June 16, 1942. D. RABINOW 2,286,373

LOCKING SLIDER

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Fig. 1

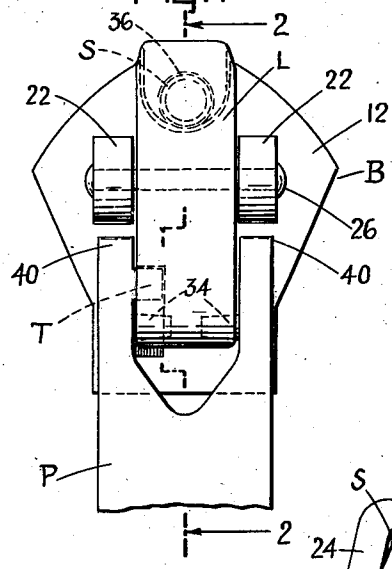


Fig. 2

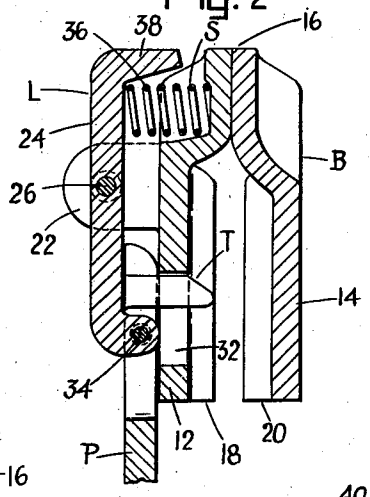
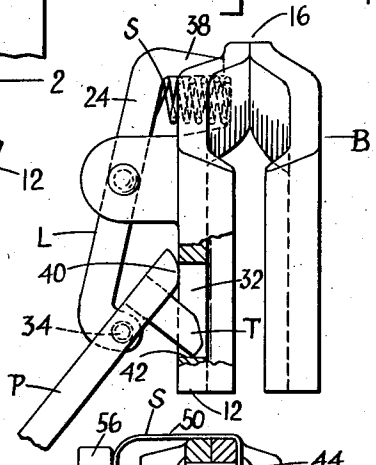


Fig 3



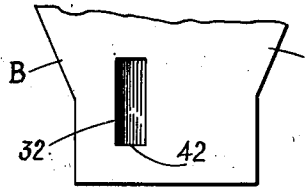


Fig. 4

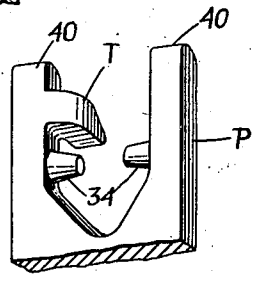


Fig. 5

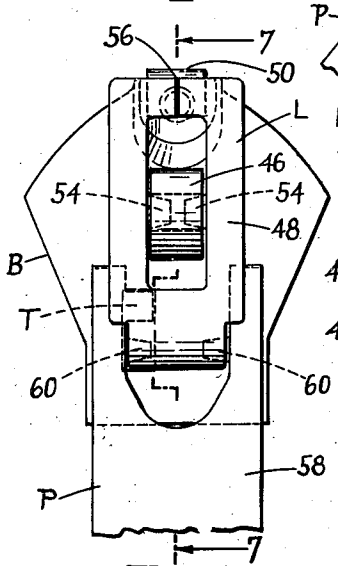


Fig. 6

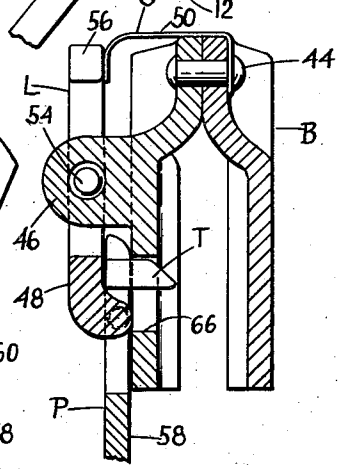


Fig. 7

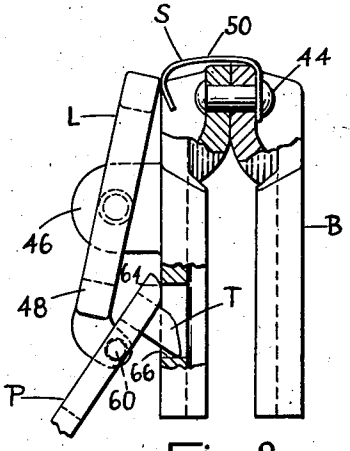


Fig. 8

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LOCKING SLIDER

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Fig. 9

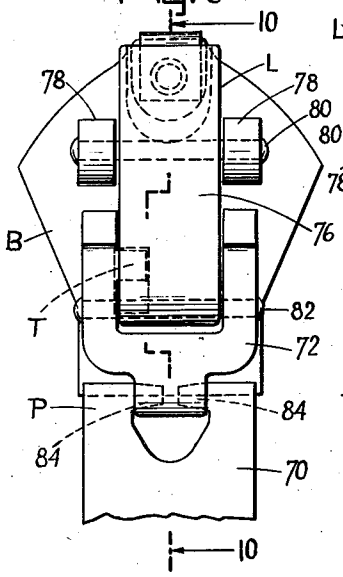


Fig. 10

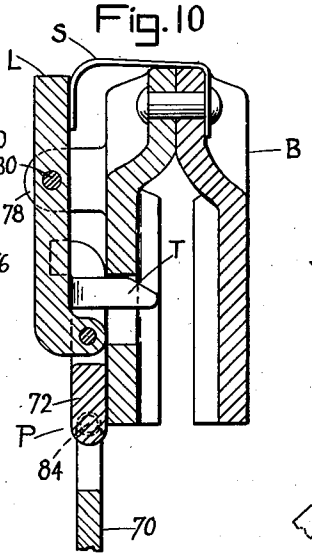


Fig. 11

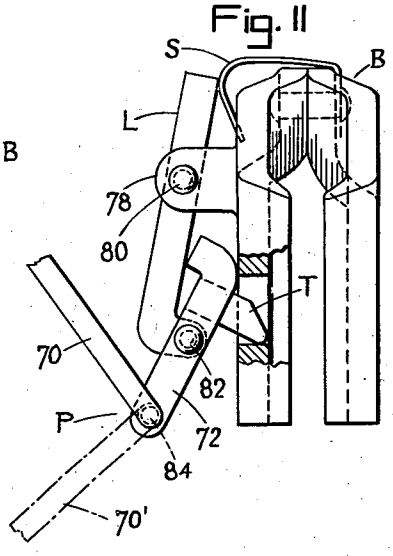


Fig. 12

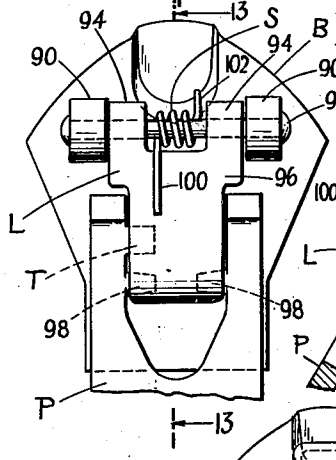


Fig. 13

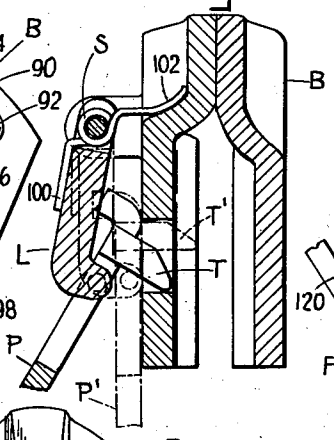


Fig. 14

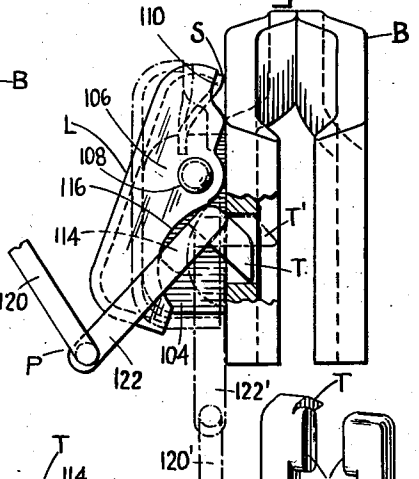


Fig. 15

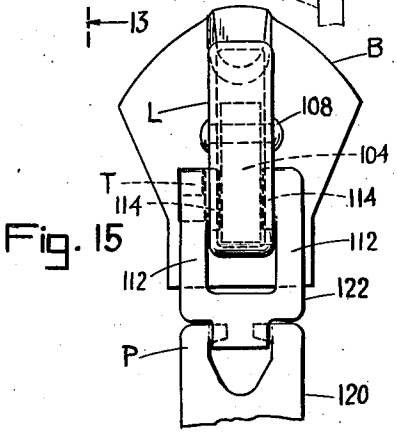


Fig. 16

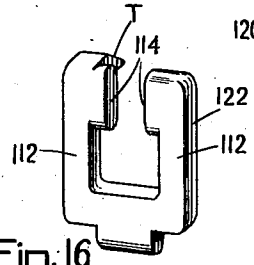


Fig. 17

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2,286,373

LOCKING SLIDER

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Application September 13, 1941, Serial No. 410,670

14 Claims. (Cl. 24—205)

This invention relates to slide fasteners.

The primary object of the invention is to generally improve slide fasteners, and more particularly locking sliders for the same. A more specific object is to provide an automatic spring-operated locking slider for use with conventional slide fasteners or zippers. Such fasteners comprise elements having interlockable projections and recesses, and jaws which are clamped on the beaded or corded edges of tapes to form the so-called "stringers" of the slide fastener, along which the slider is moved.

To the accomplishment of the foregoing general object, and other more specific objects which will hereinafter appear, my invention consists in the locking slider elements and their relation one to the other as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings, in which:

Fig. 1 is a front elevation of a locking slider embodying features of my invention;

Fig. 2 is a section taken approximately in the plane 2—2 of Fig. 1;

Fig. 3 is a partially sectioned side elevation of the slider with the parts in unlocked condition;

Fig. 4 is a front elevation of the lower end of the slider with the locking mechanism removed;

Fig. 5 is a perspective view showing the upper end of a pull forming a part of my invention;

Fig. 6 is a front elevation of a modified locking slider utilizing a bifurcated lever with integral pivots;

Fig. 7 is a section taken approximately in the plane of the line 7—7 of Fig. 6;

Fig. 8 is a partially sectioned side elevation showing the parts in unlocked condition;

Fig. 9 is a front elevation of another modification of my invention utilizing a two-piece pull;

Fig. 10 is a section taken approximately in the plane of the line 10—10 of Fig. 9;

Fig. 11 is a partially sectioned side elevation showing the parts in unlocked condition;

Fig. 12 is a front elevation of still another modified form of the invention employing a torsion spring for the lever;

Fig. 13 is a section taken approximately in the plane of the line 13—13 of Fig. 12;

Fig. 14 is a partially sectioned side elevation of a modification of the invention in which the lever is cammed upwardly by non-circular pivots on the pull;

Fig. 15 is a front elevation of the same;

Fig. 16 is a perspective view showing the inner portion of the two-piece pull; and

Fig. 17 is a similar view showing the use of similar camming pivots on a one-piece pull.

Referring to the drawings, the locking slider of my invention, in all the forms shown, comprises a slider body generally designated B provided with a lug pivotally carrying a lever L. The slider further comprises a pull generally designated P, said pull being pivoted on lever L and having a locking tooth T. A spring S operates on lever L and urges the pull-carrying end of the lever toward the slider, in order to bring the tooth into locking engagement with the elements of the slide fastener (said elements being conventional and being omitted from the drawings in order to better show the structure of the slider itself). It will be understood that the locking tooth T is so disposed and dimensioned relative to the lever L and the pull P that the tooth is moved out of engagement with the fastener elements to unlock the slider when the pull is raised preparatory to moving the slider.

Referring now more specifically to Figs. 1 through 5, the locking slider there shown comprises a slider body B having front and back walls 12 and 14 secured together at a neck portion 16. The walls 12 and 14 are appropriately flanged, as is indicated at 18 and 20, for cooperation with the elements of the slide fastener. The walls 12 and 14 may be formed of a single piece of metal or, as here shown, may be formed of separate pieces of metal, and may be secured together in any desired fashion as, for example, by welding. The construction of the slider body itself may be varied and is unimportant to the present invention.

The front wall 12 has spaced lugs 22 pivotally carrying the lever L therebetween. A fulcrum pin 26 passes through lugs 22 and lever L, and is riveted at its ends to hold it against axial movement.

Only the upper end of the pull P is shown. The locking tooth T is formed integrally on the pull and projects inwardly toward the fastener elements within the slider. The front wall 12 of the slider is cut away to form an aperture or window 32, best shown in Fig. 4, through which the locking tooth T passes (see Fig. 2), to a position between adjacent fastener elements. The pull P is pivotally mounted on the lever L by means of pivots 34. The lever L is normally urged to the locking position shown in Fig. 2 by a spring 36 which, in the present case, is a coiled compression spring disposed between the upper end of lever L and the neck portion 16 of the slider. The upper end of lever L may be turned

inwardly, as indicated at 38, to form a protective shield for spring 36. This inward projection may, if desired, be made of proper length to act as a stop for the mechanism, as will be described subsequently.

To operate the slider the pull P is raised, as shown in Fig. 3, causing the projecting ends 40 of the pull to bear slidably against the front wall 12 of the slider, and causing the lever L to turn from the position shown in Fig. 2 to that shown in Fig. 3. Meanwhile the locking tooth T is moved outwardly from the locking position shown in Fig. 2, to the unlocked position shown in Fig. 3.

The unlocking movement of the parts may be limited by appropriately dimensioning the parts. In Fig. 3 the turning movement of lever L is limited by the stop 38 which bears against the neck portion 16 of the slider. At the same time the ends 40 of the pull bear against the front wall of the slider. Moreover, the tooth T bears against the lower end 42 of the window 32. Thus the motion of the parts is limited by engagement of the movable mechanism with the slider at three different points. However, it may be explained that a three-point contact of the character shown is not necessary, a two-point contact being adequate. Thus, if a stop action by the parts 38 and 40 is preferred, it is not necessary for the tooth T to contact the wall 42. If contact at the points 40 and 42 is employed, the stop 38 is not required. In actual practice a two-point contact is preferred, in order to provide greater tolerance in the manufacture of the parts by eliminating the need for contact at the third point.

The pivots 34 are preferably formed integrally with the pull P. In such case it is desirable that the upper end of the pull be bifurcated as shown, so that the branches of the pull may be squeezed together from an initially spread condition to the parallel condition shown, thereby inserting the pivots 34 in mating holes at the lower end of lever L.

Another form of the invention is illustrated in Figs. 6, 7, and 8. As before, the slider body B comprises front and back walls secured together at a neck portion which, in this case, includes a rivet 44. The front wall of the slider is provided with a lug 46 for pivotally mounting a lever 48, but in the present case there is only a single central lug, instead of two spaced lugs. A spring 50 is disposed between the upper end of lever 48 and the neck of the slider, this spring being a strip of spring metal, one end of which is secured to the neck, as by means of the rivet 44, while the opposite end is turned inwardly beneath the lever, as will be clear from inspection of Figs. 7 and 8.

The lever 48 is cut away at the center to receive the lug 46. Inasmuch as it is stronger and more economical to use integrally formed pivots, rather than a separate pin of necessarily small diameter, the lever 48 is preferably bifurcated and provided with pivots 54 formed integrally on the inner edges of its branches. The branches are joined at the bottom but are separated at the top, as is indicated at 56. These branches are initially spread apart but are closed to the parallel position shown when assembling the parts, thereby bringing the pivots 54 into a mating hole in lug 46.

The pull 58 is a bifurcated pull with integrally formed pivots 60 and an integrally formed tooth T, just as was previously described. In the present structure, the outward motion of the pull 58 is again shown limited by a three-point contact; first the contact of the ends 64 of the pull with the front wall of the slider; second the contact of the tooth T with the bottom wall 66 of the window receiving the same; and third, the contact of the wide upper end of lever L with the slider body on each side of the indented neck portion. These contacts are illustrated in Fig. 8.

In the sliders so far described, the angle through which the pull may be raised is rather limited. If it is desired that the pull be swung through a very large angle, that result may be accomplished by using a two-piece pull, instead of a one-piece pull. Such a modification is illustrated in Figs. 9, 10 and 11 of the drawings, in which it will be seen that the pull comprises an outer portion 70 pivotally connected to the lower end of an inner portion 72. The inner portion 72 carries the locking tooth T and swings over only a limited arc of movement (corresponding to the movement of the pull when using a rigid one-piece pull). However, the outer part 70 may be moved over a much larger arc of movement. For example, it may assume the position 70' shown in broken lines in Fig. 11 when pulling the slider downwardly, and may assume the position 70 shown in solid lines when pulling the slider upwardly.

The two-piece pull is pivotally mounted on a lever 76 which in turn is pivotally mounted on the slider body by means of lugs 78. The pivot for lever 76 is illustrated as a pin 80, and the pivot connecting the two-piece pull to lever 76 is illustrated as a pin 82. It will be understood, however, that bifurcated members with integral pivots may be employed for all of these connections, and that a single lug instead of a pair of spaced lugs may be used for carrying the lever. It will be observed that the outer portion 70 of the pull is bifurcated and provided with integral pivots 84. In general, various combinations of the different pivot constructions shown in all of the figures of the drawings may be used.

The stops for limiting the movement of the inner portions 72 of the two-piece pull correspond to those shown in Fig. 8, that is, the end of the pull bears against the front wall of the slider at the same time that the tooth bears against the lower end of the slot receiving the same. This is clearly shown in Fig. 11 of the drawings.

Figs. 12 and 13 illustrate still another form of the invention in which the resilient means for urging the lever to normal locking position takes the form of a torsion spring centered on the pivot of the lever. Specifically, the slider body B may be generally like that previously described in connection with Figs. 1 and 9, it comprising spaced lugs 90 for a pivot pin 92 on which the bifurcated upper end 94 of lever 96 is carried. The pull P is bifurcated and provided with integral pivots 98 received in the inwardly bent lower end of lever 96. The spring S is coiled about pivot pin 92 and one end 100 overlies lever 96, while the opposite end 102 bears against the neck portion of the slider. The action of the spring causes the lever L to move the locking tooth T into engagement with the fastener elements, as is illustrated by the broken line position of the parts in Fig. 13. When the pull is raised the slider is unlocked, as is indicated by the solid line position of the parts in Fig. 13.

Still another form of the invention is illustrated in Figs. 14, 15, and 16. In these figures

the slider body B differs from those previously described in having a single central lug 104 which extends for an appreciable distance longitudinally of the slider. The lever L is an outwardly-convex hollow sheet-metal body which substantially encloses the lug 104. The side walls 106 of lever L receive a pivot pin 108 which passes through the lever and lug. Spring S is a small leaf spring 110, one end of which is anchored in a mating slot in lug 104, and the other end of which bears against the upper end of the lever, thereby tending to move the same to the normally locked position shown in broken lines in Fig. 14.

The pull has branches 112 (Figs. 15 and 16) with pivots 114 formed integrally on the inner edges thereof. These pivots are not circular, but instead are elongated, as is best shown in Fig. 16. The edges of the side walls 106 of the lever are preferably arcuately cut away, as is indicated at 116, for cooperation with pivots 114 acting as camming means. In other words, when the pull is raised from the broken line position to the solid line position shown in Fig. 14, the pivots 114 bear outwardly against and raise the lever to the solid line position shown. At the same time the tooth T is moved to unlock the slider. When the pull is released, the spring 110 turns the lower end of the lever inward, which in turn bears against the pull and moves it to the flat or locking position shown in broken lines in Fig. 14. The relation of the parts is such that the pull cannot be removed from the slider, even though the pivots are not received in closed apertures in the lever. Round pivots may be used in closed apertures, in which case the projecting ends of the pull will bear against the front wall of the slider, to raise the lever, much as was previously described.

In Figs. 14, 15, and 16, the pull is a two-piece pull comprising an outer portion 120 pivoted to an inner portion 122, the inner portion 122 having the pivots 114 and the tooth T. It will be understood, however, that the same construction may be used with a single piece pull, and this is illustrated in Fig. 17, which shows a one-piece pull the upper end of which is formed like the upper end of the two-piece pull shown in Fig. 16.

It is believed that the construction and operation, as well as the many advantages of my improved automatic locking slider, will be apparent from the foregoing detailed description thereof. It will also be apparent that while I have shown and described my invention in several preferred forms, many changes and modifications may be made in the structure disclosed, without departing from the spirit of the invention as sought to be defined in the following claims.

I claim:

1. A locking slider for a slide fastener, said slider comprising a lug, a lever pivoted on the lug, a pull pivoted on the lever, a locking tooth on the pull, and a spring operating on said lever and urging the pull-carrying end of the lever toward the slider in order to bring the locking tooth of the pull into locking engagement with the elements of the slide fastener.

2. A locking slider for a slide fastener, said slider comprising appropriately flanged front and back walls secured together at a neck portion, a lug on the front wall, a lever pivoted on the lug, a pull pivoted on the lever, a locking tooth on the pull, and a spring operating on said lever and urging the pull-carrying end of the lever toward the slider in order to bring the locking tooth of the pull into locking engagement with the elements of the slide fastener, said tooth being so disposed and dimensioned that it is moved away from the fastener elements to unlock the slider when the pull is raised preparatory to moving the slider.

3. A locking slider for a slide fastener, said slider comprising a lug, a lever pivoted on the lug, a pull pivoted on the lever, a locking tooth on the pull, and a spring operating on said lever and urging the pull-carrying end of the lever toward the slider in order to bring the locking tooth of the pull into locking engagement with the elements of the slide fastener, said tooth being so disposed and dimensioned that it is moved away from the fastener elements to unlock the slider when the pull is raised preparatory to moving the slider, said movable combination of lever and pull having two parts adapted to bear simultaneously against the slider in order to limit outward movement of the pull when the slider is unlocked.

4. A slider as defined in claim 1, in which the spring is located at the neck of the slider and bears against the upper end of the lever, while the pull is pivoted on the lower end of the lever, with the lug located intermediate the ends of the lever.

5. A slider as defined in claim 1, in which the pull is bifurcated at its upper end and has pivots formed integrally on the inner edges thereof and received in the lower end of the lever.

6. A slider as defined in claim 1, in which the lever is a bifurcated member having pivots formed integrally on the inner edges thereof and received in the lug.

7. A slider as defined in claim 1, in which the lever is a bifurcated member having pivots formed integrally on the inner edges thereof and received in the lug, and in which the pull is bifurcated at its upper end and has pivots formed integrally on the inner edges thereof and received at the lower end of the lever.

8. A slider as defined in claim 1, in which the pull is a two-piece pull having an outer portion and an inner portion, the inner portion carrying the locking tooth and having a limited outward movement, the outer portion being pivoted on the inner portion and having a relatively unlimited outward movement.

9. A slider as defined in claim 1, in which the pull is a two-piece pull having an outer portion and an inner portion, the inner portion carrying the locking tooth and having a limited outward movement, the outer portion being pivoted on the inner portion and having a relatively unlimited outward movement, said outer portion being bifurcated and having pivots formed integrally on the inner edges thereof and received in mating recesses on the inner portion.

10. A slider as defined in claim 1, in which the pull is a two-piece pull having an outer portion and an inner portion, the inner portion carrying locking tooth and having a limited outward movement, the outer portion being pivoted on the inner portion and having a relatively unlimited outward movement, said inner portion being bifurcated and having pivots formed integrally on the inner edges thereof and received in mating recesses on the lever.

11. A slider as defined in claim 1, in which the pull is a two-piece pull having an outer portion and an inner portion, the inner portion carrying the locking tooth and having a limited outward movement, the outer portion being pivoted on

the inner portion and having a relatively unlimited outward movement, said inner portion being bifurcated and having pivots formed integrally on the inner edges thereof and received at mating recesses on the lever, said outer portion being bifurcated and having pivots formed integrally on the inner edges thereof and received in mating recesses on the inner portion.

12. A slider as defined in claim 1, in which the lever is in the form of a convex housing surrounding the lug and the spring.

13. A slider as defined in claim 1, in which the lever is in the form of a convex housing surrounding the lug and the spring, and in which the pull is a bifurcated member having pivot portions formed on the inner edges thereof and abutting the lug and received between the slider and the inner edges of the lever, said pivots being non-circular and acting as camming members bearing against and raising one end of the lever when the pull is raised to operate the slider.

14. A slider as defined in claim 1, in which the lever is in the form of a convex housing surrounding the lug and the spring, and in which the pull is a bifurcated member having pivot portions formed on the inner edges thereof and abutting the lug and received between the slider and the lower edges of the lever, said pivots being non-circular and acting as camming members bearing against and raising one end of the lever when the pull is a two-piece pull comprising an outer portion pivoted to an inner portion, said inner portion having the locking tooth and the camming pivots.

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