

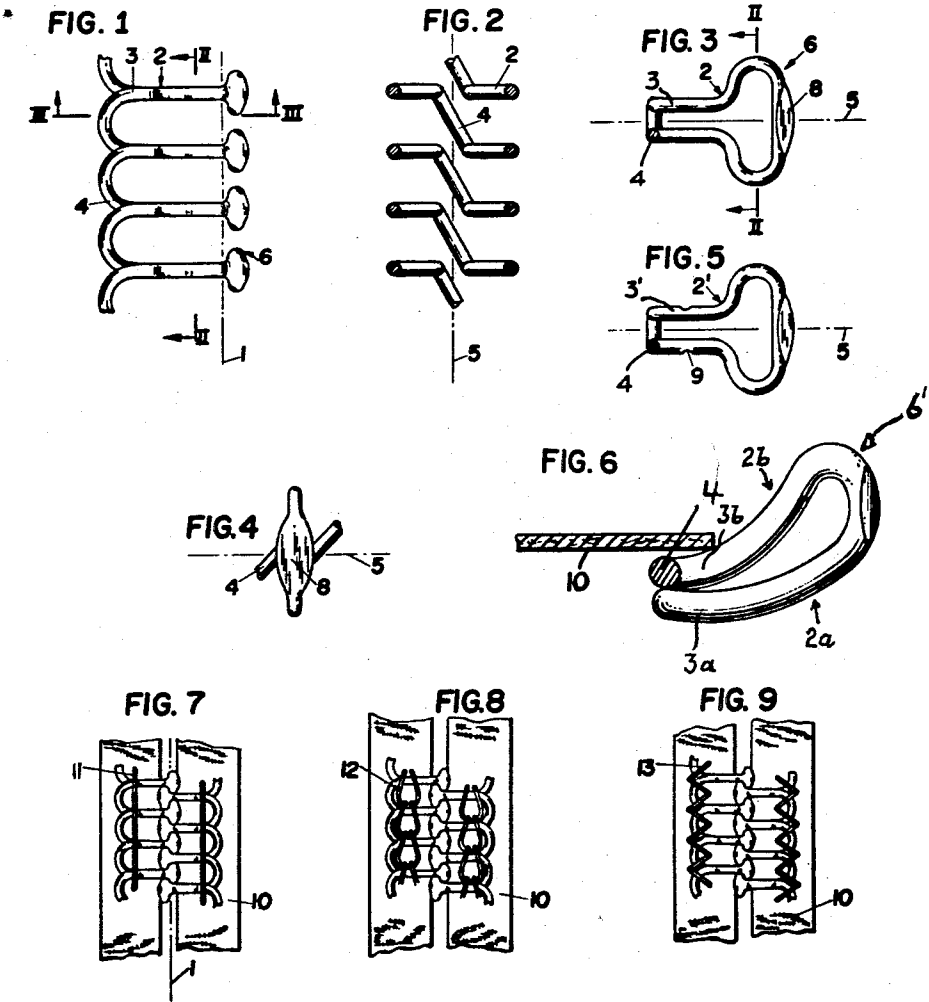
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ZIPPER

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3,149,389
ZIPPER

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This invention relates to zippers, and more particularly to zippers consisting of two interlocked elongated elements, each element being composed of a plurality of longitudinally consecutive interlocking members, and being constituted by a single length of elastically resilient elongated material.

It is conventional to attach a zipper element to the edge of a carrier tape in such a manner that the individual interlocking members are spacedly arranged in a row. The spacing of consecutive members of one element must be smaller than the width of the individual members of the other element to be received therebetween in order to assure locking and the necessary resistance to accidental opening.

It is difficult to maintain uniform spacing of members within close tolerance in a zipper element of the type with which this invention is more specifically concerned, particularly when the interlocking elements are made of plastic wire. In many known zippers, preformed wire or strip has to be employed to ensure locking, whereas round wire cannot be used.

It is an object of the present invention to provide continuous interlocking zipper elements capable of being made from plastic wires or threads of any cross section, and particularly from round wires.

It is another object to provide continuous interlocking elements for zippers in which the distance between individual members of the elements is maintained securely and permanently, whereby a zipper is obtained which has a long service life, and which remains safely in the closed position.

With these and other objects in view, the elongated elements two of which may be engaged to close the zipper of the invention, are composed of a plurality of longitudinally consecutive interlocking members. The members of each element are constituted by a single length of elastically resilient elongated material. Longitudinally contiguous sections of this length of material constitute in each member, in order, a first connecting portion in common with an adjacent other member, a first leg portion, a head portion, a second leg portion, and a second connecting portion in common with another adjacent member.

The several portions of each member are elongated. The leg portions and the head portion extend in a common plane transverse of the direction of elongation of the element which is normally straight. The connecting portions of each member are obliquely inclined relative to that common plane, and relative to the normal direction of elongation of the element so that the length of material in the element may be considered to have the shape of a somewhat deformed spiral.

Contrary to the known zipper elements made of a coiled length of material, the elements of the invention can be made of round wire which is manufactured more easily and at lower cost. Obviously, wire of non-circular cross section can be employed as well. If a plastic thread or wire is used, it is preferably manufactured from polyamide, polyurethane, or polyester resin and prestretched before it is shaped into the interlocking elements. The head portions of the individual interlocking members interconnect the two elements of each zipper in a manner

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known in itself, and not requiring detailed description. The head portions preferably have a central enlarged portion. The interlocking elements of the present invention can be sewn to a supporting zipper tape very easily, and without employing auxiliary elements. Common lock seams, zig-zag seams, or chain stitch seams may be employed.

The invention will be better understood from the following detailed description of preferred embodiments thereof, reference being had to the accompanying drawing in which:

FIG. 1 is a lateral view of a portion of an interlocking element of the invention;

FIG. 2 is a sectional plan view of the element of FIG. 1 taken on the line II—II in FIG. 3;

FIG. 3 is a sectional view of the element of FIG. 1 taken on the line III—III;

FIG. 4 is a top plan view of a detail of the device of FIG. 1;

FIG. 5 is a sectional view of a modification of the element of FIG. 3;

FIG. 6 shows another modified element in a sectional view corresponding to FIGS. 3 and 5; and

FIGS. 7, 8, and 9 illustrate sewing methods for fastening the interlocking elements of the invention to zipper tape.

FIGS. 1 to 6 show continuous interlocking zipper elements. The leg portions 2, 2', 2a, 2b of each member of an element are disposed approximately perpendicularly relative to the direction of elongation of the zipper indicated by the line 1 in FIG. 1, and in a common plane with the corresponding head portion 6. The legs have respective foot parts 3, 3', 3a, 3b which are joined by connecting portions 4 each of which is common to two adjacent members of the interlocking element. The connecting portions in all illustrated embodiments of the invention are obliquely inclined relative to the direction of elongation 1 of the element, relative to any plane 5 parallel to the normal position of the face of a tape 10 to which the element is sewn, and relative to the common planes of the leg and head portions of the several members, as best seen in FIG. 2.

In the embodiments of the invention shown in FIGS. 1 to 5, the foot parts 3, 3' of the legs 2, 2' of each member are closely spaced in substantially parallel alignment, whereas the major portions of the legs diverge from each other toward the lateral ends of the head portion 6. The embodiment of the invention illustrated in FIG. 5 differs from that illustrated in FIGS. 1 to 3 by grooves 9 on the outward sides of the legs 2'. The grooves 9 receive a sewing thread when the element is sewn to a zipper tape.

The leg portions of the interlocking members illustrated in FIGS. 1 to 5 are symmetrical with respect to a plane 5 which transversely bisects the associated head portion 6. The two legs 2a, 2b of the interlocking member shown in FIG. 6 are asymmetrical with respect to any plane transverse of the direction of elongation of the head portion 6'. The leg 2a is substantially straight whereas the leg 2b is curved and has a face opposite the leg 2a which is convexly curved in the afore-mentioned common plane. Adjacent the respective connecting portions 4, the toe parts of the legs 2a, 2b are in contact with each other or are so close to each other that their spacing, if any, is substantially smaller than the thickness of the legs. The legs 2a, 2b diverge continuously from the respective connecting portions toward the head portion.

FIGS. 7, 8, and 9 show respective zipper sections in top view. They are held together by interlocking elements having members shaped according to FIGS. 1 to 4, 5 or 6. The zippers of FIGS. 7, 8 and 9 differ by the sewing

stitches employed for fastening the interlocking elements to the zipper tapes.

The elements of FIG. 7 are fastened to the respective tapes 10 by single longitudinal rows of lock stitches 11. In the example of FIG. 8, the elements are fastened to the tapes by respective seams of longitudinal chain stitches 12. In FIG. 9, the interlocking elements are illustrated as being secured to tapes 10 by means of zig-zag stitches 13. In all sewing methods, the threads pass through the tape in the space between the respective leg portions of each pair of consecutive members.

While the invention has been described with reference to specific embodiments, it will be understood that modifications and alterations may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

This application is a division of my copending application Serial No. 831,628, filed on August 4, 1959.

What is claimed is:

1. In a zipper, an elongated, normally straight element composed of a plurality of longitudinally consecutive interlocking members, and constituted by a single length of elastically resilient elongated material, contiguous longitudinal sections of said length of material constituting in each of said members, in order:
 - (a) a first connecting portion in common with an adjacent other member;
 - (b) a first leg portion;
 - (c) a head portion;
 - (d) a second leg portion; and
 - (e) a second connecting portion in common with another adjacent member,
- (1) said portions being each elongated,
- (2) said leg portions and said head portion of each member extending in a common plane transverse of the normal direction of elongation of said element,

- (3) said connecting portions of each member being obliquely inclined relative to said common plane and to said normal direction of elongation, and
- (4) said leg portions of each member being asymmetrical with respect to any line transverse of said head portion in said common plane.

2. In a zipper as set forth in claim 1, said leg portions continuously diverging from each other in said common plane from the respectively contiguous connecting portions in a direction toward said head portion.

3. In a zipper as set forth in claim 1, said first leg portion of each member being substantially straight.

4. In a zipper as set forth in claim 1, said leg portions of each member having opposite respective faces, one of said faces being convexly curved in said common plane.

5. In a zipper as set forth in claim 1, the spacing of said leg portions of each member in the common plane thereof adjacent the respective contiguous connecting portions being smaller than the thickness of said leg portions.

6. In a zipper as set forth in claim 1, respective parts of the first and second leg portions of each member spaced from the associated head portion being in contact with each other in said common plane.

7. In a zipper as set forth in claim 1, supporting tape means, and a plurality of stitches respectively securing said interlocking members of said element to said tape means, each stitch passing over both leg portions of the corresponding interlocking member, and passing transversely through said tape means adjacent said leg portions and intermediate the head portion and one of the connecting portions of said corresponding interlocking member.

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