

March 19, 1946.

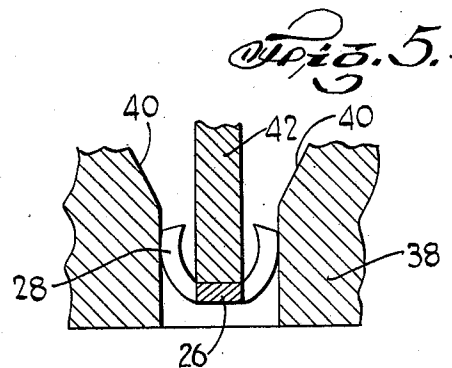
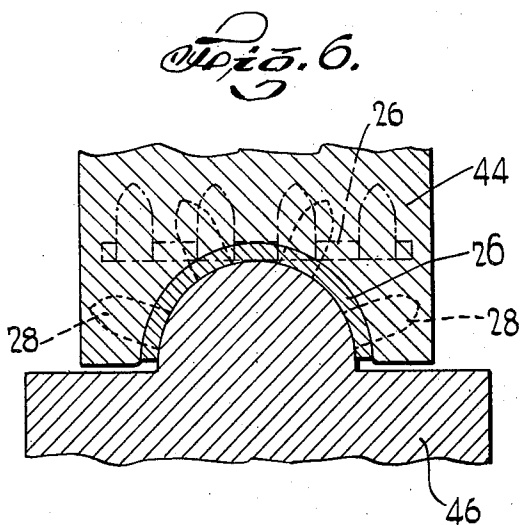
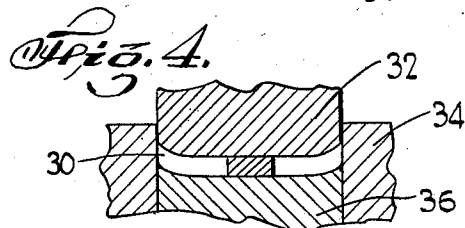
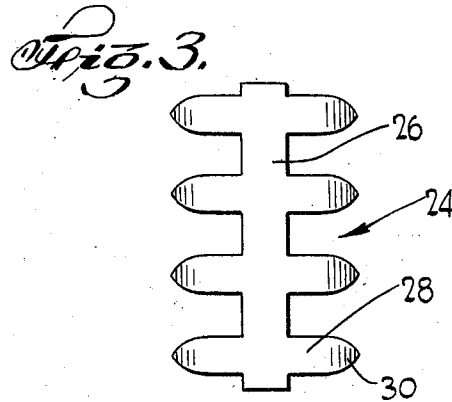
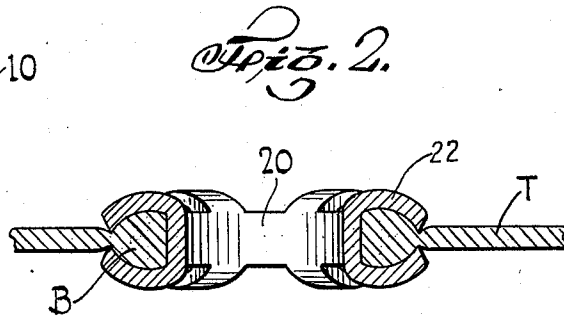
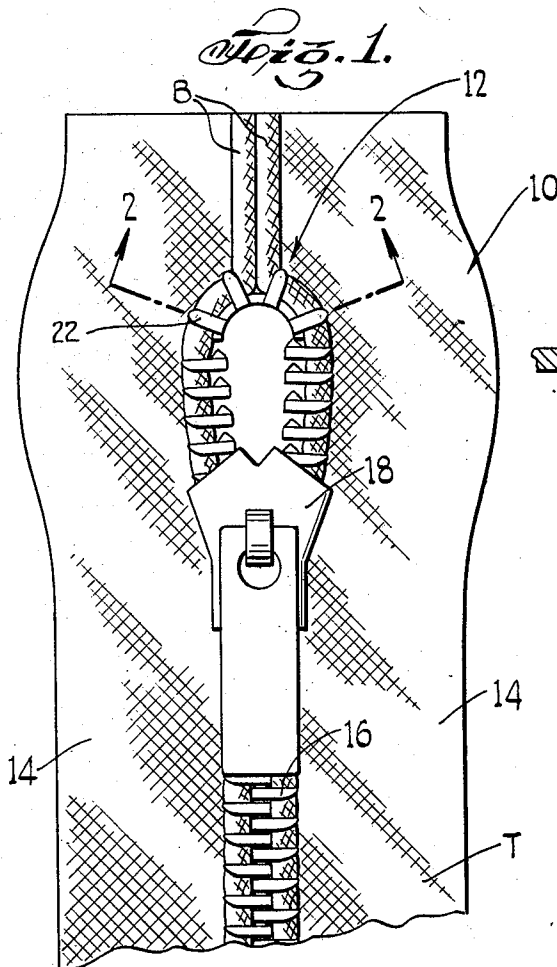
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2,397,037

BRIDGE STOPS FOR SLIDE FASTENERS AND APPARATUS FOR MAKING THE SAME

Filed June 24, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

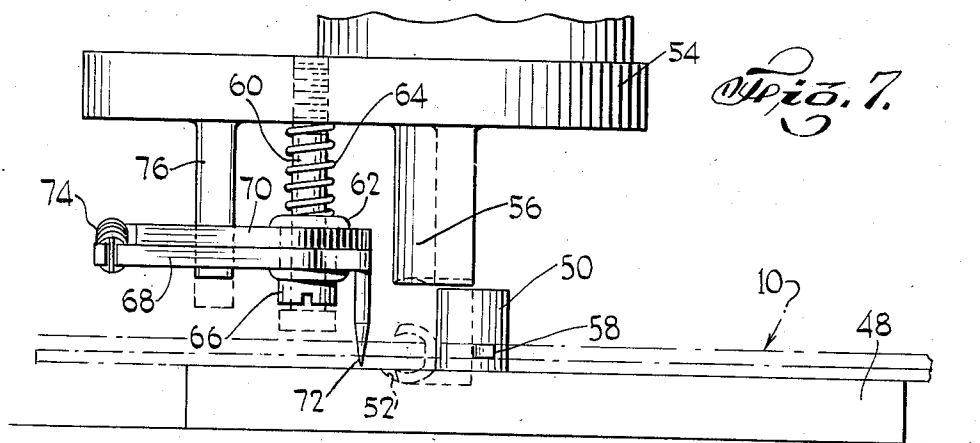


Fig. 7.

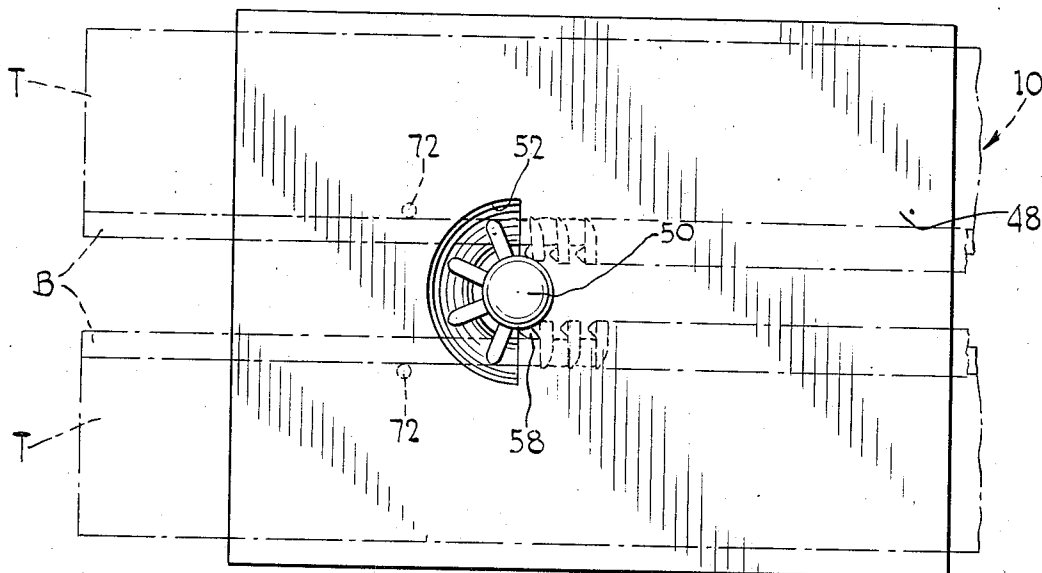


Fig. 8.

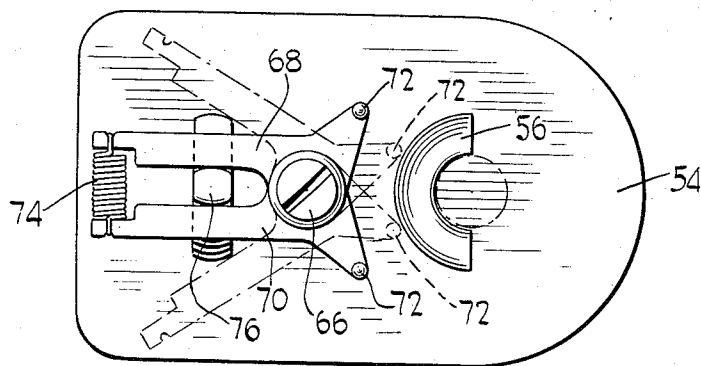


Fig. 9.

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2,397,037

BRIDGE STOP FOR SLIDE FASTENERS AND
APPARATUS FOR MAKING THE SAME

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8 Claims. (Cl. 24—205)

This invention relates to bridge stops for slide fasteners and to an apparatus for making the same. More particularly the invention is concerned with bridge stops of the type which maintain the beads of slide fastener tapes in spaced relationship on one side thereof and in abutting relationship on the other side.

Heretofore stops of this character have been so constructed that they severely mutilated and weakened the slide fastener tapes and tape beads, were prone to become loose, and required expensive and complicated apparatus and methods to form and attach the stops. It is generally an object of my invention to provide a bridge stop of such improved construction that the foregoing drawbacks and difficulties are obviated.

Another object of my invention is to provide a bridge stop in which the means for guiding the tape beads from spaced into abutting relationship is continuous while the means for holding the tape beads against the guiding means is serial and discontinuous. In this manner I am able to so hold the tape beads that they will not be mutilated and am able to form and attach the bridge stops in a simple fashion.

A further object of my invention is to provide an apparatus and method of the character described which comprises relatively few and simple parts and steps.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the claims.

In the accompanying drawings, in which is shown one of the various possible embodiments of this invention and wherein like numbers refer to like parts throughout,

Fig. 1 is a fragmentary front view of a slide fastener whose upper end is closed by a bridge stop embodying my invention;

Fig. 2 is an enlarged sectional view thereof taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a top plan view of a blank employed in the fabrication of my novel bridge stop;

Fig. 4 is a sectional view through dies employed to form blanks such as shown in Fig. 3;

Fig. 5 is a sectional view through dies employed to bend up the gripping tines of a bridge stop;

Fig. 6 is a sectional view through dies employed to impart a semi-circular shape to the body of a bridge stop;

Fig. 7 is an elevational view of dies employed to attach a bridge stop to a slide fastener;

Fig. 8 is a top plan view of the lower die shown in Fig. 7; and

Fig. 9 is a bottom plan view of the upper die shown in Fig. 7.

Referring now to the drawings and more particularly to Fig. 1 and Fig. 2, 10 denotes a slide fastener on which is attached a bridge stop 12 embodying my invention. Said slide fastener is of conventional design and includes a pair of stringers 14, each consisting of an elongated fabric tape T having a bead B formed along a longitudinal edge. Individual slide fastener elements 16 are secured to the tapes T with their legs embracing the beads B and a slider 18 cams the heads of said elements into attached or detached relationship. At the lower end of the slide fastener, facing the single exit channel of the slider 18, a conventional bottom stop (not shown) is disposed. My novel bridge stop 12 is located at the other end of the slide fastener where it faces the slider's diverging exit channels.

In accordance with the invention said bridge stop 12 comprises an elongated body 20 of rectangular cross-section (Fig. 2) and semi-circular profile (Fig. 1). Extending away from the body 20 are a plurality of gripping tines 22. Said tines are arranged in transversely registered pairs at regular intervals along the semi-circular body 20, the tines in each pair being disposed on opposite sides of the longitudinal edges of said body. The number of pairs of tines employed is governed by the dimensions of the tape T, bead B, and elements 16. However, at least four pairs of tines should be used, with two pairs on one half of the body 20, where they grip the bead B of one of the tapes T, and the other two pairs on the other half of the body. If more tines are employed I prefer that the number of pairs be even. The two center pairs of gripping tines should be spaced sufficiently far apart to permit the portions of the tape beads B lying therebetween to bend from the arcuate contour of the body 20 into an abutting straight line profile.

It will be appreciated that by employing a series of disconnected or discontinuous gripping means, such as described, in conjunction with a continuous guiding body portion 20, which serves as guide means for the tape beads, I am able to so position the gripping means that they will not cut into, mutilate or weaken the tape beads.

The bridge stop is formed and attached in the following manner:

First I stamp out of sheet metal a blank 24 (Fig. 3) comprising a flat rectangular portion 26 having a plurality of tines 28 projecting in transversely registered relationship from opposite longitudinal edges of said body. The tips 30 of the tines are arcuately turned up (Fig. 4), preferably during the blanking operation. The tines are then bent (Fig. 5) relative to the body portion 26 until they form therewith a flat-bottomed V whose side walls are arcuately shaped. The flat body portion (dotted lines in Fig. 6) is now curved into its ultimate semi-circular shape (full lines in Fig. 6). It may be mentioned that this curving operation is easily performed without distorting the previously bent tines, since said tines are relatively narrow in comparison with the length of said body portion. Finally, (Figs. 7, 8 and 9) the two tapes T with slide fastener elements already attached thereon are positioned with their beads B in desired relationship relative to the bridge stop 12 and the tines clinched together to embed the points in the fabric web of the tape (Fig. 2). It will be understood that because the tines are so narrow their bending will not distort the curved body 26.

Various forms of apparatus may be employed to perform the preceding operations. However, I have illustrated in the accompanying drawings and will now proceed to describe one form of apparatus which I have found to be highly satisfactory and economical.

The apparatus for stamping out a blank 24 comprises a pair of reciprocating male and female dies 32 and 34 (Fig. 4), of the desired shape. The lower female die 34 is provided with a floating pad 36 which serves to eject the blank 24 from said lower die subsequent to formation thereof. The male die 32 and pad 36 are so shaped that they will slightly curve the tips 30 of the tines 28.

After a blank 24 has been formed it is advanced to the tine bending dies (Fig. 5). These comprise a plate 38 having a long tapered slot 40 running vertically therethrough. A blade 42 cooperates with slot 40; and the plate 38 and blade 42 are so mounted and relatively movable that said blade will reciprocate from a position above said plate to a position wherein its lower edge projects substantially below said plate. The lower edge of the blade is approximately as long and as wide as the elongated body portion 26 of the blank 24. Thus if a blank 24 is disposed in proper position, by means of gauges (not shown), above the slot 40 and the blade 42 caused to descend, the blank 24 will be forced through said slot and out from the bottom of the plate 38. During the passage through the slot, the tines 28 will be bent up until they stand almost perpendicular to the body portion 26.

The apparatus (Fig. 6) for imparting an arcuate profile to the flat body portion 26 (dotted lines) comprises a pair of cooperating reciprocal dies 44 and 46, whose working faces are so shaped that they will impart the desired semi-circular profile (full lines) to the body 20 of the bridge stop.

Said bridge stop has now received sufficient preliminary bending to enable it to have an otherwise complete slide fastener placed thereon, and to have the bridge stop permanently positioned on the slide fastener by a simple clenching operation.

The apparatus for clenching the preliminarily bent tines about the beads of the tapes T, in general comprises means for positioning a bridge

stop, means for positioning the two tapes of a slide fastener in predetermined location relative to the bridge stop, means for causing the beads of the slide fastener tapes to conform to the semi-circular contour of the bridge stop body, means for clenching the bridge stop tines on the slide fastener tapes, and means for operating the two last named means in properly timed relationship.

The specific form of clenching apparatus shown comprises a lower stationary die member consisting of a flat die block 48 (Fig. 7 and Fig. 8) from which a stub pin 50 projects. A semi-circular groove 52 is cut in the block 48 around the base of the pin 50, said groove being shaped and dimensioned to receive the arcuately bent tines of a preliminarily bent bridge stop.

An upper die block 54 (Fig. 7 and Fig. 9), which is so mounted as to be reciprocally movable relative to the lower die block 48, carries a forming die 56 whose operative surface is rounded to the curvature desired in the tines after the same have been clenching on a tape bead (see Fig. 2). The forming die 56 may be vertically grooved so that when the die blocks 48, 54 are brought into juxtaposition, the forming die 56 will be semi-tele-scopically received on the stub pin 50. It will be seen that if a bridge stop is placed on the pin 50 and in the groove 52, with the beads B of a slide fastener 10 properly positioned relative to said stop, when the die block 54 moves downwardly, the tines of the bridge stop will be forced together to firmly grip the tape beads.

The tape beads of a slide fastener 10 are positioned in proper location relative to the pin 50, by means of a gauge member 58 which is associated with the die block 48 and cooperates with a portion of the slide fastener such as for example, the uppermost individual slide fastener element on one of the tapes.

I have found that for speedy semi-automatic operation it is desirable to place the slide fastener 10 over the lower die block 48 and manually hold the two tapes T under slight tension and on opposite sides of the pin 50. With the tapes in this position, the beads B will lie tangent to the ends of the body portion 20 of a bridge stop disposed on the pin 50, and the portions of the tapes on which the bridge stop is to be fastened will be parallel to and spaced from each other.

It is necessary to bring these parallel spaced portions together into abutting relationship at approximately the center of the body portion of the bridge stop in order for the beads to follow the arcuate contour of said body portion. For this purpose I mount on the upper die block 54 a shaft 60 on which there is slidably disposed a sleeve 62. A light spring 64 biases said sleeve to an extreme position away from the under surface of the die block 54. This extreme position may be defined by a stop 66 comprising the head of a screw secured to the end of the shaft 60. Pivotaly mounted on the sleeve 62 are a pair of levers 68 and 70, each of which has a finger 72 depending from an end adjacent the forming die 56. The opposite ends of said levers are urged by a spring 74 towards each other and into engagement with the opposed surfaces of a cam 76 depending from die block 54.

The cam 76 and levers 68, 70 are so constructed and relatively arranged that when the sleeve 62 rests on the head of the screw 66, the fingers 72 are widely spaced apart. Moreover, the relative disposition of said fingers at this time is such that when the die block 54 starts to descend, said fingers will engage the tapes T in back of the

beads B. This disposition of the fingers is indicated by full lines in Fig. 9 and the dotted circles in Fig. 8. It will be recalled that the tapes T are tensioned by hand in the attaching apparatus so that when they are engaged by the finger 72, the beads B are lying parallel to each other and one on each side of the pin 50.

The cam 76 is further so constructed and arranged relative to the levers 68 and 70 that as the die block 54 and cam continue their descent, but before the forming die 56 engages the tines of the preliminarily shaped bridge stop, said cam will force the fingers 72 to move towards each other and thereby urge the tape beads B into abutment centrally of the bridge stop. This latter position of the fingers 72 is indicated by the dotted lines in Fig. 9, and said lower position of the cam 76 is indicated by the dotted lines in Fig. 7. The vertical position of the fingers 72 and levers 68, 70 is not varied during the movement of the fingers towards each other due to the slidable mounting of the sleeve 62 on the shaft 60. However, the pressure of the fingers 72 against the tapes will be somewhat increased due to compression of the spring 64.

It will be noted that the levers and fingers are also so positioned that, after they have been actuated by the cam 76, the fingers 72 will lie but a short distance away from the body of the bridge stop, this distance being slightly greater than the width of a bead. In this manner the tape beads are forced to closely follow the arcuate contour of the bridge stop body 20.

At the very end of a down stroke of the die block 54, the forming die 56 will cooperate with the groove 52 in the lower die block 48 to clench opposite pairs of tines around the tape beads and embed them in the tape fabric.

It will thus be seen that there is provided a device and apparatus and method for making the same in which the several objects of this invention are achieved, and which are well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An apparatus for attaching a preliminarily formed bridge stop to a slide fastener wherein said bridge stop includes an arcuate, elongated body having registered pairs of spaced tines extending away from opposite longitudinal edges thereof at a substantial angle thereto, said apparatus including gauging means for arranging the slide fastener in predetermined position relative to said bridge stop and with the beads thereof substantially tangent to the ends of said body, means for forcing a portion of each of said beads to lie against one-half of said arcuate body between tines of said pairs and abut each other at the center of said body, and means for clenching said registered pairs of tines about the portions of said beads disposed in such position.

2. An apparatus for attaching a preliminarily formed bridge stop to a slide fastener wherein said bridge stop includes an arcuate, elongated body having registered pairs of spaced tines extending away from opposite longitudinal edges thereof at a substantial angle thereto, said apparatus including gauging means for arranging

the slide fastener in predetermined position relative to said bridge stop and with the beads thereof substantially tangent to the ends of said body, means for forcing a portion of each of said beads to lie against one-half of said arcuate body between tines of said pairs and abut each other at the center of said body, means for clenching said registered pairs of tines about the portions of said beads disposed in such position, and means to actuate said last two named means in properly timed relationship.

3. An apparatus for attaching a preliminarily formed bridge stop to a slide fastener wherein said bridge stop includes an arcuate, elongated body having registered pairs of spaced tines extending away from opposite longitudinal edges thereof at a substantial angle thereto, said apparatus including gauging means for arranging the slide fastener with the beads thereof substantially tangent to the ends of said body, means for forcing a portion of each of said beads to lie against one-half of said arcuate body between tines of said pairs and abut each other at the center of said body, said last named means comprising a pair of members so constructed and arranged as to engage the tapes of the slide fastener adjacent said beads in spaced relationship and a mechanism for causing said members to move towards each other, and means for clenching said registered pairs of tines about the portions of said beads disposed in such position.

4. An apparatus for attaching a preliminarily formed bridge stop to a slide fastener wherein said bridge stop includes an arcuate, elongated body having registered pairs of spaced tines extending away from opposite longitudinal edges thereof at a substantial angle thereto, said apparatus including gauging means for arranging the slide fastener with the endmost slide fastener element in predetermined position relative to said bridge stop, and with the beads thereof substantially tangent to the ends of said body, means for forcing a portion of each of said beads to lie against one-half of said arcuate body between tines of said pairs and abut each other at the center of said body, and means for clenching said registered pairs of tines against said beads.

5. In combination with a slide fastener including a pair of beaded tapes having interlocking slide fastener elements thereon, a sheet metal bridge stop comprising a continuous, curved, elongated means longitudinally curving only about an axis perpendicular to the planes of the tapes for retaining portions of the beads of said tapes in spaced relationship and portions of said beads in abutting relationship, and a series of spaced elements integral with said curving means and curved only about axes perpendicular to said first named axis for holding said beads against said curved means, two adjoining elements of said spaced elements being spaced apart longitudinally of said curved means adjacent the abutting portions of said beads to lie on opposite sides of said abutting portions, and defining an exit for the portions of said beads held against said curved means, the mouth of which exit is double the thickness of the beads along the length of the curved means, whereby to permit said beads to leave the curved means without being cut, mutilated or pinched.

6. In combination with a slide fastener including a pair of beaded tapes having interlocking slide fastener elements thereon, a sheet metal bridge stop comprising a continuous, elongated, semi-circular means longitudinally curv-

ing only about an axis perpendicular to the planes of the tapes for retaining portions of the beads of said tapes in spaced relationship and portions of said beads in abutting relationship, and a series of spaced elements integral with said semi-circular means and curving only about axes perpendicular to said first named axis for holding said beads against said semi-circular means, two adjoining elements of said spaced elements being spaced apart longitudinally of said semi-circular means adjacent the abutting portions of said beads to lie on opposite sides of said abutting portions, and defining an exit for the portions of said beads held against said semi-circular means, the mouth of which exit is double the thickness of the beads along the length of the semi-circular means, whereby to permit said beads to leave the semi-circular means without being cut, mutilated or pinched.

7. In combination with a slide fastener including a pair of beaded tapes having interlocking slide fastener elements thereon, a sheet metal bridge stop comprising a continuous, curved, elongated means longitudinally curving only about an axis perpendicular to the planes of said tapes for retaining portions of the beads of said tapes in spaced relationship and portions of said beads in abutting relationship, and a plurality of registered pairs of tines spaced along the length of said curved means and extending from opposite lateral edges thereof, said tines curving only about axes perpendicular to said first named axis to firmly engage said beads, two adjacent pairs of registered tines being spaced

apart a distance along the length of the curved means at their tips double the thickness of the beads and lying on opposite sides of the abutting portions of said beads so as to permit said beads to leave the curved means without being cut, mutilated or pinched.

8. In combination with a slide fastener including a pair of beaded tapes having interlocking slide fastener elements thereon, a sheet metal bridge stop comprising a continuous, curved, elongated means longitudinally curving only about an axis perpendicular to the planes of said tapes for retaining portions of the beads of said tapes in spaced relationship and portions of said beads in abutting relationship, and a plurality of registered pairs of tines spaced along the length of said curved means and extending from opposite lateral edges thereof, said tines curving only about axes perpendicular to said first named axis to firmly engage said beads, two adjacent pairs of registered tines being spaced apart a distance along the length of the curved means at their tips double the thickness of the beads and lying on opposite sides of the abutting portions of said beads so as to permit said beads to leave the curved means without being cut, mutilated or pinched, there being an even number of said pairs of tines, one-half of said pairs being disposed along one-half of the length of said curved means and the other half being disposed along the other half of the length of said curved means.

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