

Nov. 25, 1947.

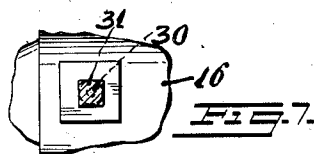
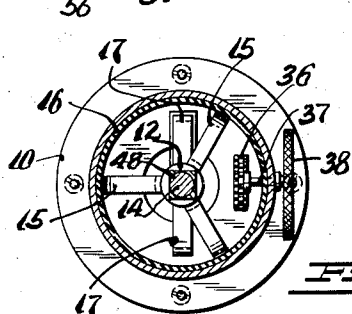
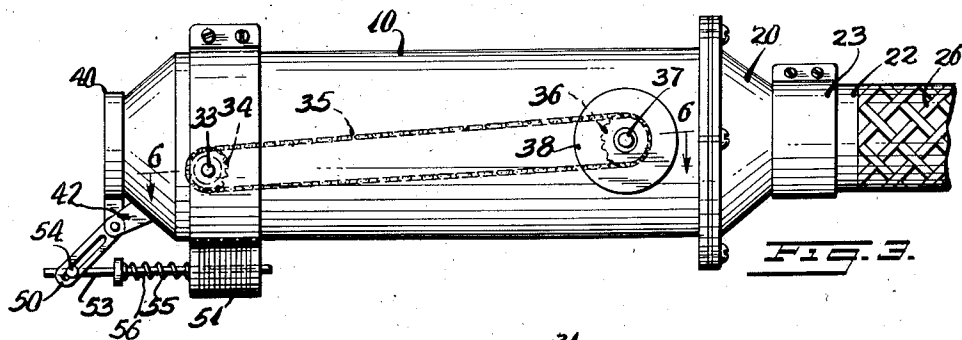
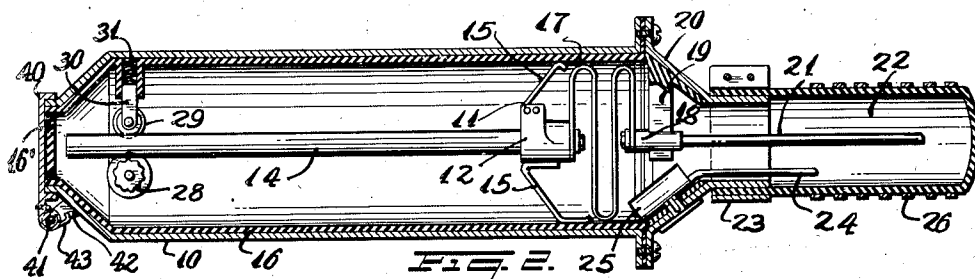
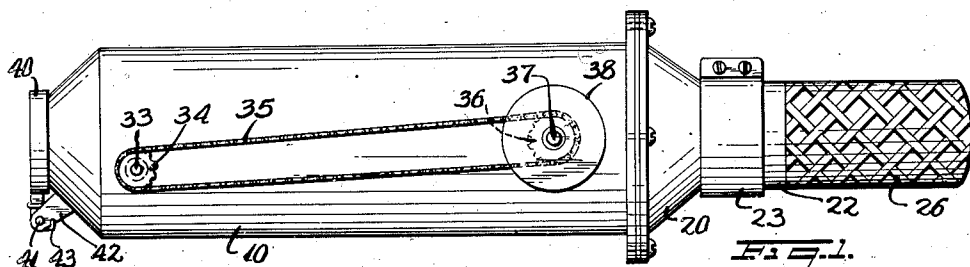
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2,431,544

ELECTRIC UNDERWATER TORCH

Filed May 4, 1945

2 Sheets-Sheet 1



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Nov. 25, 1947.

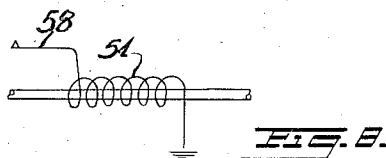
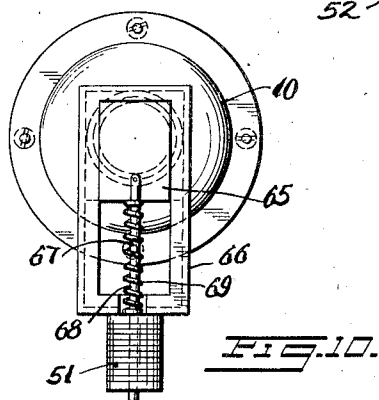
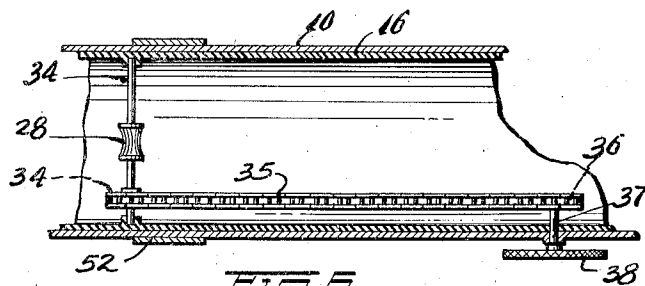
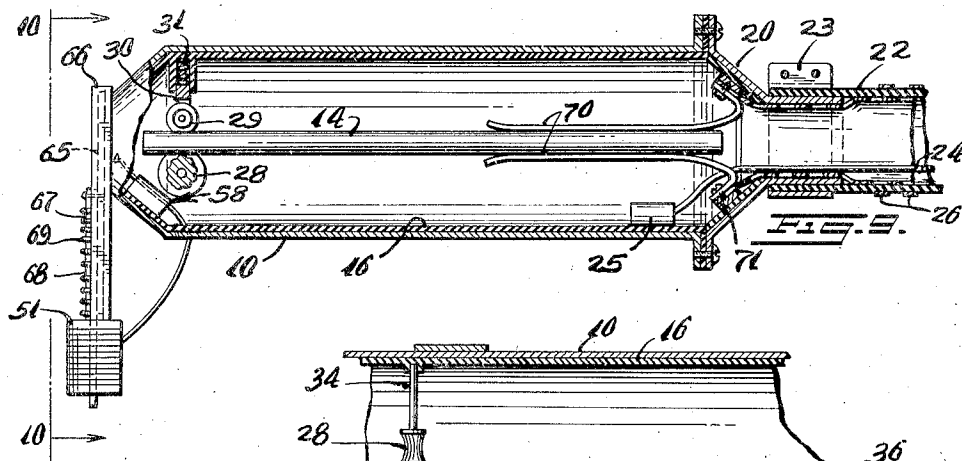
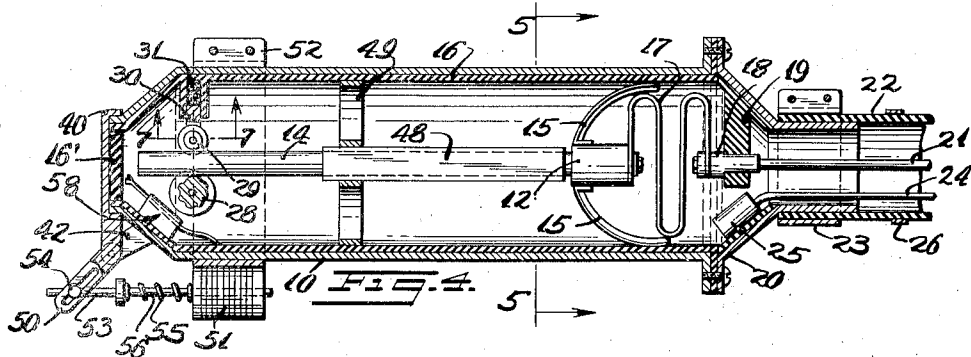
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ELECTRIC UNDERWATER TORCH

. Filed May 4, 1945

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ELECTRIC UNDERWATER TORCH

Raymond Dittrich, Forest Hills, N. Y.

Application May 4, 1945, Serial No. 591,891

4 Claims. (Cl. 219-15)

1

This invention relates to new and useful improvements in electric underwater torches.

More particularly, the invention proposes an improved underwater torch which is characterized by an electrode support mounted within the rear of a tubular casing and adapted to support a rod-like electrode which may be extended longitudinally of said casing. Means is provided for supporting the front of said electrode in a certain way. The electrode is associated with means by which it may be readily extended and retracted. A hose is provided for supplying a gaseous medium and/or fluid through said tubular casing to surround the electrode when used for welding, or metal cutting purposes. It is proposed to provide a door on the front of the casing which may be conveniently opened and closed to facilitate the operation of the torch.

The invention proposes several modified forms each of which embodies the board essentials of this invention.

Another object of the invention is the construction of a device as mentioned which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure—

Fig. 1 is a side elevational view of an electric underwater torch constructed in accordance with one form of this invention.

Fig. 2 is a longitudinal sectional view of Fig. 1.

Fig. 3 is a side elevational view of an electric underwater torch constructed in accordance with another embodiment of this invention.

Fig. 4 is a longitudinal sectional view of Fig. 3.

Fig. 5 is a transverse vertical sectional view taken on the line 5-5 of Fig. 4.

Fig. 6 is a fragmentary horizontal sectional view taken on the line 6-6 of Fig. 3 illustrated with certain parts removed, so as to clearly show the remaining portion.

Fig. 7 is a fragmentary enlarged horizontal sectional view taken on the line 7-7 of Fig. 4.

Fig. 8 is a schematic wiring diagram of the torch shown in Figs. 3-7 inclusive.

Fig. 9 is a fragmentary longitudinal sectional view of still another electric underwater torch embodying another form of this invention.

2

Fig. 10 is an end elevational view looking in the direction of the line 10-10 of Fig. 9.

The new and improved electric underwater torch, in accordance with that form of the invention illustrated in Figs. 1 and 2, includes a tubular casing 10 in the nature of a metal cylinder. An electrode support 11 is mounted within the rear of the casing 10. This electrode support includes a central clamp portion 12 into which a rod-like electrode 14 may engage, and spring portions 15 for centering the electrode 14. These springs 15 ride upon the inside lining 16 of the casing 10. The lining 16 is of insulation material so that the electrode 14 will not be short circuited.

The electrode 14 is extended axially longitudinally of and within the casing 10. A flexible copper cable 17 is connected with the rear end of the electrode 14.

This cable is connected with a terminal 18 supported on a web 19 of an end bracket or head 20 for the casing 10. An insulated copper cable 21, for the main current is connected with the terminal 18. This cable 21 extends through a rubber hose 22 attached by a clamp 23 upon the casing head 20. Another insulated multi-conductor cable 24 extends through the hose 22 and connects with a switch box 25 containing the switches for the operation of circuit breakers and gas or fluid supplying devices, not illustrated on the drawing, since they are well-known in the art of torch construction. A woven metal covering 26 is engaged upon the hose 22, said metal covering to be used as the ground return for the current. This ground must be connected with the work so that the current can flow through the electrode 14 and the work.

The front end of the electrode 14 is suitably supported. More specifically, it is rested upon a knurled grooved wheel 28. A counter pressure grooved wheel 29 is located above the wheel 28 and engages against the top of the electrode 14. This wheel 29 is mounted upon a plunger 30 which is urged downwards by a spring 31 providing the necessary pressure for moving the electrode 14.

The electrode 14 is associated with means by which it may be easily extended and retracted. This means includes a shaft 33 supporting the grooved wheel 28 and extending through the side wall of the casing 10. The outer end of the shaft 33 is provided with a sprocket wheel 34 engaged by a sprocket chain 35 which engages upon a sprocket wheel 36 mounted upon a shaft 37. This shaft 37 is provided with a hand wheel 38, or

other device by which the knurled grooved wheel 28 may be turned.

The front end of the casing 10 is closed with a door 40. This door, having insulating material 16' on the inside, is hingedly supported by a pintle 41 upon a bracket 42 mounted on the side of the casing 10.

A spring 43 is coaxially mounted upon the pintle 41 and acts between the bracket 42 and the door 40 for normally resiliently urging the door 40 closed. This spring is under such tension that the door 40 will automatically be blown open when suitable fluids, or gases are pumped through the hose 22 and the casing 10.

The operation of the electric underwater torch may be understood from the following:

The casing 10 is engaged beneath the water and the gas, or fluid used to envelope the electrode 14 is pumped through the hose 22. This gas, or fluid blows the door 40 open. Then the wheel 38 may be turned so as to indirectly turn the grooved wheel 28 for extending the electrode 14. The torch is then used in the usual way well known to those skilled in the art.

In Figs. 3-8 inclusive, another form of electric torch, constructed in accordance with this invention, is shown. A non-circular covering 48 is mounted on the back portion of the electrode 14. A web-like member 49 is mounted within the casing 10 and engages the non-circular member 48 for holding the electrode 14 from turning. However, the electrode 14 is free to be extended and retracted. The means for extending and retracting the electrode 14 distinguishes from the prior described means in the fact that the sprocket wheel 34 which is mounted on the shaft 33, is located within the casing 10. The chain 35 is positioned within the casing 10 and connects with the sprocket wheel 36 which is also within the casing 10. The sprocket wheel 36 is mounted on the shaft 37 which extends through the casing 10 and is provided with the knob 38, or other turning device.

The door 40 is provided with a slotted arm 50. A solenoid 51 is mounted on a clamp 52 which is engaged about the casing 10. The core of the solenoid 51 connects with a rod 53 provided with a pin 54 engaging the slot of the arm 50.

A spring 55 on the core of the solenoid 51 normally urges the core outwards so as to force the door 40 closed. A contact 58 is mounted within the casing 10 at a point near the front end of the electrode 14. Solenoid 51 is energized by contact of electrode 14 with contact 58.

The switch 58 is connected in an electric circuit which controls the solenoid 51. The arrangement is such that when the knob 38 is turned to extend the electrode 14, the electrode 14 closes the switch 58, which in turn causes the solenoid 51 to be energized. The core 56 of the solenoid is then retracted, which indirectly pivots the door 40 open. Now the electrode 14 may be fully extended. When the electrode 14 is retracted it will soon pass a point at which the switch 58 will be released. The switch 58 then opens and the solenoid 51 is de-energized.

In other respects this form of the invention is similar to that previously shown and like reference numerals identify like parts in each of the several views.

This form of the invention is used very similarly to the prior form. However, the gas, or fluid pressure is not depended upon to open the door 40. The door 40 is opened by the solenoid

51. Moreover, the sprocket chain 35 and the sprockets are located within the casing 10.

In Figs. 9 and 10 still another form of the invention has been disclosed which is very similar to the second form of the invention, distinguishing merely in the fact that the casing 10 is provided with a slide door 65. This slide door 65 works in a frame 66 mounted upon the front end of the casing 10.

The slide door 65 is connected by a rod 67 with the core 68 of a solenoid 51. A spring 69 normally urges the core 68 into its extended position, in which the door 65 is closed.

The rear support for the electrode 14 is also somewhat different. It is formed from several springs 70 which slidably support the electrode 14 so that it may be extended and retracted. These springs 70 are mounted on and connected with a ring 71. This ring 71 is insulated from casing 20 and connected to a woven metal hose which serves as an electrical conductor similar to the woven metal covering 25.

In other respects this form of the invention is similar to the prior forms of the invention.

It is to be understood that a suitable spotlight may be attached to the casing of the underwater torch.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. An electric underwater torch, comprising a tubular casing, an electrode support mounted within the rear of said casing, a rod-like electrode extending longitudinally of and within said casing and having its rear end supported by said support, means for supporting the front of said electrode, means for extending and retracting said electrode, a hose for supplying a fluid through said casing, an electric circuit for and including said electrode, a door for the front of said casing, and means for closing and opening said door, said electrode support comprising a bracket for receiving and supporting the rear end of the electrode, and springs slidably supporting said bracket centrally within said casing, and a flexible copper cable connected with the inner end of said bracket.

2. An electric underwater torch, comprising a tubular casing, an electrode support mounted within the rear of said casing, a rod-like electrode extending longitudinally of and within said casing and having its rear end supported by said support, means for supporting the front of said electrode, means for extending and retracting said electrode, a hose for supplying a fluid through said casing, an electric circuit including a copper cable and including said electrode, a door for the front of said casing, and means for closing and opening said door, said copper cable being connected with a terminal to which the main insulated copper cable for the main current is connected.

3. An electric underwater torch, comprising a tubular casing, an electrode support mounted within the rear of said casing, a rod-like electrode extending longitudinally of and within said casing and having its rear end supported by said support, means for supporting the front of said

5

electrode, means for extending and retracting said electrode, a hose for supplying a fluid through said casing, an electric circuit including a copper cable and including said electrode, a door for the front of said casing, and means for closing and opening said door, said copper cable being connected with a terminal to which the main insulated copper cable for the main current is connected, said hose being provided with a metal woven cover which may be used as a ground for the torch.

4. An electric underwater torch, comprising a tubular casing, an electrode support mounted within the rear of said casing, a rod-like electrode extending longitudinally of and within said casing and having its rear end supported by said support, means for supporting the front of said electrode, means for extending and retracting said electrode, a hose for supplying a fluid through said casing, an electric circuit for and including said electrode, a door for the front of

6

said casing, and means for closing and opening said door, said electrode support comprising several springs engaged against the sides of said electrode for guiding the electrode, a ring for supporting said springs, and the cable for supplying current to said electrode and connected with said ring.

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