

April 19, 1938.

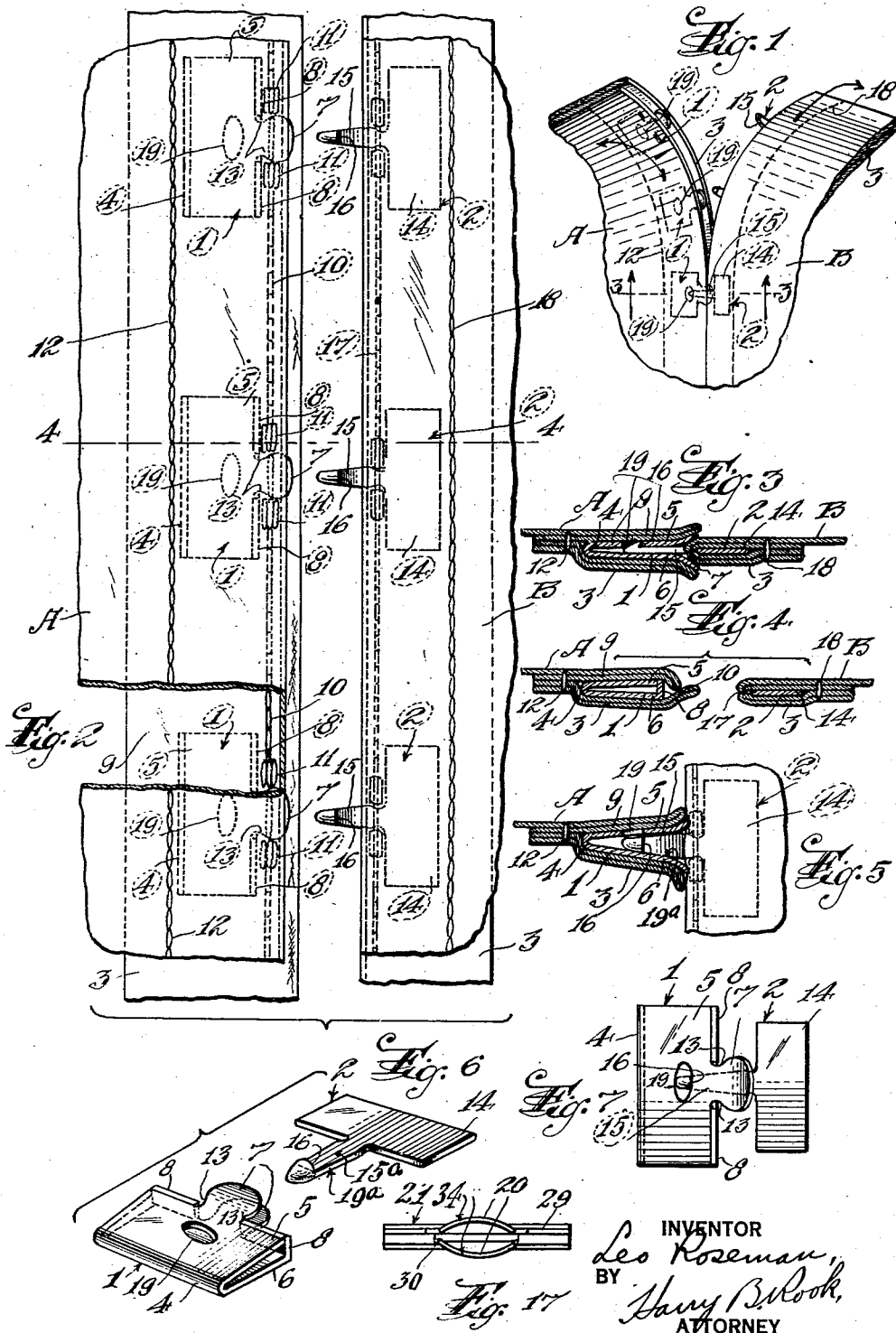
L. ROSEMAN

2,114,429

LOCKING SNAP FASTENER

Filed Oct. 19, 1936

2 Sheets-Sheet 1



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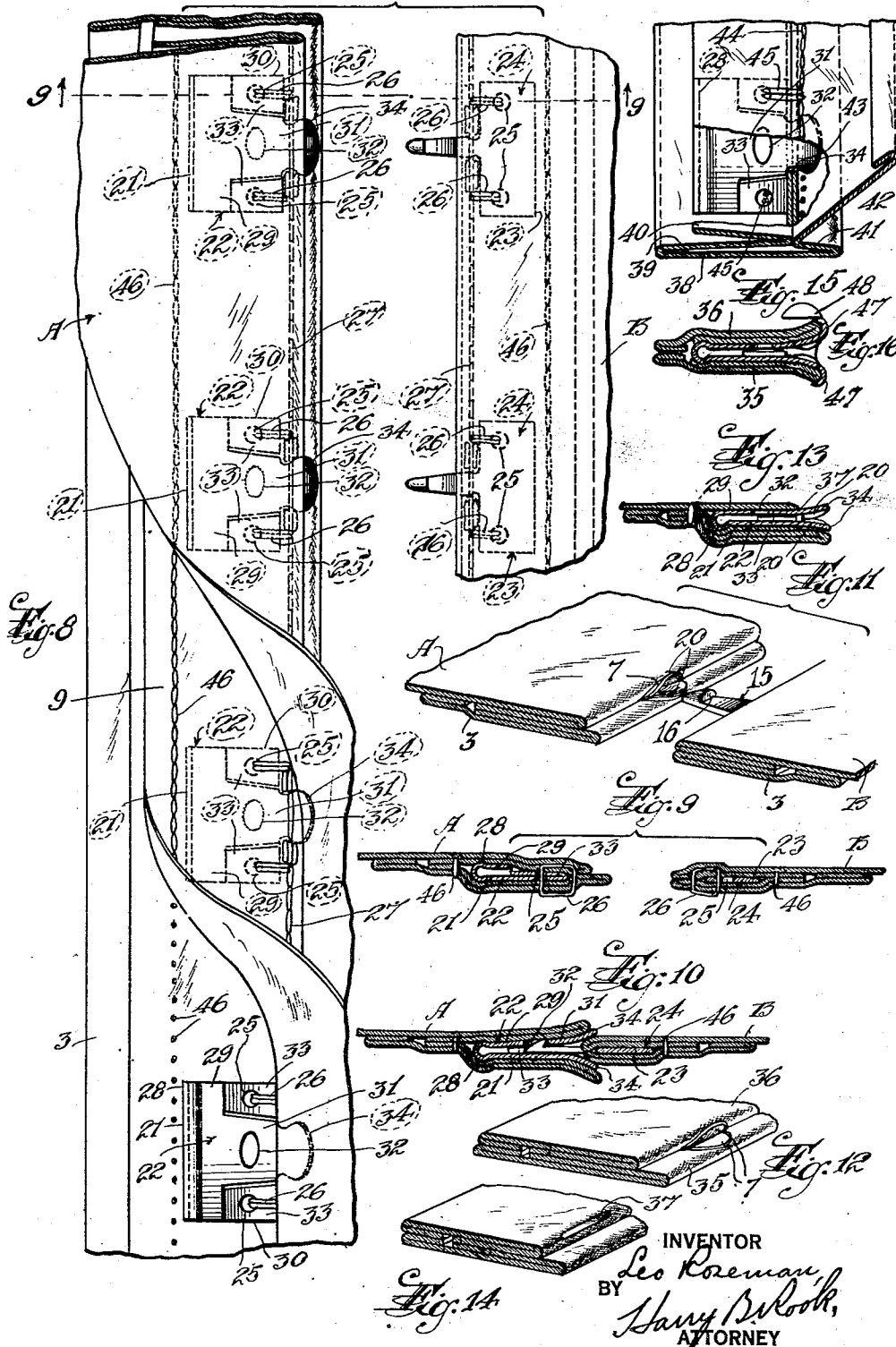
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UNITED STATES PATENT OFFICE

2,114,429

LOCKING SNAP FASTENER

Leo Roseman, Newark, N. J.

Application October 19, 1936, Serial No. 106,326

5 Claims. (Cl. 2—265)

This invention relates in general to fasteners of the head and socket or snap type, and especially to fasteners for garments such as corsets, brassières, shirts and the like.

5 There are four common forms of garment fasteners, one type is a hook and eye wherein the common plane of the shank and the bill of the hook as well as the axis of the eye are perpendicular to the general plane of the garment edges and the hooks and eyes are connected and disconnected by a compound movement of the garment edges in a direction parallel to the general plane of the garment edges and in a direction perpendicular to said general plane. Another 15 type is the head and socket fastener wherein the axis of the head and socket are perpendicular to the general plane of the garment edges, and said edges must be overlapped to connect the heads and sockets while the heads and sockets must be moved in planes perpendicular to the general planes of the garment edges for connecting and disconnecting the heads and sockets. A third 20 type is the so-called slide operated or zipper type which requires a slider for connecting and disconnecting the fastener elements. A fourth is the button and buttonhole type which requires overlapping of the edges of the garment and insertion of the buttons through buttonholes.

The hook and eye type, the head and socket 30 type and the button and buttonhole type have among other things the disadvantage of bulkiness and the forming of protuberances uncomfortable to the wearer. Moreover it is frequently difficult to connect and disconnect the complementary fasteners, the complementary fasteners may become accidentally separated, the hooks and eyes when the garment edges are not under tension and the heads and sockets when the garment edges are placed under too great a tension 40 tending to separate them. Furthermore, the operation of connecting and disconnecting the complementary fasteners is slow and tedious. The zipper type causes puckering of the garment, is frequently stiff due to the closely arranged metal fasteners, and especially in tight fitting garments the slider is frequently difficult if not impossible to operate. Moreover, the slider causes a protuberance which is visible beneath thin outer garments.

50 Therefore, a prime object of my invention is to provide a fastener embodying novel and improved features of construction which shall overcome the above-mentioned difficulties and disadvantages, shall be thin or have minimum bulk, 55 and shall have the complementary fastener ele-

ments connectible in the general planes of the garment edges in a single movement in directions approximately perpendicular to said edges with said edges in approximately abutting relation, and the complementary fastener elements shall be positively locked against accidental disconnection. 5

Another object is to provide such a fastener which shall be flexible and easy to operate, and shall permit disconnection of all complementary fastener elements quickly at one time and in one simple relative movement or pulling apart of the edge portions of the garment from one end toward the other in directions at angles to the general planes of said edge portions, similar to the movement incident to ripping or tearing of textile fabric. 15

A further object is to provide a novel and improved fastener of the general character described which shall include the edge portions of garments or fabric tapes having stud elements and complementary socket elements secured along the longitudinal edges thereof by stitching, each stud element being formed of sheet metal and having a flat base and a shank projecting therefrom perpendicular to the edge of the respective garment portion or tape and parallel to the general planes thereof and provided with a head having a lateral shoulder or projection extending in a direction approximately perpendicular to the plane of the flat base and said garment edge or tape; and each socket element being formed of a single piece of flat sheet metal and including a flat base having opposed spring jaws movable apart in a direction approximately perpendicular to the plane of the base and the respective garment edge or tape and one jaw formed with a recess or opening to receive said shoulder on the stud element, the stud element and socket element being so constructed and related that they can be easily and quickly connected by simply sliding the shank of the stud element between the jaws to spread them and then permitting them to snap over said head and cause said shoulder to interlock with said recess, and the two elements can be easily disconnected by a slight relative twist or rotation of the two elements about an axis approximately perpendicular to the edges of the garment or tapes or about an axis disposed longitudinally of the stud shank to move said shoulder out of the recess. 20 25 30 35 40 45 50

Further objects are to provide such a novel and improved fastener wherein the fastener elements shall be secured between plies of fabric so that the stud elements and socket elements when the 55

garment edge portions or tapes are connected shall be concealed and prevented from contacting with the flesh or clothing of the wearer and from becoming accidentally caught or snagged on other articles; and to provide such a fastener wherein the fastener elements shall have shoulders at opposite sides of the engaging portions thereof abutting a line of stitching or a fold in the fabric to evenly and widely distribute the strains imposed on said elements.

Other objects are to provide a fastener of this character wherein the socket elements shall be disposed wholly inwardly of the edge of the garment edge or tape and the edges of the garment or tapes shall be firmly secured to the respective fastener elements in close proximity to the engaging portions of the stud elements and socket elements to ensure relative twisting or rotation of the complementary fastener elements with a minimum of strain upon the garment edge portions or tapes upon relative movement or pulling apart of the edge portions of the garment or the tapes in directions at angles to the general planes thereof; and to obtain other advantages and results as will be brought out by the following description.

Referring to the accompanying drawings in which corresponding and like parts are designated throughout the several views by the same reference characters.

Figure 1 is a schematic perspective view of a fastener embodying my invention showing the manner of separating the complementary fastener elements.

Figure 2 is an enlarged composite plan view of the complementary socket element and stud element parts of the fastener in separated condition.

Figure 3 is a transverse vertical sectional view through the fastener with the stud elements and socket elements connected, on the line 3—3 of Figure 1.

Figure 4 is a similar view on the line 4—4 of Figure 2.

Figure 5 is a view similar to Figure 3 showing the manner of disconnecting the complementary stud elements and socket elements.

Figure 6 is a composite perspective view of a socket element and complementary stud element.

Figure 7 is a plan view of the socket element and complementary stud element connected together.

Figure 8 is a view similar to Figure 2 showing a modification of the invention.

Figure 9 is a transverse sectional view on the line 9—9 of Figure 8.

Figure 10 is a transverse sectional view showing the complementary socket element and stud element connected together.

Figure 11 is a fragmentary perspective view of the complementary parts of the fastener separated.

Figure 12 is a fragmentary perspective view of a modification of the socket element part in tape form.

Figure 13 is a transverse sectional view through another modification of the stud element part of the fastener.

Figure 14 is a fragmentary perspective view of a modification of the fastener shown in Figure 13 in tape form with the fastener element removed.

Figure 15 is a fragmentary plan view of a further modification of the invention, showing the upper ply of the tape unfolded and portions broken away for clearness in illustration.

Figure 16 is a transverse sectional view through the form shown in Figure 12 slightly modified, and

Figure 17 is a front elevation of one of the socket elements shown in Figure 8.

The invention contemplates the attachment of the complementary stud elements and socket elements directly to the edges of a garment or other article to be connected, or the attachment of the socket elements and stud elements to fabric tapes which are in turn secured to the edges of garments or other articles.

Referring to Figures 1 to 7 inclusive, the reference characters A and B designate the edge portions of a garment or article to be connected, said edge portions having secured thereto respectively socket elements 1 and stud elements 2. As shown, the fastener elements are secured between the undersides of the garment edge portions A and B and fabric strips 3, whereby the fastener elements are disposed between plies of fabric.

Each socket element includes a single piece of spring sheet material folded upon itself at 4 to form a flat base having two opposed jaws 5 and 6 each of which has a tongue 7 projecting from the free edge thereof and intermediate its width. One edge of one jaw is bent at an angle to the general plane of the jaw at 8 and overlies the free edge of the other jaw at opposite sides of the tongues 7, so as to form shoulders and eliminate thin or sharp edges.

The socket elements are secured on the garment edges preferably in equidistantly spaced relation longitudinally of said edges with the openings between the jaws facing toward the edge of the garment and the tongues 7 projecting from between the garment edge portion A and the corresponding fabric strip 3. The socket elements may be secured to the garment edge and strip in any suitable way, but preferably as shown the garment edge portion is folded under as at 9 and a line of stitches 10 runs longitudinally of the garment edge in abutting relation to the forward edges or shoulders 8 of the fastener elements and penetrates the strip 3 and the ply 9 of the garment edge, whereby the stitches are concealed by the main or upper portion of the garment edge. Preferably the line of stitches is formed to provide gaps through which the tongues of the socket elements project and reinforcing stitches 11 are formed at opposite sides of the gaps. The stitches 10 and 11 run along and are abutted by the forward edges of the bases of the socket elements to hold the elements from being pulled from between the garment edge portion and the strip, and a line of stitches 12 passes through the garment edge and strip 3 at the rear edges or edges of the bases opposite the stitches 10 so as to cooperate with the stitches 10 to firmly hold the socket elements in position against movement laterally of the garment edge. Movement of the socket elements longitudinally of the garment edge is prevented by the location of the tongues 7 in the gaps.

To temporarily hold the socket elements in the gaps prior to formation of the line of stitches 12, the bases of the tongues are notched or reduced in width at 13 so that the tongues are held in the gaps by frictional engagement between the tongues and the fabric at the ends of the gaps.

Each of the hook elements 2 includes a flat base 14 having a shank 15 rectangular in cross section and projecting from one edge thereof intermediate its ends and having flat sides 16 75

and a bulbous or ball-like rigid head formed with a shoulder 16 at one side projecting from one side of the shank at one side of the base and facing toward the base, the rounded surface of the head being approximately flush with the other sides of the shank. The bases of the stud elements are secured between the corresponding garment edge and the strip 3 in the same manner that the socket elements are secured between the garment edge A and its strip 3, the shanks of the studs projecting from the garment edge through gaps formed by the line of stitches 17 corresponding to the stitches 10, and the shanks being held against displacement from the gaps by the line of stitches 18 corresponding to the stitches 12.

Each stud element is complementary to one socket element, and each socket element has in at least one jaw a recess or opening or catch 19 to receive the head or shoulder 16 of the corresponding stud element.

In connecting the complementary stud elements and socket elements, the garment edges are moved edgewise toward each other in their own planes so as to insert the stud shanks between the jaws of the corresponding socket elements, the jaws being sprung apart as the stud shanks are inserted and then snapping over the shoulders 16 to cause interlocking engagement of the edges of the openings 19 with said shoulders. The stud elements and socket elements are thereby positively interlocked with each other, and when thus connected together, the complementary stud elements and socket elements will effectually withstand all strains tending to pull the edges apart in their own planes, which is especially important in tight fitting garments such as corsets.

The connection of the complementary fastener elements can be effected easily and quickly, the tongues 7 effectually guiding the stud shanks between the jaws of the socket elements, and if desired the tongues may be transversely curved at 20 (see Figures 11 and 17) to form in effect a mouth to accurately guide the stud shanks between the jaws.

An important feature of the invention is that the complementary socket elements and stud elements may be separated in a continuous operation by oppositely directed pulls on the garment edges from one end toward the other in directions at angles to the planes of said edges so as to relatively rotate the socket elements and stud elements about axes perpendicular to the edges of the garment and parallel to the general planes of at least one garment edge and move the shoulders 16 of the stud elements out of the recesses 19 of the corresponding socket elements, as shown in Figures 1 and 5. This relative movement of the garment edges during separation of the fastener elements is similar to that of ripping fabric or a seam as clearly shown in Figure 1, and permits easy and rapid disconnection of the garment edges which is especially desirable in tight fitting garments such as corsets. The fastener elements when connected are held against such rotation by the garment edge portions and the engagement of the jaws 5 and 6 with the flat sides 15a of the stud shanks.

As shown, the edges of the stud shanks 15 may be beveled as at 19a to spring apart the jaws 5 and 6 of the socket elements upon such relative rotation of the stud elements and socket elements, whereby complete disengagement of shoulders 16 from the recesses 19 is ensured and the spring

action of the jaws on said beveled edges will tend to eject the stud shanks from between the jaws.

While I have shown one shoulder 16 on each stud element at one side thereof, another shoulder might be formed on the opposite side of the shank, and both jaws of the socket elements could be formed with openings or recesses, one for each shoulder on the stud shank.

A modification of the invention is shown in Figures 8 to 10 inclusive wherein the bases 21 of the socket elements 22 and the bases 23 of the stud elements 24 are formed with openings 25 to receive tack stitches 26 for securing the fastener elements on the garment edges. If desired, the tack stitches 26 may form continuations of the lines of stitches 27 which correspond to the lines of stitches 10 shown in Figure 2.

The stud elements of this form of the invention are otherwise the same as the stud elements 2, but the socket elements differ in structure from the socket elements 1. As shown, each socket element includes a single sheet of spring material folded upon itself and having a split tubular formation 28 at the fold to provide a maximum of resiliency for the opposed jaws 29 and 30. One jaw 29 is reduced in width at 31 and carries the recess 32 to cooperate with the shoulder of the complementary stud. The edge portions of the other jaw at opposite sides of the reduced portion 31 are returned upon the jaw as at 33 to form rounded shoulders to abut the stitches 27 and to reinforce the jaw. The openings 25 are formed through the main portion and returned portions 33 of the jaw. The returned portions 33 form between them a guide for the shank of a stud element. The jaws 29 and 30 have integral tongues 34 which project from between garment edge portion and the corresponding strip 3, like the tongues 7.

The operation of this form of the invention in connecting and disconnecting the complementary fastener elements is identical with that shown in Figures 1 to 7 inclusive.

If desired the fastener may be in the form of a tape as shown in Figure 12 where the tape comprises two strips 35 and 36 between which the fastener elements are secured. Also, instead of disposing the fastener elements between the garment edge portions and the strip 3 or between the two strips 35 and 36 of the tape, the garment edge portion or the strip 36 may have slits 37 at the fold through which the tongues of the socket elements or the shanks of the stud elements may project, whereby the shoulders of the fastener elements will abut the fold at opposite sides of the corresponding slits.

A further modification is shown in Figure 15 where the tape is formed of a single strip of fabric and has one edge portion folded inwardly to form a ply 39 and then outwardly to form another ply 40, the other edge portion of the strip being folded inwardly to form a ply 41 in the same plane with the ply 39 and another ply 42 to overlie the ply 40. The folds between the plies 39 and 40 and the plies 41 and 42 are formed with slits 43 through which the tongues of the socket elements or the hooks of the hook elements project. The fastener elements are disposed between the plies 39 and 40 with their shoulders abutting the fold between said plies. A line of stitches 44 may be provided longitudinally in the strip before the ply 42 is folded over the ply 40, said stitches passing through all of the plies 42, 41 and 38. Preferably the line of stitches 44 will have tack stitches 45 passing

through the openings 25 of the fastener elements. With this construction a strong durable tape is provided wherein the strains imposed on the fastener elements when connected together are assumed by the double thickness of material at the folds between plies 39 and 40 and plies 41 and 42, and by the stitches 44 and 45.

In many instances it is desirable to avoid visible stitches on the face of the connected edge portions of a garment opening. In Figures 2 and 3 of the drawings, the stitches 10 are invisible but the stitches 12 are visible in passing through both plies of the garment edge portion and through the strip 3. If desired, both lines of stitches might be concealed, for example as shown in Figures 8 and 9 where the line of stitches 46 corresponding to the stitches 12 passes through only the underply 9 of the garment edge portion and the strip 3 so that the line of stitches is concealed by the main or outer ply of the garment edge portion. It will be observed that with the stitches so arranged the inner edge of the strip 3 and the underply 9 are free to pull away from the main ply. However, due to the location of the fastener elements at the edge of the garment the strains imposed on the fastener elements when they are connected are related to the garment edge portion so as to overcome the tendency of the strip 3 and underply of the garment edge to pull away from the main ply of the garment. This is in contrast to for example ordinary head and socket fasteners wherein the axes of the head and socket fasteners are perpendicular to the planes of the garment edge portions, and in which the strains on the garment fasteners, when the fasteners are connected, pull the strip and underply of the garment edge portion carrying the fastener elements into a position approximately at right angles to the plane of the garment edge, whereby the fasteners may easily accidentally separate and bulkiness at the garment edges is produced.

Due to the construction and arrangement of my fastener elements, only a light or small spring action is required in the jaws of the socket elements to hold the stud elements securely interlocked with the socket elements so that the fastener elements may be made small and flat to provide a minimum of bulkiness at the garment edge portions and ensure smooth flat surfaces which will not be visible through thin outer garments. This is further advantageous in that during laundering, mangling and ironing of the garments, no obstruction is caused by the fastener elements and furthermore in ironing a garment the jaws of the socket elements are pressed together to ensure subsequent secure interlock with the stud elements.

To facilitate insertion of the stud elements into the socket elements the extremities of the tongues of the jaws of the socket elements may be returned around and over the corresponding edges of the garment and the strip 3 as indicated at 47 in Figure 6 and where desired the tongue which is located at the outer side of the garment may carry a suitable ornament 48.

Other modifications in the details of structure of the fastener elements and in the manner of securing them to the garment edge, article or tape, will occur to those skilled in the art as within the spirit and scope of the invention.

The socket elements and the stud elements per se are described and claimed in my co-pending application Serial No. 192,702.

Having thus described my invention, what I claim is:

1. In a fastener, the combination of two pieces of pliable material disposed in edgewise approximately abutting relation, separable stud fastener elements secured on one of said pieces in spaced relation longitudinally thereof with a portion projecting from the edge of said piece to engage a complementary fastener element, and separable socket fastener elements complementary to the first-mentioned fastener elements secured on the other piece each having a spring socket opening toward the edge of said piece to receive and interlock with the engaging portion of the complementary fastener element upon movement of said pieces edgewise toward each other with the complementary elements in a certain relation to each other, all of said stud elements being releasable from the complementary socket elements in one continuous operation upon relative rotation of the stud and socket elements about axes approximately perpendicular to the edges of said pieces of material and parallel to the general plane of at least one piece by oppositely directed forces exerted on the edges of said pieces in directions at angles to the planes of the pieces.

2. In a separable fastener, the combination of two pieces of pliable material each formed of a plurality of plies of material, one or more separable stud elements each having an approximately flat base and a shank projecting from one edge of the base between the ends thereof whereby said edge forms shoulders at opposite sides of said shank, the extremity of the shank being provided with a bulbous rigid head having a shoulder extending from one side of the shank at one side of the base and facing the base, said stud elements being secured on one of said pieces of material and between two plies thereof with said shanks projecting from between said plies, one or more separate approximately flat spring socket elements between two plies of the other piece of material, each having opposed spring jaws connected together at one end with their other ends free and opening between said two plies to receive the shank of one of said stud elements between them, at least one jaw of each socket element having a catch to interlock with said shoulder of the corresponding stud shank when said elements are in a certain relation to each other and positively hold the stud element and socket element against separation by pulls in opposite directions parallel to the planes of said socket elements and said shanks, the heads of all of said stud elements being releasable from the catches of the corresponding socket elements in one continuous operation upon relative rotation of said stud elements and said socket elements about axes disposed approximately longitudinally of said shanks of the stud elements by oppositely directed forces exerted on the edges of said pieces in directions at angles to the planes of said pieces, the free end of at least one of said jaws forming shoulders at opposite sides of said catch, and means penetrating said two plies of each piece of material between the edges thereof and said shoulders of the bases of the stud elements and said shoulders of the socket elements respectively to resist strains tending to pull said fastener elements from between the plies of the respective pieces of material when the complementary stud and socket elements are connected together.

3. In a separable fastener, the combination of two pieces of pliable material each formed of a

plurality of plies of material, one or more separate stud elements each having an approximately flat base secured between two adjacent plies of one piece and with a headed shank projecting from the edge of the piece to engage a complementary fastener element, one or more separate socket fastener elements between two plies of the other piece of material, each having a spring socket having a mouth opening between the edges of said plies to receive and interlock with the engaging portion of the complementary fastener element, said socket element having shoulders at opposite sides of said socket mouth, and stitches penetrating said two plies of said piece of material in juxtaposition to said shoulders and adjacent the edges of said plies at opposite sides of said mouth to draw the edges of said plies snugly about the mouth of the socket element to form a gap between said edges of said plies and to hold the socket element against being pulled from between the plies when the complementary fastener elements are connected together, all of the stud elements being releasable from the complementary socket elements in one continuous operation upon relative rotation of the stud and socket elements about axes disposed approximately longitudinally of the shanks of the stud elements by oppositely directed forces exerted on the edges of said pieces of material in directions at angles to the planes of the pieces.

4. The separable fastener set forth in claim 2 wherein each of said pieces of material includes a face ply having an edge portion turned under and at least one other ply and said bases of said stud elements and said socket elements are secured between said turned under edge portions and said other plies of the respective pieces of material, and the last-mentioned means comprises stitches penetrating said edge portions and said other plies and free of said face ply whereby no stitches are visible on said face ply.

5. In a fastener, a piece of pliable material comprising a plurality of plies, means securing said plies together adjacent one edge of at least one ply to form a gap between said plies, and a flat spring socket element having a spring socket to receive and interlock with a complementary stud element, said socket element being secured between said plies with the mouth of said socket adjacent and opening through said gap, and said socket element having shoulders adjacent said mouth abutting said plies at the sides and ends of the gap to hold the plies apart at said gap and maintain the gap freely open to receive said stud element and to hold the socket element against being pulled from between the plies when the complementary fastener elements are connected together.

LEO ROSEMAN. 30