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DOUBLE SLIDER LOCKING SLIDE FASTENER

The present invention relates to slide fasteners of the type having two sliders which act independently one another for opening and closing a common slide fastener and can be locked together against movement
5 away from each other in their fully closed position on the slide fastener.

Double slider slide fasteners are well known, wherein two sliders act independently one another, and can be drawn together to effect the full closure of the
10 slide fastener. For example, slide fasteners of this type have been employed frequently as closure member for suitcases, garment bags or other similar luggage items.

In such use, it is frequently desirable to be
15 able to lock the slide fasteners, and for this purposes, each of the sliders has an upstanding projection with a hole extending transversely therethrough. Two of such sliders may be locked together by a padlock having a shackle extending through the holes in the projections.
20 The padlockable slide fasteners are deffective from an aesthetic view, tedious in locking and unlocking operation.

Another known double slider locking slide fastener comprises one slider including a socket portion

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and the other slider having a plug portion fittable in the socket portion. The one slider includes a locking mechanism built in the slider body and having a locking member lockingly engageable with the socket portion of the other slider. The locking mechanism is complex in structure, making the slider body bulky and relatively high profile.

According to the invention there is provided a double slider locking slide fastener comprising:

- 10 (a) a pair of sliders movable independently of one another for opening and closing a common slide fastener, each of said sliders including a U-shaped projection and a pull tab pivotably connected to said projection, said
15 pull tab of one of said sliders having an aperture for receipt onto said projection of the other slider at one position, said projection of said other slider having a recess opening outwardly of said aperture
20 when said pull tab of said one slider is in said one position; and
- (b) a locking device comprising a housing disposed on said pull tab of said one slider, a driver movably received in said housing, and
25 a bolt connected to said driver in driven relation thereto and movable, in response

to the movement of said driver, between
a first position in which said bolt partly
projects inwardly of said aperture and
a second position in which said bolt is held
outside of said aperture, said bolt having
a portion engageable with said recess when
it is in said first position with said pull
tab of said one slider in said one position.

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The invention will be described by way of example
5 with reference to the accompanying drawings in which two
preferred embodiments of the present invention are shown
by way of illustrative example. In the drawings:-

FIG. 1 is a plan view of a portion of a double
slider locking slide fastener in accordance with the
10 present invention, the locking slide fastener having
two sliders locked together;

FIG. 2 is a side elevational view, partly in
cross section, of the double slider locking slide
fastener of FIG. 1;

15 FIG. 3 is a cross-sectional view taken along
the line III - III of FIG. 2;

FIG. 4 is a plan view of one slider of the double
slider locking slide fastener of FIG. 1;

FIG. 5 is a side elevational view of the slider
20 of FIG. 4;

FIG. 6 is an enlarged view of a portion of
a U-shaped projection of the slider of FIG. 5;

FIG. 7 is a plan view of the other slider of
the double slider locking slide fastener of FIG. 1,
25 the slider being provided with a locking device;

FIG. 8 is a side elevational view, partly in
cross section, of the slider of FIG. 7;

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FIG. 9 is a cross-sectional view of the locking device of FIG. 8 with movable members being omitted for the purpose of explanation;

FIG. 10 is an enlarged plan view, partly cross section, of the movable members of the locking device of FIG. 8;

FIGS. 11 and 12 are views similar to FIGS. 1 and 2, respectively, but showing a modification of the present invention.

10 The present invention is particularly useful when embodied in a double slider locking slide fastener such as shown in FIGS. 1 and 2, generally indicated by the numeral 20.

The double slider locking slide fastener 20
15 (hereinafter referred to as "locking slide fastener") includes a pair of conventional slide fastener stringer tapes 21,21 arranged in side by side relationship and a pair of rows of coupling elements or scoops 22,22 mounted on and along inner longitudinal edges of the
20 stringer tapes 21,21, respectively. A pair of sliders 23,24 is mounted on the locking slide fastener 20 to slide along the scoops 22,22 such that the scoops 22,22 of adjacent tapes 21,21 are interlocked on the sides of each slider 23,24 away from the other slider
25 24,23, while the scoops 22,22 between the two sliders 23,24 are not interlocked and form an opening between the sliders 23,24. In FIGS. 1 and 2, the sliders 23

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and 24 are shown joined together against movement relative to each other by a locking device 25 described hereinbelow.

The internal configuration of the sliders 23,24, for effecting the closing and opening the locking slide fastener 20, is conventional, and hence need not be considered in detail in this disclosure. It will merely be noted that the sliders 23,24 have ends 26,26, which are herein arbitrarily designated as leading ends, directed toward the opening or non-interlocked scoops, and ends 27,27 herein designated as trailing ends toward the adjacent interlocked scoops.

As seen in FIGS. 1, 2, 4, 5, 7 and 8, each of the sliders 23,24 is provided with a projection 28,29 extending lengthwise of the slide fastener 20 and a pull tab 30,31 pivotably connected to the projection 28,29. The projection 28,29 is in the form of a loop or an inverted U-shaped element having one arm 32,33 (FIGS. 2, 5 and 8) joined with the base of the slider 23,24, at the leading end 26,26 thereof. The other arm 34,35 (FIGS. 2, 5 and 8) may spaced from (as in the illustrated embodiment) or contact the base of the slider 23,24 at the trailing end 27,27 thereof, but, if there is a gap, the gap is of inadequate width for the pull tab 30,31 to pass therethrough. Each of the pull tabs 30,31 may be rotated in a vertical plane to the locking slide fastener 20, from a first position lying on the slider 23,24 to a second position 180 degrees

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therefrom. The pull tabs 30,31 are used in the normal way to enable pulling of the sliders 23,24 along the scoops 22,22 to a desired location.

As shown in FIGS. 4-6, the slider 23 has in its one or rear arm 34 of the U-shaped projection 28 a pair of lateral recesses 36,36 for the purposes described below. Each of the recesses 36,36 is defined by a horizontal wall 36a (FIGS. 5 and 6) extending parallel to the base of the slider 23 and a vertical wall 36b (FIGS. 4 and 6) extending normal to the slider's base.

Turning now to FIGS. 7 and 8, the pull tab 31 of the slider 24 has an elongated aperture 37 complementary in contour to the projection 28 of the slider 23 for receipt onto the projection 28 at the second position thereof. The pull tab 31 further has a guide groove 38 extending longitudinally between the aperture 37 and the distal end of the pull tab 31, the guide groove 38 opening away from the base of the slider 24 when the pull tab 31 is in the second position shown in FIGS. 1, 2, 7 and 8.

The locking device 25 comprises an annular housing 39 formed integrally or otherwise joined with the pull tab 31 across the guide groove 38. The housing 39 has a cylindrical bore 40 (FIG. 9) extending longitudinally therethrough and communicating at one end with the guide groove 38. A driving member in the shape of a cylinder 41 is rotatably mounted within the bore 40 and having a slotted opening or key recess 40

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into which the operative tip of a separate key (illustrated by the phantom lines in FIG. 8) for the rotation of the cylinder 41 thereby. The cylinder 41 has an axial pin 43 located on the lower surface thereof in eccentric to the axis of the cylinder 41 and projecting axially downwardly into the guide groove 38 in the pull tab 31. The locking device 25 further includes a locking member or bolt 44 slidably received in the guide groove 41 and operatively coupled at one end with the cylinder 41. As shown in FIG. 10, the bolt 44 has at the one end an oblong opening 45 extending widthwise thereof and at the other end a pair of spaced locking portions 46,46 defining therebetween a space 47 for receipt therein the recessed rear arm 34 of the projection 28 of the slider 23. The oblong opening 45 loosely receives the axial pin 43 of the cylinder so that the bolt 44 slides in and along the guide groove 38 between a first position in which the locking portions 46,46 projects into the aperture 37 and a second position in which the locking portions 46,46 is retracted from the aperture 46,46, in response to the rotary movement of the cylinder 41. A cover 48 is mounted on the housing 39 to hold the cylinder 41 rotatably within the bore 40. The cover 48 has a key hole 49 through which the key (FIG. 8) is inserted to actuate the locking device 25.

In operation, the locking slide fastener 20 of the foregoing construction can be closed by moving

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either of the sliders 24,24 toward the other, or by moving both sliders 23,24 toward each other, until the sliders 23,24 are held in closed juxtaposition at their leading ends 26,26. When this is accomplished, the locking device 25 is actuated to place the bolt 44 in the second or retracted position. Then, the pull tab 31 of the slider 24 is rotated over and onto the pull tab 30 of the slider 23 with the projection 28 passing through the elongated aperture 37. In this position, the recesses 36,36 in the arm 34 opens outwardly of the aperture 37 toward the locking portions 46,46 of the bolt 44. The key is inserted through the key hole 49 into the key recess 42 in the cylinder 41. Rotation of the cylinder 41 causes the bolt 44 to slide in and along the guide groove 38 toward the recessed arm 34 whereupon the locking portions 46,46 is received into the recesses 36,36 in the arm 34. Thus, the sliders 23,24 are locked together against movement with respect to each other, as shown in FIGS. 1-3.

20 In a second embodiment of the invention shown in FIGS. 11 and 12, a locking slide fastener 20' comprises a pair of sliders 23',24' which is substantially identical to the sliders 23,24 of the preceding embodiment with the exception of the structure of a bolt 50 and a rear arm 51 (FIG. 12) of a projection 52. The bolt 51 is in the shape of a rectangular plate having one end coupled with a cylinder 41' in driven relation thereto and at the other end a locking portion 53

movable into and out of an aperture 37' in a pull tab 31', in response to rotation of the cylinder 41'. The rear arm 51 has an rectangular recess 54 opening rearwardly of a slider 23' for receiving the locking portion 53 of the bolt 51 when a locking device 25' is
5 tion 53 of the bolt 51 when a locking device 25' is actuated to move the locking portion 53 of the bolt 51 into the aperture 37'.

Advantages accruing from the arrangement of the present invention are as follows: No separate locking
10 unit such as a padlock is required as the slider 24 has a locking device 25 on its pull tab 31. The locking device 25 consists of a small number of components, and hence is simple in structure and reliable in operation. With the locking device 25 disposed on the
15 pull tab 31 instead of in the slider body, the slider 24 has a relatively low profile.

Although various minor modifications may be suggested by those versed in the art, it should be understood that I wish to embody within the scope of
20 the patent warranted hereon, all such embodiments as reasonably and properly come within the scope of my contribution to the art.



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CLAIMS

1. A double slider locking slide fastener comprising:

- (a) a pair of sliders movable independently of one another for opening and closing a common slide fastener, each of said sliders including a U-shaped projection and a pull tab pivotably connected to said projection, said pull tab of one of said sliders having an aperture for receipt onto said projection of the other slider at one position, said projection of said other slider having a recess opening outwardly of said aperture when said pull tab of said one slider is in said one position; and
- (b) a locking device comprising a housing disposed on said pull tab of said one slider, a driver movably received in said housing, and a bolt connected to said driver in driven relation thereto and movable, in response to the movement of said driver, between a first position in which said bolt partly projects inwardly of said aperture and a second position in which said bolt is held outside of said aperture, said bolt having a portion engageable with said recess when it is in said first position with said pull tab of said one slider in said one position.



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2. A double slider locking slide fastener according to claim 1, said pull tab of said one slider having a guide groove communicating at one end with said aperture, said bolt being slidably received in said guide groove.

3. A double slider locking slide fastener according to claim 1, each said projection having a U-shape extending lengthwise of said slide fastener, said recess being provided in one arm of said U-shaped projection of said other slider.

4. A double slider locking slide fastener according to claim 3, said one arm being disposed adjacent to the trailing end of said other slider.

5. A double slider locking slide fastener according to claim 1, said driver comprising a cylinder rotatably mounted in said housing and having an eccentric pin extending axially downwardly from the lower surface of said cylinder, said bolt comprising a rectangular plate having an oblong opening extending widthwise thereof, said eccentric pin being loosely received in said oblong opening.

6. A double slider locking slide fastener according to claim 1, said bolt having one end connected to said driver and the other end at which said engageable portion is disposed.

7. A double slider locking slide fastener according to claim 6, said other slider's projection further having an additional recess laterally spaced from the first-named



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recess, said other end of said bolt having a pair of spaced parallel locking portions projectable into said recesses, respectively.

8. A double slider locking slide fastener substantially as described with reference to and as illustrated in Figures 1 to 10 of the accompanying drawings.

9. A double slider locking slide fastener substantially as described with reference to and as illustrated in Figures 1 to 10 modified as in Figures 11 and 12 of the accompanying drawings.
