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D. SILBERMAN

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INTERLOCKING FASTENER STRUCTURE

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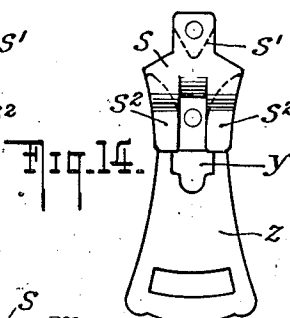
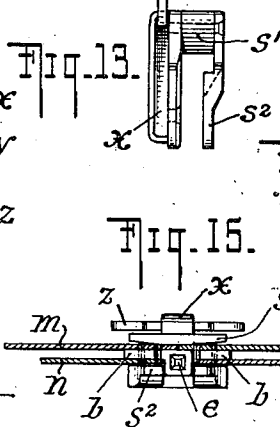
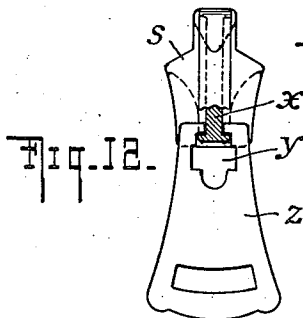
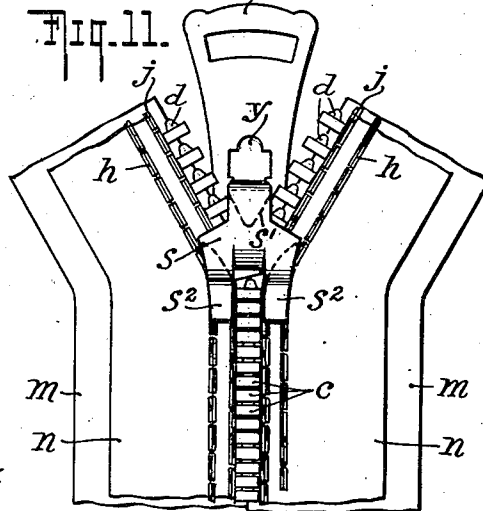
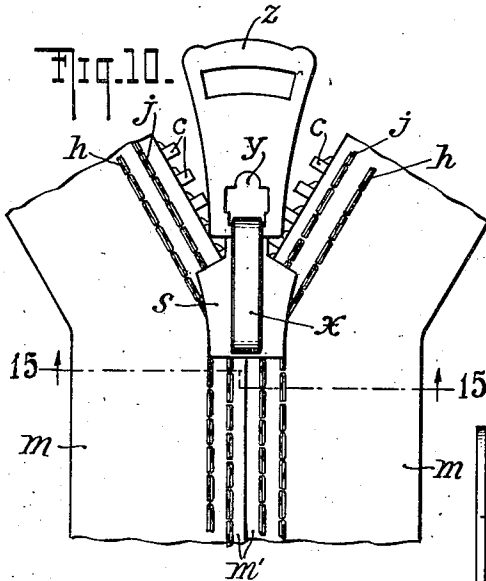
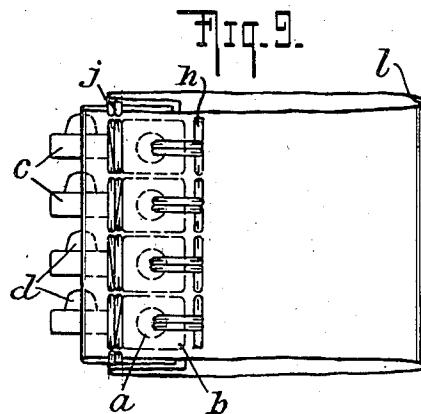
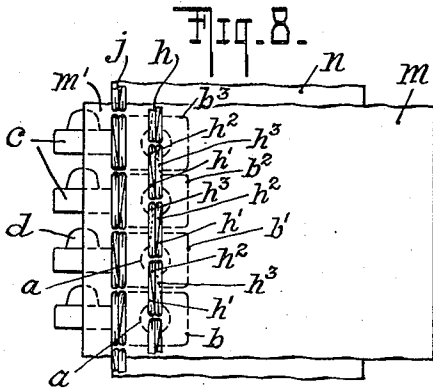
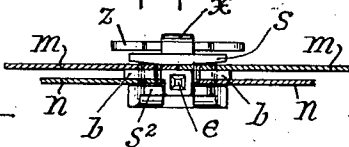


Fig. 15.



WITNESS

E. V. Rasmussen

INVENTOR

DAVID SILBERMAN

BY

Wissen Schenk
ATTORNEYS

UNITED STATES PATENT OFFICE

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INTERLOCKING FASTENER STRUCTURE

David Silberman, New York, N. Y., assignor to
Waldes Koh-I-Noor, Inc., Long Island City,
N. Y., a corporation of New York

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The invention relates to that type of device which is generally known as interlocking and automatic slide fasteners. The object of the invention is to improve such structures generally and particularly to provide a slide fastener in which the element when interlocked shall be covered so as to be practically invisible from one side and, in the preferred embodiment of the invention, to provide a new type of fastener element, to so assemble the parts constituting the interlocking tapes or fabric edges and the fastener elements that the fastener elements themselves are located on one surface only of the fabric and in such a manner as to leave the opposite face of the fabric free from projections due to the presence of the fastener elements, and to effect a union of increased strength between the fastener elements and the fabric with which they are associated by providing means whereby the attachment between the fastener elements and the fabric is effected by threads and the elements themselves are relieved of the necessity of supplying by virtue of a flexibility of their own the means required for holding them upon the fabric. Other objects and purposes of the invention will appear from the following specification:

Fasteners of the type in question are generally supplied to the trade in the form of tapes having a thickened edge in association with which a multiplicity of cooperating rigid, usually metallic, elements are anchored, the locking and interlocking positions of the respective elements being controlled by a slide. Such elements themselves may be regarded as plates, each provided with a projection extending from one face and a corresponding indentation located rearward of the projection in the opposite face, and each having spaced fabric-engaging jaws at the root portions of the elements adapted to be clamped against the opposite sides of the fabric or its thickened edge and supplying in their own flexibility and rigidity the means which permanently holds the elements upon the fabric. These conditions require the elements to be made of strong and non-brittle material as the force on which the union between the elements and the fabric depends must be inherent in the material of which the elements are constituted, since the resistance against separation can be no greater than the strength of the metal itself.

In contrast to this standard basic principle, the present invention is based on the conception that the elements shall be made entirely independent of the burden of supplying the forces required for clamping the elements to the fabric

and that the uniting means shall be of a character strong enough in itself and particularly in association with the material of which the fabric is constituted, to supply a reliable and relatively permanent connecting means as between the elements and the fabric. Following a principle of construction which as a rule is not accepted by engineers, I have found that uniting means adequate for such purposes, considering the nature and restricted size of the elements, the necessity of maintaining their relative positions notwithstanding constant relative deflection in use, and the requirement of allowing the elements a limited swinging capacity, can be furnished by threads such as are used in ordinary sewing machines and that such fibrous threads in association with the fibrous composition of the fabric to which the elements are attached will strengthen the connection and supply an adequate holding force. In riveting or clinching a hole is made in the fabric which weakens it, whereas in sewing, a thread is added which strengthens it.

This principle having been established, it was no longer necessary to rely on clamping jaws in the elements themselves or to provide jaws to embrace both edges of the fabric, nor to make the elements of metal of special strength or resiliency, and these considerations led to a modification of the form and composition of the elements. They may now be made of brittle metal, or light metal, or metal or other substances which have little resistance to deformation, provided they are sufficiently rigid to withstand the strain of pull against the threads which hold them in place on the fabric. The reconstruction of the elements also makes it possible to leave one face of their bases or root portions smooth and level so that their root portions in a series of such elements present a flat, even, substantially unbroken surface on which a covering strip may be overlaid and attached without exhibiting a welt or elevations due to the fact that the metallic elements underlie the covering strip. In the older form of elements the extreme edges of the root portions engage the slide on both sides of the fabric in effecting the interlock and when covering one side of such elements with covering strips so that the slide has but the under portions of the elements to work against, a not entirely adequate grip is left. In the new structure the elements are projected outwardly from one of the faces of the fabric at a point intermediate the extreme outer edges of the root portions to present a compact articulated ridge, thereby supplying a positive extent of abutment for the slider while great-

ly reducing the width of the narrower part of the slider opening.

Many advantages result from the embodiment of the new conceptions in slide fasteners. The sewing procedure is inexpensive, the fabric requires no special corded edge, the elements may be made of inexpensive and light metal so as to be conveniently available for example in connection with underwear, the entire structure being possessed of a flatness not possible of attainment by any other construction.

The invention is illustrated in the accompanying drawings in which Fig. 1 is a perspective view of one of the fastener elements and Fig. 2 is a perspective view of the element shown in Fig. 1 viewed from the rear. Fig. 3 is a top view of the associated fabric-interlocking elements, stitches, and slider. Fig. 4 is a bottom view of the structure illustrated in Fig. 3. Fig. 5 is a sectional view on line 5—5 of Fig. 3; Figs. 6 and 7 are enlarged detail views of parts of the structure representing modifications. Fig. 8 is an enlarged view of a section of the structure illustrative of the course of stitches, said stitches being illustrated as slightly displaced from their normal positions. Fig. 9 is a view similar to Fig. 8 illustrative also of a special manner of assembling the fabric and the fastener elements. Fig. 10 is a top view of the fabric with associated elements and slider, the stitches being those of Fig. 8 and the slider in this case being a modification of the one shown in Figs. 3 to 5. Fig. 11 is a bottom view of the structure shown in Fig. 10. Fig. 12 is a detail partly in section of the slider shown in Fig. 11. Fig. 13 is a side view of said slider. Fig. 14 is a bottom view of said slider with the hand-piece, as in Fig. 12, in the position where the slider is moving to open the interlocking elements. Fig. 15 is a section on line 15—15 of Fig. 10. Fig. 16 represents a modification.

The fastener elements are provided with a flat-bottomed plate-like horizontal portion *b* apertured or configured as at *a* to provide anchorage for sewing machine stitches and to permit passage of the needle of the sewing machine. The fastener element also embodies a vertical plate-like section *c* bearing a projection *d* on one face thereof and a corresponding recess *e* at the opposite face thereof. The section *c* has a depth or thickness greater than that of the section *b* and the section *b* has a width greater than that of the section *c*. Preferably the connection between the sections *b* and *c* are of reduced width as indicated at *f* whereby shoulders *g* are presented a little bit back of the vertical or upstanding sections *c*. It is to be understood that the fastener elements shall be appropriately configured so that those used on the edge of one stringer shall mate with those of the opposed stringer. In other words, when a fastener element such as shown in Figs. 1 and 2 is used at the edge of one stringer, the fastener elements on the mating stringer will be precisely the same in general structure except that in the mating elements the projection *d* will be located on that side of the section *c* where the depression *e* is shown in Fig. 2, while the depression in the mating elements will be on that side of the section *c* where the projection *d* is illustrated in Fig. 1.

The fastener elements themselves can be readily fashioned by punching operations applied to a square wire, for example. They can be made of any desired metal or rigid material but are preferably made of a relatively inexpensive metal such as brass or a light metal such as aluminum or an

aluminum alloy. The dimensions of a typical slider element are such that the edges of the sections *b* and *c* are approximately each about 3/32 of an inch.

The fastener elements are attached to the edge of a piece or pieces of fabric by running stitches *h* through the apertures *a* of the elements and through the fabric, the fabric edge preferably extending up to and in contact with the upstanding wall *i* of the section *c* of the fastener element. Preferably a second line of stitches *j* is run along the edge of the fabric between the shoulder *g* and the upstanding wall *i* of the individual elements, bridging the connection *f* and serving to hold the edge of the fabric down against the horizontal portion of the elements. The fabric or stringer portion may be a plain tape or ribbon having a selvedge edge, not corded as required in the clamping type of fasteners, or it may be folded as indicated in Figs. 6 and 7 at *k* or the fabric may be folded upon itself as indicated at *l* in Fig. 9. In one embodiment of the invention a second layer of fabric is used as indicated in Fig. 5, wherein the top layer *m* extends along the under side of section *b* of the elements to a point midway of the section *c*, whereby, when the elements are in interlocked position, the edges *m'* of the fabric *m* conceal the elements, while the fabric *n* covers and conceals the sections *b* of the elements, leaving visible only the top surfaces of the section *c* and a part of their lateral surfaces *i* and *i'*. In assembling the parts of the device shown in Fig. 5, for example, the fastener elements, together with the fabric sections *m* and *n*, are fed, through appropriate feeding and guiding devices, to the sewing machine, the threads passing through the aperture *a* of the fastener element. A second line of stitches *j* passes the shoulder *g*. Each of the two lines of thread in this instance passes first through the fabric *m* and then through the fabric *n* where it is locked. In the preferred construction the feed is so arranged that more than one and preferably several separate stitches are made as between each succeeding fastener element. This is indicated in Fig. 8. Here, assuming that the feed of the material and fasteners is generally in the forward direction, the stitches of the line *h* will be made as follows: Assume that the stitch *h*³ is the last of the stitches of the line *h* which unites *b* with *b'*. The next stitch will be *h'* and runs from aperture *a* of *b'* to aperture *a* of *b*². The stitch *h*² will then return to the aperture *a* of *b'*, whereupon the stitch *h*³ will progress from *b'* to the aperture of *b*². In a similar manner the stitching from *b*² to *b*³ will run in the order *h'* to *b*³, *h*² to *b*², *h*³ to *b*³, and so forth. The multiplicity of stitches is through the same spot but in Figs. 8 and 9 the stitches are illustrated as if the fabric had been given some lateral displacement which is not accurate but is so depicted in order to make it possible to illustrate the course of the stitches. While the stitches of the line *h* run in the manner described with respect to Fig. 8, the stitches of the line *j* take a corresponding course. When the fastener elements are given the configuration shown in Fig. 7 the stitches will be in alignment instead of being in the staggered relation required for the stitches of Figs. 6, 8, and 10. The shanks or sections *b* of the fastener elements may, of course, as indicated for example in Fig. 7, be of any appropriate form and shape to accomplish the desired object, to wit, of providing an anchorage for the sewing machine threads which hold the fastener elements to the fabric. The covering

fabric *m* may have a plain edge *m'* (Fig. 5) or an in-turned edge *k'* (Figs. 6, 7, and 9), or an out-turned edge, these being details relating to appearance and structural strength.

5 The stitches *h* may, of course, be sewn in any desired manner. They may be arranged as a straight line or in zig-zag arrangement, or instead of running the length of the fabric strip, extend at right angles (or other angles) to the fabric edge (as in Fig. 9) provided always that they penetrate the apertures in the fastener bases or otherwise so engage the elements as to positively attach them to the fabric.

It will be apparent that when the assembly 15 is complete, the outer surface of the fabric portion *m* in the region occupied by the fastener elements will be entirely smooth except as affected by the threads constituting the line of stitches *j* and *h* due to the fact that the closely disposed plate-like root portions of the elements provide a flat, substantially continuous line of the material of which they are constituted. There is no elevated portion or hump due to any necessity of the covering fabric to rise above any clamped root portions of the fastener elements. On the opposite face of the device the fabric *n* also lies smoothly upon the section *b*. The sections *c* of the fastener elements do not project toward or in the direction of the covering fabric *m* at all but they project at the under surface of the structure sufficiently to present shoulders *i* and *i'* for cooperative action with the walls of the slider element *s* to compel interlocking of the mating fastener elements as the slider is moved in a direction toward the top of Figs. 3 and 4. On movement of the slider in the opposite direction its inner cam surfaces *s'* cause opening of the interlocking elements in the usual manner. Due to the type of fastener elements employed 40 and their described relation with respect to the fabric with which they are associated, it is possible to reduce the transverse dimensions of the slider at those points where the slider engages the walls *i* and *i'* of the interlocking elements. Thus, as shown in Figs. 11 and 13, the slider may be open at the bottom and not materially thicker at the point *s*² than the distance by which the section *c* of the element extends outwardly from the fabric *n*. The slide is actuated by the handle 50 *z* which has a slot *y* at its slide-engaging end. The slot *y* is so configured as to provide a handle *z* with two projections at this point, said projections engaging and movable in the depressed portions on each side of the bridge *x* of the slide 55 to enable the slide to be drawn to either the opening or closing movement of the slide. The slide, whether of the type shown in Figs. 11 and 15 or in Fig. 5, will in either case perform its operations on the under side of the structure only. The upper inner surface of the slide *s* is perfectly flat or slightly convex (see Fig. 15) and moves smoothly over the fabric and the stitches and does not develop any appreciable friction or cause any appreciable wear on the stitches 65 which are thereby protected against rupture or prematurely wearing out. The top of the slider has merely the function of holding the unit of the slider together, while the bottom of the slider is configured with a channel groove deep enough 70 to receive the sharp angled, extended protrusions of the elements intermediate the extreme edges of their respective root portions. A positive grip on the side of the channel against the square sides of the elements is thereby provided and the opening and closing is positive. 75

If the fabric is bent or creased to such an extent as to cause the projections of one or more of the elements to become dislodged from their mating indentations, a simple manipulation will restore them to the proper positions, whereas in the prior structures such a misplacement of the elements practically destroyed the further usefulness of the entire series of elements.

In uniting the new elements to the fabric, the sewing machine takes a piece of cloth (preferably a prepared folded cloth) passing from the front to the back rollers. A hopper feeds the elements down a race-way to a transfer unit which carries them to the sewing points of the needles which sew back and forth through the holes of the elements (and the space adjacent to the reduced portions *f*) at a speed which may be illustratively set down as 200 elements per minute. Since four to six stitches—in the preferred practice of the invention—are used over each element, 10 the sewing machine functions very slowly—relatively—making only about 1200 stitches per minute, which means long life to the sewing-machine parts which, of course, are the most sensitive of all the instrumentalities used in the entire process of producing the finished product. 15

The appearance of the new structure is attractive and pleasing. It is wholly flat on the covered side and the threads which appear on that side supply a decorative effect. On the opposite side the elements present a compact articulated ridge. There is a fast folded edge on both sides (in the preferred form) as against the two-piece folded edge of an old style set of elements when fabric-covered. It is lighter in weight; the teeth are smaller in construction and appearance. The color problem is eliminated by the elimination of cotton tape on one side and rayon tape on the other (as was customary in the early fabric-covered "zipper" structure) 40 which do not take the same dyes. In making the new structure, small quantities of finished piece goods can be readily purchased while heretofore there was always the difficulty of having to stock thousands of yards of special ribbon 45 colors which must be ordered in thousand-yard lots. Whenever the trade, as is sometimes the case, prefers an uncovered "zipper", the new product can be offered in that form by merely reversing the slider and putting the pull tab and bridge 50 in back instead of in front.

In the old type of elements the metal used was almost exclusively nickel-silver. The side pull or strain depends upon the grip of the prongs or jaws of the element against the corded edge of the fabric and this required a metal having the properties of nickel-steel. Brass and aluminum could not be used because of the softness of the metal as any severe side strains would result in the prongs of the elements opening and pulling 60 off the edge of the cord. In the new sewn type the soft metals can be used because there is a complete shoulder surrounding the sewing hole and side strain is taken up by the resistance of that shoulder against the fastening means. 65

The old or standard fastener elements are designed so that the elements themselves constitute the fastening means which unite them to the tape or fabric, whereas the new elements are designed to be attached by means other than 70 the material of the elements themselves. Such material may comprise the use of staples, rivets, clips, etc., though threads are preferred.

In case it is desired to conceal the stitches *h* and *j* and to provide an entirely smooth fabric surface 75

at the covered side of the fastener elements free from all evidence of the sewing threads, the covering fabric *m* may be sewn on in the manner illustrated in Fig. 16. In that case the edge of the covering fabric *m* is sewn in place and the fabric *m* then reversed on itself in line with the central portion of the projections and depressions of the plate *c* of the fastener elements. The garment or other product with which the structure is permanently incorporated may be set in place between the fabric strips *m* and *n* or, when the completed stringer is made of a single piece of fabric folded as at *l* in Fig. 9, the fabric of the stringer is sewn upon, beneath, or any other convenient position to the article with which the fastener elements are to be used.

The invention is capable of being used in many other specific ways than those thus far described, depending upon the particular object to be obtained or result to be produced, such modifications being within the skill of those familiar with the dressmakers' art. The particular examples of different modes of applying the invention shown in the drawings accompanying this application were selected as typical and are not to be understood as being in any way exhaustive.

The new structure makes use of folded cloth which is cheaper than woven tape with corded edges. It uses brass which is cheaper than German silver. The entire assembly is done in one operation. The new slider and pull tab are considerably smaller, neater, and daintier. The device opens up a complete new field for "zipper" uses in the underwear trade, women's and children's clothing and other articles where the flimsiest of materials and aluminum elements can be used, eliminating all weights and dangers of side weakness.

I claim:

1. In a fastener structure of the slide-operated type, the combination of a fabric base strip, a series of adjacent, individual, rigid fastener elements having root portions on said strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with fastener elements on an associated fabric edge, a series of similar elements on a mating fabric edge and means for fixedly positioning the several adjacent elements on their respective fabrics with relation to the fabric with which they are associated and with relation to each other, said means consisting of pliable fibrous means, the active holding agent thereof being constituted of thread stitching interengaging with the root portions of said fastener elements and the fabric in such manner as to hold said root portions in spaced parallel alignment.

2. In a fastener structure of the slide-operated type, the combination of a fabric base strip, a series of adjacent, individual, rigid fastener elements having root portions on said strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with fastener elements on an associated fabric edge, a series of similar elements on a mating fabric edge and means for fixedly positioning the several adjacent elements on their respective fabrics with relation to the fabric with which they are associated and with relation to each other, said means consisting of pliable fibrous means, the active holding agent thereof being constituted of

thread stitching interengaging with the root portions of said fastener elements and the fabric in such manner as to hold said root portions in spaced parallel alignment, the root portions of said fastener elements being configured to interlock with said stitching to hold such elements against displacement lengthwise thereof.

3. In a fastener structure of the slide-operated type, the combination of a fabric base strip, a series of adjacent, individual, rigid fastener elements having root portions engaging said strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with fastener elements on an associated fabric edge, a series of similar elements on a mating fabric edge and means for fixedly positioning the several adjacent elements on their respective fabrics with relation to the fabric with which they are associated and with relation to each other, said means consisting of thread stitching interengaging with the root portions of said fastener elements and the base strip, said root portions being of greater width than said plate portions in the direction of extension of the strip so as to occupy almost all of the space between adjacent elements at such root portions.

4. In a fastener structure of the slide-operated type, the combination of a fabric base strip, a series of adjacent, individual, rigid, fastener elements having root portions engaging said strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with fastener elements on an associated fabric edge, a series of similar elements on a mating fabric edge and means for fixedly positioning the several adjacent elements on their respective fabrics with relation to the fabric with which they are associated and with relation to each other, said means consisting of thread stitching interengaging with the root portions of said fastener elements, said root portions being substantially flat and engaging the base strip at only one side of the latter.

5. In a fastener structure of the slide-operated type, the combination of a fabric base strip, a series of adjacent, individual, rigid fastener elements having root portions engaging said strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with a series of similar fastener elements on an associated strip, and thread stitching interengaging with the root portions of said fastener elements and the base strip, said interlocking portions being of greater depth than said root portions to provide a shoulder for engagement by a slide.

6. A fastener structure as set forth in claim 1, wherein the root portions of the fastener elements consist of flat sections disposed at an angle with respect to the plate portions, said flat sections being positioned on said fabric base strip inwardly from the edge thereof and being perforated to receive the stitching.

7. A fastener structure as set forth in claim 1, wherein the root portions are so configured along their outer peripheries as to provide abutments for receiving the stitching and for anchoring the root portions with relation to the fabric.

8. A fastener structure as set forth in claim 1,

wherein said stitching includes a plurality of loops for each element, whereby said fastener elements are each attached to the base strip by a plurality of strands.

9. In a fastener structure of the slide-operated type, the combination of a fabric base strip and a series of adjacent, individual, rigid fastener elements having substantially flat root portions attached at one face thereof to said strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with a series of similar fastener elements on an associated strip, said plate sections being of greater depth than said root portions to provide a shoulder running longitudinally of the series of elements intermediate their lateral margins for engagement by an operating slide.

10. In a fastener structure of the slide-operated type, the combination of a pair of fabric base strips having each a series of adjacent, individual, rigid fastener elements having substantially flat root portions attached at one face thereof to the strip and plate sections extending outwardly from the edge of the strip at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with the locking portions of the elements on the other strip, said plate sections being of greater depth than said root portions to provide shoulders running longitudinally of the series of elements and intermediate the outer margins of said series of elements, and an operating slide engaging said shoulders and adapted upon sliding movement thereof to effect closing of the fastener structure.

11. A fastener structure as set forth in claim 10, wherein the plate sections form an angle with relation to the substantially flat root portions, said plate sections when in interlocked engagement forming a raised central rib which is embraced by said slide.

12. The combination of fabric, a series of adjacent, individual, rigid fastener elements having portions resting on said fabric and including plate sections extending outwardly from the edge of the fabric at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with a series of similar fastener elements on an associated fabric and independent means cooperating with the fabric and the elements for securing the elements on the fabric, each of said elements at the portions resting on the fabric being configured to cooperate with said independent fastening means to establish and secure said elements to said fabric in spaced, parallel alignment.

13. The combination of a strip of fabric having a folded edge, a series of adjacent, individual, rigid fastener elements on said folded edge portion of said fabric and including plate sections extending outwardly from the folded edge of the fabric at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with a series of similar fastener elements on an associated fabric and independent means cooperating with the fabric and the elements passing through the folded edge portion of the fabric for securing the elements on the said edge of the fabric, each of said elements being configured to cooperate with said independent fastening means inwardly

from the folded fabric edge portion to establish and secure the position of the elements with respect to the folded fabric edge portion.

14. The combination of a strip of fabric folded on itself, a series of adjacent, individual, rigid fastener elements between the edge portions of said folded fabric, said elements including plate sections extending outwardly from the folded edge of the fabric at right angles thereto, said plate sections being configured at their forward and rearward surfaces to engage in interfingered relation with a series of similar fastener elements on an associated fabric, independent means cooperating with the fabric and the elements for securing the elements to the fabric, each of said elements being configured to cooperate with said independent fastening means inwardly from the folded fabric edge portion to establish and secure the position of the elements with respect to the fabric.

15. The combination of a strip of fabric folded on itself, the edge portions of said folded fabric being also folded, a series of fastener elements between said folded edge portions, said elements being provided with an upstanding part carrying complementary surfaces adapted to interlock in interfingered relation with a series of similar fastener elements on an associated fabric, means independent of the fabric and of the elements for securing the elements to the folded fabric edges, each of said elements being provided with a surface cooperating with said independent fastening means to establish and secure the position of the elements with respect to the folded fabric edges and in such position relative thereto that one of the folded edges of the fabric extends up to the upstanding parts of the several elements while the other folded fabric edge extends over the fabric elements to approximately a line representative of the central portion of the interlocking parts of the elements.

16. In a fastener structure of the slide-operated type, the combination of a fabric and fastener elements each having a flat section adapted to be secured at one face thereof to the fabric edge in flat relation and an upstanding section carrying interlocking portions, said upstanding section forming an angle with relation to the flat section, a slide having inner surfaces cooperating with the upstanding angular sections of the elements to bring about the locked position of cooperating elements and a covering fabric secured to each of the elements at its opposite face and extending to approximately the middle line of the interlocking portions of the several fastener elements.

17. A slide-operated fastener structure comprising a flexible base strip, a row of fastener elements attached to said flexible base strip and having portions shaped for interlocking engagement with corresponding elements attached to a second flexible base strip, each of said fastener elements comprising a substantially flat root section secured in flat relation to one side of said flexible base strip, securing means to maintain such relation, and an upstanding section forming an angle with relation to said flat root section, said upstanding section carrying the interlocking portions.

18. A slide-operated fastener structure comprising a flexible base strip, a row of fastener elements attached to said flexible base strip and having portions shaped for interlocking engagement with corresponding elements attached to a second flexible base strip, each of said fastener elements comprising a horizontal root section

having greater width than thickness secured in flat relation to one side of said flexible base strip, securing means to maintain such relation, and a vertical section having greater depth than width, said vertical section being provided with a projection on one face thereof and a corresponding recess in the opposite face thereof.

19. A slide-operated fastener structure comprising a flexible base strip, a row of fastener elements attached to said flexible base strip and having portions shaped for interlocking engagement with corresponding elements attached to a second flexible base strip, each of said fastener elements comprising a horizontal root section having greater width than thickness secured in flat relation to one side of said flexible base strip, securing means to maintain such relation, and a vertical section having greater depth than width provided with a projection on one face thereof and a corresponding recess in the opposite face thereof, said vertical section being so formed with relation to said root section that one side thereof lies in the same plane with a surface of said root section.

20. A slide-operated fastener structure comprising a flexible base strip, a row of fastener elements attached to said flexible base strip and having portions shaped for interlocking engagement with corresponding elements attached to a second flexible base strip, each of said fastener elements comprising a horizontal root section having greater width than thickness secured in flat relation to one side of said flexible base strip, securing means to maintain such relation, said root section being configured to provide anchorage for means securing said root section to said flexible base strip, and a vertical section integral with said root section having greater depth than width, said vertical section being provided with a projection on one vertical face thereof and a corresponding recess in the opposite face thereof.

21. A slide-operated fastener structure comprising a flexible base strip, a row of fastener elements attached to said flexible base strip and having portions shaped for interlocking engagement with corresponding elements attached to a second flexible base strip, each of said fastener elements comprising a horizontal root section having greater width than thickness secured in flat relation to one side of said flexible base strip, securing means to maintain such relation, a vertical section having greater depth than width, said vertical section being provided with a projection on one vertical face thereof and a corresponding recess in the opposite face thereof, and a reduced section integrally connecting said horizontal root section with said vertical section.

22. A slide-operated fastener structure comprising a flexible base strip, a row of fastener elements attached to said flexible base strip and having portions shaped for interlocking engagement with corresponding elements attached to a second flexible base strip, each of said fastener elements comprising a vertical section having greater depth than width, said vertical section being provided with a projection on one vertical face thereof and a corresponding recess in the opposite face thereof, and a horizontal section having greater width than thickness secured in flat relation to one side of said flexible base strip, securing means to maintain such relation, said horizontal section being of substantially greater width than said vertical section.

23. A fastener element of the slide-operated type, comprising two plate-like portions disposed

at right angles to each other, the thickness of each plate being considerably less than the dimension of the other plate in the same direction, one of said plates being attached to a base strip, securing means to maintain such relation and the other plate being provided with an element adapted to interlock with a similar fastener element attached to an adjoining fabric strip.

24. A fastener element as set forth in claim 23 wherein the second mentioned plate is attached to the first mentioned plate along the median line of the latter.

25. A fastener element as set forth in claim 23 wherein the second plate is attached to the first mentioned plate at approximately the center of the edge of such second plate adjoining the first plate.

26. A fastener element as set forth in claim 23, wherein the second mentioned plate is attached to the first mentioned plate along the median line of the latter and at approximately the center of the edge of such second plate adjoining the first plate.

27. A fastener element as set forth in claim 23 wherein the second mentioned plate is provided with a projecting cam lug upon one face and a complementary depression at its other face, said lug adapted to engage the complementary depression of the corresponding plate of a fastener element formed symmetrically with the herein claimed fastener element.

28. In a slide-operated fastener structure, the combination of a flexible strip, a series of separate fastener elements arranged in uniformly spaced relation along one edge of said strip, each of said fastener elements including an interlocking portion projecting from the strip and a root portion attached to the strip, the interlocking portions of said elements having a thickness greater than that of the root portions and being configured to interlock in interfingered relation with the interlocking portions of a series of fastener elements on an associated strip and the root portions of said elements consisting of plate-like sections disposed in flat relation against one side of said flexible strip, said plate-like sections having a width greater than that of said interlocking portions and extending longitudinally along the strip to provide a substantially continuous line of the material of which they are constituted and retaining means for fixedly securing the root portions of the elements in flat relation to said flexible strip.

29. In a slide-operated fastener structure, the combination of a pair of flexible supports, co-operating series of separate fastener elements arranged in uniformly spaced relation along the edges of said supports, said elements having locking portions projecting from the supports and adapted to interlock in interfingered relation with the locking portions of the elements on the opposite support and having root portions which are substantially thinner than said locking portions and are disposed in flat relation against one side of said supports, said root portions having a width greater than that of said locking portions and extending longitudinally along the tapes to provide substantially continuous lines of the material of which they are constituted and retaining means for fixedly securing the root portions of the elements in flat relation to said flexible supports.

30. A fastener structure as set forth in claim 29, in which the retaining means for each series of

elements comprises a continuous row of stitches interengaging with the root portions of the fastener elements in the series and the flexible support to hold said root portions in position on said support.

in which the retaining means for each series of elements comprises a continuous row of stitches passed through the root portions of the elements in the series to hold them in position on said support.

31. A fastener structure as set forth in claim 29,

DAVID SILBERMAN.