May 20, 1941. W. A. MEIGHAN 2,242,533

METHOD OF FASTENING ROPES TO FITTINGS

Filed Jan. 2, 1940

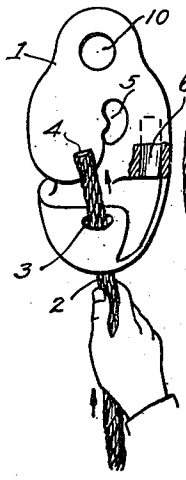


Fig. 1.

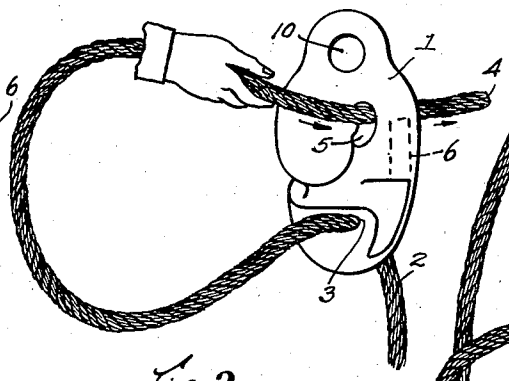


Fig. 2.

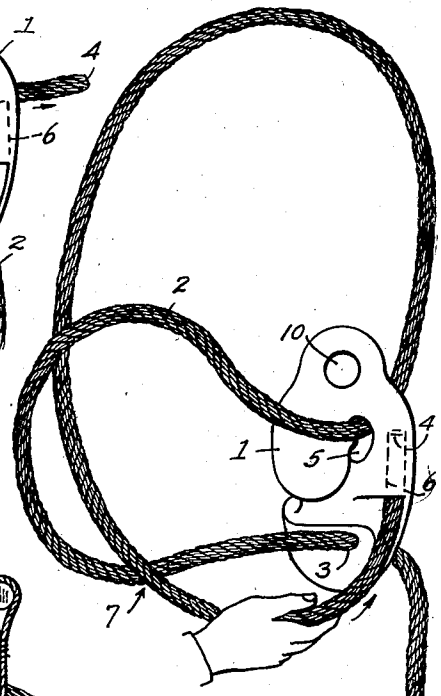


Fig. 3.

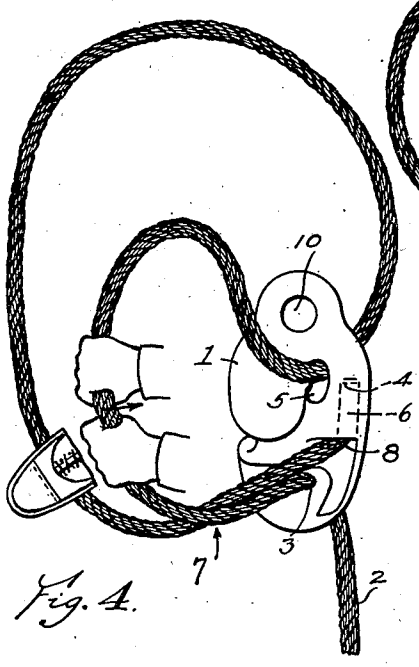


Fig. 4.

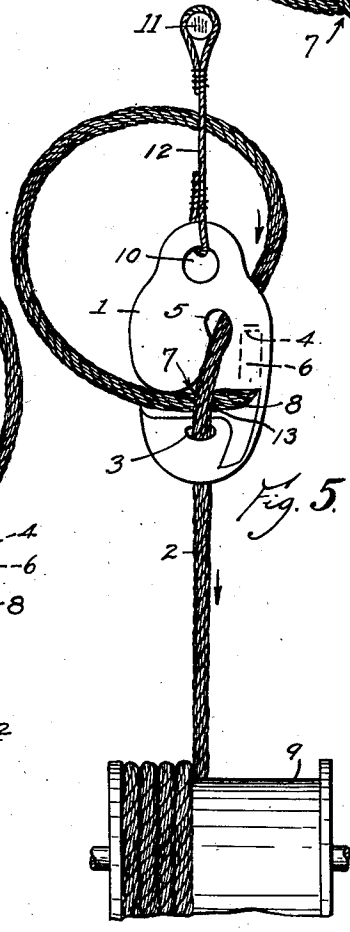


Fig. 5.

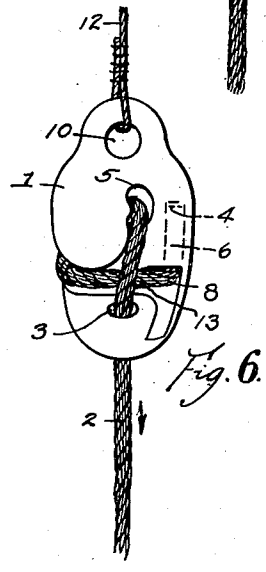


Fig. 6.

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2,242,533

METHOD OF FASTENING ROPES TO FITTINGS

William A. Meighan, Portland, Oreg.

Application January 2, 1940, Serial No. 312,037

6 Claims. (Cl. 24—129)

My invention relates to the fastening of cables to fittings, and it relates more particularly to the fastening of relatively stiff cables, such as those made of steel having a high carbon content, to fittings so small that said cable must be bent sharply to form a knot thereon. This application is a continuation in part of my copending application for United States patent for Rope fitting, which matured into United States Patent No. 2,193,236 granted March 12, 1940.

In the art of fastening ropes and cables to various objects, there have heretofore been developed two general methods. First, stiff cables have commonly been fastened by some kind of clamp that held said cable by gripping it. In some cases, molten metal such as zinc has been poured around the cable to hold it in a socket. This method is disadvantageous in that the fitting must be unduly large, and because facilities for melting zinc are often not available at the place where said cable must be fastened.

Second, in tying flexible ropes it has long been customary to arrange the rope so that one portion underlies another portion that is under tension, making the rope self-binding. This method has not heretofore been used in fastening steel cables because their stiffness has prevented them being drawn down into a compact knot. It is necessary to use some source of mechanical power to draw down even a small steel cable, and the loops thereof cannot be controlled as can those of a flexible rope.

In drawing down a steel cable into a self-binding knot by mechanical power, two general methods may be used. First, tension may be applied to the cable on the opposite sides of the knot, in the way a knot is ordinarily tied in a string. This method is not satisfactory because, for one reason, there is necessarily a loose cable end that will tend to work loose and be otherwise objectionable, and, for another reason, because the subsequent working force on the cable will be applied somewhat differently than the force used to draw down the knot. Therefore, a knot formed in this way will work loose.

The second method of drawing down a steel cable into a self-binding knot, and the method which I prefer, is to apply the force to the cable on one side of the knot and to the fitting on the other, that is, I apply tension between the cable and the fitting to draw the knot tight. This method is advantageous in that the force used to draw down the knot will be applied in exactly the same way as the working force thereafter applied to the cable, and said working force consequently will not loosen said knot. Furthermore, by this method, the otherwise loose cable end may be covered in some way.

However, this method of drawing down a steel cable has not heretofore been used because the cable would slip off the fitting, instead of drawing down into a self-binding knot. The stiffness of a steel cable makes it extremely difficult to hold while it is being drawn down. However, I have found that, by the method hereinafter described, the heaviest and stiffest cable can be drawn down by power into a small, compact knot that will not work loose. Furthermore, said knot may be much more simple than a knot in a flexible rope, and it therefore may be made to occupy very little space, which is a matter of importance for my purpose. In carrying out my invention, I make use of the very factor which has heretofore frustrated all attempts to fasten a steel cable to a fitting by means of a self-binding knot, namely, the stiffness of the cable.

The principal object of my invention is to fasten a stiff rope or cable to a fitting by means of a self-binding knot.

A further object of my invention is to fasten a cable to a fitting without the aid of tools of any kind.

A further object of my invention is to utilize the source of power with which a cable is ordinarily employed to draw a knot in said cable down upon a fitting.

A further object of my invention is to fasten a cable to fitting by means of a self-binding knot that is so compact in size that said knot and fitting may be easily handled in places where little room is available.

A further object of my invention ist to fasten a cable to a fitting by means of a self-binding knot having no loose ends.

Other objects and advantages of my invention will be disclosed in the description thereof with reference to the accompanying drawing, in which:

Fig. 1 is a view of a cable and a fitting therefor, the end of said cable being inserted through one aperture of said fitting;

Fig. 2 is a view similar to Fig. 1 but said cable further inserted through a second aperture in said fitting;

Fig. 3 is a view similar to Fig. 2 but with the cable end carried around and inserted in a socket;

Fig. 4 is a view similar to Fig. 3 but with one of the loops of said cable shown partially separated from the other loop, a man's hands and foot being shown in position for separating said loops;

Fig. 5 is a view similar to Fig. 4 but with the knot in said cable shown partially drawn down, power means for so drawing said knot being shown fragmentarily; and

Fig. 6 is a view similar to Fig. 5, but with said knot fully drawn down, said power means not being shown.

A fitting 1 suitable for being fastened to a rope 2 by my method comprises a body member having a transverse aperture 3 thru which I prefer to insert the end 4 of said rope as the first step of said method. Said end should be drawn through said aperture for a substantial distance and then passed through a second aperture 5 in said fitting. The loop thus formed between said apertures should not immediately be drawn down; it should temporarily remain of substantial size, such as is shown in Fig. 2. End 4 of said rope should now be brought around and passed through said loop in order that it will be snubbed thereby when said loop finally is drawn down. Next, I prefer to insert said end in a chamber or pocket 6 of said fitting. I prefer said chamber to be immediately adjacent aperture 3.

As is shown in Fig. 3, the method thus far described results in the formation of two loops, one between the two apertures, and the other between aperture 5 and chamber 6. Said loops will be interlinked and, as formed in a heavy steel rope, there will naturally be a considerable distance, along said rope, from said chamber to the point 7 where said ropes cross. This is the portion held by the hand in Fig. 3. As the final step in the manually performed part of my method, I slide said first mentioned loop toward said chamber, moving said point 7 where said ropes cross toward said chamber. I have found that this may be done even with a heavy rope by placing my foot on one of said loops and pulling with my hands on the other, as is shown in Fig. 4. It will be seen that a sharp bend 8 is thus formed in said rope at the entrance to said chamber, and that considerable leverage will be available in forming said bend due to the stiffness of said rope.

In this way, I pull said loops to approximately the position shown in Fig. 4, or the loop may be pulled a little further, moving point 7 a little closer to chamber 6, if desired. I then apply power, as by drum 9, to pull said loops tight. Fitting 1 is provided with an eye 10 adapted to engage a clevis, or the like, or a hook might be provided instead of said eye. In any case, I prefer to anchor said fitting by whatever part of it that is normally used to pull a load. For purpose of illustration, I have shown said fitting anchored to post 11 by strap 12.

The application of power first draws down the loop between said two apertures to the position shown in Fig. 5, thus forming a still sharper bend at 8 and forcing the portion of cable 13 immediately adjacent said bend firmly down into the groove provided for it. The stiffness of the cable then holds it in place, whereas the stiffness of the cable causes it to clip off the fitting with other methods of application. In this way, the cable is secured by power at the beginning of the application of said power, and I deem this an important result inasmuch as said cable end is thus securely held while the remainder of the knot is drawn down, whereas otherwise the knot would slip off the fitting instead of being drawn down.

Further application of power results in said knot being drawn down to the form shown in Fig. 6, the fitting then being ready for use in the ordinary way. It will be seen that subsequent pulling on said cable and fitting will be in the same direction as the force that drew down the knot. Knot will not thereby tend to work loose as it would if it had been drawn tight by forces applied, say, to the rope on opposite sides of said knot instead of between the rope and fitting.

I have thus described a method whereby a rope or cable may be formed in a loose knot around a fitting, and thereafter by applying power to said rope and fitting in the same way they are to be subsequently used said rope may be drawn tight into a self-binding knot. By confining the manual part of said method to operation on said knot when the latter is in a loose form, it is possible to carry out said method with even the heaviest and stiffest cables.

I claim:

1. The method of securing the end of a cable to a chambered fitting provided with a lateral aperture consisting in threading said cable through said aperture forming a looped section loosely about said fitting, threading said cable end beneath the cable lying immediately adjacent the point where it emerges from said aperture, inserting the extreme end of said cable in said chamber, and bending a sharp kink in said cable immediately adjacent the mouth of said chamber and simultaneously binding said looped section to the face of said fitting.

2. The method of securing the end of a cable to a chambered fitting provided with a lateral aperture consisting in threading said cable through said aperture forming a looped section loosely about said fitting, threading said cable end beneath the cable lying immediately adjacent the point where it emerges from said aperture, inserting the extreme end of said cable in said chamber, bending a sharp kink in said cable immediately adjacent the mouth of said chamber and simultaneously binding said looped section to the face of said fitting, and thereafter drawing said cable through said aperture to tighten said looped section and bind it about said fitting.

3. The method of securing the end of a cable to a chambered fitting provided with two lateral apertures consisting in threading said cable through said apertures, forming a looped section of cable lying between said apertures, forming a second looped section loosely about said fitting, threading said second looped section beneath said first mentioned section, inserting the extreme end of said cable in said chamber, drawing the cable longitudinally to flatten the loop from said first section, thereby bending a sharp kink in said cable immediately adjacent the mouth of said chamber and simultaneously binding said second looped section to the face of said fitting.

4. The method of securing the end of a cable to a chambered fitting provided with two lateral apertures consisting in threading said cable through said apertures, forming a looped section of cable lying between said apertures, forming a second looped section loosely about said fitting, threading said second looped section beneath said first mentioned section, inserting the extreme end of said cable in said chamber, drawing the cable longitudinally to flatten the loop from said first section, thereby bending a sharp kink in said cable immediately adjacent the mouth of said chamber and simultaneously binding said

second looped section to the face of said fitting, and thereafter drawing said cable through said apertures to tighten said second looped section and bind it about said fitting.

5. The method of securing the end of a relatively stiff cable to a chambered fitting provided with a pair of spaced apertures extending therethrough, and a chamber formed therein, comprising threading one end of said cable through one of said apertures and back through the other aperture forming a loop of substantial size between said apertures and extending laterally from said fitting, drawing said end from said last mentioned aperture and forming a loop about said fitting, passing said end through the first mentioned loop and inserting the extreme end of the cable in the chamber in said fitting, forming a sharp bend in said cable adjacent the mouth of said chamber and then pulling in the remainder of said cable to reduce said loops, thereby first drawing the end of the cable adjacent the bend in the cable tightly against said fitting and then drawing the second loop tightly about said fitting.

6. The method of securing the end of a relatively stiff cable to a chambered fitting provided with a pair of spaced apertures extending therethrough, and a chamber formed therein, comprising threading one end of said cable through one of said apertures and back through the other aperture forming a loop of substantial size between said apertures and extending laterally from said fitting, drawing said end from said last mentioned aperture and forming a loop about said fitting, passing said end through the first mentioned loop and inserting the extreme end of the cable in the chamber in said fitting, forcing said first mentioned loop laterally toward said chamber and thus forming a sharp bend in said cable adjacent the mouth of said chamber and then pulling in the remainder of said cable to reduce said loops, thereby first drawing the end of the cable adjacent the bend in the cable tightly against said fitting and then drawing the second loop tightly about said fitting.

WILLIAM A. MEIGHAN.