

July 23, 1963

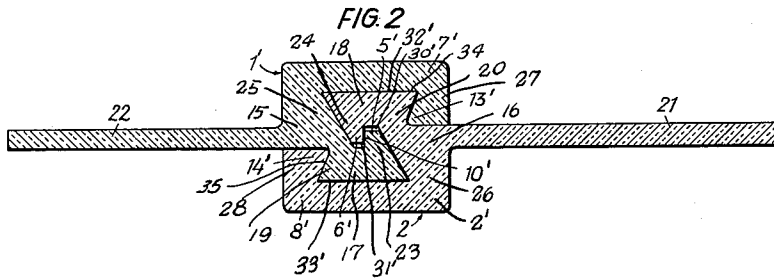
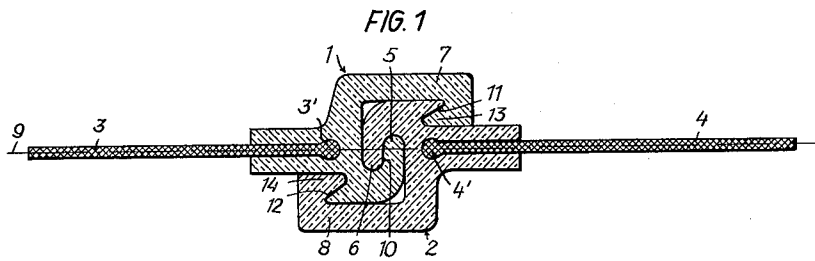
P. RECHSTEINER

3,098,276

SLIDE-FASTENERS

Filed Sept. 11, 1958

2 Sheets-Sheet 1



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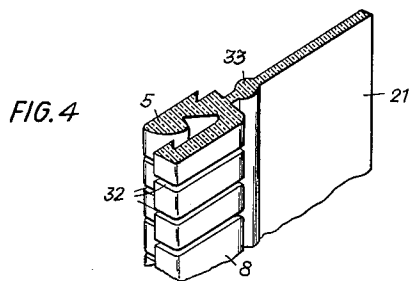
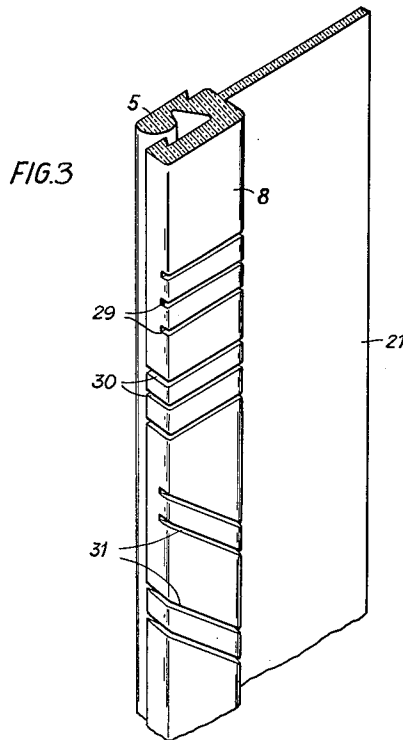
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SLIDE-FASTENERS

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The invention relates to a slide-fastener comprising two elastic profile bands of plastic or similar material, of identical cross sections and interlocking in closed position from opposite sides of the intermediate surface determined by the folds to be drawn together. The profiles of similar slide-fasteners usually present equal numbers of positive and negative elements.

According to a characteristic feature of conventional slide-fasteners the transverse forces to be taken up by the fastener are transmitted by a plurality of carrying surfaces of the profile bands extending alongside the latter, located either exclusively or mainly close to the surface of the profile bands and inclined towards the intermediate surfaces in such a way that forces are produced perpendicular to the intermediate surface which tend to pull the two profile bands apart. Therefore, the conventional slide-fasteners of this type fail to provide a dependable connection, as revealed in particular by their inadequate resistance to warping. In order to eliminate this effect which is liable to jeopardize the efficiency of the connection, the conventional slide-fasteners are provided with strong locking strips of hooked cross-section engaging undercuts or recesses of the counter-profile band, thus serving as a tie for both profile bands. These locking strips do not, however, extend beyond the level of the carrying surfaces and cannot therefore, accomplish their task and will not or only insufficiently increase the resistance to warping of the fastener. On the other hand, frictional forces are produced between the profile bands by the oblique position of the force-transmitting surfaces and the resulting spreading force, as a result of which the flexibility of the fastener will, as a rule, lag considerably behind that of the interconnected folds.

It is the object of the invention to avoid these drawbacks chiefly by preventing the formation of spreading components within the fastener. For that purpose, each profile band comprises a hook portion, principally on one side of the central plane, and a cover portion entirely to the other side of said central plane, the cover portion of each part closely encompassing the hook portion of the other part and engaging at a distance in the other part behind the carrying surfaces of the hooks.

This particular location of the carrying surfaces of the hooks produces a transfer of force between the edges of the flexible material to be fastened within or close to the central plane, thereby largely avoiding bending stresses of the profile. The cover portions encompassing the hook portions being used for the transfer of forces to a negligible extent only, they are free to fully serve their original purpose. As practical tests have shown, this fact is evidenced by the remarkable resistance to warping of the fastener. At the same time, its flexibility and impermeability to liquids and gases is increased.

This fact also constitutes an improvement over certain designs where the transfer of the tractive forces operative in the central plane is effected by a plurality of profile surfaces extending perpendicular to the central plane, yet in spaced relation to the neutral fiber located in the central plane. The frictional forces operative on these surfaces also oppose the bending of the slide fastener out of the central plane.

Being very largely relieved of tractive forces, the cover portion can be made of thinner material than the conventional slide-fasteners with the consequent increase of the

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flexibility of the slide-fastener as compared with the known types.

The design of the profile bands according to the invention offers the further advantage that the edges of the material to be fastened alongside which the profile bands are attached, can come close to the hooks, thus leaving only a short distance between the carrying surfaces of the hooks of the profile bands and said edges, as a result of which the force will be transmitted by the shortest possible route without subjecting the cover portions to any stress whatever. In addition, it is quite easy to provide recesses in the profile bands for the purpose of receiving beads of the said edges by means of which the latter chiefly engage the profile bands, since the comparatively narrow hooks take up only a minor portion of the width of the profile band.

According to a further feature of the invention, the profile-limiting surfaces of the hook portions are plane and intersect the central plane in perpendicular relation. This provides a very compact profile and facilitates the control of the spreading components.

Further details of the invention will appear from the following description of several embodiments of the invention with reference to the accompanying drawings in which:

FIGURES 1 and 2 are schematic cross-sectional views of a slide-fastener according to the invention.

FIGURES 3 and 4 show a three-quarter view of variations in design of the above.

The slide-fastener illustrated in FIGURE 1 comprises two shaped strips or profile bands 1 and 2 mounted by the conventional method of spraying with solvent or adhesive and which forms no part of this invention, or by, welding or any other suitable method on the extremities of edges of the flexible material 3 and 4 to be fastened which may be fabric, leather or similar materials. Each edge terminates in a bead 3' or 4' to prevent the loosening of the connection between the edges 3 and 4 and the profile bands or strips 1 and 2. Each of the profile bands comprises a generally C-shaped hook portion 5 and 6, respectively, of hooked cross-section and a cover portion 7 and 8, also of generally C-shape. The hook portions 5, 6 are approximately perpendicular to the cover portions 7, 8. The latter engage undercuts 11 and 12, respectively, of the counter-profile band with protruding edges 13 and 14 to prevent the unhooking of the hook portions.

The tensile tractive forces in the central plane illustrated by the chain-dotted line 9 are transmitted at the carrying surfaces 10 vertically intersecting the central plane without subjecting the hook portions 5, 6 to any substantial bending stress as the latter rest with their periphery positively against their respective counter-profiles. Thus with ordinary tensile stresses the cover portions 7, 8 have practically no forces to transmit and can therefore be made of even thinner materials than shown in the drawing.

The embodiment illustrated in FIGURE 2 does not differ essentially from that shown in FIGURE 1. Merely the cross-sections are of a more angular shape and the edges 21, 22 of the flexible material and their respective profile bands 2, 1 constitute one-piece elements. This cross-section is particularly suitable for opening and closing by means of a sliding cam, whereas rounded shapes as shown in FIGURE 1 may well be opened without a sliding cam by simply pulling at the cover portions.

In the embodiment shown in FIG. 2, the parts or elongated elements are designated by reference numerals 1' and 2'. The flexible coextensive tape-like extensions 21 and 22 are integral with the parts or elongated elements 2' and 1', respectively. These parts or elongated elements 1', 2' comprise a portion 15 and 16 respectively,

adjoining the said flexible coextensive tape-like extensions 22 and 21 respectively and first elongated generally C-shaped portions 17 and 18 respectively, each having a base 19, 20 respectively and a freestanding top 23, 24 respectively, and second elongated generally C-shaped portions 7' and 8', each having a base 25, 26 respectively and a freestanding top 27, 28 respectively. The bases 19 and 25 are integral with portion 15, the bases 20, 26 being integral with portion 16. The top 5' of the freestanding, hook-forming top portion 23 and the top 6' of the freestanding, hook-forming top portion 24 are shaped to intimately fit the inner hook recess 30' and 31', respectively. The engaging surface of the tops 5', 6' is designated by reference numeral 10'. The second C-shaped portions 7', 8' present recesses 32', 33' respectively, into which the outer dove-tail shaped back surfaces 34, 35 of the first C-shaped portion 18, 17 respectively, of the complementary part or elongated element 2', 1' respectively, engages, the protruding edges 13', 14' respectively being located in corresponding undercuts of the complementary parts or elongated elements.

In order to further increase the flexibility of the slide-fastener, the cover portion 8 or 7 can, as shown in FIGURES 3 and 4, be provided with grooves as at 29 in transverse direction extending, however, at the most through the cover portion 8 as at 30 but not through the hook portion. Thus the tightness of the slide-fastener will be maintained under all circumstances. The grooves may also extend in any oblique relation to the transverse direction of the slide-fastener as at 31 and in certain cases where absolute tightness of the fastener is not required, the grooves as at 32 may also pass through the hook portion 5. In the case of through grooves or slits and an edge 21 of the flexible material which forms one piece with the profile band, it is advisable to provide a longitudinal reinforcing rib 33 between the edges of the material and the profile band to prevent tears in the said edges.

Having thus described my invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A slide fastener of two parts of identical cross section reversed with respect to each other, each having a flexible coextensive tape-like extension, and comprising two portions, one of said portions comprising a body forming a hook portion to closely engage and hook into the corresponding hook portion of the other said part of the slide fastener, the faces of said hooks engaging in a plane normal to the plane of said extensions, and the other of said portions comprising a cover portion, the body of the hook portion lying principally to one side of the central plane of said extension and provided with a shoulder adjacent said extension, and the cover portion lying entirely to the other side of the side plane, the cover portion of each part closely encompassing the body of the hook portion of the other said part and engaging the shoulder of the body of the hook portion of said other part at a distance from the engaging surfaces of the hooks toward the flexible coextensive tape-like extension of the last-mentioned part, said cover portions being transversely grooved to provide greater longitudinal flexibility.

2. A slide fastener as defined by claim 1, in which the transverse grooves are arranged at an angle to said cover portions.

3. A slide fastener of two parts of identical cross section reversed with respect to each other, each having a flexible coextensive tape-like extension, and comprising two portions, one of said portions comprising a body forming a hook portion to closely engage and hook into the corresponding hook portion of the other said part of the slide fastener, the faces of said hooks engaging in a plane normal to the plane of said extensions, and the other of said portions comprising a cover portion, the body of the hook portion lying principally to one side of the central plane of said extension and provided with a shoulder adjacent said extension, and the cover portion lying entirely to the other side of the said plane, the cover portion of each part closely encompassing the body of the hook portion of the other said part and engaging the shoulder of the body of the hook portion of said other part at a distance from the engaging surfaces of the hooks toward the flexible coextensive tape-like extension of the last-mentioned part, said cover portions being severed by transverse slits into a plurality of fingers.

4. A slide fastener of two parts of identical cross section reversed with respect to each other, each having a flexible coextensive tape-like extension, and comprising two portions, one of said portions comprising a body forming a hook portion to closely engage and hook into the corresponding hook portion of the other said part of the slide fastener, the faces of said hooks engaging in a plane normal to the plane of said extensions, and the other of said portions comprising a cover portion, the body of the hook portion lying principally to one side of the central plane of said extension and provided with a shoulder adjacent said extension, and the cover portion lying entirely to the other side of the said plane, the cover portion of each part closely encompassing the body of the hook portion of the other said part and engaging the shoulder of the body of the hook portion of said other part at a distance from the engaging surfaces of the hooks toward the flexible coextensive tape-like extension of the last-mentioned part, said cover portions and said hook portions being severed by transverse slits into separate fingers.

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