Dec. 23, 1941. S. WALDES 2,267,384

SLIDE FASTENER

Filed Jan. 25, 1941

Fig. 1.

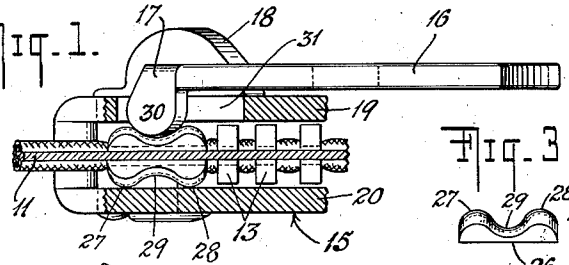


Fig. 3

Fig. 4.

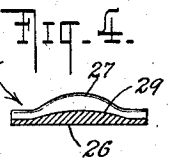


Fig. 2.

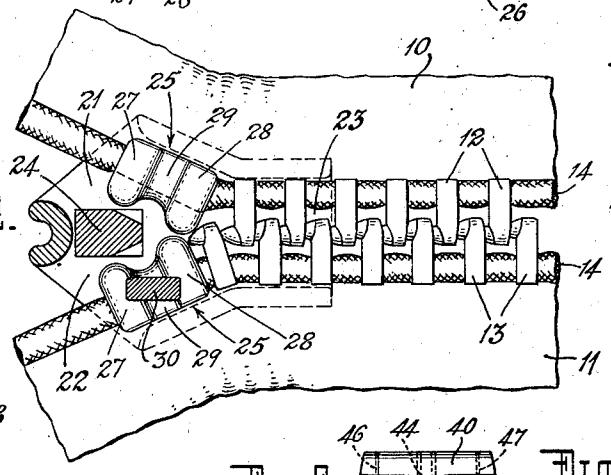


Fig. 5.

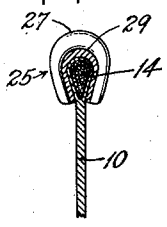


Fig. 11.

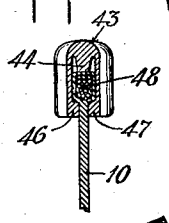


Fig. 9.

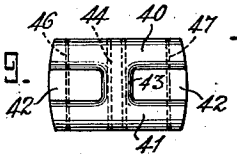


Fig. 7.

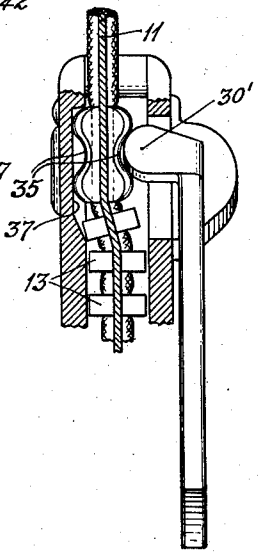


Fig. 6.

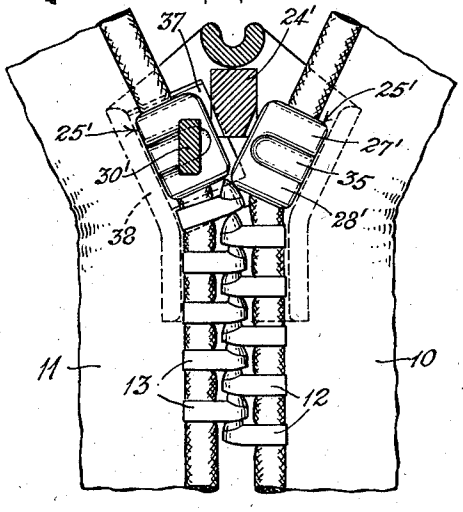


Fig. 10.

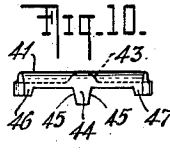
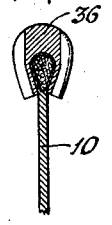


Fig. 8.



WITNESS

G. V. Rasmussen

INVENTOR

SIGMUND WALDES

BY

Riesen & Schenk,

ATTORNEYS

Patented Dec. 23, 1941

2,267,384

UNITED STATES PATENT OFFICE

2,267,384

SLIDE FASTENER

Sigmund Waldes, New York, N. Y., assignor to Waldes Koh-I-Noor, Inc., New York, N. Y.

Application January 25, 1941, Serial No. 375,909

12 Claims. (Cl. 24—205)

This invention relates to separable fasteners of the slide operated type and has for its principal object the provision of an improved means for locking the slider in position when the separable fastener is fully closed.

Separable fasteners of the type indicated usually comprise a pair of stringers having rows of interlocking elements attached along the opposed edges thereof and a slider embracing both rows of elements and movable along such rows for interlocking or disengaging the elements, the interlocking of the elements being accomplished usually by having pin members on the elements of one of the rows brought into engagement by the slider with cooperating recesses provided in the elements of the other row. Movement of the slider on the fastener is usually accomplished by manual operation of a finger tab which is pivotally attached to one plate of the slider, usually the outer one. At the upper end of the stringers, adjacent to the topmost interlocking elements, are usually provided top stops for limiting the movement of the slider in the closing direction. In some prior fastener structures, at least one of these top stops was in addition utilized as a means to lock the slider in its fully closed position. In practically all of such fastener structures, the locking action of the top stops was based on the idea that some means, such as a pin member, either on one of the top stops or the slider, should engage with a recess on the other member so that the top stop and slider became interlocked in a manner quite similar to that by which the interlocking elements interlocked with one another. One type of structure which is based on this idea and which has been used to some extent, comprises a U-shaped top stop having provided on each leg thereof, a pair of jaws by which the top stop may be clamped to the edge of the stringer and a locking pin integral with the pull tab and adapted to pass through an aperture in the slider plate on which the pull tab is mounted and to enter into the recess between the legs of the U-shaped member or top stop when the pull tab is pivoted down against the exterior surface of the pull tab bearing plate of the slider. The U-shaped member or top stop is usually made of metal which is just as thin as the metal of which the interlocking elements are constituted so that its grip on the tape or stringer is relatively weak against forces tending to rip it from the tape, as for example, when the pin is inserted therein and a transverse pull is exerted at the top of the fastener either by the wearer inadvertently trying to force the fastener open when it is locked in position or by strains created by the body of the wearer in the use of the garment to which the fastener is attached. Furthermore, the locking pin on the pull tab in a structure of this type is subject to bending or breaking, particularly so when the pull tab is pressed down into closed position with the pin out of direct alignment with the recess of the U-shaped element.

In accordance with the present invention, the top stop is made of a solid piece of metal or other suitable material which is folded or formed about the edge of the stringer and grips the latter throughout its entire length which is greater than the widths of two interlocking elements plus the width of the space therebetween. The exterior portion of the top stop facing the top or outer plate of the slider is provided with a cam surface of a configuration such that when engaged by a cam provided on the slider, the stop is not only effectively locked in jamming relation against the interior surface of the bottom plate of the slider but it also effectively holds the pull tab in its inoperative position against the top plate of the slider until positively removed therefrom. The cam of the slider is formed integrally on the pull tab of the slider so that it can be extended readily through a recess in the top plate of the slider into engagement with the cam surface of the top stop and has a configuration suitable for accomplishing the above-mentioned results when in locking engagement with the top stop.

The advantages of the construction of this invention, as well as the novel details of construction thereof, will more fully appear during the course of the following specification, read in connection with the accompanying drawing, in which Fig. 1 is a perspective view of a portion of the slider, partly in section, and showing, in section, the portion of the stringer tape which carries the top stop, the latter being positioned within the slider and the pull tab of the slider being positioned to lock the top stop within the slider; Fig. 2 is a plan view of the upper portion of the separable fastener with the top plate of the slider removed to illustrate more clearly the manner in which the slider is locked in position on the top stop; Fig. 3 is a side elevation of the top stop before being bent into position on the stringers of the fastener; Fig. 4 is a vertical sectional view taken transversely to Fig. 3 through the channel portion thereof; Fig. 5 is a sectional view similar to that of Fig. 4 but showing the top stop attached to the stringer tape; Fig. 6 is

a view similar to Fig. 2 but showing a modified form of the invention; Fig. 7 is a sectional view of the construction illustrated in Fig. 6; Fig. 8 is a sectional view of the top stop illustrated in Figs. 6 and 7; Fig. 9 is a top plan view of another form of top stop before being bent into position on a stringer tape; Fig. 10 is a front elevational view of the top stop shown in Fig. 9, and Fig. 11 is a sectional view showing the top stop illustrated in Figs. 9 and 10 clamped in position on a stringer tape.

In Figs. 1 to 5, inclusive, of the drawing, the numerals 10 and 11 indicate the two flexible stringers of the fasteners to the opposed edges of which, are attached the rows of cooperating fastener elements 12 and 13. The stringers are usually made of fabric tape and these tapes are beaded or reinforced along the opposed edges to which the interlocking elements are to be attached, such reinforcing being a well known expedient and may consist of weaving into the fabric a strengthening cord 14, such as is illustrated in Fig. 5 of the drawing. Embracing the two rows of elements 12 and 13 is the slider 15 which controls the locking and unlocking of the rows of elements. Actuation of the slider along the rows of elements is accomplished by manual operation of the pull tab 16 which has its lower end pivoted at 17 to the lug 18 provided on the upper or outer plate 19 of the slider. In Figs. 1 and 7 of the drawing, the pull tab is shown in the position it should be while the slider 15 is at rest, but when the slider is to be actuated such tab is raised about its pivot in order to facilitate gripping of the tab by the user. During the sliding movement of the slider 15, the rows of elements enter into the channel formed between the upper or outer plate 19 and the bottom plate 20 of the slider. As is more clearly shown in Fig. 2 of the drawing, the channel is Y-shaped in form and includes two angularly disposed arm portions 21 and 22 at the upper portion of the slider and a central leg portion 23 into which the arm portions 21 and 23 converge. Positioned in opposed relation to the travel of the elements 12 and 13 upwardly through the leg portion 23 of the channel and intermediate the converging channels 21 and 22 is a spacing member 24. It will be seen therefore that when the slider 15 is moved towards the unlocked portion of the fastener or to the top, the elements entering the arm portions 21 and 22 of the channel are fed into proper relation to be interlocked when they reach the leg portion 23 of the channel, while when the slider is moved in the opposite direction to unlock the slider, the elements passing from the leg portion 23 of the channel are disengaged by the member 24 as they enter into the channel portions 21 and 22.

At the upper ends of the stringers 10 and 11, and closely adjacent to the endmost fastener elements in the rows, are attached the top stop members which are indicated generally by the reference numerals 25, 25. Each stop member 25 is composed of a solid piece of suitable metal material, which prior to being bent and attached to a stringer is in the form illustrated in Figs. 3 and 4 of the drawing. In the unbent condition of each member 25, it has a flat bottom surface 26, as viewed in Figs. 3 and 4, and an upper surface which is wave-like in form to provide two transverse bead or ridge portions 27 and 28 which are separated by a transverse channel portion 29. The outer side edges of the bead portions 27 and 28 are preferably rounded, as is illustrated in Fig. 3 of the drawing. The transverse bead portions 27 and 28, as well as the transverse channel portion 29, are of maximum thickness at a point intermediate their ends (see Fig. 4) and from such point are gradually reduced in thickness towards their ends to points spaced approximately one-quarter the lengths of such portions from the ends thereof, the thickness of each of the portions from such points to their ends being substantially equal. In other words, each of the portions 27, 28 and 29, has two ends of equal thickness and a central part which gradually increases in thickness from such ends to the longitudinal center thereof, the upper surface of the central part of the channel portion 29, however, forming an arc of greater radius than corresponding surfaces of the bead portions 27 and 28 and the ends of such channel portion being shorter than the ends of the bead portions. When the member 25, therefore, is bent about the edge of the stringer along a line positioned on its bottom surface 26 and extending transversely thereto intermediate its ends, as viewed in Fig. 4 of the drawing, the integral legs of the portions 27, 28 and 29 thereof form two continuous clamping jaws which grip the beaded edge of the stringer in the manner illustrated in Fig. 5 of the drawing, such grip on the stringer being continuous and uninterrupted for the entire width of the member. By this construction, the member 25 is securely and permanently fixed on the stringer and can withstand relatively large stresses tending to separate it from the stringer. Furthermore, this construction presents a strong, rugged member which will resist successfully forces tending to distort it in the use of the fastener. When secured to the stringer, the bead portions 27 and 28 and the channel portion 29 of the member 25 present one wave-like surface which will be disposed in opposed relation to the interior surface of the bottom plate 20 of the slider 15 and a second wave-like surface which will be disposed in opposed relation to the interior surface of the top plate 19 of the slider, the bead portions of the bottom surface of the member 25 being adapted to engage with the bottom plate 20 of the slider when the top surface thereof is engaged by the cam member 30 of the slider, as is illustrated in Fig. 1 of the drawing.

The cam member 30 is integrally formed on the lower or pivoted end of the pull tab 16 in such manner that it is adapted to enter and to extend through an opening 31 provided in the top plate 19 of the slider when the pull tab 16 is in the position illustrated in Fig. 1 of the drawing. The cam member 30 is positioned at substantially right angles to the body of the pull tab 16 and has its attached end or root portion disposed in substantial alignment with the pivotal axis of the pull tab but extends outwardly from such pivotal axis at an angle greater than the angle between the body of the pull tab and a plane passed through such pivotal axis at right angles to the length of the tab, so that the outer end of the cam member 30 projects beyond the lower or pivoted end of the tab. The opening 31 through which the cam member is adapted to extend is disposed laterally from the central longitudinal line of the slider and extends lengthwise of the slider at one side of the lug, such opening being preferably just sufficiently long to provide no hindrance to the lug throughout its range of movement. The outer end of the cam member 30 which passes through the opening 31, has a width greater than the width of the

channel portion 29 of the member 25 so that when the pull tab 16 is pressed down to engage the cam member 30 with the top stop member 25 underlying the opening 31, such outer end will straddle the channel portion 29 of the member 25 and will engage with the inner and top surfaces of the beads 27 and 28 of the member 25, as is illustrated in Fig. 1 of the drawing, to bring the bead portions of the bottom surface of the member 25 into jamming relationship with the interior surface of the bottom plate 20 of the slider 15.

It will be apparent from the foregoing that after the slider 15 has been operated to the end of its path of movement in the locking direction so that the end or top stops 25 are positioned within the slider, as is illustrated in Fig. 2 of the drawing, one of the top stops 25 will be positioned beneath the opening 31 in the top plate 19 of the slider. When the pull tab 16 is then forced down by the operator to a substantially horizontal position, as is shown in Fig. 1 of the drawing, the cam member 30 thereon will enter the recess and come into engagement with the bead portions 27 and 28 of such top stop, thereby forcing such stop by a camming action against the interior surface of the bottom plate 20 of the slider and bringing the bead portions on the bottom surface of the member 25 into such jamming relationship with respect to the bottom plate as to effectively lock the slider on the fastener structure in its closed position. With the slider and top stop member 25 thus secured, there is no tendency whatever for either of such members becoming displaced. Due to the fact that the camming action takes place by a camming member which bridges the two bead portions of the stop member 25, there is not the necessity that the member 25 be initially brought into accurate position beneath the opening 31, as the cam member 30 in its camming action on the member 25, will shift the latter to the proper position as the pull tab 16 is depressed. The large camming surfaces of both the cam member 30 and the top stop member 35 and the ruggedness of their construction provide a construction which can be depended upon for wear throughout the life of the fastener. Due also to the fact that the cam member 30 is offset slightly from the pivotal axis of the pull tab 16, the locking interengagement of the member 30 and top stop member 25 will be maintained until the pull tab is positively moved from such position. The force exerted by the cam member 30 on the top stop member 25 will also secure the latter against displacement by forces tending to separate it from the stringer. From the viewpoint of appearance also, the member 25 possesses advantages over pricr end stops, because its wave-like form gives the impression that the member is smaller than it really is and is more in conformance to the design of the remainder of the fastener structure.

In the embodiment illustrated in Figs. 6 to 8 of the drawing, the top stop members 25', 25', differ from the above-described members 25, in that the beads 27' and 28' are separated by two channel portions 35, 35, the two beads 27' and 28' merging along the line of the bend to provide a relatively thick portion 36 (see Fig. 8) along the entire width of that portion of the member which projects beyond the end of the stringer. The cam member 30' differs also from the member 30 in that it is somewhat longer to take care of increased transverse movement of the member 30' within the slider as will hereinafter become more apparent. In this embodiment of the invention there is in addition provided beneath the opening in the top plate, an angularly disposed elongated recess or cavity 37 formed in the bottom plate of the slider between the adjacent side flange 38 of the bottom plate and the separating member 24' and of a size to accommodate one of the stop members 25', as is best shown in Fig. 6 of the drawing. Thus when the cam member 30' is forced down upon the stop member 25' which overlies the cavity 37, such stop member is pressed down into the cavity 37 and against the bottom surface thereof, as is illustrated in Fig. 7 of the drawing. The end walls of the cavity and particularly the vertical wall at the outer end of the cavity, therefore, cooperate with the jamming action of the cam member 30' to prevent any possibility of the top stop member 25' becoming displaced from its locked position relative to the slider. This embodiment of the invention is of particular advantage in those slide fasteners which are to be subjected to more severe strains during usage than the form previously described.

The top stop illustrated in Figs. 9 to 11 of the drawing, is similar to that illustrated in Figs. 6 to 8 of the drawing in the respect that the beads 40 and 41 are separated by two channel portions 42, 42 formed by providing a thickened portion or transverse bead 43 intermediate the ends of the beads 40 and 41, so that such beads form an H-shaped embossed outer surface in the unbent condition of the stop member, as is readily evident from Fig. 9 of the drawing. The under surface of this top stop differs from those previously described, in that it is provided with a central transverse rib 44 which is positioned directly beneath the transverse bead 43 and extends to the outer sides of the beads 40 and 41, as is indicated in Fig. 9 of the drawing. The sides 45 of the rib 44 are inclined toward the under surface of the stop member so that the rib 44 is substantially wedge-shaped and thicker at its root portion than at the free end thereof. Also projecting from the under surface of the stop member and arranged in substantial parallelism with the rib 44 are a pair of end shoulders 46 and 47 which, like the rib 44, extend to the outer sides of the beads 40 and 41. In securing this type of stop member to a stringer tape, it is bent about the rib 44 so that the outer end faces of the shoulders 46 and 47 are in opposed relation, as is illustrated in Fig. 11 of the drawing. The length of the shoulders 46 and 47 are preferably such that when the stop member is secured to the stringer tape with such shoulders gripping the tape inside the bead or strengthened edge 48 thereof the bent portions of the beads 40 and 41 are disposed in substantially parallel relation. The advantages of this construction of top stop are that the operation of folding the member is greatly facilitated and the fold can be made with great exactness to obtain two folded portions of equal area. Due to the shoulders 46 and 47, the two folded portions or sides of the stop member will be parallelly arranged, thereby making the locking action most effective and increasing the strength of the element against crushing pressures. The beaded edge of the tape will be fixed between the rib 44 and shoulders 46 and 47, thereby making it practically impossible to pull the stop from the fastener structure so long as the beaded edge of the tape does not fail. In this connection, it will be

observed also that the reinforced edge 48 of the stringer can be made of larger cross-sectional dimensions, thereby enabling the provision of a fastener structure having great strength and sturdiness. The stop member illustrated in Figs. 9 to 11 can, of course, be utilized with a slider such as is illustrated in Figs. 1 and 2 of the drawing or with a slider constructed in the manner illustrated in Figs. 6 and 7 of the drawing, as will be evident.

While I have hereinabove described and illustrated in the accompanying drawing preferred forms which my invention may assume in practice, it will be understood that other forms may be devised within the scope of the invention as defined in the appended claims.

I claim:

1. A slide fastener comprising a pair of stringers provided with interlocking fastener means along their opposed edges, a slider for controlling said fastener means, a stop member on one of said stringers for limiting the movement of said slider, said stop member having two spaced cam surface portions, and a member carried by said slider having a cam surface of such size as to bridge the space between said cam surface portions and adapted when engaged with such surface portions to lock said stop member in jamming relation against a portion of said slider.

2. A slide fastener comprising a pair of stringers provided with interlocking fastener means along their opposed edges, a slider for controlling said fastener means, a stop member on one of said stringers for limiting the movement of said slider, said stop member being constituted of a continuous piece of material extending around a side edge of a stringer and secured to the edge portions of such stringer along its entire width, one surface portion of said member being provided with a cam surface of uneven configuration, and a member carried by said slider having a cam surface of such size as to engage two raised portions of the cam surface on said stop member and adapted when engaged therewith to lock said stop member in jamming relation against a fixed portion of said slider.

3. A slide fastener such as is claimed in claim 2, in which the cam surface of said stop member and the surface portion thereof which engages the fixed portion of the slider are each configured to provide two spaced ridges extending transversely to the length of the stringer, the ridges of said cam surface interengaging with the cam member on the slider to lock the stop member in position and the ridges of the other surface portion interengaging with interior surface portions of the slider under the locking action of said cam surfaces.

4. A slide fastener such as claimed in claim 2, in which said stop member is provided with two legs having a thickness less than that of the portion of such member which projects beyond the edge of the stringer and a width equal to the width of said stop member, said legs being inclined towards one another and clamping the member on said stringer.

5. A slide fastener such as claimed in claim 2, in which said stop member is provided with two legs of substantially uniform thickness in a lengthwise direction and a central portion thicker than said leg portions, said central portion being of maximum thickness in the region thereof which is substantially in alignment with the material of the stringer and tapering in thickness towards the legs thereof, the legs of said member embracing the edge portions of the stringer and being clamped thereto.

6. A slide fastener such as claimed in claim 2, in which said slider includes a top plate and a bottom plate, said top plate having an opening extending therethrough laterally from the central longitudinal line of the slider, a member pivotally connected to said top plate, the said cam member of said slider being integrally formed on said pivoted member as to be movable through said opening into engagement with the stop member, and the bottom plate of said slider having an angularly disposed cavity positioned beneath the opening of said top plate and of a size to receive said stop member when the latter is laterally displaced by the engagement of the cam member on said pivoted member with the cam surface on said stop member.

7. A slide fastener comprising a pair of stringers provided with interlocking fastener means along their opposed edges, a slider for controlling said fastener means, a stop member on one of said stringers for limiting the movement of said slider, and means carried by the slider adapted to lock said stop member within the slider, said stop member including two plate-like portions disposed on either side of the edge of a stringer and securing the latter therebetween and an integral thickened portion projecting beyond the edge of the stringer, the exterior surface of that plate-like portion engageable by the locking means of the slider, having two raised portions extending transversely to the longitudinal length of the slider and being separated by a recess.

8. A slide fastener such as is defined in claim 7, in which said stop member includes a rib integral with said thickened portion and disposed intermediate said plate-like portions.

9. A slide fastener such as is defined in claim 7, in which said stop member includes a rib integral with said thickened portion and disposed intermediate said plate-like portions, and shoulders integral with the outer ends of said plate-like portions, said shoulders being substantially parallel to said rib and being disposed in opposed relation.

10. A slide fastener comprising a pair of stringers provided with interlocking fastener means along their opposed edges, a slider for controlling said fastener means, a stop member on one of said stringers for limiting the movement of said slider, and means carried by the slider adapted to lock said stop member within the slider, said stop member including two integral plate-like portions disposed on either side of the edge of a stringer, a central rib intermediate said plate-like portions and positioned beyond the edge of the stringer, the portion of the edge of the stringer enclosed by said stop member being fixed between the plate-like portions thereof and the central rib and the exterior surface of that plate-like portion engageable by the locking means of the slider, having spaced raised portions engageable by said locking means.

11. A slide fastener such as claimed in claim 10, in which said central rib is thicker at its root portion and has side surfaces inclining towards the face end thereof, and said plate-like portions have shoulders integrally formed with their outer ends, said shoulders being disposed in opposed relation and of a length as to maintain said plate-like portions in substantially parallel relation.

12. A slide fastener comprising a pair of

stringers provided with interlocking fastener means along their opposed edges, a slider for controlling said fastener means, a stop member on one of said stringers for limiting the movement of said slider, and means carried by the slider adapted to lock said stop member within the slider, said stop member comprising two integral plate-like portions enclosing an edge of a stringer, a central rib intermediate said plate-like portions and positioned beyond the edge of the stringer, rib-like extensions provided on the outer edges of said plate-like portions and extending in opposed relation to one another, the portion of the edge of the stringer enclosed by the stop member being fixed between the central rib and the rib-like extensions, the exterior surfaces of said plate-like portions having raised substantially H-shaped portions, the cross-bar of such H-shaped raised portions being positioned over the said central rib and the legs of such raised portions extending transversely to the longitudinal length of the slider.

SIGMUND WALDES.