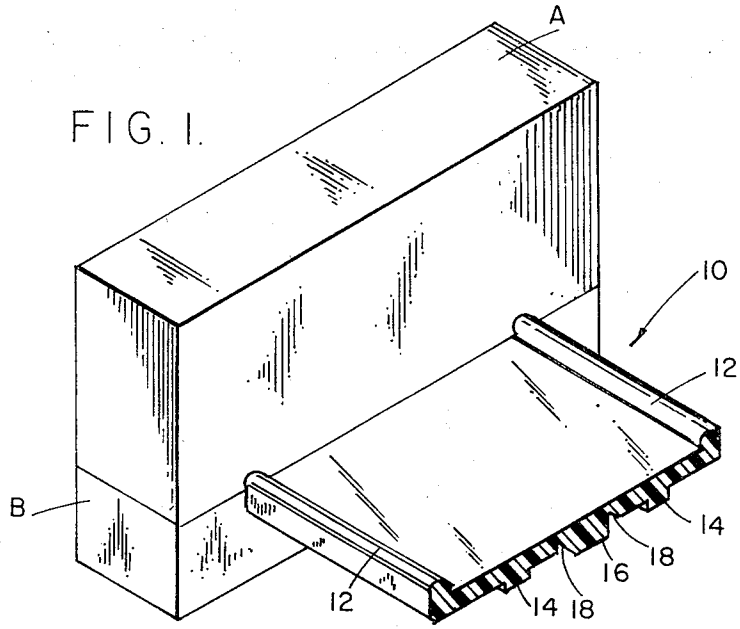
Nov. 6, 1973 F. H. ROJAHN 3,770,862

METHOD OF MAKING A STRINGER FOR A SLIDE FASTENER

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FIG. 1.



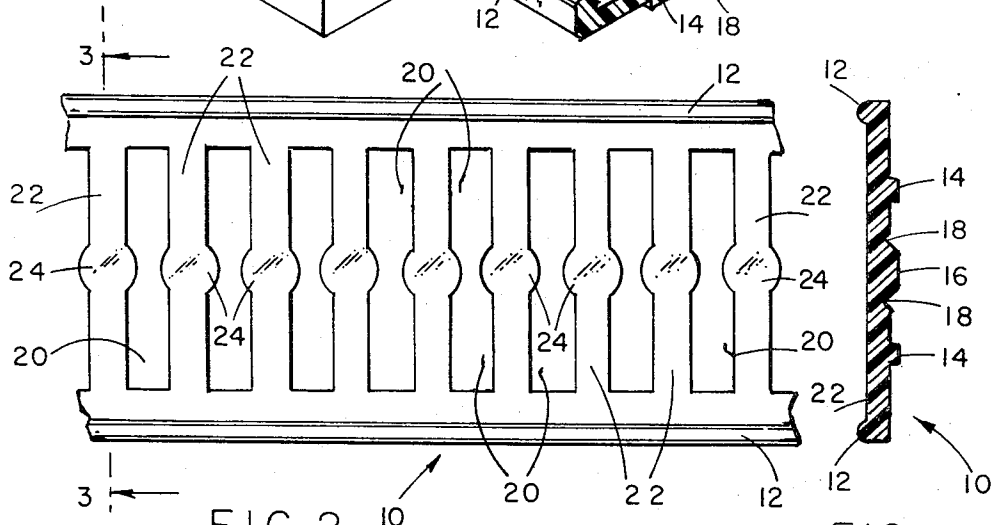


FIG. 2.

FIG. 3.

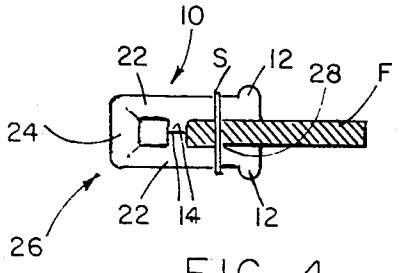
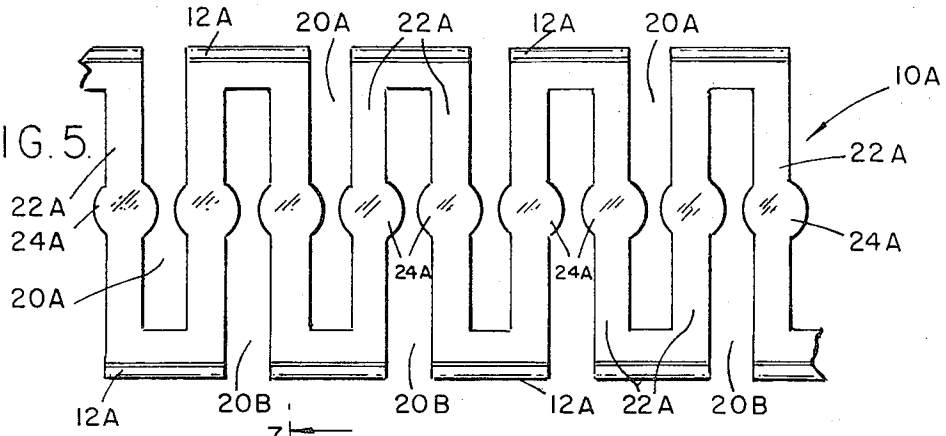


FIG. 4.

METHOD OF MAKING A STRINGER FOR A SLIDE FASTENER

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FIG. 5.



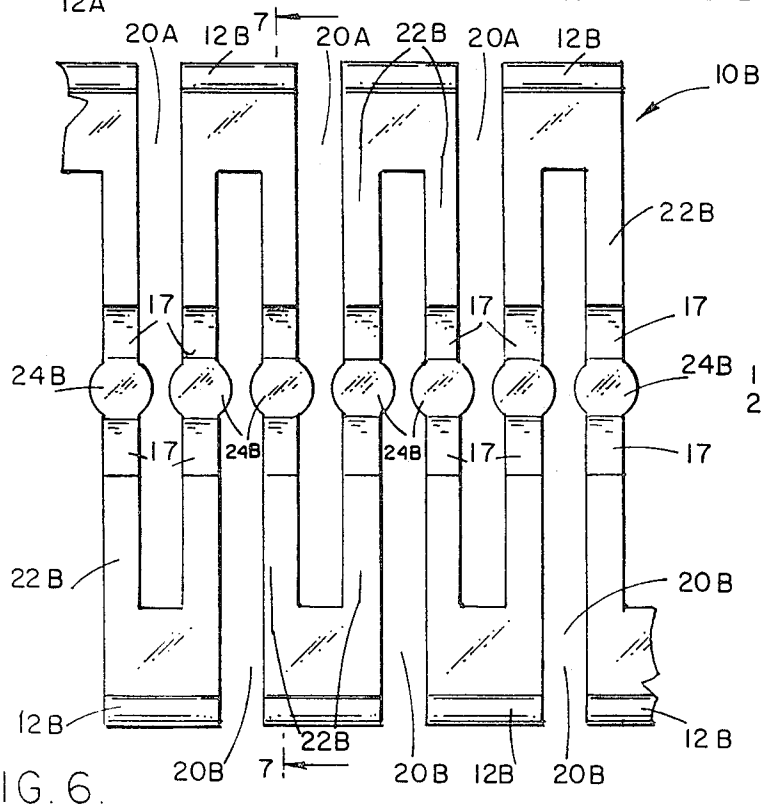


FIG. 6.

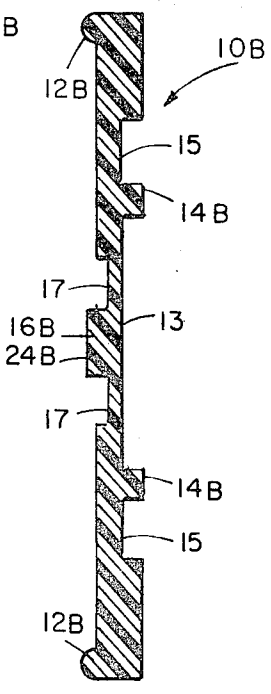


FIG. 7.

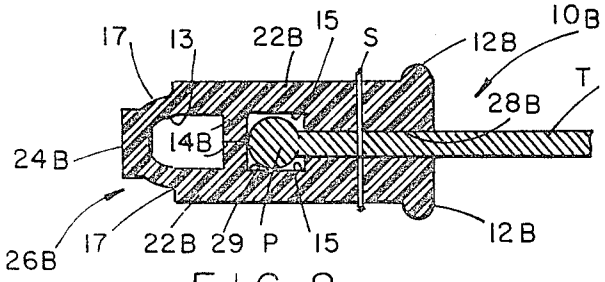


FIG. 8.

United States Patent Office 3,770,862 Patented Nov. 6, 1973

3,770,862

METHOD OF MAKING A STRINGER FOR A SLIDE FASTENER

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Original application Oct. 8, 1970, Ser. No. 79,123. Divided and this application Jan. 27, 1972, Ser. No. 221,195

Int. Cl. B29d 5/00

U.S. Cl. 264—148 7 Claims

ABSTRACT OF THE DISCLOSURE

A method of making a stringer blank for a slide fastener having an extruded elongated body provided with transversely spaced slider guide members projecting outwardly from one side thereof adjacent to the longitudinal edge portions of the body, and abutment members projecting outwardly from the opposite side thereof. Forming a plurality of longitudinally spaced slots in the stringer blank to provide a series of transverse, substantially parallel ladder-like portions, wherein each of these portions includes a centrally enlarged element to define an interlocking head member. Preferably, the slots are alternately cut through the opposing longitudinal edges of the blank. Folding the stringer blank in half with one guide member overlying the other guide member, and with the abutment members contacting each other to define a stringer provided with a series of projection elements having the interlocking head member at the free end thereof and an open receiving slot at the opposite end thereof. The receiving slot is adapted to house the tape or fabric to which the stringer is attached by conventional stitching. The abutment members position the fabric relative to the interlocking head member to provide a uniform spacing therebetween. The receiving slot may be provided with an enlarged recess to receive an elongated bead formed on the edge of the fabric.

This is division of application Ser. No. 79,123 filed Oct. 8, 1970.

BACKGROUND OF THE INVENTION

Slide fasteners are well known in the art. The usual slide fastener comprises a tape provided with a plurality of metal projections disposed along a longitudinal edge thereof to define interlocking head members. These tapes are paired, wherein each mating tape is secured to an opposite side of an opening in a fabric. A slider is disposed between the tapes and acts to bring the interlocking head members together to form a closure. The above-mentioned slide fasteners are usually expensive to manufacture and are inoperable once one of the metal head members becomes disengaged from the tape.

Other forms of slide fasteners have been attempted. Rather than using a series of metal head members, a continuous coil has been attached to a tape to form the stringer, wherein the coil interlocks with a mating coil secured to an associated tape. Another form has been to use a continuous wire, wherein the wire is bent in a serpentine fashion to define interlocking head members. In the case of both the coil and the serpentine type wire, the effectiveness of the slide fastener depends upon the skill of the operator in joining the coil and serpentine type wire to the tape, wherein such operation is critical. Furthermore, these coils and wires are usually provided with enlarged interlocking head members, wherein it has been found difficult to provide a uniform positioning of these head members with respect to themselves and to the tape. When these heads are not uniform, the slide fastener has a tendency to stick or clog, making it very difficult to move the slider to the open and close positions. From the above, it is seen that securing the coil or wire to the tape becomes a time consuming operation in order to obtain a workable slide fastener. Usually a cord is secured to the tape to provide a guide for the slider, wherein the cord requires additional time in the securement thereof, and increases the skill required of the operation.

SUMMARY OF THE INVENTION

This invention relates to slide fasteners, and more particularly, to a method of making a stringer for slide fasteners. An elongated formed strip is extruded between dies, being provided with transversely spaced slider guide means on one side thereof and transversely inwardly spaced abutment means on the opposite side thereof. A plurality of longitudinally spaced slots are formed in the stringer strip to provide parallel ladder-like portions provided with an enlarged central element which defines an interlocking head member. When bent in half with the abutment means contacting each other, the stringer provides a series of projecting elements having the interlocking head members at the free end thereof and an open receiving slot at the opposite end thereof. The tape, band, or fabric to which the stringer is attached, by conventional means, is housed within the receiving slot, wherein the receiving slot may be provided with an enlarged recess to receive a bead formed on the edge of the tape band or fabric. The slots formed in the stringer body may be cut to the longitudinal edge portions thereof to increase the flexibility of the stringer.

Accordingly, an object of the present invention is to provide an improved method of forming a stringer which overcomes the disadvantages of the prior art.

Another object of the invention is to form a stringer that can be easily attached to a fabric, making the interlocking head members uniformly spaced with respect to each other and with respect to the fabric.

A further object of this invention is to provide a stringer that can be readily formed, which nevertheless is highly efficient in operation and has a relatively long trouble-free life.

A still further object of this invention is to form a stringer with guide means to restrict the slider of the slide fastener to longitudinal movement thereon.

Yet another object of this invention is to form a stringer with means which prevent any possibility of the fabric coming in contact with the interlocking head members, wherein these means act as a stop to position the edge of the fabric relative to the stringer.

And yet another object of this invention is to form a stringer with means whereby the stringer is locked on to the fabric.

And still yet another object of this invention is to form a stringer which is flexible when secured to a fabric.

BRIEF DESCRIPTION OF THE DRAWINGS

Having in mind the above and other objects that will be evident from an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiments of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it, when read in conjunction with the accompanying drawings, in which:

FIG. 1 represents a fragmentary perspective view illustrating an extrusion stage in the process of manufacture of a stringer according to the present invention;

FIG. 2 represents a top plan view of the stringer after it has been die cut;

FIG. 3 represents a sectional view taken substantially on the line 3—3 of FIG. 2;

FIG. 4 represents an elevational view, partly in section, showing the stringer secured to a fabric;

FIG. 5 represents a fragmentary top plan view of a second embodiment of the present invention, showing a stringer blank similar to that shown in FIG. 2;

FIG. 6 represents a fragmentary top plan view of a third embodiment of the present invention, showing a stringer blank similar to that shown in FIGS. 2 and 5;

FIG. 7 represents a sectional view taken substantially on the line 7—7 of FIG. 6; and

FIG. 8 represents an elevational view, in section, showing a projecting element of the stringer of the third embodiment secured to a fabric.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, FIG. 1 illustrates the body of the stringer **10** being extruded between an upper die A and a lower die B. As best shown in FIG. 3, the die A provides the stringer **10** with a pair of outwardly, longitudinally extending guide rib-like members **12** on one face thereof, each member **12** being disposed adjacent to a longitudinal edge portion thereof, the guide members **12** being transversely spaced apart. A pair of longitudinally extending abutment members **14** extend outwardly from the other side or face of the stringer **10**, being formed by the lower die D. The abutment members **14** are transversely spaced apart and lie between the guide members **12**. The lower die member B also forms an elongated longitudinally extended central member **16** which projects outwardly in the same direction as the abutment members **14**, being equally spaced between the abutment members **14**. Two spaced apart parallel grooves **18** are formed at the base of the central member **16**, the function of which will be set forth hereinbelow.

After the stringer is extruded, the stringer **10** is die cut in a conventional manner (not shown) to form a blank, as shown in FIG. 2, having a plurality of longitudinally, equally spaced apart slots **20**. The slots **20** define a series of transverse substantially parallel ladder-like portions or ribs **22**. Each rib **22** is provided with a centrally located enlarged portion **24**, which is arcuately shaped, wherein the central member **16** forms a lower part of the enlarged portion **24**, and a transversely spaced apart pair of abutment members **14**, as set forth above.

The stringer blank may be formed in any preferable width or may be cut in any preferable length for association with a particular fabric F for closure of a predetermined opening thereof. The stringer may be formed from glass, styrene, nylon or any suitable plastic material. Preferably, the stringer is formed of a heat resistant material such as Teflon, so that the stringer is not damaged during laundering or heat pressing thereof.

The stringer blank is bent or folded in half lengthwise, as shown in FIG. 4, so that the guide members **12** overlie each other, and the abutment members **14** are in contact with each other, to form the preferred stringer **10**. The parallel grooves **18** allow the stringer blank to be easily bent in the above-mentioned manner, wherein the interlocking head members **24** are at the free or bight of the presently formed U-shaped projection elements **26**, with the ribs **22** defining legs of the U-shaped elements **26**. The receiving slot **28** is adapted to house the tape or fabric F to which the stringer **10** is attached.

The fabric F is disposed within the slot **28** with the edge portion thereof in contact with the abutment members **14** so that the abutment members **14** position the fabric F relative to the interlocking head members **24** thereby prevent the end of the fabric F from coming in contact with the interlocking head members **24** to insure that the fabric F does not become entangled in the slide fastener during the operation of a conventional slider (not shown) of the slide fastener.

Once the fabric F is properly positioned within the slot **28**, the stringer **10** is secured to the fabric F by conventional means, such as stitching S, wherein the stitching S passes through the slots **20** and into the fabric F. The slider rides on the ribs or legs **22** between mating pairs of guide members **12** and either join or separate mating pairs of the interlocking head members **24**. The guide members **12** restrict the slider to longitudinal movement along the length of the paired stringers **10**.

FIG. 5 illustrates a second embodiment of a stringer blank of the present invention, which can be mass-produced very economically, wherein similar parts are denoted by similar reference numerals.

In this construction, a stringer blank **10A** is extruded from dies similar to that of FIG. 1. The difference in this blank being in the die used to cut the plurality of longitudinally, equally spaced apart slots **20A** and **20B**, the slots **20A** and **20B** defining a series of transverse substantially parallel ladder-like ribs **22A**. As shown, the slots **20A** are open on one end thereof, extending through the guide rib-like member **12A** therefor. The alternate slots **20B** are open at the opposite end thereof, extending through the opposite longitudinally extending edge portion and associated guide rib-like member **12A** therefor.

The stringer blank **10A** is serpentine-like. The slots **20A** and **20B** permit the stringer **10A** to be flexible when secured to the fabric F, wherein the longitudinal edge portions are not continuous and have a large degree of freedom with respect to adjacent portions. As shown in FIG. 5, the guide members **12A** define two series of longitudinally, equally spaced elements, being spaced by the width of the slots **20A** and **20B**, respectively. Each rib **22A** is provided with a centrally located enlarged portion **24A**.

The stringer blank **10A** is bent or folded in half in the same manner as set forth above. The ribs or legs **22A**, which act to connect the longitudinal edge portions of the stringer **10A**, are formed into the above-mentioned U-shaped projection elements, similar to that shown in FIG. 4, wherein the fabric F is received in the open receiving slot defined by the contacting abutment members to achieve the same result as mentioned hereinabove.

Referring to FIGS. 6, 7 and 8, there is shown a third embodiment of the present invention, wherein similar parts are denoted by similar reference numerals.

In this construction, a stringer blank **10B** is extruded from dies (not shown) different from that of FIG. 1. As best shown in FIG. 7, the dies provide the stringer **10B** with a pair of outwardly extending guide rib-like members **12B**, each member **12B** being disposed adjacent to a longitudinal edge portion thereof, the guide members **12B** being transversely spaced apart. On the same side or face of the stringer **10B**, a pair of longitudinally extending, transversely spaced apart recesses **17** are formed. The recesses **17** define a longitudinally extending central member **16B** which projects outwardly in the same direction as the guide members **12B**, member **16B** being equally spaced between the guide members **12B**.

On the opposite side or face of the stringer **12B**, a pair of longitudinally extending, transversely spaced apart recesses **15** are formed, being disposed between the guide members **12B**. A wide longitudinally extending recess **13** is also formed on this opposite side, being centrally disposed between the recesses **15**. The recess **13** and recesses **15** define a pair of longitudinally extending abutment members **14B**, which extend outwardly from this opposite side of the stringer **10B** in a direction opposite to the guide members **12B**. The above members **14B** are transversely spaced apart and lie on opposite sides of the central member **16B**, being disposed between the guide members **12B**. The recess **13** and recesses **17** replace the grooves **18** of FIG. 3, the function of which will be set forth hereinbelow.

After the stringer **10B** is extruded, the stringer **10B** is die cut in a conventional manner to form a blank, as shown in FIG. 6. The cutting die used is similar to that

used to form stringer blank 10A of FIG. 5, wherein a plurality of longitudinally, equally spaced apart slots 20A and 20B are formed, defining a series of transverse substantially parallel ladder-like ribs 22B. As shown, the slots 20A are open on one end of the blank with the alternate slots 20B being open at the opposite end thereof.

The stringer blank 10B is also serpentine-like, wherein the slots 20A and 20B permit the stringer 10B to be flexible when secured to the fabric T. As shown in FIG. 6, the longitudinal edge portions are not continuous and have a large degree of freedom with respect to adjacent portions, wherein the guide members 12B define two series of longitudinally, equally spaced elements, being spaced by the width of the slots 20A and 20B, respectively. Each rib 22B is provided with a centrally located enlarged portion 24B, which is arcuately shaped, wherein the central member 16B forms an upper part of the enlarged portion 24B, and a spaced apart pair of abutment members 14B, as set forth above.

As shown in FIG. 8, the fabric T is provided with a longitudinally, extending bead P along the edge portion thereof. To secure the stringer 10B to the fabric T, the fabric T is first positioned with the bead P disposed in one of the recesses 15. Thereafter, the stringer blank 10B is bent or folded in half lengthwise, as shown in FIG. 8, so that the guide members 12B overlie each other, and the abutment members 14B are in contact with each other, to form the preferred stringer 10B.

The recess 13 and opposing recesses 17 allow the stringer blank to be easily bent in the above-mentioned manner, wherein the interlocking head or bight members 24B are at the free end of the presently formed, U-shaped projection elements 26B. The contacting abutment members 14B define an open receiving slot 28B at the opposite end of the projection elements 26B, wherein the recesses 15 define an enlarged opening 29 of the slot 28B to house the bead P of the fabric T as shown in FIG. 8.

The bead P is in contact with the abutment members 14B so that the abutment members 14B position the fabric T relative to the interlocking head members 24B to provide a uniform spacing therebetween. The abutment members 14B thereby prevent the edge of the fabric T from coming in contact with the interlocking head members 24B to insure that the fabric T does not become entangled in the slide fastener during the operation of a conventional slider (not shown) of the slide fastener.

Once the fabric T is properly positioned within the slot 28B with the bead P disposed in the opening 29, the stringer 10B is secured to the fabric T by conventional means, such as stitching S, wherein the stitching S passes through the slots 20A and 20B and into the fabric T. With associated ribs or legs 22B secured together, the bead P of the fabric T is locked within the opening 29 so that the fabric T cannot be disengaged therefrom. The slider rides on the ribs or legs 22B between mating pairs of guide rib-like members 12B and either join or separate mating pairs of the interlocking head or bight members 24B. The guide members 12B restrict the slider to longitudinal movement along the length of the paired stringers 12B, as mentioned above.

Numerous alterations of the structure herein-disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to preferred embodiments of the invention which is for the purpose of illustration only and not to be construed as a limitation of the invention.

What is claimed is:

1. A method of forming a stringer for a slide fastener comprising extruding a longitudinally extending body, simultaneously extruding a pair of outwardly, longitudinally extending guide rib-like members on one side of said body and a pair of longitudinally extending abutment members on an opposite side of said body, positioning said guide rib-like members during extrusion in a transversely spaced apart position with each guide rib-like member being formed adjacent to a longitudinal edge portion of said body, transversely cutting slots in said body to form a blank with a plurality of longitudinally, equally spaced part slots to provide a series of transverse substantially parallel ladder-like ribs, providing a centrally located enlarged portion and a transversely spaced apart pair of said abutment members on each ladder-like rib, simultaneously cutting one longitudinal edge portion and one guide rib-like member when transversely cutting a first set of said spaced slots to extend said first set through said one longitudinal edge portion of said blank to provide an opening on one end of each slot of said first set, simultaneously cutting the other longitudinal edge portion and the other guide rib-like member when transversely cutting a second set of said spaced slots to extend said second set through said other longitudinal edge of said blank to provide an opening on an opposite end of each slot of said second set, alternately positioning said slots of said first set with respect to said slots of said second set to provide alternating openings in said longitudinal edges of said body, folding said blank in half lengthwise, and abutting said pair of said abutment members on each rib together to form U-shaped projection elements each having said enlarged portion at its free end thereof and an open fabric receiving slot at an opposite end thereof.

2. A method of forming a stringer according to claim 1, including forming said enlarged portion of said blank with an outwardly extending element, and providing a pair of recesses with one recess being formed on each side of said extending element adjacent its base portion.

3. A method of forming a stringer according to claim 2, wherein said extending element of said blank is formed to extend in the same direction as said guide members.

4. A method of forming a stringer according to claim 2, wherein said extending element of said blank is formed to extend in an opposite direction of said guide members.

5. A method of forming a stringer according to claim 1, including forming recesses in said body on opposite sides of each abutment member.

6. A method of forming a stringer according to claim 1, wherein said pair of guide members are formed to extend in opposite directions when said blank is folded.

7. A method of forming a stringer according to claim 1, wherein said receiving slot is formed with an enlarged opening adjacent said abutment members for housing an enlarged portion of fabric and locking the enlarged portion of fabric therein.

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U.S. Cl. X.R.

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