April 28, 1942. A. B. NEWHALL 2,280,968

AUTOMATIC LOCK SLIDER FOR SLIDE FASTENERS

Filed Aug. 15, 1941

Fig. 1.

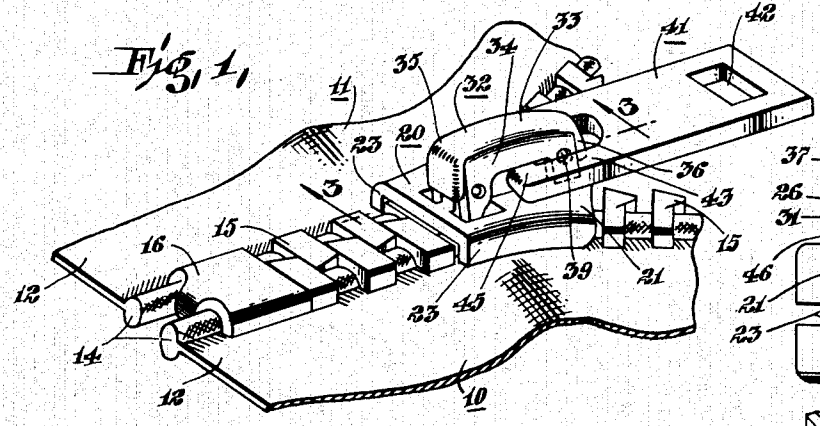


Fig. 5.

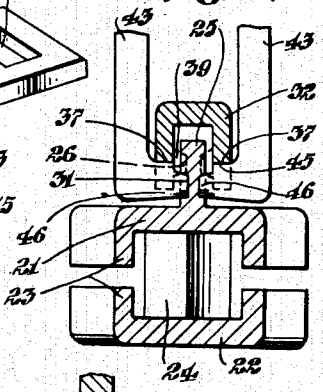


Fig. 2.

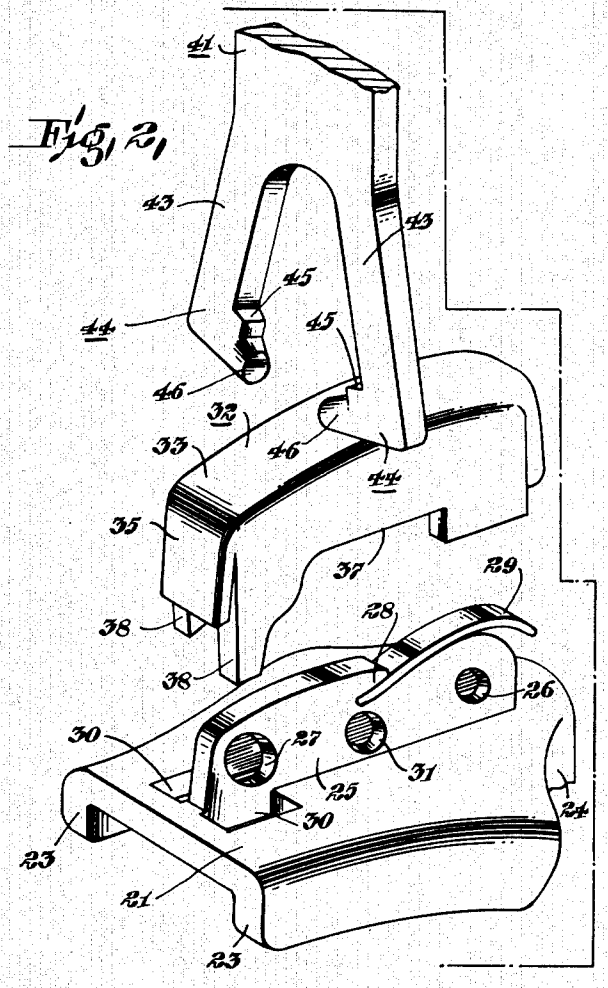


Fig. 4.

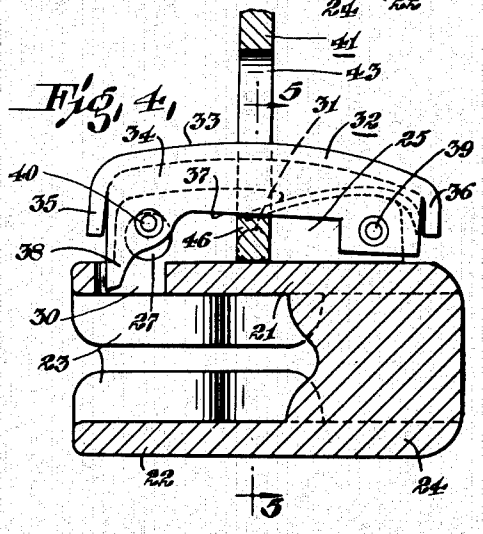
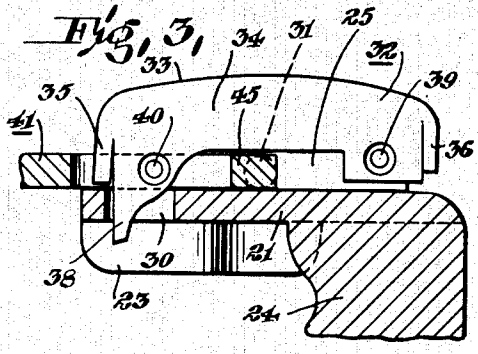


Fig. 3.



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AUTOMATIC LOCK SLIDER FOR SLIDE FASTENERS

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6 Claims. (Cl. 24—205.5)

This invention relates to slide fasteners and, in particular, to the provision of a new and improved slider for slide fasteners.

It is the object of this invention to provide a new and improved automatic lock slider for slide fasteners, wherein the pull member or operating member is of such construction and is connected to the slider body in such manner as effectively to prevent accidental detachment thereof.

It is a further object of the invention to provide such a construction wherein the pull member or operating member is provided with cam means cooperating with the spring-urged locking member of the slider to withdraw the locking member from locking engagement in one position of the pull member and to permit return of the locking member to locking engagement in other positions of the pull member or operating member, the cooperative relationship between the spring-urged locking member and the pull member or operating member being such that the locking member, in returning from unlocked position to locked position, will cause the pull member or operating member to be brought flat against the slider, effectively to prevent accidental removal of the pull member, by twisting, during laundering of garments embodying slide fasteners equipped with such slider construction.

It is a further object of this invention to provide such a slider wherein, by reason of the nature of the pull member and its connection to the slider, distortion or spreading of its trunnions sufficiently to cause failure of the pull member to operate as a camming device will be followed by its operation as a tension member for controlling the locking member in the manner disclosed in U. S. Letters Patent No. 1,966,457 granted July 17, 1934, to Samuel H. Norton and Peder Nedal.

These and other objects and advantages of the invention will appear from the following description taken in conjunction with the accompanying drawing which forms a part thereof, and will be pointed out in the appended claims.

In the drawing:

Fig. 1 is a fragmentary view, in perspective, of a slide fastener embodying a slider constructed according to the principles of this invention with the parts in one locked position;

Fig. 2 is a fragmentary, enlarged, exploded view, in perspective, of the slider shown in Fig. 1;

Fig. 3 is a fragmentary, enlarged section taken substantially on line 3—3 of Fig. 1, but showing the pull tab in a different, locked position;

Fig. 4 is a view similar to Fig. 3, but showing the parts in unlocked position; and

Fig. 5 is a fragmentary transverse section taken substantially along the line 5—5 of Fig. 4.

In United States Letters Patent 1,966,457, granted July 17, 1934, to Samuel H. Norton and Pedar Nedal, disclosure is made of a lock slider wherein the locking member is in the form of a hollow metal member with top wall, side walls, and end walls. This locking member overlies a longitudinal lug on the front wing of the slider body and is pivotally secured thereto at one end. The free end of the locking member is provided with locking projections adapted normally to be projected into the channel of the slider, into locking engagement with the interlocking fastener members of the fastener.

The locking member is constantly biased toward this locking position by a leaf spring secured to the longitudinal lug on the front wing of the slider, which spring engages the interior of the locking member for constantly biasing the locking member about its pivot toward locking position. The pull member, by which the slider is operated, is of plate-like form having a bifurcated inner end with inwardly, oppositely directed projections or trunnions. The projections, or trunnions, extend under the edges of the side walls of the locking member and are freely movable for a substantial distance longitudinally of the slider, the trunnions being confined between the slider body and the edges of the above-mentioned side walls of the locking member. The lug forms a separating wall between the trunnions which are disposed at opposite sides thereof.

In order that there be freedom of movement of the pull member with respect to the slider, it is necessary that the space between the ends of these projections or trunnions be substantial, in fact, somewhat greater than the thickness of the lug. Manual twisting of the pull tab with respect to the slider, in use, frequently causes spreading of the trunnions to such degree that one or both of them escapes from its operative zone, causing jamming of the locking member or disconnection of the pull member from the slider, with consequent loss of the pull member. Wear caused by friction between these trunnions and the lug, in use, naturally causes the space between the projections to be increased, often to such extent that normal manual application of operating force to the pull member will cause such undue spreading of the trunnions or projections as to cause the above-described jamming

of the locking member or detachment of the pull member from the slider.

In the above-described patented construction, the edges of the side walls of the locking member alone retain the pull tab on the slider by reason of the engagement of these side wall edge surfaces with the projections or trunnions on the pull member. Therefore, but slight increase of spacing of the ends of the trunnions, either by wear or by spreading, is necessary to cause damage to the slider and/or failure thereof.

According to this invention, the above disadvantages are totally obviated by pivotally or hingedly connecting the pull tab directly to the longitudinal lug on the slider body. For this purpose, the lug is provided with aligned sockets or recesses at opposite sides to receive the ends of the trunnions or projections, which ends are, of course more closely spaced than in the above-described construction. Cam surfaces are provided adjacent those pivot projections or trunnions which extend into the above-described sockets or recesses. These cam surfaces engage the edges of the side walls of the locking member and cooperate therewith in such manner that the locking member is allowed to be biased to locking position when the pull member is flat against the slider body, as shown in Figs. 1 and 3, while it is withdrawn from locking position and retained in unlocked position, against the force of the biasing spring, when the pull member is in intermediate, upright position, as shown in Figs. 4 and 5.

The relative movement between the trunnions on the pull member and the supporting lug is entirely rotary and close engagement of the projection ends or trunnions in the sockets or recesses, by decrease of the freedom of movement of the pull member, substantially increases the resistance of the pull member to twisting torques. Furthermore, the application of such twisting torques as will cause spreading of the projections or trunnions must be so great as to cause such spreading of the trunnions that the space between these trunnion ends will be substantially as great as the transverse thickness of the locking member. In other words, the increase in space between the trunnions necessary to damage the slider is far greater than in the above-described patented construction.

Since the freedom of movement of the pull tab is less than in the above-described patented construction, the tendency toward spreading of the projections upon application of twisting force to the pull member is proportionately reduced. Since the distance from the bottom or inner walls of the trunnion retaining sockets or recesses to the outside surfaces of the side walls of the locking member is substantially greater than the distance represented by the thickness of the side walls of the locking member, the amount of spreading of the projections or trunnions which is necessary to cause failure is necessarily far greater than in the patented construction.

Furthermore, upon occurrence of such spreading as will increase the spacing of the trunnions or projection ends to equal the thickness of the lug, the slider will still remain operative because the trunnions or projection ends of the pull member though they escape from the sockets or recesses will still be retained by the edges of the locking member side walls whereby the slider will operate in substantially the same manner as does the above-described patented construction.

In Fig. 1 of the drawing, a slider according to this invention is shown applied to a conventional slide fastener comprising a pair of stringers 10 and 11 secured together at their lower ends. Each stringer comprises a tape 12 with a thickened reinforced edge 14, to which is secured a row of predeterminedly spaced interlocking fastener members 15. The lower ends of the reinforced edges 14 are secured together by a conventional bottom stop or bottom end fitting 16 clamped therebetween. Longitudinal movement of the slider on the rows of interlocking fastener members 15 of the stringers 10 and 11 causes progressive engagement and disengagement of interlocking fastener members 15 to operate and close the fastener.

The slider which is generally designated 20 comprises a pair of plate-like wings 21 and 22 each provided with side flanges 23 and secured together in predetermined spaced relationship by a wedge or neck member 24 providing integral connection between their upper ends. The inner surfaces of the flanges 23 cooperate with the surfaces of the wedge or neck member 24 to form an upwardly diverging substantially Y-shaped guide channel confining the rows of interlocking fastener members 15 which are guided into and out of engagement thereby.

While the rear wing member 22 has a flat outer surface, a longitudinally disposed upstanding lug 25 extends outwardly from the outer front surface of the front wing member 21. At its upper end, the lug 25 is provided at opposite sides with pivot recesses 26, by means of which the hollow locking member is pivotally secured to the lug 25 in a manner hereinafter most clearly described.

At its lower end, the lug 25 is provided at opposite sides with limiting recesses 27 which accommodate projections or limiting stops formed at the lower or free end of the locking member for predeterminedly limiting pivotal movement of the locking member about the pivot recesses 26, as will also be hereinafter most clearly described.

The lug 25 is provided with an inclined notch 28 in its upper surface into which the locking member biasing spring 29 is securely clamped at one end, the other end thereof being free and engaging the upper wall of the hollow locking member on the inside, constantly to bias the locking member toward locking position, as hereinafter described. Adjacent the lower end of the lug 25 and adjacent the above-described recesses 27, the front wing 21 is provided with a pair of locking projection accommodating apertures 30.

The lug 25 is also provided at opposite sides with a pair of aligned trunnion-receiving recesses 31 intermediate its length, which trunnion-receiving recesses receive and pivotally support trunnions provided on the slider pull tab, pivotally to secure the pull tab directly to the lug 25.

The locking member is generally designated 32. It comprises a hollow member having a generally rectangular top wall 33, similar side walls 34, a lower end wall 35, and an upper end wall 36. While this member is shown as formed of sheet metal bent to shape, it may, of course, be formed of any suitable material, in any suitable manner as by molding or die casting. The central portion of each side wall 34 is cut away, as shown at 37 (Fig. 2), to permit extension of the oppositely directed pivot projections or trunnions at the inner ends of the pull tab between the edges of the cut-away portion and the outer surface of the front wing 21. These edges of the side walls cooperate with the cam surfaces on the pull tab

for operation of the slider, as hereinafter most fully explained.

At its lower end, each side wall 34 is provided with a locking projection 38 which extends through an above-described locking projection accommodating aperture 30 into the channel of the slider. Adjacent its upper end, each side wall 34 is provided with indentations 39 which form pivot projections or pivot trunnions closely engaging the pivot recesses 26 for pivotally securing the upper end of the locking member 32 to the lug 25. Somewhat similar indentations 40 are provided adjacent the lower end of each side wall 34, which indentations 40 form limiting stops which project into the limiting recesses 27 with which they cooperate to limit piovtal movement of the locking member 32 with respect to the supporting lug 25. The locking member, when assembled to the slider, as shown in Figs. 1, 3, 4 and 5 substantially encloses the supporting lug 25 and encloses the biasing spring 29.

The pull tab, which is generally designated 41, is preferably of plate-like form and is provided at its outer end with a thong-receiving aperture 42. The pull tab is bifurcated at its inner end, which end terminates in a pair of spaced legs 43, each leg terminating in an inwardly, oppositely directed end projection generally designated 44 (Figs. 2 and 5). Each end projection 44 forms two portions, the outer portion immediately adjacent the leg 43 is a cam portion 45 of substantially rectangular section. Extending inwardly from this cam portion 45 is a pivot portion or trunnion 46 of circular section and preferably slightly tapered to conform closely to the tapered trunnion recesses 31 on the lug 25.

In assembling the slider, the biasing spring 29 is inserted in the notch 28 of the lug 25 and the notch 28 is closed by upsetting portions of the lug adjacent thereto in order firmly to secure the inner end of the spring 29 (Fig. 2). Thereafter, the locking member, in the form shown in Fig. 2, is placed over the lug 25 and attached spring 29, being positioned as shown in Fig. 3, and the indentations 39 and 40 are formed in the side walls 34. The formation of the indentations 39 which are received by the recesses 26 firmly secures the locking member 32 pivotally to the lug 25, while the formation of the indentations 40, which are received in the recesses 27 of the lug 25, provides means for limiting pivotal movement of the locking member 32 on the lug 25 and the slider 20. Thereafter, the pull tab 41 which has the legs 43 thereof spread, as shown in Fig. 2, is placed substantially in the position shown in Fig. 4, and the legs 43 are forced together whereby the trunnions 46 are secured closely in the trunnion receiving recesses 31 of the lug 25. The pull tab is then pivotally secured to the lug 25 and the cam portions 45 of the projections 44 engage the cam surfaces formed by the edges of each side wall 34 of the locking member, as shown in Fig. 5.

While the spring constantly urges or biases the locking member 32 in counterclockwise direction, as seen in Figs. 1, 2, 3 and 4, or to the locking position shown in Figs. 1 and 3, the cooperation of the cam portions 45 of the pull tab with the cam surfaces on the locking member cause the force of the spring to be overcome when the pull tab 41 is swung to the intermediate position shown in Figs. 4 and 5, wherein the pull tab or pull member is substantially perpendicular to the plane of the slider proper. When the pull tab is in this position, the force exerted by the spring upon the locking member 32 retains the pull tab in this position which insures that the slider shall remain unlocked until the pull tab 41 is moved from the position of Fig. 4 sufficiently in clockwise or counter-clockwise relation (Figs. 1 and 3) to enable the force of the spring exerted through the locking member 32 to bring the pull tab to the nearest of the flat positions shown in Figs. 1 or 3.

From the above description, it will readily appear that the pull tab of the slider of this invention is connected directly to the lug 25 of the slider, whereby the support of the pull tab is totally independent of the firmness of attachment of the locking member 32 to the lug 25 which is secured by the indentations 39 and cooperating recesses 26. It will likewise appear that the connection of the pull tab to the lug, being pivotal, is more positive than in the above-described patented construction and necessarily more resistant to detachment.

Likewise, since it is necessary that there be a greater degree of spreading of the trunnions or projection ends 46 to cause inoperativeness of the slider than is necessary to cause escape of the trunnions 46 from the recesses 31 alone, the pull member 41 will operate as a simple tension lock operating means upon the occurrence of such spreading of the trunnions 46 as is sufficient to cause their escape from the recesses 31, with their retention by the edges of the side walls 34 of the locking member 32.

It is of course to be understood that the above description is merely illustrative and in nowise limiting and that I desire to comprehend within my invention all modifications included within the scope of the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a slider for slide fasteners, a slider body having a fastener member guide channel therein, a lug projecting from one side of said slider body, a locking member pivotally connected to said lug at one end and having thereon a projection projectible into said channel for locking said slider and retractible therefrom for unlocking said slider, biasing means normally urging said locking member toward locking position, and means for controlling said locking member comprising a pull member pivoted directly to said lug, and a cam on said pull member engageable with said locking member for holding said locking member in unlocked position against the force of said biasing means in one position of said pull tab, said cam releasing said locking member to the control of said biasing means in other positions of said pull member.

2. In a slider for slide fasteners, a slider body having therein a channel for guiding fastener interlocking members into and out of engagement, a longitudinally disposed lug projecting from one side of said slider body, a hollow locking member pivotally connected to said lug at one end and enclosing said lug at least partially, said locking member having a locking projection extensible into said channel for locking said slider and retractible from said channel for unlocking said slider, biasing means normally urging said locking member toward locking position, and means for controlling said locking member comprising a pull member pivoted directly to said lug and cam means on said pull member engaging surfaces of said locking member in one position of said pull member for holding said lock-

ing member in unlocked position against the force of said biasing means, while releasing said pull member in other positions to the control of said biasing means for locking said slider.

3. In a slider for slide fasteners, a slider body having therein a channel for guiding fastener interlocking members into and out of engagement, a longitudinal lug projecting from one side of said slider body, a substantially rigid locking member pivotally connected to said lug at one end and having a locking projection extensible into said channel for locking said slider and retracticle from said channel for unlocking said slider, biasing means normally urging said locking member toward locking position, and means for controlling said locking member comprising a pull member pivoted directly to said lug and cam means on said pull member engaging cooperating surfaces of said locking member in the upright position of said pull member for holding said locking member in unlocked position against the force of said biasing means, while releasing said pull member in other positions to the control of said biasing means for locking said slider, and said locking member maintaining said pull tab flat against said slider body when in locking position.

4. In a slider for slide fasteners, a slider body having a fastener member guide channel therein, a longitudinal lug projecting from one side of said slider body, a hollow locking member extending over said lug and pivotally connected to said lug at one end, said locking member having a projection adjacent its free end projectible into said channel for locking said slider and retractible therefrom for unlocking said slider, yielding means acting between said lug and said locking member for constantly urging the free end of said locking member toward said slider body to project said projection into said channel and lock said slider, said lug having aligned trunnion receiving recesses at opposite sides intermediate its length, a pull member having at one end a pair of oppositely, inwardly directed trunnions complementary to said recesses and disposed therein for pivotally connecting said pull member directly to said lug, and cam members on said pull member adjacent said trunnions, said cam members engaging said hollow locking member and lifting the free end portion of said locking member against the force of said yielding means and maintaining said locking member in unlocked position in one position of said pull member.

5. In a slider for slide fasteners, a slider body having a fastener member guide channel therein, a longitudinal lug projecting from one side of said slider body, a hollow locking member extending over the top and sides of said lug and pivotally connected to said lug at one end, said locking member having a projection adjacent its free end projectible into said channel for locking said slider and retractible therefrom for unlocking said slider, a spring connected to said lug and acting between said lug and said locking member for constantly urging the free end of said locking member toward said slider body to project said projection into said channel and lock said slider, said lug having aligned trunnion receiving recesses at opposite sides intermediate its length, a pull member having at one end a pair of oppositely, inwardly directed trunnions complementary to said recesses and disposed therein for pivotally connecting said pull member directly to said lug, and cam members on said pull member adjacent and outside said trunnions, said cam members engaging side edges of said hollow locking member and lifting the free end portion of said locking member against the force of said spring and maintaining said locking member in unlocked position in the intermediate position of said pull member, said spring reaching through said locking member and said cam members in other positions of said pull member to urge said pull member flat against said slider body.

6. In a slider for slide fasteners, a slider body having a fastener member guide channel therein, a longitudinal lug projecting from one side of said slider body, a hollow locking member having top and side walls extending over the top and sides of said lug and pivotally connected to said lug at one end, said locking member having thereon a projection adjacent its free end projectible into said channel for locking said slider and retractible therefrom for unlocking said slider, a spring supported by said lug and acting between said lug and said locking member for constantly urging the free end of said locking member toward said slider body to project said projection into said channel and lock said slider, said lug having aligned trunnion receiving recesses at opposite sides intermediate its length, a pull member terminating at one end in a pair of oppositely, inwardly directed trunnions complementary to said recesses and adapted to be retained therein for pivotally connecting said pull member directly to said lug, and cam members on said pull member adjacent and outside said trunnions, said cam members normally engaging the edges of the side walls of said hollow locking member for lifting the free end portion of said locking member against the force of said yielding means in at least one position of said pull member to unlock said slider, said trunnions, upon accidental escape from said recesses by spreading, engaging the edges of the side walls of said locking member to retain said pull member on said slider and cause said pull member to operate as a simple lock operating tension member.

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