

[54] SLIDING CLASP FASTENERS

[76] Inventor: Siegfried W. Spindler, Frieden-
strasse 19, Unterpfaffenhofen, Ger-
many

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[58] Field of Search 29/410, 408, 207.5 R, 400

[56] References Cited

UNITED STATES PATENTS

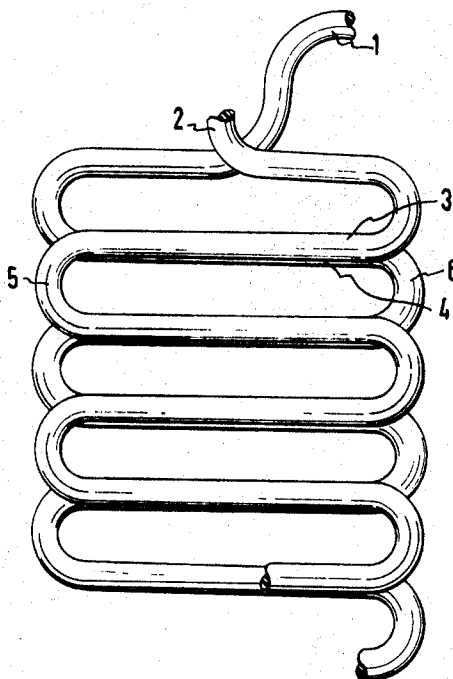
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Primary Examiner—Thomas H. Eager
Attorney—Hans Berman

[57] ABSTRACT

A process of making zip fastener elements is disclosed comprising the steps of bending two filaments of thermoplastic materials into S-shaped configurations, positioning these S-shaped configurations above each other, joining these S-shaped configurations together by welding along their central longitudinal axis, forming engaging heads in the welding process, separating the welded together S-shaped zigzag configurations along their central longitudinal axis and joining those fastener elements to supporting tapes either prior to or after separating by means of welding or sewing.

1 Claim, 7 Drawing Figures



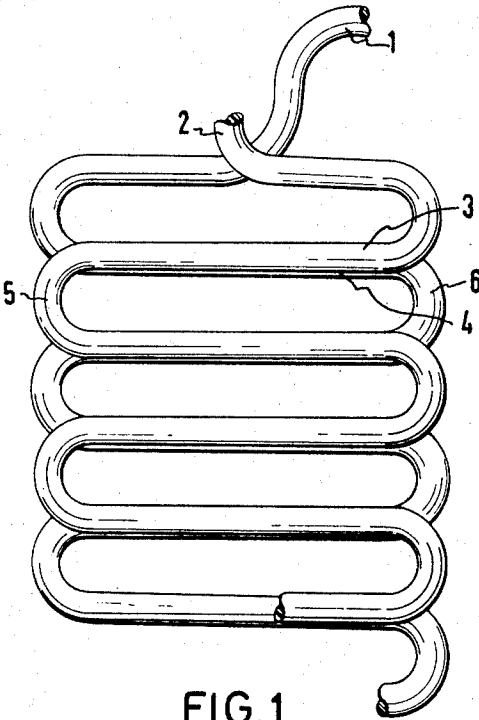


FIG. 1

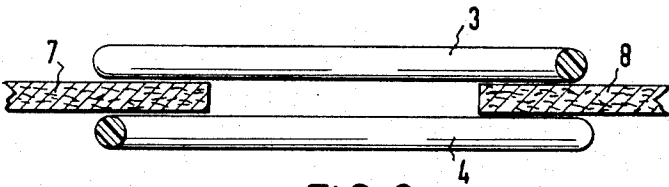


FIG. 2

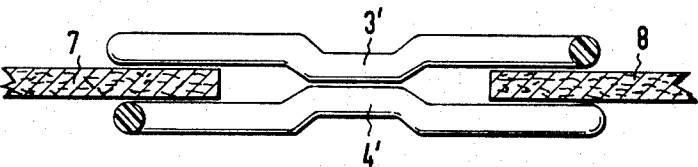
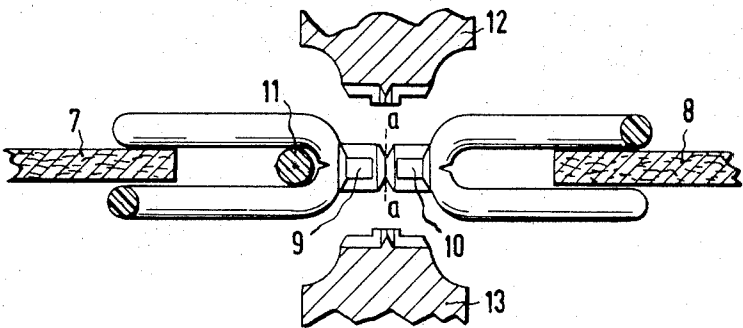
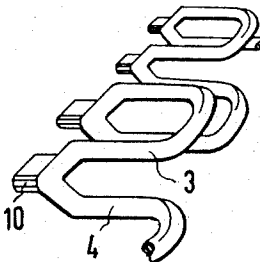
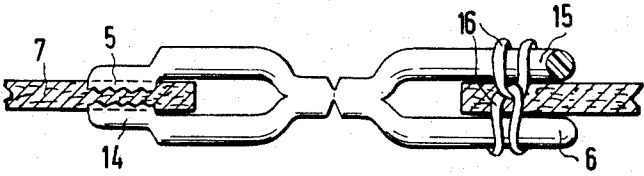


FIG. 3



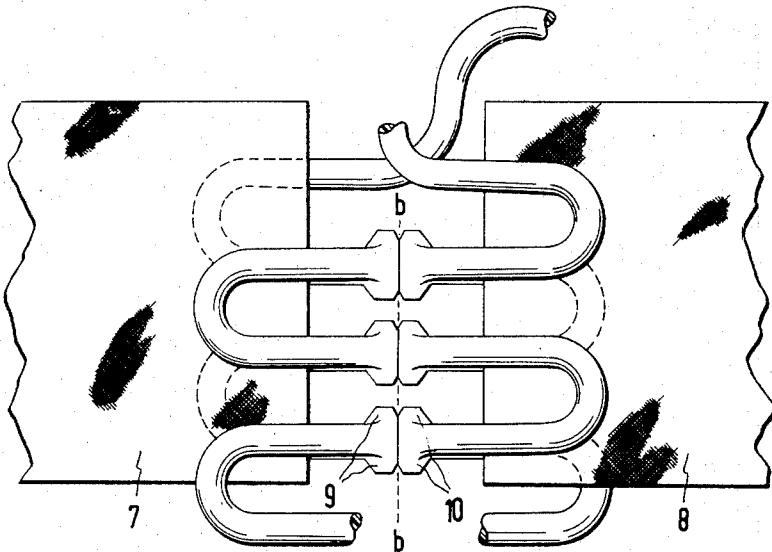


FIG. 7

SLIDING CLASP FASTENERS

This invention relates to a sliding clasp fastener of the kind including two elements, each comprising a row of coupling members made from plastics filament.

Sliding clasp fasteners of the foregoing kind have been known for a long time and are in use in a multitude of forms of constructions. In these fasteners the rows of coupling elements are made from plastics filaments either by forming a plastic filament into a coil-type configuration, or by forming a plastic filament into as S-shaped, zigzag configuration, having a series of ladder-like transverse portions interconnected by longitudinal portions alternately located at opposite sides of the configuration, and bending such S-shaped configuration along its central longitudinal axis into U-shaped scoops. Two rows of coupling members are connected together by means of the engagement of heads formed onto the coupling members. In sliding clasp fasteners whose elements are formed from plastics filaments bent into an S-shaped configuration, the heads are formed by flattening the cross-section of the filament along the longitudinal axis of the S-shaped configuration, along which said configuration is later folded backwards.

According to the invention the fastener elements comprising a row of coupling members each are formed by bending two plastics filaments into S-shaped zigzag configurations, and positioning those configurations above each other in such a manner that the transverse portions of both S-shaped zigzag configurations are parallel and on top of each other, while the longitudinal portions of those S-shaped configurations are opposite each other.

Those S-shaped zigzag configurations so positioned are then connected with each other by ultrasonic or high-frequency welding along their central longitudinal axis. Deformation of the cross-section in the welding area and cutting apart of the welded S-shaped configurations along the center of the welding zone, i.e. along the central longitudinal axis, provides two rows of U-shaped sections of plastics filament which are connected in such a way that coupling members result, and fastener elements are formed.

The rows of coupling members may be connected to supporting tapes, which may be inserted between the S-shaped zigzag configurations either before or after the welding process. Connection of the rows of coupling members to the supporting tapes can be effected either by welding or by sewing.

In order to enable the engagement of the two fastener elements, it is necessary to provide space in the coupling members to accommodate the heads of the opposite coupling members. Therefore, apart from the welding zone, the plastics filaments forming the basic S-shaped zigzag configurations must be kept at a distance sufficient to accommodate the heads of the opposite coupling members, which are formed by welding together, and deforming the two plastics filaments forming the basic S-shaped zigzag configurations. In order to achieve such distance, strips, wires, etc. may be inserted between the S-shaped zigzag configurations prior to, and during the welding process. It is also possible to deform the S-shaped configurations prior to welding in such a way that the central parts of the transverse portions of these configurations are bent towards each other prior to the welding process.

There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claim appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claim be regarded as including such equivalent construction as do not depart from the spirit and scope of the invention.

In order that the invention may be more readily understood, reference is made to the accompanying drawings, which illustrate diagrammatically and by way of example one embodiment thereof, and in which:

FIG. 1 is a partial top plan view of two S-shaped zigzag configurations positioned above each other so that the transverse portions of filament of the S-shaped zigzag configurations are parallel to each other, whilst the connecting longitudinal portions are opposite each other;

FIGS. 2 and 3 show cross-sections through the S-shaped zigzag configurations positioned above each other with inserted supporting tapes;

FIG. 4 shows the same cross-section after forming of the heads of the coupling elements;

FIG. 5 is a view of a row of coupling members;

FIG. 6 is a cross-section after forming of the heads and connection of the joined S-shaped zigzag configurations with the supporting tapes by welding or sewing;

FIG. 7 shows a top plan view of rows of coupling elements with inserted supporting tapes prior to cutting apart.

Referring to the drawings, two continuous plastics filaments 1,2 are positioned above each other in S-shaped zigzag configurations. Their straight portions 3,4 extending transversely to the longitudinal axis of the configurations are parallel to and above each other, whilst their longitudinal connecting portions 5,6 are opposite each other.

The S-shaped zigzag configurations are in a lateral distance to each other similar to the thickness of the supporting tapes 7,8. The straight portions of the plastics filaments are welded together by welding plates 12,13, which may be constructed so as to produce heads 9,10. In order to achieve distance between the plastics filaments in that portion of each coupling member directly adjacent to the coupling heads so formed, means to guarantee such distance, such as wires 11 can be provided.

The distance between the filaments necessary to enable the engagement of the opposite coupling members' heads can also be provided by bending the central parts of the transverse portions of the S-shaped zigzag configurations towards each other in such a manner that after welding the filaments adjacent to the welding zone will still be at the desired distance.

The rows of coupling members created by welding are to be severed along the line a — a, so that individual rows of coupling elements result, as shown in view in FIG. 5.

The coupling elements can be joined to the supporting tapes by welding portions of the elements 5,14 or by sewing, where sewing threads 16 are securing portions 6,15 to the supporting tape 7.

In the top plan view of FIG. 7 the coupling heads 9,10 formed during the welding process are not yet cut

apart. This may, however, be done synonymously with the welding process or directly after the welding process by welding plates particularly formed to suit this purpose. The coupling heads are to be severed along the line b — b.

What I claim is:

1. In a process of making zip fastener elements the steps of bending two filaments of thermoplastic materials into S-shaped configurations, positioning these S-

shaped configurations above each other, joining these S-shaped configurations together by welding along their central longitudinal axis, forming engaging heads in the welding process, separating the welded together S-shaped zigzag configurations along their central longitudinal axis and joining those fastener elements to supporting tapes either prior to or after separating by means of welding or sewing.

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