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SEPARABLE SLIDE FASTENER

The present invention relates to a slide fastener, and more particularly to a separable slide fastener having a separable bottom-end-stop assembly.

There are known various separable slide
5 fasteners in which a separable bottom-end-stop assembly of metal is mounted on adjacent bottom ends of opposed fastener stringers, the separable bottom-end-stop assembly comprising a pair of pin members secured to the inner tape-margins, and a socket member secured to
10 one of the pin members. To this end, as disclosed in Japanese Utility Model Laid-Open Publication (Jikkaisho) 59-50312, it is known that the socket member has a pair of claws punched from a rear wall thereof and projecting inwardly through a rear wall of
15 the one pin member into a stringer tape in order for non-rotatable attachment. However, this prior socket member tends to be cracked in portions not only between two openings (formed when punching the respective claws) but also between a bottom end of the socket

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member and one of the openings adjacent thereto, thus causing non-stable attachment of the socket member, which would sometimes result in removal of the socket member.

According to the present invention there is provided a
5 separable slide fastener, comprising:

(a) a pair of fastener stringers each having a stringer tape carrying a row of fastener elements;

(b) a slider movable along said pair of stringers to open and close the slide fastener; and

10 (c) a separable bottom-end-stop assembly mounted on adjacent ends of said stringers and including

(1) a first pin member secured to one of said stringers and having a respective rear wall,

(2) a second pin member secured to the other of said stringers,
15 and

(3) a socket member secured to said first pin member and receiving a portion of said first pin member and a portion of said second pin member, said socket member having a claw projecting inwardly from a respective rear wall of said socket member through said rear
20 wall of said first pin member into said stringer tape of said one stringer, said socket member having near said claw a first protuberance projecting inwardly from said second rear wall into said first rear wall of said first pin member, said first pin member having, in super-imposed relation to said first protuberance, a second protuberance
25 projecting inwardly from the rear wall of said first pin member to squeeze said stringer tape of said one stringer.

It is believed possible by means of the present invention to provide a separable slide fastener having an improved bottom-end-stop assembly in which a socket member is attached to one of a pair of pin members accurately and stably.

5 It is also believed possible by means of the present invention to provide a separable slide fastener having an improved bottom-end-stop assembly in which a socket member is free from cracks and hence cannot be easily displaced on or removed from one pin member while the slide fastener is in use.

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

Figure 1 is a fragmentary underneath plan view of a separable slide fastener having a separable bottom-end-stop assembly embodying the present invention;

15 Figure 2 is a longitudinal cross-sectional view taken along line II-II of Figure 1;



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slide fastener 10.

As shown in Figures 1 - 4, the separable bottom-end-stop assembly includes a first separate pin member 18 secured to the bottom end portion of one of the confronting inner tape-margins, a second separate pin member 16 of metal secured to the bottom end portion of the other inner tape-margin, and a socket member 20 of metal secured to the first pin member 18.

The socket member 20 has a first cavity or bore 20a (Figures 2 and 3) receiving a portion of the first pin member 18 in a fitting manner and a second cavity or bore 20b (Figure 3) for receiving a portion of the second pin member 16.

The first pin member 18 has a pair of longitudinally spaced first claws 19, 22 each projecting inwardly from its rear wall through the reinforcing strip 15 into the stringer tape 11, while the second pin member 16 has a single second claw 17 projecting substantially centrally and inwardly from its rear wall through the reinforcing strip 15 into the corresponding stringer tape 11. The second claw 17 and one of the first claw 19 are formed by punching when the corresponding pin members 16, 18 are attached to the respective stringer tapes 11, 11; the other first claw 22, (Figures 2) is formed in a manner described below.

The socket member 20 has in its rear wall a pair

of laterally spaced small-thickness portions 25, 25' for a purpose described below. From one of the small-thickness portions 25, a single third claw 21 projects inwardly through the rear wall of the first pin member 18 into the stringer tape 11 in such a manner that the third claw 21 and the other first claw 22 are disposed in a superimposed relationship. Further, a first protuberance 23 (Figures 1 - 3) is disposed near the third claw 21 and bulges or projects inwardly from the one small-thickness portion 25 of the rear wall of the socket member 20 into the rear wall of the first pin member 18, i.e. toward the stringer tape 11. The first pin member 8 has, in superimposed relation to the first protuberance 23, an inwardly projecting second protuberance 24 (Figures 2 and 3) which bulges to squeeze the reinforcing strip 15 and the stringer tape 11.

For assembly, the first pin member 18 (initially without a claw) is threaded onto the element-free bottom end portion of the inner tape-margin of one of the stringers, and is then struck on the rear wall with a non-illustrated punch in such a manner that the one first claw 19 is thereby formed in the rear wall and then forced inwardly to project into the stringer tape 11. Thus the first pin member 18 has been fixedly secured to the one stringer. Meanwhile, the second pin member 16 is also fixedly secured to the other stringer

in the same manner as the first pin member 18.

Subsequently, the first pin member 18 is partially inserted in the first bore 20a of the socket member 20 as shown in Figure 5, the rear wall of the socket member 20 is struck on one of the small-thickness portions 25 with a punch 26 which has first and second punching portions 27, 28. At that time, the first punching portion 27 of the punch 26 pierces the rear wall of the socket member 20 and the rear wall of the first pin member 18 to provide the third claw 23 and the other first claw 22 therein respectively and then to force these two claws 23, 22 inwardly in a superimposed relationship. As a result, as best shown in Figure 2, the third claw 21 projects inwardly from the small-thickness portion 25 of the rear wall of the socket member 20 through the rear wall of the first pin member 18 and through the reinforcing strip 15 into the stringer tape 11, while the other first claw 22 projects inwardly from the rear wall of the first pin member 18 through the reinforcing strip 15 into the stringer tape 11.

Meanwhile, the second punching portion 28 stamps on the rear wall of the socket member 20 and thus the rear wall of the first pin member 18 to provide the first and second protuberances 23, 24 respectively thereon in a superimposed relationship. As a result, as best shown in Figures 2 and 3, the first

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protuberance 23 bulges inwardly from the small-thickness portion 25 of the rear wall of the socket member 20 into the rear wall of the first pin member 18, while the second protuberance 24 bulges
5 inwardly from the rear wall of the first pin member 18 to force the stringer tape 11, together with the pair of reinforcing strips 15 and the core thread 13, against a front wall of the first pin member 18 and thus a front wall of the socket member 20.

10 With this arrangement, the socket member 20 can be non-rotatably attached to the first pin member 18 accurately with adequate firmness, partly because the socket member 20 and the first pin member 18 are joined together at two different points spaced apart from each
15 other longitudinally along the first pin member 18.

Further, since there is only a single claw in its rear wall, the socket member 20 is free from being cracked while the slide fastener 10 is in use.

The purpose of the small-thickness portion 25 of
20 the socket member 20 is to facilitate the forming of the third claw 21 and the first protuberance 23.



CLAIMS:-

1. A separable slide fastener, comprising:

(a) a pair of fastener stringers each having a stringer tape carrying a row of fastener elements;

(b) a slider movable along said pair of stringers to open and close the slide fastener; and

(c) a separable bottom-end-stop assembly mounted on adjacent ends of said stringers and including

(1) a first pin member secured to one of said stringers and having a respective rear wall,

(2) a second pin member secured to the other of said stringers, and

(3) a socket member secured to said first pin member and receiving a portion of said first pin member and a portion of said second pin member, said socket member having a claw projecting inwardly from a respective rear wall of said socket member through said rear wall of said first pin member into said stringer tape of said one stringer, said socket member having near said claw a first protuberance projecting inwardly from said second rear wall into said first rear wall of said first pin member, said first pin member having, in superimposed relation to said first protuberance, a second protuberance projecting inwardly from the rear wall of said first pin member to squeeze said stringer tape of said one stringer.

2. A separable slide fastener according to claim 1, said rear wall of said socket member having a small-thickness portion from which said claw and said first protuberance are punched.



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3. A separable slide fastener according to claim 1 or 2, each of said stringers having at said end thereof a pair of reinforcing strips of thermoplastic synthetic resin attached to opposite surfaces of said stringer tape, said claw extending through one of said pair of reinforcing strips, said second protuberance being disposed against said one reinforcing strip.

4. A separable slide fastener substantially as described with reference to and as illustrated in the accompanying drawings.



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