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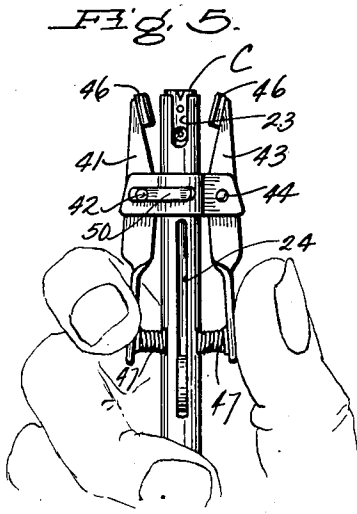
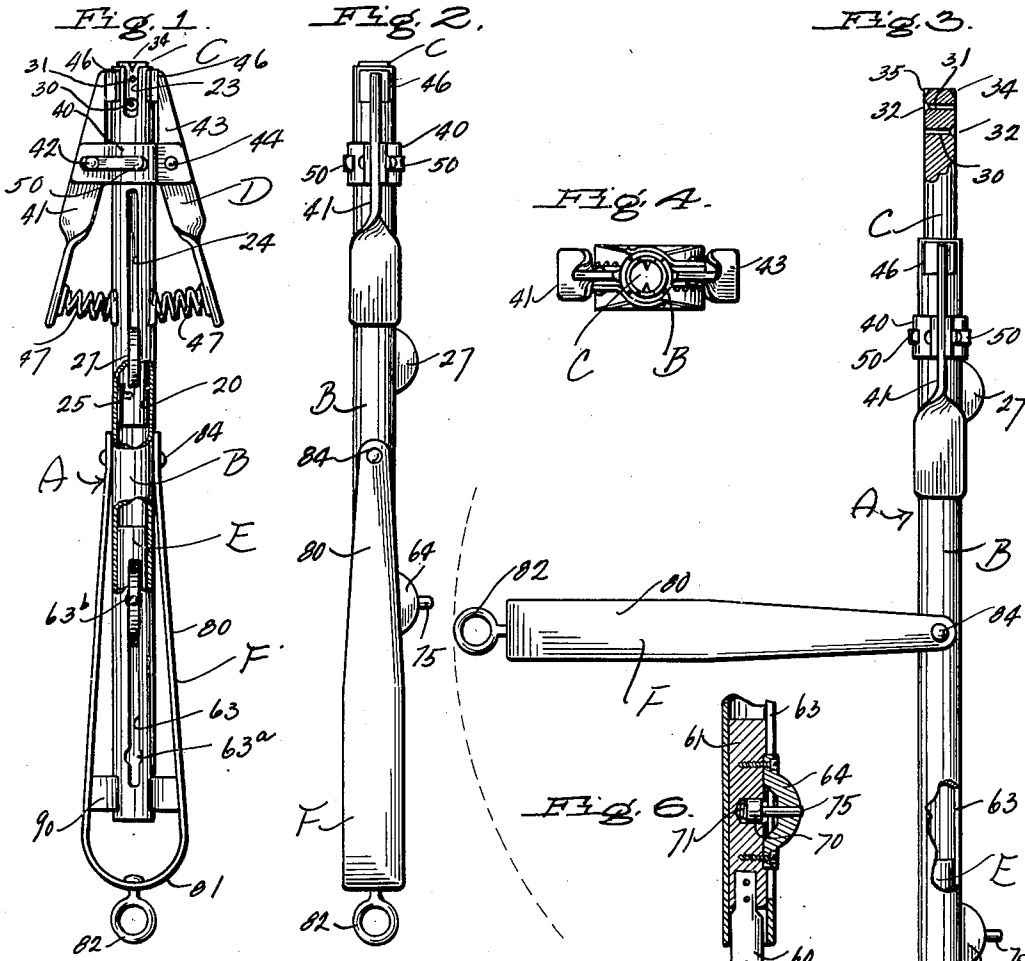
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2,488,414

STRAND SPLICING DEVICE AND METHOD

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2 Sheets-Sheet 1



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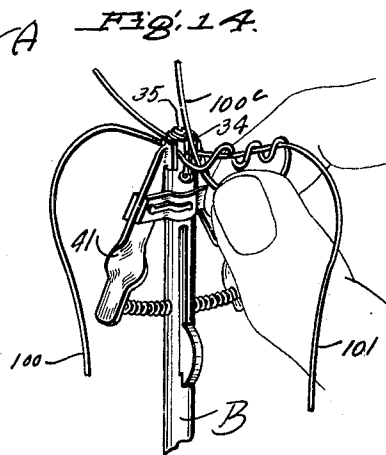
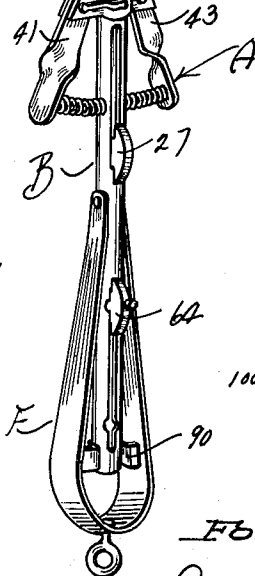
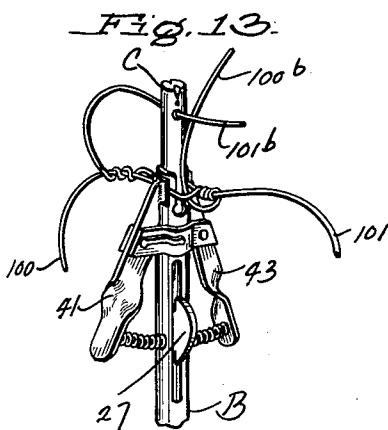
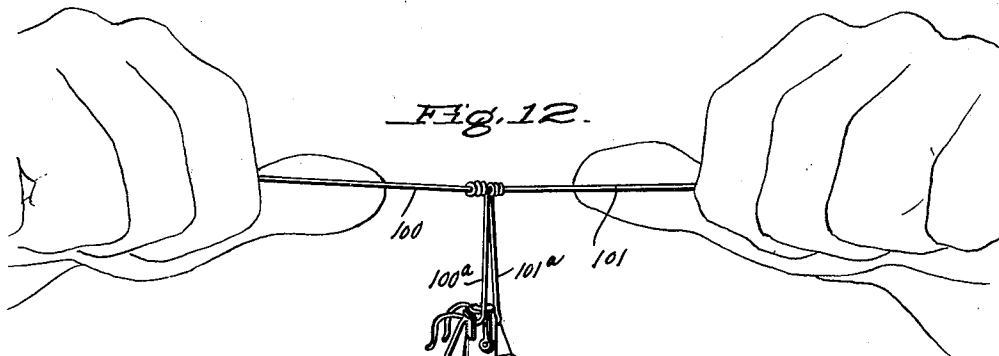
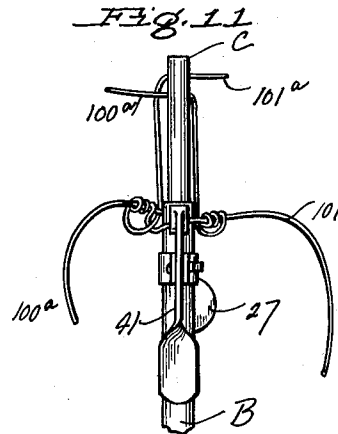
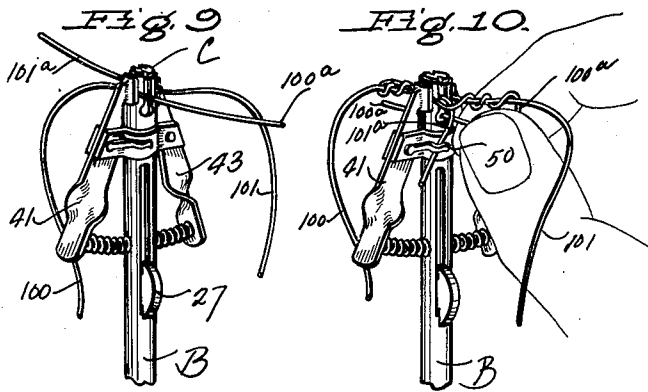
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STRAND SPLICING DEVICE AND METHOD

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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

2,488,414

## STRAND SPLICING DEVICE AND METHOD

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10 Claims. (Cl. 28—72)

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This invention relates to an improved appliance for splicing the ends of strands of flexible material.

The primary object of this invention is the provision of a portable tool to facilitate the splicing of strands of material such as gut, nylon, yarn, thread, etc.

A further object of this invention is the provision of an improved portable appliance particularly well adapted for use by fishermen to facilitate the splicing of strands of line, gut or nylon, with a double coil snub type of knot.

A further object of this invention is the provision of an improved portable tool which is relatively compact and easily operated for the purpose of efficiently and quickly splicing the ends of strands of material such as gut or nylon, with a type of knot that will prevent accidental disconnection of the strands at the spliced connection.

The matter of splicing nylon or gut leaders in the field is one of the fly fisherman's most difficult problems. Usually such leaders offer resistance to simple knots. It is therefore a purpose of this invention to provide a tool that will enable a fisherman to provide a splice knot of a double coil snub type which will prevent disconnection of the spliced strands.

A further object of this invention is the provision of a portable tool for splicing strands of material, having improved means to effect the splicing and the knotting of strands, and an improved knife arrangement to facilitate trimming.

Other objects and advantages of this invention will be apparent from the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts thruout the several views,

Figure 1 is a front elevation of the improved tool, showing the casing tube or body partly in cross section.

Figure 2 is a side elevation of the improved tool or appliance.

Figure 3 is a side elevation showing the handle swung to one side with the knife of the tool extended at one end and a strand threading plunger or member extended at the opposite end.

Figure 4 is a plan view of the splice threading end of the tool.

Figure 5 is a fragmentary view showing the manner in which an operator opens certain clamping members to permit the clamping of strands of flexible material upon the supporting body or member.

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Figure 6 is a fragmentary cross-sectional view showing a knife mounting means.

Figure 7 is another view of the knife mounting means.

Figure 8 is a cross-sectional view of the details shown in Figure 6 with the knife mounting means in the position it will assume when the knife is extended for use, as in the position shown in Figure 3.

Figures 9, 10, 11 and 12 are views showing various steps in the manipulation of the tool and the strands of material to effect the splicing thereof.

Figure 13 is a perspective view of the upper end of the tool showing the splicing of the strands using a different method than that shown in Figures 9 to 12 inclusive.

Figure 14 is a perspective view of the upper end of the tool showing the method of using the same for the splicing of strands according to a method differing from those shown in Figures 9 to 13 inclusive.

In the drawing, wherein for the purpose of illustration is shown only a preferred embodiment of the splicing tool, as used for varied types of knot splice formations, the letter A may generally designate the tool or appliance. It includes a supporting body, member or tube B having at one end a reciprocable strand threading member C associated with a strand clamping arrangement D. At the opposite end of the supporting tube B is provided an improved collapsible knife arrangement E and a handle structure F.

The supporting tube, member or body B is of tubular material, preferably of uniform diameter thruout and providing a passageway 20 therein. The material of the various parts of the tool may vary. Preferably, the same are constructed of brass, stainless steel or other plated metal, or even plastic.

The tubular supporting body, member or frame B at its splicing end has the passageway or socket 20 open to permit the extension of the threading member or plunger C, as will be subsequently mentioned. At the front and back the tube is slotted, at 23, inwardly from the top end edge for a short distance along the tube, and at what is normally known as the front of the tool, shown in Figure 1, the body B is further provided with a long slot 24 opening into the passageway 20 to accommodate the finger-engaging knob or button of the threading member C, as will be subsequently mentioned.

The strand member C is preferably of elongated cylindrical construction, as shown in Figure 3. It

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is slidably mounted in the passageway 20 with a friction fit, or a friction spring 25 may be provided at the inner end of the threading member having a resiliently urged engagement against the inner wall of the tube B to offer some resistance to accidental movement of the threading plunger or member C. The latter is provided with a finger engaging knob or tab 27, preferably detachable, which operates in the slot 24 to limit the extended and retracted position of the threading member C with respect to the tube or casing B.

The threading member C is preferably provided with a pair of eyes or passageways 30 and 31 for receiving splice yarns or threads. One end of each is flared at 32, at opposite sides of the member. That is, the lower passageway is flared at the front of the tool and the upper passageway is flared at the back or rear of the tool. These flared ends may be otherwise distinctively marked, such as by coloring, in order that the individual will recognize the end of the passageway into which the thread or strand should be inserted. In the same plane within which the axes of the passageways 30 and 31 lie, the threading member C is notched at 34 and 35 at its extreme end, as indicated in Figures 1 and 3.

Referring to the clamping means for handling the strand ends, I provide a supporting strap or band 40 secured upon the tube B below its slotted end. This strap 40 has a laterally extending pair of ears to which a clamping arm 41 is pivoted at 42 at one side of the tool body B, and a second pair of ears diametrically opposed for pivotally supporting a second clamping lever 43 upon a pin or pivot 44. The clamping levers 41 and 43 are in a plane at right angles or normal to the plane in which the slots 23 lie, and at their ends they are provided with segmental-shaped clamping shoes 46 which conform to and engage the opposite sides of the tube B directly adjacent to the slots 23. Compression springs 47 are interposed between the supporting tube B and the ends of the clamping levers opposite the shoes 46; conveniently mounted upon studs to maintain them in place. They normally urge the clamping shoes into snug clamping engagement with opposite sides of the tube B. The curvature of the shoes is the same as that of the tube B, so that the strands will be afforded a considerable length of clamping engagement.

The clamping means D also includes small spring clamps 50 which may be mounted upon the pivot pins 42 and 44 and extend along the strap 40 for resilient clamping action upon said strap in the plane of the slots 23 at the front and back of the tool. They are adapted to engage the terminal ends of the strands for a purpose to be subsequently described.

Referring to the handle and knife structure associated with the splicing tool A, a knife blade 60 is secured at one end upon a sliding plunger 61 which operates snugly in the passageway 20 of the supporting tube B, as shown in Figures 6, 7, and 8 of the drawings. The tube B is slotted at 63 to receive the projecting thumb button or stud 64 secured at 65 upon the knife mounting plunger 61. As shown in the drawings, the plunger 61 may be positioned to entirely retract the knife blade in the tube body B or extended from the end of the tube body opposite the splicing end, as shown in Figure 3. The blade is locked either in its retracted or extended positions by means of a detent plunger 70 which is spring actuated at 71 and seats, when

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in locking position, in enlargements 63<sup>a</sup> and 63<sup>b</sup> near the ends of the slot 63. The cross dimension of the detent plunger 70 is such that when depressed it will not extend into the slot 63, except at the enlarged ends 63<sup>a</sup> and 63<sup>b</sup>. The plunger has a reduced pin extension 75 which projects beyond the outer surface of the thumb stud or button 64, as shown in Figure 8, for the purpose of manually controlling the detent plunger.

An improved gripping and safety type handle structure F is provided, consisting of a U-shaped body 80 of band material, the bight end 81 of which may be provided with a securing ring 82. The free ends of the body 80 are pivoted upon a pin 84 at opposite sides of the supporting tube B. The handle body 80 is of such length that it may be swung to substantially entirely cover the lower end of the tube B, as shown in Figure 2. This protects the knife against accidental extension and the possibility of injury to the user. The material of the handle body 80 is of a springy nature and it provides an effective hand grip for operation of the tool. As shown in Figures 1 and 12, the handle may be locked in proper position upon the tube B by means of a spring clamp 90 which intermediate its ends is bowed to receive the handle and of a curvature to grip the opposite sides of the body B. The clamping member 90 gives some spring action so that a slight effort is needed to remove the handle for swinging, and in any event the handle body 80 being of a springy nature, can be flexed laterally to effect the disconnection of the clamping means from the supporting tube when so desired.

The improved tool or appliance can be used for splicing strands of gut, nylon, yarn or thread with a plurality of different knots.

The operation of the tool is extremely simple. The first operation is indicated in Figures 5 and 9. The splicing ends of the leaders or strands are overlapped a distance of approximately 1½" at opposite sides of the tool; one strand being placed under each of the clamps 41 and 43; the strand 100 being secured beneath the shoe of clamp 41, and the strand 101 being secured beneath the shoe of the other clamp 43. The strands 100 and 101 are respectively provided with splicing ends 100<sup>a</sup> and 101<sup>a</sup>, as indicated in Figure 9.

In the next step of the method of forming the splice, the loose splicing end 100<sup>a</sup> is wrapped a plurality of times, preferably three, over the top of the main body of the strand or leader 101, in either direction as desired, and the terminal end then threaded thru the passageway 30 of the threading member. This is usually accomplished as indicated by the operator's hands in Figure 10. The loose end, after threading thru the passageway 30, is taken by the finger of the operator and snapped under the keeper spring 50 at the rear of the tool. Preferably, the front eye, which is the eye or passageway 30, should be threaded first altho not necessarily so. The operation is repeated at the opposite side of the tool, that is, the splicing end 101<sup>a</sup> is wound around the body of the strand 100 and then threaded thru the remaining eye or passageway 32 and the end snapped under the spring keeper at the front, as shown in Figure 10. If the threading is reversely done (as shown in Figure 10) care will have to be taken to avoid feeding the second terminal end thru the loop made by the first.

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With the windings of the splicing ends in the position shown in Figure 10, it is noted that the windings between them provide a loop which encircles the tube end. Of course a part of this loop is at each side of the tube adjacent to the winding.

In the next step of the method of forming the splice, it is merely necessary for the operator to place his thumb upon the button 27 and extensively slide the threading member or plunger C beyond the tubular body B, as far as it will go. This action carries both terminal ends thru the loop and the action will probably slide the terminal ends out of the keeper springs 50, to the position shown in Figure 11. The terminal ends are now removed from their respective passageways or eyes of the threading plunger C and the plunger is retracted. The two terminal ends are taken between the thumb and finger of one hand of the operator and the clamping levers are unfastened from the strands and the terminal ends then clamped under the shoes of the clamping levers 41 and 43, as shown in Figure 12. The operator then takes the two strands in his hands as shown in Figure 12, allowing the tool to hang from the terminal ends of the strands. By gravity, it acts as a counter-balance which will enable the operator to snub the windings tightly and draw them and the loop securely upon the terminal ends threaded previously thru the loop. The knot has thus been formed and all that is now necessary is to release the tool from the clamps 41 and 43, open the knife and clip the terminal ends free from the knot. This knot is known as a double coil snub knot.

In order to splice the strands by means of a barrel knot, the method of Figure 13 is used. It was noted in tying the double coil snub knot that both terminals are threaded thru the loop of the strands in the same direction. In the barrel type knot the strands are threaded thru the loop from opposite directions. To effect a barrel knot splicing, wrap three full turns over the top of one of the strands and thread the end thru the front passageway 30 as shown in Figure 13. Of course the end is snapped under the spring keeper to take up the slack. Next the plunger sliding rod is extended and the leader end here indicated at Figure 13 as 100<sup>b</sup> is removed from passageway 30 and allowed to stand as shown in Figure 13. The plunger is then moved about half way back to bring the rear eye or passageway 31 close to the loop which has been formed by the winding, as aforesaid. The other terminal end of the strands is then wrapped three full turns over the strand at the opposite side and threaded thru the rear passageway 31 or the other passageway, if desired. The plunger is then retracted entirely. This action will draw the terminal end thru the loop at the opposite side from that from which the terminal end 100<sup>b</sup> extends. In Figure 13 the last terminal end is indicated at 101<sup>b</sup> and the terminal ends are held with the thumb and finger and the tool removed. The terminal ends are inserted one under each of the clamps 41 and 43 and the splice knot is finished in the manner above indicated.

Another method of splicing is shown in Figure 14. In this instance the threading plunger is not used, but the terminal end, indicated at 100<sup>c</sup> is slipped along the slot 23 of the tube B and along the notch 34 or 35, as the case may be. The slack is drawn up tightly and the operation is then repeated from the opposite side. The snubbing of the windings may be effected, as above indicated.

During splicing of gut or nylon the strands

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should be thoroughly water soaked for best results. It is not necessary to have three full turns across the top in wrapping the ends. This is merely a suggestion since two turns or more than three up to seven or eight may be used.

Various changes in the shape, size and arrangement of parts and in the method of manipulating the strands and terminal ends thereof may be made, without departing from the spirit of the invention or scope of the claims.

I claim:

1. The method of splicing strands of flexible material which consists in mechanically clamping the ends in oppositely extended overlapped spaced substantially parallel relation, winding one end of one strand about the body of the second strand spaced from the end of the second strand, attaching the said end of the first strand to a threading member, winding the end of the second strand about the body of the first strand to provide a loop between the first and second windings aforesaid, attaching the end of the second strand to said threading member, moving the threading member thru said loop to thread the ends of the strands therethru, removing the ends of the strands from the threading member, withdrawing said threading member from the loop, and tightening said windings in the direction of the loop to draw the loop into non-slipping clamped engagement upon the ends of the strands threaded therethru.

2. The method of splicing the ends of strands of flexible material which consists in mechanically clamping the strands of material in spaced relation upon a supporting member with the end portions of the strands in overlapping oppositely extended relation, winding the spliced end of one strand about the adjacent body of the other strand to provide a loop adjacent to the supporting member between said strands, winding the spliced end of the second strand about the adjacent body of the first strand at the opposite side of the supporting member to provide a loop adjacent to the supporting member, threading the said ends thru the adjacent loops, holding said ends, removing the strands from their clamped relation as aforesaid, and tightening the windings and loop therebetween in knot providing relation upon the ends of the strands threaded thru the loop.

3. The method of splicing the ends of strands of flexible material which consists in mechanically clamping the strands of material in spaced relation upon a supporting member with the end portions of the strands in overlapping oppositely extended relation, winding the spliced end of one strand about the adjacent body of the other strand to provide a loop adjacent to the supporting member between said strands, winding the spliced end of the second strand about the adjacent body of the first strand at the opposite side of the supporting member and in the opposite direction from the direction of turn of the winding first mentioned to provide a loop adjacent to the supporting member, threading the said ends thru the adjacent loops, holding said ends, removing the strands from their clamped relation as aforesaid, and tightening the windings and loop therebetween in knot providing relation upon the ends of the strands threaded thru the loop.

4. The method of splicing the ends of strands of flexible material which consists in mechanically clamping the strands of material in spaced relation upon a supporting member with the end portions of the strands in overlapping op-

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positely extended relation, winding the spliced end of one strand about the adjacent body of the other strand to provide a loop adjacent to the supporting member between said strands, securing said end upon the supporting member and holding the said end against accidental removal from the supporting member, winding the spliced end of the second strand about the adjacent body of the first strand at the opposite side of the supporting member to provide a loop adjacent to the supporting member, securing the end last mentioned upon said supporting member and holding the said last mentioned end against accidental removal from the supporting member, moving said supporting member thru the aforesaid looped arrangement of said strands and threading the ends upon the supporting member thru the looped arrangement aforesaid, releasing the strands from the supporting member, clamping the terminal ends of the strands upon the supporting member, and tightening the windings and loop to clamp the ends in the loop.

5. In a portable splicing tool the combination of a body member having an open ended socket, a threading member slidably carried in said socket and having a transverse threading opening therethru, strand clamps carried by the body member at opposite sides of the threading member adjacent to the threading opening of the latter, and terminal strand end clamps also carried by the body member at the front and back of the body member.

6. In a device for splicing strands of flexible material such as gut, nylon, yarn and thread, the combination of a supporting body having a passageway therethru opening at an end, said supporting body at said end being longitudinally slotted at front and back, a threading plunger longitudinally slidable in said passageway for retraction therein or extension therefrom having a transverse strand receiving eye therethru positioned, when the threading member is retracted in the passageway, directly within the slots of the supporting body, and strand clamping means carried at the sides of the supporting body adjacent to said slots.

7. In a splicing tool the combination of a supporting body having a passageway opening at an end thereof, said supporting body at the extreme end margin where said passageway opens being longitudinally slotted at the front and back thereof, a threading member longitudinally slidable in said body passageway having an end adapted to extend into the passageway in normally retracted relation, means to control the extension and retraction of the threading member with respect to said passageway, said threading member at the extensible end thereof having a pair of relatively but closely spaced strand receiving threading eyes transversely therethru which lie within said slots when the threading member is retracted within said body and which lie without said slots when the threading member is extended from said passageway.

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8. In a splicing tool the combination of a supporting body having a passageway opening at an end thereof, said supporting body at its extreme end where said passageway opens being longitudinally slotted at the front and back thereof, a threading member slidable in said body passageway having an end adapted to extend into the passageway in normally retracted relation, means to control the extension and retraction of the threading member with respect to said passageway, said threading member at the extensible end thereof having a pair of spaced strand receiving threading eyes retracted therethru which lie within said slots when the threading member is retracted within said body, strand clamping spring urged members at opposite sides of the supporting body in a plane normal to the plane in which said slots lie, and terminal strand end clamping keepers mounted upon said supporting body immediately beneath the slots.

9. In a tool for knot splicing the ends of strands of flexible line material the combination of a supporting body having means thereon providing a transverse passageway therethru for receiving the line material, and a pair of clamps carried by the frame supporting independent strand ends of the line material in such adjacent relation to the transverse opening that the said ends of the line material secured by said clamps may be extended therethru from opposite sides of the frame.

10. In a tool for knot splicing the ends of strands of flexible line material the combination of a supporting body having means thereon providing a transverse passageway therethru for receiving the ends of the line material therethru, a pair of clamps carried by the frame for supporting independent strand ends of the line material in such adjacent relation to the transverse opening that the ends of the line material secured by said clamps may be extended therethru from opposite sides of the frame, and a second pair of line material clamps securely mounted at opposite sides of the frame adjacent to said transverse opening and relatively spaced from the first mentioned clamps.

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