April 1, 1958 S. QUISLING 2,828,520

INTERLOCKING FASTENER

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FIG. 1

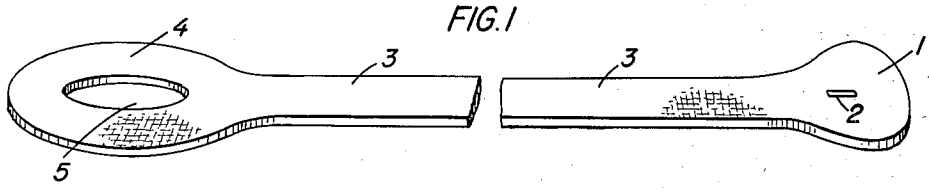


FIG. 2

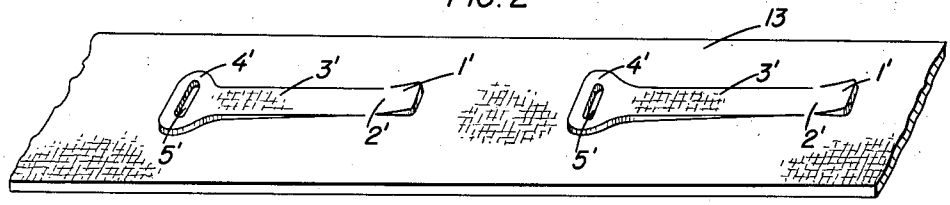


FIG. 3

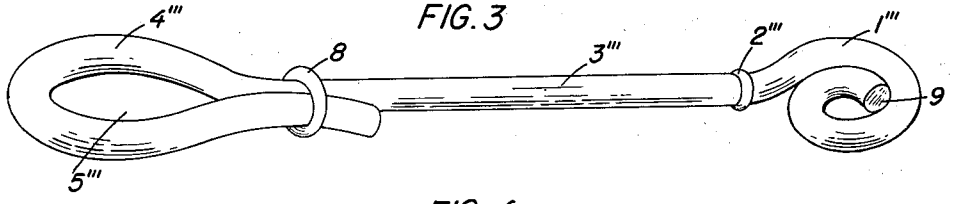
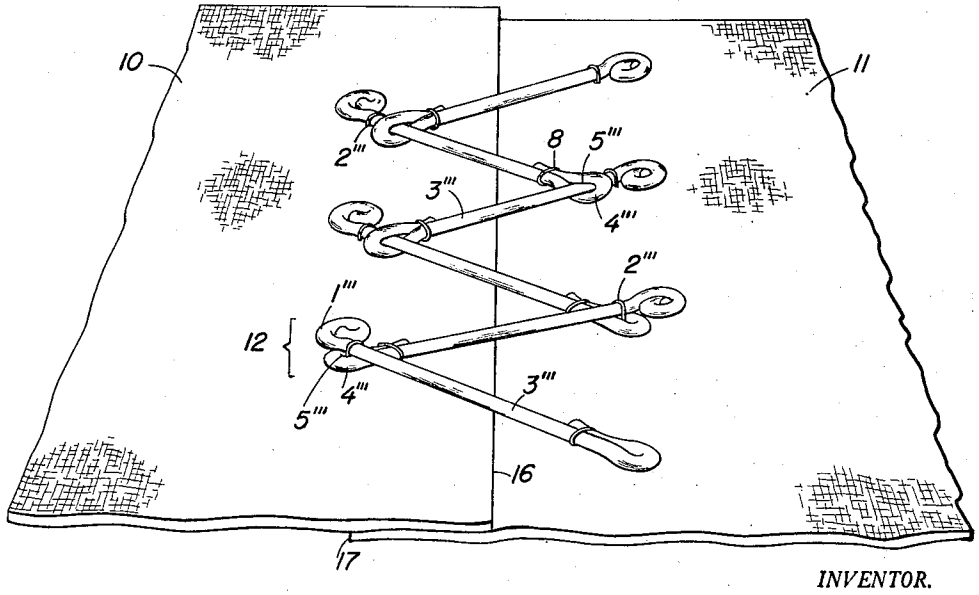


FIG. 4



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FIG. 5

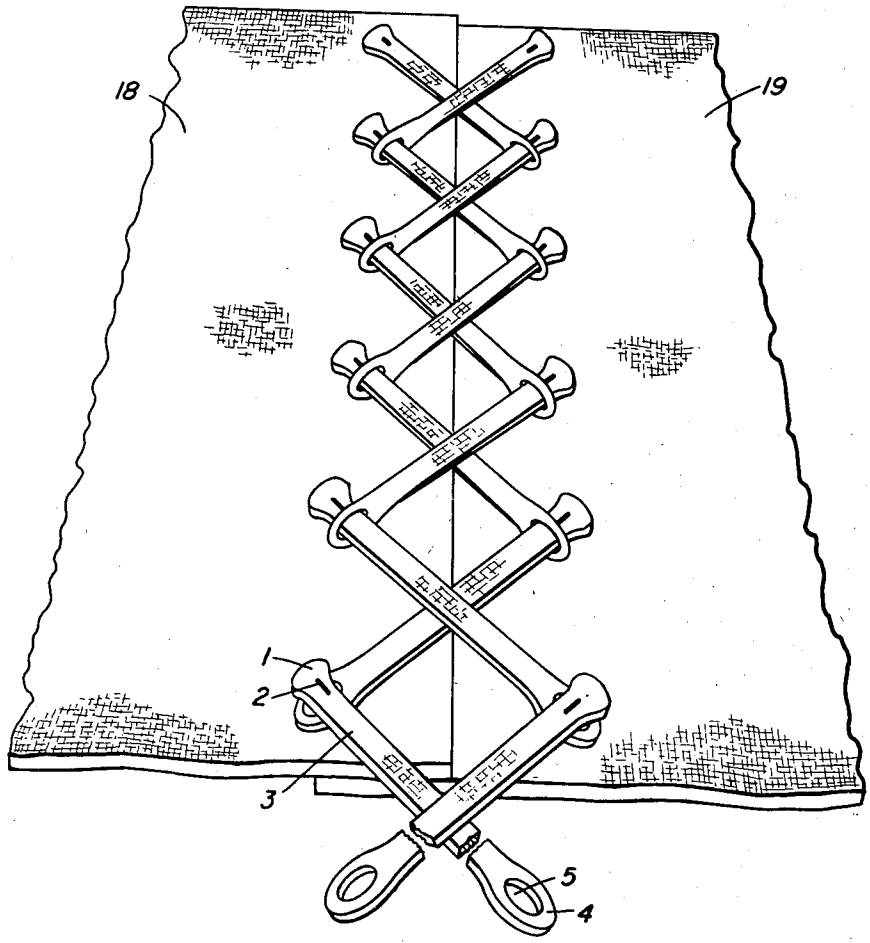
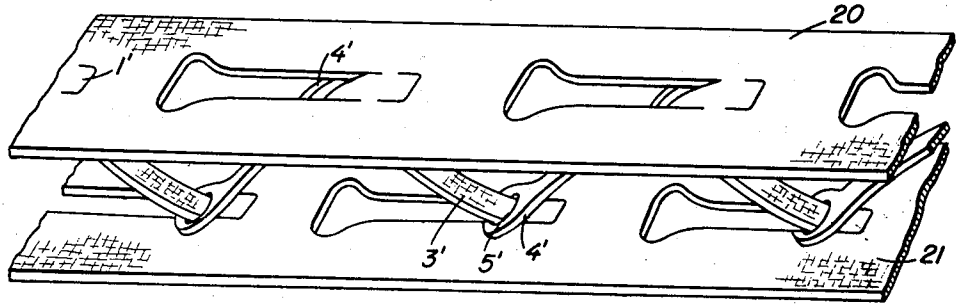


FIG. 6



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INTERLOCKING FASTENER

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4 Claims. (Cl. 24—140)

This invention relates to separable fasteners and more particularly to that class of separable fasteners which comprises opposed series of interlocking fastener elements secured to opposing free edges of a closure and adapted to be interlocked and disengaged progressively or separately, as desired.

Fasteners of the above type have in the past included the slide fastener, the hook and eye type fastener, button and buttonhole fasteners and fasteners secured to ribbons or part of a ribbon, respectively. The great advantage of this invention over the fasteners heretofore in use is that the fasteners of my invention require no rigid or semi-rigid members that may be crushed, dislodged or otherwise disturbed from interlocking relationship when the material to which they are secured be washed, put through a wringer, or otherwise crushed. The plastic flexible-type fasteners as well as the fabric-type fasteners of this invention contemplates materials which would resist all this type of disturbance.

Herefore, interlocking fasteners have been made universally of rigid materials which when fasteners of this type were first employed frequently pinched and lacerated the skin of the wearer on garments worn next to the skin. This objection was partly overcome by the use of a cloth backing strip, but such backing increased the bulk of the material already provided at the opening using this slide fastener. This bulkiness has prohibited the use of such fasteners on very thin materials. Such fasteners have further proven objectionable on women's clothing because the weight of the fastener causes some materials to sag producing an unsightly appearance.

My invention provides a solution of these difficulties in an interlocking fastener in which the fasteners may be made of extremely light, flexible material, in fact as light weight as a fine piece of fabric.

My invention provides improved fastener elements which are simple in construction, inexpensive to manufacture and easy to operate.

A second advantage of the invention is that the members may be arranged on a tape which tape can be sewed or stitched on a garment without special machinery such as buttons or buttonholes or hooks and eyes, or male and female parts of snap fasteners.

A further advantage of the fastener elements are that they may be punched out of leather or plastic material in one operation, or made automatically in knitting machines at very low cost.

Another advantage of this invention is that members that may be broken or worn out can be replaced without discarding the entire group of members as in the case of interdigitating slide fasteners.

Another advantage is that the use of the fastener of this invention provides more even distribution of tension load to all interlocking members than is possible with either slide fasteners, buttons, snap fasteners, or hooks and eyes.

A further advantage of this type fastener is that it

permits more artistic and colorful variations in styling and colors of materials than is possible using other types of fasteners.

My invention further provides fastener elements which can be made of flexible fabric or plastic materials and be used safely on undergarments worn next to the skin, such as underwear, corsets, and the like.

My invention also provides an improved construction for fastener elements which permits the use of fabric materials as well as flexible plastic materials of increased strength and resiliency.

My invention further provides a separable fastener having a greater flexibility and strength than fasteners now in use.

My invention also provides fastener elements which permit progressive interlocking and disengagement of elements without the use of a slider and yet the speed in opening is equal and the speed in closing is almost equal to that which might be obtained if a slider were used.

My invention also provides a fastener the elements of which cannot become accidentally disengaged no matter at what angle or with what twist the fastener is flexed.

This invention provides a fastener, the elements and parts of which may be made economically at a high speed on modified buttonhole tape machinery or other high speed machinery.

My invention also provides fastener elements which permit the application of the elements to the surface of overlapping edges of a closure as well as to the abutting edges of a closure.

My invention also provides a decorative fastener.

It has long been recognized that flexible fastener elements would be superior to rigid ones but no satisfactory positive interlocking means could be discovered which would be commercially practical. Such flexible elements as were tried were mainly made of rubber and would pull apart under tension or were bulky and unwieldy. Obviously fabric, elastic, or other flexible elements could not be interlocked in the conventional manner of having a projection of the face of one element enter a depression in the back of the next element secured to the opposite free edge of the closure. Flexible elements, being to some extent yieldable, would pull apart under strain using the conventional methods feasible in rigid elements, so that a new principle as shown in my present application had to be found. This invention provides a fastener in which the elements are positively interlocked, practically interwoven, when the fastener is closed.

Plastic materials have been used for fastener elements but such plastic materials have been of rigid or semi-rigid type. The present invention contemplates plastics as well as fabrics which are flexible and will stand boiling water and solvents or cleaning fluids. Hence the fastener can be used in almost any type of flexible closure that must withstand weather, cleaning fluids, temperature changes of great degree, in fact almost any type of mistreatment.

My invention, because of its simplicity, permits the use of a great variety of materials, including such plastic materials and fabrics as will withstand almost any type of treatment. Because of the possibility of the use of this great variety of materials it is possible to make my fastener elements of any desired color so as to match the color of the closure material upon which they are secured. The use of plastic material and fabric permits the production of fastener elements of less weight and greater strength than is possible with metal fasteners.

I have found that I may form fastener elements from sheet material in the form of a ribbon made of such material as synthetic resin, rubber, pulp, or paper sheets impregnated with plastic, leather, silicate fabric, and the

like. To simplify the description I may on occasion refer to the class represented by these materials as "Foundation Materials."

Forming up fastener elements within or as part of a ribbon makes it possible to manufacture the fastener elements at a very high rate of speed. These ribbons are then stitched to the opposing edges of openings to be closed in the proper space relationship.

More specifically, the invention comprises a series of elements each of which comprises a head having a buttonhole-like opening, a neck and a base, said base being secured close to said neck to the underlying material which is to be fastened as part of a closure. In operation, the head of one element, secured to one part of a closure, passes through the buttonhole-like opening of an opposing element secured to an opposing part of said closure and, if desired, the elements may be locked together by further sliding the buttonhole-like opening of the head down the neck and over the base of the opposing element, which will then lock the two members together as a button over a buttonhole. However, it is not necessary to lock the elements in this fashion. The elements may be held together by one head starting on the neck of the opposing element until such time as the operator may desire to unfasten the elements higher up and then by an opposing pull a whole series of elements may be disengaged very rapidly.

Other advantages will become apparent from the following detailed description, which is to be considered in conjunction with the accompanying drawings herein.

Figure 1 is a perspective view of one fastener element;

Figure 2 is a perspective view of a portion of a strip showing two of the fastener elements of my invention;

Figure 3 is a perspective view of a fastener element of my invention which is made of cord;

Figure 4 is a plan view of two pieces of material fastened together according to my invention;

Figure 5 is a plan view of two pieces of material fastened together according to another embodiment of my invention;

Figure 6 is a perspective view showing how two strips containing partially punched-out fastening elements can be fastened together according to my invention.

Referring to Figure 1 there is shown a single fastening element of my invention which may be stamped out of plastic, fabric, or leather, or any thin flexible material. The element is adapted to be secured to the material which it will fasten, such as for example one side of the front of a jacket, at attachment point **2**. Neck **3** extends in one direction from attachment point **2** and base **1** which may be the same width as neck **3** or may be a slightly greater width extends oppositely from attachment point **2**. At the opposite end of neck **3** from attachment point **2** is head **4**, which may be broader in width than neck **3**, and which contains opening **5**. Opening **5** is of a size suitable to conveniently slip over the head of another element which corresponds to the size of head **4** and to easily slide on the neck of another element which corresponds to neck **3** and additionally to be carried over base **1** so as to underlie base **1** and thus then bear the same relationship to base **1**, attachment point **2**, and neck **3** adjacent to attachment point **2**, as a buttonhole bears to a button.

Referring now to Figure 2 there is shown two elements formed integrally with strip **13** of material which is adapted to be sewed to the material of a closure member which it is desired to fasten. Each of the elements consists of a base **1'**, an attachment point **2'** which consists simply of that portion of the element which has not been separated from strip **13**, a neck **3'**, a head **4'** and an opening **5'** therein. The size of head **4'**, the size of opening **5'** and the size of base **1'** may bear the same relation to one another as do head **4**, opening **5** and base **1**.

Figure 3 shows another embodiment of the fastening element of my invention in which the element is formed from a cord or monofilament of flexible material instead of being stamped out or otherwise formed of a flat piece of material. Base **1'''** may be formed by curling a cord around and adhesively securing the end to the adjacent standing part as shown at **9**. The element is adapted to be attached to a closure member at attachment point **2'''**. On the other side of point **2'''** from piece **1'''** is neck **3'''** which may consist of one or more strands of cord or monofilament. At the opposite end of neck **3'''** of point **2'''** is head **4'''** formed by making a loop in said cord and tying or securing the end of the cord to the standing part at **8** to form opening **5'''**.

Ii Figure 4 there is shown two pieces of material, **10** and **11** with marginal edge **16** of piece **10** overlapping the substantially parallel marginal edge **17** of piece **11**. Three of the elements shown in Figure 4 are attached to piece **10** and two elements according to Figure 4 are attached to piece **11**. Each of the elements attached to piece **11** is attached at a point substantially equidistant from the points of attachment of the two nearest opposite elements on piece **10**. Neck **3'''** of each element has been passed through opening **5'''** and head **4'''** of an opposite element, thus providing an interlocking relationship between the elements fastening pieces **10** and **11** together. At **12** the base **1'''** of one element has been passed through opening **5'''** in head **4'''** of another element after neck **3'''** was first passed through thus terminating the series of fastenings. It will be seen that the series could then be continued if further elements were provided or remaining elements could be left unfastened, allowing the five fastened elements to hold panels **10** and **11** together.

Referring to Figure 5 there is shown two pieces of material **18** and **19** fastened with the interlocking elements of Figure 1. Two series of elements are shown, the points of attachment of one series being intermediate the points of attachment of the other series. The two series of fasteners thus form a symmetrical criss-cross pattern having decorative appeal and securely and tightly fastening panels **18** and **19** together.

In Figure 6 there is shown two strips containing partially punched-out fastening elements of the embodiment of Figure 2. The strips **20** and **21** are disposed in parallel planes and could suitably be attached by sewing or otherwise to panels of flexible material such as fabric which could also be in parallel planes, as might be the case with closures for jackets, women's skirts, men's trousers and other articles of clothing in which one panel of fabric overlaps another panel so as to conceal the fastening from public view. Opening **5'** in head **4'** has been passed over head **4'** and neck **3'** of the next adjacent opposing element. For the elements shown the closure can be terminated by opening **5'** also encircling base **1'** at **34**, but this is not shown.

It will be seen that my invention is broad in scope and is to be limited only by the claims.

Having thus disclosed my invention I claim:

1. A closure means comprising pieces of flexible material having free adjoining edges, elongated members on each edge, each having one end thereof connected to a first portion of one of the pieces of material adjacent the free edge thereof and another portion having a loop therein, said loop being adapted to be received over the attached end of the first portion of another member on the opposite edge so as to encompass the same, the attached end of the member on the opposite edge being completely outside of the loop, whereby a series of said members may be connected or disconnected from each other by starting said connection and disconnection only at one end thereof.

2. The closure means of claim 1 wherein said members are formed from cord.

3. The closure means of claim 1 wherein said members are stamped out from flat flexible sheet stock.

4. The closure means of claim 1 wherein the said portions of said members are partially stamped out from pieces of flexible material which are joined by the closure.

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