United States Patent [19]

Lavitch et al.

[11] **3,815,798**

[45] **June 11, 1974**

[54] **BUTTON FASTENER**

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[22] Filed: **May 21, 1973**

[21] Appl. No.: **362,473**

[52] **U.S. Cl.** **223/102**

[51] **Int. Cl.** **A41h 37/10**

[58] **Field of Search** 223/102, 103, 104; 112/80, 112/104

[56] **References Cited**

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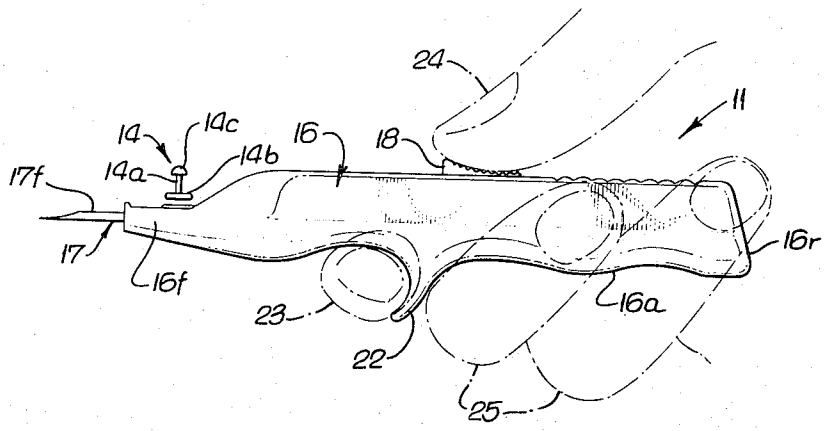
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Primary Examiner—George H. Krizmanich
Attorney, Agent, or Firm—Flam & Flam

[57] **ABSTRACT**

A button is secured to a fabric or other material using a resilient plastic stringer inserted by the inventive button fastening tool. The fastening tool is of simplified design to achieve both minimum cost and optimum ease of use. The tool housing includes a depending finger rest, a contoured grip and a push button slidingly mounted atop the housing. Placement of the forefinger against the finger rest limits forward movement of the fastening tool as the push button is thumb-advanced for stringer insertion. This cooperation enables one hand operation. Simplified assembly of the fastening tool is accomplished without screws or rivets, using a two piece molded plastic housing including recesses for receiving a unitary needle, and a push rod-push button assembly of unique configuration. The housing also includes storage for a protective needle cap.

6 Claims, 10 Drawing Figures



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SHEET 1 OF 2

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FIG. 1.

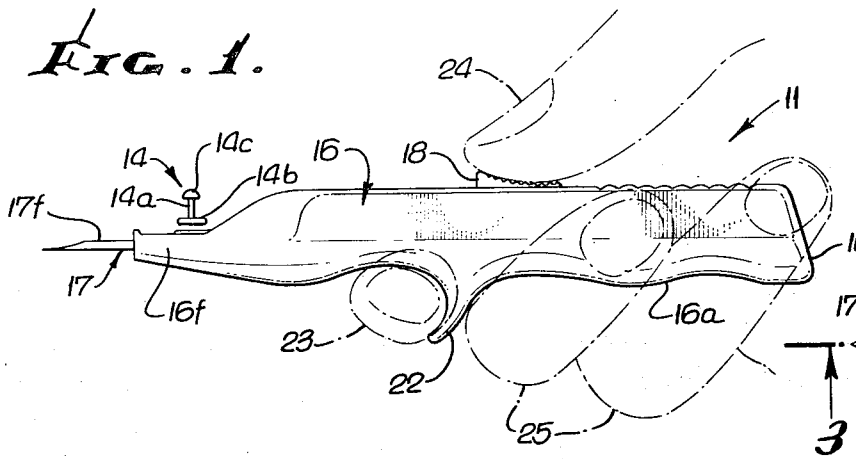


FIG. 2.

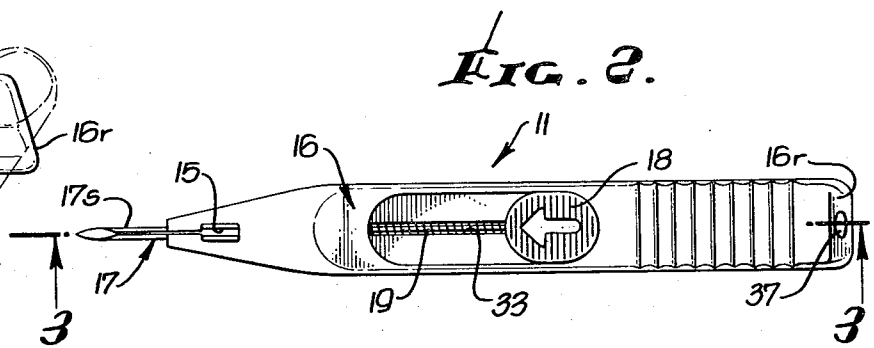


FIG. 3.

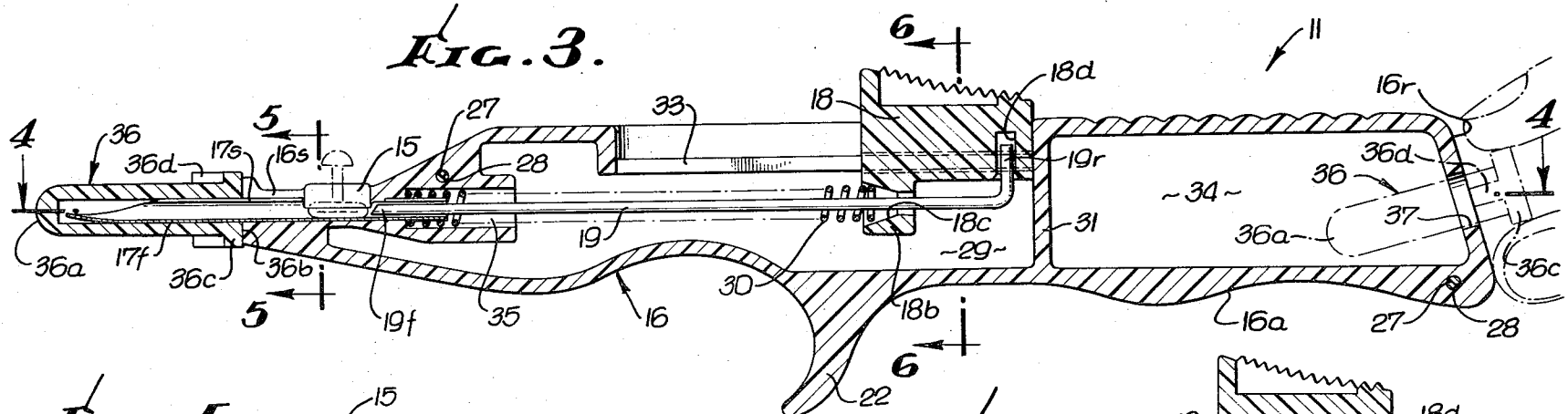


FIG. 5.

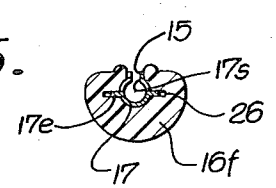


FIG. 10.

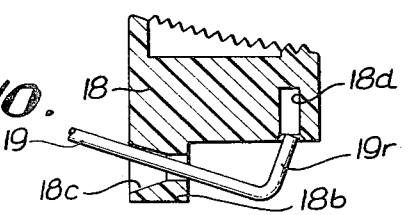


FIG. 4.

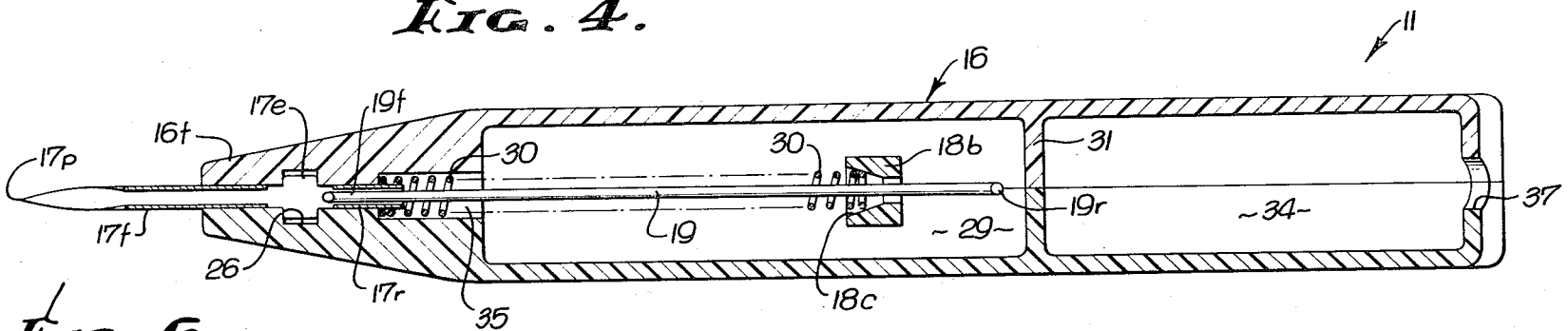


FIG. 6.

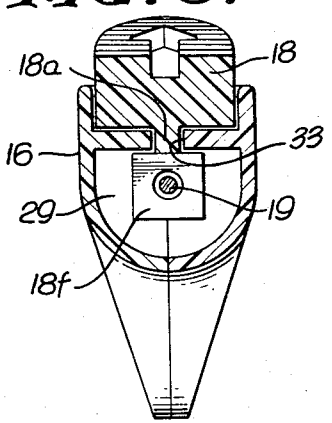


FIG. 7.

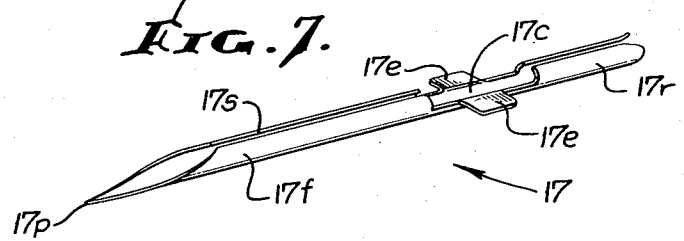


FIG. 8.

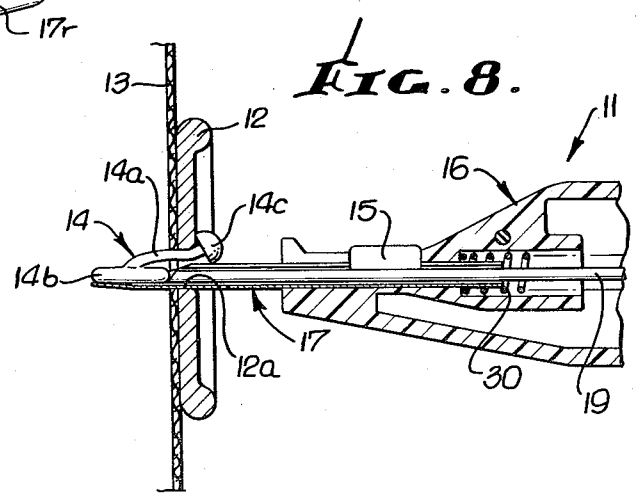
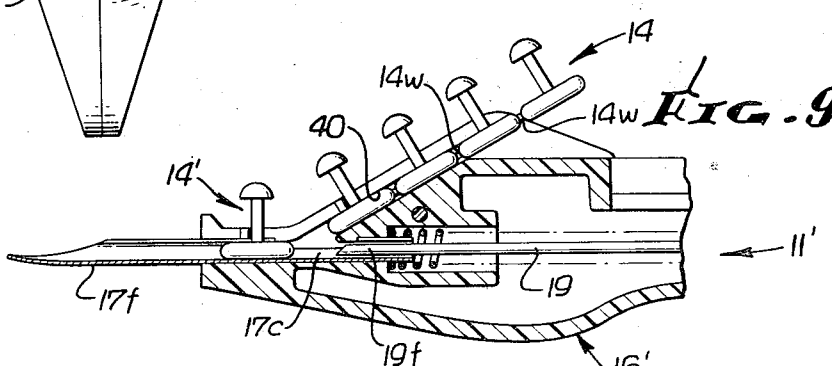


FIG. 9.



BUTTON FASTENER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a button fastening tool designed for minimum cost and one-hand operation.

2. Description of the Prior Art

The attachment of buttons to a fabric or other material is simplified by using a stringer of the type having a filament which extends through the fabric and a button hole, a transverse bar at one end of the filament which is situated behind the fabric, and a head at the other end of the filament which retains the button in place. Such button attachment is far faster and simpler than the usual sewing operations. However, a very simple, and hence low cost, stringer-insertion tool has not been available in the past. Therefore a principal object of the present invention is to provide a much simplified button fastening tool.

Certain stringer-insertion tools are known, but none is of very simple construction. One quite satisfactory attacher is shown in the U.S. Pat. No. 2,069,878 to Flood. There, the blunt end of a hollow needle is clamped between a metal guide plate and a pair of guide blocks connected to the plate by screws or rivets. The guide plate itself is mounted to a handle via flanged parallel side walls interior of the handle. A push rod or plunger provided with a thumb operated actuating element forces the transverse bar portion of the stringer through the hollow needle.

While intended primarily for attaching tags to a garment, the Flood device is equally applicable to the attachment of buttons to fabric. Indeed, with regard to stringer insertion, the button fastening tool disclosed herein operates exactly like the Flood device. But the Flood patent reflects pre-World War II materials and techniques of manufacture, whereas the present invention uniquely takes advantage of present day materials and fabrication techniques, resulting in a tool of much simpler construction. Indeed, even the stringer itself underlines post-World War II technology. Thus, whereas Flood uses an attacher having a tubular metal retaining bar at the end of a strand of string, present stringers are molded as a single piece of plastic.

Design of the inventive tool also is simplified by using certain components for plural functions. For example, the unitary needle includes a novel push rod guideway which insures accurate push rod alignment without requiring careful emplacement of guide plate or like needle-retaining components during tool assembly, and without requiring a plunger guide bore in the tool handle. The needle is attached by integral, lateral projections, in a well known manner, as taught, for example, by the U.S. Pat. No. 2,518,888 to Hearst, wherein a fastener-insertion needle is secured to a handle or casing by a lateral tail. As another example of plural component functions, the push button of the present invention is configured for simplified attachment of the push rod rear end, and also retains one end of the push rod bias spring.

Another objective of the present invention is to provide a button fastening tool easily operated with one hand. This has been a problem in the past. Thus in another known fastening tool, the push rod is actuated by a handle telescopically engaging the rear part of the tool housing. In use, the housing must be held with one hand while the other hand is used to "pump" the telescoping handle. It is impossible without considerable practice or unusual manual dexterity to use this plunger type handle with one hand.

SUMMARY OF THE INVENTION

The foregoing objectives are achieved by providing a button fastening tool having a minimum number of easily assembled components. The tool housing is configured to be gripped comfortably in one hand with the forefinger curled against a depending finger rest and with the thumb atop a push button. As the push button is pushed forward, a cooperating push rod urges a stringer through a hollow needle extending from the housing front end. During such stringer insertion, the presence of the forefinger against the finger rest stops forward motion of the tool itself, despite forward motion of the push button. True one-hand operation is accomplished.

The push button itself is uniquely configured to permit connection thereto of one end of the push rod with no attachment hardware. The forward end of the push rod seats within a guideway in the unitary needle structure. This guideway insures alignment of the push rod with the needle, and supports the push rod end, so that no guide bore is required. This also permits the tool housing to be substantially hollow, with concomitant savings in material cost.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the invention will be made with reference to the accompanying drawings, wherein like numerals designate corresponding parts in the several figures. These drawings, unless otherwise indicated, are to scale.

FIGS. **1** and **2** respectively show side and top views of the inventive button fastening tool.

FIG. **3** is a longitudinal sectional view of the button fastening tool, as seen along the line of **3—3** of FIG. **2.**

FIGS. **4, 5** and **6** are sectional views of the button fastening tool as seen respectively along the lines **4—4, 5—5** and **6—6** of FIG. **3.**

FIG. **7** is a greatly enlarged perspective view of the needle employed with the button fastening tool of FIGS. **1–6.**

FIG. **8** is a fragmentary transverse sectional view showing use of the button fastening tool for attaching a button to a fabric.

FIG. **9** is a fragmentary transverse sectional view of an alternative embodiment of the inventive button fastening tool including a guideway for supplying stringers to the needle central section.

FIG. **10** is a fragmentary transverse sectional view of the fastening tool push button, illustrating attachment of the push rod thereto.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following detailed description is of the best presently contemplated modes of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention since the scope of the invention best is defined by the appended claims.

Structural and operational characteristics attributed to forms of the invention first described also shall be attributed to forms later described, unless such charac-

teristics obviously are inapplicable or unless specific exception is made.

Referring to the drawings, the inventive button fastening tool **11** is used to secure a button **12** (FIG. **8**) to a fabric **13** by means of a stringer **14.** Each stringer includes a filament **14***a* having a transverse bar **14***b* at one end and a button-retaining head **14***c* at the other end. The stringer bar **14***b* is inserted through a lateral slot **15** (FIGS. **2** and **3**) in the tool housing **16** and then into coaxial alignment with a generally clyndrical needle **17** extending from the housing forward end **16***f*.

The needle **17** is inserted through the button hole **12***a* and the fabric **13,** as shown in FIG. **8.** A push button **18** is moved forward, causing a rod **19** to push the stringer bar **14***b* through the needle forward portion **17***f*. During this forward motion, the stringer filament **14***a* projects through aligned slots **16***s*, **17***s* in the housing **16** and needle **17.** The stringer bar **14***b* is urged out of the needle **17** into place behind the fabric **13** with the filament **14***a* extending through the fabric and the button hole **12***a*, and with the head **14***c* retained at the front of the button **12.** The needle **17** is withdrawn, leaving the button **12** firmly secured to the fabric **13** by the stringer **14.**

The fastening tool **11** is configured for optimum comfort and ease of use. To this end, the housing **16** is provided with a depending finger rest **22** situated slightly forwardly of the push button **18** rest position. The housing underside **16***a* rearward of the finger rest **22** is arcuate to form a contoured grip. With this handle configuration, the user's forefinger **23** comfortably engages the finger rest **22** (FIG. **1**) with the thumb **24** atop the push button **18** and the other fingers **25** comfortably surrounding the contoured grip area **16***a*.

Holding the fastening tool **11** in this manner, a natural forward motion of the hand is all that is required to force the needle **17** through the button hole **12***a* and the fabric **13.** Moreover, the presence of the finger **23** against the rest **22** limits forward motion of the housing **16** as the push button **18** is moved forward by the thumb **24** to insert the stringer **14.** This cooperation is important, as it permits true one hand operation of the inventive fastening tool **11.** Use of the finger rest **22** overcomes a problem associated with prior art button fastening tools wherein pressure of the housing itself against the button, or use of the other hand to grip the housing, is required to provide a counter-force as a stringer **14** is plunger-inserted through the button hole.

Another feature of the invention is the unitary needle configuration best illustrated in FIG. **7.** The needle **17** itself is made of a single piece of metal which is incompletely curled to form the forward portion **17***f* and to define the slot **17***s*. The forward end of the section **17***f* is tapered to define a sloping point **17***p* providing easy egress for the stringer bar **14***b*. The needle **17** also has a curled rearward section **17***r* coaxial with the forward section **17***f* and having an inner diameter appropriate to receive the push rod **19.** The needle rearward section **17***r* serves a dual function. It both supports the front end **19***f* of the push rod **19** and serves as a guideway insuring alignment of the push rod **19** with the needle forward section **17***f*. Since the guideway is an integral part of the unitary needle **17** structure, the needle does not have to be critically aligned in the housing **16.** Tool assembly is simplified. Further, no separate push rod guideway is required in the housing **16.**

The central section **17***c* of the needle **17** is open and has a length slightly greater than the stringer bar **14***a*. As shown in FIG. **3,** this center section **17***c* is aligned beneath the slot **15** to facilitate stringer **14** insertion. A pair of ears **17***e* extend laterally from the needle central section **17***c* into ear-receiving recesses **26** (FIG. **4**) in the housing **16** interior. The ears **17***e* prevent axial movement of the needle **17** during the button fastening operation.

The housing **16** preferably is molded of plastic, and advantageously may be formed in two pieces divided along the plane **3—3** (FIG. **2**). Guide pins **27** integrally molded with one housing piece engage cooperating recesses **28** in the other housing piece to facilitate alignment during assembly and bonding of the two pieces. The housing **16** interior is substantially hollow to minimize material cost. A forward chamber **29** contains the push rod **19** and a spring **30** which biases the push button **18** rearwardly toward a rest position against a housing interior wall **31** (FIG. **3**). A slot **33** opening upwardly from the chamber **29** guides the push button **18.** As shown in FIG. **6,** the push button **18** includes a neck **18***a* situated within the slot **33.** The housing **16** has another rear interior chamber **34** separated from the chamber **29** by the wall **31.**

Further to minimize the cost of components and assembly, a unique arrangement is used to connect the rod **19** to the push button **18.** As shown in FIG. **3,** the push button **18** includes a depending flange **18***b* having a counterbored hole **18***c* therethrough. Another bore **18***d* extends upwardly into the push button **18** rearward of the flange **18***b*. The rear end **19***r* of the push rod **19** is bent at a right angle. The conical taper of the hole **18***c* and the distance between the flange **18***b* and the bore **18***d* are selected to allow easy insertion of the push rod bent end **19***r* through the hole **18***c*, then rearwardly and upwardly into the bore **18***d*, as indicated in the fragmentary view of FIG. **10.** The forward end **19***f* of the push rod **19** is retained within the needle rear section **17***r* (FIG. **3**). Thus the push rod **19** will not come loose from the push button **18,** even though no fastening hardware is used to attach these elements. The length of the rod **19** is selected so that the forward end **19***f* rests just behind the needle central section **17***c* when the push button **18** is in its rest position. The spring **30** is retained between the conical hole **18***c* and a recess **35** extending forwardly from the chamber **29** within the housing **16.**

Another feature of the invention relates to the needle cap **36.** As shown in FIG. **3,** this protective cap **36** removably covers the needle **12** to prevent accidents when the fastener **11** is not in use. The cap **36** comprises a cylindrical member closed at one end **36***a*, open at the other end **36***b*, and having an interior diameter dimensioned for tight press fit over the needle forward section **17***f*.

A receptical is provided to store the needle cap **36** when not in use. As shown in FIG. **3,** this receptical comprises a hole **37** in the housing rear end **16***r* opening into the interior chamber **34** and having a diameter equal to the outside diameter of the cap **36.** With this arrangement, the needle cap can be stored within the receptical hole **37** as shown in phantom in FIG. **3.** To permit easy removal of the cap **36** from the receptical **37,** the cap end **36***b* includes a finger grip flange **36***c*. Ribs **36***d* limit the extent of cap insertion, insuring that the flange **36***c* will be sufficiently spaced

from the housing rear surface 16*r* to permit finger grip removal.

In an alternative fastening tool embodiment 11' shown in FIG. 9, a guideway 40 is provided in the housing 16' leading down to the needle central section 17*c*. A plurality of stringers 14 are fed through this guideway 40 into operative position in line with the push rod 19 and forward needle section 17*f*. The stringers 14 may be connected as by webs 14*w* linking adjacent bars 14*b* into a chain-like structure. This arrangement eliminates the need to insert each stringer 14 separately. The web 14*w* of the stringer 14' being urged through the needle 17 is severed by the push rod forward end 19*f*.

Intending to claim all novel, useful and unobvious features shown or described the inventor makes the following claims:

1. A button fastening tool for attaching a button using a stringer of the type having a filament, a transverse bar at one end of the filament and a button-retaining element at the other end of the filament, said fastening tool comprising:

a. a housing including a finger rest depending from the bottom of the housing, a push button slidably mounted at the top of said housing, said housing being configured to be hand held with the forefinger engaging the forward side of said finger rest, and a contoured grip along the bottom of the housing rearwardly of the finger rest for the user's other fingers,

b. a unitary, metal needle projecting forwardly from the front end of said housing, said needle including a forward portion incompletely curled coaxially forming a cylindrical passageway for the transverse bar of a stringer and an upwardly opening slot extending the entire length of said forward portion, an uncurled central portion including laterally extending flat ears, the length of said central portion being adapted to be slightly longer than the length of a transverse bar, and a rearward portion curled coaxially to form a guideway for a push rod,

c. said housing including interior lateral recesses receiving the ears of said needle, an upwardly opening stringer loading slot aligned with the central portion of said needle for insertion of a stringer transverse bar into coaxial alignment with said needle cylindrical passageway, and an upwardly opening slot extending from said loading slot to the front end of said housing in alignment with the upwardly opening slot of said needle for passage of a filament, and

d. a push rod reciprocally, longitudinally disposed within said housing, the front end of said rod being disposed within the guideway formed by said curled rearward portion of said needle, the rear end of said rod being attached to said push button for reciprocation therewith, and a spring surrounding said push rod to bias said rod rearwardly of said housing front end to a rest position in which the rod front end is disposed within said needle guideway rearwardly of said central portion to provide clearance for insertion of a stringer transverse bar, forward motion of said push button by a user's thumb moving said push rod forwardly to urge a transverse bar of a stringer through said needle forward section for securing a button while the rearward pressure of said forefinger against said finger rest limits forward movement of said fastening tool.

2. A button fastening tool according to claim 1 further comprising a needle cap for protecting the pointed forward portion of said needle when said tool is not in use, said needle cap comprising a cylinder closed at one end, and having an inner diameter dimensioned for snug mating engagement with said needle forward portion, said needle cap other end having a laterally extending peripheral flange forming a finger grip and a rib member extending a short distance from said flange toward said cap one end exteriorly of said cap cylinder, and

wherein said housing includes an interior hollow chamber the rear end of said housing having a needle cap storage hole opening to said chamber and having a diameter substantially the same as the outer diameter of said needle cap, so as to receive said needle cap snuggly therewithin to permit storage of said needle cap while said fastening tool is in use, said rib member limiting the extent of insertion of said cap into said hole so that said flange is sufficiently spaced from said housing rear end to permit easy finger grip removal of said cap from said storage hole.

3. A button fastening tool according to claim 2 wherein said housing is formed of two molded pieces separated along the longitudinal axis of said housing, said members including complementary alignment pins and holes, each section also including one of said needle ear-receiving recesses.

4. A button fastening tool according to claim 1 wherein said push button includes a neck slidingly engaging a longitudinal slot in said housing and a depending flange extending into another interior chamber in said housing, there being a conical hole through said depending flange, the diameter of said hole increasing toward the forward surface of said depending flange, and a bore extending upwardly into said push button rearwardly of said depending flange, said push rod being disposed within said other interior chamber, the rear end of said push rod being bent at a right angle, the relative positions of said flange and said bore and the dimension of said conical hole permitting insertion of said push rod bent end through said conical hole and into said bore to retain said push rod attached to said push button without additional fastening hardware.

5. A button fastening tool according to claim 1 further comprising a stringer guideway in the upper portion of said housing front end, said stringer guideway accepting the aligned transverse bars of a plurality of stringers and guiding said transverse bars downwardly into said needle central portion, said guideway including an upwardly opening slot joining said housing slot to permit unimpeded passage of the filaments of the stringers being guided to said needle central portion.

6. A button fastening tool according to claim 5 wherein the transverse bars of adjacent guided stringers are web-attached, the forward end of said push rod severing the web of the stringers being inserted during forward motion of said rod.

* * * * *