This invention relates to slide fasteners and, in particular, to the provision of new and improved end stops therefor.

It is an object of this invention to provide new and improved slide fastener end stops which are manually applicable to the stringer tapes of slide fasteners whereby to avoid the necessity for special end stop attaching presses or other tools and devices.

It is a further object of this invention to provide such end stops which are formed of resilient sheet material pre-stressed in such manner that they will automatically clamp themselves to the stringers of slide fasteners when properly located manually thereon.

It is a further object of this invention to provide such end stops embodying stringer tape penetrating bars preventing sliding of the end stops on the stringer tapes when applied and attached thereto.

It is a further object of this invention to provide such end stops each comprising similar opposed connected clamping wings provided with means adapted to maintain the aforesaid wings predeterminedly spread before attachment and adapted, after attachment, to lock the aforesaid wings together positively, in fixed tape clamping relationship.

These and other objects and advantages of the invention will hereinafter appear from the following description, taken with the accompanying drawings, and will be pointed out in the appended claims.

In the drawing:
Fig. 1 is a fragmentary front view of a slide fastener equipped with a manually applicable bottom end stop, formed and applied according to this invention;
Fig. 2 is a transverse section taken substantially on the plane indicated by the line 2—2 in Fig. 1;
Fig. 3 is a longitudinal section taken substantially on the plane indicated by the line 3—3 in Fig. 1, but with the righthand stringer omitted in the interest of clear disclosure;
Fig. 4 is a plan view of a flat blank for forming the end stop shown in Figs. 1, 2 and 3;
Fig. 5 is a plan view of the blank of Fig. 4, but with the side flanges bent or struck up, and with the tape engaging bars struck out of the wing portions of the blank;
Fig. 6 is a view, in side elevation, of the blank of Fig. 5 as bent along transverse axes at the junction of the neck or tongue and the wings of the end stop;
Fig. 7 is a view similar to Fig. 6, but illustrating the bending of the end strap or wing retainer member to impart the proper stress thereto;
Fig. 8 is a view similar to Figs. 6 and 7, but illustrating the position of the parts of the end stop prior to attachment to the fastener stringers, and showing in elevation the end fragment of an attaching tool particularly adapted for use in facilitating attachment of the end stop;
Fig. 9 is an enlarged view, similar to Fig. 8, but showing a subsequent position of the parts of the end stop during attachment, and showing the end stop attaching tool of Fig. 8, in dash lines, in its cooperative relation with the end stop;
Fig. 10 is a view similar to Fig. 9, showing the end stop attached to the fastener stringers as in Figs. 1, 2 and 3;
Fig. 11 is a view similar to Fig. 9, but showing the method of attaching a modified form of end stop, according to this invention;
Fig. 12 is a view similar to Fig. 10 but showing the end stop of Fig. 11 in its attached position;
Fig. 13 is a view similar to Figs. 10 and 12 but illustrating the striking out of the retaining bars from the wings of the end stop subsequent to its attachment to the fastener stringers;
Fig. 14 is a view similar to Fig. 5, but showing a modified end stop forming blank with two end straps or wing retainers, the blank being shown with the wing side flanges struck up and the retaining bars struck out from the wing portions;
Fig. 15 is a view similar to Fig. 6 of the end stop forming blank shown in Fig. 14;
Fig. 16 is a view similar to Fig. 7 of the end stop forming blank shown in Figs. 14 and 15;
Fig. 17 is an enlarged view similar to Fig. 9, but illustrating the position of the parts of an end stop formed according to Figs. 14, 15 and 16 during attachment and before it is locked to the stringer tapes of a slide fastener; and
Fig. 18 is a view similar to Fig. 17 but showing the position of the parts of the end stop of Figs. 14 to 17 when locked to the stringer tapes of a slide fastener.

The slide fastener, of which a fragment is shown in Fig. 1, comprises a righthand stringer 21 and a lefthand stringer 22 each of which stringers comprises a flexible textile or other tape 23 provided at its inner edge, in conventional manner, with an edge reinforcement 24. A row of predeterminedly equally spaced scoops or interlocking members 25 is secured to each tape edge reinforcement 24. These scoops are progressively engaged and disengaged, in conventional manner, by a slider (not shown). This slider is supported on these rows of scoops for movement therein upwardly and downwardly for this purpose. This structure, as shown, is conventional.

Below the lowermost scoop 25, the stringers 21 and 22 are connected by one preferred form of bottom end stop formed and applied according to this invention and generally designated 26 in Fig. 1. The details of this end stop 26, the blank from which it is formed, and the method of form-
ing and attaching it to the stringer tapes are illustrated in Figs. 1 to 10, inclusive.

The end stop 26 comprises a front wing 27 with inturned side flanges 28 which confine the edge reinforcements at one side of the stringer tapes 23 (Fig. 2) and a similar obverse rear wing 29 with similar side flanges 30 confining the edge reinforcements at the other side of these, the front wing portion being connected by an integral neck 31 extending from the lower edge of the rear wing 29 to the upper edge of the front wing 27. A locking strap or retainer member 32 extends forwardly from the upper edge of the rear wing 29 and terminates in a flange 33 adapted to engage the upper edge portion of the front wing 27 to lock the wings 27 and 29 clamping to the stringers 21 and 22 (see Figs. 3, 2 and 10). Preferably, each of the wings 27 and 29 is provided with a pair of laterally spaced downwardly and inwardly directed bars 34 struck out therefrom and adapted to penetrate the tape edge reinforcements 24, as shown in Figs. 1, 3 and 10. If desired, however, the bars 34 may be omitted from one wing, as shown in Figs. 11 and 12. It is preferred that these bars 34 be struck out in the wings “in the flat” as indicated by the blanks shown in Figs. 4 and 5, in order that the application of the end stop 26 to the stringers 21 and 22 be entirely manual; however, as shown in Fig. 13, the bars 34 may be struck out of one or both of the wings by suitably laterally spaced punchings 35 a fixed portion of the end stop 26 to the stringers 21 and 22.

A modified form of end stop is illustrated in Figs. 14 to 18 and is therein generally designated 26a. This end stop is similar to that form illustrated in Figs. 1 to 13, inclusive, save that it is provided with a second locking strap or retainer member 32a similar to the above described member 32 and terminating in a flange 33a similar to the above described flange 33. This member 32a extends rearwardly from the lower edge of the front wing 27 and its flange 33a engages the lower edge portion of the rear wing 29 as shown in Fig. 18. In this modified form, the rigidity of the attached and locked end stop 26a is somewhat enhanced over the form shown in Figs. 1 to 13, inclusive, by the additional connection provided between the wings 27 and 29 by the strap connector member 32a.

In order to facilitate attachment of the form of end stop shown in Figs. 1 to 13, inclusive, I have provided a tool 36 of which a fragmentary showing is made in Figs. 8 and 9. This tool comprises an elongated bar preferably of width equal to, or less than, the width of the neck 31 and the member 32. A slot 37 terminates at its outer upper corner in a depending projection 38 adapted to engage the outer surface of the front wing 27. This slot 37 also defines the upper inclined edge of the triangular projection 38 which engages and spreads the wing 27 and the tongue 31 upon exertion of thrust upwardly of stringers 21 and 22 to provide the necessary wing clearance for relatively free movement of the end stop 26 upwardly with respect to the fastener, as shown in Figs. 14 to 18.

In forming the end stop of Figs. 1 to 10, a blank as shown in Fig. 4 is stamped or cut out from a flat sheet of resilient sheet material such as steel or other suitable metal. This blank comprises the front wing portion 27 and similar rear wing portion 29 connected by the integral neck portion 31. The strap or retainer portion 32 extends outwardly from the free edge of one of the wing members in substantial alignment with the neck portion 31.

The side portions are wider than the wings of the finished end stop by an amount equaling the width of the side flanges 28 and 30 and the strap or retainer member 32 is longer than the strap or retainer of the end stop by an amount equaling the width of the side flange 33.

As shown in Fig. 5, in the next step the side flanges 28 are bent or struck downwardly, and the side flanges 30 and retainer flange 33 are bent or struck upwardly. The bars 34 may, optionally, be simultaneously struck out, downwardly from the wing portion 27, and upwardly from the wing portion 29. Of course, in the form illustrated in Figs. 11 and 12, the bars 34 are omitted from one wing portion.

Likewise, as illustrated in Fig. 13, the striking out of the bars 34 may be entirely omitted from the above described end stop and defender until after the end stop is attached to the slide fastener stringers.

After the blank has been bent “in the flat” as shown in Fig. 5, or as described above, it is bent along the junction of the neck 31 and the wings 27 and 29 “in the flat” as indicated by the blanks shown in Figs. 6 and 7. In this state, the wings are disposed closer than in their final position when the end stop is attached to the stringers (Figs. 1, 2 and 3) whereby, when they are in their final position, they clampingly engage the stringer tapes with a more positive grip after attachment.

In order to facilitate manual positioning of the end stop upon the stringer tapes, the wings must be more widely spread than in Fig. 6. For this purpose I utilize the strap member 32 as a “prop” or spreader.

In order to pre-stress the member 32 for this purpose and also to insure that it shall remain snugly in position as shown in Figs. 3 and 10, the wing members 27 and 29 are temporarily forced apart to facilitate bending of the strap member 32 toward the lower end of the member 29 to an acute angle as shown in Fig. 7.

When the wing members 27 and 29 are thereafter released the parts take substantially the position of Fig. 8 wherein the upper ends of the wing members are spread apart a distance greater than the tape thickness. The end stop may then manually and threadedly forced upwardly on the tapes since the bars 34 extend downwardly and will not “dig” into the edge reinforcements as they move upwardly over them.

When the end stop 26 in the form of Fig. 9 has been moved upwardly until it engages the lowermost scoop 25 it may be moved or forced downwardly of the tapes sufficiently to “set” it on the tapes by reason of the penetration of the edge reinforcements by the bars 34 which, thereafter, effectively prevent relative movement between the end stop and the supporting tapes.

As shown in Fig. 11, the omission of bars from the front wing 27 facilitates manual attachment although the security of attachment is dependent entirely upon the bars 34 of the rear wing 29.

As shown in Fig. 12, and as pointed out above, the bars 34 may be omitted from both wings 27 and 29 before attachment for utmost facility of manual attachment. In such case the bars are struck out by opposed dies 35 after attachment of the end stop 26 to the stringer tapes.

As an alternative, as shown in Figs. 14 to 18, the end stop may be provided with straps or retainers, 32 and 32a, at both ends. Such provision facilitates manual threaded attachment as shown.
In Fig. 17 since the two "props" provided by the members 32 and 32a maintain the wings 27 and 29 parallel and spaced wide apart to permit this manual placement without interference from the bars 34.

The end stop of this embodiment is formed from a flat blank similar to that of Fig. 4 but provided with strap portions at both ends, the respective flanges being bent up and down as shown in Fig. 14 before the blank is bent as in Fig. 15, the wings spread as in Fig. 6 and the straps or retainers 32 and 32b bent as therein shown. Upon release of the spreading force the parts take the position shown in Fig. 17.

In either case, when the end stop is manually positioned on the tape as shown in Figs. 9 and 17 wherein the retainer member 32, or retainer members 32 and 32a, "prop" or spread the wings 27 and 28 apart, application of squeezing pressure to force the wings 27 and 29 together, manually or otherwise, will cause the retainer flanges 33, or 33 and 33a, to ride upon the engaged surface of the neck 31 as upon a track, until they pass over the bend or bends at the junction or junctions of the neck 31 with the adjacent wings or wings whereupon the flange 33 will snap over into the position of Figs. 10 and 18 effectively to lock the wings together in predetermined clamping spaced relation.

It is, of course, to be understood that the above description is merely illustrative and in nowise limiting and that I desire to comprehend within my invention such modifications as is included within the scope of the appended claims.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent is:

1. In a manually applicable end stop for slide fasteners of the class described, a pair of wings engaging opposite sides of the stringer tapes of a slide fastener when attached thereto for clamping said stringer tapes theretwixt, and an integral neck extending between the upper edge portion of one of said wings and the lower edge portion of the other wing, said wings and said neck being formed of resilient sheet material and being so pre-stressed as to secure substantial tape clamping pressure between said wings, and means for retaining said wings in fixed tape clamping position after attachment comprising an integral strap member extending from an edge of each of said wings and each terminating in a retaining flange, each of said strap members after attachment extending between said wings with each of said retaining flanges engaging the outer surface of the other wing, and said strap members being so pre-stressed as to spread both ends of said wings before attachment for facilitating manual attachment of said end stops to slide fastener stringer tapes.

2. In a manually applicable end stop for slide fasteners of the class described, a pair of wings engaging opposite sides of the stringer tapes of a slide fastener when attached thereto for clamping said stringer tapes theretwixt, and an integral neck extending between the upper edge portion of one of said wings and the lower edge portion of the other wing, said wings and said neck being formed of resilient sheet material and being so pre-stressed as to secure substantial tape clamping pressure between said wings, and means for retaining said wings in fixed tape clamping position after attachment, comprising an integral strap member extending from an edge of each of said wings and each terminating in a retaining flange, each of said strap members after attachment extending between said wings with each of said retaining flanges engaging the outer surface of the other wing, and said strap members being so pre-stressed as to spread both ends of said wings before attachment for facilitating manual attachment of said end stops to slide fastener stringer tapes.

3. In a manually applicable end stop for slide fasteners of the class described, a pair of wings engaging opposite sides of the stringer tapes of a slide fastener when attached thereto for clamping said stringer tapes theretwixt, and an integral neck extending between the upper edge portion of one of said wings and the lower edge portion of the other wing, said wings and said neck being formed of resilient sheet material and being so pre-stressed as to secure substantial tape clamping pressure between said wings, and means for retaining said wings in fixed tape clamping engagement, comprising a strap member integral with one of said wings and terminating in a retaining flange, said strap member extending between said wings with said retaining flange firmly engaging the outer surface of the other wing to lock said wings together after attachment, said strap member being so pre-stressed as to spread the adjacent ends of said wings before attachment for facilitating manual attachment.

4. In a manually applicable end stop for slide fasteners of the class described, a pair of wings engaging opposite sides of the stringer tapes of a slide fastener when attached thereto for clamping said stringer tapes theretwixt, and an integral neck extending between the upper edge portion of one of said wings and the lower edge portion of the other wing, said wings and said neck being formed of resilient sheet material and being so pre-stressed as to secure substantial tape clamping pressure between said wings, and means for retaining said wings in fixed tape clamping position after attachment comprising an integral strap member extending from an edge of each of said wings and each terminating in a retaining flange, each of said strap members after attachment extending between said wings with each of said retaining flanges engaging the outer surface of the other wing, and said strap members being so pre-stressed that the flanges thereof engage said neck and spread both ends of said wings before attachment for facilitating manual attachment of said end stops to slide fastener stringer tapes, said flanges riding over said neck during attachment into engagement with an outer end surface of a wing for locking said wings together in tape clamping position.

5. In a manually applicable end stop for slide fasteners of the class described, a pair of wings engaging opposite sides of the stringer tapes of a slide fastener when attached thereto, an integral neck extending between the upper edge portion of one of said wings and the lower edge portion of the other wing, said wings and said neck being formed of resilient sheet material and being so pre-stressed as to secure substantial tape clamping pressure between said wings when said stop is attached to said tapes, and integral locking means functioning to spread said wings identically to facilitate manual placement on said tapes before attachment and to lock said wings positively together in tape clamping relation after attachment.

6. The structure defined in claim 5, wherein said last named means comprises a pre-stressed strap member extending from one wing and terminating in a retaining flange engaging said neck
before attachment to prop said wings apart, riding on said neck during attachment, and engaging the outer surface of the other wing after attachment.

7. The structure defined in claim 5, wherein said last named means comprises a strap member extending from each wing adapted for engagement with the other wing fixedly to secure said wings in predetermined spaced relation at each end.

8. A manually applicable end stop for slide fasteners including complementary edge reinforced stringer tapes, said end stop comprising a pair of opposed wing members each engaging one of the opposite sides of said stringer tapes when attached thereto and having tape edge reinforcement confining side flanges, an integral neck connecting said wings and extending between the upper edge portion of one of said wing members and the lower edge portion of the other, said wing members and said neck being formed of resilient sheet material and being pre-stressed for clampingly engaging slide fastener stringer tapes between said wing members when said stop is attached thereto, and means comprising inwardly projecting tape penetrating bars for preventing sliding movement of said end stop with respect to said stringer tapes in at least one direction when attached thereto.

9. A manually applicable end stop for slide fasteners including complementary stringer tapes with edge reinforcements, said end stop comprising a pair of opposed wing members each having tape edge reinforcement confining side flanges, an integral neck connecting said wings and extending between the upper edge portion of one of said wing members and the lower edge portion of the other wing member, said wing members and said neck being formed of resilient sheet material and being pre-stressed for clampingly engaging slide fastener stringer tapes, anchoring means comprising inwardly projecting tape edge reinforcement penetrating bars for preventing sliding movement of said end stop with respect to said stringer tapes when attached thereto, and locking means including an integral strap member extending from one of said wing members and pre-stressed in such manner as to maintain said wing members spread apart beyond a predetermined distance before attachment to slide fastener stringer tapes and to clampingly lock said wing members positively together in tape clamping position when said end stop is attached to slide fastener stringer tapes.

10. The structure defined in claim 9, wherein said anchoring means comprises bars extending inwardly from each wing member into the space therebetween and directed toward the end of said end stop opposite the scoops of the slide fastener.

11. The structure defined in claim 9, wherein said anchoring means comprises bars extending inwardly from each wing member into the space therebetween in a direction away from the scoops on said stringer tapes and wherein said locking means comprises a strap member extending from each of said wing members wherein both ends of said wing members are locked in predetermined spaced relation.

12. In combination with the structure defined in claim 5, a slide fastener comprising a pair of complementary stringer tapes having edge reinforcements at their adjacent edges with rows of complementary engageable scoops on said edge reinforcements, the ends of said rows of scoops being spaced from the ends of said stringer tapes, the free portions of said stringer tapes beyond the ends of said rows of scoops extending between said wings and being clampingly engaged thereby and said neck and said locking means extending between the adjacent reinforced stringer tape edges.

13. In a method of manually attaching to the edge reinforced stringer tapes of a slide fastener an end stop of the class described comprising opposed wing members formed of resilient sheet material with tape edge reinforcement confining side flanges, said wings being connected with an integral neck and having an end strip tending from one wing toward the other wing and terminating in a retaining flange, pre-stressing the structure comprising wings and connecting neck to such degree as to secure tape clamping force therebetween when said end stop is attached, spreading said wings and pre-stressing said end strip to such degree that its retaining flange will engage said neck and prop one end of said wings apart sufficient for ready passage of said stringer tapes therebetween, manually placing said end stop substantially in position on said stringer tapes, applying squeezing force to said wings to cause the retaining flange on the end strip to slide outwardly along the neck and snap over onto the outer end surface of the opposite wing whereby fixedly to secure said wings together in stringer tape clamping relation, and thereafter striking out tape penetrating bars from at least one of said wings for preventing endwise movement of said end stop.

14. In a method of manually attaching to the edge reinforced stringer tapes of a slide fastener an end stop of the class described comprising opposed wing members formed of resilient sheet material with tape edge reinforcement confining side flanges, said wings being connected with an integral neck and having an end strip extending from each wing toward the other wing and terminating in a retaining flange, pre-stressing the structure comprising wings and connecting neck to such degree as to secure tape clamping force therebetween when said end stop is attached, spreading said wings and pre-stressing said end strips to such degree that they engage said neck and prop both ends of said wings apart sufficient for ready passage of said stringer tapes therebetween, placing said end stop substantially in position on said stringer tapes, applying squeezing force to said wings to cause the retaining flanges on the end strips to slide outwardly along the neck and snap over onto the outer end surface of the opposite wings whereby fixedly to lock said wings together in stringer tape clamping relation, and thereafter striking out tape penetrating bars from at least one of said wings for preventing endwise movement of said end stop.

ALFRED E. CARLILE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,084,429</td>
<td>Harner</td>
<td>Jan. 13, 1914</td>
</tr>
<tr>
<td>1,784,256</td>
<td>Stout</td>
<td>Dec. 9, 1930</td>
</tr>
<tr>
<td>1,805,353</td>
<td>Legal</td>
<td>Nov. 29, 1932</td>
</tr>
<tr>
<td>1,964,485</td>
<td>Searles</td>
<td>Dec. 19, 1934</td>
</tr>
<tr>
<td>2,053,822</td>
<td>Balfude</td>
<td>May 5, 1936</td>
</tr>
<tr>
<td>2,191,290</td>
<td>Kiessling</td>
<td>Feb. 20, 1940</td>
</tr>
<tr>
<td>2,512,045</td>
<td>Morin</td>
<td>Feb. 23, 1943</td>
</tr>
</tbody>
</table>