation;

Figure 2, a fragmentary sectional view of the handles and locking means in side elevation, the handles being moved to a different position from that shown in Fig. 1;

Figure 3, a sectional view on the line 3—3 of Fig. 2, looking in the direction of the arrows;

Figure 4, a detail perspective view of the aligning and binding plate band or loop; and

Figure 5, a detail perspective view of the releasable locking pawl.

In the drawing, which is drawn to exact full size from a commercial embodiment, the invention is illustrated as embodied in a valve-spring lifter constructed in accordance with the Kulp and Dellinger Patent No. 1,879,330 granted Sept.

27, 1932, excepting for the substitution of the locking means of the instant invention for the locking means illustrated in said patent.

Referring now in detail to the drawing, A designates one handle, B the other handle, said handles being pivotally connected together by the pivot pin C and having forward extensions respectively lying on the same side of the pivot pin C as the respective handles and to which are respectively pivotally connected the jaw members D by the respective pivot pins E and F, the tails of the respective jaw members D crossing each other and being slidably pivotally connected to the respective handles A and B to the rear of the pivot pin C by the pivot pins G and H respectively, all as more fully described in detail in said Kulp and Dellinger Patent No. 1,879,330.

In the embodiment illustrated the arcuate rack bar 1 is pivotally connected to the handle B by the pivot pin 3 so that the free end of said rack bar 1 will swing toward and from the rear end of handle B and as illustrated in said embodiment the convex edge portion of said rack bar 1 is formed with a plurality of serrations forming abrupt teeth or shoulders 5 facing forwardly toward the pivot pin C.

In the embodiment illustrated the pawl 2 is pivotally connected to the handle A by the pivot pin 4 at a point appreciably to the rear of pivot pin 3, its free end portion being disposed between the pin C and said pivot pin 4 on which it is mounted to swing and being formed with a preferably integral finger or thumb piece *a* extending up through a slot *a'* in the handle A. The rear lower portion of pawl 2 is cut away to form a rearwardly facing abrupt locking shoulder or finger 6, the rearwardly facing shoulder or finger 6 being so formed and related to the forwardly facing teeth or shoulders 5 of the rack 1 that when the rear face of shoulder 6 is in engagement with any one of said shoulders 5, the opposing faces of said engaging shoulders will lie substantially parallel to each other, though this is not essential so long as there is a positive non-slipping interlocking engagement between the rack and pawl or they are so formed that they may function in this manner.

The pawl 2 has its upper edge portion formed with a wide deep notch 8 appreciably in advance of the pivot pin 4 to receive the upper cross-bar of the aligning and binding plate band or loop 7, the elongated opening 9 of which receives the intervening portions of the pawl 2 and the rack bar 1 to maintain them in proper alignment and to bind them together in proper operative rela-

tion while permitting their relative movements necessary to their proper functioning.

The notch or recess 8 will preferably be of such size and shape with relation to the upper cross-bar of the binding member 7 as will permit said binding member 7 to rock or swing about said cross-bar under the drag of the rack bar 1 in sliding through said binding member 7 and in accordance with the movement of the pawl 2 to release the rack bar 1 and the movement of the rack bar 1 by the pawl 2 incident to such releasing operation, as indicated in broken lines in Fig. 1.

A tension spring 10, in the embodiment illustrated, having its forward end hooked about or anchored to pivot pin G and its rear end hooked through hole 12 in the lower forward portion of the free end portion of pawl 2 serves as a convenient yieldable resilient means or normally holding the pawl up in its normal locking position against the influence of gravity, though clearly any one of a number of other known means suitable to the same purpose may equally well be employed instead.

Preferably the rack bar 1 and the pawl 2 will be formed from suitable sheet metal stock by usual quantity production sheet metal stamping operations, and the same applies as to the aligning and binding member 7.

The elongated opening 9 in the member 7 will be of such width as to just snugly freely slidably receive the rack bar 1 and the embraced portion of pawl 2 and will be of a length slightly in excess of the combined width of the rack bar 1 and the portion of the pawl 2 between the bottom of the notch or recess 8 and the lower edge face of said pawl 2, the bottom of the notch or recess 8 and the lower or distant edge face of the rack bar 1 being normally held spread apart, thus taking up the slack, by the spring 10 holding the pawl 2 swung up about its pivotal point 4 in normal locking position. When the pawl 2 is depressed to swing downward about its pivot 4, as indicated in broken lines in Fig. 1, so that the lower edge of said pawl 2 rests on or bridges the outer edge faces of the shoulders 5 the bottom of the recess or notch 8 is moved closer to the rack bar 1, whereby the rack bar 1 may move slightly away from the pawl 2 about its pivot 3 under the thrust of said pawl 2, so that the rack bar 1 will be held depressed, the arcuate path of movement of the locking shoulders 5 then lying below the locking shoulder or finger 6 so as not to be engaged by the latter, the length of the elongated opening 9 being such as to permit a slight play between the parts when in such relationship, as indicated in broken lines in Fig. 1.

To assemble, the aligning and binding band, loop or member 7 may be slipped over the rear end of the pawl 2 until its top cross-bar comes to rest in the notch or recess 8, the normally free end of the rack bar 1 being next threaded rearwardly through the member 7 with the locking shoulders 5 being presented upwardly and forwardly in opposition to the downwardly and rearwardly presented locking shoulder or finger 6 of pawl 2. Thereafter the pawl 2 and rack bar 1 are to be pivotally secured in their respective handles A and B by their respective pivot pins 4 and 3, and finally the spring 10 will have its forward end hooked around or otherwise suitably anchored to the pivot pin G and its rear end hooked through the hole 12 when the assembly operation will have been completed.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent is:

1. A plier type tool comprising a pair of handles pivotally connected together for relative swinging movement toward and from each other in a single plane, an arcuate rack-bar at all times disposed entirely between said handles and pivotally mounted on one of said handles with its free end disposed toward the free ends of said handles for swinging movement toward and from the free end of its handle, the convex upper edge portion of said rack-bar being formed with a plurality of serrations having abrupt forwardly presented shoulders, a pawl pivotally mounted on the other handle to the rear of the point of pivotal mounting of said rack-bar and with its free end disposed toward the fulcrum point of said handles for swinging movement between said handles, said pawl having an integral thumb piece extending upward through a corresponding slot in its handle and having its upper edge portion formed with a deep notch in advance of the axis of its point of pivotal mounting and its lower rear portion formed with an abrupt rearwardly and downwardly presented locking shoulder adapted to selectively engage said shoulders of said rack-bar to lock said handles in any one of several relative positions, in combination with an aligning binding plate member fitting about said pawl and said rack-bar to hold them in alignment and to maintain them in their proper relative positions while permitting their relative movements necessary to their proper functioning, said member having an upper cross-bar received in said notch and being of less thickness than the width of said notch and being formed with an elongated opening of a width just snugly freely slidably receiving said pawl and said rack-bar and of a length slightly in excess of the combined width of said rack-bar and the portion of said pawl between the bottom of said notch and the nearest point of the lower edge of said pawl.

2. A plier type tool comprising a pair of handles connected pivotally together for relative swinging movement in a single plane, an arcuate rack-bar pivotally mounted on one of said handles with its free end disposed toward the free ends of said handles, the convex upper edge portion of said rack-bar being formed with a plurality of serrations having abrupt forwardly presented shoulders, a pawl pivotally mounted on the other handle to the rear of the pivotal point of mounting of said rack-bar and with its free end disposed toward the fulcrum point of said handles for swinging movement between said handles, said pawl having a thumb piece and having its upper edge portion formed with a notch in advance of the axis of its point of pivotal mounting and its lower rear portion formed with an abrupt rearwardly and downwardly presented locking shoulder adapted to selectively engage said shoulders of said rack-bar to lock said handles in any one of several relative positions, and a spring acting on said pawl to hold it in normal locking position, in combination with an aligning binding plate member fitting about said pawl and said rack-bar to hold them in alignment and to maintain them in their proper relative positions while permitting their relative movements necessary to their proper functioning, said member having an upper cross-bar received in said notch and being formed with an elongated opening of a width just snugly freely slidably receiving said pawl and said rack-bar and of a length slightly in excess of the combined width of said rack-bar and the portion of said pawl

between the bottom of said notch and the lower edge of said pawl.

3. A plier type tool comprising a pair of handles connected together for relative swinging movement in a single plane, a rack-bar pivotally mounted by one end portion on one of said handles for swinging movement between said handles, one edge portion of said rack-bar being formed with a plurality of serrations having abrupt shoulders, a pawl pivotally mounted on the other handle for swinging movement between said handles, said pawl being formed with an abrupt locking shoulder adapted to selectively engage said shoulders of said rack-bar to lock said handles in any one of several relative positions, and a spring acting on said pawl to hold it in normal locking position, in combination with an aligning binding plate member fitting about said pawl and said rack-bar to hold them in alignment and to maintain them in their proper relative positions while permitting their relative movements necessary to their proper functioning, said member being formed with an elongated opening of a width just snugly freely slidably receiving said pawl and said rack-bar and of a length slightly in excess of the combined width of said rack-bar and the portion of said pawl between the bottom of said notch and the lower edge of said pawl.

4. A plier type tool comprising a pair of handles connected together for relative swinging movement in a single plane, a rack-bar pivotally mounted on one of said handles for swinging movement between said handles, said rack-bar being formed with a plurality of shoulders, a pawl pivotally mounted on the other handle for swinging movement between said handles, said pawl being formed with a locking shoulder adapted to selectively engage said shoulders of said rack-bar to lock said handles in any one of several relative positions, and yielding means acting on said pawl to hold it in normal locking position, in combina-

tion with a binding means fitting about said pawl and said rack-bar between their respective points of pivotal mounting to maintain them in their proper relative positions while permitting their relative movements necessary to their proper functioning.

5. A plier type tool comprising a pair of handles connected together for relative swinging movement in a single plane, a rack-bar connected to one of said handles for swinging movement between said handles, said rack-bar being formed with a plurality of shoulders, a pawl connected to the other handle for swinging movement between said handles, said pawl being formed with a locking shoulder adapted to selectively engage said shoulders of said rack-bar to lock said handles in any one of several relative positions, and yielding means acting on said pawl to yieldingly hold it in normal locking position, in combination with an aligning binding means fitting about said pawl and said rack-bar to hold them in alignment and to maintain them in their proper relative positions while permitting their relative movements necessary to their proper functioning.

6. A plier type tool comprising a pair of handles connected together for relative swinging movement in a single plane, a rack-bar connected to one of said handles for swinging movement between said handles, a pawl connected to the other handle for swinging movement between said handles, and yielding means acting on said pawl to yieldingly hold it in normal operative position, said pawl and rack-bar being formed to positively interlock with each other in a plurality of their relative positions to selectively lock said handles in any one of several relative positions, in combination with freely floating binding means encircling said pawl and said rack-bar to maintain them in their proper relative positions while permitting their relative movements necessary to their proper functioning.

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