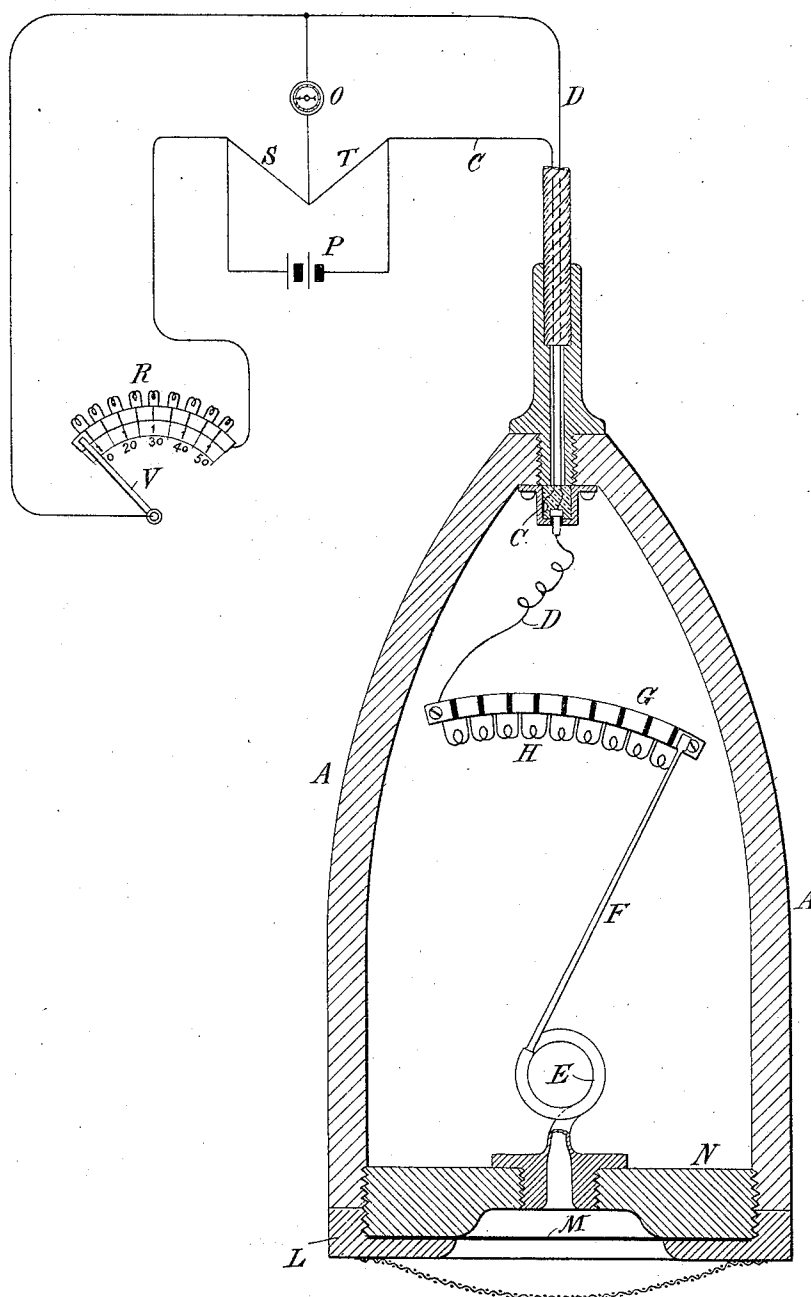


(No Model.)

A. M. LOZIER.
SOUNDING APPARATUS.

No. 576,208.

Patented Feb. 2, 1897.



Witnesses:

Rapphael Ketter

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UNITED STATES PATENT OFFICE.

ARTHUR M. LOZIER, OF NEW YORK, N. Y.

SOUNDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 576,208, dated February 2, 1897.

Application filed April 24, 1896. Serial No. 588,862. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR M. LOZIER, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Deep-Sea-Sounding Devices, of which the following is a specification, reference being had to the drawing accompanying and forming a part of the same.

In order to facilitate the taking of soundings for hydrographic and similar purposes, various automatic indicating and registering devices have been proposed, among them being a line containing an insulated conductor with a sinker inclosing such an instrument as a Bourdon tube, the movement of which, under varying hydrostatic pressures, was to be utilized in shifting a circuit-controller adapted to transmit, through the conductor in the sounding-line, electrical impulses to operate suitable alarm or registering apparatus on shipboard.

In the improved sounding apparatus which forms the subject of my present application for Letters Patent I employ in the sinker an instrument capable of a movement corresponding in degree to variations of hydrostatic pressure and utilize such movement to vary the electrical resistance of a circuit permanently maintained between the sinker and suitable instruments on board, which will accurately and with great sensitiveness respond to such variations. In the combination of instrumentalities thus generally stated my invention resides.

In carrying out my invention I employ an apparatus of substantially the character illustrated in the accompanying drawing, which is partly diagrammatic, but showing the sinker and portions of the sounding-line in central vertical section.

A designates a hollow metal body of sufficient weight to constitute a sinker suitable for deep-sea-sounding. It is attached to a stout line B, through which, as a core, runs an insulated cable containing an electric conductor, or, preferably, two of such conductors C D.

Within the sinker A is mounted any suitable instrument adapted to be operated by variations of hydrostatic pressure, but prefer-

ably an ordinary Bourdon tube or spring E, to which is attached a conducting-arm F, that is arranged to sweep over a series of insulated contact-plates G, connected by resistance-coils H or any other suitable form of rheostat.

One of the conductors, as C, is grounded, as by direct electrical connection with the shell or body of the sinker, while the other is insulated and connected to the last of the series of plates of the rheostat.

In order to exclude solid particles from the interior of the tube E, the water-tight base-plate L in which said tube is set is formed with a depression over which is stretched a stout piece of canvas M or other porous material, preferably held in position by the plate L and a cap or ring N, acting as a clamp.

The conductors C D are brought out at the end of the sounding-line and connected with a battery and any suitable instrument for indicating variations of resistances in the circuit formed by said conductors when the sinker is submerged. Various arrangements may be adopted for this purpose; but in order to secure great sensitiveness of operation I prefer that shown, and which is as follows:

A galvanometer O is connected across the two conductors C and D to form one of the diagonals of a Wheatstone bridge, the other diagonal containing the battery P. Two of the bridge-sections S T are of fixed and equal resistance. The other sections are formed by the conductors C D, through the rheostat in the sinker, on one side of the galvanometer diagonal and by a rheostat R on the other side of said diagonal. By adjusting the rheostat R until the galvanometer reads zero the resistance of the branches of the bridge will be equalized. I therefore prepare a scale over which the arm V of rheostat R sweeps, graduated to feet or fathoms, the divisions corresponding to the position of the Bourdon tube in the sinker due to the pressure at different depths. By this means the depth of the sinker may be at once ascertained at any time by adjusting the resistance R to equal that of the other section of the bridge, as determined by the Bourdon tube. This arrangement affords a much more sensitive, accurate, and convenient means of determining depths than those hitherto performed and known to me.

The specific construction and arrangement of the parts may of course be greatly varied without departure from the invention.

What I claim is—

5 1. A sounding apparatus comprising in combination a sinker containing a device which is moved by variations of hydrostatic pressure, a rheostat varied by the movement of said device, a circuit extending through
10 the sounding-line and including said rheostat, and electrical devices therein adapted to respond to variations of resistance in said circuit, as set forth.

15 2. The combination with a sounding-line containing the conductors of an electric circuit and a sinker attached thereto, of a device such as a Bourdon tube and a rheostat operated thereby, both carried by a sinker, a galvanometer, a rheostat and battery, con-

nected with the conductors from the sound- 20 ing-line, the rheostats, battery and galvanometer being arranged to form a bridge, so that the hydrostatic pressure and corresponding depth of the sinker may be ascertained by the adjustment and position of the rheo- 25 stat on shipboard, as set forth.

3. A device for ascertaining the depth or pressure of water consisting of a device moved by variations in hydrostatic pressure, a rheostat varied by the same, a device for 30 indicating variations of resistance due to the operation of the rheostat, and a circuit connecting such rheostat and indicating instrument, as set forth.

ARTHUR M. LOZIER.

Witnesses:

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