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H. FOREPP

2,901,803

SLIDER FOR HELICAL-WIRE SLIDE FASTENER

Filed June 28, 1956

2 Sheets-Sheet 1

Fig. 1

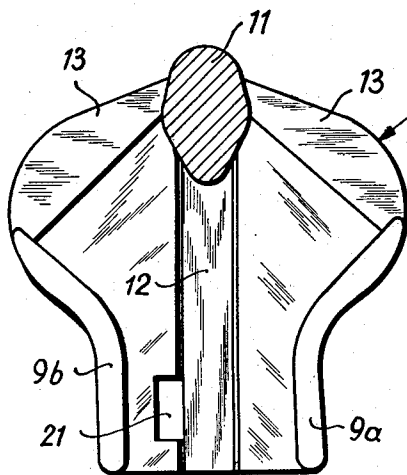


Fig. 2

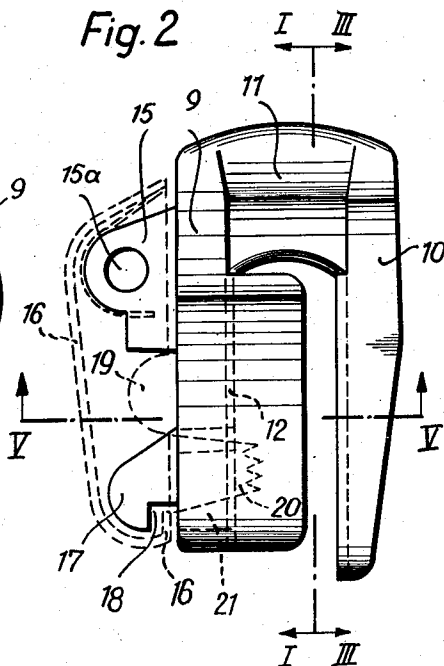


Fig. 3

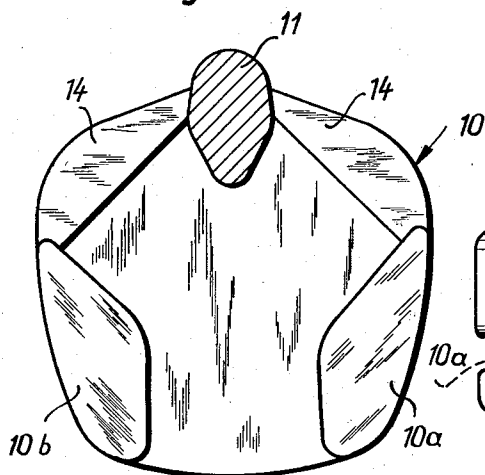
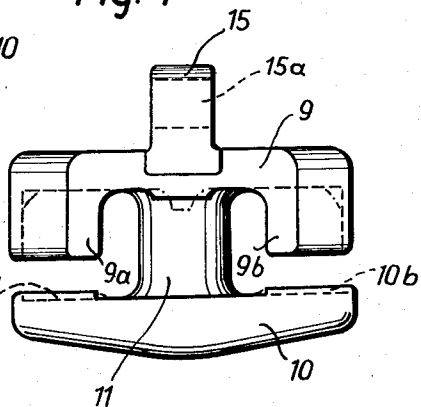


Fig. 4



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Fig. 5

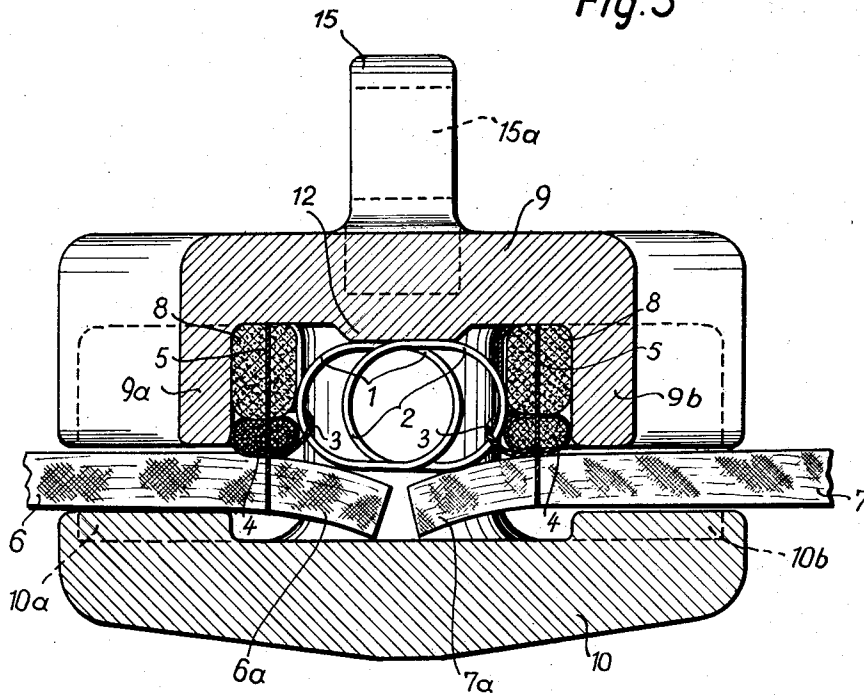
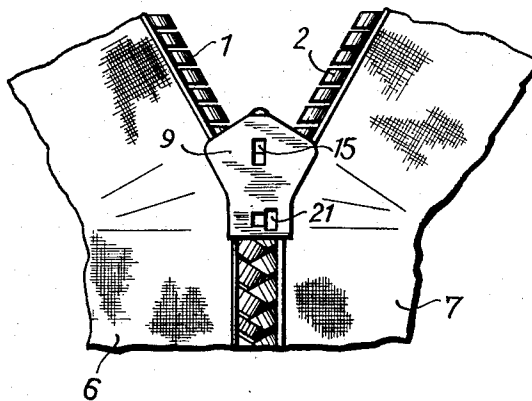


Fig. 6



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SLIDER FOR HELICAL-WIRE SLIDE FASTENER

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Claims priority, application Germany June 29, 1955:

3 Claims. (Cl. 24-205.15)

The present invention relates to helical-wire slide fasteners of metal or plastic. More particularly, it relates to a novel slider for engaging and disengaging the wires of a helical-wire slide fastener wherein wires of opposite twist are secured to respective tapes by cords.

In such slide fasteners, one of the wires has a left-hand twist and the other a right-hand twist, the wires being formed of metal or plastic such as nylon or polyurethanes. The helices in cross-section may either be circular or flattened into an oval-shape. The wire may actually be a thin band or ribbon which is helically wound so that the width of the ribbon is less than the spacing between the ribbon of adjacent turns. Thus, when a turn of the left wire is received between two adjacent turns of the right wire, it will be held therein. In the event that thin wires are employed so that the spacing between adjacent turns of the same wire is greater than the thickness of the wire, each turn may be provided with a bent portion or projection which serves to reduce the effective distance between adjacent turns. This is also the case where a flat ribbon is employed and the spacing between ribbons of adjacent turns exceeds the width of the ribbon.

For the application of such helical wires to fastening tapes or directly to the object or the article of clothing to be closed by the fastener, a cord is wrapped by means of a thread to each helical wire by means of which cord the helical wire is then sewed to one side of an attachment tape or the like. In this way, it is necessary to have the facing edges of the two attachment tapes or the like protrude somewhat beyond the winding cord so that the helical wires lie on one side of the tape. The helical wires and the winding cord do not provide a dependable guiding for a slider since the winding cord and the helical wire turns form an inclined surface which can become jammed in the slider. For this reason, such fasteners are provided with a pair of guide cords each of which is sewed to the side of the winding cord opposite the attachment tape, conveniently simultaneously with sewing of the winding cord to the tape. In this way, the height of the winding cord and guide cords above the plane of the tape is greater than the height of the helical wires above the plane of the tape.

Even with the provision of these guide cords, the possibility of jamming in the slider is still present. In addition, there is the possibility that the individual turns of the helical wires may shift relative to the tapes so that both wires are no longer spaced the same distance therefrom and so that proper engagement is not certain. In the case of oval wire turns there is the possibility that the turns will assume a round shape and will not form the smooth surface for which the oval shapes are particularly intended.

It is accordingly an object of the present invention to provide means for ensuring that jamming will not occur in a helical-wire slide fastener.

It is a further object of the present invention to provide a novel slider for a helical-wire slide fastener which

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slider controls the wires to ensure proper engagement of the turns of the respective wires.

Another object of the invention is to provide a slider with means for positively guiding the turns of the individual wires before engagement as well as during the act of engagement.

These and other objects and advantages are realized in accordance with the present invention wherein there is provided a slider including upper and lower shields connected adjacent one end by a wedge. The upper shield is provided with side flanges approximately equal in height to the cords, i.e., the winding cord and the guide cord, above the tape. The flanges are symmetrical and arcuate so that they are closest to each other at the bottom of the slider and gradually diverge as they approach the top. The upper shield is further provided with a central guide strip on its underside, the portions of the wire turns most remote from the tapes resting against this guide strip.

The lower shield of the slider may have a continuous flat inner surface since only the smooth bottom surfaces of the two attachment tapes which face away from the helical wires rest against the inner surface of the lower shield. However, there may also be provided on the inner surface of the lower shield flanges of small height which increase its stability. The surface of each of these flanges may be wider than the opposed surface of each upper shield flange in order to provide the attachment tape with a wider resting surface whereby a better sliding of the tape through the slider is obtained than if the supporting surface were narrow and thereby forced itself in a lacing manner into the tape.

The invention will now be described more fully with reference to the accompanying drawings, wherein:

Fig. 1 is a section through a novel slider taken along line I-I of Fig. 2, looking toward the upper shield;

Fig. 2 is a lateral elevation of the slider;

Fig. 3 is a section taken along line I-I of Fig. 2, looking toward the lower shield;

Fig. 4 is a bottom plan view of the slider of Fig. 2;

Fig. 5 is a section on an enlarged scale taken along line V-V of Fig. 2, showing the tapes, cords and helical wires;

Fig. 6 is a front elevation of the slider of Fig. 2, showing the manner of engagement of the wires; and

Fig. 7 is a bottom plan view of a modified slider.

Referring now more particularly to Figs. 5 and 6, the slide fastener comprises two helical wires 1, 2 shown as oval-shaped in cross-section and having opposite twists. The distance between adjacent turns of each wire, as opposed to the pitch which is the height per turn, is less than the width of the helical wires in longitudinal direction of the fastener. Each of the wires 1, 2 is wrapped by a thread 3 to a winding cord 4 which is in turn sewed by a thread 5 to a respective attachment tape 6, 7, which tapes may be portions of a garment or other object or may merely be bands which will subsequently be attached to a garment.

A guide cord 8 simultaneously sewed to each tape 6, 7 by thread 5. To prevent the lines of stitching 5 from tearing out at the tapes 6, 7, the ends of the tapes are spaced somewhat from the stitching lines so as to define portions 6a, 7a which substantially abut. Thus the helical wires 1, 2 are wholly disposed on one surface of the tapes and the under surfaces of the tapes are substantially flat, smooth, and closed. It will be noted that the top of guide cord 8 is somewhat higher in Fig. 5 than the top of the helical wires 1, 2, i.e., the combined heights of cords 4 and 8 above the plane of the tapes is greater than the height of the helical wires above said plane.

There is also shown a slider comprising an upper shield 9 and a lower shield 10 interconnected adjacent one end

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by a wedge 11 (Figs. 2 and 4). The upper shield 9 is provided with lateral guide flanges 9a and 9b, the height of which corresponds approximately to the height of the wrapping cord 4 plus the height of the guide cord 8. As seen in Fig. 1, these flanges are arcuate and diverge from the bottom toward the wedge 11 at the top.

Rather than having a flat inner surface, the lower shield 10 is preferably provided with lateral flanges 10a, 10b of small height and opposed to flanges 9a, 9b. These flanges 10a, 10b are conveniently of greater width than the upper flanges (Fig. 3) so as to provide a greater supporting surface for the tapes 6, 7 which respectively pass between the opposed flanges 9a, 9b and 10a, 10b. The corners of the space defined by the flanges and the opposed surfaces of the shields will of course depend upon the configuration of the flanges and in Figs. 4 and 5 are shown slightly rounded. The curvature can be even greater to conform more closely to the profile of the wires either individually or engaged.

In order to prevent the turns of wires 1, 2 from shifting prior to or during the act of engagement due to the fact that they are lower than the guide cords 8, the upper shield 9 is provided on its inner surface with a guide strip 12 which extends from the wedge 11 to the lower end. In this way, the helical wires are continuously held in the same position with respect to each other and inter-engaged in this position so that the slider produces a closed fastener, which is completely smooth with no turns projecting out from the fastener. In the case of an oval cross-section of the helical-wire turns, a straightening up of the turns is avoided by this guide strip 12. In order that the two helical wires together with the cords 4 and 8 can enter smoothly without disturbance into the slider on its wedge side, it is advantageous to widen or round off the edges 13 and 14 of the upper and lower shields on the wedge side so as to impart to them a calyx shape, so that damage to the individual helical wire turns or their sticking to the edges of the slider shields is avoided.

The upper shield 9 is also provided with a protuberance 15 on its outer surface adjacent the top, and the protuberance can be cast with a transverse hole 15a. A cap 16, shown in broken lines in Fig. 2, can be pivotally supported in hole 15a and a detent 16a at the bottom of the cap lodges under a nose 17 in a recess 18 also provided on the upper shield 9. An indent 19 provided on the cap 16 serves to pivotally secure a pull tab (not shown) for manipulating the slider. A locking tooth 20 provided on cap 16 extends through an aperture 21 provided in shield 9 to the side of guide strip 12 (Fig. 1).

In order to effect locking of the slider in any position, the left helical wire 1 must be left-handed and the right helical wire 2 right-handed, as represented in Fig. 6. As a result, the right-hand helix turns of the helical wire 2 have their edges which face the opened side extending in front of the corresponding edges of the helical wire 1 so that the locking tooth 20 can rest against these edges and thus prevents an unintended displacement of the slider after the loosening of the pull tab.

In operation, the pull tab (not shown) is grasped and serves to pull upon cap 16 so that locking tooth 20 is dislodged from the turns and movement of the slider by means of the pull tab will either engage or disengage the helical wires.

The embodiment shown in Fig. 7 differs from that shown in Fig. 4 in that the wedge 11 is provided with more arcuate portions 11a and 11b. While the cross-section of the wedge in either embodiment can be round or otherwise curved, the increased vertical curvature shown in Fig. 7 with minimum cross-section midway between the shields provides additional support for the wires which are also curved correspondingly at their points of contact with the wedge, and thus ensures that the turns will be properly positioned when they approach each other for engagement. The flanges of the lower

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shield 10 lie directly opposite the flanges 9a, 9b of the upper shield and do not extend laterally therebeyond, as in Fig. 4.

In the slide fasteners shown in the drawings, the engaged helical wires face the outside and are visible on the background of attachment tapes. Due to the fact that the inner tape edges 6a and 7a which face each other protrude beyond the wrapping cord 4 and can touch each other, it is possible to use the helical wire fastener also as a covered fastener, in which case the attachment strips 6 and 7 then form the upper side and lower side respectively of the fastener. In this case, the protuberance 15 together with the pull tab or the swingable locking cap 16 must be arranged on the outside of the lower shield 10 so that the outer surface of the upper shield is then completely smooth.

The novel slider herein described ensures easy opening and closing of the slide fastener without jamming and without the possibility of projecting or improperly engaged turns.

Various changes and modifications can be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

What is claimed is:

1. A slide fastener comprising, in combination, a pair of tapes, a pair of helical wires of opposite twist, a pair of cord means each longitudinally connected to one of said tapes and one of said wires to thereby secure said wires to said tapes, the height of said cord means above the plane of said tapes being greater than the height of said wires above said plane, and a slider for engaging and disengaging said wires, said slider including an upper shield and a lower shield interconnected adjacent one end by a wedge, said upper shield being provided on its inner surface with a pair of downturned lateral flanges approximately equal in height to said cord means and with a longitudinally directed abutment member disposed intermediate its flanges for compressing the pair of helical wires prior to the coupling thereof.

2. A slide fastener comprising, in combination, a pair of tapes, a pair of helical wires of opposite twist, a pair of cord means each longitudinally connected to one of said tapes and one of said wires to thereby secure said wires to said tapes, the height of said cord means above the plane of said tapes being greater than the height of said wires above said plane, and a slider for engaging and disengaging said wires, said slider including an upper shield and a lower shield interconnected adjacent one end by a wedge, said wedge in cross-section parallel to said shields increasing to a maximum adjacent said shields from a minimum intermediate said shields, said upper shield being provided on its inner surface with a pair of downturned lateral flanges approximately equal in height to said cord means and with a longitudinally directed abutment member disposed intermediate its flanges for compressing the pair of helical wires prior to the coupling thereof, said abutment member being slightly greater in height than the difference between the heights of said cord means and said wires above the plane of said tapes, said lower shield being provided with a pair of upturned lateral flanges respectively opposite said flanges of said upper shield.

3. A slide fastener comprising, in combination, a pair of tapes, a pair of helical wires of right-hand twist and left-hand twist, respectively, a pair of cord means each longitudinally connected to one of said tapes and of said wires to thereby secure said wires to said tapes, the height of said cord means above the plane of said tapes being greater than the height of said wires above said plane, and a slider for engaging and disengaging said wires, said slider including an upper shield and a lower shield interconnected adjacent one end by a wedge disposed intermediate said wires, the wire of right-hand twist lying to the right of said wedge when said upper

shield is viewed with said wedge on top, said upper shield being provided on its inner surface with a pair of downturned lateral flanges approximately equal in height to said cord means and with a longitudinally directed abutment member disposed intermediate its flanges for compressing the pair of helical wires prior to the coupling thereof, said abutment member being slightly greater in the height than the difference between the heights of said cord means and said wires above the plane of said tapes, a cap pivoted to the outer surface of said upper shield for limited movement in a vertical plane relative to said upper shield, said cap being provided with a locking tooth aligned with and extending through an aperture provided in said upper shield in the region of said wire of right-hand twist and normally engaging the underlying wire, said tooth preventing displacement of said slider until disengaged from said wire by pivoting of said cap.

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