

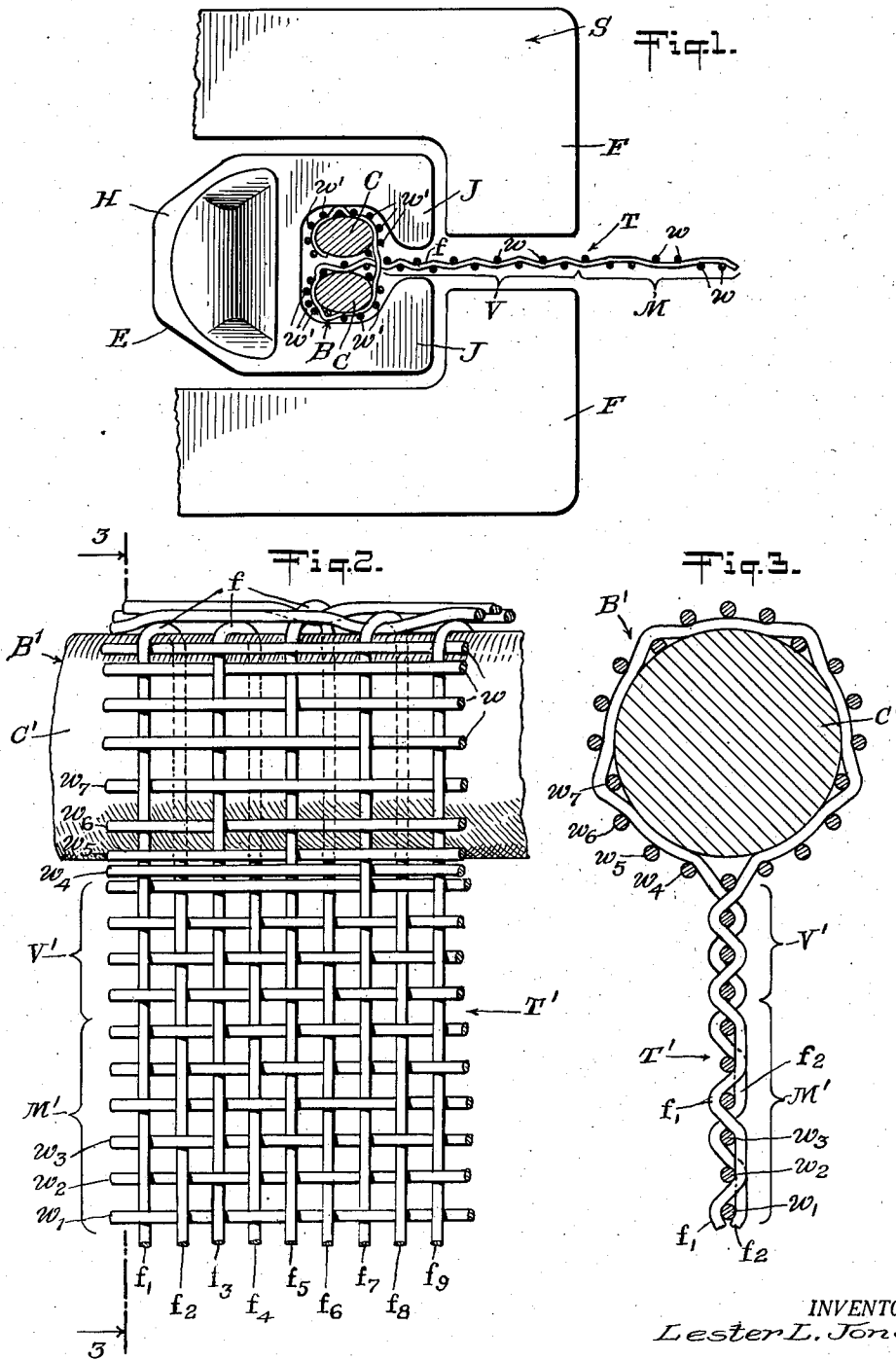
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TAPE FOR SLIDE FASTENERS

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TAPE FOR SLIDE FASTENERS

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This invention relates to slide fasteners, and more particularly to a tape having an improved integrally woven beaded edge for the reception of slide fastener elements and stops.

The primary object of the invention is to generally improve beaded edge constructions for slide fastener tape in which the bead is formed as a part of the weaving operation. More specifically, it is an object of this invention to improve the durability of the beaded edge of a slide fastener tape for any type of bead integrally woven on the tape and held by weft threads.

In the construction of integral beads of slide fastener tapes, it has been heretofore suggested to weave into the fabric structure at its edge a single cord or two cords on its opposite sides, or to use a woven sleeve enclosing a cord, filling or stuffing to form the bead. It has also been suggested to use a number of warp threads instead of cords for the bead filling. These proposals have the disadvantage of exposing that part of the weft threads passing around the bead to damage by the inner surfaces of the jaws of mounted slide fastener elements. A slide fastener element generally comprises a head portion provided with interlocking means and jaws which are secured to the tape by clamping them under great pressure around the beaded edge. Abrasion of the weft threads and other damage, such as tearing, result from compression of the beaded edge in the jaws of the fastener elements, from irregularities on the inner surfaces of the jaws and also from small motions of the elements in use. One of the main objects of the present invention is to devise a beaded tape structure in which such abrasion, wear and tear are effectively minimized.

Another disadvantage of prior tapes with integral beads is the exposure of weft threads to abrasion by movement of the slider. It is, therefore, a further object of this invention to provide a weave for the tape which will minimize the abrading of the weft threads by the slider. More specifically, it is an object of the invention to specially weave the tape in the region adjoining the bead in order to hold the weft threads close to the bead so as to prevent abrasion by the slider.

It is a further object of the present invention to provide in the region adjoining the beaded edge a weave of great stretch in the direction of the weft threads. This is desirable because of the inequalities in weft thread tension due to the fastener elements mounted at spaced intervals along the beaded tape edge.

The nature of this invention is illustrated in the accompanying drawing in which:

Fig. 1 is a view looking at a slide fastener element attached to a tape, the bead and a portion of the tape being shown schematically in section, a slider fragmentarily shown being also indicated, the tape and bead structure embodying the principles of the invention;

Fig. 2 is a fragmentary view of a beaded tape showing schematically a modified form of tape and beaded edge structure of the present invention; and

Fig. 3 is a schematic view of the latter taken in section in the plane of the line 3—3 of Fig. 2.

In order to more clearly illustrate the invention, the tape bead forming parts are not shown in compressed relation, as assumed thereby when slide fastener elements are clamped to a tape bead, but are shown instead in loose relation. Referring first to Fig. 1, the tape T is illustrated as including three different longitudinal parts extending transversely thereof. M indicates the main part along the free edge of the tape; V is a narrow part adjoining the beaded edge and generally within the compass of the slider; and B is the beaded edge. The slide fastener element E has a head H and the two bead B encompassing jaws J. A slider S is mounted on the slide fastener, and the inturned flanges F, F of the slider are spaced apart to permit of the free movement of the slider along the slide fastener tape T.

In the tape selected for illustration in Fig. 1, the weave of the main part M is what is called an even twill in which weave the weft threads, such as the weft thread *f*, pass over two and under two warps, such as the warp threads *w*, *w*. It is to be understood that any suitable weave may be employed for the part M.

A slider when mounted on two slide fastener stringers and when moved along same, rides on each side, as is indicated in Fig. 1, with its inturned flanges F, F over the tape thereby rubbing on the respective tape regions. It has been experienced that a breakdown of slide fasteners usually occurs by tearing of the weft threads in said tape regions. I have found that by providing a weave for the region V of the tape suitable for holding the weft threads close to the bead, this liability to rupture or break down is removed or minimized. Furthermore, according to the present invention, the part or section V is also made to serve another purpose, that is, to minimize the inequalities in weft thread tension in high-tension uses of slide fasteners. Due to the fastener elements being mounted on the tape at spaced

intervals, the weft threads in line with the jaws of the elements are put under high tension. Since the bead portions between adjacent fastener elements do not effectively transmit the tension to the weft threads positioned between elements, substantially all the stress is carried by the weft threads in line with the element jaws. I have found that such inequalities can be minimized by giving the weft threads maximum stretch in a transverse direction. These results I accomplish by making the weave of the part or section in the form of a so-called plain weave. This is formed by passing weft threads over one warp and under the next warp as shown in Fig. 1, while, the second time across, the weft thread passes in the reverse order. This plain weave for the section V has proved satisfactory both to hold the weft threads close to the bead and to give the weft threads maximum stretch in a transverse direction. Any other weave suitable to serve these two purposes may also be employed. I find it preferable to use for the part or section V the tightest possible weave, and in a preferred form I use for the part or section V a tighter weave than for the remainder of the tape. The part V usually extends over an approximate width of five to ten warp threads.

The bead B in the form of the invention depicted in Fig. 1 comprises one or more tubular bead forming pockets and filling in the aforesaid pocket or pockets. In the form shown in Fig. 1, the bead comprises a stuffer here consisting of two cords C, C woven into two tubular pockets in the tape along one edge at opposite sides thereof. The cords C, C are enveloped by the bead forming pockets formed by the interlaced warp threads w' , w' and weft threads such as the thread f . The interlacing forming these pockets has its weft threads weaving under and over the warp threads, the characteristic of the construction being that the warp threads which are over each weft thread are a multiple of the warp threads under each such weft thread. Thus as shown in Fig. 1, the weft thread f is interlaced with the warp threads w' , w' so that at the exposed surfaces of the bead B the weft thread threads under four, then over one, and continues to alternate in this manner around the bead. I have found that the desired multiple is from three to five warp threads over each weft thread for every warp thread under each such weft thread. As a result, the warp threads are exposed to the inner surface of the element jaws to a greater extent than the weft threads. Viewed from another angle, the warp threads protect the weft threads from the inner surfaces of the element jaws. Thereby the warp threads help protect the weft threads against abrasion by the jaws of the slide fastener elements and against the wear and tear which results from compression of the beaded edge within the jaws of the fastener elements, from irregularities on the inner surfaces of the jaws and also from small motions of the elements in use.

In the form of the invention shown in Fig. 1, the stuffer cords C, C are usually of opposite twisted construction. It will be understood that instead of the cords C, C, the stuffer may comprise a plurality of warp threads bunched together throughout their lengths and interlaced in the weaving operation with the warp threads w' and weft threads f . The warp threads w' surrounding the bead may be arranged and bunched together in various ways, and the number of the weft threads may be varied as desired,

the important characteristic being the structure above described whereby the warp threads are exposed to the inner surfaces of the element jaws and the weft threads are protected or shielded by the warp threads.

By constructing the part or section V of the tape web in a plain weave as above described, in addition to giving the weft threads here maximum stretch in a transverse direction for the reasons explained, the weft threads f are held close to the bead B so that the slider S has a lessened tendency in its movement over the slide fastener to rub against the tape regions over which the flanges F, F thereof ride. Thereby exposure of the weft threads at the bead and in the region adjoining the bead to abrasion by movement of the slider is also minimized.

Referring now to Figs. 2 and 3, the tape T' also consists of three transversely extending parts or sections, namely, M', V' and B'. In the tape shown, the weave of the main part M' is an uneven twill weave in which the weft threads f , f pass under one and over two warps, each weft thread, as is clearly shown in Fig. 2, lapping back on the respective interlacings on the previous weft thread. The part V' as before is a plain weave. The bead B' is formed here by a single cord C' (or corresponding warp stuffers) woven in the tape along one edge, a number of warp threads w , w enveloping the cord. Thus, considering one of the weft threads, such as the weft thread f_1 , beginning at the free tape edge it passes under warp w_1 , over warps w_2 and w_3 , continues in this way for the section M', until it forms the plain weave for the section V'. In the bead structure B', this weft thread f_1 passes under three warp threads w_4 , w_5 , w_6 , and then over the warp thread w_7 , and continues to alternate in this manner around the cord C'. The second time across the tape web, the weft thread, now f_2 , interlaces with the warp threads of the part V' and M' after the manner of weft thread f_1 , the uneven twill interlacings of the weft thread f_2 for the section M' being, however, displaced by one warp with reference to the uneven twill interlacings of the weft thread f_1 .

In the constructions of the part M' and of the tubular formation B', the interlacings of succeeding weft threads with the warp threads vary according to the following pattern: In the part or section M', the weft threads f_3 , f_4 , f_5 and f_6 each ends (or begins) its uneven twill weave one warp behind (displaced from) its preceding weft thread. The seventh row of the weft threads, f_7 , is a repetition of the first row f_1 ; and the eighth and ninth rows, f_8 and f_9 , are repetitions of rows f_2 and f_3 , etc. In the tubular formation B', the successive weft threads, such as f_1 , f_3 , f_5 and f_7 , interlace with the warp threads w , each in the manner above described, but by successive one warp displacements. The ninth row, f_9 , (which is the fifth successive weft thread in the same direction) is a repetition of the first row f_1 ; the eleventh row would be a repetition of the third row, etc. Each weft thread over the bead, however, lies under three warp threads and then over one warp thread; and by thus passing under three warp threads the respective portions of their lengths lie between the warp threads and the cord C' and are thereby protected against abrasive action and resulting wear and tear.

It will be understood that this described pattern for Figs. 2 and 3 is correspondingly carried out for the construction of Fig. 1 of the drawing, except for the modification made necessary by

the use of an even instead of an uneven twill for the section M and by the use of a four under to one over instead of a three under to one over interlacing for the weft threads.

The structure of the beaded slide fastener tape of the present invention, the manner of making the same and the advantages of its use will, in the main, be fully apparent from the above detailed description thereof. It will be further apparent that changes may be made in the particular weave arrangement for the bead section B and the bead adjacent section V, within the principles above set forth, without departing from the spirit of the invention defined in the following claims.

I claim:

1. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a stuffer in said pocket, the web and tubular pocket being formed by interlaced weft and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread.

2. A tape for slide fasteners having an integral bead along one edge, the bead being formed by at least one cord held by weft and warp threads interlacing with the weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread around the bead.

3. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a warp thread stuffer in said pocket, the web and tubular pocket being formed by interlaced weft and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread, whereby the warp threads help protect the weft threads against abrasion by the jaws of slide fastener elements spacedly attachable to the tape bead.

4. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a stuffer in said pocket, the web and tubular pocket being formed by interlaced weft and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being from three to five for every warp thread under each such weft thread.

5. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a stuffer in said pocket, the web and tubular pocket being formed by interlaced weft

and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread, whereby the warp threads help protect the weft threads against abrasion by the jaws of slide fastener elements, said web including a narrow part adjoining the bead, said part being of a tight weave to hold the weft threads running across the web close to the bead and also to give said part as great a stretch as possible in the direction of the weft threads.

6. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a stuffer in said pocket, the web and tubular pocket being formed by interlaced weft and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread, said web including a part adjoining the bead, said part being made in a plain weave.

7. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a stuffer in said pocket, the web and tubular pocket being formed by interlaced weft and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being from three to five for every warp thread under each such weft thread, said web including a part adjoining the bead, said part being made in a one to one weave.

8. A beaded tape for slide fasteners comprising an integrally woven web, tubular bead forming pocket and a stuffer in said pocket, the web and tubular pocket being formed by interlaced weft and warp threads, the interlacing forming the pocket having its weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread, successive weft threads being interlaced with the warp threads by successive one warp displacements.

9. A tape for slide fasteners having an integral bead along one edge, the bead being formed by at least one cord held by weft and warp threads interlacing with the weft threads weaving under and over the warp threads, the warp threads over each weft thread being a multiple of the warp threads under each such weft thread around the bead, successive weft threads being interlaced with the warp threads by successive one warp displacements.

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