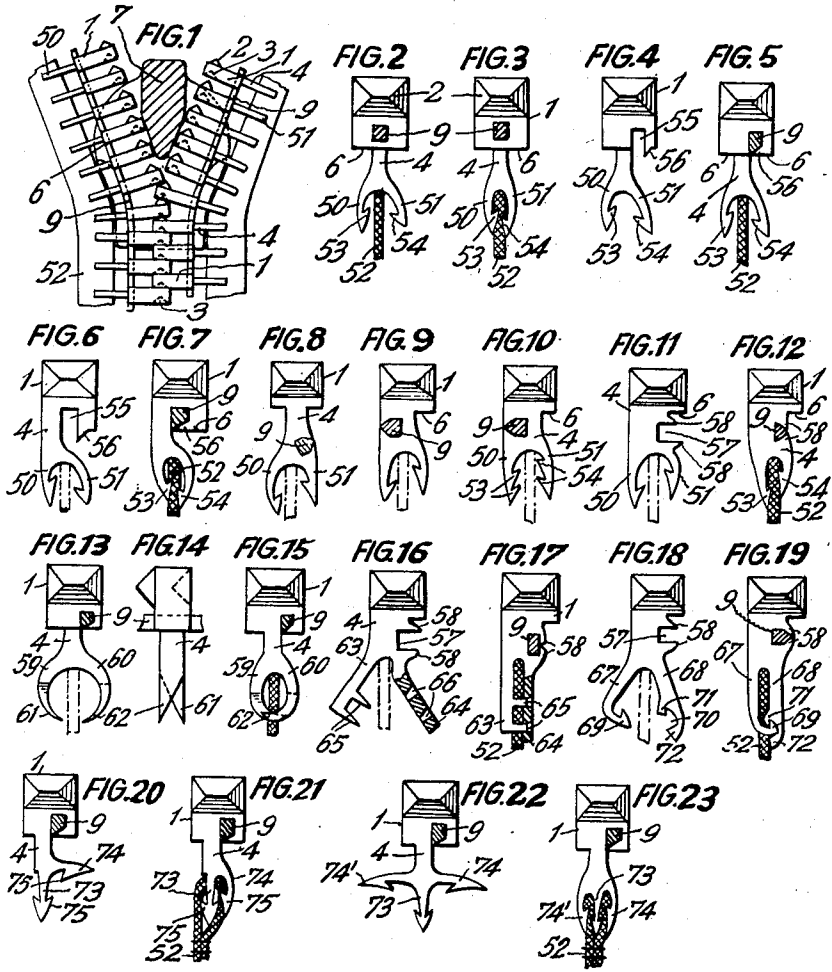


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SEPARABLE FASTENER

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SEPARABLE FASTENER

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Original application March 25, 1943, Serial No. 480,463, now Patent No. 2,380,623, dated July 31, 1945. Divided and this application May 12, 1945, Serial No. 593,352. In Switzerland October 14, 1942

1 Claim. (Cl. 24—205.16)

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This invention relates to separable fasteners which can be made of metallic or thermoplastic materials. More particularly, the invention relates to stringers for slider operated separable fasteners of the type wherein two rows of fastener elements are interlocked and disengaged by the slider bending the rows in the planes thereof toward and away from each other. This application is a division of my prior application Serial No. 480,463, filed March 25, 1943, now Patent 2,380,623, dated July 31, 1945.

It is an object of the invention to provide a fastener stringer of the above type having fastener elements capable of being attached directly to the article which is to be provided with the fastener, without first clamping the elements to the usual fabric tapes by means of which the fastener stringers are formed.

According to the invention each fastener element is provided with a stud forming an integral extension of the head portion element and by means of which the element is directly attached to the article to be provided with the separable fastener. In order to enable the connection of the fastener elements to the article in correct and simple manner the elements are first strung on a carrier consisting of rigid material but which owing to its shape or feeble cross sectional area is rendered flexible, so as to obtain fastener stringers having the required flexibility for the operation of the usual slider producing engagement and disengagement of the cooperating elements. The carrier can preferably consist of a thermoplastic material, such as high molecular condensation products, polyamides and the like, in the shape of threads, wires or bands, on which the fastener elements are longitudinally spaced. Such carrier threads can be obtained by drawing the material nearly to its limit of expansion, so that the threads do not expand any more and the fastener elements fixed thereon always keep their correct spacing, while in transverse direction these threads are extremely flexible to allow an easy displacement of the slider along the stringers.

Several embodiments of separable fasteners according to the invention are illustrated by way of example in the accompanying drawings, in which

Fig. 1 is a fragmentary plan view of a separable fastener according to the invention;

Fig. 2 is a transverse section through a fastener stringer according to the invention, the figure also illustrating a step in the method of attaching the stringer to an article;

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Fig. 3 is a transverse section of the stringer according to Fig. 2 with the stringer attached to an article;

Fig. 4 is an elevation of a modified fastener element according to the invention;

Fig. 5 is a transverse section of a stringer having the fastener elements according to Fig. 4, illustrating a step in the method of attaching the stringer to an article;

Fig. 6 is an elevation of a modified fastener element according to the invention;

Fig. 7 is a transverse section of a stringer having the fastener elements according to Fig. 6 with the stringer attached to an article;

Fig. 8 is a transverse section of another modified stringer according to the invention;

Fig. 9 is a transverse section of another modified stringer according to the invention;

Fig. 10 is a transverse section of another modified stringer according to the invention;

Fig. 11 is an elevation of another modified fastener element according to the invention;

Fig. 12 is a transverse section of a stringer having the fastener elements according to Fig. 11 with the stringer attached to an article;

Fig. 13 is a transverse section of another modified stringer according to the invention;

Fig. 14 is an elevation of a fragment of the stringer according to Fig. 13 as viewed from the right;

Fig. 15 is a transverse section of the stringer according to Figs. 13 and 14 with the stringer attached to an article;

Fig. 16 is an elevation of another modified fastener element according to the invention, with parts in section;

Fig. 17 is a transverse section through a stringer having the fastener elements according to Fig. 16 with the stringer attached to an article;

Fig. 18 is an elevation of another modified fastener element according to the invention;

Fig. 19 is a transverse section through a stringer having the fastener elements according to Fig. 18 with the stringer attached to an article;

Fig. 20 is a transverse section of another modified stringer according to the invention;

Fig. 21 is a transverse section through the stringer according to Fig. 20 with the stringer attached to an article;

Fig. 22 is a transverse section of another modified stringer according to the invention; and

Fig. 23 is a transverse section through the stringer according to Fig. 22 with the stringer attached to an article.

As represented in Figs. 1, 2 and 3, the slide

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fastener comprises fastener elements having a head portion 1 provided with the interlocking coupling projection 2 and socket 3. The end of the fastener element opposite to the coupling projection and socket is formed by a connecting stud 4 integral with the head portion 1 and having two free end portions 50 and 51, which, as shown in Fig. 2, are spread apart before the fastener element is attached to a piece of fabric, leather or other article 52. The two end portions 50 and 51 are provided on their sides facing each other with hooks 53 and 54. The head portions 1 are firmly secured to a carrier 9 of wire, thread or band shape. The carrier 9 is formed of a non expansible but resiliently flexible material, as for example polyamide or another high molecular poly-condensation product. The fastener elements are directly die-cast on the carrier 9. They could also be made separately and strung on the carrier to be secured thereby by pressure. The fastener elements can be made from metal or from thermoplastic material. For attaching a fastener stringer thus formed to an article 52, the edge of the article is introduced between the spread apart end portions 50 and 51 of the connecting studs as shown in Fig. 2 and then both end portions are pressed towards each other by means of any suitable instrument, so that the hooks 53 and 54 penetrate into the material of the article 52 and produce a firm connection of the stringer with the article. The two hooks 53 and 54 of the end portions 50 and 51 are axially displaced so that they do not prevent each other from penetrating into the material. The width or cross sectional area of the connecting stud 4 is smaller than that of the fastener element so that shoulders 6 are formed between the connecting stud and the fastener element for guiding the usual operating slider 7 of the fastener.

In the example according to Figs. 4 and 5 the carrier 9 is inserted into a notch 55 provided in the lower portion of the head portion 1 laterally of the connecting stud 4 and then the projection 56 laterally of the notch is bent towards the carrier 9 and pressed against the latter so as to ensure a firm connection of the fastener element with the carrier. The attachment of the fastener elements on the article 52 which is to be provided with the fastener is effected in the same manner as in the example according to Figs. 1 to 3, by means of the end portions 50 and 51 of the connecting studs 4. Guiding of the slider is obtained by means of shoulder surfaces 6 on both sides of the connecting stud 4.

In the modification according to Figs. 6 and 7 a notch 55 is provided in the middle of the rear end of the head portion, while the connecting stud 4 is disposed on one side of this portion. The carrier thread 9 placed in the notch 55 is fixed to the fastener element by clamping the projection 56 down on the carrier. A guiding surface 6 for the slider is disposed on one side of the head portion 1. The connecting stud 4 is again provided with two free end portions 50 and 51 which are clamped towards each other for attaching the stringer formed by the fastener elements and the carrier 9 to the article 52, whereby the hooks 53 and 54 penetrate into the material of the article.

The fastener element shown in Fig. 8 is attached to the carrier 9 by having the carrier inserted into a notch provided in the connecting stud 4 and fixed therein by pressing the material of the stud towards the carrier. The connect-

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ing stud is again provided with two free end portions 50 and 51 for attaching the fastener element to the article to be provided with the fastener.

In Fig. 9 the connecting stud of the fastener element is disposed laterally on the head portion 1 and the carrier 9 is clamped in a notch of the connecting stud. A guiding surface 6 is provided on the fastener element for the operating slider of the fastener.

The modification shown in Fig. 10 is similar to that shown in Fig. 9 with the exception that the free end portions 50 and 51 of the connecting studs are each provided with two prongs or hooks 53 and 54.

In the example according to Figs. 11 and 12 the connecting stud 4 of the head portion 1 of the fastener element is provided with a laterally open notch 57 for the carrier thread 9. The connecting stud is provided on one side of the head portion 1, while on the other side of this portion a guide surface 6 for the slider is provided. Above and below the notch 57 the material of the connecting stud forms projecting noses 58 which are pressed upon the carrier 9 after this latter is placed in the notch, so as to firmly lock the fastener element on the carrier. For attaching the fastener element to an article 52 the connecting stud 4 is provided with two free end portions 50 and 51 which are clamped together after the edge portion of the article has been inserted between them.

In the example according to Figs. 13, 14 and 15 the carrier 9 of the fastener elements is secured in a notch in the head portion of the element, laterally of the connecting stud 4. This latter is provided with two free end portions 50 and 60 having pointed ends 61 and 62 which are displaced relatively to each other in the plane of the stringer. For attaching the stringer to a piece of fabric or other article the edge portion of this latter is introduced between the end portions 50 and 60 which are then clamped towards each other so that the pointed ends 61 and 62 traverse the material of the article.

The fastener element represented in Figs. 16 and 17 is provided with a notch 57 in the connecting stud 4 for insertion of the carrier thread 9 which is clamped in the notch by pressing the two projections 58 of the material of the connecting stud against the carrier. The stud 4 is provided with two end portions 63 and 64 which are spread apart before the fastener element is attached to an article. The end portion 63 is provided with small prongs 65, and the end portion 64 with corresponding conical holes 66. For attaching the fastener element to the article, an edge portion of this latter is introduced between the two end portions 63 and 64 which are then pressed together so that the prongs 65 penetrate through the material of the article and into the holes 66 of the end portion 64, where they are then riveted as shown in Fig. 17.

In the example according to Figs. 18 and 19 the carrier 9 is secured in a notch 57 of the fastener element by pressing the projections 58 over the carrier inserted in the notch. The connecting stud is provided with two free end portions 67 and 68, of which the portion 67 has a hook-shaped pointed end 69, while the portion 68 is provided with a recess 70. In order to attach the fastener element to an article 52 an edge portion of the article is introduced between the spread apart end portions 67 and 68 and then these latter are clamped towards each other, so that the hook-

shaped end 69 penetrates through the material of the article 52 and into the recess 70 of the portion 68, to engage behind the nose 71 of this portion. Afterwards the end 72 of the portion 68 is pressed upwardly towards the hook-shaped end 69 so that this latter is maintained in engagement with the nose 71. In the examples according to Figs. 16 to 19, it is not necessary that both end portions of the connecting studs are spread apart before introducing an edge portion of the article to be provided with the fastener between the two end portions.

In the modification according to Figs. 20 and 21 the head portion 1 of the fastener element is secured to a carrier 9 inserted into a notch provided in the element. The connecting stud 4 is provided with two free end portions 73 and 74. The end portion 73 forms an extension of the connecting stud 4 and is directed according to the vertical axis of the fastener element, while the end portion 74 is spread laterally.

Both end portions are provided with hook-shaped ends 75. For attaching the fastener element to an article such as a piece of fabric 52 the end portion 73 is stuck through the edge portion of the fabric and this edge portion is then folded down and sewn to form a seam as shown in Fig. 21. The hooks 75 of the portion 73 now prevent the stud from being pulled off the article 52. The end portion 74 is then closed down towards the portion 73 so that a portion of the seam of the cloth is clamped between the two end portions of the connecting stud.

The fastener element shown in Figs. 22 and 23 is provided with a connecting stud 4 having three end portions 73, 74 and 74'. For attaching this fastener element to a piece of fabric or other material 52 the central portion 73 is stuck through the fabric and the edge portion of the fabric is folded down to form a seam. The two lateral end portions 74 and 74' are then bent towards the central portion 73, so that both branches of the seam are clamped between the end portions of the connecting stud 4.

While I have shown and described a number of embodiments which my invention may assume in practice, it will be understood that variations may be made in the configuration and combination of the several parts without departing from

the spirit of the invention or the scope of the appended claim.

I claim:

A stringer forming one complementary part of a slide operated separable fastener; said stringer comprising a row of fastener elements having head portions formed adjacent one of their ends with opposite projections and recesses for releasable interlocking engagement with the recesses and projections, respectively, of the other complementary stringer of the fastener; a stud carried by and projecting from the opposite end of each head portion formed with spaced jaws, one at least of which jaws is adapted to be bent toward the other for securing between them the article to which the stringer is to be attached; the end of each head from which said stud projects being shaped to form a slider guide surface at each side of said stud and being formed with a notch; and a wire-like bendable but substantially non-extensible carrier member extending through the notches of said head portions, each of which head portions has a portion adjacent the notch deformed to bear against the carrier member for fixedly securing the fastener element to it, the fastener elements being so secured to said carrier member with the head portions, studs, and jaws of each in spaced out of contact relation to those of adjacent fastener elements.

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