A knot-tying device for use in tying a true barrel knot between lines, the device having four resiliently releasable retaining means located on a block, two of the means being located for holding the lines in place during wrapping and threading of the lines and the other two of the means being located for holding the terminal ends of the lines after wrapping and threading, and direction indicating means for indicating the direction of threading for establishing a true barrel knot.

20 Claims, 14 Drawing Figures
1

KNOT-TYPING DEVICE FOR BARREL KNOTS

The present invention relates generally to knot-typing devices and pertains, more specifically, to a device for use in tying a true barrel knot, or blood knot, between lines.

The art of angling requires numerous diverse skills and many anglers strive to become proficient in all of the skills required. One such skill is the tying of knots for a variety of purposes. Among those knots found in angling perhaps the most difficult knot to tie is the barrel knot, also known as the blood knot, which is usually employed in tying consecutive line segments together. For example, where a tapered leader is constructed of several consecutive line segments, each line segment being a filament of a diameter different from the diameter of the next consecutive line segment, the line segments are usually tied together with barrel knots.

In a barrel knot, the lines which are joined together are each wrapped or coiled around the other over several turns and the knot has the appearance of two confronting helices with the end portions of the lines locked between the confronting helices. While it is possible to tie a barrel knot so that the end portions of both lines emerge from between the helices in the same direction transverse to the lines, in a true barrel knot these end portions are made to emerge in opposite directions. Thus, the tying of a true barrel knot requires skill, dexterity and patience not only in holding and wrapping the lines over one another, but in threading the end portions between the confronting helices in the proper directions.

The problems presented in tying such a knot are compounded when the knot is tied in the field where the angler is already burdened with his equipment and is often hampered by cold fingers, wet lines and other adverse conditions, all of which have a deleterious effect upon his dexterity and patience.

A variety of knot-tying devices have been made available for assisting the angler in tying barrel knots. Some of these devices are portable enough to be carried into the field. However, such devices have either been relatively complex in their design and construction, and therefore relatively expensive, or have required relatively elaborate procedures for their use, thus reducing their effectiveness as an aid to the angler in the field. In addition, many of these devices do not aid in the tying of true barrel knots. It would be advantageous to have available a simple, inexpensive knot-tying device which would enable an angler to tie a true barrel knot with ease and thus encourage him to become proficient in one of the more neglected skills of angling.

It is therefore an important object of the invention to provide a knot-tying device for use in tying true barrel knots between lines and can accommodate a wide variety of line weights.

Another object of the invention is to provide a compact, portable knot-tying device which is exceptionally easy to use in the field and which enables the tying of a true barrel knot without elaborate procedures.

Still another object of the invention is to provide a knot-tying device which is rugged and exceptionally simple in construction and therefore economical to manufacture.

A further object of the invention is to provide a knot-tying device in which the structure of the device itself indicates the manner in which it is to be used so that elaborate procedures need not be committed to memory and mistakes are avoided.

The above objects, as well as still further objects and advantages, are attained by the invention which may be described briefly as a knot-tying device for use in tying a true barrel knot between first and second lines, the knot-tying device comprising a block, and at least four releasable retaining means on the block located at each of four corners of a polygon having at least four sides, each of the four retaining means being oriented such that a length of one or the other of the first and second lines will be releasably retained therein with the line extending transverse to the plane of the polygon, at least two of the retaining means being resiliently releasable and facing one another such that the length of line retained therein will be released therefrom in response to lateral movement of the retained lengths toward one another.

The invention will be more fully understood, while still further objects and advantages will become apparent, in the following detailed description of preferred embodiments of the invention illustrated in the accompanying drawing, in which:

FIG. 1 is a plan view of a true barrel knot;
FIG. 2 is a plan view of a knot-tying device constructed in accordance with the invention;
FIG. 3 is a side elevational view of the knot-tying device taken in the direction of the arrow in FIG. 2;
FIG. 4 is a side elevational view of the knot-tying device taken in the direction of the arrow in FIG. 2;
FIG. 5 is a plan view of the knot-tying device illustrating its use in the construction of a barrel knot;
FIG. 6 is one plan view of an alternate embodiment of a knot-tying device constructed in accordance with the invention;
FIG. 7 is a side elevational view taken in the direction of the arrow in FIG. 6;
FIG. 8 is another plan view of the knot-tying device of FIG. 6; FIG. 9 is a side elevational view taken in the direction of the arrow in FIG. 6;
FIG. 10 is a plan view of the knot-tying device of FIG. 6 illustrating its use in the construction of a barrel knot;
FIG. 11 is a front elevational view of another embodiment of the invention illustrating another alternate knot-tying device constructed in accordance with the invention;
FIG. 12 is a side elevational view taken in the direction of the arrow in FIG. 11;
FIG. 13 is a side elevational view taken in the direction of the arrow in FIG. 11; and
FIG. 14 is a side elevational view similar to FIG. 13 but illustrating the use of the knot-tying device in constructing a barrel knot.

Referring now to the drawing, and especially to FIG. 1 thereof, a typical barrel knot is illustrated at 10. Barrels knot 10 joins together two consecutive lines 12 and 14. Line 12 is coiled around line 14 and makes three turns to establish a first helix 16. Likewise, line 14 is coiled around line 12 and makes three turns around that line to establish a second helix 18. The end portions 20 and 22 of the lines 12 and 14, respectively, are
threaded between the helixes 16 and 18 in opposite transverse directions such that when the knot is drawn tight the end portions 20 and 22 are firmly gripped between the confronting helixes 16 and 18 and emerge from the knot in opposite transverse directions. Thus, barrel knot 10 is a true barrel knot in that the end portions 20 and 22 of the lines 12 and 14 emerge from the knot in opposite directions. The opposite end portions 20 and 22 may be cut off very close to the helices 16 and 18 so that the barrel knot 10 presents a relatively smooth contour along the length of the knot. A true barrel knot is preferred since the knot presents a symmetrical configuration which enhances the desired smooth contour.

Turning now to FIGS. 2, 3 and 4, a knot-tying device constructed in accordance with the invention is illustrated generally at 30 and is seen to include a block in the form of a bar 32, which in this instance is a parallelepped, having front and rear portions in the form of front and rear surface 34 and 36, respectively, extending between opposite ends 38 and 40, and opposite side portions in the form of side surfaces 42 and 44, also extending between the opposite ends 38 and 40. Four resiliently releasable retaining means are provided in the form of spring clips 46, 48, 50 and 52, each located at one of four corners of the bar 32, the four corners representing four corners of a polygon of four sides as viewed in either FIG. 3 or FIG. 4. The spring clips each include a leaf spring 54 affixed to the bar 32 by fastener means, illustrated in the form of rivets 56, such that each leaf spring 54 is held firmly against a corresponding front and rear surface 34 or 36. Thus, each leaf spring 54 cooperates with its corresponding surface 34 or 36 to form a spring clip 46, 48, 50 or 52 with the leaf spring 54 serving as one jaw of the clip. Each leaf spring 54 is raised from its corresponding surface 34 or 36 at the tip 58 of the leaf spring 54 to provide an opening 60 into the jaws of the spring clip. Each side surface 42 and 44 of the bar 32 is provided with a direction indicating means, here shown in the form of notches 62 and 64, one in each side surface, the notches 62 and 64 both having an arrowhead configuration such that one notch 62 is a pointer which points toward the front surface 34 of the bar while the other notch 64 is a pointer which points toward the rear surface 36 of the bar.

Referring now to FIGS. 2 and 5, the knot-tying device is used for the construction of a barrel knot as follows: The first line 12 is placed in the opening 60 beneath the leaf spring 54 of the first spring clip 46 and is moved laterally until the line 12 is held in place by the leaf spring 54 against the bar 32 at a location spaced from the terminal end 66 of the line. Likewise, the second line 14 is placed in the opening 60 beneath the leaf spring 54 of the second spring clip 48 and is moved laterally until the second line 14 is held between the leaf spring of the second spring clip 48 and the front surface 34 of the bar 32 at a location spaced from the terminal end 68 of the second line, both lines 12 and 14 then being held parallel as seen in FIG. 2. Then, the end portion 20 of the first line 12 is wrapped around the opposite portion 70 of the second line 14 through a plurality of turns 72 which will establish the coils of the first helix 16 of the barrel knot. The number of turns 72 is a matter of choice, but three turns are usually adequate and three turns 72 are illustrated. Upon completion of the wrapping to establish the desired number of turns 72, the terminal end 66 of the first line 12 is then threaded through the loop 74 formed between the first and second lines adjacent the side surface 42 of the bar 32. The direction of such threading is indicated by the direction-indicating notch 62; hence, the terminal end 66 of the first line 12 is threaded from below the loop 74, as seen in FIG. 5 upwardly through the loop. After the terminal end 66 is threaded through the loop 74, the first line 12 is anchored near its terminal end by placing the first line between the leaf spring 54 of third spring clip 50 and the corresponding portion of the rear surface 36.

Now, the end portion 22 of the second line 14 may be wrapped around the opposite portion 80 of the first line 14 in a manner similar to that in which the first line was wrapped around the second line. Upon completion of the desired number of turns 82, the terminal end 86 of the second line is threaded through the loop 84 formed by the first and second lines adjacent the other side surface 44 of the bar 32, the direction of threading being indicated by the direction-indicating notch 64. Hence, the terminal end 86 of the second line is threaded in a direction extending from the front surface 34 toward the rear surface 36 and is then placed between the leaf spring 54 of the fourth spring clip 52 and the corresponding portion of the rear surface 36 where the second line 14 is anchored adjacent the terminal end 68 thereof.

Now, the first and second lines 12 and 14 may be pulled in opposite directions as indicated by the arrows in FIG. 5. Since the first and second spring clips 46 and 48 are arranged so that the openings 60 thereto face one another, the pulling of the two lines will draw the knot tight and simultaneously draw the two lines laterally toward one another to close the loops 74 and 84 and pull the lines from beneath their respective spring clips 46 and 48. Continued pulling of the lines will tighten the knot to establish the two confronting helixes 16 and 18 and to clamp the end portions 20 and 22 of the two lines between the confronting helixes. Since the end portion 20 and 22 have been threaded in prescribed directions, the end portions will project from the knot 10 in opposite directions. These end portions 20 and 22 may then be released from the spring clips 50 and 52 and cut off close to the helixes 16 and 18 to complete a smooth contoured symmetrical barrel knot.

Turning now to FIGS. 6 through 9, another embodiment of the invention is illustrated in the form of a knot-tying device 100 constructed in accordance with the invention. Knot-tying device 100 also includes a block shown in the form of a bar 102, also a parallelepiped, having opposite parallel front and rear surfaces 104 and 106 extending between opposite ends 108 and 110 of the bar and opposite side surfaces 110 and 112, also extending between the opposite ends 108 and 109.

A first coil spring 114 is located in a groove 116 in one end 108 of the bar and includes first and second arms 118 and 120, respectively. The first arm 118 includes a first portion 122 which extends along the rear surface 106 of the bar 102, a second portion 124 which passes transversely through the bar 102 and a third portion 126 which terminates in a finger 128 resting
against the front surface 104 of the bar 102. The second arm 120 also extends from one end toward the other end of the bar 102 and includes a first portion 130 spaced from the front surface 104 of the bar, a second portion 132 passing through the bar and a third portion 134 terminating in a finger 136 held against the rear surface 106 of the bar 102.

A second coil spring 140 is located in a groove 142 in the opposite end 109 of the bar 102 and also includes first and second arms 144 and 146 extending from that end of the bar toward the opposite end 108 of the bar. The first arm 144 includes a first portion 148 which extends along the rear surface 106 of the bar 102, a second portion 150 passing through the bar and a third portion 152 terminating in a finger 154 resting against the front surface 104 of the bar. The second arm 146 includes a first portion 156 spaced from the front surface 104 of the bar 102, a second portion 158 extending through the bar and a third portion 160 terminating in a finger 162 resting against the rear surface 106 of the bar 102. Each of the fingers 128, 136, 154 and 162 serves as a jaw of a spring clip so that here too the knot-tying device 100 is provided with four resiliently releasable retaining means located at four corners of a polygon of four sides. As best seen in FIG. 7, each finger 128 and 154 may be lifted from the front surface 104 by pushing the coil spring 114 or 140 toward the rear, as illustrated in 164 in FIG. 7. Each finger 136 and 162 may be lifted from the rear surface 106 of the bar 102 by pushing upon the second arm 120 or 146 of each coil spring 114 or 140 as illustrated at 166 in FIG. 7.

As in the earlier described embodiment, direction indicating means are provided in the form of notches 168 and 170 in each of the side surfaces 110 and 112, the notches having the configuration of a pointer with notch 168 pointing toward the front surface 104 and notch 170 pointing toward the rear surface 106 of the bar 102.

Turning now to FIG. 10, the knot-tying device 100 is used to construct a barrel knot in much the same manner as the earlier described embodiment of FIGS. 2 through 5. The first and second lines 12 and 14 are first placed beneath the corresponding fingers 128 and 154 of the coil springs 114 and 140, respectively, and held in place against the front surface 104. The end portion 20 of the first line 12 is then wrapped around the corresponding parallel portion 70 of the second line 14 to establish three turns 72 and is then threaded through the loop 74 in the direction indicated by the notch 168. Subsequently, the end portion 20 is placed beneath the finger 162 of the coil spring 140 to anchor the end portion against the rear surface 106 of the bar 102. Likewise, the end portion 22 of the second line 14 is wrapped around the corresponding parallel portion 80 of the first line 12 to establish three turns 82 and is then threaded through the loop 84 in the direction indicated by the notch 170. The end portion 22 is then anchored beneath the finger 134 of the coil spring 114 against the rear surface 106 of the bar 102. It is noted that the relationship between the fingers of a single coil spring is such that movement of either one finger away from its corresponding surface will tend to urge the other finger toward its corresponding surface so that when each coil spring is actuated to move the finger away from the rear surface as the end portion of a line is anchored to the rear surface, the portion of the line which is clamped between the other finger and the front surface is held with a greater clamping force, thus tending to retain that line in place.

Upon pulling the lines 12 and 14 in opposite directions, as indicated by the arrows in FIG. 10, the portions of the lines forming the loops 74 and 84 will be moved laterally toward one another and will be released from beneath their respective fingers 128 and 154 to enable the knot to tighten and to establish the confronting helixes 16 and 18. The end portions 20 and 22 of the lines, having been threaded through the loops 74 and 84 in a prescribed direction will be clamped between the confronting helixes 16 and 18 and will project from the knot 10 in opposite directions, as before.

Referring now to FIGS. 11, 12 and 13, still another embodiment of the invention is illustrated in the form of knot-tying device 200 which includes a block with a composite construction including a body of resilient elastomeric material, such as rubber, shown in the form of a core 202 sandwiched between a pair of side plates 204 and 206 which are held together by fastening means shown in the form of rivets 208. The block is generally parallelepipedal and includes front and rear portions in the form of front and rear edges 210 and 212 extending between opposite ends 214 and 216 and opposite side portions in the form of side surfaces 218 and 220 also extending between the opposite ends. The core 202 of the block is provided with a notch 222 adjacent the front edge 210 of the block intermediate the opposite ends 214 and 216 and terminating at a forward-facing surface 224 on the core 202. A first resiliently releasable retaining means is provided by a slit 226 in the core extending from the notch 222 toward one end 214 of the block while a second resiliently releasable retaining means is provided by a second slit 228 extending from the notch 222 in an opposite direction toward the opposite end 216 of the block. Third and fourth resiliently releasable retaining means are provided adjacent the rear edge 212 of the block by third and fourth slits 230 and 232 in the core 202 adjacent the rear edge of the block. The configuration of the side plates 204 and 206 is such that the slits 226, 228, 230 and 232 are exposed for the reception of the first and second lines 12 and 14 as will be described hereinafter.

Direction indicating means are provided in each of the side surface in the form of directional arrows or pointers 234 and 236, respectively, etched, scored or otherwise permanently displayed in the side plates 204 and 206 as shown in FIGS. 12 and 13.

Referring now to FIG. 14, knot-tying device 200 is employed in constructing a true barrel knot in a manner similar to that described in connection with the earlier embodiments. The first line 12 is inserted into the first slit 226 and is held at a location spaced from the terminal end 66 of the first line 12 by the resilient grip of the elastomeric material of the core 202. Likewise, the second line 14 is placed within the second slit 228. The end portion 20 of the first line 12 is then wrapped around the corresponding parallel portion 70 of the second line 14 to establish three turns 72 and is then threaded through the loop 74 in the direction indicated by the pointers 234. The first line
12 is then anchored adjacent its terminal end 66 within the third slit 230. The end portion 22 of the second line 14 is then wrapped around the corresponding parallel portion 80 of the first line 12 to establish three turns 82 and is then threaded through the loop 84 in the direction indicated by the pointers 236 in the side plate 206. The second line 14 is then anchored adjacent its terminal end 68 in the fourth slit 232. Upon pulling the lines 12 and 14 in opposite directions, as indicated by the arrows in FIG. 14, the portions of the first and second lines which form the loops 74 and 84 will move laterally and will be released from the first and second slits 226 and 228 while the respective turns 72 and 82 will be tightened to establish the confronting helices 16 and 18. Continued pulling on the lines will clamp the end portions 20 and 22 of the lines between the confronting helices 16 and 18 to complete the barrel knot 10 with the end portions projecting from the knot in opposite directions. The end portions 20 and 22 may then be removed from their respective slits 230 and 232 and cut off to complete a smooth-contoured, symmetrical barrel knot.

It will be seen that each of the above described embodiments is exceptionally simple in construction and may be fabricated of corrosion resistant materials for long and dependable service. Elaborate procedures are not required in order to construct a true barrel knot and those procedures which must be performed need not be committed to memory since the manner in which the devices will be used is indicated on the device by the direction indicating means. Each device is capable of handling a wide range of line weights.

It is to be understood that the above detailed description of preferred embodiments of the invention is provided by way of example only. Various details of design and construction may be modified without departing from the true spirit and scope of the invention as set forth in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:
1. A knot-tying device having a plurality of laterally spaced line holding means for use in tying a true barrel knot between first and second lines, said knot-tying device comprising:
   a block; and
   at least four releasable retaining means on said block located one at each of the four corners of a polygon having at least four sides, each of said four retaining means being oriented such that a length of one or the other of said first and second lines will be releasably retained therein with the line extending transverse to the plane of said polygon;
   at least two of said retaining means being releasably releasable and facing one another such that the length of line retained therein will be released therefrom in response to lateral movement of said retained lengths toward one another;
   direction indicating means on said block extending in directions parallel to the plane of said polygon; and
   a plurality of releasable retaining means secured to the rear portion of said block in spaced relationship to each other for receiving and releasably holding, respectively, the terminal end of each of said lines.
2. A knot-tying device having a plurality of laterally spaced line holding means for use in tying a true barrel knot between first and second lines, said knot-tying device comprising:
   a block having opposite front and rear portions, said portions extending longitudinally between opposite ends of the block, and a pair of opposite side portions extending transversely between the front and rear portions;
   a first resiliently releasable retaining means secured to the front portion adjacent one end of said block for receiving and releasably holding the first line at a location on the line spaced from the terminal end of the line;
   a second resiliently releasable retaining means secured to the front portion adjacent the other end of said block spaced from said first resiliently releasable retaining means for receiving and releasably holding the second line generally parallel to the first line at a location on the line spaced from the terminal end of the second line;
   said first and second resiliently releasable retaining means facing one another so as to enable the respective lines retained therein to be released in response to lateral movement of the lines toward one another;
   third and fourth releasable retaining means at the rear portion of the block for receiving and releasably holding, respectively, the terminal end of each of said lines; and
   direction indicating means at said side portions for indicating the direction in which the terminal end of each line is to be threaded between the lines retained in said first and second retaining means prior to being secured in said third and fourth retaining means.
3. The knot-tying device of claim 2 wherein:
   said block is a bar, said front and rear portions are opposite front and rear surfaces on said bar and said side portions are opposite side surfaces on said bar;
   said first resiliently releasable retaining means is a first spring clip affixed to the bar adjacent one end of the bar and includes a jaw with an opening facing the other end of the bar;
   said second resiliently releasable retaining means is a second spring clip affixed to the bar adjacent the other end of the bar and includes a jaw with an opening facing one end of the bar;
   the jaw of the first spring clip being spaced longitudinally along the front surface from the jaw of the second spring clip.
4. The knot-tying device of claim 3 wherein:
   said third releasable retaining means is a third spring clip affixed to the bar adjacent one end of the bar and includes a jaw with an opening facing the other end of the bar; and
   said fourth releasable retaining means is a fourth spring clip affixed to the bar adjacent the other end of the bar and includes a jaw with an opening facing said one end of the bar;
   the jaw of the third spring clip being spaced longitudinally along the rear surface from the jaw of the fourth spring clip.
5. The knot-tying device of claim 4 wherein each of said spring clips is a leaf spring and said direction indicating means includes:
a first pointer on one of said side surfaces pointing from the rear surface toward the front surface; and a second pointer on the other of said side surfaces pointing from the front surface toward the rear surface.

6. The knot-tying device of claim 5 wherein said bar is a parallelepiped.

7. The knot-tying device of claim 3 wherein said direction indicating means includes:
   a first pointer on one of said side surfaces pointing from the rear surface toward the front surface; and a second pointer on the other of said side surfaces pointing from the front surface toward the rear surface.

8. The knot-tying device of claim 3 wherein each of said spring clips is a leaf spring.

9. The knot-tying device of claim 2 wherein said block is a bar, said front and rear portions are opposite front and rear surfaces on said bar and said side portions are opposite side surfaces on said bar, said knot-tying device including first and second coil springs located at opposite ends of the bar, each of said coil springs having
   a first arm with a first portion extending longitudinally along the rear surface of the bar toward the other end of the bar, a second portion passing transversely through the bar, and a third portion terminating in a first finger extending further toward the other end of the bar along the front surface of the bar, said first finger including a first jaw resiliently biased against said front surface by said coil spring, and
   a second arm with a first portion extending longitudinally toward the other end of the bar and spaced from said front surface, a second portion passing through the bar, and a third portion terminating in a second finger extending further toward the other end of the bar along the rear surface of the bar, said second finger including a second jaw resiliently biased against said rear surface by said coil spring.

10. The knot-tying device of claim 9 wherein said direction indicating means includes:
    a first pointer on one of said side surfaces pointing from the rear surface toward the front surface; and a second pointer on the other of said side surfaces pointing from the front surface toward the rear surface.

11. The knot-tying device of claim 10 wherein said bar is a parallelepiped.

12. The knot-tying device of claim 2 wherein each said resiliently releasably retaining means comprises a pair of juxtaposed jaws of elastomeric material.

13. The knot-tying device of claim 2 wherein said block is constructed at least partially of an elastomeric material and at least one of said resiliently releasably retaining means comprises a slit passing through said elastomeric material for receiving and gripping a line.

14. The knot-tying device of claim 13 wherein said third and fourth releasably retaining means are, respectively, slits in said body adjacent the rear edge thereof.

15. The knot-tying device of claim 13 wherein:
    said block includes a body of elastomeric material, said front and rear portions are opposite front and rear edges of said body and said side portions are side surfaces on said body;
    said first resiliently releasably retaining means is a first slit in said body extending from a closed end adjacent one end of the body toward an open end facing the other end of the body; and
    said second resiliently releasably retaining means is a second slit in said body extending from a closed end adjacent the other end of the body toward an open end facing the open end of the first slit and spaced longitudinally therefrom.

16. The knot-tying device of claim 15 wherein said body includes a notch therein extending from the front edge toward the rear edge of the body and the open ends of the first and second slits are located at said notch.

17. The knot-tying device of claim 15 wherein said direction indicating means includes:
    a first pointer on one of said side surfaces pointing from the rear edge toward the front edge; and
    a second pointer on the other of said side surfaces pointing from the front edge toward the rear edge.

18. The knot-tying device of claim 15 wherein said block is a composite block including a pair of relatively rigid side plates extending along said side surfaces such that the body of elastomeric material is sandwiched between the side plates, said side plates having a configuration which terminates short of the slits in the body so as to expose the slits for the reception of said lines.

19. The knot-tying device of claim 18 wherein said body includes a notch therein extending from the front edge toward the rear edge of the body and the open ends of the first and second slits are located at said notch.

20. The knot-tying device of claim 18 wherein said direction indicating means includes:
    a first pointer on one of said side surfaces pointing from the rear edge toward the front edge; and
    a second pointer on the other of said side surfaces pointing from the front edge toward the rear edge.