

(12)

SLIDE FASTENER STRINGER

This invention relates to sliding clasp fasteners and more particularly improvements in a slide fastener stringer having a discrete formation of coupling elements or scoops mounted on a support tape. A series of such scoops are formed on
5 the tape by injection or extrusion moulding of a plastic material.

It has heretofore been proposed to use synthetic resins as the material for forming fastener coupling elements for reasons of fashionability and physical feed unavailable from metallic materials. Certain types of plastic material such as for
10 example polyacetal have also been preferred for their physical strength comparable to metals. However, polyacetal is rather weak in its resistance to shock, and fastener elements made thereof are prone to be brittle when applied to slide fasteners used on bags, outdoor canvas and other articles that are handled
15 in a rough manner. Nylon has been proposed to substitute for polyacetal as it is much stronger in shock-resistance. However, due to its softness, nylon-made fastener elements are not quite satisfactory in their strength with which to anchor at the fastener tape and would often tend to spread
20 apart at their leg portions when the fastener tape is soaked wet and swollen. To eliminate this problem, means have been considered to interconnect the two oppositely disposed legs of the element by a suitable connecting strip provided in

an opening in the tape, the opening being formed by punching, cutting or piercing pin. However, due to limitations imposed on the strip, the fastener elements are liable to spread apart along their superposed legs or otherwise move out of place when the fastener tape is wetted and swollen, resulting in sluggish or otherwise inoperative manipulation of the slider. This tendency is pronounced when the bead on the edge of the tape is increased in size to strengthen resistance to lateral pull.

A slide fastener stringer comprising: (a) a tape made essentially of thermoplastic fibers having a longitudinal edge portion including a bead extending longitudinally therealong, there being a series of openings formed in and along said longitudinal edge portion, each of said openings being located closely to said bead and each opening being defined by a rigid marginal edge constituted by fused tape fibers; (b) a series of discrete coupling scoops made of a synthetic resin and mounted on and along said longitudinal edge portion, each in registration with only one of said openings, each of said scoops having a coupling head, an upper leg and a lower leg, said upper and lower legs being disposed astride the opposite surfaces of said longitudinal edge portion, each said opening extending closely along and between marginal edges of each pair of scoop legs; (c) said bead having a width in the range of one-third to two-fifths of the length of said scoop legs, both said width of said bead and said length being measured in the plane of the stringer perpendicular to the longitudinal direction of the stringer from the outer edge of the bead; and (d) a series of separate connecting strips individually accommodated

in one of said openings and respectively interconnecting said upper and lower legs.

The invention will be described by way of example with reference to the accompanying drawings, wherein:-

5 Figure 1 is a front plan view of a portion of the slide fastener which is provided in accordance with the invention;

Figure 2 is a plan view on enlarged scale of a portion of the slide fastener stringer;

Figure 3 is a schematic fragmentary plan view on further enlarged
10 scale of a portion of the stringer; and

Figure 4 is a cross-sectional view on enlarged scale taken on the line IV-IV of Figure 2.

Referring now to the drawings and Figure 1 in particular, there is shown a slide fastener 10 which comprises a pair

15

of stringer tapes 11,12 each having mounted thereon a series of discrete fastener coupling elements or scoops E. The stringer tapes 11,12 are engaged and disengaged by a slide S as the latter is moved reciprocally to take the two opposed series of scoops E into and out of engagement in the well known manner.

The tape 11,(12) is fabricated from thermoplastic resin fibres such as of polyester or a blend of such plastic fibres and naturally occurring fibres. It has a longitudinal edge portion 11',(12') including a bead 13 and defining a region for mounting the scoops E. The scoops E shown for purposes of illustration to be made from nylon are each provided with an upper leg portion Ea and a lower leg portion Eb which are mounted on the tape 11,(12) astride the opposite surfaces of the longitudinal edge portion 11',(12') and with a coupling head portion Ec integral with the leg portions and protruding from the bead 13 for coupling engagement with the corresponding head portion Ec on the opposite mating tape. At an end of the scoop E opposite to or remote from the coupling head portion Ec, there is provided a tail portion Ed for guided sliding engagement with the slider S. While the tail portion Ed can be dispensed with, its presence is advantageous in that an opening later described can be made so much large.

As shown in Figures 2 and 3, the tape 11,(12) is provided with an opening 14 closely adjacent to the bead 13 for accommodating therein a connecting strip 15 which interconnects the upper

and lower leg portions Ea, Eb by thermal fusion when the scoops E are anchored to the tape 11, (12) by means injection or extrusion moulding in a manner known in the art. The opening 14 may be formed by supersonic processing effected by for example

5 a rotary toothed anvil cooperating with a supersonic horn, in which instance the opening 14 is defined by a marginal edge 14' reinforced as the polyester fibres constituting the tape are fused rigidly together. Designated at 16 in Figure 4 is a flange-like lug resulting from fusion of the tape fibres

10 in contact with the toothed anvil.

The opening 14 is generally dimensioned in complementary relation to the leg portions Ea, Eb of the scoops E and larger the better for increasing the anchoring strength of the scoops E with respect to the tape 11, (12).

15 According to an important aspect of the invention, the width W of the bead 13 or the diameter thereof measuring transversely of the tape 11, (12) is selected to be in the range of from one-third to two-fifths of the transverse length L of the leg portion Ea, (Eb) of the scoope E. This arrangement makes

20 it possible to minimize the total thickness of the scoop E on one hand and to maximize the area for opening 14 on the other hand.

It has now been also found that the dimensional relation between the bead 13 and the scoop legs Ea, (Eb) as specified herein

(17)

contributes to reduce to an absolute minimum the extent to which the bead 13 expands when the fastener tape is wetted and swollen and the extent to which the tape is stretched under the influence of external forces further to maintain the scoops E securely positioned on the tape against lateral pull. Smaller width W of the bead 13 than $\frac{1}{3}$ of the length L of the scoop legs Ea, (Eb) will fail to achieve the above advantages and result in disturbed scoop-to-scoop pitch and malfunctioned fastener. Greater width W of the bead 13 than $\frac{2}{5}$ of the leg length L will necessitate undue increase in the height of the scoop E and reduce the area of the opening 14 that may be provided.

Since the opening 14 according to the invention is sufficiently large extending closely along the marginal edges of the scoop legs Ea, (Eb), it is literally possible to provide a correspondingly large connecting strip 15 that is fitted into and secured in the opening 14 to join the upper and lower scoop legs Ea, (Eb) firmly together.

As the opening 14 is formed by supersonic processing, its marginal edge 14' is rigidified upon fusion of the individual tape fibres. This will add to strengthened integral stringer structure including the scoops E and the tape edge 11', (12'), and will also serve to facilitate the positioning of the scoops E at the time of moulding.

(18)



- 7 -

CLAIMS

1. A slide fastener stringer comprising:
 - (a) a tape made essentially of thermoplastic fibers having a longitudinal edge portion including a bead extending longitudinally therealong, there being a series of openings formed in and along said longitudinal edge portion, each of said openings being located closely to said bead and each opening being defined by a rigid marginal edge constituted by fused tape fibers;
 - (b) a series of discrete coupling scoops made of a synthetic resin and mounted on and along said longitudinal edge portion, each in registration with only one of said openings, each of said scoops having a coupling head, an upper leg and a lower leg, said upper and lower legs being disposed astride the opposite surfaces of said longitudinal edge portion, each said opening extending closely along and between marginal edges of each pair of scoop legs;
 - (c) said bead having a width in the range of one-third to two-fifths of the length of said scoop legs, both said width of said bead and said length being measured in the plane of the stringer perpendicular to the longitudinal direction of the stringer from the outer edge of the bead; and
 - (d) a series of separate connecting strips individually accommodated in one of said openings and respectively interconnecting said upper and lower legs.
2. A slide fastener stringer according to claim 1, each said scoop having a pair of tail portions of reduced width and thickness



19

- 8 -

extending lengthwise from said upper and lower legs remotely from said coupling head, each said opening being covered partly by said upper and lower legs of a respective one of said scoops and partly by said tail portions of said respective one scoop.

- 5 3. A slide fastener stringer substantially as hereinbefore described with reference to the accompanying figures.

The text of the specification has been reproduced by photocopying the applicants original typescript. It may contain a few amendments which are difficult to read. The original typescript containing these amendments may be inspected on the premises of the Patent Office