

Sept. 20, 1971

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3,605,206

SLIDE-FASTENER

Filed Sept. 2, 1969

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FIG. 5

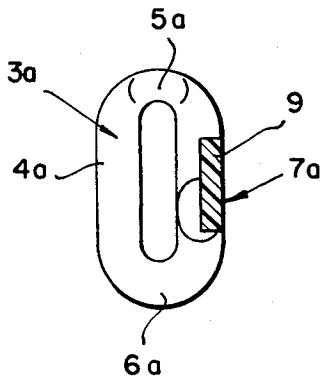


FIG. 4

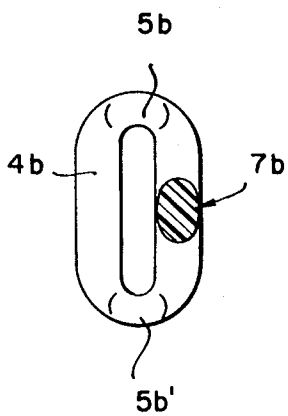
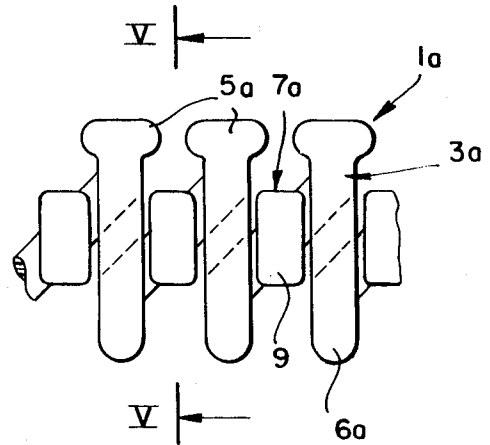


FIG. 7

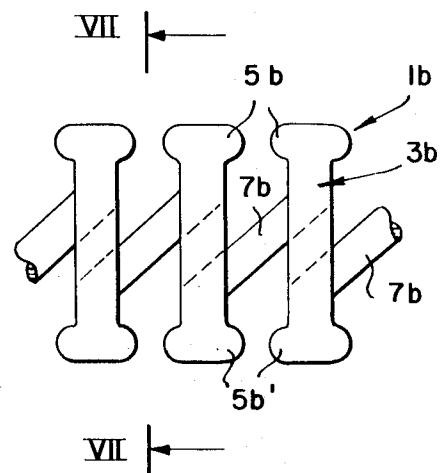


FIG. 6

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FIG. 1

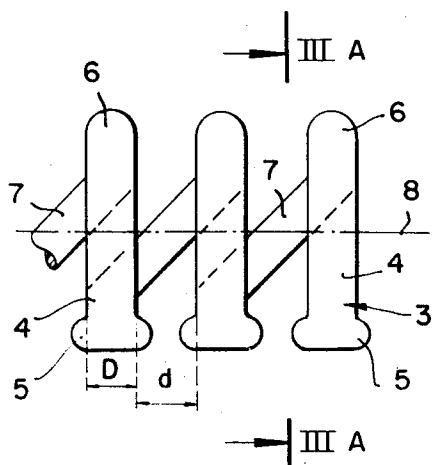
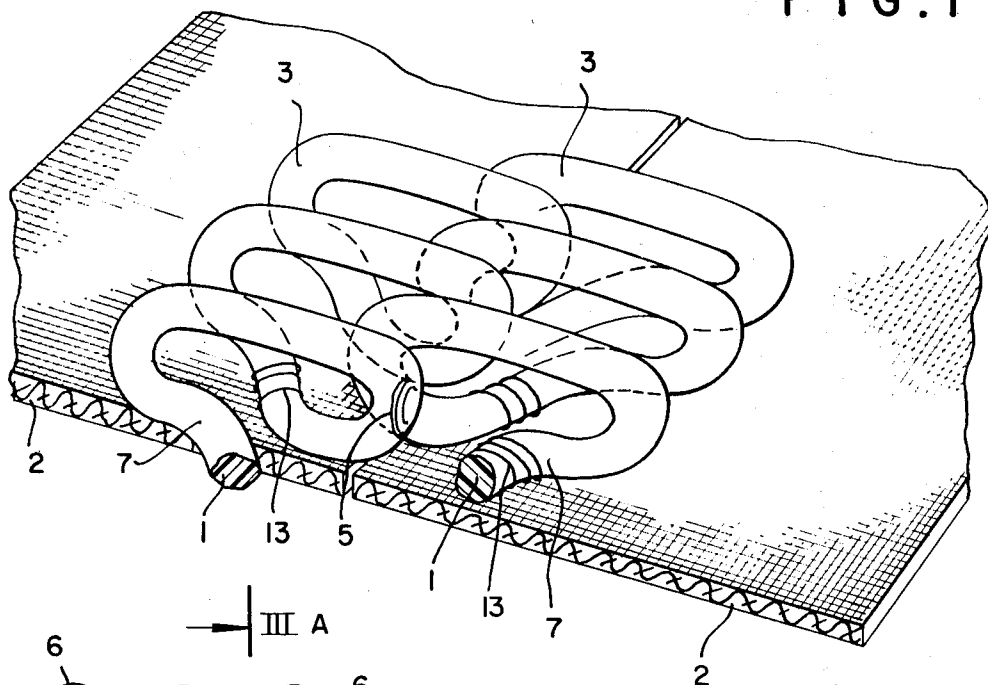


FIG. 2

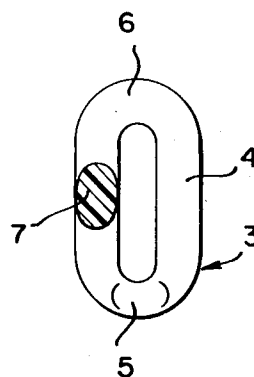


FIG. 3A

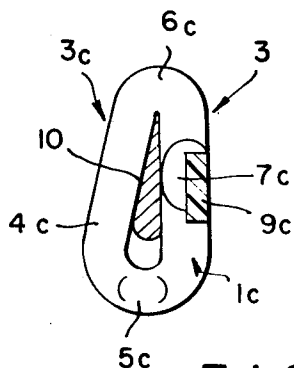


FIG. 3B

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FIG. 8

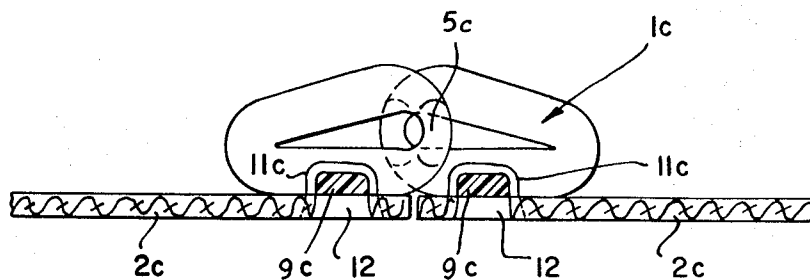


FIG. 9

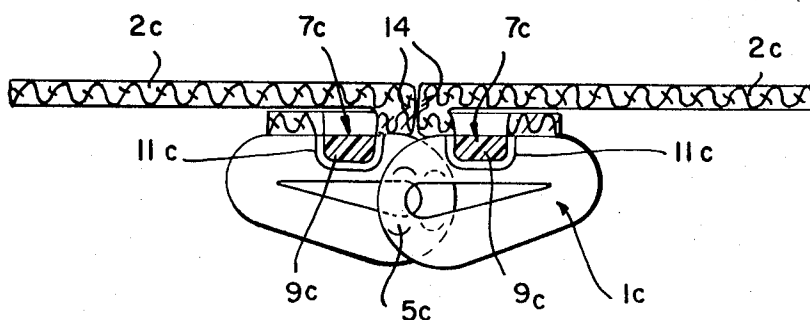
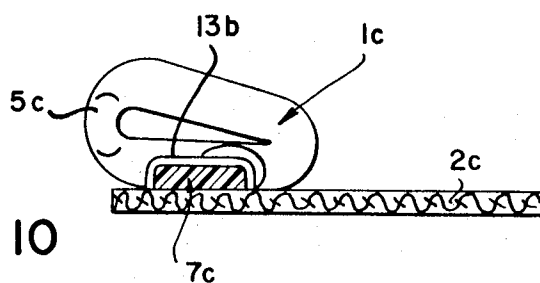


FIG. 10



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SLIDE-FASTENER

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P 18 17 134.1

Int. Cl. A44b 19/12

U.S. Cl. 24—205.1C

10 Claims

ABSTRACT OF THE DISCLOSURE

A slide fastener has a slide-fastener half consisting of a support tape and a coupling element in the form of a coil of synthetic resin mounted thereon. The coil has turns which each have a head next to an edge of the tape, a bight opposite the head, an upper shank extending between the head and bight and lying orthogonally to the coil axis, and a lower shank lying on and attached to the tape at an angle to the coil axis. The heads are flattened so that a head of a similar coil can be gripped between neighboring heads. The upper shank can be inclined to the tape so that the head is wider than the bight and the lower shank can be also flattened for better contact with the tape for bonding thereto or for creating a formation preventing shifting of the coupling element relative to the tape.

The present invention relates to a slide fastener and, more particularly, to a slide-fastener half with an improved system securing the coupling element to the tape.

Slide fasteners are known wherein a pair of tapes can be releaseably laterally joined to each other by means of interengaging coupling elements in the form of synthetic-resin coils at their edges. A slider fitting over both coils can be shifted to mate or separate them. Each coil and its respective support tape constitutes, thus, a slide-fastener half.

The coil is attached to the tape by a row of stitches in most cases. Often these stitches simply overlie the separate links of turns of the coil to hold it to the tape, leaving the heads of the turns or links free to engage with those of the confronting coil. With such an arrangement as the slider moves along the coupling element the stitches are abraded and, therefore, eventually wear out. Indeed, any object brought into contact with the coils abrades the stitches, and deterioration often occurs in the washing or drying cleaning of garments.

In another arrangement, the coils have turns with generally U-shaped end portions that are sewn to the edge of the tape, or simply woven into the tape like a thread. As long as such a fastener remains closed there is no difficulty; however, in an open condition the coils are liable to slip back through these stitches and make subsequent closure of the fastener very difficult. If not impossible. In addition, the coil is fastened in this instance, to the tape at a location remote from its head so that a relatively long lever arm is provided which, on stressing of the fastener, allows the coil to be ripped loose from its point of attachment.

It is possible to overcome some of these disadvantages by threading a filler cord or the like through the coil, and stitching through this cord. This measure, however, requires a further structural element in the fastener, and is not applicable to very fine fasteners. Also systems wherein the coupling element of the slide fastener, each turn of which has parallel shanks running from and to its head, are held in place by threads of the tape are not entirely satisfactory in preventing withdrawal of the turns.

It is, therefore, the principal object of the present invention to provide an improved slide-fastener half.

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A more specific object is to provide a slide-fastener half with improved coupling coil and system for securing it to the support tape which overcomes the above-mentioned disadvantages.

Another specific object is to provide a coil which can be easily and surely attached to a tape, and which can be used for either half of a slide fastener.

The above objects are attained, in accordance with the present invention, by a slide-fastener half comprising an elongated generally helicoidal coil of synthetic resin constituting a coupling element of the continuous type and a generally flat support tape. The coil has a plurality of turns each consisting of a head proximal to an edge of the tape, a bight remote therefrom, an upper shank extending orthogonally to the longitudinal axis of the coil between the head and the bight, and a lower shank lying on and attached to the tape and extending at an angle to the axis between the bight of one turn and the head of the neighboring turn.

According to a further feature of the present invention, the lower shanks lie at an angle of around 45° to the axis and are formed with a flattened lower surface portion engaging and facilitating attachment of the coil with the tape. The latter may be a synthetic-resin band or a knitted or woven fabric web while the coupling element is composed of linearly molecularly oriented monofilamentary synthetic resin of the thermoplastic type, preferably polyarnide.

In accordance with another feature of the invention, the coil is as described above but is formed with two flattened heads rather than a head and a bight. This makes the coil fully symmetrical thereby making use of the same, rather than a specular coil, possible for both halves of a single fastener. The coil of one half will have one row of heads lying along the confronting edge of the support tape while the other half used a similar coil with the other row of heads lying proximal to the confronting edge.

When the coil is woven into the tape, or passed through holes in the tape, the weft threads of this tape lie between the turns or links and are, therefore, protected from wear. Furthermore, when the coil is stitched to the tape, preferably held by the looper or locking threads which pass over the middle of the lower shank when a two-thread double-locked stitch is used, the threads holding the tape are also out of harms way between the links. In this manner, the coil is held between the links thereby creating only a relatively small lever arm at the attachment site so that the coil can not be easily ripped loose, while permitting the flexing of the links that is necessary for opening and closing of the fastener. However, the invention contemplates the use generally of double-chain stitches and especially multiple-needle chain stitches (e.g., twin-needle double chain stitches) to retain the coupling elements. Preferably the retaining stitches are of double-locked type with two needle threads and a single locking thread (which may overlie the coupling element) designated as Stitch Type 402 by the Federal Specifications Board of the United States.

The above and other objects, features, and advantages of the present invention will become more readily apparent from the following description, reference being made to the accompanying drawing, in which:

FIG. 1 is a diagrammatic perspective view of a portion of a slide fastener according to the present invention;

FIG. 2 is a top view showing the coil of the fastener of FIG. 1;

FIG. 3A is a section taken along line IIIA—IIIA of FIG. 2;

FIG. 3B is a section similar to that of FIG. 3A showing a second embodiment of the present invention;

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FIG. 4 is a top view of a third embodiment of the slide-fastener coil of the present invention;

FIG. 5 is a section taken along line V—V of FIG. 4;

FIG. 6 is a top view of yet another embodiment of the present invention;

FIG. 7 is a section taken along line VII—VII of FIG. 6;

FIG. 8 is a section through a fastener using the coil shown in FIG. 3B;

FIG. 9 is a section through another fastener using the coil of FIG. 3B and

FIG. 10 is a cross section through a slide-fastener half using, once again, the coil shown in FIG. 3B

As shown in FIGS. 1, 2 and 3A, a slide fastener consists of two slide-fastener halves each comprising, basically, a coil 1 mounted on a support tape 2. Each coil 1 is formed with a plurality of links or turns 3 each comprising, in turn, a flattened head 5, a bight 6, an upper shank 4, extending at a right angle to a coil axis 8, FIG. 2, and a lower or connecting shank 7 extending from the head 5 of one turn 3 to the bight 6 of the next, at an angle of about 45° to the axis 8.

As shown in FIG. 2, the distance *d* between neighboring turns 3 is approximately equal to the diameter *D* of the round synthetic-resin monofilament forming the coil 1.

The coils 1 are advantageously sewn to the tapes. A chain stitch is useful for this; here, however, a two-thread double-locked stitches 13 of the Type 402 is used with its looper or locking threads passing over the turns of the coupling element while the two needle threads lie respectively to the right and to the left of the attaching location, to hold the coil 1 in place. The coil 1 is formed on a mandrel, as is well known in art, or on a forming wheel.

FIGS. 4 and 5 show a coil 1a having shanks 4a and 7a bight 6a, and head 5a much as in FIGS. 1, 2, and 3A. The lower connecting shank 7a is here formed with a flattened portion 9 which facilitates attachment of the coil 1a to one a support tape, as will be described below.

FIGS. 6 and 7 show another coil 1b with shanks 4b and 7b connected together by two heads 5b and 5b. In all respects, save in the replacement of the bight 6 with the head 5b, the coil 1b of FIGS. 6 and 7 is identical to that of FIGS. 1, 2 and 3A. This extra head 5b presents the great advantage of making the coil 1b fully symmetrical so that it can be used for both halves of a slide fastener without the necessity of reversing it.

A preferred embodiment of the present invention is shown in FIG. 3B. Here the coil 1c is provided which has shanks 7a and 4c, a bight 6c, a head 5c, and a flattened connecting flank portion 9c as in FIGS. 1, 2, and 3A. Here, however, the shank 4c is inclined to the shank 7c, as seen from the end, thereby forming a narrowing opening through the center and making the coil 1c wider at the head 5c than at the bight 6c. This construction provides a slide fastener coil or coupling member which is relatively flat, only being wide in the region where this width is strictly necessary. In addition, a thread 10 is provided extending axially up the center of the coil 1c to reinforce it.

FIGS. 8, 9, and 10 show different methods of mounting the coil 1c on support tapes to provide a firm and static connection therebetween.

In FIG. 8 a pair of the coils 1c are mounted on respective tapes 2c. They are held in the regions of their narrowed, flattened shank portions 9c by weft threads 11c of the tapes 2c. These tapes are, to this purpose, provided with holes 12 through which the coils 1c are woven.

FIG. 9 is entirely similar to FIG. 8, except that the tapes 2c are bent at 14 so that if, as seen in FIG. 9, the up side of the fastener is used as the outside, a very neat appearance is given and the coils 1c are fully protected against damage from the outside.

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Finally, FIG. 10 shows the coil 1c stitched to a tape 2b by stitches 13b, once again of the preferred two-thread double locked stitch (Type 402): the coil is simultaneously bonded to this tape 2b along the interface between the flattened portion 9c and the tape 2b.

I claim:

1. A slide-fastener half comprising an elongated generally helicoidal coil of synthetic resin and a support tape, said coil having a plurality of turns each with a head proximal to an edge of said tape, a bight remote therefrom, an upper shank extending substantially orthogonally to the longitudinal axis of said coil between said head and said bight, and a lower shank lying on and attached to said tape and extending at an angle to said axis between said bight and the head of a neighboring turn, said bight, head and upper shank of each turn lying generally in a respective plane perpendicular to the axis of the coil with only the lower shank extending away from this plane, said lower shanks all lying generally in a common plane parallel to said tape and resting thereon, said lower shanks being the exclusive portions of each turn secured to the tape.

2. The slide-fastener half defined in claim 1 wherein each of said lower shanks is formed with a flattened portion engaging said tape.

3. The slide-fastener half defined in claim 2 wherein said lower shanks extend at an angle of about 45° to said axis.

4. The slide-fastener half defined in claim 2 wherein each of said lower shanks is bonded to said tape at said portion.

5. The slide-fastener half defined in claim 2 wherein said heads are flattened and are thereby adapted to grip similar flattened heads between one another.

6. The slide-fastener half defined in claim 2 wherein said tape is generally flat and said upper shanks are inclined to said tape, each of said turns being thereby wider adjacent said head.

7. The slide-fastener half defined in claim 2, wherein a filler cord extends axially through said turns of said coil.

8. The slide-fastener half defined in claim 2, wherein said lower shank is sewn to said tape.

9. The slide-fastener half defined in claim 2, further comprising a two-thread double-locked stitch connecting said lower shank to said tape.

10. A coupling-element coil for a slide fastener comprising a plurality of turns each having a pair of heads, an upper shank, and a lower shank, said coil being elongated and having a longitudinal axis, said upper shank extending between said pair of heads substantially orthogonally to said axis, said lower shank extending from one of said heads to the head of a neighboring turn at an angle to said axis, said coil being substantially symmetrical about said axis, said bight, head and upper shank of each turn lying generally in a respective plane perpendicular to the axis of the coil with only the lower shank extending away from this plane, said lower shanks all lying generally in a common plane parallel to said tape and resting thereon, said lower shanks being the exclusive portions of each turn secured to the tape, each of said shanks having a flattened portion adapted to be secured to a support tape.

References Cited

UNITED STATES PATENTS

3,170,207	2/1965	Morin	24—205.13BcUX
3,430,304	3/1969	Swainson	24—205.1CUX
3,490,110	1/1970	Frohlich	24—205.1CUX

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24—205.13C, 205.16C