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METHOD OF FORMING THERMOPLASTIC FASTENERS

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2 Claims. (Cl. 18—59)

This invention relates to separable fasteners employing linked stringers adapted to be coupled and uncoupled by a slider movable longitudinally of the links of said stringer in coupling and uncoupling the same and particularly to the formation of end stops at the ends of the stringers to limit the travel of the slider thereon; and the object of the invention is to provide the ends of the stringers with stops formed entirely or partially by the links employed in forming the stringers so as to produce a simple and economical construction as well as a neat and finished appearance on the resulting fastener; a further object being to provide an end stop construction for fastener stringers which is made in accordance with the method more fully hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the several parts of my invention are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a plan view of a fastener made according to my invention, with part of the construction broken away.

Fig. 2 is a detail view of one end of a fastener stringer diagrammatically illustrating the method of stacking or bunching links thereon.

Fig. 3 is an enlarged detail edge view of one stringer, diagrammatically showing the method of securing the bunched or stacked links together, said figure being a view substantially looking in the direction of the arrows 3—3 of Fig. 1.

Fig. 4 is a partial section on the line 4—4 of Fig. 1, showing the other end stop which I employ; and

Fig. 5 is a view similar to Fig. 4 showing a modified form of construction.

In Fig. 1 of the drawing, I have shown at 10 and 11 the stringers of a separable fastener having attached to the beaded edges 12 and 13 thereof a plurality of longitudinally spaced coupling links 14 and 15. At 16, I have shown a slider movable longitudinally of the links to couple and uncouple the same, said slider having a finger piece or pull 17 to facilitate the operation thereof.

The links 14 and 15 in the construction shown are preferably made from a plastic or thermoplastic material, such for example as cellulose acetate. These links may be clamped upon the stringer tapes 10, 11, or the beaded edges 12, 13 thereof or directly die cast thereon. It is preferred that the beaded edges have rayon or other strands 12a, 13a extending longitudinally there-

of to contact the respective links to aid in securing or cementing the links to the stringers, especially when subjecting the stringer tapes to a saturating solution in the form of a solvent, such for example as acetone which, by capillary attraction, extends to the inner surfaces of the links where they contact the tapes to form a cementing area between the links and tape. This structure and method is in accordance with the teachings in my companion application Serial No. 129,321, filed March 6, 1937. If desired, slight pressure may be applied to the links in the cementing operation as well as the application of heat sufficient only to aid in setting or hardening the cement, all as taught in a companion application filed March 6, 1937, Ser. No. 129,321.

In the operation of forming my improved stringers or the end stops at the ends of said stringers, each stringer tape is formed in the conventional manner with all of the links 14—15 applied thereto in an equally spaced manner. The first step in forming end stops 18 at one end of the stringer is as follows. Four of the end links are forced longitudinally of the stringer tape by a suitable fork-shaped tool 19 as indicated in Fig. 2 of the drawing in which the links 14 are shown on the tape 10. This operation is performed after acetone or slight heat has been applied to said four links to soften the same sufficiently to provide free action or sliding movement longitudinally of the beaded edge 12 of the tape, and especially in the case of die cast links which are applied to said tapes. When these links are brought into the stacked or piled relationship with the projecting beads 18a of the links extending into recesses on the opposed surface of adjacent links, said links are then secured together by applying a suitable cement or solvent thereto, for example, by spraying a cement or solvent such as acetone in the manner indicated at 20 in Fig. 3 of the drawing to one or both side surfaces of the links, and then allowing the solvent or cement to dry. If desired, slight pressure may be applied to the links in this operation. However, if all of the links are to be cemented to the tapes 10 as above stated, the pressing operation may be performed in the aforesaid cementing operation. All of the stacked or grouped links forming the end stops 18, in addition to being cemented together on adjacent abutting surfaces, will also be cemented to the tape 10 or the beaded edge thereof.

In the accompanying drawing, the end stop 18 on the stringer 10 consists of five links whereas the stop 18 on the stringer 11 consists of four

links, but this is simply to provide a balanced finished end to the complete stringer. But, if desired, any number of the links may be provided, it being understood that two links joined on each stringer will block or stop further progress of the slider along the stringers. With the present construction, the slider 16 is capable of extending the full length of the stringers or to a point in alinement with the outer link of each stop 18, or substantially so.

End stops such as 18 will provide a neat and finished appearance to one end of the stringers, and a uniform construction will be provided throughout the entire stringer in so far as the link and end stop 18 is concerned. The same result or substantially the same result can also be accomplished at the other end of the stringers by simply providing a stop plate or sheet 21 of cellulose acetate or similar material, preferably of a color consistent with that of the color employed in the links 14 and 15.

This plate 21 is arranged upon a number of the interlocked end links 22 of the stringers 10 and 11 and is secured thereto by a cement or adhesive 23 such for example as acetone which may first be spread onto the coupled links 22 and onto one surface of the plate 21, and then said plate attached or mounted in position in the manner shown in Fig. 1 of the drawing and slight pressure may be applied to secure and retain the plate 21 in position, and this may be done in the presence of heat if desired.

In Fig. 5 of the drawing, I have shown a modification which consists simply in including a supplemental stop plate 21a at the lower surface of the stringers to provide a double stop. The plate 21a is secured in position at the same time that the plate 21 is secured or directly thereafter as may be desired. By using acetone or cellulose acetate fasteners a substantial weld is provided between the parts secured together which provides a strong and durable construction. Thus, it will be seen that a very simple and economical form of end stop is provided for both ends of the stringers while at the same time eliminating the use of metallic parts or parts of complicated construction, thus materially reducing the cost of manufacture of the complete device.

The slider 16 as well as the pull 17 may also be composed of plastic material of the type and

kind under consideration, but these members form no specific part of the present invention.

This invention constitutes a division of my prior application Serial No. 129,316, filed March 6, 1937.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The herein described method of forming end stops on the stringers of separable fasteners, said stringers having cellulose acetate links including coupling portions arranged longitudinally thereof normally in equally spaced relationship to each other, moving predetermined end links at one end of each stringer longitudinally of the stringer in the direction of the other links thereon to stack and nest a predetermined number of said links including the coupling portions thereof, then securing said stacked and nested links together with a suitable cement to form a blocking end stop at said end of each stringer, coupling predetermined links at the other ends of the stringers together, and then applying a suitable cement to said coupled links to secure said links against separation and applying a stop plate to the secured links in the operation of cementing said links together to form an end stop at said last named end of both stringers.

2. The herein described method of forming the stringers of separable fasteners, which consists in providing fabric stringer tapes, attaching thermoplastic links having coupling portions to one edge portion of each tape at longitudinally spaced intervals, including the coupling portion of the end links of opposed stringers at one end thereof, applying a solvent cement to the coupled links at said end of the stringers to unite said coupled links, cementing a stop plate to said coupled links in the operation of cementing said links together in forming an end stop at said coupled end of the stringers, moving predetermined links at the other end of each stringer longitudinally of the stringer in the direction of the other links thereon to stack and nest a predetermined number of said links, securing the stacked and nested links together with a suitable cement to form an end stop at the last named end of the stringers, and treating the stringer tapes with a link solvent to cement all of the links to said tapes.

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