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LOCKABLE SLIDER FOR A SLIDE FASTENER

This invention relates to slide fasteners and more particularly ^{to/} a slider therefor which is switchable between locked and unlocked positions.

There are known various types of the so-called
5 lockable sliders, a typical example of which is a slider having a key lock mechanism as disclosed for instance in Japanese Utility Model Publication No. 62-32415 and another example is a slider having a stopper means operatively associated with a slider pull tab as
10 disclosed for instance in Japanese Utility Model Publication No. 56-37607. Most key-lock sliders are designed with the use of a key to keep the slider in locked position in which a locking prong extends into a guide channel for the passage of coupling element rows
15 on slide fastener stringers and release the slider into unlocked position in which the locking prong is freely movable into and out of the guide channel, or alternatively switch the key to hold the locking prong retracted away from the guide channel. Sliders of the

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other type are constructed such that a stopper means often in the form of a locking prong integral with the pull tab is retracted from the guide channel by pulling the pull tab in one or the other direction and brought
5 into engagement in between the coupling elements by flipping the pull tab flat against the slider body to prevent unintentional movement of the slider along the slide fastener. Since the latter type of lockable slider is easily released from its locked position by
10 manipulating the pull tab, the user would often unconsciously leave his garment or bag with the slider unlocked thereon, posing a theft or other security problem. Whereas, the key locking type of slider literally requires the user to carry with him a key in
15 which instance such key is liable to get lost. It would also be embarrassing to put a key on a person. Furthermore, keys are by nature tedious to handle and hence would often be left unused.

With the foregoing problems of the prior art in
20 view, the present invention seeks to provide an improved slider for a slide fastener which incorporates means of switching the slider from locked position to unlocked position, or vice versa, with utmost ease and without the use of a key.

25 According to the invention, there is provided a lockable slider for a slide fastener including a pair of interengaging element rows to be coupled and uncoupled



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by the lockable slider, said lockable slider comprising:
a slider body including an upper wing member and a lower
wing member joined at one end of the slider body by a
connecting neck so as to define therebetween a generally
5 Y-shaped guide channel; a cover member mounted on and
jointly defining with said upper wing member an elongate
aperture; a pull tab pivotably connected to said cover
member; and a locking member having a locking prong at
one of its ends, characterized in that said slider is
10 provided with a switching means movable in said elongate
aperture between a first position in which to cause said
locking prong to advance into said guide channel and a
second position in which to cause said locking prong to
retract from said guide channel.

15 The above features and advantages of the invention
will be apparent from the following detailed description
taken in conjunction with the accompanying drawings.

Figure 1 is a longitudinal cross-sectional view of
a lockable slider according to a first embodiment shown
20 mounted on a slide fastener stringer and disposed in
unlocked position relative to the fastener stringer;

Figure 2 is a view similar to Figure 1 but showing
the slider in locked position;

Figure 3 is a top plan, partially broken away,
25 view of the lockable slider of Figure 1;

Figure 4 is a perspective, partially broken away,
view of the slider of Figure 1;



Figure 5 is a perspective view of a switching means constituting a part of the slider of Figure 1;

Figure 6 is a perspective view of part of a cover member for the slider of Figure 1;

5 Figure 7 is a longitudinal cross-sectional view of a lockable slider according to a second embodiment of the invention;

Figure 8 is a perspective view of the slider of Figure 7;

10 Figure 9 is a longitudinal cross-sectional view of a lockable slider according to a third embodiment of the invention shown in unlocked position (phantom line);

Figure 10 is a view similar to Figure 9 but showing the slider in locked position;

15 Figure 11 is a perspective view of the slider of Figure 9;

Figure 12 is a longitudinal cross-sectional view of a lockable slider according to a fourth embodiment of the invention shown in unlocked position (phantom
20 line);

Figure 13 is a view similar to Figure 12 but showing the slider in locked position;

Figure 14 is a top plan view of the slider of Figure 12;

25 Figure 15 is a longitudinal cross-sectional view of a lockable slider according to a fifth embodiment of the invention shown in unlocked position;



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Figure 16 is a view similar to Figure 15 but showing the slider in locked position;

Figure 17 is a longitudinal cross-sectional view of a lockable slider according to a sixth embodiment of the invention shown in unlocked position; and

Figure 18 is a view similar to Figure 17 but showing the slider in locked position.

Like reference numerals refer to like or corresponding parts throughout the several views.

10 Figures 1 through 6 inclusive illustrate a lockable slider 10A according to a first embodiment of the invention. The slider 10A is reciprocally movable along a pair of fastener stringers 11 to take rows of coupling elements 12 thereon into and out of engagement
15 with each other. The slider 10A comprises a slider body 13 including an upper wing member 14 and a lower wing member 15 joined at one end of the slider body 13 by a connecting neck or diamond 16 so as to define therebetween a generally Y-shaped guide channel 17 for
20 the passage therethrough of the stringers 11 as shown in Figures 1 and 2. A cover member or trunnion 18 includes an elongate rectangular bar 19 whose one end is secured to a rear end of the upper wing member 14 and a circular hub 20 connected to the other end of the bar 19. The
25 cover member 18 and the upper wing member 14 jointly define therebetween an elongate aperture 21 in which a pull tab 22 is pivotably mounted. The upper wing member



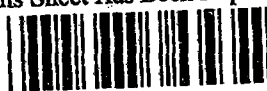
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14 has a guide through opening 23 communicating with the guide channel 17 and the elongate aperture 21.

A locking member 24 having at one of its ends a downwardly directed locking prong 25 is vertically
5 movably supported on the upper wing member 14 and normally biased upwardly at the opposite end 24a by the action of a spring member 26 so as to urge the locking prong 25 through the opening 23 into the guide channel 17 as shown in Figure 2.

10 A switching means 27 in the form of a collet 28 is mounted in place between the upper wing member 14 and the cover member 18 and has a central locking groove 29 defined by a peripheral ridge 30 extending circumferentially around the lower surface of the collet
15 28 as shown in Figures 1 and 2. As better shown in Figure 5, the collet 28 has a plurality of lugs 31 extending in spaced relation to each other and projecting upwardly from the upper surface of the collet 28 and a radially outwardly projecting actuating member
20 32 which is exposed to view through an arcuate guide slot 33 formed between the hub 20 and the upper wing member 14.

The circular hub 20 is provided, as shown in Figure 6, with a plurality of dents 34 formed in its
25 lower surface in spaced relation to each other for engagement with the lugs 31 of the collet 28. The collet 28 is disposed rotatable by the actuating member



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32 which is movable through the arcuate guide slot 33 in a plane parallel to the general plane of the slider body 13, the arrangement being that rotating the collet 28 in one direction will cause the opposite end 24a of the locking member 24 to ride on the peripheral ridge 30 of the collet 28 against the tension of the sprig 26, in which position the locking prong 25 is lifted or retracted away from the guide channel 17, allowing the slider 10A to move freely along the stringers 11 by manipulation of the pull tab 22 as shown in Figure 1, and rotating the collet 28 in the opposite direction will cause the opposite end 24a of the locking member 24 to disengage from the ridge 30 and fall into the locking groove 29 of the collet 28 under the tension of the spring 26, in which position the locking prong 25 has moved into the guide channel 17 to engage with the coupling elements 12 thereby locking the slider 10A against sliding movement as shown in Figure 2.

Figures 7 and 8 show a lockable slider 10B according to a second embodiment of the invention in which the switching means 27 is in the form of a lever 35 integral with the locking member 24. The lever 35 has one of its ends connected to the opposite end 24a of the locking member 24 and is pivotable about a pin 36 extending transversely of the slider body 13. An elongate opening 37 extends longitudinally of the cover member 18 in communication with a pair of upper and



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lower arcuately recessed inner wall portions 38a and 38b at the front end of the cover member 18 which are demarcated by a pair of opposed bulged inner wall portions 39a and 39b of the cover member 18. The lever 5 35 is received in the opening 37 to be pivotable in a plane perpendicular to the general plane of the slider body 13 switchably between the upper and lower recessed inner wall portions 38a and 38b. The lever 35 has a pair of lateral arcuate projections 35a dimensioned to 10 fit snugly in the corresponding recessed wall portions 38a and 38b of the cover member 18. To provide smooth pivotal movement of the lever 35 between the recessed wall portions 38a and 38b, there are formed a pair of pores 40 on opposite sides of the bulged inner wall 15 portions 39a and 39b of the cover member 18, which pores 40 serve to allow the lever 35 to resiliently pass through the bulged wall portions 39a and 39b. Switching the lever 35 into the upper recessed wall portion 38a will cause the locking prong 25 to move into the guide 20 channel 17 as indicated by the solid line in Figure 7, and switching the lever 35 conversely into the lower recessed wall portion 38b will cause the locking prong 25 to retract from the guide channel 17 as indicated by the phantom line in Figure 7.

25 Figures 9 - 11 inclusive illustrate a lockable slider 10C according to a third embodiment of the invention. The switching means 27 is embodied in a



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cover member 18 which is mounted on and longitudinally reciprocally slidable relative to the upper wing member 14 of the slider body 13. The inner wall of the cover member 18 is polygonal in configuration, including at its forward end a first locking recess 41, a second locking recess 42 separated therefrom by a downwardly projecting ridge 43 and at its rearward end a locking ledge 44. A locking member 24 in the form of a leaf spring is looped to provide an upper engaging portion 24b and a lower engaging portion 24c which are resiliently held in abutting engagement with the cover member 18 and the upper wing member 14, respectively. A locking prong 24 extends downwardly integrally from the lower engaging portion 24c of the locking member 18. A pull tab 22 has its pintle portion 22a disposed in between the lower engaging portion 24c of the locking member 24 and the upper wing member 14. Lifting the pull tab 22 as indicated by the phantom line in Figure 9 will cause the locking prong 25 to retract away from the guide channel 17, and flipping the pull tab 22 flat against the slider body 13 will allow the locking prong 25 to enter into the guide channel 17 by the resilient force of the locking member 24 as shown in Figure 10 in a manner well known in connection with a conventional automatic lock slider.

Designated at 45 is a locking tab disposed between the cover member 18 and a spring member 26 supported in



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the diamond 16. The locking tab 45 is normally biased upwardly toward the cover member 18 with its head 45a lockable in either of the two locking recesses 41 and 42 in the cover member 18 as the latter is moved

5 reciprocally back and forth relative to the slider body 13. Moving the cover member 18 forwardly of the slider body 13 will bring the head 45a of the locking tab 45 into registry with the second locking recess 42 of the cover member 18 to retain the locking prong 25 in the

10 guide channel 17 with the lower engaging portion 24c of the locking member 24 held in abutting relation to the locking ledge 44 of the cover member 18 as shown in Figure 10. Moving the cover member 18 backwardly of the slider body 13 will shift the head 45a of the locking

15 tab 45 over to the first locking recess 41, in which position the locking member 24 is released from the locking ledge 44 and is ready for manipulation by the pull tab 22 to lift the locking prong 25 from the guide channel 17 as shown in Figure 9.

20 Figures 12 - 14 inclusive illustrate a lockable slider 10D according to a fourth embodiment of the invention. The switching means 27 is embodied in a locking tumbler 46 having a first arm 46a and a second arm 46b and pivotably connected by a transversely

25 extending pin 47 to a cover member 18. A spring member 26 is provided for normally biasing the locking tumbler 46 to move transversely axially of the pin 47 toward one



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side of the slider body 13 as better shown in Figure 14. A locking member 24 is similar in construction to the locking member 24 shown in Figures 9 and 10 but has its end opposite to the locking prong 25 anchored at a

5 projection 48 formed in the inner wall of the cover member 18. The second arm 46b of the locking tumbler 46 is exposed to view beyond the cover member 18 and arranged by pivotal movement to come into abutting engagement with a first stepped inclined locking surface

10 49a and a second stepped inclined locking surface 49b respectively formed in the rear end of the cover member 18 as shown in Figures 12 and 13. The first locking surface 49a lies at a predetermined level above the second locking surface 49b such that rotating the

15 locking tumbler 46 clockwise will bring its second arm 46b into abutting engagement with the first locking surface 49a, in which position the first arm 46a urges the locking prong 25 into the guide channel 17 as shown in Figure 13, while rotating the locking tumbler 46

20 counterclockwise (after moving the same transversely against the tension of the spring 26) will shift the second arm 46b into abutting engagement with the second locking surface 49b, in which position the first arm 46a of the tumbler 46 releases the locking prong 25 to

25 retract from the guide channel 17 as shown in Figure 12.

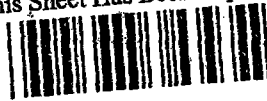
Figures 15 and 16 illustrate a lockable slider 10E



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according to a fifth embodiment of the invention. The switching means 27 is embodied in a cover member 18 and is essentially similar to that which is shown in Figures 9 - 11 in that the cover member 18 is longitudinally movable in sliding relation to the slider body 13 between two selected operative positions. The cover member 18 has a first arcuate dent 50a and a second arcuate dent 50b spaced apart longitudinally of the slider body 13 and facing toward the upper wing member 14 at one or front end of the slider body 13. A second spring 26a is provided with a ball 51 supported thereon at the front end of the slider body 13, which ball 51 alternately engages either of the two arcuate dents 50a and 50b under the tension of the spring 26a as the cover member 18 is moved back and forth relative to the slider body 13.

A locking member 24 is supported at one end on a spring member 26 which normally urges the locking member 24 against the inner wall of the cover member 18. Moving the cover member 18 backwardly of the slider body 13 will register and lock the first dent 50a with the ball 51, in which position the locking member 24 descends against the tension of the spring member 26 with its locking prong 25 entering into the guide channel 17 as shown in Figure 16. Moving the cover member 18 forwardly of the slider body 13 will shift the second dent 50b into locking engagement with the ball



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51, in which position the locking member 24 is bounced back upwardly by the action of the spring member 26 with its locking prong 25 lifted from the guide channel 17 as shown in Figure 15.

5 Figures 17 and 18 illustrate a lockable slider 10F according to a sixth embodiment of the invention. The switching means 27 is further embodied in a cover member 18 which is provided internally with a first or upper elongate aperture 52a and a second or lower elongate
10 aperture 52b separated therefrom by a pair of opposed inwardly projecting ledges 53a and 53b defining therebetween a central opening 54 dimensioned to allow the passage therethrough of the pintle 22a of the pull tab 22 selectively into and out of the upper and lower
15 apertures 52a and 52b. A locking member 24 has one end movably supported on the upper wing member 14 of the slider body 13 and connected to a spring member 26 which normally urges the locking prong 25 upwardly away from the guide channel 17. The pull tab 22 is manipulated in
20 a manner that its pintle 22a is brought into the second aperture 52b between the ledge 53a and the locking member 24 immediately above the locking prong 25 and the pull tab 22 is laid flat against the slider body 13 as shown in Figure 18, in which position the locking prong
25 25 is forced down into the guide channel 17 against the tension of the spring member 26 thereby locking the slider 10F against movement. Bringing the pintle 22a of



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the pull tab 22 up through the opening 54 into the first aperture 52a will release the locking member 24, when the locking prong 25 is lifted from the guide channel 17 and borne against the ledge 53a of the cover member 18 as shown in Figure 17, in which position the slider 10F is ready for sliding movement by the pull tab 22.

Various changes and modifications may be made in the specific form and construction herein described and illustrated, without departing from the scope of the appended claims.

As for an example, such a mock key hole designated at 100 and indicated by the phantom line in Figure 4 may be provided in the upper surface of the hub 20 that may serve to avert theft. Also, the actuating member 32 of the switching means 27 better shown in Figure 4 may be shortened to be concealed from view.

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CLAIMS:

1. A lockable slider (10A - 10F) for a slide fastener including a pair of interengaging element rows (12) to be coupled and uncoupled by the lockable slider (10A - 10F), said lockable slider (10A - 10F) comprising: a slider body (13) including an upper wing member (14) and a lower wing member (15) joined at one end of the slider body (13) by a connecting neck (16) so as to define therebetween a generally Y-shaped guide channel (17); a cover member (18) mounted on and jointly defining with said upper wing member (14) an elongate aperture (21, 37, 52a, 52b); a pull tab (22) pivotably connected to said cover member (18); and a locking member (24) having a locking prong (25) at one of its ends, characterized in that said slider (10A - 10F) is provided with a switching means (27) movable in said elongate aperture between a first position in which to cause said locking prong (25) to advance into said guide channel (17) and a second position in which to cause said locking prong (25) to retract from said guide channel (17).

2. A lockable slider (10A) according to claim 1 characterized in that said switching means (27) is embodied in the form of a collet (28) rotatably mounted between said upper wing (14) and said cover member (18), said collet (28) having a central locking groove (29) defining said first position, a peripheral ridge (30)



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extending circumferentially around said locking groove (29) and defining said second position, and a radially outwardly projecting lever (32) exposed to view for actuating said collet (28).

5 3. A lockable slider (10B) according to claim 1 characterized in that said cover member (18) is provided at one of its ends with a pair of upper and lower recessed inner wall portions (38a, 38b), and said switching means (27) is embodied in the form of a lever
10 (35) formed integral with said locking member (24) and pivotable between said upper and lower recessed inner wall portions (38a, 38b).

 4. A lockable slider (10C) according to claim 1 characterized in that said switching means (27) is
15 embodied in the form of a cover member (18) and a locking tab (45) operatively associated therewith, said cover member (18) being reciprocally movable relative to said upper wing member (14) and having a first locking recess (41) and a second locking recess (42) selectively
20 engageable with said locking tab (45).

 5. A lockable slider (10D) according to claim 1 characterized in that said cover member (18) has at one of its ends first and second inclined locking surfaces (49a, 49b), and said switching means (27) is embodied in
25 the form of a locking tumbler (46) pivotably connected to said cover member (18) and selectively engageable with said first and second inclined locking surfaces



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(49a, 49b).

6. A lockable slider (10E) according to claim 1 characterized in that said switching means (27) is embodied in the form of a cover member (18) and a resiliently supported ball (51) operatively associated therewith, said cover member (18) being reciprocally movable relative to said upper wing member (14) and having first and second arcuate dents (50a, 50b) selectively engageable with said ball (51).

10 7. A lockable slider (10F) according to claim 1 characterized in that said switching means (27) is embodied in the form of a cover member (18) and a pull tab (22) operatively associated therewith, said cover member (18) having an upper elongate aperture (52a) and
15 a lower elongate aperture (52b) separated therefrom by a pair of opposed inwardly projecting ledges (53a, 53b) defining a central opening (54) for the passage of a portion (22a) of said pull tab (22) therethrough selectively into and out of said upper and lower
20 apertures (52a, 52b).