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SLIDE FASTENER

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8 Claims. (Cl. 24-207)

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My invention relates to a slide fastener.

It is the general object of the invention to provide an improved form of slide fastener which is simple in construction, cheap to manufacture, and effective in use.

It is a more specific object to provide a slide fastener constructed and arranged to avoid wear, abrasion or puncturing of the material being fastened by my fastener.

Another object is to provide a slide fastener which may be of universal application in that it need not be made or sold in predetermined lengths but may be cut to and applied in the desired length by the user.

Other objects and various features of novelty and improvement will be hereinafter pointed out or will become apparent to those skilled in the art.

In the drawings which show, for illustrative purposes only, preferred forms of the invention:

Fig. 1 is a fragmentary view in front elevation of a garment or the like having an opening with my improved slide fastener incorporated therein, parts being broken away to illustrate various features of construction;

Fig. 2 is an enlarged, sectional view, taken substantially in the plane of the line 2-2 of Fig. 1;

Fig. 3 is an isometric view of my improved fastener slightly modified, parts being broken away to illustrate the construction;

Fig. 4 is a sectional view, taken substantially in the plane of the line 4-4 of Fig. 1;

Fig. 5 is an isometric view of a clasp carrier tape showing slide clasps and a guide, together with a finger pull;

Fig. 6 is a sectional view of a slightly modified form of finger pull or finger piece;

Fig. 7 is an isometric view of a modified form of guide and finger pull;

Fig. 8 is an isometric view of rack means for collecting clasps, whereby the two sides of an opening in a garment may be wholly separated from each other, as for instance when my improved fastener is used on a coat or sweater, the parts being shown in open or separated position;

Fig. 9 is an isometric view of the parts shown in Fig. 8, the parts being shown in fastened together position, the slide clasp tape being extended for holding the side tapes and attached two sides of the opening together;

Fig. 9^a is a fragmentary view of a modified rack means;

Figs. 10 and 11 are transverse sectional views of modified forms of tapes.

Briefly stated, in a preferred form of the invention, I employ two flexible side tapes of fab-

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ric, plastic or the like, each having one longitudinal edge stiff in a transverse direction but longitudinally flexible, and these stiffened edges are turned underneath the side tape by return bending the latter, forming rails which are housed in and are slidably engaged by slide clasps which act as means to hold the side tapes with opposed fold edges 5' together. The edges of the opening in the garment to be fastened together are secured to the side tapes. The sliding clasps preferably are carried by a clasp tape so that the tape may be pulled and the clasps distributed in spaced relation on the rails for holding the side tapes together. When it is desired to open the slide fastener, the clasp tape is actuated so as to cause the slide clasps to move toward the end of the opening, and in so doing each clasp engages its next succeeding neighbor clasp and causes the clasps to bunch up toward the end of the opening and permit the side tapes to separate. Various finger pulls, guides and clasp racks and the like may be associated with or incorporated in the fastener when required.

The edges of the opening to be closed by my fastener are stiff and such stiffening may be accomplished by forming the edges of or by impregnating or coating them with some plastic or other stiffening agent as indicated in Figs. 10 and 11. In the form illustrated (Figs. 1 to 9), each side tape 5, 6 has a relatively narrow strip of stiffening material 7 secured to the edge thereof. The stiff edge, no matter how formed, should have the requisite transverse stiffness, but while stiff transversely should be very flexible longitudinally. The stiffening strips 7 on the two side tapes 5-6 may be secured thereto in any suitable manner, such as by employing adhesive, by thermo-plastic adhesion or embedding, or sewing, etc. When the fastener is assembled and the fastener is holding together parts of the garment, the stiffened edges 7' of the flexible side tapes 5-6 are turned underneath by return bending said flexible side tapes, as illustrated particularly in Fig. 2, the actual bend being shown at 8^a, and the portion beyond the bend at 8. In the preferred form the outer edges of the stiffening strip 7 extend slightly beyond the edge of the return bent portion 8 of each side tape. Thus, the extreme edge of the stiffening strip 7 forms a bearing surface for the slide clasps as will be described. Since the bend 8^a is flexible, the bend may be flattened out.

The slide clasps which hold the side tapes (and consequently the garment edges attached thereto) together are preferably in the form of flat

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generally rectangular C-shaped frames with preferably square inside bends to provide flat bearing seating for the rail edge. One form of such clasp 9' may be made of wire or similar material and includes a flat base 9, short bent up sides 10—10, and inturned ends or prongs 11—11. The wire may be of square or rectangular cross-section, with slightly rounded corners, and the prongs 11—11 are preferably tapered as is clearly illustrated in Figs. 2 and 3. The stiffened edges such as the strips or rails 7—7 may be so formed in relation to the prongs 11—11 that there is substantially no possibility of any contact between the prong ends and the fabric of the side tapes. In the form illustrated, each rail 7 has an upstanding bead 12 at its inner edge, and the prongs 11—11 extend into proximity to the beads. Thus, the side tapes extending upwardly and over the beads are held by the latter out of engagement with the prong ends. In any event, the width of the stiffening strips (whether beaded or not) on the rails 7—7 is slightly greater than the length of the prongs, thus fending off the side tape, as it makes its return bend, from any stressed contact with the ends of the prongs. The inner edges of the stiffening strips are preferably square and lie in proximity to each other so as to prevent one from mounting the other and slipping out. The slide clasps are carried by a clasp tape 13 and are secured thereto by any suitable or well known means. As illustrated, the slide clasps 9' are secured to the tape by having the prongs projected through the tape 13 before the prong ends are bent over and inwardly.

The edges of the material 14—14 to be fastened or held together are secured to side tapes 5—5 as by stitching 15. Bend 8a may be flattened out, to give clearance for applying such stitching 15. When the said edges are fastened or held together, the clasp tape 13 is extended lengthwise and the clasps are spaced apart so as to hold the side tapes and attached garment edges at such spaced apart points. Normally, the proportions of the various parts are such that the parts of the side tapes extending between the prongs of the clasps are or are practically in contact with each other as at 56 in Fig. 2, and the adjacent edges of the garment material may be in engagement with each other so as to form an almost invisible meeting of the edges like a seam. When the fastener is to be opened, the clasp tape may be actuated so as to cause the slide clasps to gather together, as heretofore described, and the material of the clasp tape 13 will simply form pleats or folds between adjacent clasps, and since the clasps are of relatively small dimensions, the garment edges defining the opening may be separated practically down to its end, and by extending the rails down beyond the end of the opening, the clasps will accumulate beyond the end and the opening may be opened all the way to its end. Because the clasps ride on the hard bearing edge of the rails 7—7, and the tape is fended off from the clasp prongs, the clasps may be made of thin wire or the like, and the clasps being of such small extent along the tape, may be closely spaced to prevent gapping and yet all the clasps when bunched to permit separation of the edges of the opening will occupy but little space.

If desired, various types of pulls, as illustrated particularly in Figs. 1, 4, 5, 6 and 7, may be secured to the clasp tape so that the latter can be easily actuated from the front or outside. Of

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course, in such situations where the clasp tape can readily be gotten at from the back, no pull on the outside is necessary, since the tape itself may be readily grasped.

In some cases instead of employing only the clasps as heretofore described, it may be desirable to have a heavier clasp or guide as the leading clasp for drawing the edges of the garment together as the fastener is being closed. For example, as shown in Figs. 4 and 5, a metal, plastic or other plate 17 may be provided with upturned sides and inturned edges 18 so as to be in large part of very much the same form in section as the slide clasps heretofore described. However, the guide formed by the plate 17 and inturned edges or flanges 18 is designed to be much stronger than the wire clasps and serves admirably as a lead clasp. Such a guide may be slipped onto the rails 7—7 and secured to the folded over front end of the clasp tape 13. The pull 16 may be sharpened so as to pierce the tape and pass through an opening 19a in the plate 17 and thus secure the guide on the tape by means of the loop 19. A finger piece 16' is secured over the sharp end to act as a protector and a finger grip. The rails 7, being wider than the guide flanges 18, fend off the tapes from stressed contact with the edges of the flanges.

In Fig. 6 a modified form of finger pull is illustrated. As there shown, a wire is bent into the desired form, with an eye 19' at one end, and the two extreme ends are housed in a little cap finger grip 20. One end of the wire is preferably sharpened so as to readily pierce the fabric of the tape 13, while the other end is threaded as indicated at 21. The deep bore in the finger grip 20 is either threaded, or the threaded end 21 may cut its own thread into the deep bore of the finger grip 20, and the sharp end may be housed in a protecting counterbore 22, as illustrated.

In the form shown in Fig. 7, the guide member is an open box-like structure preferably formed of sheet metal or other suitable material and is preferably tapered from an enlarged or bell shaped entrance mouth at one end to the exit end, where the inside dimensions are about the same as those of a clasp so as to facilitate the drawing together of the edges of the side tapes and garment edges in closing the fastener. The bottom or base 23 of the guide shown in Fig. 7 is recessed or apertured so that a wire loop 24 may be secured thereto after one sharp end has pierced the tape 13 which would be secured by the loop to the guide. The two ends of the wire beyond the loop may be received in a slotted tube 25 forming a protector and finger grip. The pointed end of the wire simply extends transversely into the tube and the other end is bent, as illustrated at 26, in a double curve to lie zig-zag across the slot so as to securely but detachably hold both ends of the wire in the tube and so that the point cannot injure the user.

In all forms of pull and guide herein illustrated, there are no sharp edges or corners to catch on the fabric or injure the person. The loops 19, 19' and 24 provide pivotal mountings for the finger pulls as a whole so that the latter can be moved into convenient position for opening or closing the fastener. It is desirable to have a guide retainer projecting upwardly toward or into the space between the inturned flanges on the guide to prevent the rails and the side tapes from overlapping in the guide or from slipping out of the guide under stresses incidental to

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closing the fastener. The loop 24 projecting between the flanges serves admirably as such a guide retainer or separator.

The fastener as heretofore described, that is, the side tapes and clasp tape, will usually be secured at the end of the opening in the garment, as by means of stitching such as 30 (Figs. 1 and 4) and the fastener as so secured is in the usual form for securing plackets or other openings. When it is necessary that the two parts of the garment be wholly separated, as when the fastener is used on a sweater, coat, detachable lining, or the like, I provide means for collecting all of the slide clasps on a single member and disengaging the two side tapes from each other.

As illustrated in Figs. 8 and 9, the rail 7, carried by the side tape 5, may be secured to an angle member 35 having a tapered projection 36 thereon, which latter may be provided with an overhanging lip 37. The rail carried by the side tape 6 may be secured to and form a continuation of a clasp rack plate 38 having a right angle flange 39 thereon. The flange has a tapered opening 40 for receiving the projection 36 on the mating member. When the two member 35-38 are assembled as shown in Fig. 9, the rack plate of the member 38 forms in effect a continuation of the two rails 7-7, so that all of the slide clasps may be slid down and racked or held on the one piece (Fig. 8). When all of the clasps are down on the one piece 38, the mating member 35 may be disengaged from the flange 39 and the two tapes 5-6 and the parts of the garment carried thereby separated. The rack plate 38 as commercially made may be of considerable length and have a series of stop abutments such as 41-42 provided along its length. Thus, when a long rack is required, the abutment 41 may be cut off and the clasps may extend down to the abutment 42. On the other hand, when a short rack is required, the abutment 41 may be left in place and the entire rack beneath the abutment 41 cut off. When all of the clasps are racked on the member 38, they may be held thereon as by means of a finger grip at the front end of the clasp tape, say the tubular member 25 of Fig. 7, which may be swung down and snapped behind an undercut projection 43 on the flange 39. The reengagement of the clasps with the rails is accomplished by a reversal of the process just described, as will be understood.

Where the garment adjacent the fastening is subjected to considerable side strain, there is likely to be some gapping at points between adjacent clasps, particularly when the clasps are relatively far apart. In order to reduce such tendency to gapping, I may provide extra stiffening such as strips 7' (Fig. 3), flexible longitudinally but stiff transversely, on the side tapes inwardly of the reverse bends 8^a. Thus, the strain on the garment outside of the stiffening strips 7' will be more uniformly distributed among the clasps and gapping will be reduced to a minimum.

It will be seen that I have provided an improved form of fastener which is simple and cheap to manufacture and effective in use.

A principal feature of the invention is the combination and arrangement of the side tapes and clasps. The stiff edges on the side tapes have heretofore been described as being wider than the lengths of the prongs of the clasps. This is well illustrated in Fig. 2. Thus the parts of the side tapes extending outwardly through the space between prongs and beyond will be

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carried well away from the prong ends so as to avoid injuring the side tapes or garment. The stiff edges or rails bear on the inside ends of the clasps, thus making possible the fending off action described. The stiff edges forming the rails may be formed by separate strips applied to fabric (Figs. 1 and 9) or by impregnating, coating or other method (Figs. 10, 11). In fact in some cases the side tapes may be inherently stiff transversely and flexible longitudinally. These constructions provide hard smooth bearing edges on the side tapes upon which the slide clasps slide easily. Because of the hard bearing surfaces the clasps may be made very thin as of wire. The bunched clasps therefore take up very little space and may be closely spaced on the clasp tape to avoid gapping. Furthermore, side stress on the side tapes or garment actually seats the rails more tightly in the clasps rather than tending to pull out of the clasps as is the case in ordinary glide fasteners. My fastener may be made of very small dimensions so as to be inconspicuous. The edges of the opening approach or touch each other. No metal is visible from the front. The clasp tape may be folded back and secured over the bottom of the clasps so as to render them invisible from the back. There are no teeth or projections to injure the garment or the user. By providing rails of sufficient length beyond the end of the opening the clasp tape may be pulled from opposite ends to open or close the fastener. Numerous other advantages will be apparent to those skilled in the art.

While I have used the term garment herein, it should be understood that that term is used in a generic sense, since my fastener may be employed to fasten linings, slip covers, bags and the like. Furthermore, the side tapes in some cases may be garment edges themselves instead of being secured to garment edges.

While the invention has been described in considerable detail and preferred forms illustrated, it is to be understood that various changes may be made within the scope of the invention as defined in the appended claims.

I claim:

1. In a slide fastener, side tapes having return bent outwardly facing edges, said edges being stiff, slide clasps for holding said side tapes together, said slide clasps including means having inwardly directed prongs defining an opening between them, said stiff edges being embraced by said clasps and lying beneath said prongs, said side tapes being extended outwardly through said openings in said clasps, the extreme edges of said stiffened edges being in running engagement with said clasps, said stiff edges beneath said prongs being of a width greater than the length of said prongs whereby the side tapes passing through the openings in said clasps will be fended off from the ends of said prongs.

2. A slide fastener comprising a pair of flexible side members defining an opening, each of said side members having adjacent its outer edge a reverse bend, the portions of each side member beyond its reverse bend having a plastic stiffening material thereon, and a flexible clasp carrying element, provided with spaced clasps having reverse bends therein, said clasps being engageable over said stiffened portions of the side members and slidable thereon.

3. A slide fastener, comprising a pair of tapes adapted to be secured along the adjacent edges of an opening, said tapes each having a reverse

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bend adjacent its outer edge, the portion of each tape outwardly of its reverse bend having a stiffening material applied thereto to provide a rail, and a flexible clasp carrying member, provided with spaced clasps having reverse bends therein, engageable over said rails and slidable thereon.

4. A slide fastener, comprising a pair of tapes adapted to be secured along the adjacent edges of an opening, said tapes each having a reverse bend adjacent its outer edge, the portion of each tape outwardly of its reverse bend having a stiffening material applied thereto to provide a rail, a flexible clasp carrying member, provided with spaced clasps having reverse bends therein, engageable over said rails and slidable thereon, and a finger operated actuating pull, secured to the clasp carrying member and passing outwardly in the space between the reverse bends in the pair of tapes.

5. A slide fastener, comprising a pair of flexible fabric tapes adapted to be secured along the adjacent edges of an opening, said tapes each having a reverse bend adjacent its outer edge, that portion of each tape outwardly of its reverse bend having a plastic material applied thereto for stiffening it, and a flexible clasp carrying tape, provided with spaced clasps each having reverse bends therein, engageable over said stiffened portions of the tapes and slidable thereon.

6. A slide fastener, comprising a pair of tapes adapted to be secured along the adjacent edges of an opening, said tapes each having a reverse bend adjacent its outer edge, the portion of each tape outwardly of its reverse bend having a stiffening material applied thereto to provide a rail, and a flexible clasp carrying tape, provided with spaced clasps having reverse bends therein, engageable over said rails and slidable thereon, said clasps being of a single piece of material anchored to the clasp carrying tape.

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7. A slide fastener, comprising a pair of tapes adapted to be secured along the adjacent edges of an opening, said tapes each having a reverse bend adjacent its outer edge, the portion of each tape outwardly of its reverse bend having a stiffening material applied thereto to provide a rail, a flexible clasp carrying tape, provided with spaced clasps having reverse bends therein, engageable over said rails and slidable thereon, the body portion of each tape, inwardly of its reverse bend, having a stiffening material applied for uniformly distributing a lateral pull on the tapes.

8. A slide fastener comprising a pair of flexible side members defining an opening, each of said side members having adjacent its outer edge a flexible reverse bend, the portions of each side member beyond said reverse bend having a plastic stiffening material thereon, and a flexible clasp carrying element, provided with spaced clasps having reverse bends therein, said clasps being engageable over said stiffened portions of the side members and slidable thereon.

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