United States Patent

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[54] **FLAME-CUTTING TORCH**
2 Claims, 3 Drawing Figs.

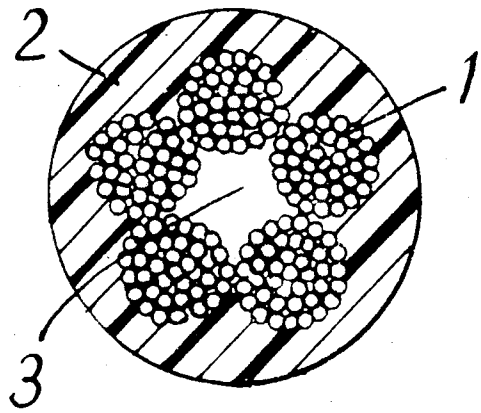
[52] **U.S. Cl.** **219/70,** 219/74, 219/145

[51] **Int. Cl.** **B23k 35/02**
[50] **Field of Search** 219/70, 74, 75, 130, 145, 146

[56] **References Cited**
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ABSTRACT: A flame-cutting lance which is flexible and composed of a plurality of multistrand steel wires forming a hollow core within an outer sheath of plastics material, oxygen being supplied to flow through the hollow core and an electric current applied to the steel wires when the lance is in use.



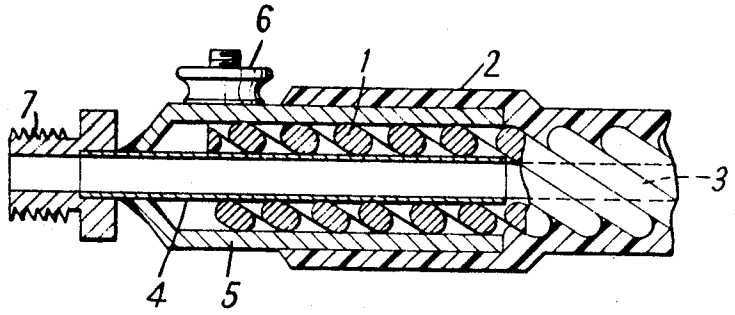


Fig. 1.

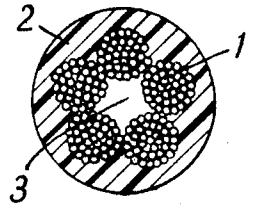


Fig. 2.

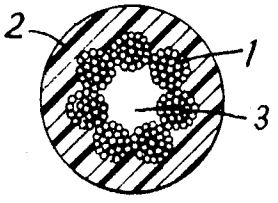


Fig. 3.

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FLAME-CUTTING TORCH

BACKGROUND TO THE INVENTION

Flame-cutting lances at present in use are rigid and necessarily of limited length, and have disadvantage of being breakable when made of carbon and of requiring heavy electrical current. There are, therefore, restrictions in use of known oxygen lances, particularly in underwater operations, and difficulties due to rapid consumption of the lance or on account of the large current generator necessary to supply the electric current. Other lances are made of a metallic sleeve containing a soft-iron multistrand wire core and are unwieldly.

The object therefore of the present invention is to provide an oxygen lance suitable for cutting into or through metals which may be of infinite length yet strong, convenient to use and unbreakable and suitable for air and underwater use.

A further object of the invention is to provide a torch in which multistrand steel wires form a hollow core within an outer sheath of plastics material through which oxygen may be caused to flow and to which electric current is applied when in use. The steel of the wires is preferably high-tensile steel, as distinct from soft-iron in known lances which burn away quickly, and the sheath, which may be composed of a variety of plastics materials, serves to contain the oxygen gas within the length of the lances as well as provide electrical insulation.

The sheath of plastics material, such as nylon, may be provided by winding on, with overlapping, a web or ribbon of the material with adhering or fusing together of the overlapping portions; by coating with liquid or powder material subsequently treated to form a homogeneous gastight sheath; or by other method known in the plastics-material art. Such sheath which is conveniently the thicker the better not only confines the oxygen gas but prevents splaying out of the high-tensile steel wires which tend to fuse together before disintegrating and may burn away more quickly than the sheath.

The electric current applied to the steel wires of the lance may be of the order of some 160 amps, that is to say quite low as compared with the known carbon lances which require something like 400 amps.

One end of the flexible lance is provided with an end fitting for connecting the oxygen gas supply and the electrical supply, when such fitting may comprise a copper or other conductive tube which may be forced into the hollow core and a ferrule or sleeve to overlie the ends of the steel wires with the plastics material extending over at least part of the length thereof. Beyond the end of the lance the tube or the sleeve is formed as, or intimately connected to, a threaded member serving as a union member for cooperating with a complementary coupling member of an oxygen-supply hose. The sleeve may also be provided with a terminal or the equivalent to which an electric supply cable may be connected, the current return being through earth.

In the use of the lance, oxygen gas is supplied thereto and also electric current and then when the work end of the lance is made to contact a metal a spark occurs which ignites the gas and the torch continues to burn with consumption of the lance until the gas supply is cut off. The flexibility of the lance enables it to be made in appreciable length, so avoiding interruptions in the operation as with known limited-length lances, as well as making it convenient to use and suitable for operations not possible with a rigid lance, and especially so in submarine operations.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal section through a lance and fitting in position at a lance end, while

FIGS. 2 and 3 show in section different multicore multistrand cables with a hollow central core and outer sheath of plastics material.

DESCRIPTION OF PREFERRED EMBODIMENT OF THE INVENTION

The flexible lance is composed of a multicore multistrand high-tensile steel cable, such as in commercially available and used for example as a crane cable, but without the center core so that it comprises in section (see FIGS. 2 and 3) a ring of wire strands 1 enclosing a hollow core 3 which serves as the oxygen gas flow path, and of an outer sheath 2 of plastics material which confines the gas supplied to the lance to flow within the hollow core 3 as well as provides electrical insulation.

An end fitting of convenient design is provided, and as illustrated in FIG. 1 comprises a copper tube 4 which is forced into the hollow core and is fast with an outer metallic sleeve 5 which clamps onto the metal wires. The sheath 2 extends at least partly along the length of the sleeve 5, which is also provided with a clamping terminal 6, or the like, for the connecting-on of a current-conducting cable. The tube 4 is at its outer end formed as, or made fast to, a threaded union member 7 capable of engaging a complementary union member of an oxygen-supply hose.

A flexible cover sleeve may also be positioned over the exposed end of the fitting to enclose the electric cable end and gas-supply hose, particularly for underwater use.

I claim:

1. An oxygen flame-cutting lance including a plurality of multistrand steel wires disposed to define a hollow gas-flow passage, an outer sheath of plastics material enclosing said steel wires, means for supplying oxygen to flow through said passage, and means for connecting an electric current to said steel wires.

2. An oxygen flame-cutting lance as claimed in claim 1 in which the ends of said steel wires extend into a metallic sleeve adapted for connection to a supply of oxygen and provided with a terminal for connection of an electrical lead.