

PATENT SPECIFICATION

DRAWINGS ATTACHED

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Improvements in or relating to Sliding Clasp Fasteners.

COMPLETE SPECIFICATION

We, HANS PRYM, and AXEL PRYM, both German Citizens, personally responsible partners of the Firm William Prym-Werke K.G., of 7 to 9, Zweifaller Strasse, Stolberg,

5 Rheinland, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to sliding clasp fasteners.

Sliding clasp fasteners comprise generally a pair of stringer tapes, such as fabric tapes, 15 and two rows of interlocking elements consisting either of metal or of synthetic plastic material and being connected to the stringer tapes in any suitable manner. For example, the elements may be attached by clamping, 20 sewing, rivetting, glueing or pasting or by the application of heat and pressure, i.e. some sort of welding or they may be moulded or cast on the stringer tapes.

If the rows of interlocking elements are 25 formed by substantially helically wound wires of metal or synthetic plastic material, then the stringer tapes are folded or are two-ply tapes and the middle part contains no warp threads but only weft thread portions.

Each helix is pressed right through the ladder-like middle part of a tape so that the weft thread portions engage between the windings of the helix and thus hold the latter on the folded tape. In some cases the helices 30 are attached to the tape by sewing or by weaving or by means of an edge warp thread of the tape running longitudinally through the helix. Flexible slide fasteners comprising homogeneous stringers with continuous interconnecting ledges, for example dovetailed ledges are not comparable with sliding clasp fasteners of the kind to which the present invention relates.

The present invention relates to sliding 35 clasp fasteners of the kind in which the

interlocking takes place in a manner somewhat similar to the interlocking of fasteners having rows of interlocking elements formed by a helix.

The present invention consists in a sliding 50 clasp fastener, comprising two stringer tapes and a row of interlocking elements on one edge of each stringer tape, characterised in that said interlocking elements of at least one of said stringer tapes are formed by 55 portions of the thread or one of the threads from which the tape is plaited, knitted or woven projecting from the stringer tape edge in spaced apart relationship.

The interlocking members preferably com- 60 prise more or less inclined horse shoe-like loops of synthetic plastic material or metal having a round, oval, flat, or other suitable cross section.

As the loop forming material is a thread 65 of a woven, plaited, or knitted fabric constituting the stringer tapes of the fastener, the interlocking elements can readily be produced during the manufacture of stringer tapes. For example during the weaving of 70 woven stringer tapes, the said elements are conveniently formed by loop-like parts of weft thread projecting from the tape or from an edge bead of the same. Unless the stringer tapes are made of a uniform material as, for example, polyamide plastic 75 thread throughout, the thread forming the interlocking elements may consist of other materials than the remaining threads of the stringer tape and it may also differ therefrom 80 in shape and thickness. In order to improve their interlocking function the thread portions forming the interlocking elements can be provided for example with thickenings or knots or the same can be given any other 85 suitable shape for instance by stamping, pressing or other hot or cold shaping methods. At that edge of the stringer where the interlocking takes place the marginal warp threads may be so positioned or 90

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worked in that they wholly or partly form guide means for the slider. To this end according to a feature of the invention a bead-like thickening is provided at the said edge of one or both tapes, the loops being preferably arranged at the side of the or each bead and anchored thereto by means of the warp threads of the or each bead in order to obtain horse-shoe-like loops.

10 The thread the projecting portions of which form the loop-like interlocking elements may constitute the whole of the weft of a woven stringer tape or only part of the weft material. Furthermore said loop-forming thread may, if desired, extend over the full width of the stringer tape or only over a part of the width, for instance, the thread may be woven in at the bead edge of the stringer tape. In the latter case, the weft thread portions may, either alone or together with other thread of like or similar material, form behind the bead of each stringer tape a longitudinal reinforcement constituting a guide for the slider. In all events, the thread providing the thread portions forming the interlocking elements are of a quality suitable for this purpose. They are flexible but relatively stiff. They may consist of synthetic plastic material, such as Nylon for example, or of metal.

Instead of using the weft thread for the production of the interlocking elements said elements may alternatively be formed by projecting portions of other threads of a woven stringer tape. More particularly, the interlocking elements can be formed by portions of a longitudinal warp thread, filling the bead-edge of the or each stringer tape, said portions projecting at intervals from the or each bead edge to form interlocking elements which have for example the form of heads or hooks.

In a modified form of the invention only one stringer tape is provided with loop-like interlocking elements formed by loop-like projecting portions of weft thread while the other stringer tape has head or hook-like or similar interlocking elements formed by projecting portions of a filling thread of the bead-edge, said head or hook-like elements of the last-named stringer tape engaging the loop-like elements of the first-named stringer tape.

In a further embodiment of the invention the interlocking elements of the or each stringer tape are formed by at least one weft thread woven in a winding or meandering path at the bead-edge of the stringer tape or tapes, the elements being positioned either at the side or at the front of the or each bead, as may be desired.

The stringers with loop-like interlocking elements according to the invention need not necessarily be made each in one piece, since it is possible, for example, to manufacture

the same elements and the stringer tape in two separate parts and consequently in two or more working processes.

Thus the present invention also consists in a sliding clasp fastener comprising two stringer tapes each including a row of interlocking elements, wherein each row of interlocking elements is formed in a relatively narrow woven ribbon the longitudinal middle part of which contains only weft thread, said narrow ribbon being folded around one edge of a stringer tape and fastened thereto, whereby the weft thread at the middle part of said folded narrow ribbon forms the interlocking elements. The narrow ribbon may be composed of a woven, plaited or knitted row of loops of metal or synthetic plastic material forming the interlocking elements, the stringer tape being of usual construction.

The ribbon is produced so that the middle part of the ribbon contains no longitudinal thread but transverse thread only, so that it resembles a kind of ladder. For example in a woven ribbon the middle part contains no warp threads. When this ribbon is folded around an edge of the stringer tape and sewed thereto, then the thread of its middle part forms horse-shoe-like loops constituting the row of interlocking elements, while the edges of the folded ribbon form longitudinal guides for the slider. Instead of being sewn, the folded narrow ribbon may be pasted, glued or welded to the stringer tape; the latter can for the purpose of welding contain some threads of synthetic plastic material which on being subjected to heat and pressure cause the tape and ribbon to be welded together.

The loops can, if desired, be sloped or inclined with respect to the stringer tape edge by arranging the two plies of the folded narrow ribbon in staggered relation so that one ply is displaced somewhat with respect to the other in longitudinal direction. The slope may alternatively be obtained during the manufacture of the narrow ribbon by a suitable arrangement of the loop forming thread in the fabric.

In order that the invention may be more readily understood, reference is made to the accompanying drawings which illustrate diagrammatically and by way of example several embodiments thereof, and in which:

Figure 1 is an elevation of a sliding clasp fastener with interlocking elements formed by the weft thread of a woven stringer tape;

Figure 2 is an end view of the fastener shown in Figure 1;

Figure 3 is a side elevation of a modified construction of stringer;

Figure 4 is a perspective view of a modified construction of a sliding clasp fastener stringer during an intermediate stage in the production; and

Figure 5 is an elevation of a woven ribbon used in the stringer shown in Figure 4.

In the sliding clasp fastener shown in Figures 1 and 2 each stringer tape 20 is of woven material, each having on one edge a row of spaced apart, loop-like interlocking elements 24 formed by the projecting thread portions of the weft thread of the woven material. It is advantageous to lay the loops so that the mutually interlocking elements 24 extend with a pitch, i.e. are interlockable after the style of known helical wire fasteners.

Figure 3 shows a modification of the previous construction in which the thread 36 providing the thread portions forming the interlocking elements 23 is anchored by weaving said thread only into the edge region of the tape 37.

Instead of the interlocking elements being interlocked after the style of known helical sliding clasp fasteners, other constructions may be used. For example it is possible to form one stringer with loop-shaped elements, while the other row of elements has thickened head parts. Such thickenings can be formed by stamping, pressing or the like, if desired with the action of heat.

It is also possible moreover, to form thickened head parts on both rows of elements, said head parts being supported directly positively on one another in the fastening position. In a further construction plain loops are formed on one of the tapes forming the fastener, while the loops of the other tape are shaped into hooks, which hold the loops when in the fastened position.

For the threads forming the fastener use may be made not only of round cross-sections, but also of other cross-section. For example, the interlocking elements anchored by weaving in the tapes and formed by loops of the weft threads can be interlocked particularly effectively if use is made of threads having oval cross-sections. Other cross-sectional shapes are, however, also possible.

In the fastener constructions disclosed in Figs. 1, 2 and 3 the interlocking elements are formed as part of the stringer tape. A modification of this construction is possible as shown in Figures 4 and 5, by forming the interlocking elements from thread 49 preferably of synthetic plastic material, of a ribbon constructed ladder-fashion, which thread is free over a certain length and connected on both sides by means of continuous warp threads. A ladder-like ribbon 50 of this kind can, as shown in Figure 4, be bent in the form of a U round a longitudinally continuous line and fastened to a stringer tape 51 by for example sewing or glueing. A sliding clasp fastener is then obtained in which the rear narrow sides 52

of the ribbon 50 provide guide tracks for a slider. The production of such ribbons 50 is considerably simplified compared with that of a previously known construction in which ladder-like strips are stamped from synthetic plastic material in the form of foils in order to be connected, after bending round a longitudinally continuous line into the form of a U, to a stringer tape. The construction of the ribbon 50 by weaving has the further advantage of a considerably greater elasticity in comparison with previously known synthetic plastic foil strips, and this has a favourable effect on the flexibility of the fastener.

WHAT WE CLAIM IS:

1. A sliding clasp fastener, comprising two stringer tapes and a row of interlocking elements on one edge of each stringer tape, characterised in that said interlocking elements of at least one of said stringer tapes are formed by portions of the thread or one of the threads from which the tape is plaited, knitted or woven projecting from the stringer tape edge in spaced apart relationship.

2. Sliding clasp fastener as claimed in Claim 1, wherein said interlocking elements are formed by loop-like projecting portions of said thread.

3. Sliding clasp fastener as claimed in Claim 1, wherein the interlocking elements are formed by projecting thread portions of weft thread in a woven stringer tape.

4. Sliding clasp fastener as claimed in Claim 3, wherein the interlocking elements are formed from thread portions of the weft thread forming the whole weft of each tape.

5. Sliding clasp fastener as claimed in Claim 3, wherein the interlocking elements are formed from thread portions of a thread woven in a bead-like edge provided on each tape.

6. Sliding clasp fastener as claimed in any one of Claims 3 to 5, wherein the interlocking elements of each stringer tape are formed on a bead-like edge of a woven stringer tape by weft thread portions projecting from the bead-like edge, said weft thread portions at the same time forming behind said bead edge a reinforcement adapted to guide a slider.

7. Sliding clasp fastener as claimed in any one of Claims 1 to 6, wherein the thread the projecting portions of which form the interlocking elements consists of a material different from that of other threads used in the construction of the stringer tapes.

8. Sliding clasp fastener as claimed in any one of the preceding Claims, wherein the thread forming the interlocking elements is of a flexible but relatively stiff material.

9. Sliding clasp fastener as claimed in Claim 7, wherein the thread from which the interlocking elements are formed consists



Figure 5 is an elevation of a woven ribbon used in the stringer shown in Figure 4.

In the sliding clasp fastener shown in Figures 1 and 2, each stringer tape 20 is of woven material, each having on one edge a row of spaced apart, loop-like interlocking elements 24 formed by the projecting thread portions of the weft thread of the woven material. It is advantageous to lay the loops so that the mutually interlocking elements 24 extend with a pitch, i.e. are interlockable after the style of known helical wire fasteners.

Figure 3 shows a modification of the previous construction in which the thread 36 providing the thread portions forming the interlocking elements 23 is anchored by weaving said thread only into the edge region of the tape 37.

Instead of the interlocking elements being interlocked after the style of known helical sliding clasp fasteners, other constructions may be used. For example it is possible to form one stringer with loop-shaped elements, while the other row of elements has thickened head parts. Such thickenings can be formed by stamping, pressing or the like, if desired with the action of heat.

It is also possible moreover, to form thickened head parts on both rows of elements, said head parts being supported directly positively on one another in the fastening position. In a further construction plain loops are formed on one of the tapes forming the fastener, while the loops of the other tape are shaped into hooks, which hold the loops when in the fastened position.

For the threads forming the fastener use may be made not only of round cross-sections, but also of other cross-section. For example, the interlocking elements anchored by weaving in the tapes and formed by loops of the weft threads can be interlocked particularly effectively if use is made of threads having oval cross-sections. Other cross-sectional shapes are, however, also possible.

In the fastener constructions disclosed in Figs. 1, 2 and 3 the interlocking elements are formed as part of the stringer tape. A modification of this construction is possible as shown in Figures 4 and 5, by forming the interlocking elements from thread 49 preferably of synthetic plastic material, of a ribbon constructed ladder-fashion, which thread is free over a certain length and connected on both sides by means of continuous warp threads. A ladder-like ribbon 50 of this kind can, as shown in Figure 4, be bent in the form of a U round a longitudinally continuous line and fastened to a stringer tape 51 by for example sewing or glueing. A sliding clasp fastener is then obtained in which the rear narrow sides 52

of the ribbon 50 provide guide tracks for a slider. The production of such ribbons 50 is considerably simplified compared with that of a previously known construction in which ladder-like strips are stamped from synthetic plastic material in the form of foils in order to be connected, after bending round a longitudinally continuous line into the form of a U, to a stringer tape. The construction of the ribbon 50 by weaving has the further advantage of a considerably greater elasticity in comparison with previously known synthetic plastic foil strips, and this has a favourable effect on the flexibility of the fastener.

WHAT WE CLAIM IS:

1. A sliding clasp fastener, comprising two stringer tapes and a row of interlocking elements on one edge of each stringer tape, characterised in that said interlocking elements of at least one of said stringer tapes are formed by portions of the thread or one of the threads from which the tape is plaited, knitted or woven projecting from the stringer tape edge in spaced apart relationship.

2. Sliding clasp fastener as claimed in Claim 1, wherein said interlocking elements are formed by loop-like projecting portions of said thread.

3. Sliding clasp fastener as claimed in Claim 1, wherein the interlocking elements are formed by projecting thread portions of weft thread in a woven stringer tape.

4. Sliding clasp fastener as claimed in Claim 3, wherein the interlocking elements are formed from thread portions of the weft thread forming the whole weft of each tape.

5. Sliding clasp fastener as claimed in Claim 3, wherein the interlocking elements are formed from thread portions of a thread woven in a bead-like edge provided on each tape.

6. Sliding clasp fastener as claimed in any one of Claims 3 to 5, wherein the interlocking elements of each stringer tape are formed on a bead-like edge of a woven stringer tape by weft thread portions projecting from the bead-like edge, said weft thread portions at the same time forming behind said bead edge a reinforcement adapted to guide a slider.

7. Sliding clasp fastener as claimed in any one of Claims 1 to 6, wherein the thread the projecting portions of which form the interlocking elements consists of a material different from that of other threads used in the construction of the stringer tapes.

8. Sliding clasp fastener as claimed in any one of the preceding Claims, wherein the thread forming the interlocking elements is of a flexible but relatively stiff material.

9. Sliding clasp fastener as claimed in Claim 7, wherein the thread from which the interlocking elements are formed consists

of synthetic plastic material or metal.

10. Sliding clasp fastener as claimed in any one of the preceding Claims, wherein the thread portions forming the interlocking elements are of round, oval or flattened cross section.

11. Sliding clasp fastener as claimed in any one of the preceding Claims, wherein the thread portions forming the interlocking elements are provided with knot-like thickenings.

12. A sliding clasp fastener comprising two woven stringer tapes each having a bead-like thickened edge, and a row of interlocking elements at the thickened edge of each stringer tape, the interlocking elements of at least one of said stringer tapes being formed by thread portions of weft thread of the or each stringer tape projecting in the form of loops from the bead of the or each tape.

13. A sliding clasp fastener comprising two woven stringer tapes both having a bead-like thickened edge and a row of interlocking elements at the thickened edge of each stringer tape, wherein said interlocking elements are formed by projecting portions of a filling thread of the bead of each stringer tape.

14. Sliding clasp fastener as claimed in Claim 12, wherein the interlocking elements of the other stringer tape are formed by projecting portions of a warp thread filling the bead-like thickened edge of said other stringer tape.

15. Sliding clasp fastener as claimed in Claim 13, wherein the projecting portions of the said filling thread of the said bead edge form head or hook-like interlocking elements.

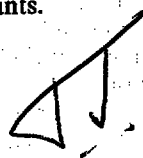
16. A sliding clasp fastener comprising two woven stringer tapes having each a bead-like thickened edge, and a row of interlocking elements at the thickened edge of each stringer tape, the interlocking elements of at least one of said stringer tapes being formed by at least one weft thread woven in a winding or meandering path at the or each bead edge.

17. Sliding clasp fastener as claimed in Claim 16, wherein the or each weft thread is arranged at the side or at the front of the or each bead edge.

18. A sliding clasp fastener comprising two stringer tapes each including a row of interlocking elements, wherein each row of interlocking elements is formed in a relatively narrow woven ribbon the longitudinal middle part of which contains only weft thread, said narrow ribbon being folded around one edge of a stringer tape and fastened thereto, whereby the weft thread at the middle part of said folded narrow ribbon forms the interlocking elements.

19. A sliding clasp fastener as herein described with reference to Figs. 1 and 2, Figure 3 or Figures 4 and 5 of the accompanying diagrammatic drawings.

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