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Heimberger

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[54] **METHOD OF MAKING SLIDE-FASTENER HALVES**

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[52] **U.S. Cl.** ..... **112/265;** 24/205.16 C

[51] **Int. Cl.** **A44b 19/12;** A44b 19/34

[58] **Field of Search** ..... 2/265; 112/104, 113, 265; 24/205.1 C, 205.16 C, 205.13 C

[56] **References Cited**

UNITED STATES PATENTS

2,910,755	11/1959	Hansen	24/205.1 C
3,283,379	11/1966	Burbank	24/205.1 C
3,665,561	5/1972	Heimberger	24/205.1 C
3,750,605	8/1973	Warburton et al.	112/265

Primary Examiner—Werner H. Schroeder
Attorney, Agent, or Firm—Karl F. Ross; Herbert Dubno

[57] **ABSTRACT**

A preformed multiturn coupling element of the helicalcoil or meander type is juxtaposed with a tape and a loop is formed by a stitching thread whose needle is thrust upwardly between each pair of turns. A gripper engages the loop and draws it laterally out of the coupling element to reintroduce it between another pair of turns where it is engaged by another loop thrust through the tape.

4 Claims, 5 Drawing Figures

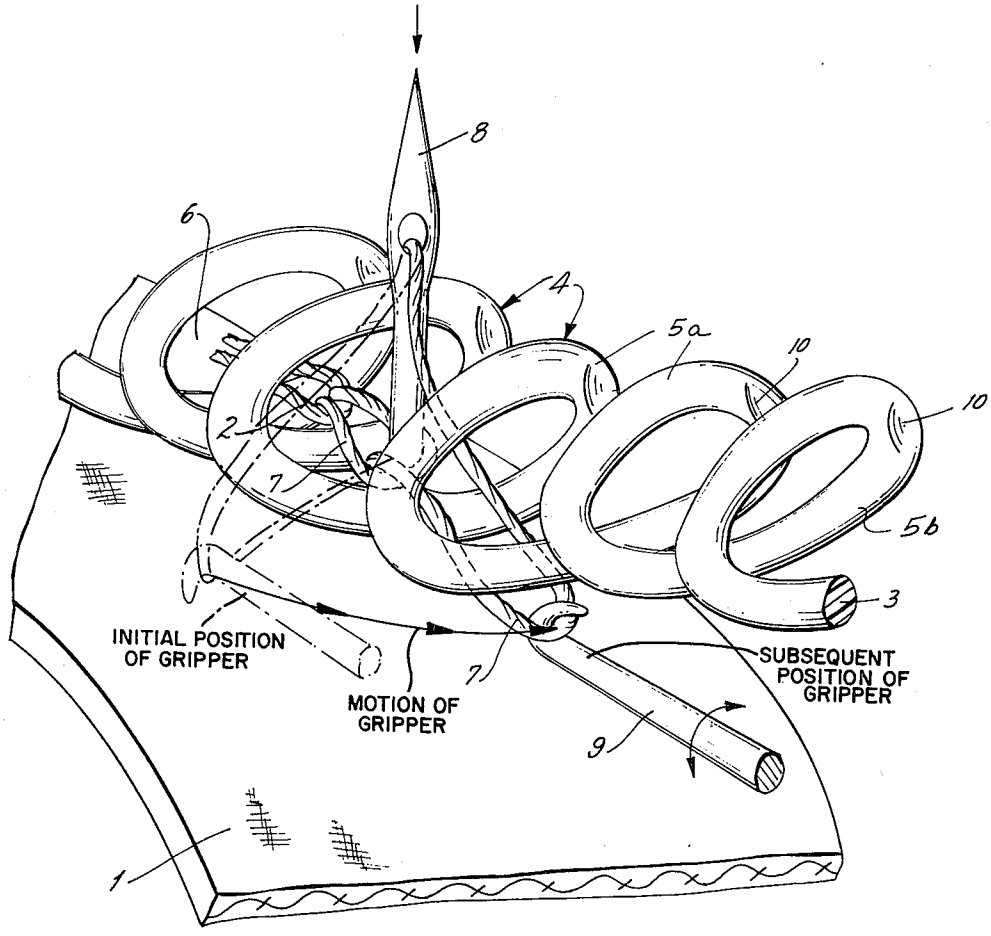


FIG. 1

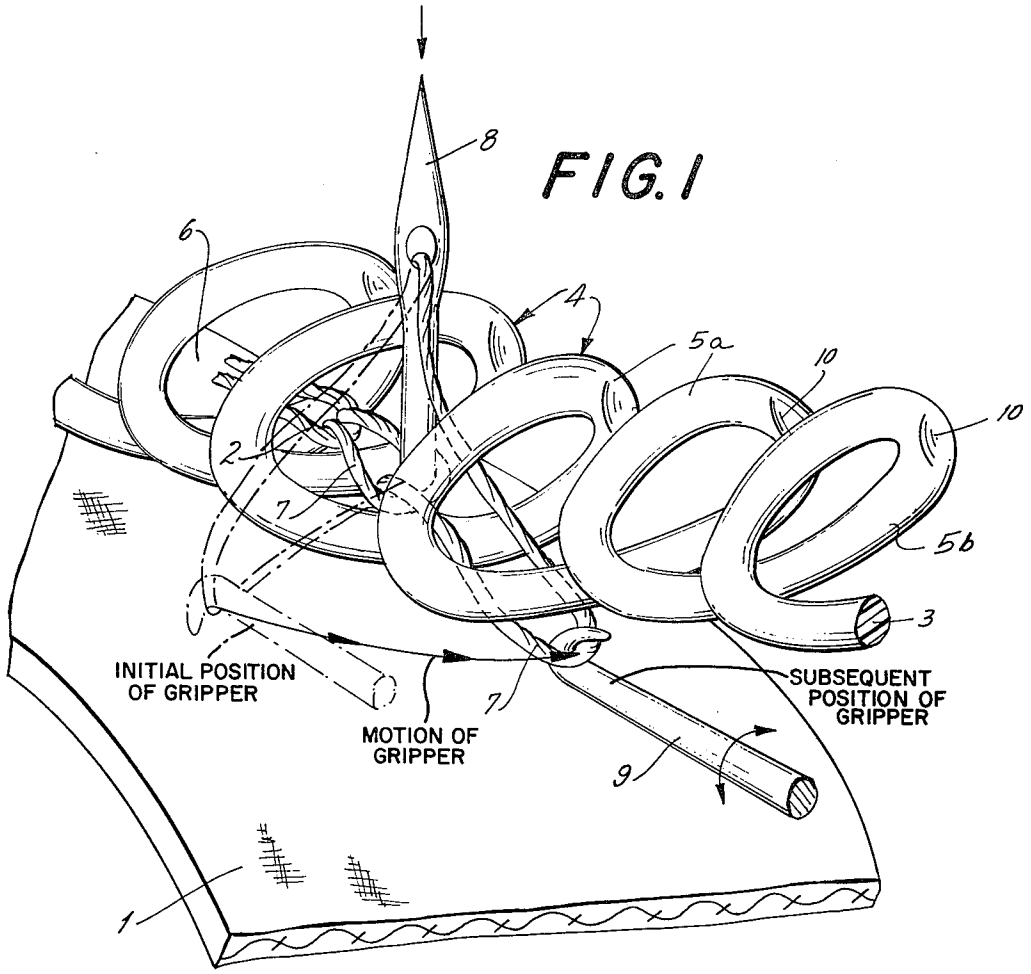
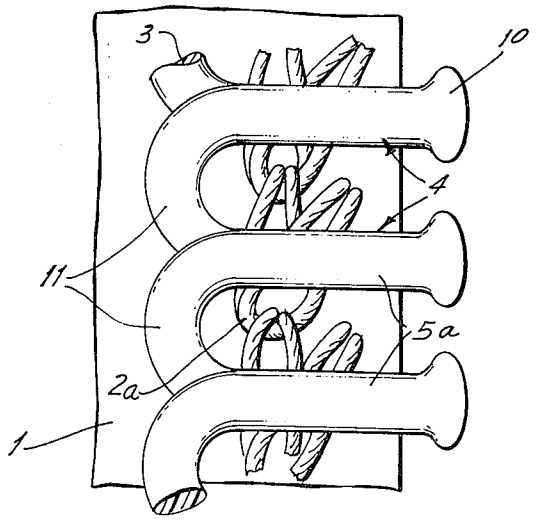

8
6
4
5a
10
10
2
7
5b
3
INITIAL POSITION OF GRIPPER
MOTION OF GRIPPER
7
SUBSEQUENT POSITION OF GRIPPER
9
1

FIG. 2


3
10
4
11
5a
2a
1

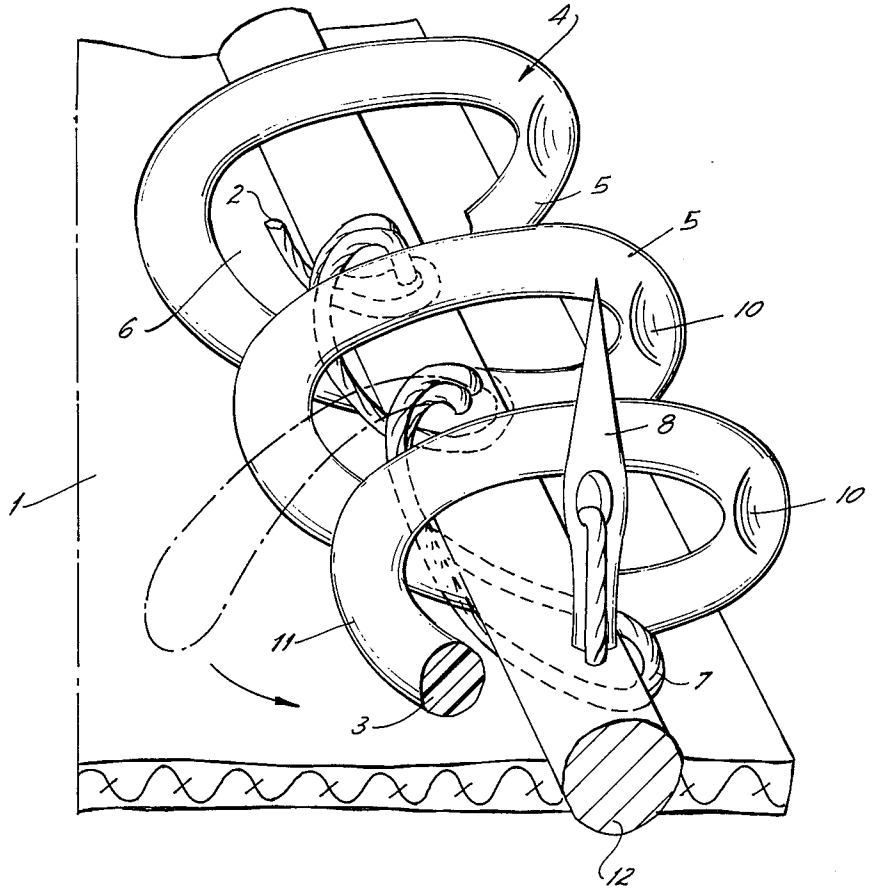


FIG. 3

FIG. 4

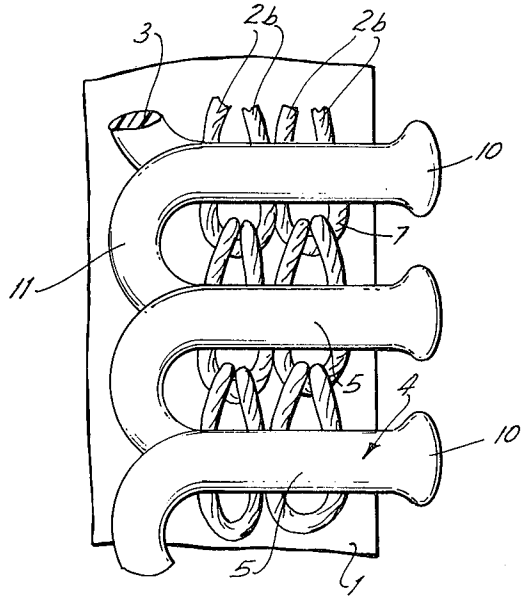
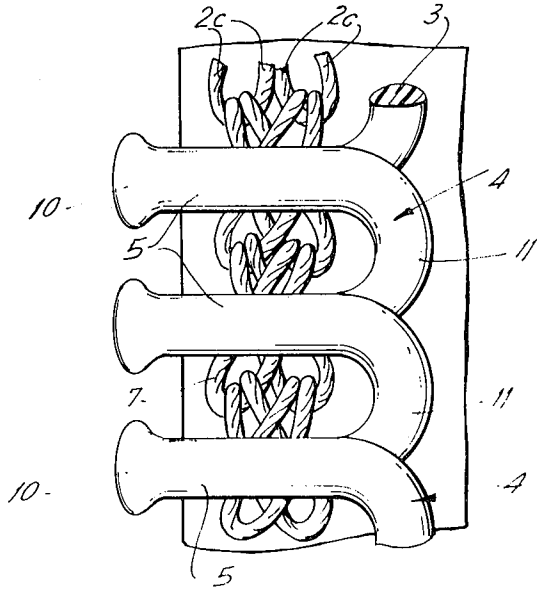


FIG. 5



METHOD OF MAKING SLIDE-FASTENER HALVES

FIELD OF THE INVENTION

This invention relates to a method of amking a slide fastener. More particularly, this invention relates to a method of making such a half from a textile tape and a preformed monofilamentary coupling element.

BACKGROUND OF THE INVENTION

A slide fastener usually comprises a pair of textile support tapes each carrying on one longitudinal edge a coupling element. A slider is displaceable along these elements to join them together and separate them.

In one common construction the coupling element is a synthetic-resin monofilament, usually made of a polyamide such as Nylon, having a plurality of turns. So-called meander types of coupling elements have variously shaped turns and are often U-shaped or open as seen in longitudinal projection. The more common coupling element is of the coil type, wherein the monofilament has a helocoidal shape and is O-shaped or closed longitudinal projection. This latter type has turns each formed by a lower shank lying on the respective stringer tape and an upper shank above the lower shank relative to the tape. A coupling head is formed in the filament between the two shanks of one turn, and the upper shank of each turn is connected by a bight to the lower shank of the upstream turn and the lower shank of each turn is similarly connected to the upper shank of the downstream turn, or vice versa. In the so-called modified meander or coil type each turn has a bight portion connecting each shank to the shanks of the turns on each side. The shanks may lie directly one above the other, seen in a projection orthogonal to the plane of the tape, or may be oppositely inclined as in a true helix.

Such coupling elements are secured to the support tape as a general rule by stitching. The element is exactly positioned on the tape and is stitched thereto. The stitching usually overlies the two shanks of the fastener, two rows of stitching usually being employed to insure secure fastening. Alternately the monofilament is fed to the sewing station as a straight element and is there formed into a coil or meander as the stitching progresses. This latter method is quite slow since the various motions necessary to both stitch and form a coupling element turn by turn are considerable. The former method has the disadvantage that the rows of stitching overlying the turns of the element are subject to considerable wear by use of the garment in which the fastener is mounted and by displacement of the slider.

OBJECTS OF THE INVENTION

It is, therefore, an object of the present invention to provide an improved method of making a slide-fastener stringer half.

Another object is the provision of an improved method for securing a coupling element to a support tape.

Yet another object is a method of making a slide-fastener stringer which is rapid and simple.

SUMMARY OF THE INVENTION

These objects are attained according to the present invention in a method wherein a preformed monofilament coupling element is juxtaposed with the tape and a loop of thread is passed up through the tape and over

the shank of the turn lying on the tape, then under the next turn. Another loop of this thread is then passed up through this loop and over the next shank, and under the following turn and so on. The coupling element in this fashion is secured to the tape by a simple chain-stitch whose loops overlie the lower shanks of each turn.

According to another feature of this invention the loop of each stich is pulled laterally away from the coil away from the coupling heads thereon and is thereafter returned under the next turn and released once the next loop is passed therethrough. This displacement is effected by a gripper of the type known in the sewing (chain-stitching) art.

In accordance with yet another feature of the present invention the coupling element is closed in projection and is provided with a longitudinally throughgoing filler cord. The loops each pass up through the cord, then under the next turn where the next loop passes through it.

DESCRIPTION OF THE DRAWING

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

FIG. 1 is a perspective view illustrating the method according to the present invention;

FIG. 2 is a top view of a slide-fastener stringer half according to this invention;

FIG. 3 is another perspective view illustrating the method of this invention when a filler cord is employed; and

FIGS. 4 and 5 are top views of other embodiments of stringer halves according to the present invention.

SPECIFIC DESCRIPTION

As shown in FIG.1 a slide-fastener stringer half is formed of a support tape 1 to which is secured a preformed polyamide monofilament 3 formed with turns 4 having upper shanks 5*a*, lower shanks 5*b*, coupling heads 10, and connecting bights 11 as described above. FIGS. 2, 4 and 5 illustrate how in a projection orthogonal to the plane of the tape 1 the upper shanks 5*a* overlie the lower shanks 5*b*.

The coil 3 is secured to the edge of the tape 1 by successively laying its shanks 5*b* on this tape and piercing the tape 1 with a needle 8 carrying a thread 2. A gripper 9 engages the thread 2 in a manner well known in the art and forms a loop 7 which, as shown in dot-dash lines in FIG. 1 is first drawn back from between the turns 4, and then forward under the shank 5*b* of the next succeeding turn while the needle 8 withdraws downwardly. Thereafter, the needle again pierces the textile tape 1 between the next two turns 4 and through the loop 7 held by the gripper 9 which then releases this loop and hooks the thread 2 on the needle 8 to form another stitch in the same manner. This method forms a type 203 chainstitch according to Federal Standard No. 751*a* of Jan. 1965.

This method may be expanded by the use of two needles 8 and a single gripper 9 to produce an embodiment as shown in FIG. 2 with a double stitching 2*a*. Two parallel rows of stitching 2*b* can also be used as shown in FIG. 4. The arrangement of FIG. 5 has two rows of stitching 2*c* which cross over each other.

FIG. 3 shows a method similar to that of FIG. 1 wherein the coil 3 is provided with a longitudinally throughgoing filler cord 12 through which the needle 8 pierces. The individual loops 7' here go from above the cord 12 to below it, passing under the one lower shank 5*b* and under the next so that the filler cord 12 holds the coil 3 down.

A slide-fastener made with stringer halves 1, 2, 3, according to this invention, has its stitching 2 completely received within the coil so that the slider will not wear through the stitches as it is displaced along the fastener, thereby giving the fastener a much longer service life. Since a preformed coil is used the production speed is greatly increased as the controlling factor becomes the stitching speed of the sewing apparatus.

I claim:

1. A method of making a slide-fastener stringer half comprising the steps of:

a. feeding a support tape and a continuous synthetic-resin monofilament preformed with a succession of turns each having a pair of shanks joined together at a coupling head to a sewing station so that shanks of successive turns come to lie on said tape;

b. passing a first thread loop through said tape between a pair of shanks of successive turns at said sewing station;

c. drawing said loop over one of the latter shanks;

d. thereafter swinging said loop laterally under a shank of the next turn between said shank of the next turn and said tape;

e. passing a second loop of thread through said tape between said one of said shanks and said next shank and through the first loop;

f. passing said second loop over said next shank and thereafter swinging said second loop laterally and under a third shank of a further turn; and

g. repeating steps (b) - (f) for the succeeding turns of said filament while advancing same and said tape through said station.

2. A method of making a slide-fastener stringer half comprising the steps of:

a. feeding to a sewing station a support tape and a continuous synthetic-resin substantially helicoidal monofilament preformed with a succession of turns each having a pair of shanks joined together at a coupling head;

b. juxtaposing a shank of a turn of said monofilament with said tape;

c. passing a first loop of a thread through said tape adjacent said shank and under the corresponding shank of the next succeeding turn;

d. passing another loop of said thread said tape adjacent said corresponding shank of said next succeeding turn and through said first loop and thereafter passing said other loop over the corresponding shank of the next succeeding turn and under the next succeeding shank;

e. repeating steps (c) and (d) for the succeeding turns of said monofilament while advancing same and said tape through said station;

f. pulling said loops out laterally from between the turns of said coil and thereafter swinging said loop under the next succeeding turn, said monofilament being provided with a longitudinally throughgoing filler cord; and

g. passing said loops through said cord.

3. A method of making a slide-fastener stringer half comprising the steps of:

a. feeding to a sewing station a support tape and a continuous synthetic-resin monofilament preformed with a succession of turns each having a pair of shanks joined together at a coupling head;

b. juxtaposing a shank of a turn of said monofilament with said tape;

c. passing a first loop of a thread through said tape adjacent said shank and under the corresponding shank of the next succeeding turn;

d. passing another loop of said thread through said tape adjacent said corresponding shank of said next succeeding turn and through said first loop and thereafter passing said other loop over the corresponding shank of the next succeeding turn and under the next succeeding shank; and

e. repeating steps (c) and (d) for the succeeding turns of said monofilament while advancing same and said tape through said station, a pair of such loops being passed through said tape and said other loop being passed through both of said first loops of said pair.

4. A method of making a slide-fastener stringer half comprising the steps of:

a. feeding to a sewing station a support tape and a continuous synthetic-resin monofilament preformed with a succession of turns each having a pair of shanks joined together at a coupling head;

b. juxtaposing a shank of a turn of said monofilament with said tape;

c. passing a first loop of a thread through said tape adjacent said shank and under the corresponding shank of the next succeeding turn;

d. passing another loop of said thread through said tape adjacent said corresponding shank of said next succeeding turn and through said first loop and thereafter passing said other loop over the corresponding shank of the next succeeding turn and under the next succeeding shank; and

e. repeating steps (c) and (d) for the succeeding turns of said monofilament while advancing same and said tape through said station, a pair of such first loops being passed through said tape and a pair of said other loops being passed through opposite respective first loops such that the first loops cross each other.

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