United States Patent [19]

Frohlich

[11] **3,848,298**

[45] **Nov. 19, 1974**

[54] **SLIDE FASTENER**

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[73] Assignee: **Opti-Holding AG,** Glarus, Switzerland

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[30] **Foreign Application Priority Data**

Apr. 5, 1972 Germany 2216282

[52] **U.S. Cl.** ..... **24/205.1 R,** 24/205.13 D, 24/205.15 R, 24/201 C

[51] **Int. Cl.** **A44b 19/14,** A44b 19/26

[58] **Field of Search** ..... 24/205.13 D, 205.15 R, 24/201 C, 205.12, 205.1 R

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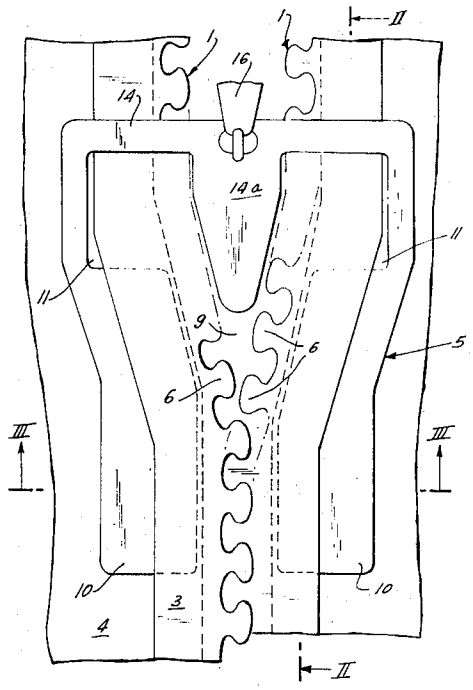
Primary Examiner—Bernard A. Gelak
Attorney, Agent, or Firm—Karl F. Ross; Herbert Dubno

[57] **ABSTRACT**

An essentially plate-shaped slider has two wings with confronting camming edges separated by a gap for the passage of coupling formations of a pair of mating fastener halves, each of these halves forming a pair of interconnected parallel flanges carrying the corresponding coupling formations and bracketing a respective wing between them. The connection between the flanges may extend between the confronting camming edges or around the opposite, outer edges of the two wings; in the first instance the wings are interconnected by at least one transverse end strip separated from them by slots giving passage to one of the flanges of each half, whereas in the latter instance they are interconnected by a central web toward which the split coupling formations project from opposite sides. The leading ends of the wings, as seen in the direction of closure motion, may diverge in opposite directions from the common plane of their trailing ends whereby the coupling formations of the two fastener halves are moved perpendicularly to that plane for interlinking or disengagement.

12 Claims, 20 Drawing Figures



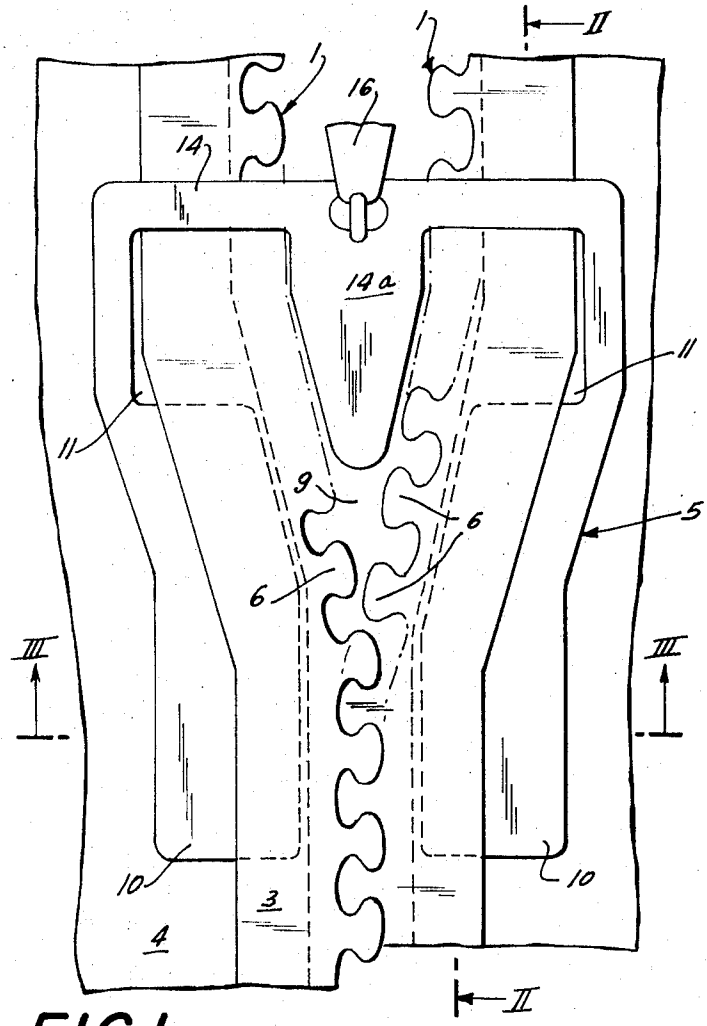


FIG. 1

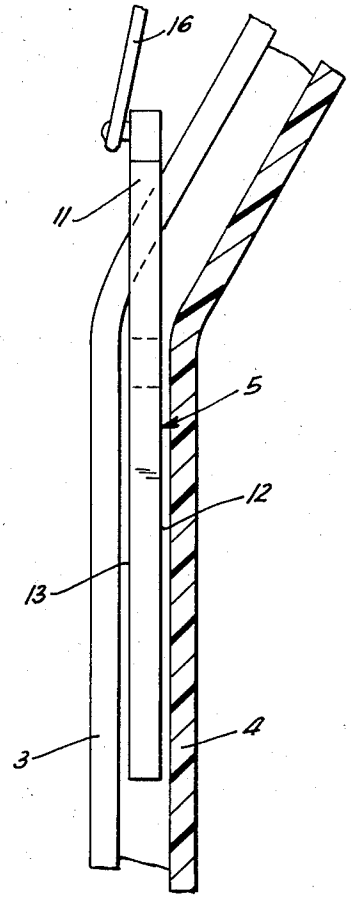


FIG. 2

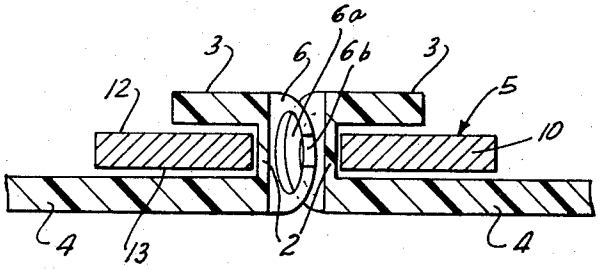


FIG. 3

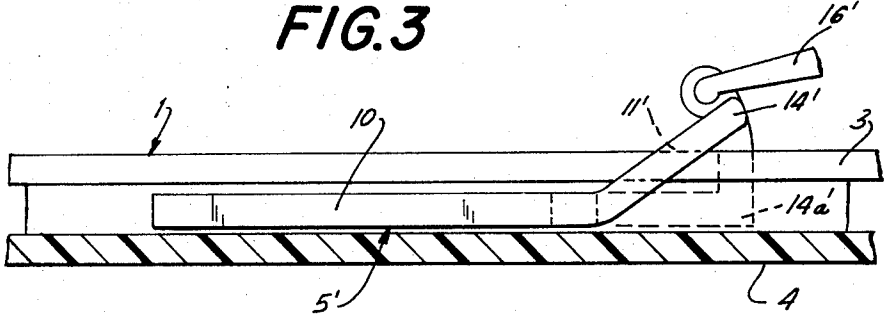
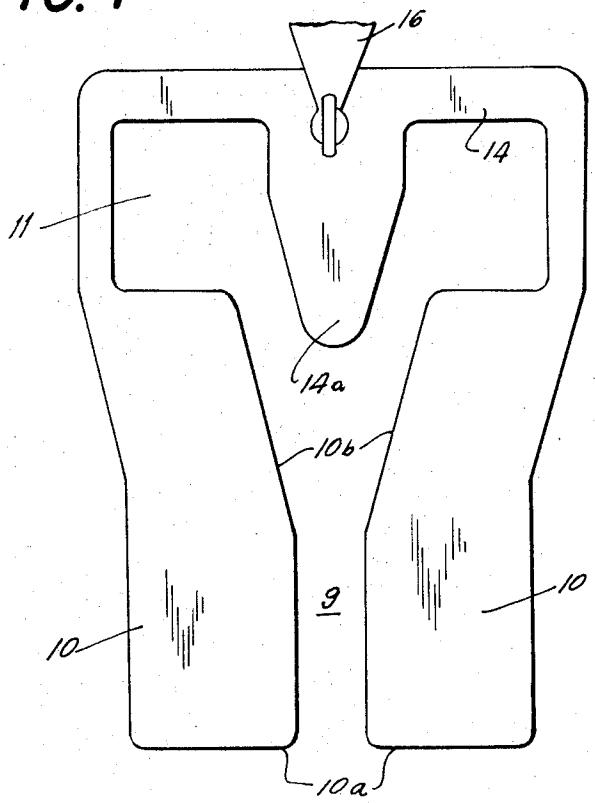


FIG. 2A

FIG. 4



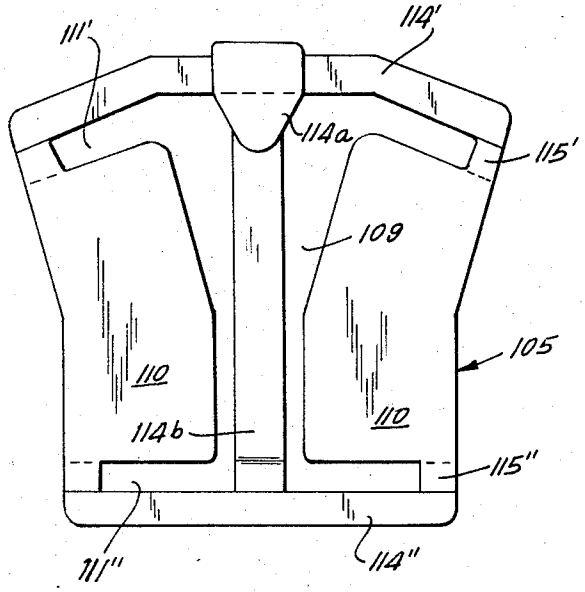


FIG. 8

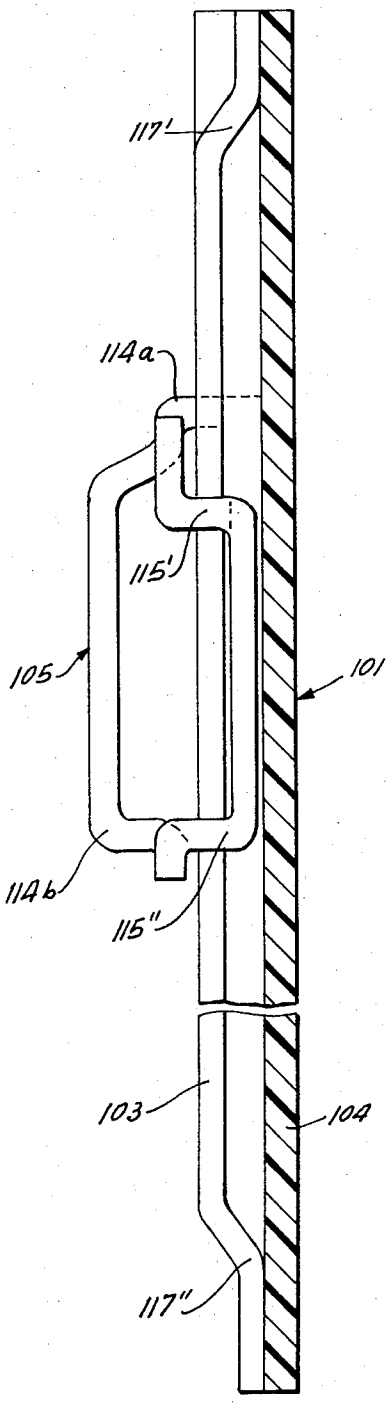


FIG. 6

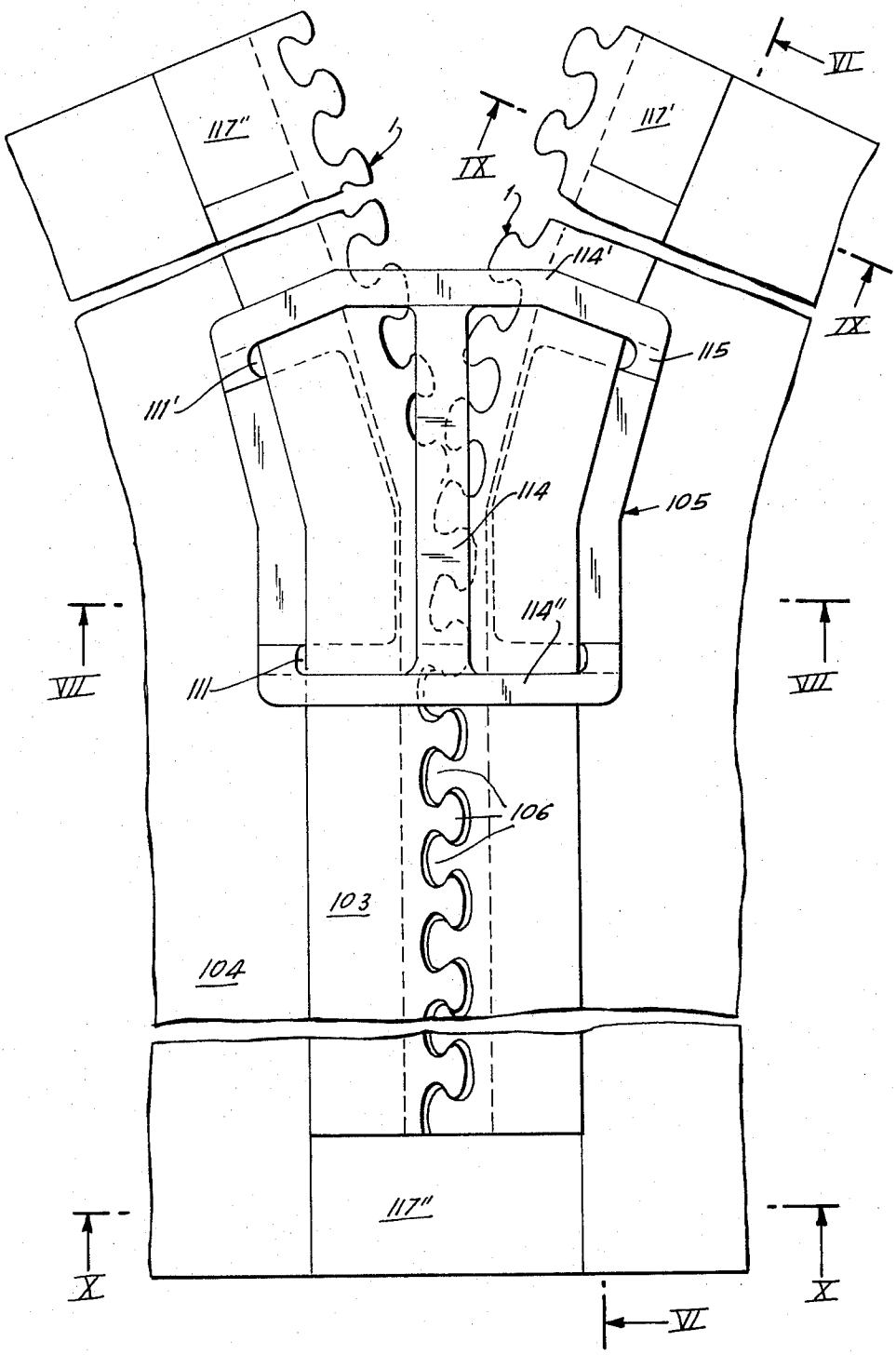

VI
117''
IX
117'
114'
IX
115
111'
114
105
114''
VII
VII
111
106
103
104
117''
X
X
VI

FIG. 5

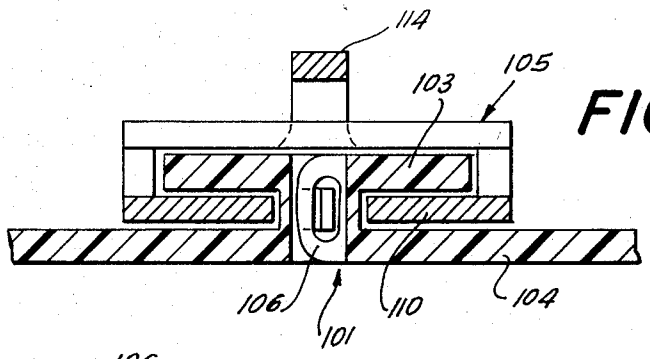


FIG. 7

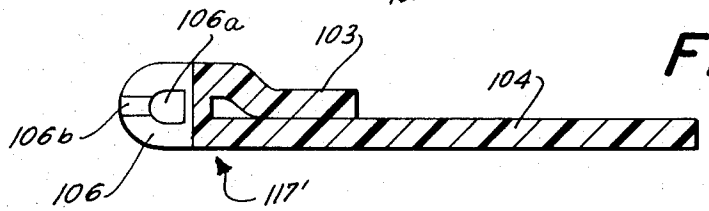


FIG. 9

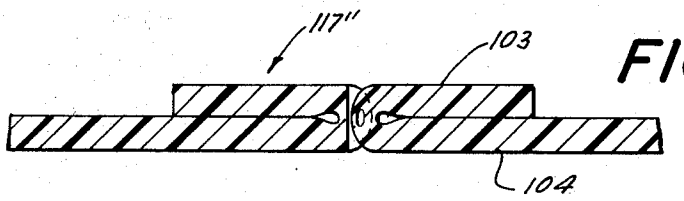


FIG. 10

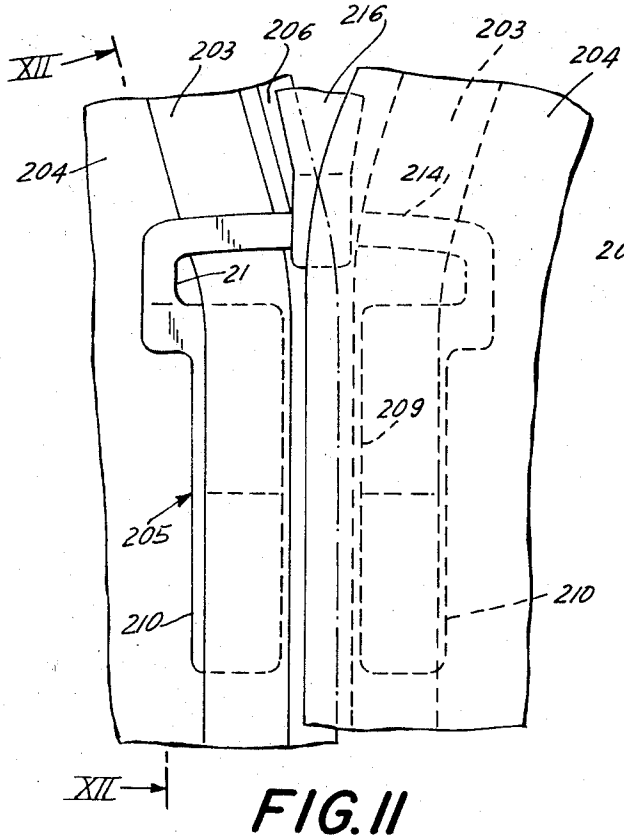


FIG. 11

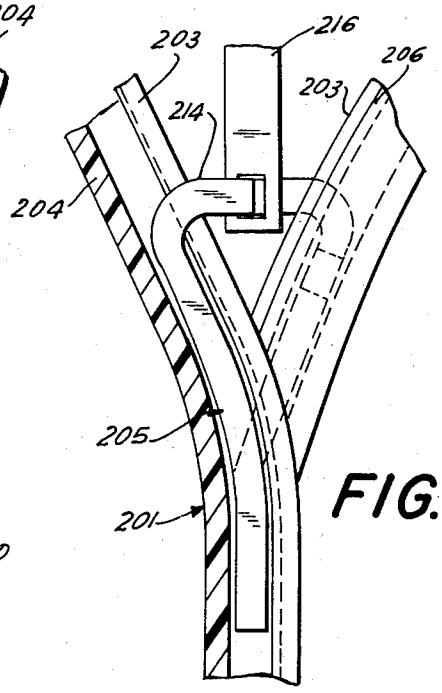


FIG. 12

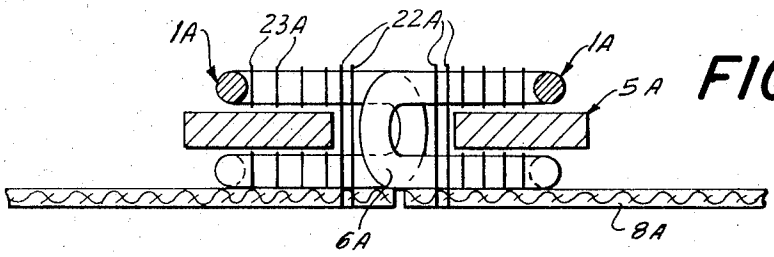


FIG.13

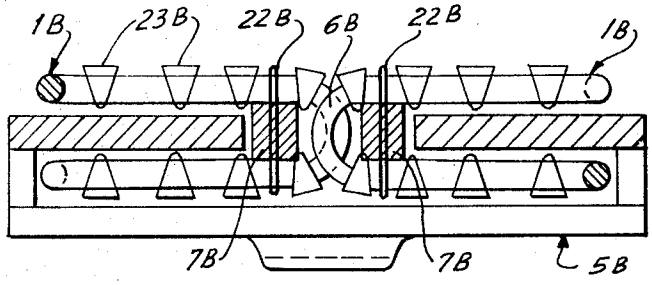


FIG.14

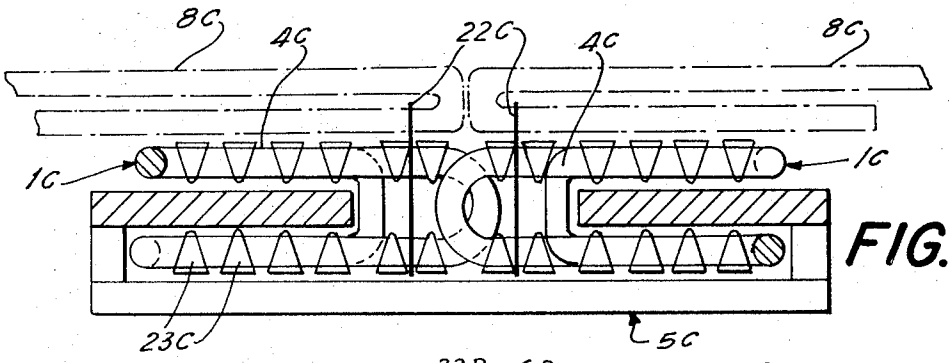


FIG.15

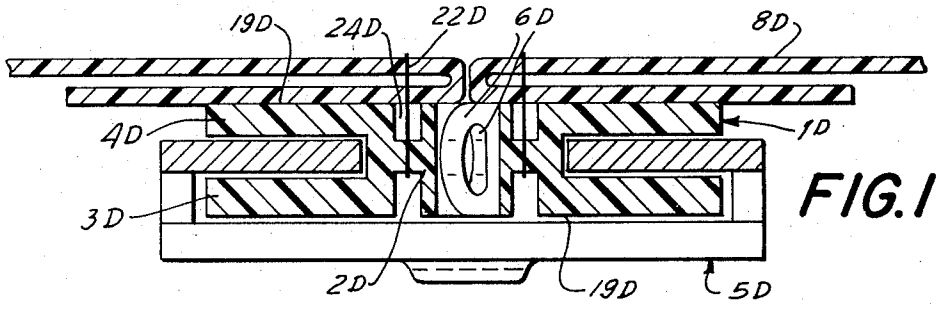


FIG.16

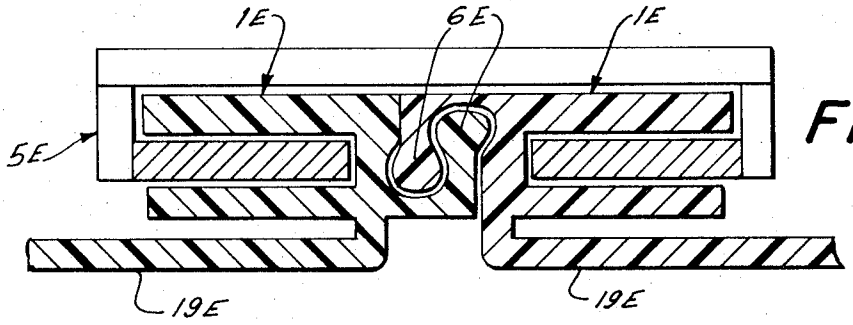


FIG.17

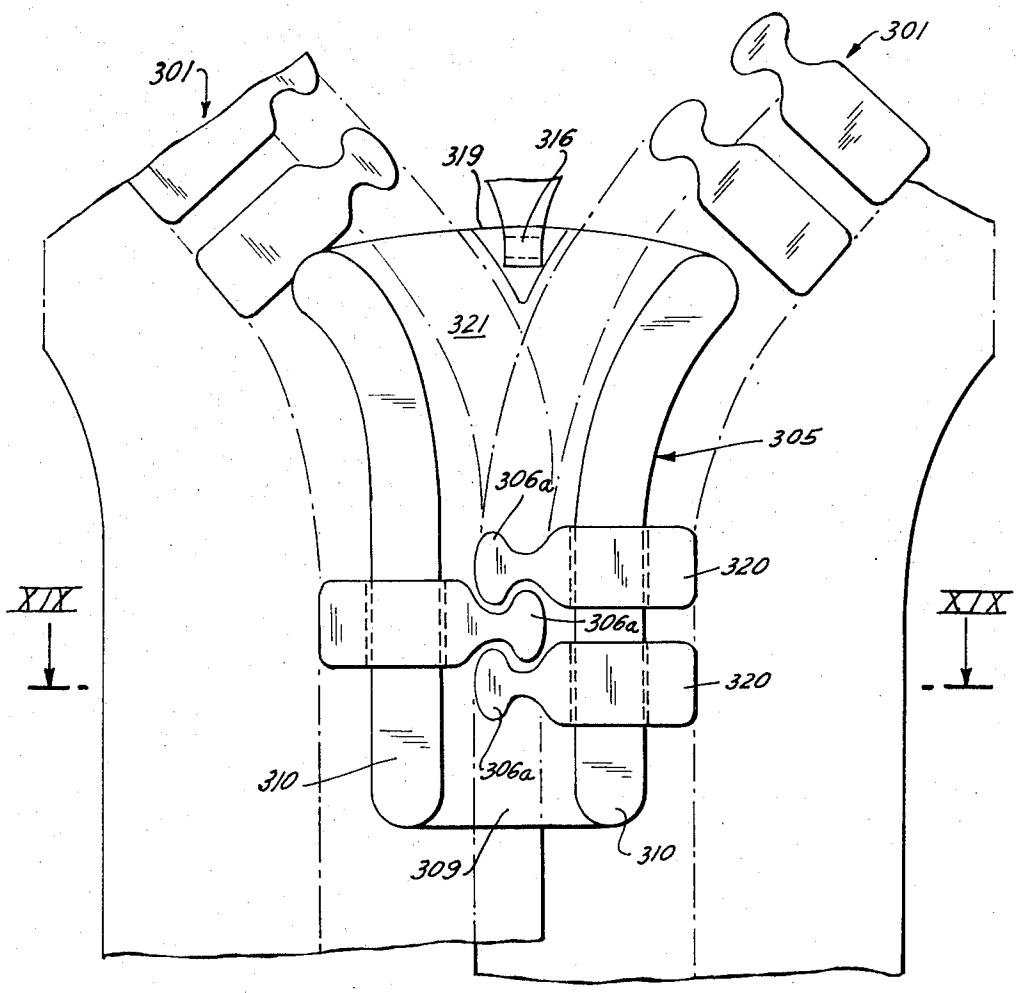

301
301
319
316
321
305
306a
320
306a
320
XIX
XIX
310
306a
309
310

FIG. 18

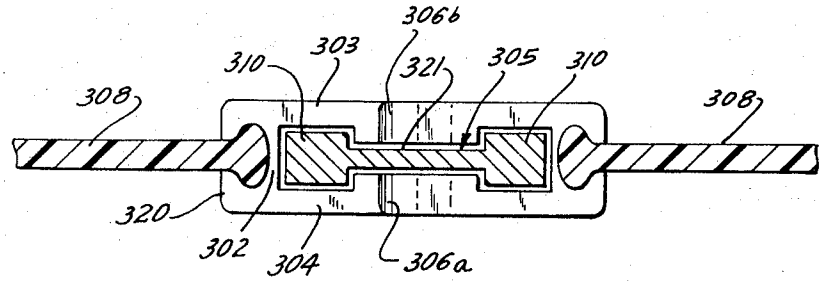

306b
310
303
321
305
310
308
308
320
302
304
306a

FIG. 19

SLIDE FASTENER

FIELD OF THE INVENTION

My present invention relates to a slide fastener and, more particularly, to the construction of a slider and associated fastener halves whose complementary coupling formations are interengageable and disengageable by reciprocation of that slider as is well known per se.

BAACKGROUND OF THE INVENTION

Conventional sliders generally comprise a pair of substantially parallel plates, respectively over- and underlying each fastener half, which are interconnected by a central wedge piece designed to open the fastener; the outer edges of these plates are provided with confronting projections for closing the fastener by exerting a camming action upon its two elastically deformable halves. Such a slider is therefore essentially a three-dimensional body which is relatively bulky and has a rather limited compressive strength perpendicular to its plates. Moreover, since the two fastener halves are completely bracketed by these plates, restrictions are imposed upon their mode of attachment to associated stringer tapes through which these halves are conventionally connected with parts of garments or the like that are to be joined together by the fastener.

OBJECTS OF THE INVENTION

The general object of my invention is to provide an improved slider-and-fastener combination avoiding the aforestated disadvantages.

A more particular object is to provide a simplified slider, adapted to be manufactured for example by a single stamping operation, for use with an otherwise more or less conventional fastener, e.g., one whose halves consist of meandering monofilaments such as nylon threads.

SUMMARY OF THE INVENTION

A slider embodying my invention is essentially plate-shaped and has a pair of wings with confronting camming edges separated by a gap for the passage of the coupling formations of the associated fastener halves, each of these halves forming a pair of interconnected, substantially parallel flanges carrying the corresponding coupling formations and bracketing a respective wing between them.

In one advantageous embodiment, the wings are interconnected at the leading end of the slider (as seen in the direction of closure motion), or at each end thereof, by bridge means in the form of a transverse strip which is separated from these wings by slots giving passage to one of the flanges of each fastener half; if the slider is flat, the two fastener halves are bent out of its plane on passing through these slots, yet the slider may also be curved to preserve the planar position of these halves. Alternatively, in an inversion of this arrangement, the flanges are interconnected at the outer edges of the slider wings which in turn are joined to each other by a central web; this requires a foreshortening of the coupling formations or, preferably, a splitting thereof into segments approaching that web from opposite sides, i.e., from the front and the back of the slider. Such an inverted arrangement also allows each

fastener half to be divided into a series of separate links held together by a common stringer tape.

In either instance, by way of modification, the leading ends of the two wings may diverge in opposite directions from the common plane of their trailing ends so that the coupling formations of the fastener halves are guided into and out of engagement with each other by a motion perpendicular to that plane. In that instance, the coupling formations may be designed as continuous beads rather than as longitudinally separated heads of the type commonly used in slide fasteners.

BRIEF DESCRIPTION OF THE DRAWING

The above and other features of my invention will now be described in detail hereinafter with reference to the accompanying drawing in which:

FIG. **1** is a plan view of a significant part of a slide fastener embodying my invention;

FIG. **2** is a longitudinal sectional view taken on the line II — II of FIG. **1**;

FIG. **2A** is a view similar to FIG. **2**; showing a modification;

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

FIG. **4** is a plan view of a slider forming part of the embodiment of FIGS. **1** – **3**;

FIG. **5** is a view similar to FIG. **1**, illustrating another embodiment;

FIG. **6** is a longitudinal sectional view taken on the line VI — VI of FIG. **5**;

FIG. **7** is a cross-sectional view taken on the line VII — VII of FIG. **5**;

FIG. **8** is a plan view, similar to FIG. **4**, of a slider used in the embodiment of FIGS. **5** – **7**;

FIGS. **9** and **10** are cross-sectional views respectively taken on lines IX — IX and X — X of FIG. **5**;

FIG. **11** is a plan view, similar to FIGS. **1** and **5**, of a further embodiment;

FIG. **12** is a cross-sectional view taken on the line XII — XII of FIG. **11**;

FIGS. **13** – **17** are cross-sectional views generally similar to FIG. **7**, illustrating various combinations of fastener halves and sliders according to my invention;

FIG. **18** is a plan view similar to FIGS. **1**, **5** and **11**, showing still another embodiment; and

FIG. **19** is a cross-sectional view taken on the line XIX — XIX of FIG. **18**.

SPECIFIC DESCRIPTION

The embodiment of my invention shown in FIGS. **1** – **4** comprises two elastically deformable fastener halves **1** with coupling formations **6** in the shape of projecting heads longitudinally spaced along their confronting edges. Each fastener half includes two parallel flanges **3** and **4** defining, together with a connecting part **2** carrying the coupling heads **6**, a generally J-shaped profile as best seen in FIG. **3**. The shorter flange **3** overlies the front surface **12** of a flat, plate-shaped slider **5** whose back surface **13** rests against the longer flange **4**; this slider is formed with two wings **10** each bracketed by the flanges **3**, **4** of a respective fastener half **1**. The fastener halves may be integrally molded from theremoplastic material, e.g., polyamide; parts **2** – **4** could also be woven from preferably theremoplastic fibers having the necessary elasticity and stiffness, with

the coupling heads **6** secured thereto by any suitable means.

As best seen in FIG. **4**, the wings **10** of slider **5** are separated by a longitudinally extending gap **9** which is relatively narrow at the trailing ends **10***a* of these wings (as viewed in the direction of the closing stroke of the slider indicated by an arrow A) and has a diverging portion in the region of their leading ends **10***b*. The wings are interconnected by an end strip **14** spaced from their leading ends **10***b* by slots **11** which communicate with the gap **9** and are traversed by the shorter forward flanges **3** of fastener halves **1** as best seen in FIG. **2.** End strip **14** is integral with a wedge piece **14***a* which projects into the widening gap portion between the leading ends **10***b* of wings **10** and serves to disengage the interlinked coupling heads **6** of the two fastener halves during the opening stroke of the slider, i.e., upon its movement opposite the direction of arrow A. A tab **16**, which facilitates manual operation of the slider and may also be manipulated to lock the slider in position as is well known per se, is hinged to the end strip **14** which bridges the wings **10.**

In FIG. 2A I have shown a slider **5'** which, in contradistinction to the slider **5** of FIGS. **1 – 4**, has its end strip **14'** bent out of the plane of wings **10'** to an extent sufficient to let the front flange **3** of each fastener half **1** pass straight through its slot **11'** so that the two fastener halves can retain their planar positions during reciprocation of the slider. A wedge piece **14***a'* depends from the strip **14'** into the plane of the wings.

If desired, the slider **5** could also be slightly curved abouts its longitudinal centerline, e.g., with its outer edges bent up as viewed in FIG. **3.**

In the embodiment of FIGS. **5 – 10** I have provided a slider **105** which, as best seen in FIG. **8**, differs from slider **5** mainly by the fact that its wings **110** are bridged by two end strips **114'** and **114''** spaced from their leading and trailing ends by respective slots **111'** and **111''**. These end strips are connected with the slider wings through bent legs **115'**, **115''** so as to be raised from the plane of the wings **110**, substantially in the manner of strip **14'** (FIG. 2A), for the purpose of allowing the flange **103** of a fastener half **101** to remain essentially straight during slider reciprocation. The strips **114'** and **114''** are centrally interconnected by a handle bar **114***b* offset from the plane of the wings; a separating wedge piece **114***a* depends from leading strip **114'** in a manner similar to that of wedge piece **14***a'* in FIG. 2A.

FIG. **6** also shows a pair of end stops limiting the slider stroke, namely a top stop **117'** and a bottom stop **117''**. As shown more clearly in FIG. **9**, the top stop **117'** (which is individual to each fastener half **101**) is formed by fusing the thermoplastic flanges **103** and **104** to each other. Similarly, as best seen in FIG. **10**, the flanges of both fastener halves are fused to form the common bottom stop **117''**.

The coupling heads **6**, **106** of fastener halves **1**, **101** are shown provided with apertures **6***a*, **106***a* and projections **6***b*, **106***b* fitting into the apertures of the mating heads of the other fastener halves. It will be understood, however, that the shape of these heads may be varied and that different types of fasteners, such as meandering monofilamentary coils as illustrated in FIGS. **13 – 15**, could also be used in the aforedescribed embodiments.

FIGS. **11** and **12** show a slider **205** which is generally similar to slider **5** of FIG. **4**, except for the omission of wedge piece **14***a* and the fact that the leading ends of its wings **210** are bent in opposite directions out of the plane of their trailing ends, causing the connecting strip **214** to assume a generally S-shaped curvature. The two fastener halves **201** invertedly engaged by these wings **210**, which are again bracketed by flanges **203** and **204** thereof, are thus spread apart in a transverse plane (see FIG. **12**) between the slider **205** and the nonillustrated top stops. As the slider is advanced toward these top stops with the aid of a tab **216** attached to the end strip **214**, the fastener halves are moved toward each other at right angles to the basic plane of the slider (i.e., the plane of its trailing ends) so that their coupling formations **206** may be different from those shown at **6** and **106** in preceding Figures. In particular, these formations **206** may be continuous longitudinal beads of a profile as shown at **6E** in FIG. **17** more fully described hereinafter.

In FIGS. **13 – 14** I have illustrated various possibilities for attaching the two fastener halves to stringer tapes or other pieces of fabric to be joined to each other by the fastener. In FIG. **13** two fastener halves **1A**, bracketing a flat slider **5A** of the type shown in FIGS. **1 – 4**, are stitched at **22A** to respective tapes **8A**; the fastener halves **1A** are meandering monofilaments (e.g., of nylon) whose bight portions carry coupling heads **6A** and which are further provided with ribs **23A** for reducing the friction between their flange-forming sections and the slider wings bracketed thereby.

In FIG. **14** each fastener half **1B** is traversed by a heavy filler cord **7B** received in the gap between the two wings of a slider **5B** which is generally similar to slider **105** of FIGS. **5 – 8.** These filler cords are traversed by stitching **22B** securing them to the meandering coils of the fastener halves which in this instance are shown provided with bosses **23B** facilitating the relative displacement of the slider; the associated coupling heads have been designated **6B**. The cords **7B** may in turn be stitched onto respective pieces of sheet material, e.g., as illustrated in FIG. **15** where two fabric strips **8C** are shown secured in this manner to a pair of fastener halves **1C** with the aid of stitching **22C**; the filler cords have been omitted in that Figure. Fabric strips **8C**, which have been folded over to conceal the stitching, are shown to touch each other in the midplane of slider **5C** from which they are separated by fastener flanges **4C**; this arrangement thus makes it possible to bring two pieces of fabric or other sheet material into close proximity with each other, in a nonoverlapping manner, without any danger that either piece may be caught by the reciprocating slider. The fastener halves **1C** have coupling heads **6C** and bosses **23C**.

In FIG. **16** I have shown a similar arrangement wherein each fastener half **1D** comprises an extruded U-shaped profile **19D** with flanges **3D**, **4D** and a bight portion **2D** carrying the coupling heads **6D**, this bight portion being recessed at **24D** to receive stitching **22D** which in the present instance is shown to pass through both layers of two pieces of folded fabric **8D**.

FIG. **17** depicts fastener halves **1E** in the form of extruded profiles, generally similar to those shown at **19D** in FIG. **16**, which are integral with the above-discussed longitudinal beads **6E** and are also made in one piece with respective strips **19E** adapted to be stitched or

otherwise secured to nonillustrated pieces of fabric or other sheet material.

Naturally, the various combinations shown in FIGS. **13 – 17** are only given by way of example and may be modified, for example, by the interchange of compatible features thereof.

In FIGS. **18** and **19** I have illustrated an embodiment of my invention wherein two fastener halves **301** coact with a slider **305** whose wings **310,** separated by a gap **309,** comprise each a multiplicity of links **320** clamped onto respective stringer tapes **308,** each link forming a pair of flange sections **303, 304** which bracket a respective wing **310** of slider **305** and are interconnected by a leg **302** externally of the slider, i.e., along the outer edge of its wing. The two wings **310** are joined together by a central web **321** whose thickness is substantially less than that of the wings and which partly occupies the intervening gap **309.** Each link **320** (only a few of which have been illustrated in FIG. **18**) has a coupling formation in the shape of a head split into two segments **306***a*, **306***b* which approach the web **321** from opposite sides (only the forward segments **306***a*) being visible in FIG. **8**) and which co-operate with corresponding segments on the confronting links of the other fastener halves. Web **321** also carries a wedge piece **314** projecting on both surfaces thereof into the path of coupling formations **306***a*, **306***b;* a tab **316** is articulated to that wedge piece.

In view of the two-way positive engagement of the links **320** with slider wings **310,** the opening wedge **314** is not indispensable in this embodiment.

Naturally, the slider configuration of FIGS. **18** and **19** could also be used with fastener halves of the same general profile formed in one piece, e.g., as a monofilamentary coil or an extruded profile of the type shown in the preceding embodiments, rather than in discrete links held together by an associated stringer tape.

I claim:

1. A slide fastener comprising:

two elastically deformable fastener halves provided with complementary coupling formations; and

a generally plate-shaped slider having two wings separated by an elongate gap accommodating said coupling formations, each of said fastener halves including a pair of rigidly interconnected substantially parallel flanges bracketing a respective one of said wings, the latter being provided with guiding edges adjacent said gap in camming engagement with said coupling formations for interlinking same upon a relative displacement of said slider in a fastener-closing sense in the longitudinal direction of said gap, said slider further including bridge means joining said wings to each other.

2. A slide fastener as defined in claim **1** wherein said wings have closely spaced coplanar trailing ends and further have leading ends defining a widening portion of said gap, said bridge means spanning said wings at least in the region of their leading ends.

3. A slide fastener as defined in claim **2,** further comprising a wedge piece on said bridge means disposed in said widening gap portion for separating said coupling formations upon a relative displacement of said slider in a fastener-opening sense.

4. A slide fastener as defined in claim **2** wherein the pair of flanges of each fastener half are interconnected within said gap by parts carrying said coupling formations, said bridge means comprising a transverse end strip spaced from said leading ends by a pair of slots each traversed by one flange of a respective pair.

5. A slide fastener as defined in claim **4** wherein said bridge means further comprises another transverse end strip spaced from the trailing ends of said wings by another pair of slots each traversed by said one flange of the respective pair.

6. A slide fastener as defined in claim **4** wherein said end strip is offset from the plane of said trailing ends to an extent sufficient to maintain said flanges substantially planar.

7. A slide fastener as defined in claim **4** wherein said leading ends are bent in opposite directions from the plane of said trailing ends, said coupling formations being interlinkable upon a relative motion perpendicular to said plane.

8. A slide fastener as defined in claim **2** wherein said bridge means comprises a central web narrower than said wings extending across said gap, the pair of flanges of each fastener half being interconnected externally of said slider.

9. A slide fastener as defined in claim **8** wherein said coupling formations are split into segments extending from opposite sides toward said web within said gap.

10. A slide fastener as defined in claim **8** wherein each fastener half is divided into a series of discrete links held together by a common stringer tape.

11. A slide fastener as defined in claim **1,** further comprising pieces of sheet material secured to said fastener halves in the region of said gap.

12. A slide fastener as defined in claim **1** wherein the flanges of each pair are joined together at longitudinally separated locations, thereby forming top and bottom stops limiting the stroke of said slider.

* * * * *