

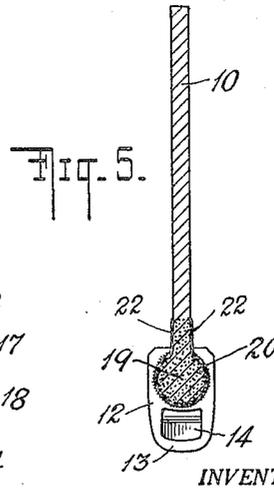
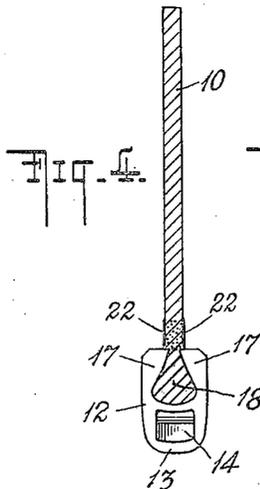
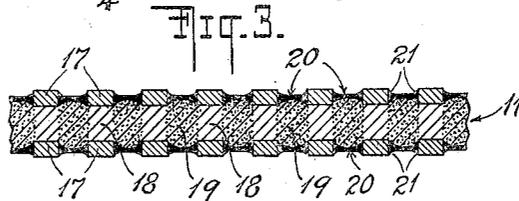
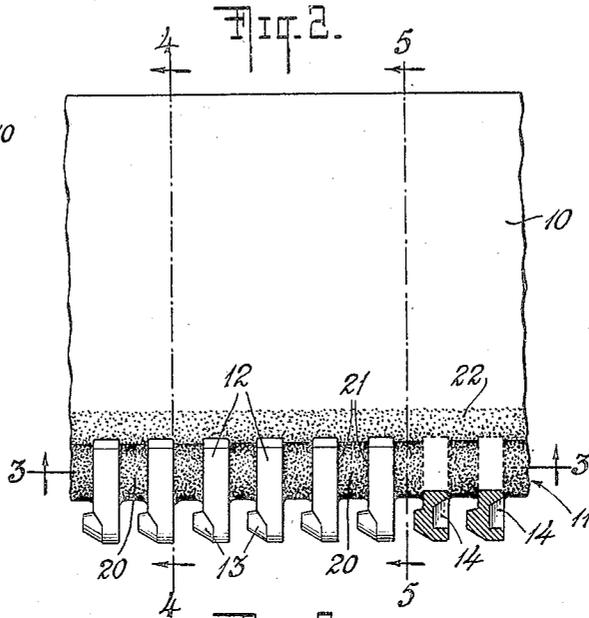
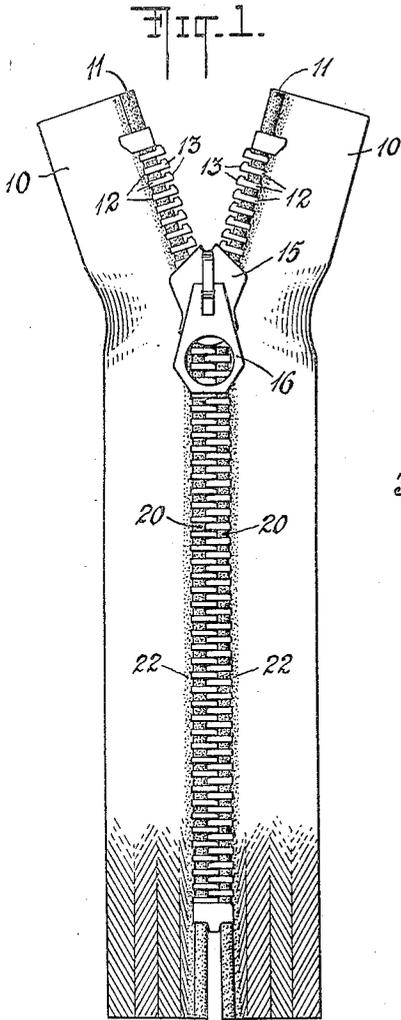
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2,496,946

FASTENER STRUCTURE

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WITNESS
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FASTENER STRUCTURE

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This invention relates to slide operative fasteners and has reference more particularly to the construction of the stringers of such fasteners.

Fasteners of the indicated type usually include a pair of stringers in the form of tapes having opposed thickened edges upon which are mounted a multiplicity of cooperating rigid elements, the locking and interlocking of the elements being controlled by a manually operated slider. The elements are usually each provided with a pair of clamping jaws by which they are secured in aligned, parallel relation to the thickened edges of the tapes. This type of fastener has been used satisfactorily for a wide variety of purposes, but for many other purposes their use has been unsatisfactory and even impracticable, due to the fact that the elements tend to move out of alignment under severe strain. Thus, when used in connection with garments or devices where it is likely that a tremendous leverage will be applied to the pull tab to operate the slider either quickly or along stringer tapes which are under severe stresses, invariably some of the elements will be moved out of their proper aligned, parallel relation and, as the slider then cannot function properly on the stringers or interengage the displaced elements with the other elements, the fastener becomes inoperative.

The principal purpose of the present invention is to overcome the above-mentioned difficulty in fasteners of this type and by a simple inexpensive method of procedure to provide such a fastener with elements which will not move out of proper alignment even under relatively severe strains exerted thereon, either through the tapes of the fasteners or through its associated slider.

The invention is illustrated in the accompanying drawing in which Fig. 1 is a face view of a partially open fastener embodying the invention; Fig. 2 is an enlarged detailed view, partly in section, of a portion of one of the stringers of the fastener shown in Fig. 1; Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2; Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2 and Fig. 5 is a sectional view taken along the line 5—5 of Fig. 2.

In the drawings, the reference numeral 10 indicates the two flexible supports of the fastener stringers which may be made of the customary fabric tape provided with a thickened edge portion 11. Mounted on the opposed thickened edges 11 of the supports 10, are the interlocking elements 12, each having a free end projecting outwardly from the thickened edge of one tape and provided with a projection 13 and a correspond-

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ing indentation or recess 14 (see Fig. 2) adapted for interlocking cooperation with similar parts on the free ends of adjacent fastener or interlocking elements extending from the opposing edge of the other tape. The elements 12 on both supports or tapes 10 are arranged to be interlocked in interfingered relation by means of the usual slider 15 which is manually moved lengthwise of the fastener through the pull tab 16. The base or inner end of each interlocking element 12 is in the form of a pair of spaced clamping jaws 17 by which the element is clamped or affixed in parallel, aligned relation to the other elements on the thickened edge 11 of the tape. It will be noted from Figs. 3 and 4 of the drawings, that the portions 18 of the thickened edge 11 enclosed by the jaws 17 of the elements are in a compressed condition and are constituted of the fabric material which forms the thickened edge 11 of the tape. The portions 19 of the thickened edge 11 intermediate the elements 12 have a cross-sectional area substantially greater than that of the portions 18 and such that the ends of such portions 19 engage with or abut against the side surfaces of the elements (note Figs. 3 and 5). The fabric material of the portions 19 is thoroughly impregnated with a hardening material, which when dry, becomes hard, stiff and rigid, such as a lacquer of the type known as #1617 Clear Lacquer (air drying) manufactured by The Stanley Chemical Company of East Berlin, Connecticut, or a suitable resinous compound having the aforesaid qualities. When such hardening material dries, the portions 19 of the fabric material are transformed into hard, stiff, rigid elements. Preferably there is applied a surface coating 20 of such hardening material which extends the entire length of the spaces between adjacent elements 12 in each row. It will thus be seen that the thickened edge 11 of the tape is constituted of a series of rigid links 19, spaced apart and connected together by the flexible reduced portions 18 to which the jaws 17 of the elements are clamped. The rigid links 19 through their engagement with the side surfaces of the elements 12, fix the position of such elements relative to each other and prevent such elements, even under very severe stresses, from being moved or shifted from their proper aligned, parallel relation, while the flexible portions 18 enable the fastener to be flexed or bent in usage.

In constructing the fastener stringers of this invention, a support constituted of the customary fabric tape with a thickened edge in the form of a bead, is fed lengthwise with a step-by-step move-

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ment to mechanism for attaching the elements in predetermined spaced relation to the thickened edge thereof during the pauses in the step-by-step feed of the tape. The elements attached to the tape are then subjected to a rolling down process to securely clamp the jaws 17 of the elements 12 on to the tape with the elements in their proper spaced parallel, aligned relation so that the outer front and rear surfaces thereof are in alignment and afford no obstruction to the travel of the slider 15 over such surfaces. The thickened edge 11 of the resulting product will be compressed in those portions thereof enclosed by the jaws 17 of the elements to the form shown in Figs. 3 and 4 of the drawings, while those portions of the thickened edge 11 intermediate the elements 12 will, as a result of the compressing action of the jaws 17, be compressed at their ends so that their outer surfaces will be convexly shaped in a longitudinal direction or along the line 3—3 of Fig. 2 of the drawings. The thickened edge portions of the tape intermediate the elements are then treated with a suitable hardening compound, such as, clear transparent lacquer or other suitable material, to change such portions from their soft, spongy condition to a stiff, rigid condition and, at the same time, to change the form of such intermediate portions so that their ends will abut the side surfaces of the elements. The hardening material may be applied in any suitable fashion, such as, by a brushing operation or by an immersing step and is preferably applied in several applications with sufficient time between applications to enable the hardening material to thoroughly permeate the fabric of such portions and to partially dry. Thus, when applying to such portions clear, transparent lacquer by a brushing operation, I have found that best results are obtained by applying three coatings of the lacquer, allowing half an hour between coatings. As a result of these coatings of the hardening material, the portions 19 of the thickened fabric intermediate the elements are thoroughly impregnated with the hardening material and each of such portions is covered with a coating 20 which is anchored to such portion by the material within the fabric body thereof. Due to the added hardening material, the cross-sectional dimensions of the original fabric portions 19 are increased, particularly at the ends thereof where the hardening material forms rigid shoulders 21, 21 (note Fig. 3) abutting against the opposed side surfaces of adjacent elements; the form of the coating changing the exterior configuration of the intermediate portions so that the outer front and back surfaces thereof, are changed from a convex shape to a concave shape, thereby buttressing the shoulders 21 against stresses exerted thereon through the elements. It will accordingly be seen that the elements 12 which previously to the coating operation while securely clamped to the beaded or thickened edge of the tape, could be moved out of their proper alignment with relative ease, now are prevented by the rigid, stiff intermediate portions 19 from moving from the positions in which they have been attached and such portions 19 will maintain the elements 12 in proper aligned relation even when the elements are under relatively great stresses tending to move them from their proper relationship. This has been confirmed by severe tests which have demonstrated that a fastener constructed according to this invention is substantially stronger than any known type of fastener of similar size and is in fact at least fifty percent stronger than the fastener of

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usual construction. This increased strength of the instant fastener makes it particularly suitable for use on clothing and other devices or equipment where it will meet a harsher service than the customary fastener is capable of satisfactorily withstanding. This advantage of the instant fastener as has been pointed out, is attained by first clamping the elements in proper aligned condition to the untreated thickened edge of the tape and then treating the portions of such edge intermediate the elements to transform the latter into hard, rigid links in which the hardened filler material coating the impregnated fabric portions thereof is permanently bonded to the latter so as to form one unitary mass and abuts the side surfaces of the elements to function as stops between the elements and prevents their moving out of their proper alignment. Another advantage of the invention is that the longitudinal portions 22 of the tapes may be treated at the same time with the hardening material to provide immediately adjacent to the inner ends of the elements, longitudinally extending stringer portions which will have a greater resistance to wear by the side guide flanges of the slider 15 than the untreated fabric material of the tape and will facilitate the operation of the slider as they tend to prevent the formation of wrinkles or creases in the tapes along the paths of travel of such flanges. The treated longitudinal portions 22, while containing the hardening material, are only partially impregnated with the same and are not covered with the material or impregnated to the extent that they become stiff and hard, but only to the extent as to give sufficient body and hardness to such portions 22 to obtain the aforementioned advantages without substantially effecting the flexibility of such portions.

While I have described and illustrated a preferred embodiment of my invention, various changes and modifications thereof may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A stringer for a fastener of the slide operated type, comprising a textile supporting member, a series of fastener elements attached in spaced relation to a longitudinal edge of said supporting member and having free ends projecting outwardly from such edge; the portions of said edge intermediate said elements being each composed of a substantially homogeneous compound which is hard, stiff and rigid impregnating the textile portion and coating such impregnated portion to form a substantially cylindrically-shaped portion so dimensioned that the ends of such portions engage the opposed side surfaces of adjacent elements, and the portions of such edge to which the elements are attached being flexible and having a cross-sectional dimension less than that of said intermediate coated portions.

2. A stringer construction as set forth in claim 1 wherein said fastener elements extend through a reinforced section of said textile supporting member and wherein said reinforced section is a soft spongy material capable of readily absorbing said hardening material.

3. A stringer construction as set forth in claim 1 wherein the portion of said supporting material clamped by said fastener elements is soft spongy and flexible and wherein such impregnated and coated portions have a coating of the same material anchored thereto.

4. A stringer construction as set forth in claim 1 wherein said supporting member is provided with

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a continuous longitudinally extending portion adjacent to said longitudinal edge gripped by said fastener elements, such continuous portion containing a filler to render the same harder than the untreated textile of said supporting member whereby a hardened guideway is provided for the flanges of a slider.

5. A stringer construction as set forth in claim 1 wherein the rigid portions of said edge intermediate said fastener elements each have a cross sectional area that substantially conforms in configuration to an unimpregnated portion of said edge and the first mentioned area is greater than the second mentioned area but smaller than the

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cross-sectional area defined by the edges of said fastener elements.

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