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PATENT SPECIFICATION

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(54) AUTOMATIC LOCKING SLIDERS FOR SLIDING CLASP FASTENERS

(71) We, YOSHIDA KOGYO KABUSHIKI KAISHA, of No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, a corporation duly organized under the laws of Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to sliders for sliding clasp fasteners and has particular reference to an automatic locking slider of the type comprising a slider body, a pull tab and a locking spring member without cap means to enclose the spring member.

Conventional locking sliders of the type described incorporate a locking spring member that is disposed to project above the outer surface of the slider body. Such projecting spring member is liable to deformation or damage when a garment or the like to which the slider is attached, undergoes cleaning, washing or pressing operation. Another drawback of such conventional sliders is that sufficient considerations are absent with regard to resistance of the slider per se to external pressures so that the requisite spacing between the upper and lower wing members of the slider is often reduced or otherwise changed as a result of the pressing of like operations.

The present invention aims to provide an improved automatic locking slider of this character which incorporates structural features designed to eliminate the foregoing disadvantages of conventional sliders.

A more specific aim of the invention is to provide an improved automatic locking slider of the particular construction wherein the locking spring member is protected against deformation or damage and at the same time, the wing to wing spacing or the fastener element guide channel in the slider is held free from the influence of cleaning, pressing or like operations.

Another specific aim of the invention is to provide an improved automatic locking slider of which height is reduced to a minimum as desired.

According to the invention, there is provided an automatic locking slider of the type described comprising an upper wing member and a lower wing member positioned in spaced opposed relation and connected at one end by an integral neck portion to provide a substantially Y-shaped channel therebetween, a locking spring member having an inwardly bent tongue portion at one end, a locking prong at the other end and exposed center portion, said upper wing member having an aperture disposed for the passage therethrough of said locking prong into the Y-shaped channel, a retaining lug provided on said upper wing member immediately above said neck portion for retaining said tongue portion in place against displacement, and a pull tab having a transversely extending trunnion portion disposed between said locking spring member and said upper wing member, said trunnion portion being reduced in thickness compared with the remainder of the tab so that the outer surface of said pull tab normally lies substantially flush with the exposed outer surface of said locking spring member, and said retaining lug projecting lightly above the outer surface of said pull tab and said locking spring member.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a plan view, partly broken away, of an improved automatic locking slider according to a first embodiment of the invention;

Figure 2 is a longitudinal cross-sectional view taken along the line II—II of Figure 1;

Figure 3 is a plan view of an improved automatic locking slider according to a second embodiment of the invention;

Figure 4 is a longitudinal cross-sectional view taken along the line IV—IV of Figure 3;

Figure 5 is a plan view of an improved automatic locking slider according to a third embodiment of the invention;

Figure 6 is a longitudinal cross-sectional view taken along the line VI—VI of Figure 5; and

Figure 7 is a transverse cross-sectional view taken along the line VII—VII of Figure 5.

Referring now to the drawings and Figures 1 and 2 in particular, there is shown an improved automatic locking slider 10 embodying the invention which is fabricated by a die-cast operation and which generally comprises a slider body 11 constituted by an upper wing member 12 and a lower wing member 13 connected together at one end and in spaced opposed relation by an integral neck portion 14 to provide a substantially Y-shaped channel 15 therebetween for the passage of rows of fastener elements (not shown). Flanges 16 and 17 extend inwardly from the upper and lower wing members 12 and 13, respectively and serve to retain the fastener elements in the Y-shaped channel 15 during longitudinal movement of the slider 10 along a fastener (not shown) to open or close the latter in the well known manner.

Upon the upper wing member 12 at the end immediately above the neck portion 14, there is provided a retaining lug 18 which overlies and encloses a recess 19 formed in the outer surface of the upper wing member 12 and which is adapted for the purpose hereafter to be described.

Extending upwardly from the outer surface of the upper wing member 12 adjacent the recess 19 is a supporting projection 20 for supporting thereon a center portion of a locking spring member later described.

The upper wing member 12 is further provided with an aperture 22 for receiving a locking prong portion of the locking spring member in a manner hereafter to be described.

Designated at 23 is a locking spring member formed of a suitable resilient material into a polygonal shape as seen in Figure 2. The spring member 23 has a tongue portion 23a at one end anchored in the recess 19 and secured in place by the retaining lug 18 against displacement relative to the slider body, for which purpose there is a wedge-like projection 18a extending inwardly from each side wall of the lug 18 and adapted to snap into engagement with corresponding recess 23b in the spring member 23 as shown in Figure 1.

A center portion 23c of the locking spring member 23 is seated against the supporting

projection 20 and is exposed to lie substantially flush with the outer surface of the pull tab when the slider 10 is in locked position relative to the fastener. Extending downwardly from the central portion 23c is a locking prong 23d which is arranged to pass through the aperture 22 in the upper wing member 12 and into the Y-shaped channel 15 so as to come into locking engagement with the fastener elements in a well known manner.

There is provided a pull tab 24 having a transversely extending trunnion portion 24a which is disposed between a locking spring member 23 and the outer surface (depression 21) of the upper wing member 12 and which serves as a pivotal axis about which the pull tab 24 is swung to actuate the locking spring member 23 in a well known manner. The pull tab 24 has bifurcated arms 24b, 24b' extending in spaced parallel relation on opposite sides of an opening 25 in the pull tab body and connected together by the trunnion portion 24a. The trunnion portion 24a is reduced in thickness as compared to the arms 24b, 24b' such that when the pull tab 24 is held flat against the upper wing member 12, the outer surface of the pull tab lies substantially flush with exposed surface of the locking spring member 23 as indicated by the solid line position of these parts in Figure 2. These arms 24b, 24b', having their respective outer surfaces 24c lying substantially flush with the exposed surface 23e of the locking spring member 23 and disposed on opposite sides of the majority of said exposed surface 23e, will effectively protect the spring member 23 against deformation or damage which would otherwise occur during cleaning or pressing of the garment to which the slider 10 is attached.

Designated at 26 is a stop member projecting upwardly from the upper wing member 12 adjacent the opposite end of the slider 10 and having a hook-like portion 26a which extends over the aperture 22 so as to prevent the locking prong 23d from being detached from the upper wing member 12 when the pull tab 24 is lifted to the dotted-line position shown in Figure 2 to release the locking prong 23d from locking engagement with the fastener elements.

Advantageously, in accordance with the invention, the retaining lug 18 that retains the tongue portion 23a of the spring member 23 in the recess 19 against displacement has the outer surface 18b projecting slightly above the outer surface 24c of each arm portion 24b of the pull tab 24 and above the exposed surface 23e of the spring member 23, so that external pressures as applied for example during pressing of the garment are received collectively at the retaining lug 18 mounted on the neck

portion 14 which is most rigid throughout the parts of the slider 10 and are thus prevented from being exerted to the spring member 23 or to the wing members 12, 13 which are vulnerable to crush to deform or change the spacing therebetween.

Reference to Figures 3 and 4 shows a modified embodiment which is substantially similar to the slider 10 shown in Figures 1 and 2, with the exceptions that a part of the tongue portion 23a of the locking spring member 23 is bent inwardly and embedded in the upper wing member 12 as at 23f to provide more stable anchorage of that portion of the spring member 23; the aperture 22 is longitudinally elongated to extend through the rearward end of the upper wing member 12; and the stop member 26 is disposed horizontally in the form of a gate.

A third embodiment of the invention is illustrated in Figures 5, 6 and 7 inclusive, wherein there is provided an automatic locking slider 10 which is fabricated by a press-forming process. While the structural details, shape and contour of the slider 10 as a whole are somewhat different from the representative embodiment shown in Figures 1 and 2, such details being a matter of choice, particular attention is invited to the manner of retaining the locking spring member 23 in position against displacement. The upper wing member 12 is bifurcated at the forward end adjacent the neck portion 14 so as to provide an opening 27, and bifurcated portions 12a, 12a are provided with recesses 12b, 12b respectively on opposite sides of the opening 27 for receiving a transversely elongated tongue portion 23a of the spring member 23 as shown in Figure 7. The elongated end portion 23a is retained in the recesses 12b, 12b by a swollen retaining lug 18 which extends integrally from the neck portion 14 and is U-bent to abut the end portion 23a as better shown in Figure 6. In this embodiment also, it is important to position the lug 18 such that its outer surface 18b

projects slightly above the outer surface 24c of the pull tab 24, and also to position the pull tab 24 such that its outer surface 24c of the pull tab 24 lies substantially flush with the exposed surface 23e of the spring member 23 for reasons set forth herein above.

WHAT WE CLAIM IS:—

1. An automatic locking slider of the type described comprising an upper wing member and a lower wing member positioned in spaced opposed relation and connected at one end by an integral neck portion to provide a substantially Y-shaped channel therebetween, a locking spring member having an inwardly bent tongue portion at one end, a locking prong at the other end and exposed center portion, said upper wing member having an aperture disposed for the passage therethrough of said locking prong into the Y-shaped channel, a retaining lug provided on said upper wing member immediately above said neck portion for retaining said tongue portion in place against displacement, and a pull tab having a transversely extending trunnion portion disposed between said locking spring member and said upper wing member, said trunnion portion being reduced in thickness compared with the remainder of the pull tab so that the outer surface of said pull tab normally lies substantially flush with the exposed outer surface of said locking spring member, and said retaining lug projecting slightly above the outer surfaces of said pull tab and said locking spring member.

2. An automatic locking slider substantially as herein described with reference to and as illustrated in the accompanying drawings.

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