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(71) Applicant: **YOSHIDA KOGYO K.K.**
No. 1 Kanda Izumi-cho Chiyoda-ku
Tokyo(JP)

(72) Inventor: **Tsubokawa, Yoshitoki**
95-1, Oka
Kurobe-shi Toyama-ken(JP)

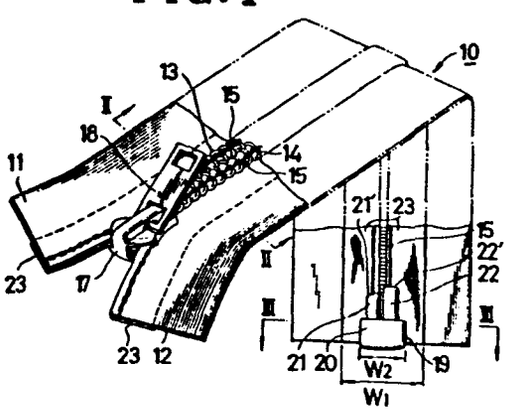
(72) Inventor: **Yamamoto, Noboru**
569, Ueki
Kurobe-shi Toyama-ken(JP)

(74) Representative: **Casalonga, Axel et al,**
BUREAU D.A. CASALONGA OFFICE JOSSE & PETIT
Baaderstrasse 12-14
D-8000 München 5(DE)

(54) Separable slide fastener.

(57) A separable slide fastener includes a pair of stringer tapes (11, 12) made of a pliable thread-free material such as nonwaven fabrics, a pair of rows of coupling elements (13, 14) on the respective stringer tapes, a separable end assembly (19) connected to bottom end portions of the stringer tapes, and reinforcement strips (23, 23) extending longitudinally over at least one side of the respective stringer tapes from the bottom end portions, respectively. The reinforcement strips (23, 23) have a length greater than that of the bottom end assembly (19), with the result that portions of the stringer tape contiguous to the upper end of the end assembly are prevented from being bent or stretched even after repeated operation of the fastener.

FIG. 1



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SEPARABLE SLIDE FASTENER

This invention relates to a slide fastener and more particularly to a separable type of slide fastener having a separable bottom end connection.

A variety of separable slide fasteners have been proposed for use on articles such as rain coats, anoraks, bags and the like. Such a separable fastener is provided with a separable end assembly at one of its tape ends that allows the fastener to split apart at that end for the intended purpose. The end assembly takes the form of a pin member on one stringer and a socket member on the other stringer, both members being releasably interengageable to couple the stringers. The ends of the stringer tapes which are usually woven or knitted, are reinforced in the region of the separable assembly with a suitable reinforcement strip of fabric or plastic film so as to ensure firm attachment of the fastener to the article and also to facilitate the manipulation of the end assembly.

Difficulties were encountered with separable

slide fasteners having stringer tapes made of pliable thread-free material such as nonwoven fabric, the tape ends being reinforced only at the region of the separable end assembly with the result that the portion of the tape immediately adjoinning the upper end of the end assembly is prone to bend and stretch upon repeated operation of the fastener, causing a malfunction of the coupling elements adjacent to the end assembly and eventually a rupture of the chain of coupling elements. Bending forces when applied repeatedly to the tape portion bordering the end assembly would often tear off the tape along that area.

The present invention seeks to provide a separable slide fastener having stringer tapes made of thread-free materials which are reinforced against rupture of the chain of coupling elements or damage to the tape.

According to the present invention, there is provided a separable slide fastener comprising a pair of stringer tapes made of a pliable thread-free material, rows of coupling elements mounted on the respective tapes along inner longitudinal edges thereof, a slider adapted to bring said rows of coupling elements into and out of engagement, a separable end assembly mounted on the bottom ends of said stringer tapes, and reinforcement strips respectively attached at least to one side ofsaid tapes along

an inner longitudinal edge thereof, characterized in that said reinforcement strips have a length greater than that of said end assembly and extend at least over the portion of each stringer tape which supports said end assembly and an endmost coupling element located next to said end assembly.

The foregoing and other objects and features of the invention will be better understood from the following description taken in connection with the accompanying drawings which illustrate by way of example some preferred embodiments which the invention assume in practice. Like reference numerals refer to like or corresponding parts throughout the several views.

Figure 1 is a perspective, partly plan view of a separable slide fastener according to a preferred embodiment of the invention;

Figure 2 is an enlarged cross-sectional view taken along line II - II of Figure 1;

Figure 3 is an enlarged cross-sectional view taken along line III - III of Figure 1;

Figure 4 is a plan view of a portion of a separable fastener according to another embodiment of the invention;

Figure 5 is a plan view of a portion of a separable fastener according to a further embodiment of the invention;

Figure 6 is a cross-sectional view taken on enlarged scale along line VI - VI and looking in the direction of the arrow in Figure 5; and

Figure 7 is a cross-sectional view of a separable fastener according to still another embodiment of the invention.

Figure 1 shows a slide fastener 10 which is separable at its bottom end. The fastener 10 comprises a pair of stringer tapes 11 and 12 having confronting longitudinal edges along which the opposed rows of coupling elements 13 and 14 are secured as by sewn seams 15. The rows of coupling elements 13 and 14 are shown for purposes of illustration to be in the form of a continuous helical coil and are sewn through a pair of cords 16, 16 (Figure 2) to the respective tapes 11 and 12. A slider 17 is mounted astride the confronting edges of the tapes 11 and 12 and it is manipulated at its pull tab 18 to move slidably along the rows of coupling elements 13 and 14 to close or open the identical halves of the slide fastener 10 in the well known manner.

The stringer tapes 11 and 12 are made of a thread-free pliable sheet material such as for example vinylchloride, polyester, polyamide and other suitable synthetic resins, or nonwoven fabrics containing synthetic fibers. The tapes 11 and 12 may be therefore conveniently attached by ultrasonic or high-frequency

welding to an article made of for example a thermoplastic material.

Designated at 19 is a separable end assembly composed of a socket member 20 including integrally formed stud 21 and attached on one stringer tape 11 and a pin member 22 attached on the other stringer tape 12, the socket and pin members being releasably interengageable to couple the fastener halves in a manner well known. The end assembly 19 may be clinched or injection-molded onto the bottom ends of the stringer tapes 11, 12. The socket member 20 may have a slider function, as is well knwon, so as to permit the fastener to open from the reverse direction.

In the embodiment shown in Figure 1, there is provided a reinforcement strip 23 attached to and extending all way from one end to the other along the lower inner longitudinal marginal surface of each of the tapes 11 and 12 which underlies the row of coupling elements 13, (14). The reinforcement strip 23 is made of an intimate weave of synthetic fibers, a knitted taffeta or a film of synthetic resins. The reinforcement strips 23 when brought together edge to edge have a combined width W_1 at least greater than the width W_2 of the socket member 20, or preferably greater than the track of the slider 17. The end assembly 19 is mounted astride and envelops the bottom ends of the stringer tapes 11, 12 at the region which includes the rows of

elements 13, 14 sewn seams 15, cords 16 and reinforcement strips 23, as shown in Figure 3. Importantly, the reinforcement strips 23 each have a length greater than that of the end assembly 19 and more specifically extend along the inner confronting edges of the tapes 11, 12 beyond the exposed ends 21' and 22' of the stud 21 and the pin 22, respectively that adjoin the rows of elements 13, 14, so as to protect the tape portions adjacent to the end assembly 19 against damage which would otherwise result from repeated handling of pin 22 and socket 20.

Figure 4 illustrates a modified embodiment in which a pair of reinforcement strips 23a, 23a are applied only to the tape end portions where the end assembly 19 is located, instead of the strips 23 extending along the entire length of the fastener as embodied in Figure 1.

Figures 5 and 6 illustrate a further modification which is substantially the same as the embodiment of Figure 1, except that there is provided a reinforcement strip 23' extending transversely of and wrapping around both sides of the tape 13, (14) at the region of the end assembly 19, so as to provide increased strength at that tape region.

Figure 7 illustrates another embodiment in which a reinforcement strip 23b wraps around both sides of each of the tapes 11, 12 and extends along the inner

longitudinal edge of the tape either through the entire length of the fastener or only at the bottom tape end where the end assembly 19 is located, the illustrated elements 13, 14 being of a discrete formation in which individual elements are mounted astride of the confronting edges of the tapes.

CLAIMS:

1. A separable slide fastener comprising a pair of stringer tapes (11, 12) made of a pliable thread-free material, rows of coupling elements (13, 14) mounted on the respective tapes along inner longitudinal edges thereof, a slider (17) adapted to bring said rows of coupling elements into and out of engagement, a separable end assembly (19) mounted on the bottom ends of said stringer tapes, and reinforcement strips (23, 23; 23a, 23a; 23', 23'; 23b' 23b) respectively attached at least to one side ofsaid tapes along an inner longitudinal edge thereof, characterized in that said reinforcement strips have a length greater than that of said end assembly and extend at least over the portion of each stringer tape which supports said end assembly and an endmost coupling element (13, 14) located next to said end assembly.

2. A separable slide fastener according to claim 1, each of said reinforcement strips (23, 23) extending respectively along the inner longitudinal edge of each of said stringer tapes (11, 12) over the entire length of the fastener.

3. A separable slide fastener according to claim 1, each of said reinforcement strips (23b, 23b) extending on both sides of a corresponding one of the stringer tapes (11, 12) along the inner longitudinal edge thereof through the entire length of the fastener,

and envelop bottom end portions of the tapes.

4. A separable slide fastener according to claim 1, said reinforcement strips, measured when said rows of coupling elements on the respective tapes are in a mutual engagement, having a combined width (W_1) which is greater than the width (W_2) of said end assembly (19).

5. A separable slide fastener according to claim 1, further including reinforcement strips (23', 23') extending transversely across and enveloping the bottom end portions of said tapes in the region of said end assembly (19).

6. A separable slide fastener according to claim 1, each of said reinforcement strips being made of an intimate weave of synthetic fibers.

7. A separable slide fastener according to claim 1, each of said reinforcement strips being made of a knitted taffeta.

8. A separable slide fastener according to claim 1, each of said reinforcement strips being made ofa film of synthetic regins.

FIG. 1

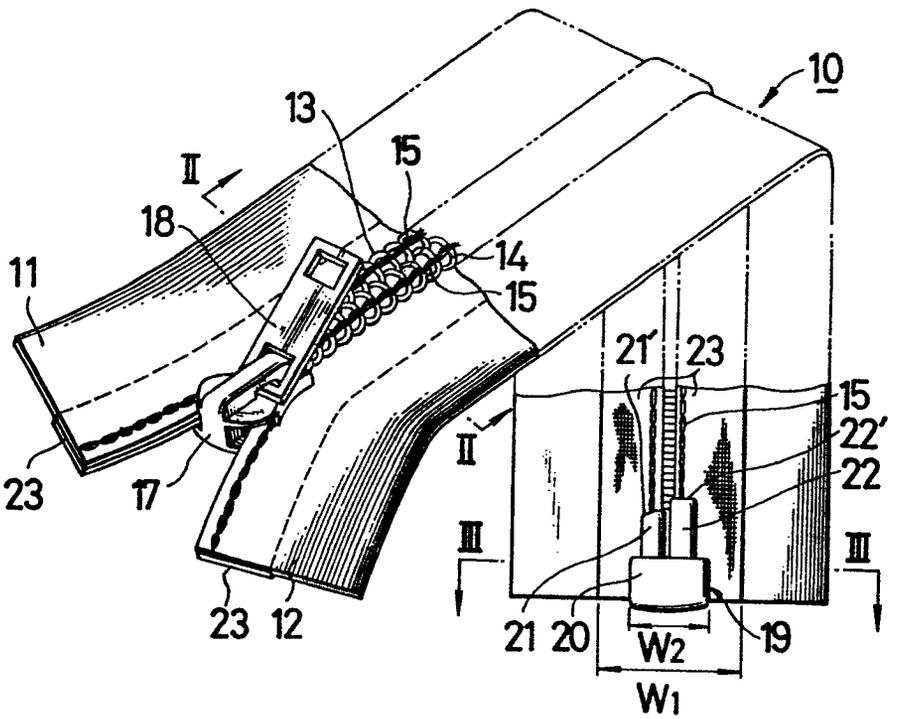
10
13
15
II
18
11
14
15
21'
23
15
22'
II
22
23
17
III
III
23
12
21
20
W2
19
W1

FIG. 2

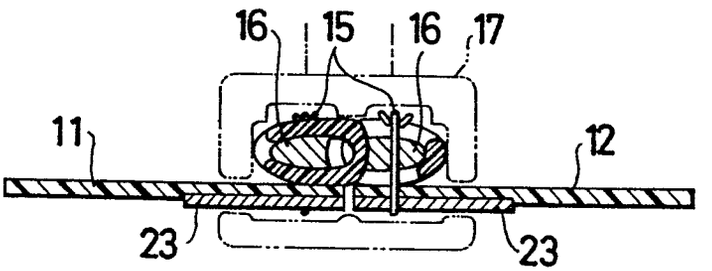
16
15
16
17
11
12
23
23

FIG. 3

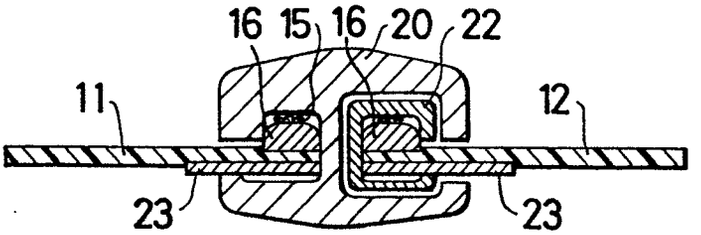

FIG. 4

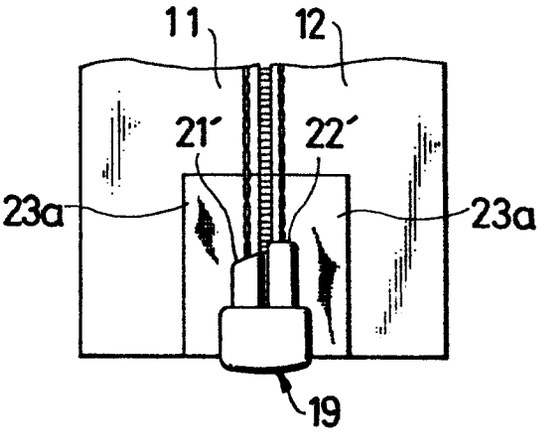

FIG. 5

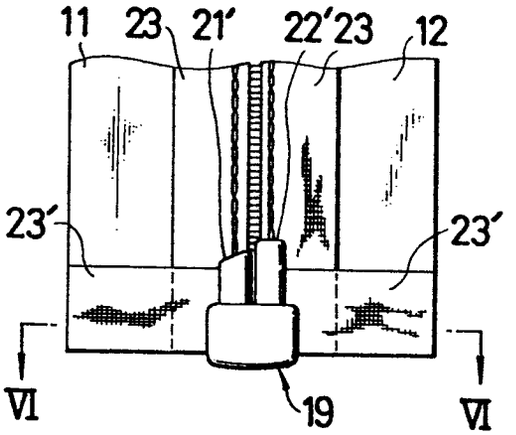

FIG. 6

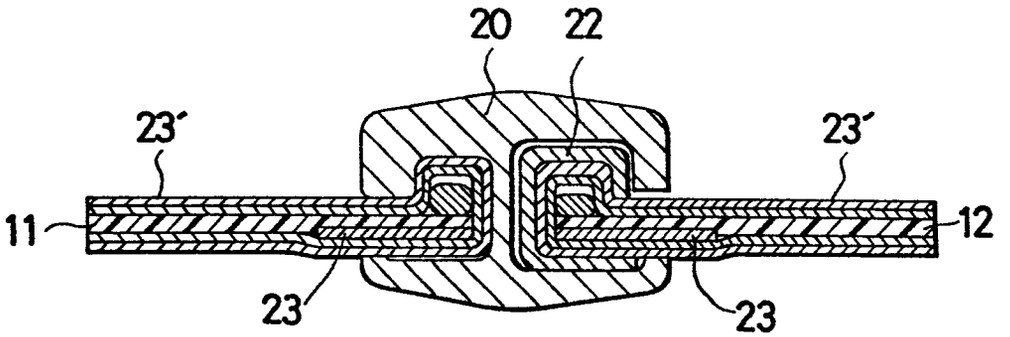

FIG. 7