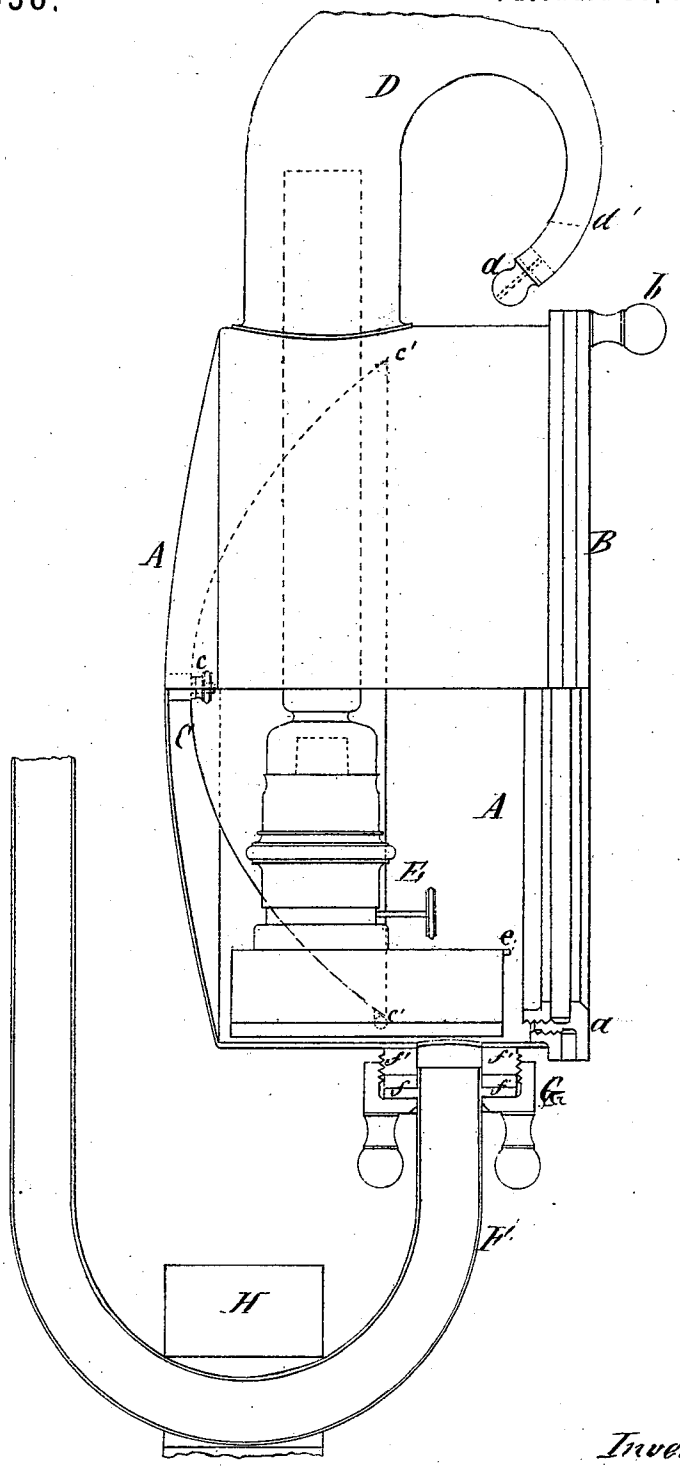
C. MARSCHALK.
Divers' Lamp.

No. 168,038. Patented Sept. 21, 1875.



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UNITED STATES PATENT OFFICE.

CHARLES MARSCHALK, OF DANTZIG, PRUSSIA.

IMPROVEMENT IN DIVERS' LAMPS.

Specification forming part of Letters Patent No. **168,038**, dated September 21, 1875; application filed July 31, 1875.

To all whom it may concern:

Be it known that I, CHARLES MARSCHALK, of the city of Dantzig, in the Kingdom of Prussia, have invented a Lamp particularly applicable for use by Divers in submarine or other works conducted under water, of which the following is a specification:

My invention relates to that class of lamps particularly applicable for use under water, whereby operations may be carried on when the water is turbid, or at night-time; and consists, first, in a heavy metallic water-tight casing or shell, so as to cause the lamp to sink readily, or the casing may be made light, and the lamp sunk by means of a weight affixed to the air-supply tube; second, in the arrangement of the atmospheric air-feed tube, whereby the lamp is not only properly supplied with the necessary atmospheric air required for its combustion, but a handle is also provided for the carrying or attachment of said lamp; third, in the peculiar construction of the device employed for carrying off the gases resulting from the combustion of the illuminating material employed.

The accompanying drawings represent in side elevation, partly in section, a lamp constructed according to my invention.

A is the body or casing of the lamp, by preference of a cylindrical shape, though it may be made of any other desired configuration and constructed of any suitable or preferred metal. The front part of the casing A has a flange, *a*, formed thereon, which has its inner periphery screw-threaded for the purpose of holding the face-disk B, carrying the glass, the outer periphery of which is threaded to fit the thread on the inner periphery of the flange *a*, and by these means the face-disk may be readily secured, water-tight, to the body of the lamp. The disk B is provided with two hand-knobs, *b*, for screwing it up or unscrewing it from the lamp when it is desired to fill the reservoir or replenish the illuminating material employed, or for any other purpose. A parabolic reflector, C, is affixed to the concave back of the lamp by means of a screw, *c*. The upper and lower ends of this reflector rest against studs *c'*, formed on or affixed to the casing A, as shown. D is a tube or horn of a snail or spiral shape, having its end connected to the lamp considerably enlarged, forming a chimney or cowl, and gradually diminishing in diameter toward its extremity, which is bent downward, as shown, and is provided with a button, *d*, having a very small orifice for the escape of the gases resulting from combustion, as hereinafter more fully explained. E is an ordinary petroleum-lamp, the oil-reservoir of which is constructed to fit the inner configuration of the casing, and rests in a slide, *e*, affixed to the casing A so as to be readily removed or inserted, and when in position forms an air-passage underneath said reservoir for the passage of the atmospheric air required for its combustion. The upper part of the glass chimney of the lamp penetrates into the enlarged part of the horn or spiral D, into which the gases, the products of combustion, are discharged. F is a metallic tube, one end of which is provided with a disk or flange, *f*, fitting into a recess formed for its reception in the screw-disk G, which, when the tube is fitted to the lamp, is screwed onto the projecting threaded tube or cylinder *f'*, formed on the lower part of the casing. The disk G is also provided with two hand-knobs for the purpose of screwing it on or off when desired or required. The tube F is curved in such manner as to form about two-thirds of an ⌒, or nearly so, as shown by the drawings, passing upward toward the top of the casing. The cylindrical portion of the tube thus forms a handle to said lamp. This handle or tube, when the lamp is made light, has a weight, H, affixed to its lower portion, so as to cause the lamp to readily sink in the water. To the upper portion of the tube F an india-rubber tube is connected, which, in its turn, is connected with the helmet of the diver, or direct with the air-pump supplying atmospheric air to said diver, and, by means of the tube F, the required quantity of air for the proper combustion of the illuminating material used is supplied to the lamp, the operation of which is as follows:

The lamp being properly secured and lighted, and the air-tube F connected, by means of the connecting-tube, (not shown in the drawings,) to the helmet of the diver, both may then go down into the water, the diver holding the

lamp by the handle F. Owing to the small orifice in the button *d*, and the peculiar shape of the horn or spiral D, the end of which is bent downward and sidewise, the water penetrating into said orifice in the button *d* cannot rise above the point *d'*, if to that point, being kept back by the pressure of the gases—the products of combustion.

The atmospheric air, supplied to the lamp constantly under a pressure sufficient to keep the diver alive will also be sufficient to keep the lamp burning, the escape or discharge of the products of combustion being effected as follows:

The heated gases, owing to their density being much less than the density of the atmospheric air supplied to the lamp, which of necessity is of the temperature of the water, will cause the heated gases to collect in the top of the lamp and the enlarged portion of the horn or spiral D, which forms a sort of cowl or chimney, and when a sufficient amount of such gases is collected the pressure of the atmospheric air from below will force the heated gases to escape in a continuous chain of bubbles into the surrounding waters, and so long as the required atmospheric air is supplied to the diver to enable him to live, so long will the lamp keep on burning.

The construction and arrangement of the lamp are not only theoretically correct, but, by practical experience, the lamp has fully realized all my expectations, and by means of it operations may be readily carried on in turbid water or by night-time.

Having described my invention, I would have it understood that I do not wish to limit myself to the exact configuration shown and described, as various other forms may be employed, nor to the illuminating material, as any kind of material may be used; but

What I do claim is—

1. The combination of the casing A with the horn or spiral D, substantially as and for the purposes set forth.

2. The casing A, horn or spiral D, face-disk B, and the tube F, of a diver's lamp, in combination with the weight H, as and for the purposes set forth.

3. The horn or spiral D, in combination with the button *d*, as and for the purposes specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES MARSCHALK.

Witnesses:

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