# United States Patent [19]

**Cartwright**

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[54] **RECOVERY CABLE CONNECTOR FOR DIVER-SWIMMER**


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[58] **Field of Search** ..... 294/110, 86.29, 86.33; 24/230 AT, 123 A; 340/275, 52 E; 287/20.5; 114/51, 52; 61/69 A; 403/27, 325, 330, 327



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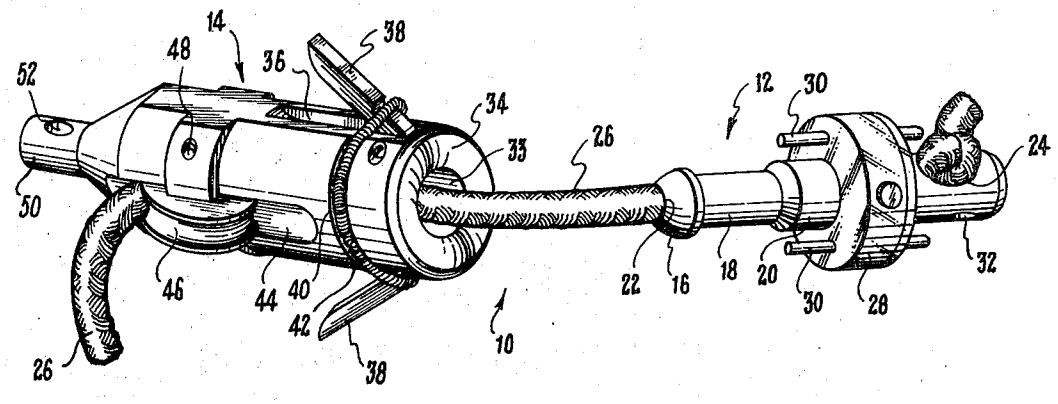
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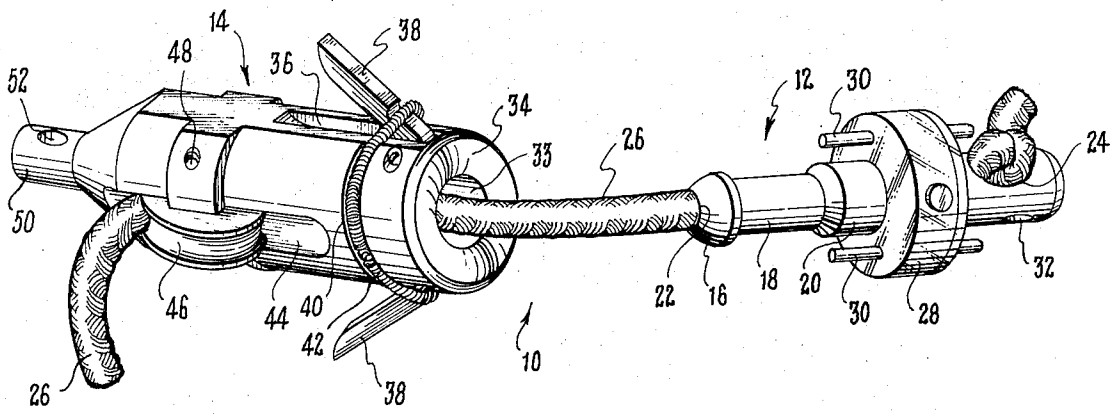


[57] **ABSTRACT**

A cable connector suited for underwater salvage operations by diver-swimmers having an engagable male and a female part. The male member is attached to a hoisting line and flotation gear and the female part is attached to the load. A hauling line attached to the male member, leads away from the head, threads into the central barrel and over a sheave in the female part. Pulling on the hauling line brings the two parts into locking engagement. Spring-loaded cammable latches on the female part engage the head of the male member for a swivel connection.


**3 Claims, 1 Drawing Figure**






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# RECOVERY CABLE CONNECTOR FOR DIVER-SWIMMER

## BACKGROUND OF THE INVENTION

Salvage operations underwater by "Hard-hat" and "Scuba" divers requiring normal tasks, such as locating an item, are at best tiring and time consuming. Operations requiring much labor, such as carrying and attaching the heavy, stiff hoisting cables to the salvage item may be almost impossible because of the additional exertion of the diver and the concomitant use of breathing air. These factors severely limit the time a diver has to work on the project.

Attempts to solve these problems have generally been in the nature of diver carrying messenger lines down to the salvage item. The hoisting cable may be attached to the messenger line by the screw on the surface vessel and hauled down by the diver for attachment to the item by shackles and other connectors. This task is also difficult because the heavy cables perhaps influenced by water currents must be held in alignment to the item while connection is made.

Another method shown by the prior art involves the use of a neutrally-buoyant buoy carried by the diver to the salvage item where a fitting is shackled on and the buoy is released to float to the surface on a messenger line. Later, a mating fitting is lowered down the messenger line to engage the fitting attached by the diver. This method suffers because of the lack of positive control to mate the fittings and also the bulk of the neutrally buoyant buoy that the diver must carry around.

## SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a cable connector suitable for salvage operations.

Another object of the instant invention is to provide a cable connector that can be conveniently used by divers and swimmers underwater.

A further object of the invention is to provide a cable connector that can be readily engaged by divers or by surface salvage ship personnel.

A still further object of the instant invention is to provide a cable connector that may be pulled into engagement by a light hauling line and is later capable of carrying heavy strains in lifting salvage items.

Briefly, these and other objects of the present invention are attained by the use of a cable connector having an engagable male and a female part. The female part may be shackled to the salvage item and the male part connected to the floatation gear or hoisting cable. A hauling line, of plaited nylon attached to the male part, extends coaxially out the head and is threaded into the opening and over a sheave in the female part so that hauling of the line causes the parts to be brought into union where spring-loaded latches on the female part engage the enlarged head of the male part. Thereafter, a strain may be taken by the floatation gear and cables to raise the salvage item to the surface.

## BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention and many of the attendant advantages thereof will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

The FIGURE is a pictorial view of the cable connector just prior to engagement.



## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, there is shown in the FIGURE generally a cable connector **10**, having a male part **12** and a female part **14**. The male part comprises an enlarged head **16**, a shaft **18** having a reduced diameter and base **20**. Bored coaxially through the male part is a passage **22** open at the head **16** and exiting at the base **20** by an intersecting angular hole **24** to form a communicating passage. A plaited nylon hauling line **26** is knotted at hole **24** and extends out passage **22** at head **16**.

Affixed about the base **20** of the male part **12** is an insulating ring **28** having therein a pair of spring-loaded electrical contactors **30**. A transverse hole **32** in base **20** may be used to connect the male part **12** to floatation or other lifting gear (not shown).

The female part **14** of the cable connector **10** comprises a barrel **33** having a bell-mouthed entrance **34**. A plurality of latches **38** in slots **36** intersecting with the barrel **33** are pivotally attached to the body of the female part **14** to engage head **16** of the male part **12** when inserted. A circumferential groove **40** about the body of the female part **14** has a helically wound spring **42** embracing the body and thereby the latches **38** to bias them inwardly.

At the inner end of the barrel **32** and open to the side of the body is a slot **44** containing a sheave **46** mounted for rotation about an axle pin **48** and having the hauling line **26** bent thereover. On the end opposite the bell-mouthed opening **34** of the female part is a lug **50** having a transverse hole **52** for attachment to a salvage item to be hoisted.

In operation, the floatation or hoisting gear (not shown) is first attached to the base **20** of the male part by the use of hole **32** in any conventional manner, as for example by a shackle. A hauling line **26** made of plaited nylon for example is threaded into the coaxial passage **22** in the tip **16** and out the intersecting hole **24** where it is knotted. A diver takes the hauling line **26** with him and descends to the salvage item. He attaches the female part **14** to the salvage item by the use of hole **52** in lug **50** in any conventional manner as for example by a shackle. He then inserts the hauling line **26** into the bell-mouthed entrance **34** in the female part **14**, through the barrel **33**, and out the slot **44** over the sheave **46**. Thence the diver pulls on the hauling line **26** drawing the male part **12** to a position adjacent the female part **14**, where the tip **16** enters the entrance **34** readily due to the bell-mouthed shape, into the barrel **33** where the latches **38** are cammed outwardly against the spring **42**, and finally when full penetration is achieved, the latches spring inwardly gripped behind the head at the reduced diameter of the shaft **18**. In this position, the spring-biased contactors **30** in the insulating ring **28** contact the female part closing an electrical circuit to thereby signal the condition to a surface ship to begin hoisting or to ignite a squib to inflate floatation gear and thus bring the salvage item to the surface.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within

the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

**1.** A cable connector assembly comprising:

an elongated male part attachable to hoisting means having

an enlarged head portion,

a reduced shaft portion,

a base portion, and

a central passage extending substantially through said male part;

a female part attachable to a load having an internal passage with a bell-mouthed entrance portion;

a plurality of latches pivotally attached to and normally lying flush with the outer diameter of said female part;

an annular groove extending about the periphery of said female part;

an annular spring positioned in said groove and embracing said plurality of latches to hold them in the flush position; and

a flexible line interconnecting said male and female parts, said line being secured to said male part and extending through said central passage and out of said enlarged head portion, threaded into said entrance portion and passing through said internal passage of said female part, and out the side of said female part,

whereby pulling of the loose end of said line causes said male part to enter and be engaged by said female part.

**2.** The cable connector assembly of claim **1** further comprising:

electrical contactors attached to said male part for completing a circuit when engaged with said female part.

**3.** The cable connector assembly of claim **1** further comprising:

a sheave rotatably attached to said female part for smoothly guiding said line therethrough.

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