Sept. 17, 1957 H. ERDMANN 2,806,274

SLIDE FASTENERS

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FIG. 1

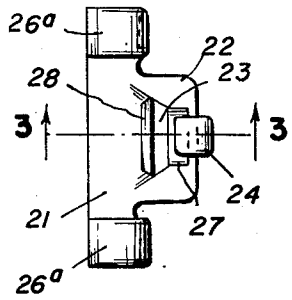


FIG. 2

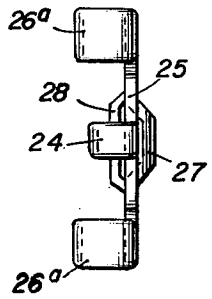


FIG. 4

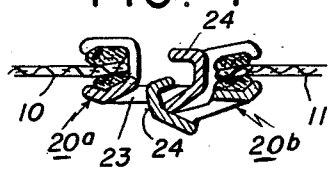


FIG. 5

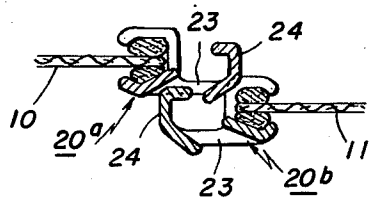


FIG. 3

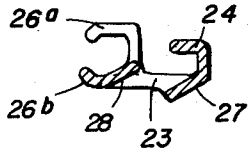
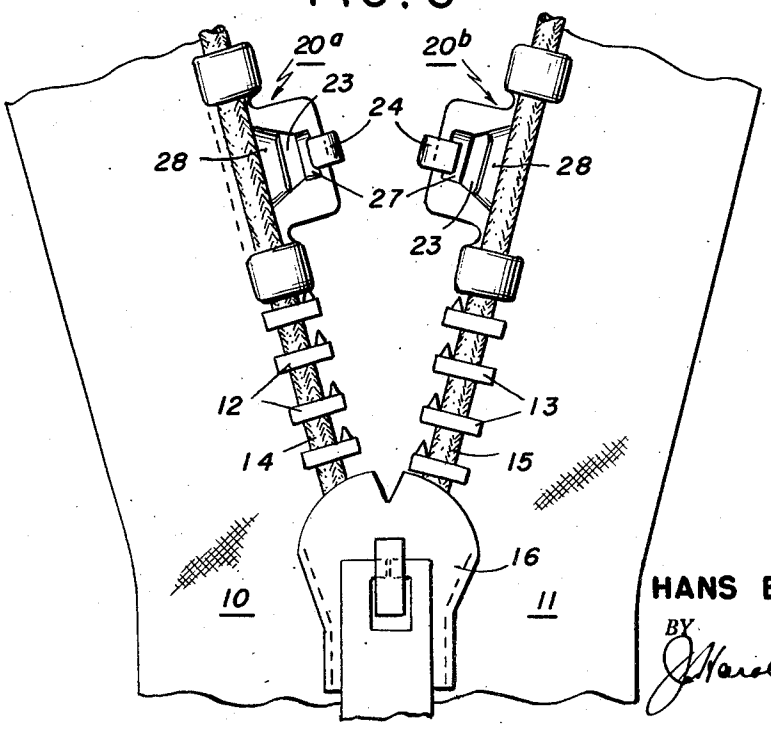


FIG. 6



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SLIDE FASTENERS

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FIG. 7

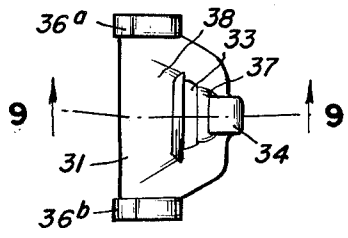


FIG. 8

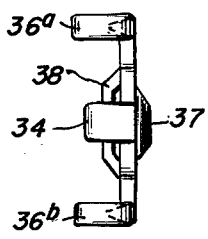


FIG. 9

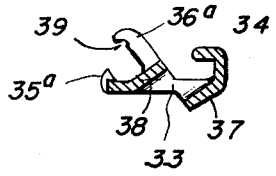


FIG. 10

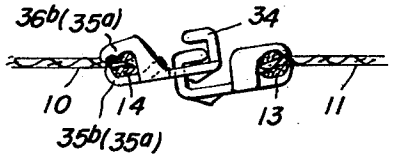


FIG. 11

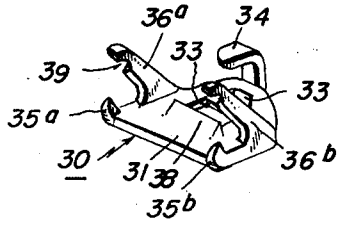
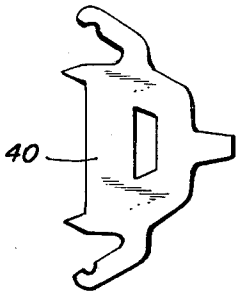


FIG. 12



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United States Patent Office 2,806,274 Patented Sept. 17, 1957

2,806,274

SLIDE FASTENERS

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Application September 29, 1954, Serial No. 459,195

4 Claims. (Cl. 24—205.11)

This invention relates to improvements in slide fasteners, and more particularly to an improved combined end connection and top stop therefor (hereinafter for convenience referred to simply as an end connection) of the type disclosed in my prior application Serial No. 426,210, filed April 28, 1954.

While providing an effective connection between the element-free ends of the fastener stringers which usually extend beyond the endmost fastener elements to the end edges of the fastener, an end connection according to my prior application requires a certain amount of care if not skill in engaging and disengaging the two parts making up the connection. For example, to engage said parts, it is necessary that the one part intended to function as the hook element be not only initially positioned in accurate lateral alignment with the other or eye part, but also that such alignment be maintained while the parts are being fully engaged. Also, when disengaging said parts, which is effected by initial movement of said parts toward one another, said parts are likely to bind unless purposely tilted or angled to one another. When the small-size of the parts making up such an end connection is considered, together with the fact that such end connections are usually provided on slide fasteners used with tight-fitting garments, such as ladies' girdles, bathing suits and the like, the requirement for a precise positioning and/or manipulation of said connector parts to effect their engagement and disengagement detracts from the popularity and use of such an end connection, despite the numerous advantages theerof as explained in my patent application aforesaid.

A main object of this invention, therefore, is the provision of an end connection for slide fasteners which preserves the advantages of an end connection of the two-part hook-and-eye type generally as disclosed in my aforesaid prior application Serial No. 426,210, while at the same time improving the functioning thereof in such a way as to facilitate and speed up engagement and disengagement of the two connector parts.

A further object of the invention is the provision of a hook-and-eye type end connection for slide fasteners comprising two identical connector parts whose construction is such that each part may function either as a hook or as an eye element, wherein said parts are so constructed and arranged as to require the minimum care and/or skill in their engagement and disengagement.

A more particular object of the invention is the provision of an end connection for slide fasteners which is composed of two identical parts, each of which may function as the hook or the eye element of the connection, wherein said parts are so specially formed that whichever part is acting as the eye element of the connection is provided with means for guiding the hook member of the other part into and out of hook-engaging relation therewith.

Yet another object of the invention is the provision of an end connection for slide fasteners comprising two coacting parts which are so constructed and arranged

with respect to one another that, upon the parts being initially lightly engaged and drawn apart, they become fully engaged in more or less automatic manner, and that, upon the so-engaged parts being pressed together, they automatically disengage themselves without any likelihood of binding one with the other.

Yet a further object of the invention is to provide an end connection for slide fasteners, which is of the two-part hook-and-eye type, and wherein the eye part is provided with inclined surfaces constructed and arranged so as to guide the hook member of the other part into fully engaged connection relation therewith, responsive to initial engagement of said parts being effected followed by slight separating movement applied to said parts, and, conversely, to guide said hook member out of engagement with the eye part responsively to the parts being simply pushed towards one another.

A still further object of the invention is the provision of an end connection for slide fasteners comprising two parts coacting in such a way as to provide a quick-detachable positive connection between the element-free ends of the fastener stringers which usually extend above the rows of oppositely disposed fastener elements, and which parts incorporate novel means by which they may be simply yet effectively clamped in operative position to the element-free tape edges of the fastener stringers.

The above and other objects and advantages of the improved end connection of the invention will appear from the following detailed description thereof, taken with the accompanying drawings, in which

Fig. 1 is a plan and Fig. 2 a front-edge end view of one of the two identical parts of a slide fastener end connection according to the invention;

Fig. 3 is a transverse sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is a similar section taken through the two inter-engaged parts of a slide fastener end connection as herein proposed;

Fig. 5 is a section similar to Fig. 4 but illustrating the parts either about to be engaged or in the act of disengaging;

Fig. 6 is a plan view of the upper end of a slide fastener illustrating the manner in which an end connection according to the invention as applied thereto;

Figs. 7–10 are views corresponding to Figs. 1–4, respectively, which illustrate an end connection operating on the principle of the end connection illustrated in the lower numbered views but incorporating an improved clamping means for clamping the same to the fastener stringers;

Fig. 11 is a perspective view of the connector part illustrated in Fig. 7, which better illustrates the improved clamping means aforesaid; and

Fig. 12 is a plan view of a blank from which the connector parts shown in Fig. 11 is fashioned.

Referring to Fig. 6, an end connection according to the invention is adapted to provide a postive yet quick-detachable connection between the upper element-free ends of a slide fastener which illustratively comprises tapes **10**, **11** having rows of oppositely disposed fastener elements clamped to their edge beads **14**, **15**. As usual, the fastener is provided with a slider **16** which functions to engage the aforesaid fastener elements and thereby close the fastener when moved in one direction, i. e. upwardly, and to disengage said elements when actuated in the opposite or downward direction. As its name implies, a slide fastener end connection is adapted to positively connect the fastener tapes at their upper ends, quite independently of the fastener-closing action of the slider **16**, and it is also adapted to provide a top stop serving to limit upward movement of the slide and thereby preventing the slider being run off the fastener.

Being of the general type disclosed in my aforesaid prior application Serial No. 426,210, the end connection as here proposed comprises two identical connector parts **20***a*, **20***b*, of which one of said parts is shown in Figs. 1, 2 and 3. As seen in said views, said parts are each formed from sheet metal and are so fashioned as to have a flat body portion **21** which is substantially widened intermediate its end edges as at **22**, the widened portion being provided with a generally rectangular eye opennig **23** preferably having straight front and rear edges. Additionally, the wider portion **22** is provided with a hook **24** whose shank end is integrally connected to the front edge of the body portion **22** and arranged so that its bill overlies the front edge zone of said body portion. At its upper and lower rear corners, the body portion **21** of the connector part is provided with pairs of clamping jaws **26***a*, **26***b* (Fig. 3), by which the part may be clamped along its rear edge to its tape bead (**14** or **15**).

Because of the identical construction of the connector parts as aforesaid, either one may function as the hook member or as the eye member of the connection, depending on the desire of the user or the location of the fastener on the particular garment, for example. The identical construction of the connector parts is also of advantage in that either part may be used as a lefthand or a righthand part, with righthand or lefthand disposition depending on which way the fastener part is turned in its plane.

However, despite the advantages of an end connection as so far described, such is open to the objection that some care and purposeful manipulation of said parts is required to effect their engagement and disengagement, particularly the latter. For example, to engage two connector parts, the hook **24** of one must be positively aligned laterally below the eye **23** of the other part because, otherwise, the hook will not pass into the eye as the two connector parts are drawn apart to effect their full engagement. Moreover, if attempt is made to disengage said parts by moving them towards one another in closely adjacent parallel paths, the parts are liable to bind with one another rather than to separate, with the result that their full separation can be obtained only by slanting or angling the parts with respect to one another.

According to the present invention, the above stated objection to the prior two-part end connection as aforesaid is overcome by providing in each part an inclination **27** along the outer side edge of the eye opening **23** over which the hook bill **24** of the other part engages. As best seen in Figs. 1 and 3, such inclination may be provided by pressing the material of the widened body portion **22** which extends along the eye **23** in downward direction, resulting in the front edge of the eye opening being disposed below the plane of said widened body part. Preferably, also, an opposite or upwardly directed inclination **28** is provided along the other or rear edge of the eye opening **23**, such resulting in said edge being raised above the plane of the body portion of each said connector part.

Due to the opposite inclination of the material defining the front and rear edges of said eye opening as aforesaid, resulting in the parallel inclined surfaces **27** and **28** (Fig. 3), there is in effect provided a guideway for the hook which facilitates its movement into coacting relation with the eye and also its disengaging or separating movement therefrom. By reference to Figs. 4 and 5, the provision of these inclined surfaces **27** and **28** simplifies and speeds up engagement and disengagement of the two connector parts as aforesaid. For example, when it is desired to engage said connector parts, the then hook-functioning part **20***b* is effectively guided by the inclined surface **27** to a position in which the bill of its hook directly underlies the eye opening **23** of the connector part **20***a*. Upon the parts being moved away from one another so as to effect their engagement, it will be seen that the hook is now guided forwardly and upwardly by the inclined surface **28** into full engagement with the front edge of the eye opening **23** of the part **20***a*. Conversely, when disengagement of said parts is desired, initial movement thereof towards one another results in the front edge of the hook **23** of the hook part engaging against the under surface of the inclination **28** of the connector part **20***a*, such in effect causing the connector parts to be positively cammed away from one another so that the possibility of their binding is positively precluded.

Referring to Figs. 7–12, of which Figs. 7–10 correspond to Figs. 1–4, such depict a connector part and a connection operating on the same principle as previously described but incorporating a novel connector part-to-tape bead clamping means now to be described. Referring to Fig. 11, such being a perspective view illustrating the improved clamping means in better fashion than do the preceding views, the connector part **30** has a flat body portion **31** which is widened and is provided in said widened portion with an eye **33** and a hook **34**, as described. Parallel downwardly and upwardly inclined surfaces **37**, **38** are provided along the front and rear edges of the eye opening **33**, also as previously described. However, rather than the part being provided adjacent its rear corners with pairs of conventional clamping jaws of the type illustrated in Fig. 3, it is instead provided with thorn-like projections **35***a*, **35***b* which extend upwardly of its plane, and with upwardly-rearwardly inclined arms **36***a*, **36***b* which extend from the top and bottom edges of the body part **31**. The free ends of said arms, which extend over the points or barbs of the thorns **35***a*, **35***b*, are provided with an under edge recess **39**, in which the points of the thorns are adapted to seat upon lowering of the arms against said thorns.

The connector part and its novel connecting means as aforesaid may be formed from a single blank designated **40** as shown in Fig. 12. Such a blank may be formed from sheet metal as a simple stamping, provided along its rear edges with point-like formations, along its top and bottom edges with arm formations, and along its front edge with a hook formation, all said formations lying in the same plane as the body portion of the blank. It will be understood that, as formed, the blank has an opening adapted to provide an eye opening **23** or **33** in the finished connector part and the inclined surfaces **27**, **28** or **37**, **38** may be pressed into the blank in the operation of stamping out the same.

Following fashioning of a blank as aforesaid, it may be simply completed to the form of a connector part shown in Fig. 11 by bending the thorn-like projections upwardly so that they form the previously described thorns **35***a*, **35***b*, by bending the arm formations upwardly to a right-angled disposition with respect to the blank body portion so that they now provide the aforesaid clamping arms **36***a*, **36***b*, and by bending the hook formation to provide the hook **34**.

By reference to Fig. 10, a connector part provided with novel clamping means as aforesaid may be simply clamped to a stringer tape **10** or **11** as by inserting the tape beads thereof into the companion jaw spaces provided by the upper face zone of said connector part extending along its rear edge and the under edges of the clamping arms **36***a*, **36***b* and thereupon bending said arms down over the tape bead and against the points of the prongs **35***a*, **35***b*. Such causes the prongs to pierce the tape immediately to the rear of its edge bead and to be thereupon housed or sheathed in the recesses **39** provided in the under edges of said clamping arms, in the manner illustrated in Fig. 10.

Without further analysis, it will be appreciated that the improved end connector for slide fasteners according to the present invention fulfills the objectives therefor outlined in the foregoing. That is to say, the provision of simple inclined surfaces extending along the front and

preferably also the rear edges of the eye opening formed in each of the connector parts enables the parts to be engaged and disengaged without the exercise of care or special skill, inasmuch as engagement and disengagement of the parts is effected more or less automatically merely by movement thereof with respect to one another in the proper direction. Moreover, as the inclined surfaces **27, 28** may be impressed in the body portion of the connector part as they are blanked out, their incorporation does not increase the manufacturing costs to any substantial extent. The novel clamping means for clamping the connector parts to the fastener or stringer tapes as here proposed is also worthy of note in that it provides a very effective means for securing the connector parts to their tape, while at the same time effecting a substantial saving in the amount of material required, since the arms and prongs may be such as to take but a fraction of the metal previously required to form clamps of the type indicated at ***26a***, ***26b***.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. An end connection for slide fasteners comprising two identical connector parts each made of sheet metal and each including a plane body portion provided adjacent its rear corners with means enabling it to be clamped along its rear edge to the edge of its fastener tape and having a widened front edge portion, each said parts further carrying a hook which extends integrally from the front edge of said widened portion and with a hook-receiving eye in said widened portion having a front edge over which the hook of the opposite part is adapted to engage, the construction and arrangement of said parts being such that either part may function as the hook or as the eye part of the connection, and the material of each said part which extends along said front edge of its eye being inclined out of the plane of the flat body portion thereof.

2. An end connection for slide fasteners comprising two identical connector parts each made of sheet metal and each including a plane body portion provided adjacent its rear corners with means enabling it to be clamped along its rear edge to the edge of its fastener tape and having a widened front edge portion, each said part further carrying a hook which extends integrally from the front edge of said widened portion and with a hook-receiving eye in said widened portion, said eye being defined in part by generally parallel front and rear edges, of which the front edge is adapted to be engaged by the hook of the other connector part, the construction and arrangement of said parts being such that either part may function as the hook or as the eye part of the connection, and the material of each said part extending along both the front and rear edges of its eye being inclined in opposite directions out of the plane of the body portion thereof, thereby to provide a pair of sloped surfaces leading to and from said eye.

3. An end connection for slide fasteners as set forth in claim 2, wherein the sloped surface extending along said front edge of the eye is inclined downwardly and the sloped surface extending along said rear edge of the eye is inclined upwardly from the plane of said body portion.

4. An end connection for slide fasteners as set forth in claim 1, wherein said clamping means comprises thorns integral with and extending upwardly from the rear corners of said body portion, and upwardly and rearwardly sloping arms extending from the top and bottom edges of said body portion, the free ends of said arms reaching over but being normally spaced from the thorns and being provided with under-edge recesses aligned with said thorns, said arms being adapted to be bent downwardly to clamp the edge bead of a fastener tape extending in the space between said body portion and arms against said body portion and to sheath the thorns upon the latter piercing said tape in their under-edge recesses.

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