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METHOD OF MAKING SLIDE FASTENERS

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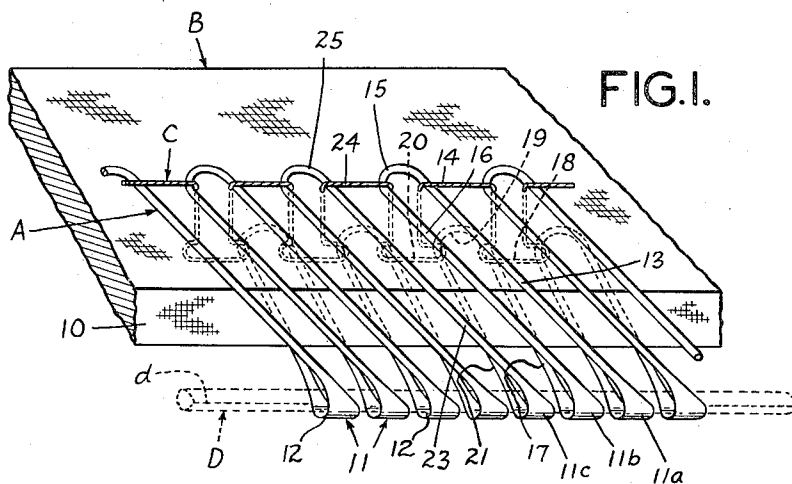


FIG. 1.

FIG. 2.

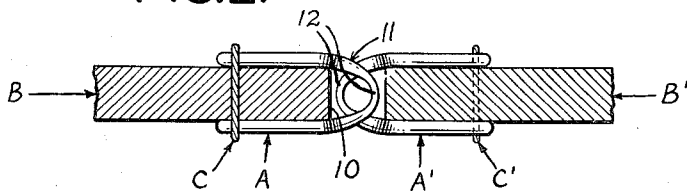
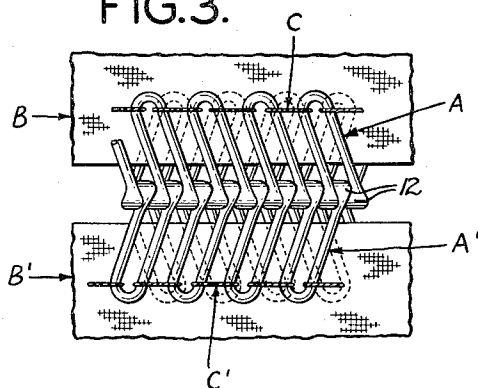


FIG. 3.



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METHOD OF MAKING SLIDE FASTENERS

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Divided and this application July 1, 1959, Ser. No. 828,924

8 Claims. (Cl. 18—48)

This invention relates to a method of forming or making interlocking type fasteners, wherein each interlocking or marrying element is made from a continuous filament, such as plastic or nylon monofilament, that is applied or anchored to the edge of the material to which the fastener is to be applied and is formed simultaneously with and as an incident of its application to the material.

This is a division of application Serial No. 470,318, filed November 22, 1954.

The present invention introduces a completely new and unique slide fastener, and the simplicity of fabrication is such that virtually every manufacturer possessing the proper equipment may become a producer of his own fasteners. The continuous filament may be sewn, bonded or woven to the edge of the material or tape to which it is to be applied, and if a relatively fine filament is employed in the fabrication of the fastener elements, it is possible to produce a very narrow and almost fabric-thin fastener which may be barely detected. In addition, by its very construction, the slide fastener elements are inherently self-indexing, readily and effectively interlocking under the influence of the slide.

In the preferred method of making the fastener of the present invention, loops are formed progressively over a mandrel adjacent to the edge of the material to which the fastener is to be applied, and the loops are secured to the fabric during their formation. After each loop is formed, the direction of the filament is reversed to form another loop adjacent the one previously formed. Thus, it is understood that each loop is formed by passing the filament around the edge of the material in a direction opposite to the direction of the filament in forming the previous loop. As the loops are formed progressively along the edge of the material, the filament is anchored to both sides of the material by a separate stitched thread, and, the mid-portions of the loops of the filament are suitably deformed over the mandrel to produce interlocking or marrying elements thereon, which are adapted to mesh with similar deformed loops of an oppositely disposed companion fastener.

The interlocking elements may be deformed against the surface of the mandrel by any suitable means, such as, by applying heat to the filament or the mandrel, and/or by applying pressure between the filament and the mandrel, in either case widening or flattening the filament against the mandrel to impart an oblong cross-section to the outermost portions of the loops, the longer cross-sectional dimension of the filament running in a direction substantially parallel with the edge of the material. Preferably, however, the flattened portions are formed at the mid-portions of the loops by pulling the filament tightly around the mandrel during the forming operation.

Inasmuch as the interlocking type fastener of the present invention is formed by a continuous filament, it may be produced along the edge of a material in various ways, such as by the use of needles or by an overedge stitching machine wherein the plastic or nylon monofilament is substituted for the usual thread. For example, a Merrow type machine, as well as many other types of overedge machines may be readily adapted for manufacturing the interlocking type fastener of the present invention merely

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by positioning the mandrel in the looper-stitch arc, so that when the overedge looper brings the filament around the edge of the material, a loop is formed around the mandrel and at a distance from the edge of the material or tape.

After producing the fastener in this manner, it may then be put through a series of finishing operation, such as, mangling, assembly of a slider, attachment of terminal-end stops, cutting to length, etc., to produce a highly satisfactory, inexpensive, easily manufactured fastener device.

In addition to the simplicity and ease of manufacture of the fastener device of the present invention, a further advantage is that the right-hand and left-hand fastening devices may be produced so that it is possible to subdivide a length of the fastener element and use the subdivided portions as mating companion devices. A further feature of the construction is that it can be utilized in conjunction with regular zipper tape or incorporated directly onto the edges of a fabric, and in fact, the construction may be fabricated directly to the edges of fabrics by looms, rather than by sewing machines.

A special application of the present invention is the use of the fastener devices to produce a relatively water and/or air-tight closure. This is possible, due to the fineness and close stitching of the filament to the tapes, as well as the close interlocking characteristics of the deformed interlocking portions of the overedge loops. Obviously, in this type of closure, the zipper tapes should be of rubber or other impermeable material.

These and other advantages of the present invention will be apparent from an understanding of the present invention, which is fully described below with reference to the accompanying drawing in which:

FIG. 1 is an isometric view diagrammatically illustrating the fabrication of the fastener device of the present invention with the overedge loops somewhat exaggerated;

FIG. 2 is a cross-sectional diagrammatic edge view of companion interlocking fastening devices;

FIG. 3 is a top diagrammatic plan view similar to FIG. 2.

Referring to the drawing and especially to FIG. 1, a plastic filament A, preferably a nylon mono-filament, is applied to the edge 10 of a material B, which may be either a tape or the fabric of a garment, in the form of an overedge stitch. A thread C is needle-stitched by the overedge sewing machine through the fabric to anchor the plastic filament to the material in the usual way. The plastic filament is looped around a mandrel D, shown in phantom lines in FIG. 1, held parallel to the edge of the material, thus forming a plurality of overedge loops 11. The mandrel has a free end in the direction of movement of the material 13 so that the loops slide off of it as the material is advanced by the machine.

The mid-portions of the loops 11 may be deformed in any suitable manner to produce interlocking elements 12 which will mesh with interlocking elements of a companion, oppositely disposed fastener device. For example, the application of heat to the filament and/or the application of pressure between the mandrel and the filament may be utilized to flatten the filament in the vicinity of the overedge loop. The flattened portion of the overedge loop should run generally, although not necessarily precisely, in a direction parallel to the edge of the material.

One highly satisfactory method of deforming a nylon filament is by drawing the filament tightly around a heated mandrel formed with a prominent, tapering edge d, the filament being suitably deformed at the portions contacting the said edge. The obvious advantage of this method is that the interlocking elements 12 are formed while the filament is being overedge stitched without the need for a separate deforming operation.

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When the filament has been stitched to the edge of the material, the mandrel may be removed and the fastener device thus produced, utilized with an oppositely disposed mating device, as shown in FIGS. 2 and 3, comprising a filament A' overedge stitched to a material B' and anchored thereto by a stitched thread C'. The companion fastener devices may be cut from the same strip, inasmuch as the fastener devices are symmetrical. The angular disposition of the parallel lengths of the filaments A and A', as diagrammatically shown in FIG. 3, is, of course, greatly exaggerated.

After being produced in the manner aforesaid, the fastener may be then put through a series of finishing operations, forming no part of the present invention, such as, mangling, assembly of a slider, attachment of terminal-end stops, cutting of the length, etc.

The fabrication of the fastener device may be traced in detail with reference to FIG. 1. Thus, beginning at the right end of the portion of the fastening device represented, it will be seen that after the formation of the loop, represented by the reference symbol 11a in that figure, the upper limb 13 of the loop extends toward the top surface of the material, whereupon the limb 13 is bridged by the loop 14 of a stitch of the thread C. Thereupon, the filament reverses its direction forming a partial loop 15, another limb 16 running parallel with the limb 13 and finally, another overedge loop 11b around the mandrel D, adjacent the previously formed overedge loop 11a. The filament travels once again in the direction of the material B, but this time beneath the material, forming a lower limb 17 which passes through a loop 18 of the thread C formed beneath the material. After passing through the said loop 18, the filament reverses its direction forming a partial loop 19 beneath the material, which also passes through a loop 20 adjacent the loop 18. After passing through the loop 20, the filament is formed by a looper of the machine into a lower limb 21 which is looped around the mandrel D to form another overedge loop 11c. Thereupon, the filament once again is looped by a looper toward the upper surface of the material B, forming a limb 23 which passes beneath a stitch 24 of the thread C before reversing itself once again at 25 and so on. Thus, it is noted that the thread C is stitched in timed relation to the formation of the overedge loops 11 along the edge of the material, the bridge loops formed on one side of the material, such as 14 and 24, anchoring limbs, such as 13, 16 and 23 to one side of the material, while the loops 18, 20 of the thread C anchor limbs, such as 17 and 21, to the other side of the material. The fabrication of the fastening device continues in this fashion along the edge of the material B. It is understood, of course, that the filament may be overedge stitched in either direction along the material B.

Due to the nature of the overedge stitch, the size of the filament may be varied over a wide range of diameters approximating for example, relatively coarse or thick carpet or canvas binding twine to fine sizes of conventional sewing thread. If the filament thickness is great enough and the stitch spacing sufficiently close, and/or the sewing thread C is large enough, it will not be necessary to attach special bead cords to act as slider rails as is now ordinarily done in slide-type fasteners because the stitches, such as stitches 15 and 25, formed by the end of the loops serve as a slider rail.

As mentioned above, the fastener device may be fabricated to form a relatively water and/or air-tight closure, and in this case the overedge loops should be formed very close together and in very close proximity with the edge 10 of the material, thus eliminating air pockets between individual interlocking elements.

The invention has been shown in a single preferred form and by way of example only, and obviously many variations and modifications may be made therein without departing from the spirit of the invention. Thus, it should be clear that in place of the separate stitched

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thread, the fastener device may be bonded to or woven into the edge of the material or tape. In addition, it may be possible with certain filaments to dispense with deforming the loops to produce interlocking elements thereon, inasmuch as uniformly round or symmetrical loops may effectively interlock and hold together. It is to be understood, therefore, that the invention is not to be limited to any specified form or embodiment except insofar as such limitations are set forth in the claims.

I claim:

1. A method of making a fastener device of a type adapted to interlock with a companion fastener device comprising the steps of progressively forming with a continuous filament a plurality of loops along the edge of material according to a pattern which includes forming a loop over a mandrel held adjacent the edge of the material and reversing the direction of the filament to form another loop over the mandrel adjacent the one previously formed, but in an opposite direction, anchoring said loops to the material by a stitched thread, and deforming the filament at the crest of the loops to produce interlocking elements thereon.

2. A method of making a fastener device of a type adapted to interlock with a companion fastener device comprising the steps of forming with a continuous filament a plurality of overedge type loops along the edge of a piece of material to which the fastener is to be applied, said loops passing back and forth across and partially around a mandrel held substantially parallel with respect to the edge of the material, anchoring said loops to the edge of the material by a stitched thread, and forming interlocking elements on the filament between the anchored portions of the loops and adjacent to the edge of said material.

3. A method as set forth in claim 2 wherein the interlocking elements are produced on the filament by deforming the filament against the mandrel.

4. A method as set forth in claim 2 wherein each repeat in the formation of the overedge type loops comprises the steps of forming an overedge loop partially around the mandrel, extending the filament in the direction of the material adjacent one side thereof, passing said filament through a loop of the stitched thread, reversing the direction of the filament and passing it through an adjacent loop of the stitched thread, forming another overedge loop partially around the mandrel adjacent to the previously formed overedge loop, extending the filament in the direction of the material adjacent the opposite side thereof and engaging a loop of the stitched thread, and again reversing the direction of the filament and the passing through an adjacent loop of the stitched thread preparatory to forming another overedge loop partially around the mandrel.

5. A method of making a fastener device of a type adapted to interlock with a companion fastener device comprising the steps of forming a plurality of overedge type loops along the edge of the material to which the fastener is to be applied, drawing said filament tightly across and partially around a mandrel held substantially parallel with respect to the edge of the material, said mandrel having an edge formed thereon which deforms the filament to produce interlocking elements thereon, and anchoring said loops to the edge of the material by a stitched thread.

6. A method as set forth in claim 5 wherein a nylon filament is utilized.

7. A method of making a fastener device of a type adapted to interlock with a companion fastener device, comprising progressively bending a continuous filament of substantially uniform cross-section over a mandrel to form a first substantially U-shaped loop, pressing a portion of said loop against said mandrel to flatten it and form a flattened interlocking portion, reversely bending the filament to form a first substantially U-shaped attaching portion disposed in a plane approximately perpendicular

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lar to the plane of said first U-shaped loop, bending said filament over said mandrel to form a second substantially U-shaped loop approximately parallel with said first loop, pressing a portion of said second loop against said mandrel to flatten it and form a flattened interlocking portion, reversely bending the filament to form a second substantially U-shaped attaching portion disposed in a plane approximately perpendicular to the planes of said first and second loops and repeating said bending, pressing and reverse bending of said filament to form a continuous series of interlocking and attaching portions in alternate relation.

8. A method of making a fastener device of a type adopted to interlock with a companion fastener device comprising bending a continuous filament back and forth

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over and only partially around an elongated mandrel of rod-like shape to form a series of spaced apart generally U-shaped loops extending substantially transversely of said mandrel and another series of interposed loops disposed substantially perpendicular to said transversely extending loops, and pressing said spaced apart loops against said mandrel to form locking portions of oblong cross-section at the crests of said spaced loops.

References Cited in the file of this patent

UNITED STATES PATENTS

2,300,442	Wahl	Nov. 3, 1942
2,541,728	Wahl	Feb. 13, 1951
2,643,432	English	June 30, 1953
2,919,482	Casson	Jan. 5, 1960