

March 3, 1936.

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2,032,858

SEPARABLE FASTENER

Filed Jan. 13, 1930

3 Sheets-Sheet 1

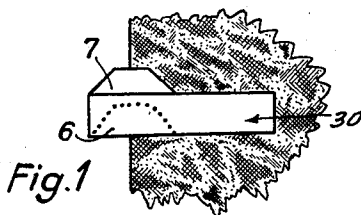


Fig. 1

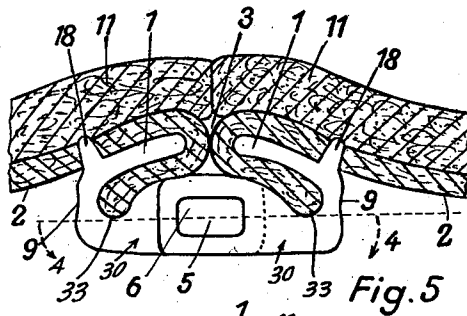


Fig. 5

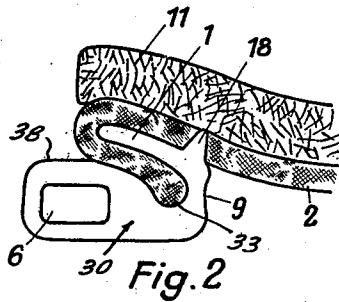


Fig. 2

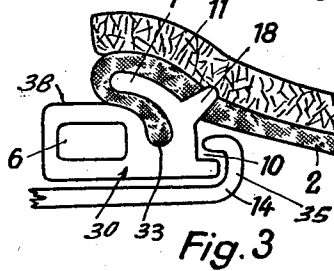


Fig. 3

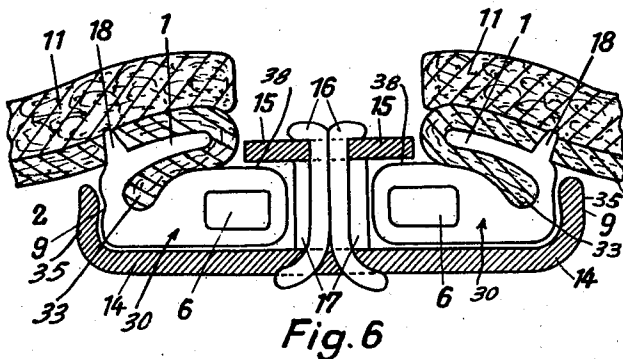


Fig. 6

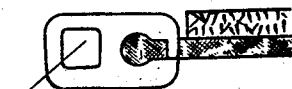


Fig. 4

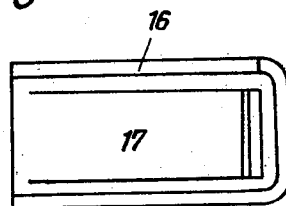


Fig. 7

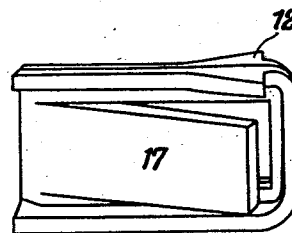


Fig. 8

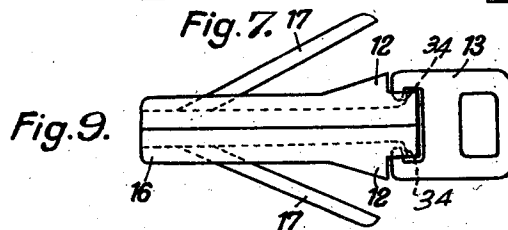


Fig. 9

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3 Sheets-Sheet 2

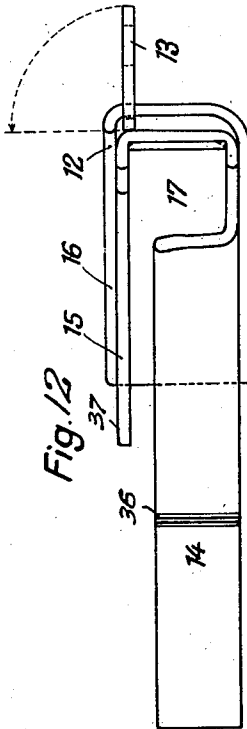


Fig. 12

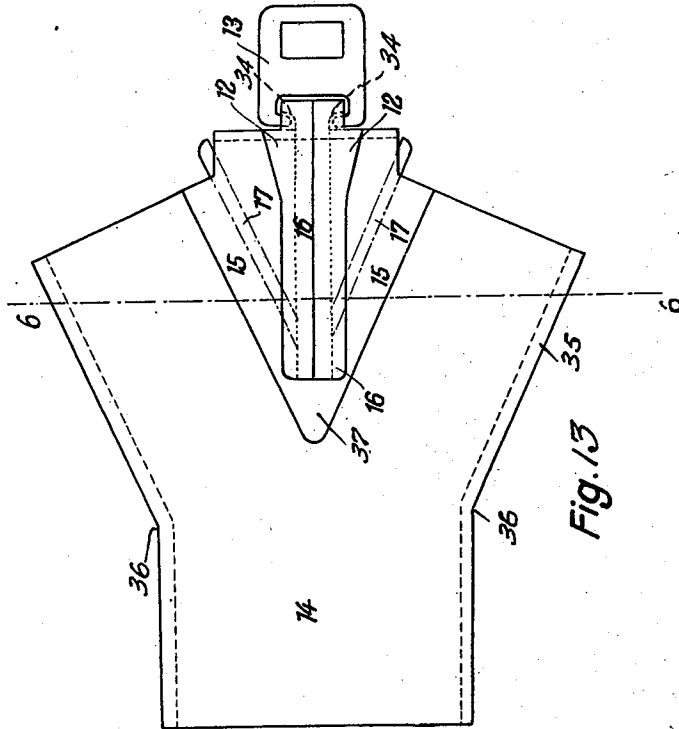


Fig. 13

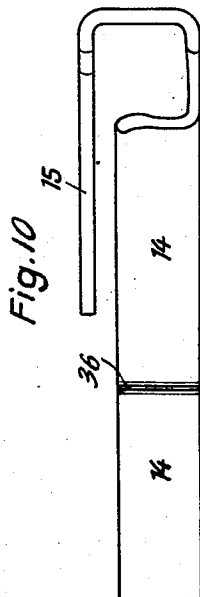


Fig. 10

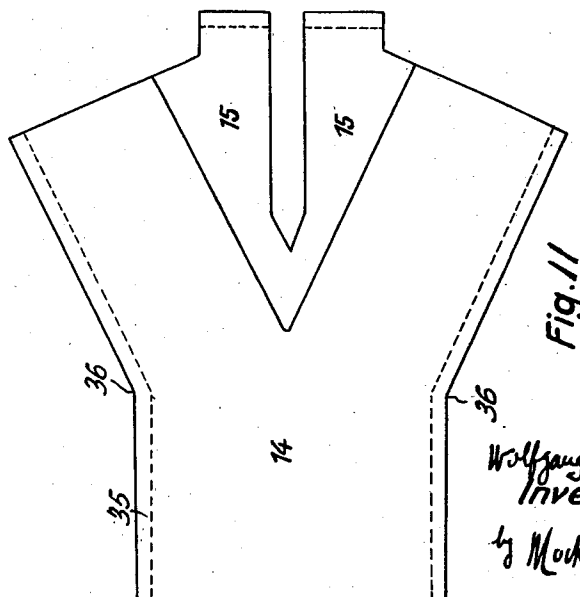


Fig. 11

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3 Sheets-Sheet 3

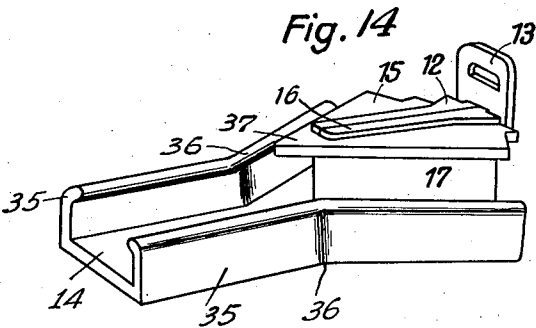


Fig. 16

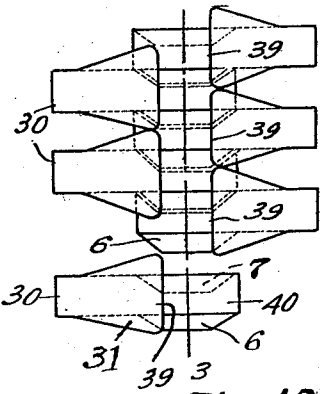
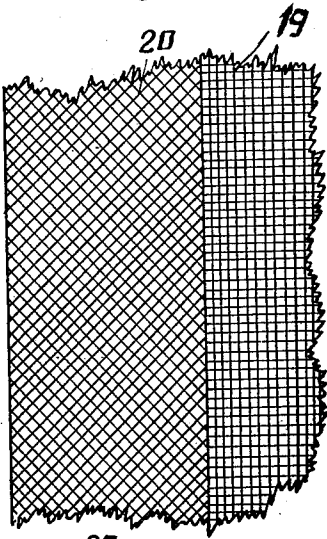


Fig. 15

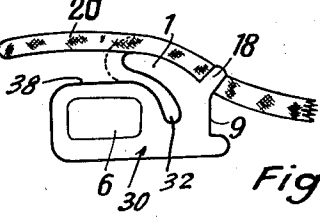


Fig. 17

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UNITED STATES PATENT OFFICE

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SEPARABLE FASTENER

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In Germany January 15, 1929

14 Claims. (Cl. 24—205)

This invention relates to separable fasteners and has particular reference to that type of fastener in which two oppositely located series of locking elements are interlocked and unlocked by a slider sliding on both series, the locking being effected by movement in one direction and unlocking by movement in the opposite direction.

In this type of fastening device each series of locking elements is fixed to the edge of a piece of fabric or the like, whereby the two edges of fabric are securely connected to each other, when the two series of locking elements are in interlocking position.

The applicability of the separable fasteners in its hitherto known forms is limited, because the interlocking elements remain visible.

The invention is particularly concerned with a fastener of the type mentioned in which the locking elements are covered by a fabric or other material, whereby the applicability of the separable fasteners is greatly increased.

The objects of the present invention are to apply covering material to corresponding faces of the locking elements; to securely fix the covering material to the interlocking elements; to shape the interlocking elements so that the covering layer can be securely attached to these elements; to provide a slider which will only glide along uncovered parts of the locking elements; to provide a fastener in which the covering material lies perfectly flat. Other objects and advantages of the invention will be pointed out in the detailed description thereof which follows or will be apparent from such description.

In order that the invention may be readily understood and its practical advantages fully appreciated reference may be had to the accompanying drawings in which I have illustrated one convenient form of means embodying the invention. However, it will be understood that the invention is susceptible of embodiment in other forms of construction than that shown and that changes in the details of construction may be made within the scope of the claims without departing from the principle thereof.

In the drawings Fig. 1 is a plan view of an interlocking member or element.

Fig. 2 is an elevation of an interlocking element covered with two layers of covering material.

Fig. 3 is a view similar to that of Fig. 2 of an interlocking element in which the guide for the sliding cam is more strongly developed.

Fig. 4 is an elevation of a hitherto known form of interlocking element.

Fig. 5 is an elevation of two opposite interlocking members in locked position.

Fig. 6 is a section through the opened fastener with the sliding cam or slider in cross-section, taken on line 6—6 of Fig. 13,

Figs. 7 to 14 depict details of the sliding cam; Fig. 7 being a side view of the wedge-shaped middle part of the sliding cam; Fig. 8 being a perspective view and Fig. 9 a top view of that middle part. Fig. 10 is a side view and Fig. 11 a top view of the shields which form part of the slider, Fig. 12 is a side view, Fig. 13 a top view and Fig. 14 a perspective view of the complete slider.

Fig. 15 is a top view showing a series of interlocking members of a preferred specific form, 10 each member having an enlarged outer surface, the lowest of said members being removed in order to more clearly show the shape of a single member or element.

Fig. 16 diagrammatically shows the material 15 which is used for covering the outside of the metal elements and schematically illustrates the different modes of weaving which should be used for different parts of the covering material.

Fig. 17 illustrates in connection with Fig. 16, 20 how the different parts of the covering may be combined with an interlocking member.

Referring first to Figs. 2, 3, 5 and 6 each individual locking element 30, which usually consists of metal, has an elongated projection 1, about 25 which the covering material 2 is placed. This projection 1 is spaced from the body of element 30, and it projects towards the dividing line 3 of the fastener, as clearly shown in Fig. 5. Each covering strip 2 can be fixed to each set or series 30 of locking elements by clamping its margin 33 between the body of each element 30 and its projection 1. In order to securely fasten each strip 2 a spike or pin 18 can be provided on the projection 1, pointing sideways and upwards as diagrammatically shown in Figs. 2, 3, 5 and 6. In the fastener shown in the drawings the upper part of this pin 18 protrudes through strip 2. In that case means must be provided for making this part of the locking element invisible, too. This can 40 be done by providing a second covering strip 11 above the first covering strip 2 and attaching this second layer in any suitable way to the first layer; or the top part of pin 18 may be made inconspicuous in other ways, for instance, by applying a 45 suitable coating or coloring which matches with the adjacent fabric or other material. It is apparent from Fig. 5 that the covering strips 2 and 11 may completely cover all those parts of the interlocking elements at one face of the fastening device, as long as the fastener is closed. The covering material may extend to the middle line 3 of the fastener, if it is desired to have the covering strips of the left and of the right part meet and lie closely adjacent each other.

Referring now particularly to Figs. 1 to 6 and to Fig. 15, each element 30 is provided with a recess 6 and with a locking projection 7, so that the projection 7 of one element can interlock with the recess 6 of the corresponding opposite 60

element. I prefer to provide said recesses 6 and projections 7 with elongated shapes, as shown in Figs. 1 and 2. If thus shaped, the elements will offer sufficient resistance to turning forces which would tend to turn the interlocking members around the point 5, in the directions of the arrows 4 which are shown in Fig. 5. Such turning is undesirable because it would separate the covering strips for the interlocking members, if it is desired to have such strips contact with each other.

If fasteners with square shaped locking projections and recesses have been in use for some time, the angles will get worn or rounded off, whereby the projections may be turned within their recesses. In order to illustrate this point more clearly, Fig. 4 shows the ordinary element used in fasteners of this type. The ordinary element has a recess 8 of substantially square shape, instead of having its length greater than its width.

The closing and opening of the fastener is effected, as already mentioned, in the generally known way by means of a sliding cam or slider. However, sliders of the already known type can not be used with the improved fastener to which the present invention relates, in the embodiment in which the covering strips contact with each other, because these sliders usually glide along surfaces of the locking elements which according to the present invention may be covered with fabric or other covering material. The friction exerted by the slider would within short time spoil the covering and in fact this difficulty has up to now formed a bar against the manufacturing of completely covered separable fasteners of the present type.

The new slider developed for the covered fastener is best shown in Fig. 14. Figs. 7 to 13 are more or less diagrammatic views, partly of the whole slider, partly of different parts of the slider, Figs. 7 and 8 showing the central piece without and Fig. 9 with the pulling member fitted thereto, Figs. 10 and 11 showing the two shields of the slider and Figs. 12 and 13 showing the central piece connected to the two shields.

As shown in Figs. 7 to 10, the improved slider comprises a wedge-shaped central piece which includes the wedge 17, and a surrounding part 16, which is substantially U-shaped. This central piece can be manufactured as one integral piece by bending a piece of metal into the shape shown in the drawings as will be described in detail later on, or the parts 16 and 17 can be manufactured as separate parts and then connected together as by soldering or welding. Member 16 is provided with a flange 41 for a purpose which will be explained later.

Referring now to Figs. 10 and 11, two shields 14 and 15 are provided. The shields can be molded or otherwise manufactured as one integral piece or they may be secured together, such as by welding or soldering. Each of the shields 14 and 15 is provided with an elongated slot through which the flange 41 of member 16 extends, as best shown in Fig. 6. The upper or outer shield 15 has a triangular shape, while the lower or inner shield 14 consists of a rectangular left part, and of a tapered right part, whereby the periphery of shield 14 forms an angle at 36, as shown in Fig. 11. The rim 35 of the lower shield 14 is bent upwardly and the edges of said rim engage the recesses which are provided on the elements 30.

As shown in Figs. 2, 5 and 6, flat or shallow

recesses 9 may be provided. As shown in Fig. 3, deeper recesses 10 may be provided.

The different parts of the slider can be connected in any suitable manner as by welding, soldering or forming the parts from an integral casting or stamping. For instance, the flange 41 of member 16 can be fitted into the slot thereof, provided on shields 14 and 15, whereafter the wedge 17 can be placed in the position shown in the drawings and then fixed as by soldering or welding. Or parts 16 and 17 may be first rigidly connected, whereafter shield 14 is shifted with its slot 42 over the upper part of flange 41, and shield 15 is shifted with its slot 42 over the lower part of flange 41. With this latter manner of mounting the slider, the shields 14 and 15 must be connected to each other after each of them has been separately mounted on the flange 41.

The wedge-shaped central portion as shown in Figures 9 and 13 comprises two plate members arranged back to back and secured together in a conventional manner, each of said plate members having a wedge 17 struck out therefrom, thereby leaving a surrounding part 16.

The outer shield 15 is relatively short. Its pointed end 37 should not project up to a line joining points 36 which define the angles of the margin of member 14. Likewise the shield 15 should project over the wedge 17 only to an extent which corresponds to the width of the uncovered portions of the fasteners. By thus shaping and dimensioning the upper shield injury to the coverings 2 and 11 of the locking elements 30 is prevented, because the shield 15 contacts with the locking members only after they have been transferred into partly unlocked position.

As shown in Fig. 6, the lower or inner shield 14 embraces the inner surfaces of the interlocking elements, and the shield 15 which is located at the upper or outer faces of said interlocking elements, slides only on the uncovered parts 38 of said interlocking elements. The pointed end 37 of the shield 15 only engages those interlocking members which have already been at least partially disengaged, so that the covering strips 2 are separated along the line 3. Hence, the shield 15 can be introduced between the covering strips, without contacting with them, and the upper shield remains at all times out of contact with the covering means which avoids any injury of said covering means.

For the same reason, means are provided for preventing the pulling member 13 from contacting with the covered parts of the locking elements and from thereby injuring the cover. For this purpose the pulling member 13 is held by shoulders 12 against tilting, when the slider is moved in a direction for opening the fastener. The opening movement is thus effected by pushing the slider by means of member 13, while the closing movement is effected, as usual, by pulling the slider by means of the same member 13.

Referring once more to Figs. 2, 3, 5 and 6, in order to thoroughly conceal the interlocking elements, each strip 11 can have its inner edge firmly connected to the under-strip 2, and this can be done by means of adhesive, sewing, or the like. The layer of material 11 may be a part of the article with which the fastener is combined.

Referring to Fig. 15, the interlocking members 30 may be provided with projections, the upper and front portions 31 of which are larger than the rear portions. In other words, in this em-

bodiment, the projections 1 are provided with enlarged upper portions 31, these portions of the projections being also larger than the lower parts of the interlocking elements, which interengage when the fastener is closed. By thus enlarging the upper or front portions of the projections, adjacent members 30 will touch each other so as to provide a well-defined straight edge.

As shown in Fig. 15, the edges 39 thus form an unbroken continuous line, so that when the elements are interlocked in normal position, the covering strips 2 which are connected to the parts 31, meet (if desired) along straight lines.

The edge 39 should be twice as long as the edge 40.

Figs. 16 and 17 show in diagrammatic form certain details of the covering means. When the elements are interlocked or separated, they are moved towards or away from each other. Hence, it is necessary that the corresponding parts of the covering should be made with a certain degree of elasticity in vertical direction, as viewed in Fig. 16. The mentioned displacement towards and away from each other occurs only at the parts of the interlocking members which lie near the middle line 3. Elasticity is therefore necessary only in that part of the covering which is located adjacent line 3, also. Hence, it may be desirable to have the covering means comprise two parts of different properties. For example, the marginal part 20 of the covering is resilient in the longitudinal direction, and the part 19 of the covering can be made of non-resilient or non-stretchable material in order to make the fastener sufficiently tight. The marginal part 20 may be, for instance, made of material which is diagonally woven.

Fig. 17 shows the relationship of the two parts of the covering strip with reference to a single interlocking member 30. It is to be understood that the marginal edge of the part 20 is to be clamped in the recess 32.

I have shown preferred embodiments of the invention, but it is clear that numerous changes and omissions could be made without departing from its spirit.

For convenience, the faces of the interlocking elements to which the fabric is applied, may be designated as "corresponding" faces. These are the upper faces shown in Fig. 6. Likewise, and in order to distinguish from overlapping cloth covering members, the cloth members 2 and 11 may be designated as "facing each other". It will be noted that the edges of the cloth strips (either 2 or 11) are held immovable relative to the fastening device, at those parts of said cloth strips which are adjacent the free edges of the interlocking members.

Likewise, and assuming that the parts are held in the position shown in Fig. 6, the fabric strips may be considered as being connected to the upper corresponding faces of the fastening devices, although the invention is not restricted to covering said upper faces. Likewise, the portion 33 of each strip 2 may be considered as underlying the strip 2, and the recess between the body of each interlocking element and its member 1 may be designated as the underlying portion of the fastening device.

It will be noted that the fabric strips 2 constitute the stringers of the fastener. When the fastener is closed, portions of these stringers or strips 2 form a butt-joint, as clearly shown in the drawings. The locking elements are arranged parallel to each other as shown for example in

Fig. 6, so that they interlock along their relatively narrow faces, thus providing a flat closure or fastening device. Likewise, the covering strips 11 also have portions which meet to form a narrow and flat butt-joint when the fastener is closed.

It will also be noted that when the locking members are interlocked, their relatively narrow faces are forced towards each other so that the relatively narrow faces of the stringers 2 and the relatively narrow faces of the covering strips 11 are also forced towards or against each other. This produces a flat thin closure, in which the interlocking elements are completely concealed.

In other words, it will be noted that the two series of locking members interfit with each other in such a manner that when they are in their interlocked or closed position the two series lie in one plane, as distinguished from fasteners where the two series of locking members are positioned one above the other, when the fastener is closed. In that latter case the fasteners form a thick roll or padding, which looks rather unattractive. It is an important advantage of the present invention that, though the locking members are completely concealed, the closure is yet thin and flat.

I claim:

1. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, said elements having projections which are separated from the bodies of said elements by recesses, and covering strips for said elements, the ends of said strips being located in and being secured in said recesses so that the adjacent portions of said strips are inturned, the adjacent portions of said strips meeting edge to edge to form a butt-joint, when the fastening device is closed.

2. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, said elements having projections which are separated from the bodies of said elements by recesses, and covering strips for said elements, the ends of said strips being located in and being secured in said recesses so that the adjacent portions of said strips are inturned, the adjacent portions of said strips meeting edge to edge to form a butt-joint, when the fastening device is closed, said projections having points which enter said covering strips.

3. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, said elements having projections which are separated from the bodies of said elements by recesses, and covering strips for said elements, the ends of said strips being located in and being secured in said recesses so that the adjacent portions of said strips are inturned, the adjacent portions of said strips meeting edge to edge to form a butt-joint, when the fastening device is closed, said projections having points which enter said covering strips, said strips having additional outer strips connected thereto and having their edges meeting to form a butt-joint, said additional strips covering said points.

4. A fastening device of the type described having two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, said elements being provided with covering strips having adjacent portions which meet edge to edge, when the

fastening device is closed and a slidable cam adapted to interlock and to separate said interlocking members, said cam being shaped to avoid contact with said covering strips, when it is operated to separate said fastening members, and attaching means on the interlocking elements for fixedly attaching the edges of the adjacent portions of the covering strips thereto.

5. A fastening device of the type described having two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, and provided with cover strips having adjacent portions, said adjacent portions meeting edge to edge to form a butt-joint, when the fastening device is closed, the adjacent portions of said cover strips having longitudinal elasticity, the adjoining portions of said cover strips being relatively non-elastic in the longitudinal direction, the adjacent portions of said cover strips being connected to said elements.

6. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, said elements having projections which are separated from the bodies of said elements by recesses, and covering strips for said elements, the ends of said strips being located in and being secured in said recesses so that the adjacent portions of said strips are interturned, the adjacent portions of said strips meeting edge to edge to form a butt-joint, when the fastening device is closed, said projections having points which enter and project through said covering strips, the projecting ends of said points being coated with a material which matches with the covering strips.

7. For a fastening device of the type described, a slider comprising a lower shield, a wedge-shaped central part and an upper shield, the lower shield consisting of one part with parallel edges and of a second generally conical shaped part with inclined edges; the said upper shield being triangular-shaped and the pointed end of said upper shield extending to a point which is limited by the line along which the said one part and the said other part of the lower shield meet.

8. A fastening device of the type described having interlocking elements, covering strips connected to said elements, the adjacent edges of said covering strips being spaced from the adjacent edges of said elements, so that a portion of the outer surface of each element is free from said covering strip, and a cam slide adapted to interlock said elements and to separate them, said cam slide comprising a lower shield, a wedge-shaped central part and an upper shield, said upper shield being generally triangular-shaped, and having a rim projecting over said central part, the width of the rim of said upper shield projecting over the wedge-shaped central part being not greater than the portion of the outer surface of each element which is free from said covering strip.

9. A fastening device of the type described having two series of interlocking elements, said elements having projections which are separated from the bodies of said elements by recesses, fastening stringers secured in said recesses, the upper and front parts of said projections being larger than the rear parts of said projections and also larger than the lower parts of said bodies,

whereby said upper and front parts of adjacent interlocking elements of the same series border on each other in the normal position of the fastening device.

10. A fastening device of the type described having two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, the interlocking elements having covering strips, said covering strips having edge portions which meet edge to edge to form a butt-joint when the fastening device is closed, and attaching means on the interlocking elements for fixedly attaching the edges of the adjacent portions of the covering strips thereto.

11. A fastening device of the type described having two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, each series of interlocking elements being connected to a stringer, the interlocking elements having covering strips, said covering strips having edge portions which meet edge to edge to form a butt-joint, when the fastening device is closed, and attaching means on the interlocking elements for fixedly attaching the edges of the adjacent portions of the covering strips thereto.

12. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, covering strips connected to said elements and covering substantial surface portions of said elements, the adjacent edges of said covering strips being spaced from the adjacent edges of said elements, so that other portions of the outer surface of said elements are uncovered, and attaching means on the interlocking elements for fixedly attaching the edges of the adjacent portions of the covering strips thereto.

13. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, covering strips connected to said elements and covering substantial surface portions of said elements, the adjacent edges of said covering strips being spaced from the adjacent edges of said elements, so that other portions of the outer surface of said elements are uncovered, said covering strips being fixedly attached to underlying portions of the fastening device along the line where the said uncovered and covered portions meet, said strips having additional outer strips connected thereto.

14. A fastening device of the type described with two series of interlocking elements, said two series lying in one and the same plane when the fastening device is closed, covering strips connected to said elements and covering substantial surface portions of said elements, the adjacent edges of said covering strips being spaced from the adjacent edges of said elements, so that other portions of the outer surface of said elements are uncovered, said covering strips being fixedly attached to underlying portions of the fastening device along the line where the said uncovered and covered portions meet, and a cam slide adapted to interlock said elements and to separate them, said cam slide comprising a lower shield, a wedge-shaped central part and an upper shield, said upper shield being shorter than said lower shield.

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