April 27, 1965 H. CLAUSS 3,179,996

CONCEALED SLIDE FASTENER

Filed Sept. 3, 1963

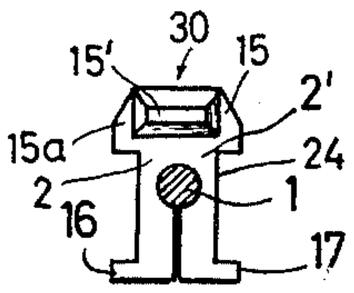

Fig. 1

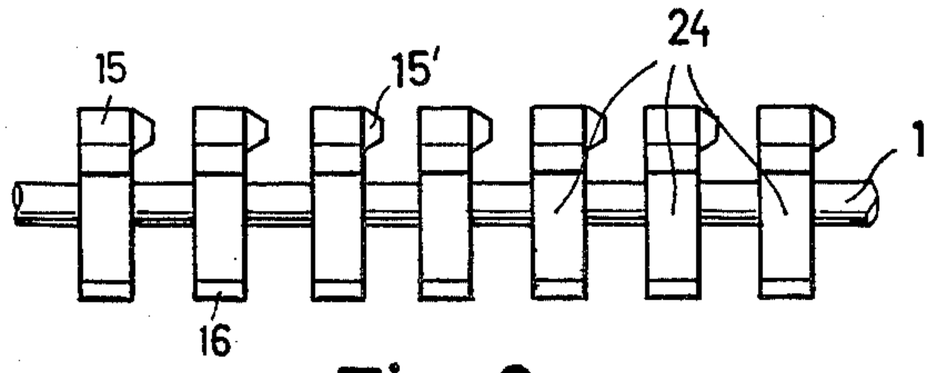

Fig. 2

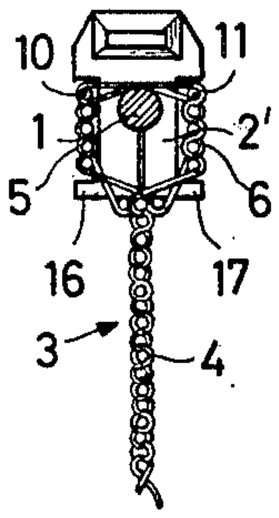

Fig. 3

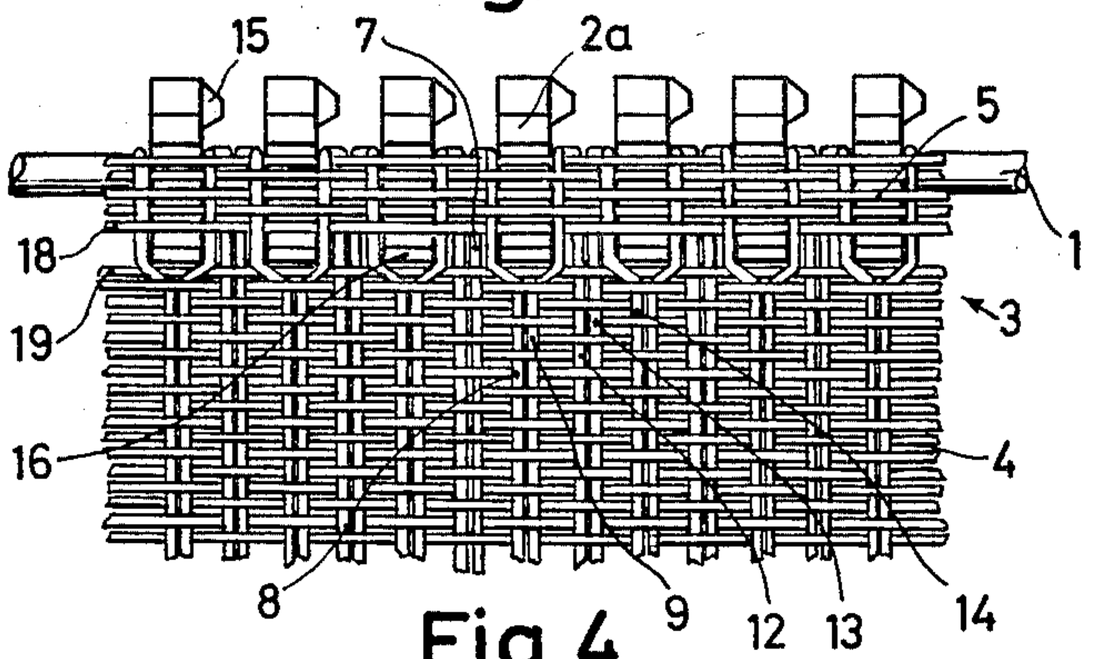

Fig 4

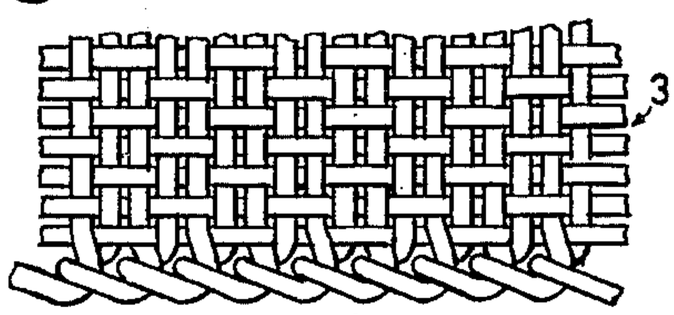

Fig. 5

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3,179,996

Patented Apr. 27, 1965

3,179,996
CONCEALED SLIDE FASTENER

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Filed Sept. 3, 1963, Ser. No. 306,233
5 Claims. (Cl. 24—205.1)

This invention relates to slide fasteners, and more particularly to a slide fastener in which two rows of interlocking elements are fastened to respective supporting tapes, and the interlocking elements are largely hidden from view by the tapes. The rows are engaged and disengaged by a longitudinally traveling slider.

In a known slide fastener of this type, a row of interlocking slide fastener elements mounted on a carrier is woven into one selvage of the tape and is retained by filling threads which pass between adjacent elements and are looped about the carrier. The outer faces of the element legs are covered by warp threads interlaced with the filling threads.

The slider of the afore-described known fastener travels over the threads of the tape during opening and closing of the fastener. Because of the inherent resiliency of of the textile material interposed between the slider and the interlocking elements, the position of the silder relative to the interlocking elements is not as precisely fixed as is desirable. The pressure of the slider also causes relatively rapid wear of those tape threads which are interposed between the hard surfaces of the slider and of the elements during opening and closing of the fastener.

The object of the invention is the provision of a slide fastener of the general type discussed above in which the slider is precisely guided on the interlocking elements.

Another object is the provision of a slide fastener in which wear of the textile threads of the tape by the moving slider is reduced or avoided.

A more specific object is the provision of a slide fastener in which the slider is guided on the interlocking elements themselves although the outer leg faces of the elements are covered with integral portions of the supporting tape.

With these and other objects in view, the invention in one of its aspects resides in a slide fastener which includes a support such as a tape constituted by warp members and filling members. A carrier for the interlocking elements is woven into one selvage of the tape. The interlocking elements are longitudinally spaced on the carrier. Their head parts extend transversely of the carrier, and their leg parts project from opposite end portions of the head part in a common direction. The legs have inner faces directed toward each other and conformingly receiving the carrier in respective grooves, and outer faces facing in opposite directions. At least one of the outer faces is inwardly offset relative to the associated end portion of the head part so that the latter projects beyond the face. A toe part projects from the terminal portion of each leg part. The offset outer leg face abuttingly engages warp members of the selvage, and the filling members are interlaced with these warp members between adjacent interlocking members, and are looped about the carrier.

Other features and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 shows an interlocking element of the slide fastener of the invention and the associated carrier in a front elevational, partly sectional view;

FIG. 2 shows the carrier of FIG. 1 with several attached interlocking elements in side elevation;

FIG. 3 shows a slide fastener stringer including the

carrier and interlocking elements of FIG. 2 in a front elevational view in section taken between two adjacent interlocking elements, a portion of the supporting take being broken away;

FIG. 4 shows the stringer of FIG. 3 in fragmentary side elevation; and

FIG. 5 is an enlarged side-elevational view of the tape selvage portion omitted from the showing of FIG. 4.

Referring now to the drawing in detail, and originally to FIG. 1, there is shown a twisted cord **1** on which an interlocking element **30** is fastened. The element **30** illustrated consists of metal, and it is fastened to the cord **1** by the clamping pressure of its two leg parts **2, 2'** in the usual manner. The leg parts **2, 2'** are connected by a head part **15** which extends transversely of the cord **1**. A projecting central portion **15'** of the head part engages a recess in a head part of the other stringer in the closed position of the fastener as is usual.

The terminal portions **15***a* of the head part **15** project laterally beyond the outer faces **24** of the legs **2, 2'**. The ends of the legs **2, 2'** carry outwardly projecting toe parts **16, 17** so that the terminal portions **15***a*, the outer faces **24**, and the toe parts **16, 17** define shallow, relatively short and wide notches in the respective legs **2, 2'**. As seen in FIG. 2, the notches are aligned in the direction of elongation of the fastener stringer. The inner faces of the legs **2, 2'** are grooved conformingly to receive the carrier **1**.

The carrier **1** with the elements **30** clamped thereon is woven into a tape **3** of which a central longitudinal portion **4** and a split selvage are seen in FIG. 3. The selvage consists of two flaps **5, 6** the warp members of which engage the aligned notches in the outer faces of the legs **2, 2'** respectively and thereby conceal the interlocking elements with the exception of the head parts **15** and the toe parts **16, 17**. The central tape portion **4**, the selvage warp members in the flaps **5, 6**, and the carrier **1** with the interlocking members **30** are connected by the filling members of the fabric.

The tape fabric chosen for illustration in the drawing is basically a 2 x 1 basket weave in which double picks or filling runs are jointly interlaced with the warp threads in the finished fabric. The fabric shown in FIG. 4 is preferably woven on a needle loom by means of a needle which enters the shed from the selvage seen in FIG. 4. The fabric may be woven in the following manner:

Let it be assumed that weaving has progressed from the left toward the right, as viewed in FIG. 4, to a point immediately ahead of the interlocking member **2***a*, and that the pick **7** was carried across the tape by the needle withdrawing in an upward direction. After a change of shed, the needle is passed through the shed so that the next pick **8** is placed ahead of the element **2***a*. The conventional manner in which the filling thread is tied to the other selvage of the tape **3** is illustrated in FIG. 5, and the needle is withdrawn without shed change to carry the pick **9** across the tape. Within the central portion **4** of the tape **3**, the pick **9** is closely adjacent the pick **8** in the central tape portion **4**, and it is interlaced with the warp threads jointly with the pick **8** in the manner of a double pick.

In the selvage illustrated at the top of FIG. 4, the picks **8** and **9** are spaced from each other to receive the interlocking element **2***a* therebetween. After the needle was withdrawn upwardly, as viewed in FIG. 4, the shed is changed. The filling thread is looped about the cord **1** and the outermost warp threads **10, 11** during the next passage of the needle when the pick **12** is inserted. The picks **7** and **12** are thus interlaced with the warp threads of the flap **6** whereas the picks **8** and **9** are interlaced with the warp threads of the flap **5**. The upward return movement of the needle passes a pick **13**

through the shed in the same position as the pick **12**. The next shed change is followed by the insertion of the pick **14** which corresponds to the pick **8** in the weave illustrated so that a new repeat begins.

The number of picks in the flaps **5, 6** is only one half of the number of picks in corresponding warpwise sections of the central tape portion **4**. The resulting low density of the warp threads in the selvage flaps does not unfavorably affect the stability of the fabric since the warp threads are confined in a filling-wise direction in the notches between the head parts **15** and the toe parts **16, 17**. The latter are interposed between the innermost flap warp thread **18** and the outermost warp thread **19** of the central tape portion **4**. The filling members of the flaps **5, 6** are held out of the notches by the toe parts **16, 17** and the head parts **15**. The fabric density in the gaps between the interlocking elements is relatively high, and the warp threads of the flaps **5, 6** are firmly held there by the interlaced filling members.

It will be readily appreciated from inspection of FIG. 3 that a slider which engages the interlocking elements **30** does not make contact with the textile material which conceals a major portion of each interlocking element. The contact pressure between the slider and the interlocking elements is concentrated during opening of the fastener on the head parts **15** of the interlocking elements which are engaged by the central diamond of the slider. During closing, contact pressure is concentrated on the projecting toe parts **16, 17** which are engaged by the slider rails. If the slider makes any contact with the fabric, such contact is made under very low pressure, and does not result in significant wear of the textile material.

It will be appreciated that the same results can be obtained with correspondingly shaped interlocking elements of non-metallic material, such as plastic elements molded on a carrier **1** by injection methods or otherwise, or integral with the carrier, and that the invention is not limited to the specific weave illustrated in FIG. 4.

If it is considered necessary to have as many picks in each of the flaps as there are in the corresponding central portion **4** of the tape **3**, I employ a needle loom equipped with two needles of which one is set to operate in the manner described above whereas the other needle enters the shed only to a distance corresponding to the width of the flaps **5, 6** for placing additional double picks alternatingly in the flap **5** and the flap **6** in the same manner as described with reference to FIG. 4.

It should be understood, of course, that the foregoing disclosure relates to only preferred embodiments of the invention, and that it is intended to cover all changes and modifications of the examples of the invention chosen for the purpose of the disclosure which do not constitute departures from the spirit and scope of the invention set forth in the appended claims.

What is claimed is:

1. In a slide fastener, in combination:

(*a*) a support having a plurality of elongated warp members and a plurality of elongated filling members,

(1) said support having two selvage portions elongated in a warpwise direction and spaced from each other in the direction of elongation of said filling members,

(2) the warp members of one selvage portion extending in a common plane, and

(3) the warp members of the other selvage portion constituting two groups spaced from each other in a direction transverse to said common plane;

(*b*) a carrier member elongated in said warpwise direction and interposed between said two groups; and

(*c*) a plurality of interlocking elements fastened on said carrier member in longitudinally spaced relationship,

(1) each element having a head part extending transversely of said carrier member, two elongated leg parts projecting from respective opposite end portions of said head part in a common fillingwise direction, said leg parts being spaced from each other in said transverse direction and having respective terminal portions remote from said head part, and two toe parts respectively projecting from said terminal portions in opposite directions,

(2) said leg parts having respective outer faces directed away from the other leg part and extending from said head part to said toe part, and respective inner faces opposite each other,

(3) said end portions of said head part projecting beyond the outer faces of the associated leg parts and defining with said outer faces and said toe parts two lateral recesses on said element, said recesses respectively receiving longitudinal portions of the warp members of said two groups only,

(4) said carrier member being received between said inner faces, and

(5) said filling members being interlaced, in sequence, with the warp members of said one selvage portion, with respective portions of the warp members of one of said groups intermediate said elements, with respective portions of the warp members of the other group intermediate said elements, and again with the warp members of said one selvage portion, said filling members only being looped about said carrier member in contact with the same between said two groups.

2. In a slide fastener as set forth in claim 1, the lateral recesses of consecutively juxtaposed elements constituting two elongated rows of aligned lateral recesses, said groups of warp members being respectively received in the recesses of a respective one of said rows and spaced from the recesses of the other row in said transverse direction.

3. In a slide fastener as set forth in claim 1, a plurality of said filling members being interposed warpwise between two longitudinally adjacent ones of said interlocking elements.

4. In a slide fastener as set forth in claim 1, each of said filling members constituting a double pick with another filling member adjacent in a warpwise direction, the filling members of said double pick being jointly interlaced with said warp members and jointly looped about said carrier member.

5. In a slide fastener as set forth in claim 4, the filling members of said double pick being looped about respective portions of said carrier member spaced from one of said interlocking elements in opposite warpwise directions.

References Cited by the Examiner

UNITED STATES PATENTS

2,067,734	1/37	Silberman	24—205.1
2,168,598	8/39	Banning	24—205.13
2,380,623	7/45	Winterhalter	24—205.16
2,567,160	9/51	Wahl	24—205.16
2,963,047	12/60	Monahan	24—205.16
3,022,803	2/62	Berberich	24—205.16

FOREIGN PATENTS

1,152,073	8/63	Germany.
600,127	4/48	Great Britain.

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