AUTOMATIC LOCKING SLIDER FOR SLIDE FASTENER

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Filed Mar. 15, 1965, Ser. No. 439,879

3 Claims. (Cl. 24—205.14)

This invention relates to sliders for slider fasteners and, more particularly, to an improved automatic locking slider.

Conventional locking sliders incorporate a locking spring, a locking pin, and cap means to enclose the spring and pin. This assembly of components projects outwardly from the face of the slider and is thus extremely vulnerable to damage, especially when the slider fastener is attached to a garment and the garment undergoes cleaning, washing, pressing, or like operations. It is also necessary that the locking pin be held in a released position during the assembly of the slider fastener and this requirement introduces additional complications.

The present invention provides an automatically locking slider in which the locking means comprises a locking spring, locking pin, and cap means combined into a one-piece locking member. This one-piece locking member is attached at one end to the outer face of the slider body and the locking pin portion is in the form of a locking protrusion which extends from the free end of the locking member into the slide channel, to lock the fastener. The pull tab of the slider incorporates a slot adjacent one end thereof. The portion between the slot and the end of the pull tab represents a lifting cam and is assembled in a U-shaped portion of the locking member to lie between the locking member and the slider body. The distance between the slot and the end of the pull tab is arranged to be greater than the perpendicular distance between the inside surface of the U-shaped portion and the surface of the slider body, and the thickness of the pull tab is arranged to be less than the perpendicular distance between the inside surface of the U-shaped portion and the surface of the slider body. Thus when the pull tab is positioned to lie flat against the face of the slider body the cam portion will not effect the position of the locking member and the protrusion will project into the slide channel and the slider will be locked in this position to the fastener elements which pass through. However, when the pull tab is rotated 90°, to a position perpendicular to the slider body, the cam portion will lift the U-shaped portion of the locking member and the locking protrusion will be withdrawn from the slide channel and the slider will be free for longitudinal movement.

When the pull tab is grasped to move the slider, the locking protrusion will be automatically withdrawn from the slide channel and the slider will be free to be moved and, at the same time, when the pull tab is released and felled downwardly, the locking protrusion will snap back into the slide channel and the slider will be automatically locked in this position on the fastener elements.

It is, therefore, the main object of this invention to provide an improved slider which embodies the locking spring, locking pin and cap, in a one-piece locking member.

Another object of this invention is to provide an improved slider which embodies a depression in the body thereof, and in which one end of the one-piece locking member is secured in the recess and is flush with the surface of the slider body, to reduce the over-all height of the slider assembly, as compared with the height of a conventional slider, and to prevent any side movements of the locking relative to the slider body.

Another object of this invention is to provide an improved slider in which one end of the locking member is securely located in the above-memtioned slider body depression by two ears which are made as part of the slider body and which are staked to grip the end of the locking member and also to retain the pull tab, in one simple operation.

Another object of this invention is to provide an improved slider in which the locking member is manufactured from heat treated spring steel and does not embody slots, holes, or other perforations for attachment to the slider body, and is thus able to develop its maximum strength characteristics.

Another object of this invention is to provide an improved slider in which the pull tab embodies a cam portion which is assembled between the locking member and the slider body and in which engagement or release of the locking protrusion is accomplished by movement of the pull tab.

A further object is to provide an improved slider which incorporates stop means built into the slider body to prevent the locking protrusion of the locking member from being pulled away from the slider body by the use of excessive force on the pull tab.

These and other objects and advantages of this invention will be further apparent by referring to the following detailed specification and figures, in which:

FIG. 1 is a front elevation of a slide fastener assembly embodying a slider according to this invention.

FIG. 2 is a perspective view of the slider body shown in FIG. 1, before assembly of the locking member and pull tab thereto.

FIG. 3 is a horizontal longitudinal section through the slider body shown in FIG. 2.

FIG. 4 is a perspective view of the locking member.

FIG. 5 is a perspective view of the pull tab.

FIG. 6 is a perspective view of the complete slider assembly in which the pull tab is positioned to lie adjacent the surface of the slider body member.

FIG. 7 is a longitudinal vertical section through the slider assembly shown in FIG. 6.

FIG. 8 is a perspective view, similar to FIG. 6, but showing the pull tab rotated through 90° to a position perpendicular to the surface of the slider body member.

FIG. 9 is a longitudinal vertical section through the slider assembly shown in FIG. 8.

FIG. 10 is a longitudinal vertical section, similar to FIG. 7, but showing an alternative execution.

Refer now to FIG. 1 which shows a slide fastener assembly which comprises a pair of edge tapes 11 having a plurality of spaced apart and interlocking fastener elements 12 attached to the opposed edges thereof. Slide assembly 13 is provided with a Y-shaped slide channel therethrough and is adapted to be assembled on edge tapes 11 such that longitudinal movement of slider assembly 13 will produce opening and closing of fastener elements 12 in a manner well known to those skilled in the art.

Referring now to FIGS. 2 and 3, slider body 14 comprises outer body member 15 and inner body member 16, connected together at one end, and in spaced opposed relation, by neck portion 17 to provide a substantially Y-shaped channel between the opposed outer and inner body members 15 and 16, respectively. Thus, downward opening movement of slider assembly 13 will cause edge
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3 tapes 11 and assembled slider elements 12 to pass through the centre channel 18 of the Y-shaped channel and separate slider element 12 in the Y-shaped channel. Flanges 21 and 22 extend inwardly from outer body member 15 and inner body member 16, respectively, and serve to retain edge tapes 11 and fastener elements 12 in the Y-shaped channel as slider assembly 13 is moved longitudinally. A distal end on the surface of outer body member 15 adjacent neck portion 17 and a second recess 24 is formed in the surface of outer body member 15 adjacent centre channel 18. First recess 23 extends into a deeper recess 23a at the end remote from said second recess 24. Second recess 24 extends into a slot 24a at the end remote from the first recess 23. Ears 25 are formed adjacent the longitudinal edges of first recess 23 and project outwardly from outer body member 15.

Slider body 14 will preferably be manufactured by conventional means such as a die casting process, the complete slider body 14, including recesses 23 and 24 and ears 25, being formed in one single die casting operation.

FIG. 4 is a perspective view of the yieldable locking member 26 which comprises the combination of locking spring 20, locking pin 19 and cap, in one unit. Locking member 26 is preferably manufactured of heat treated spring steel strip to provide maximum strength characteristics combined with resiliency. U-shaped portion 27 is formed approximately midway along the length of locking member 26 and is positioned transverse thereto. Each end of locking member 26 is bent in a direction away from U-shaped portion 27, one end being bent at approximately 90° to locking member 26 and extending to form locking protr 28, and the other end 26a being bent at approximately 25° to locking member 26.

FIG. 5 shows a perspective view of a pull tab 29 which includes a slot 30 positioned therethrough adjacent end remote thereof. Refer now to FIGS. 6 and 7 which show a perspective view and longitudinal section, respectively, of the slider assembly 13. Slider assembly 13 is assembled by positioning locking member 26 through slot 30 in pull tab 29, such that the portion 31 will be located in U-shaped portion 27. The locking member 26 is placed in recesses 23 and 24 such that locking prong 28 will extend through slot 24a in outer slider body 15 and protrude into centre channel 18, and end 26a will be located in recess 23a. Ears 25 are then stake down rigidly locate locking member 26 in slider body 14. Thus slider assembly 13 is assembled in one simple operation.

The location of locking member 26 in recesses 23 and 24 serves to rigidly locate locking member 26 and to reduce the over-all height of the slider assembly. The location of end 26a in recess 24a serves to eliminate any sharp corners which might otherwise catch in garments or interfere in pressing operations, etc.

The thickness of pull tab 29 is dimensioned to be less than the perpendicular distance between the inside surface of U-shaped portion 27 and the upper surface 32 of outer body member 15, thus when pull tab 29 is positioned to lie adjacent upper surface 32, as shown in FIGS. 6 and 7, locking prong 28 will extend into centre channel 18, and thus into fastener elements 12, and securely lock the slide fastener in this position.

FIGS. 8 and 9 show a perspective view and longitudinal section, respectively, similar to FIGS. 6 and 7, but in which pull tab 29 is positioned perpendicular to upper face 32 of slider body 14. The distance between the lower edge of slot 30 and end face 33 of pull tab 29, as represented by portion 31, is dimensioned to be larger than the perpendicular distance between the underside of U-shaped portion 27 and upper surface 32. Thus, when pull tab 29 is positioned, as shown in FIGS. 8 and 9, portion 31 will form an effective cam member and result in U-shaped portion 27 being lifted upwardly and locking prong 28 being withdrawn from centre channel 18. Slider assembly 13 will now be free to move longitudinally to fasten outer body elements 12.

Thus it will be seen that to operate the fastener according to this invention, it is merely necessary to grasp pull tab 29, whereby pull tab 29 will be moved to a position substantially perpendicular to upper surface 32, and locking member 26 will be released to free slider assembly 13 for operation. When the desired slider position is attained, pull tab 29 is released, and flicked downwardly, whereupon the spring characteristics of locking member 26 will urge pull tab 29 to lie against the face 32 of slider body 13 and the slider assembly will be securely locked in this position. It will be seen that, during manufacture, assembly of slider assembly 13 over edge tapes 11 and fastener elements 12 is greatly facilitated by the fact that the positioning of pull tab 29 perpendicular to slider body 14 will enable the assembly to be executed without the need for any additional assembly devices.

FIG. 10 shows a longitudinal vertical section through an alternative execution of this invention wherein pull tab 29 is positioned to lie adjacent upper surface 32, in a manner similar to FIG. 7.

In this execution yieldable locking member 34 includes a locking prong 35 which extends downwardly from U-shaped portion 27 and extends through slot 36, in slider body 14, into centre channel 18. Stop member 37 is formed on the transverse edge of slot 36, remote from first recess 23. Stop member 37 is formed in a substantially vertical position during the die-casting of the slider body and is deformable to the position shown in FIG. 10 in the same assembly operation in which ears 25 are staked downwardly.

Thus stop member 37 prevents locking prong 35 from being pulled away from slider body 14 by the use of excessive force on the pull tab 29. This execution is thus especially useful for heavy duty slide fastener applications, such as in overshoes, girdles, etc.

What I claim is:

1. A locking slider for slide fasteners including a slider body comprising outer and inner body members positioned in spaced relation and connected at one end by a neck portion to provide a substantially Y-shaped channel therebetween, a first rectangular recess in said outer body member over the centre channel of said Y-shaped channel, a transverse slot extending from said first recess through said outer body member, a second rectangular recess in said outer body member, a second slot, rigidly locates locking member, and a third slot in said first and second recesses being substantially in axial alignment, ear means extending outwardly from said outer body member on each longitudinal side of said second recess, an unperforated longitudinal locking member of flat spring strip, said locking member having a substantially U-shaped portion extending outwardly therefrom and intermediate the length thereof, the end portion of said locking member on one side of said U-shaped portion being located in said second recess and secured thereto by deformation of said ear means, the other end portion of said locking member being movably positioned in said first recess and forming locking prong means which extends through said transverse slot and into said centre channel, a pull tab having a slot adjacent one end thereof, the portion of said pull tab between said slot and said one end thereof being positioned within said U-shaped portion of said locking member and said pull tab slot and said one end of said pull tab being greater than the perpendicular distance between the outer member of said U-shaped portion and said outer body member, such that when said pull tab is positioned to lie adjacent said slider body said locking prong means will extend into said centre channel and when said pull tab is positioned perpendicular to said slider body said locking prong means will be withdrawn from said centre channel.

2. A locking slider as set forth in claim 1 including a third recess in said outer body member, said third recess
extending from the transverse edge of said second recess remote from said first recess, said third recess being deeper than said second recess, the outer end of said first mentioned locking member end portion extending into said third recess and terminating below the outer surface of said outer body member.

3. A locking slider as set forth in claim 1 including a stop ear extending from the transverse edge of said first recess remote from said second recess, said stop ear extending into said transverse slot and providing an obstruction to prevent said locking prong means from being pulled out of said slot by use of excessive force on said pull tab.

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