June 9, 1964 O. FIRING 3,136,016

PLASTIC ZIPPER WITH HEAT SHIELDING

Filed April 12, 1963

Fig. 1.

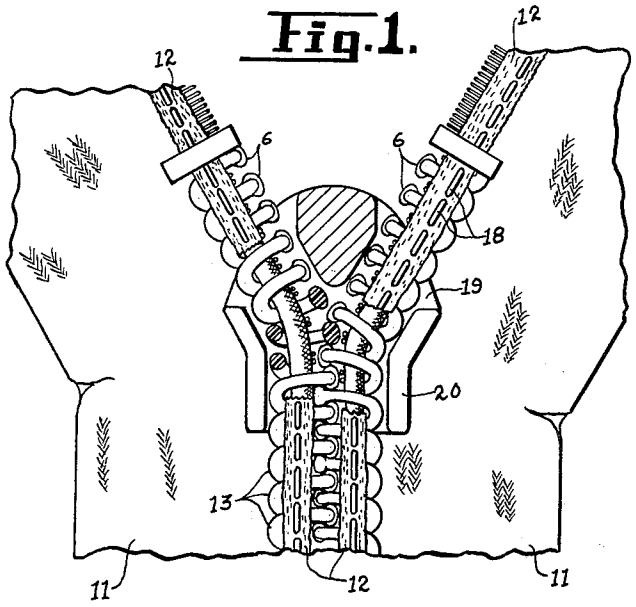


Fig. 4.

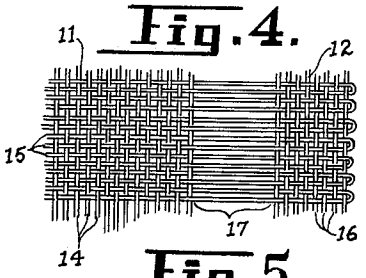


Fig. 5.

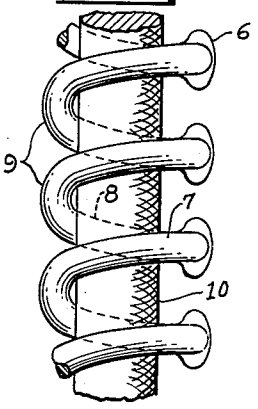


Fig. 2.

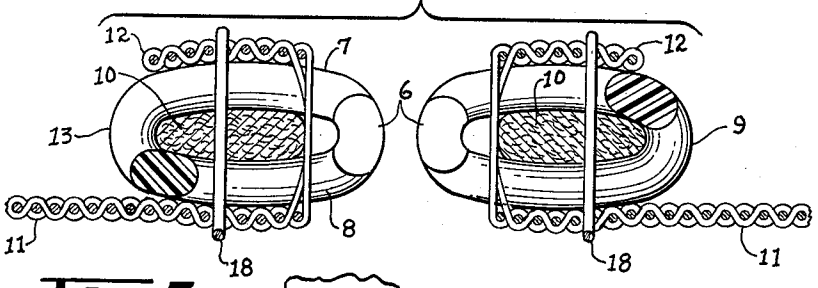
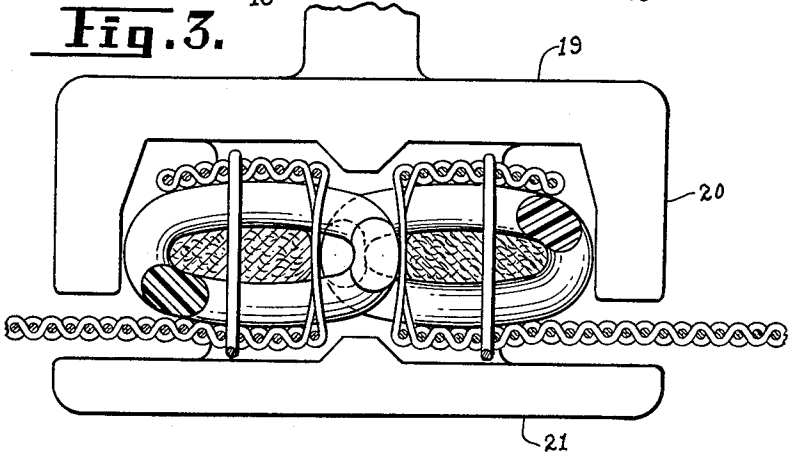


Fig. 3.



United States Patent Office

3,136,016

Patented June 9, 1964

3,136,016

PLASTIC ZIPPER WITH HEAT SHIELDING

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Filed Apr. 12, 1963, Ser. No. 272,689
3 Claims. (Cl. 24—205.1)

My invention relates to plastic zippers of the continuous filament type, and more particularly to an improved zipper fastener structure of the kind provided with means to shield the plastic filament against heat which might be applied with a hot iron in a laundering operation.

Continuous filament plastic zippers which have come into general use are either of the modified spiral coil type or of the type having a filament formed into zigzag or serpentine shape and then bent to U-form. Such filamentary structures are attached to a flexible supporting tape usually by stitching.

Various suggestions have been made for shielding the outer surface of the filament structure from the heat of an iron, but so far as I am aware, they all have serious disadvantages. In one method, the base tape underlies the filament and a separate narrow tape is applied to the top surface and then the entire structure sewn together. This is usually adequate, but the making and attaching of a separate tape is too expensive.

Other proposals involve the employment of multiple stitches for attaching the coil to the base tape, and while this affords a fair degree of protection, it is not usually adequate and at any rate, the operation of passing multiple needles in the small space afforded between the coupling elements of the filament structure involves difficulties.

While still other suggestions have been made for obtaining a covering of the front side of the plastic filament involving the use of either Y-tape or a double tape stitched behind or to one side of the coil, these have such major objections that they have not been used to any extent in practice. In addition to their expense, the resulting fastener presents a fabric surface to the wear of the slider, whereas it is desirable to have the slider wear on the comparatively hard track provided by the back or inner edges of the filament structure.

According to the present invention, these disadvantages are eliminated by means of a single unitary tape and the attachment may be accomplished by a simple single stitch. When the filament stringers are attached to the base tape only by stitching in the usual way, the transverse strength will depend altogether on the stitching. A further advantage of my invention, particularly when the filament structure is in the shape of a coil enclosing a cord, is that portions of the unitary tape structure itself take up the transverse tension without excessive stress on the stitching thread.

Other objects and advantages of my invention will hereinafter more fully appear.

In the accompanying drawing, I have shown for purposes of illustration, one embodiment which the invention may assume in practice. In the drawing:

FIG. 1 is a front view, partially broken away, of a zipper made in accordance with my invention;

FIG. 2 is a cross section of my improved zipper with the two stringers separated;

FIG. 3 is a cross section showing the stringers interengaged and also indicating how the slider fits on the stringers;

FIG. 4 is a diagrammatic view of a section of the unitary tape; and,

FIG. 5 shows the filament structure ready for assembling to the tape.

The plastic filament structure may be generally described as having a series of integrally united coupling elements with longitudinally aligned head portions 6 along the outer edge, spaced apart transversely extending leg portions 7 and 8 on each element, and bridging portions 9 along the inner edge of such structure connecting the leg portions of each element to those of adjacent legs. This general description applies to that type of structure in which a filament is formed into zigzag or serpentine shape and then bent to U-form, as well as the specific type illustrated in the drawing, which may be described as a flattened coil shape.

Extending longitudinally throughout the length of the filament structure in the space between the leg portions 7 and 8 is a flexible core, preferably in the form of flattened textile cord 10, which in the embodiment illustrated, fills the major part of the coil without, however, interfering with the intermeshing of the head portions 6, in the manner seen in FIG. 3.

The terms "inner" and "outer" are used with particular reference to a single stringer as seen on either side of FIG. 2. The supporting tape has a wide portion 11 on the underside of each filament structure, which extends beyond the inner edge of the filament a sufficient distance to provide means for conveniently attaching the zipper to an article of clothing or the like. The tape also has a narrow portion 12 overlying the major portion of the front of each coil structure, but not extending beyond the inner edge of the filament structure, such inner edge being indicated by the numeral 13.

The wide portion of the tape consists of interwoven warp and weft threads 14 and 15, respectively, and the narrow portion consists of warp threads 16 interwoven with the same weft threads 15. Between the wide and narrow portions of the tape, there is a section 17 which consists only of the weft threads 15.

Assuming that the filament structure has been prepared as seen in FIG. 5, the unitary tape is assembled with it by forcing the head portions of the coil through the connecting section 17. This may be readily accomplished because there are no warp threads in that section of the tape. Then, the narrow portion 12 is laid over against the front surface of the coil while the wide portion 11 is on the back side of the coil with the weft threads 15 in the connecting section of the tape passing through the coil between the convolutions thereof, behind the head portions 6 and in front of the flexible cord 10. In fact, these weft threads will bear against the front edge of the flexible cord. This affords greater strength than prior constructions because lateral stress is resisted by all of the weft threads bearing tightly around the cord.

It is now only necessary to connect the parts together by means of a single line of stitching 18, which passes through the front narrow tape portion, the textile cord 10 and through the wide portion of the tape on the back side of the fastener. In such an operation and with a simple type of stitching, such as a single chain stitch, lock stitch or zigzag stitching, it is an easy matter to pass the sewing needle between the adjacent convolutions of the coil. With the coil type filament structure as shown, this stitching is preferably located approximately midway of the width of the narrow tape portion so that it will hold the front narrow section of the tape firmly against the plastic filament structure.

The type of slider commonly used in plastic fasteners of this type, employs a front wing 19 having side flanges 20, and a back wing 21. Since the narrow portion of the tape does not extend beyond the inner edge of the coil stucture, the flanges 20 of the slider will ride on a track provided by the inner edges of the plastic filament, thus

avoiding any excess wear on any portion of the fabric tape.

It will be evident that a single unitary tape of the kind described is much more economical to manufacture than separate wide and narrow tapes. The narrow portion of the unitary tape not only provides adequate shielding against heat, but the resulting structure does not depend entirely on the stitching for its crosswise strength. This is because the weft threads in the connecting portion of the tape will pull against the front side of the cord 10 so that any undue stress is transmitted directly to such cord.

As a result of my invention, it will be apparent to those skilled in the art, that I have provided adequate heat shielding for a plastic filament zipper with a single unitary tape structure which is much less costly to make and assemble to the filament structure. Also, the transverse strength is increased since every weft thread is working to resist lateral stress on the zipper.

What I claim is:

1. A zipper fastener stringer comprising

(*a*) a filament structure forming a series of integrally united coupling elements with longitudinally aligned head portions along the outer edge of said structure, spaced apart transversely extending leg portions on each element and bridging portions along the inner edge of said structure connecting the leg portions of each element to those of adjacent elements;

(*b*) a flexible core in the space between said leg portions;

(*c*) a unitary supporting tape having wide and narrow portions each consisting of interwoven warp and weft threads connected by a section of only weft threads, said weft threads passing across said structure between the coupling elements behind said head portions and outwardly of said core, said narrow portion of the tape overlying the major part of said filament structure behind said coupling head portions; and,

(*d*) means for holding said tape in position comprising stitching passing through said tape narrow portion, through the filament structure between said leg portions while at the same time penetrating through said flexible core and finally through said wide portion of the tape.

2. A stringer for zipper fasteners comprising

(*a*) a filament structure in the shape of a generally flattened coil having a series of longitudinally aligned head portions along the outer edge for intermeshing with similar head portions of a companion stringer;

(*b*) a flexible textile core extending longitudinally through the flattened coil and filling the major part of same;

(*c*) a unitary supporting tape having wide and narrow portions, each consisting of interwoven warp and weft therads positioned against opposite sides of said coil, and a connecting section for said wide and narrow portions consisting of only weft threads passing across said coil behind said head portions and in front of said textile core, said wide portion extending a substantial distance beyond the back side of said coil while said narrow section does not extend beyond the back side of said coil; and,

(*d*) stitching extending across the coil in the spaces between the convolutions thereof and through the front narrow tape portion, textile core and wide bottom portion.

3. A stringer for zipper fasteners as defined in claim 2 wherein said stitching is located approximately midway of the width of said tape narrow portion.

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