

"SLIDE FASTENERS WITH BOTTOM STOPS"



The present invention relates generally to slide fasteners,
and more particularly to slide fasteners with bottom stops of
a type which comprises a plurality of separate members combinable
into a functionally integral body upon being threaded through
5 a slider.

A typical example of end stop of the type described is disclosed
in U.S. Patent No. 3, 104, 438. The disclosed device comprises
three members, one of which has its width slightly greater than
the distance between the diamond and the side flanges of the
10 slider. This widened member is forced into the slider between
the diamond and the side flanges thereof to join with the diamond
to restrict the downward movement of the slider. This prior
device has suffered two deficiencies. Firstly, due to forced
passage of the widened member through the slider, the widened
15 member, the diamond and/or the slide flange of the slider are
prone to become worn or otherwise damaged by frictional
engagement with each other to render the bottom stop inoperative.
Secondly, the constituent members of the bottom end stop once
united were liable to be displaced or disengaged under the
20 influence of severe stresses exerted laterally of the slide
fastener or perpendicularly to the slide fastener plane.
According to one aspect of the invention there is provided a
slide fastener comprising:



- (a) a pair of stringer tapes having a pair of first and second resilient beads mounted along the respective longitudinal marginal edges thereof;
- (b) a pair of rows of discrete interlocking fastener elements mounted on and along the respective marginal beads, each element comprising a base for the mounting, a coupling head extending therefrom towards the other bead;
- (c) a slider slidably mounted on and along the rows of fastener elements for opening and closing of the slide fastener, the slider having a slider body, a diamond provided centrally at a flared front end thereof and a pair of first and second flanges provided along both the sides, respectively, of the slider body to define with the diamond a Y-shaped channel; and
- (d) a bottom stop including a first member mounted on the first bead for engagement with the lowermost element mounted on the second bead, a second member mounted on the first bead a given distance below the first member, the second member being substantially of a C-shaped configuration and including a base for the mounting of the second member on the first bead, an upper and a lower protuberance protruding obliquely upwardly towards the second bead from the upper and lower ends, respectively, of the base, with a recess

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defined therebetween, a third member mounted on the
second bead and disposed in opposed relation with the
second member and one interelement distance below
the lowermost element, thus leaving intact the bead
5 portion of a length substantially corresponding to one
interelement distance, the third member being
substantially of an inverted F-shaped configuration
and including a support obliquely mounted on the
second bead, an upper end and the middle, respectively,
10 of the support, thus defining, between both the tongues
and lower cavities, respectively, the upper and lower
cavities and the lower tongue of the third member being
engageable with the upper and lower protuberances and
the recess, respectively, of the second member, whereby
15 the third member can be tilted relative to the slider
due to resiliency of the intact bead for smooth passage
between the diamond and the second flange into the
Y-shaped channel and, after assembly with the other
members, is ready for abutting engagement with the
20 diamond of the slider to prevent the slider from
running off the fastener element rows and hence to
prevent the bottom stop from being disassembled,
characterized in that the first member includes a
base and a coupling head substantially identical
25 in shape and size, with the base and the coupling
head, respectively, of each other fastener element
and further characterized in that the said first
member is provided with a niche at the lower

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part of the base, and in that the third member has formed at the apex of the support thereof a concavity for engagement with the coupling head of the first member, and in that the upper tongue of the third member is adapted for engagement with the said niche
5 provided on the first member.

It is believed possible by means of the invention to provide a slide fastener having a bottom end stop comprising separate members which will remain interlocked under forces tending to
10 displace these members from each other either perpendicularly to the slide fastener plane or laterally of the slide fastener.

It is believed possible by means of the invention to provide a slide fastener having a bottom stop comprising three normally separate members which can smoothly enter a slider whereupon
15 they can be held unitarily together to lock the slider.

It is believed possible by means of the invention to provide a slide fastener having a bottom end stop comprising three pieces of components which can readily engage each other to form a unified body serving to lock the slider in the well known manner.

20 It is believed possible by means of the invention to provide a slide fastener having a bottom end stop which will permit smooth reciprocation of the slider all the way between the opposite endmost fastener elements.

It is believed possible by means of the invention to provide

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a slide fastener having a bottom end stop which can be mounted to the stringer tape simultaneously and in the same stage of manufacture as the fastener elements are mounted.

5 It is believed possible by means of the invention to provide a slide fastener having a bottom end stop which is capable of passing through a slider subsequently mounting of the bottom stop upon stringers, thereby permitting sewing of the stringers onto an article without interference of sliders.

10 The invention will be described by way of examples with reference to the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof and wherein.

Figure 1 is a front elevational view of a slide-fastener incorporating a bottom stop according to the present invention;

15 Figure 2 is an enlarged front elevational view of the bottom stop shown in Figure 1;

Figure 3 is an enlarged perspective view of the bottom stop of Figure 2 as it is separated into constituent members;

20 Figures 4, 5, 6 and 7 are cross-sectional views taken along lines IV-IV, V-V, VI-VI and VII-VII, respectively of Figure 2;

Figures 8, 9, 10 and 11 are front elevational views showing sequential phases of bringing the bottom stop members into interlocking engagement with each other. Figure 12 is a view similar to Figure 2 showing a bottom stop according to another
25 embodiment of the invention; and Figure 13 is a cross-sectional view taken along line XIII-XIII of Figure 12.

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As illustrated in Fig. 1, a slide fastener 20 comprises a pair of stringer tapes 21, 21' having a pair of first and second beads 22, 22' attached to their respective inner longitudinal edges, and a pair of rows of interlocking fastener elements 23, 23' mounted on and along the beads 22, 22' respectively. A slider 24 is mounted on and slidable along the rows of fastener elements 23, 23' for taking the elements 23, 23' into and out of interdigitating engagement with each other to open and close the slide fastener 20. A pair of top stop members 25, 25' is mounted on the beads 22, 22' respectively, at the top of the rows of coupling elements 23, 23' to prevent the slider 24 from running of the element rows past the top stop members 25, 25'. Similarly, at the novel bottom of the element rows 23, 23', a bottom stop 26 is mounted to prevent the slider 24 from running off the element rows past the bottom stop 26, which is described further in detail hereinafter. The term "fastener stringer" used herein means a separate slide fastener half devoid of a slider.

As clearly shown in Figs. 2 and 3, each fastener element 23a comprises a base leg portion 27 anchored in place on the bead 22, 22', a coupling head 28 extending forwardly therefrom and a reduced neck portion 29 interposed between the base 27 and the coupling head 28. The base 27 and the coupling head 28 are substantially rectangular and elliptical, respectively, in shape as seen perpendicularly to the plane of the slide fastener 20. At the front part of the coupling head 28 there is a groove 30 extending in parallel relation to the beads 22, 22'. Integral with both



the shoulders or front edges of the base 27, a pair of coupling fins 31 extends forwardly therefrom for engagement with the grooves 30 of the two adjacent mating elements 23a carried on the opposed fastener tape, as shown in Fig. 2.

As shown in Figs. 8 to 11, the slider 24 comprises a slider body 32, a diamond or a wedge-shaped neck portion 33 disposed centrally at a flared front end thereof and a pair of first and second flanges 34, 34' disposed along both the sides, respectively, of the slider body 32 to define with the diamond 33 a Y-shaped channel 35 for passage of the bottom stop as well as the fastener element rows 23, 23'.

As shown in Figs. 2 and 3, the bottom stop 26 comprises a first member 36 mounted on the first bead 22 for engagement with the lowermost fastener element 23b mounted on the second bead 22', a second member 37 mounted on the first bead 22 and disposed a given distance below the first member 36, and a third member mounted on the second bead 22' and disposed substantially an interelement distance below the lowermost element 23b and in opposed relation to the second member 37. The term "an interelement distance" used here is defined as a distance between the lower extremity of each element and the upper extremity of the next lower element. The first member 36 comprises a base or leg portion 39, a neck portion 40, a coupling head 41 and an upper coupling fin 42a substantially identical in shape and size with the base 27, the neck portion 29, the coupling head 28 and the coupling

fins 31, respectively, of each coupling element 23a except that the lower part of the base 39 has a niche 43, that a lower fin 42b is slightly larger than the upper fin 42a and that a groove 30' terminates at the midpoint of the coupling head 41. The

5 second member 37 is substantially of a C-shaped configuration and comprises a base 44 anchored on the first bead 22, upper and lower protuberances 45, 46 protruding obliquely upwardly, as viewed in Fig. 2, towards the second bead 22' from the upper and the lower end, respectively, of the base 44, with a recess

10 47 defined therebetween. The lower protuberance 46 has an arcuate lower surface. The upper and lower protuberances 45, 46 of the second member 37 have at their free ends a pair of upper and lower grooves 48, 49 respectively, which extend parallel to the first bead 22. The third member 38 is substantially of an

15 inverted or reverted F-shaped configuration and comprises a support 50 mounted on the second bead 22' in oblique relation thereto, upper and lower tongues 51, 52 projecting obliquely downwardly from the upper end and the middle, respectively, of the support 50, defining between both the tongues 51, 52 and

20 between the lower tongue 52 and the support 50, a pair of arcuate upper and lower cavities 53, 54. The third member in the upper and lower cavities 53, 54 thereof has a pair of upper and lower tenons 55, 56. The upper tongue 51 of the third member

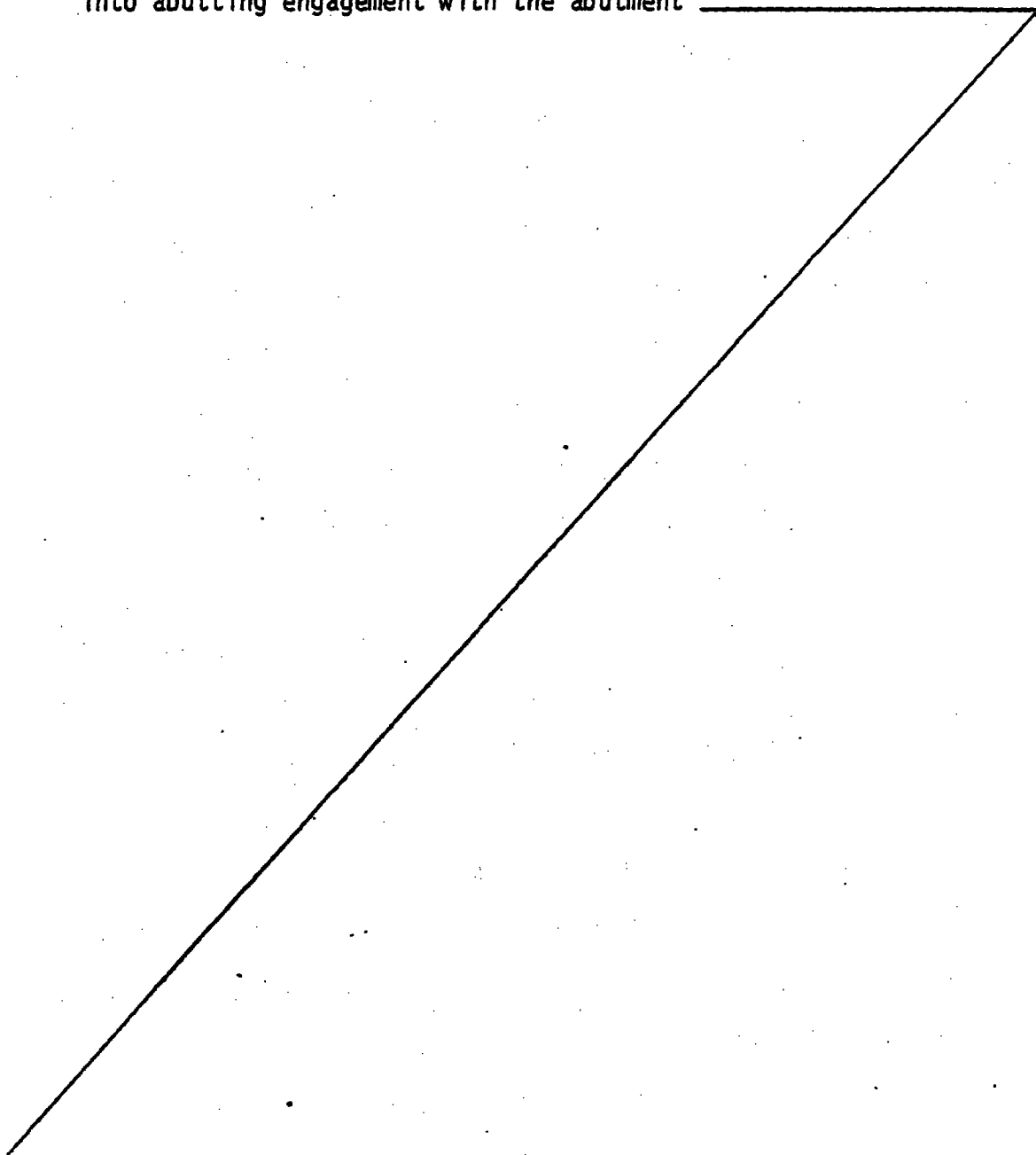
25 38 is bifurcated at its free end 59 and recessed at its upper surface to provide an abutment 57 for engagement with the diamond 33 of the slider 24. Behind the bifurcated end or on the apex of

the support 50 there is a concavity 58 for engagement with the lower part of the coupling head 41 of the first member 36. The third member 38 has an edge having a first planar portion parallel to the head, and that this portion, the third member 5 38 has a width exceeding the distance between the diamond 33 and the second flange 34'. The edge of the third member 38 has a second planar portion disposed at angle with respect to the bead and at this portion, the maximum width of the third member 38 is slightly less than the distance between the diamond 33 and 10 the second flange 34' of the slider 34.

The bottom stop members 36, 37, 38 are assembled together as follows: The fastener stringers 20a, 20b are inserted through the slider 24 from the flared upper end thereof as shown in Fig. 8. At this phase, the lower tongue 52 of the third member 15 38 partly engages the lower protuberance 46 of the second member 37 with the lower tenon 56 of the third member 38 partly engaged in the lower groove 49 of the second member 37. The third member 38, upon passage between the diamond 33 and the second flange 34' of the slider 24, is allowed to tilt 20 outwardly relative to the diamond 33 due to resiliency of that portion of the second bead 22' lying immediately above the third member 38. Since the maximum width of the third member 38 is slightly less than the distance between the diamond 33 and the second flange 34' of the slider 24, the third member 38 can 25 be smoothly inserted into the slider 24. A slight pull on the stringers 20a, 20b exerted in the direction indicated by an

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arrow P1 of Fig. 8 causes the second and third members 37, 38 to descend along the first and second inwardly curved flanges 34, 34', respectively, and to tilt inwardly towards each other within the slider 24. The upper tongues 51 of the third member 38 is thus moved immediately below the diamond 33 as shown in Fig. 9. When the slider is slightly pulled in the direction of an arrow P2, the lower tip of the diamond 33 is brought into abutting engagement with the abutment





engagement 57 of the third member 38, as shown in Fig. 10. This prevents further downward movement of the slider 24. At this phase, the downwardly slanting lower tongue 52 of the third member 38 firmly engages the upwardly slanting lower protuberance 46 of the second member 37, so that each of the fastener stringers 20a, 20b is prevented from detachment from the other stringer 20b, 20a and from separation from the slider 24 even under severe stresses applied thereto in the direction of an arrow S3 of Fig. 10. A further pull of the fastener stringers 20a, 20b in the direction on arrow P3 with respect to the slider brings the second and third members 37, 38 into substantially complete locking engagement with each other and at the same time brings the first and third members 36, 38 into partial engagement with each other, as shown in Fig. 11, whereupon the coupling head 41 of the first member 36 starts sliding along the concavity 58 of the third member 38 for interfitting engagement therewith. Partly because the first member 36 is substantially identical in shape and size with a fastener element 23a, and partly because both the engagements between the first and third members 36, 38, and between the first member 36 and the lowermost element 23b are substantially identical in manner with that between every two adjacent fastener elements 23a, unobstructed or smooth reciprocation of the slider 24 is assured all the way between the third member 38 of the bottom stop 26 and the top stop members 25, 25'. When the fastener stringers 20a, 20b are further pulled in the direction of an arrow P4, both the bottom stop members 36, 37, 38 and some adjacent fastener elements 23a, 23b are brought into coupling disposition, as shown in Fig. 2. In this coupling disposition,

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the upper and lower protuberances 45, 46 of the second member 27 engage the upper and lower tongues 51, 52, respectively, of the third member 38, and as better shown in Figs 5 and 6, the upper and lower tenons 55, 56 of the third members 38 engage in the upper and lower grooves 48, 49, respectively, of the second member 37. As shown in Figs. 2 and 7, the bifurcated end 59 of the upper tongue 51 of the third member 38 is disposed astride of the first bead 22 and of the lower coupling fin 42_b of the first member 36. Furthermore, as better shown in Figs 2 and 4, the coupling head 41 of the first member 36 engages at its upper part with the reduced neck portion 29 of the lower most fastener element 23_b and at its lower part with the concavity of the third member 38.

From the construction and the operation of the bottom stop 26 many advantages result. The bottom stop 26, when assembled, is prevented from being accidentally broken apart because of firm and stable interengagement between the upper and lower protuberances 45, 46 of the second member 27 and the upper and lower tongues 51, 52, respectively, of the third member 38, even under severe lateral forces tending to pull apart the stringers 20_a, 20_b from each other either in the direction indicated by an arrow S1 or in the direction indicated by an arrow S2 of Fig. 2. Unobstructed and smooth reciprocation of the slider 24 is ensured all the way between the third member 38 of the bottom stop 26 and the top stop members 25, 25'. That portion of the second bead 22' lying between the lowermost element

23b and the third member 38, substantially as short as one interelement distance, is resistant enough to severe stresses exerted perpendicularly to the slide fastener to prevent the bottom stop members 36, 37, 38 from accidental disassemblage. Since the upper and lower protuberances 45, 46 of the second member 37 extend obliquely upwardly towards the second bead 22', and the upper and lower tongues 51, 52 of the third member 38 extend obliquely downwardly towards the first bead 22, the upper and lower protuberances 45, 46 of the second member 37 and the upper and lower tongues 51, 52 of the third member 38 are engageable together smoothly without any clumsiness.

Figs. 12 and 13 show a modification of the present invention wherein the first member 36 has a slot of 60 formed in the lower part of the coupling head 41 thereof as to extend in the slide fastener plane, and the third member has a crest 61 provided in the concavity 58 so as to extend also in the slide fastener plane for engagement in the slot 60.

Terms such as "upper", "lower", "front", "top", "bottom"; and the like are used as terms of reference and not limitation. Thus with the fastener incorporated vertically into the front of a garment, the bottom stop structure would be lower most.



Claims:-

1. A slide fastener comprising:
 - (a) a pair of stringer tapes having a pair of first and second resilient beads mounted along the respective longitudinal marginal edges thereof;
 - 5 (b) a pair of rows of discrete interlocking fastener elements mounted on and along the respective marginal beads, each element comprising a base for the mounting, a coupling head extending therefrom towards the other bead;
 - 10 (c) a slider slidably mounted on and along the rows of fastener elements for opening and closing of the slide fastener, the slider having a slider body, a diamond provided centrally at a flared front end thereof and a pair of first and second flanges provided along both
15 the sides, respectively, of the slider body to define with the diamond a Y-shaped channel; and
 - (d) a bottom stop including a first member mounted on the first bead for engagement with the lowermost
20 element mounted on the second bead, a second member mounted on the first bead a given distance below the first member, the second member being substantially of a C-shaped configuration and including a base for the mounting of the second member on the first bead, an upper and a lower protuberance protruding obliquely



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upwardly towards the second bead from the upper and lower ends, respectively, of the base, with a recess defined therebetween, a third member mounted on the second bead and disposed in opposed relation with the second member and one interelement distance below the lowermost element, thus leaving intact the bead portion of a length substantially corresponding to one interelement distance, the third member being substantially of an inverted F-shaped configuration and including a support obliquely mounted on the second bead, an upper end and the middle, respectively, of the support, thus defining, between both the tongues and lower cavities, respectively, the upper and lower cavities and the lower tongue of the third member being engageable with the upper and lower protuberances and the recess, respectively, of the second member, whereby the third member can be tilted relative to the slider due to resiliency of the intact bead for smooth passage between the diamond and the second flange into the Y-shaped channel and, after assembly with the other members, is ready for abutting engagement with the diamond of the slider to prevent the slider from running off the fastener element rows and hence to prevent the bottom stop from being disassembled, characterized in that the first member includes a base and a coupling head substantially identical in shape and size, with the base and the coupling head,



respectively, of each other fastener element and further characterized in that the said first member is provided with a niche at the lower part of the base, and in that the third member has formed at the apex of the support thereof a concavity for engagement with the coupling head of the first member, and in that the upper tongue of the third member is adapted for engagement with the said niche provided on the first member.

2. A slide fastener as claimed in claim 1, wherein the upper tongue of the third member is bifurcated at its free end, the first member having a coupling fin extending downwardly from the niche, the bifurcated end of the upper tongue being disposed astride of the first bead and of the coupling fin of the first member.

3. A slide fastener as claimed in claim 1, wherein the upper and lower protuberances of the second member are provided at their free ends with upper and lower grooves, respectively, which extend parallel to the first bead, the third member being provided in the upper and lower cavities thereof with upper lower tenons, respectively, for engagement in the upper and lower grooves of the second member, respectively.

4. A slide fastener as claimed in claim 1, wherein the third



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member is provided in the concave with a crest extending in the slide fastener plane, the first member being provided at the lower part of the coupling head thereof with a slot extending in the slide fastener plane for slidably receiving the crest

5 of the third member.

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