Sept. 12, 1972 W. V. WILLIAMS 3,690,994

HAND-CARRIED YARN SPLICING DEVICE

Filed Oct. 7, 1970 3 Sheets-Sheet 1

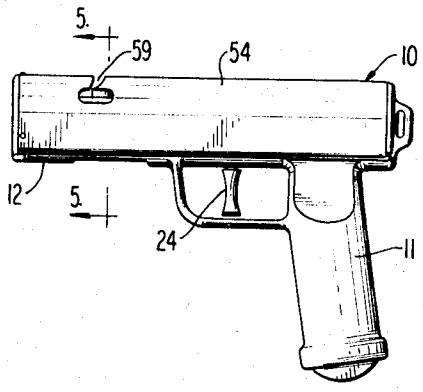
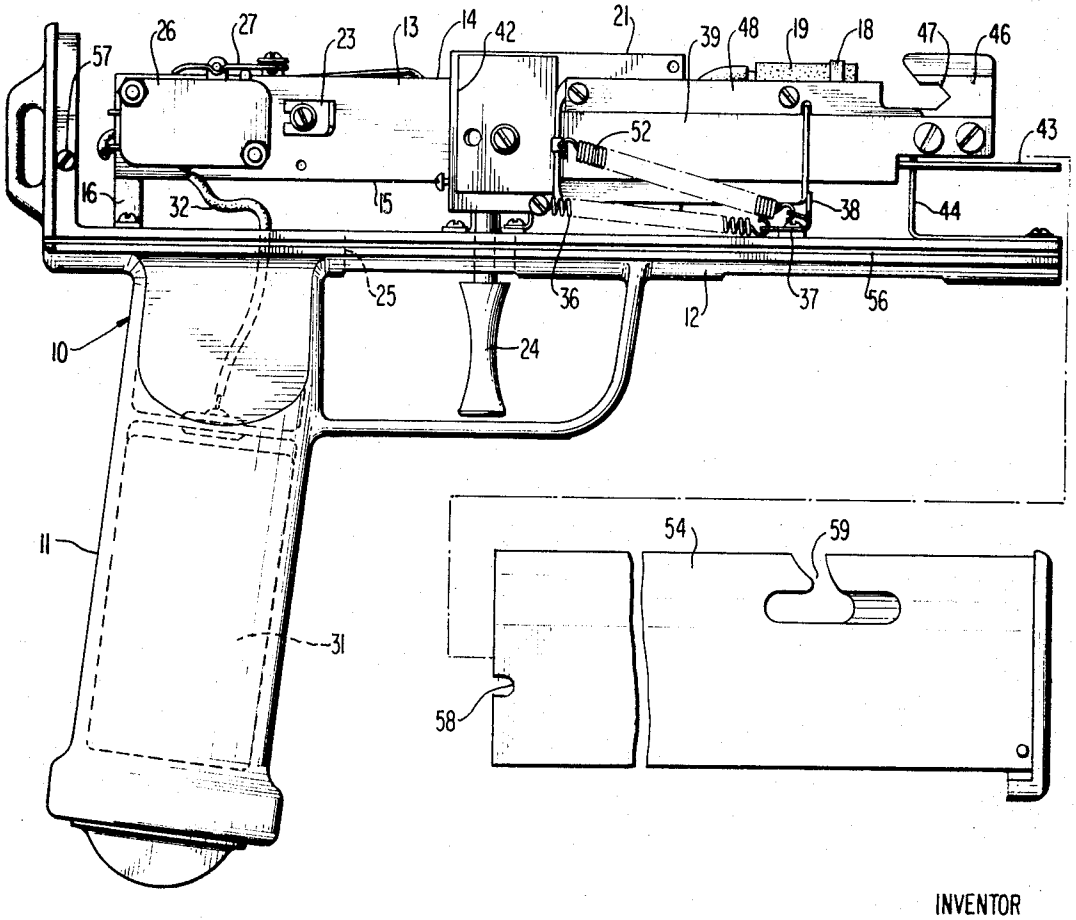


FIG.1

FIG.2



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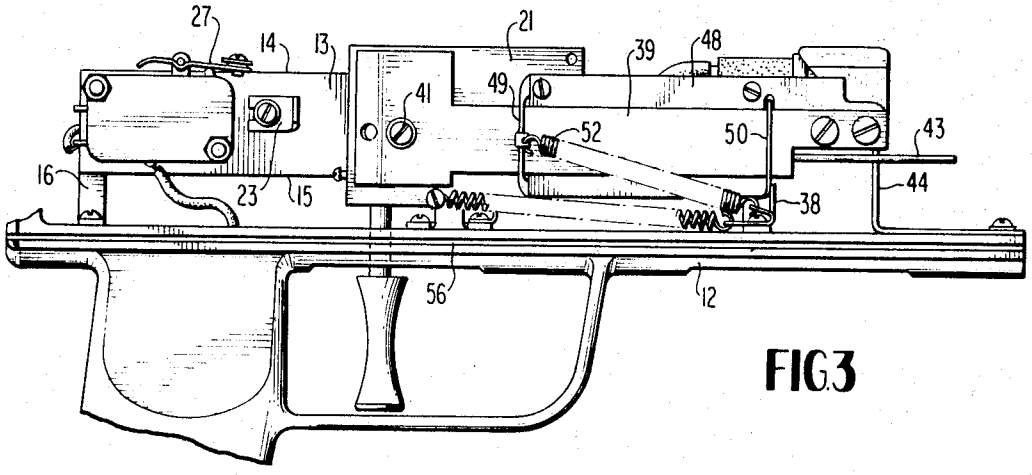


FIG.3

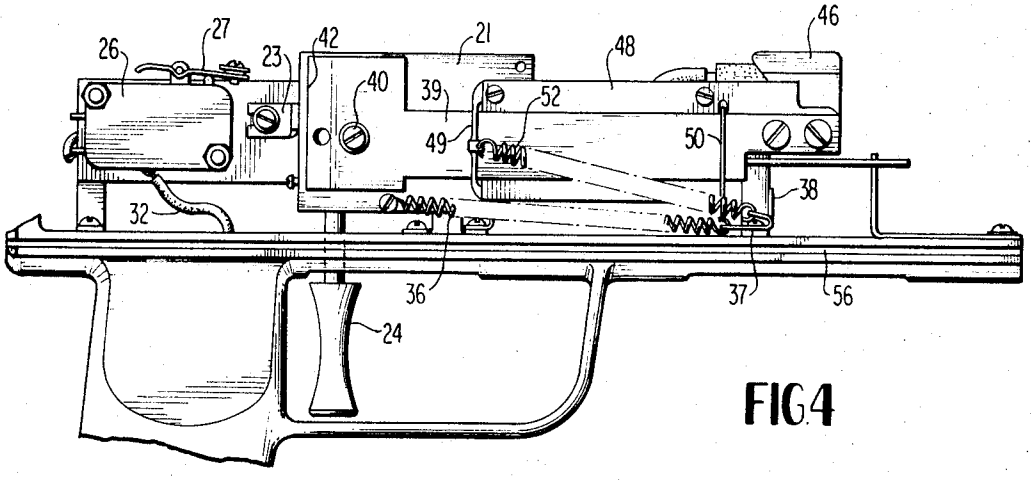


FIG.4

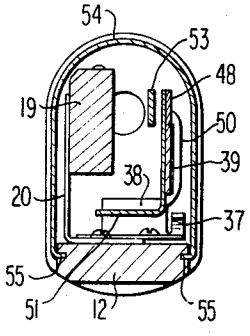


FIG.5

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FIG.6

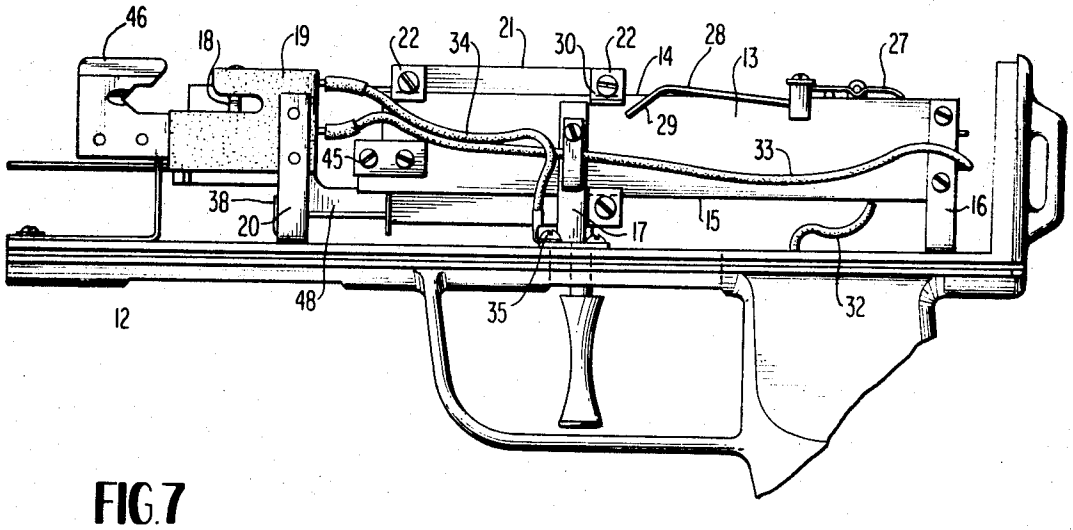


FIG.7

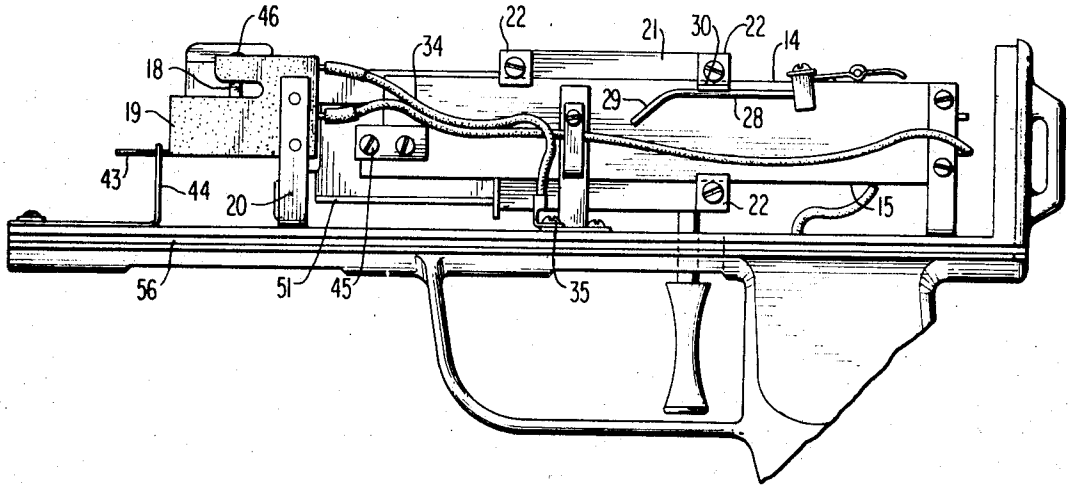
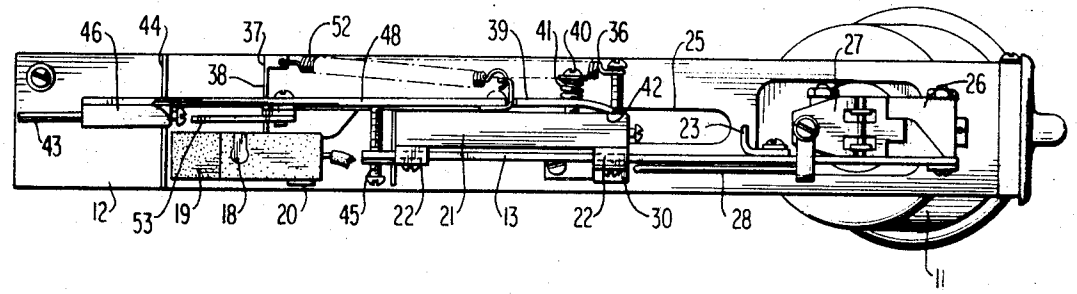


FIG.8



United States Patent Office 3,690,994 Patented Sept. 12, 1972

3,690,994

HAND-CARRIED YARN SPLICING DEVICE

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Continuation-in-part of application Ser. No. 790,077, Jan. 9, 1969, now Patent No. 3,607,559. This application Oct. 7, 1970, Ser. No. 78,812

Int. Cl. B65h 21/00

U.S. Cl. 156—433 1 Claim

ABSTRACT OF THE DISCLOSURE

A hand-held battery-powered apparatus for splicing thermoplastic yarn embodies a pistol-shaped body having a primary guide rail thereon and a fixed heating element near one end of this rail. A trigger operated carriage moves on the rail and carries coacting jaw means which grip and move the yarn ends into close proximity with the radiant heating element. The heating element is energized automatically by the closing of a switch when the carriage is retracted.

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of prior copending application S.N. 790,077, filed Jan. 9, 1969 now U.S. Pat. No. 3,607,559, for Portable Synthetic Yarn Splicing Apparatus.

The object of the invention is to improve upon and materially simplify the apparatuses disclosed in prior U.S. Pat. 3,323,971 and in the above copending application. The apparatus in the present application has been stripped to essential elements and still operates very effectively for its intended purpose. It is much more economical and more trouble-free in use and requires a lesser degree of skill by the user.

Other features and advantages of the structure will appear as the description proceeds.

BRIEF DESCRIPTION OF DRAWING FIGURES

FIG. 1 is a side elevation of the yarn splicing device.

FIG. 2 is an enlarged side elevation of the device with the cover removed and the carriage in the forwardmost position.

FIG. 3 is a fragmentary side elevation showing the carriage and associated parts partly retracted.

FIG. 4 is a similar elevational view showing the carriage fully retracted.

FIG. 5 is a transverse vertical section taken on line 5—5 of FIG. 1.

FIG. 6 is a fragmentary side elevation showing the opposite side of the apparatus with the carriage in the normal forward position.

FIG. 7 is a similar view showing the carriage retracted.

FIG. 8 is a plan view of the apparatus with the carriage in the forward position as shown in FIG. 6.

DETAILED DESCRIPTION

Referring to the drawings in detail, wherein like numerals designate like parts throughout, the device comprises a hand-held body **10** having the shape of a pistol and including a hand grip portion **11** and a plate portion **12** projecting forwardly from the top of the hand grip and upon which the apparatus components are mounted.

A primary longitudinal guide rail or member **13** is disposed above and extends longitudinally of the plate portion **12** and this rail is a laterally thin blade-like rail, FIG. 8, disposed on edge vertically and having top and bottom edges **14** and **15**. A pair of spaced brackets **16** and **17** rise from the plate portion **12** and are secured to one

side of the guide rail **13** to support the same at the proper elevation above the plate portion **12**.

A relatively stationary radiant heating element **18** is spaced forwardly of the leading end of the guide rail **13** and is carried by a block **19** of ceramic or the like supported by an L-bracket **20** anchored to the plate portion **12** in advance of the guide rail **13**.

A carriage block **21** is mounted on the guide rail **13** for movement lengthwise thereof and has grooved bearing elements **22** on one side at its upper corners and lower rear corner. These bearing elements are formed of plastic material which is nylon or the like and they engage over the edges **14** and **15** of the guide rail, as shown.

An adjustable L-shaped stop element **23** is mounted on the side of the guide rail **13** so as to be in the path of movement of the rear end of the carriage block **21**, FIG. 8, when the latter is retracted. This adjustable stop accurately limits the rearward movement of the carriage block on the guide rail so as to position the yarn ends being spliced directly opposite the heating element **18** at the required time. A trigger **24** is dependingly secured to the carriage block **21** and projects below the plate portion **12** through a clearance slot **25** provided therein.

A switch **26**, such as a microswitch, is secured to one side of the rail **13** at its rear end and has a top pivoted actuator **27** including a rod extension **28** which projects forwardly close to the opposite side of the rail **13** and has an inclined downturn forward end **29**. The downturned terminal **29** is engaged by the upper rear bearing element **22** of the carriage block when the carriage is retracted or by an extension element **30** thereon in the form of a small L-shaped bracket. This causes pivoting of the switch actuator **27** to close the switch **26** and energize the heating element **18** at the proper times. In this connection, the hand grip **11** is hollow and contains suitable battery **31** electrically connected by wiring **32** with the switch **26**. Additional wiring **33** connects the switch with the terminal of the element **18** and the other terminal of the heating element is connected by a wire **34** to a suitable ground terminal **35**.

A return spring **36** interconnects the carriage block **21** with a small anchoring element **37** on the foot of the L-shaped bracket **20**. The foot of this bracket also carries an upstanding stop **38** to limit forward movement of the carriage structure moving on the rail **13**, as will be further discussed. The spring **36** returns the carriage structure automatically to its forwardmost position against the stop **38** when the trigger is released.

An extension plate **39** is disposed on the side of the carriage block **21** remote from the rail **13** and has its rear end pivotally anchored to the carriage block by an element **40** having a compression spring **41** which biases the extension plate **39** toward the adjacent side of carriage block **21** but allows lateral pivoting of the extension plate to a limited extent about its rear vertical edge **42** which bears against the carriage block **21**. The forward laterally swingable end of extension plate **39** carries a longitudinal guide rod **43** engaging in a horizontal slot in an upstanding guide element **44** mounted on the forward portion of plate **12**. This guide arrangement stabilizes the forward end of the longitudinally movable and laterally swingable extension plate **39** which moves with the carriage block **21** but can pivot laterally thereof about its rear end or edge **42**. To accurately adjust the lateral spacing of extension plate **39** relative to the guide rail **13**, an adjustable lateral screw stop **45** is provided on the forward end of the guide rail **13** in advance of the carriage block **21**, see FIG. 8. The screw stop engages the interior side of extension plate **39** adjustably. The screw stop **45** slidably contacts the interior side of carriage extension plate **39** to maintain this plate

and the jaw means **46** carried thereby at a predetermined angle to the guide rail **13** during movement of the carriage longitudinally with respect to the guide rail.

A reversely facing yarn gripping jaw **46** is carried by the forward extremity of extension plate **39** and has a tapered cavity **47** to receive the yarn ends to be spliced as they are placed transversely through the jaw. A secondary carriage or slide **48** is longitudinally movably mounted on the extension plate **39** and has elements **49** and **50** which embrace the extension plate **39** slidably. A lateral extension **51** on the secondary carriage **48** is the carriage element which contacts the previously-described forward limit stop **38**. A separate return spring **52** interconnecting the secondary carriage **48** and the anchoring element **37** serves to automatically return the secondary carriage to its forwardmost position when the trigger is released.

The secondary carriage **48** has secured to its inner side a coacting yarn gripping jaw **53** which faces forwardly in opposing relationship to the jaw **46**, FIG. 8 and FIG. 5. When the trigger is pulled to retract the carriage block **21**, extension plate **39** and jaw **46**, the latter will engage the coacting jaw **53** so as to clamp the yarn ends together in the tapered socket **47** and then continued retraction of the trigger will cause the secondary carriage **48** to move rearwardly with the block **21** and associated parts until the stop **23** is engaged and the yarn ends gripped by the two jaws **46** and **53** are held directly opposite the vertical heating element **18** in closely spaced relation thereto but out of contact therewith. It will be understood that the secondary carriage **48** and its jaw **53** are independently movable and slide on the extension plate **39**.

A cover or housing **54** for all of the components mounted on the plate portion **12** of the main body is provided and this cover has bottom flanges **55**, FIG. 5, which are received in grooves **56** formed in the opposite sides of the plate portion **12** so that the cover can be slid into place longitudinally and secured by a set screw **57** or the like, FIG. 2, engaging a notch **58** at the rear end of the cover. The cover **54** has a guide slot **59** in its top for the purpose of guiding the two transverse yarn ends to be spliced between two jaws **46** and **53** when the trigger is released and the jaw **46** is in the forwardmost position. The slot **59** assures proper entry of the yarn between the jaws and into the cavity **47**.

The general mode of operation and purpose of the invention remains the same as disclosed in Pat. 3,323,971 and in said copending application S.N. 790,077 and need not be repeated herein. The structure and mode of operation, however, have been greatly simplified in the present device

without effecting the end result of highly efficient yarn splicing.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claim.

I claim:

1. A portable apparatus for splicing thermoplastic yarn consisting essentially of a support including a primary guide member, a radiant-type heating element fixed to the support, a carriage member provided with a first yarn gripping means slidably mounted on the primary guide member for movement longitudinally thereon, a slide member having a second yarn gripping means mounted on the carriage member and being relatively movable with respect to the carriage member and also moving with the carriage member along the primary guide member, said first and second yarn gripping means operable to grip yarn at a remote point from the radiant-type heating element and to carry the yarn along the primary guide member to a point close to but slightly spaced from the heating element, and a laterally adjustable screw stop on the primary guide member extending transversely thereof and slidably engaging one longitudinal side face of said slide member and maintaining the slide member at a predetermined angle and lateral spacing from the primary guide member during the entire longitudinal travel of the carriage member and slide member as a unit along the primary guide member, said slide member having a spring-loaded pivotal connection with the carriage member, whereby said one longitudinal side face of the slide member is biased into sliding contact with said screw stop at all times and during the entire longitudinal travel of said carriage and slide members.

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D. J. FRITSCH, Assistant Examiner

U.S. Cl. X.R.

156—499, 502, 538, 579