

(No Model.)

H. FINCH.

SUBMARINE TELEPHONE.

No. 476,007.

Patented May 31, 1892.

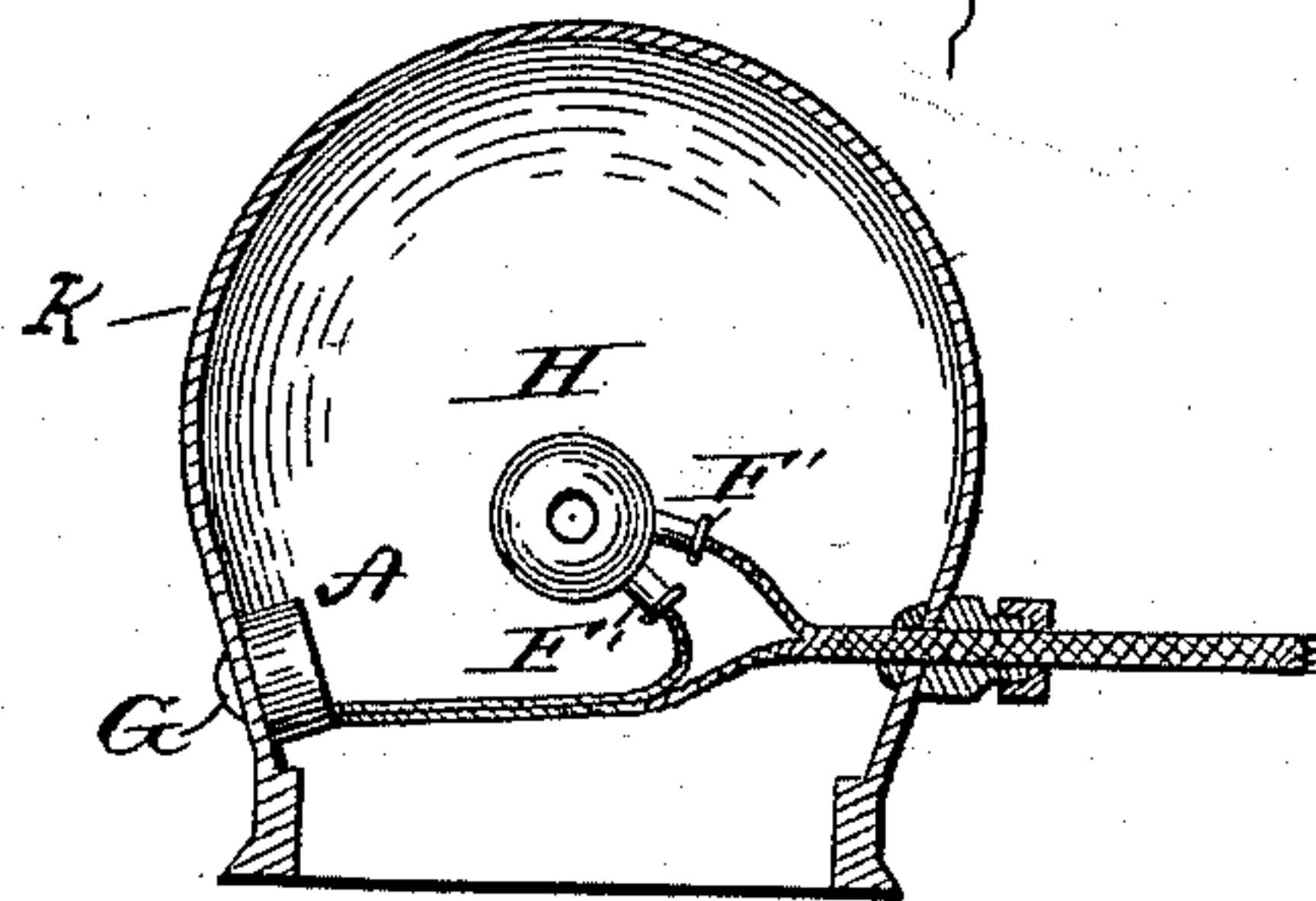
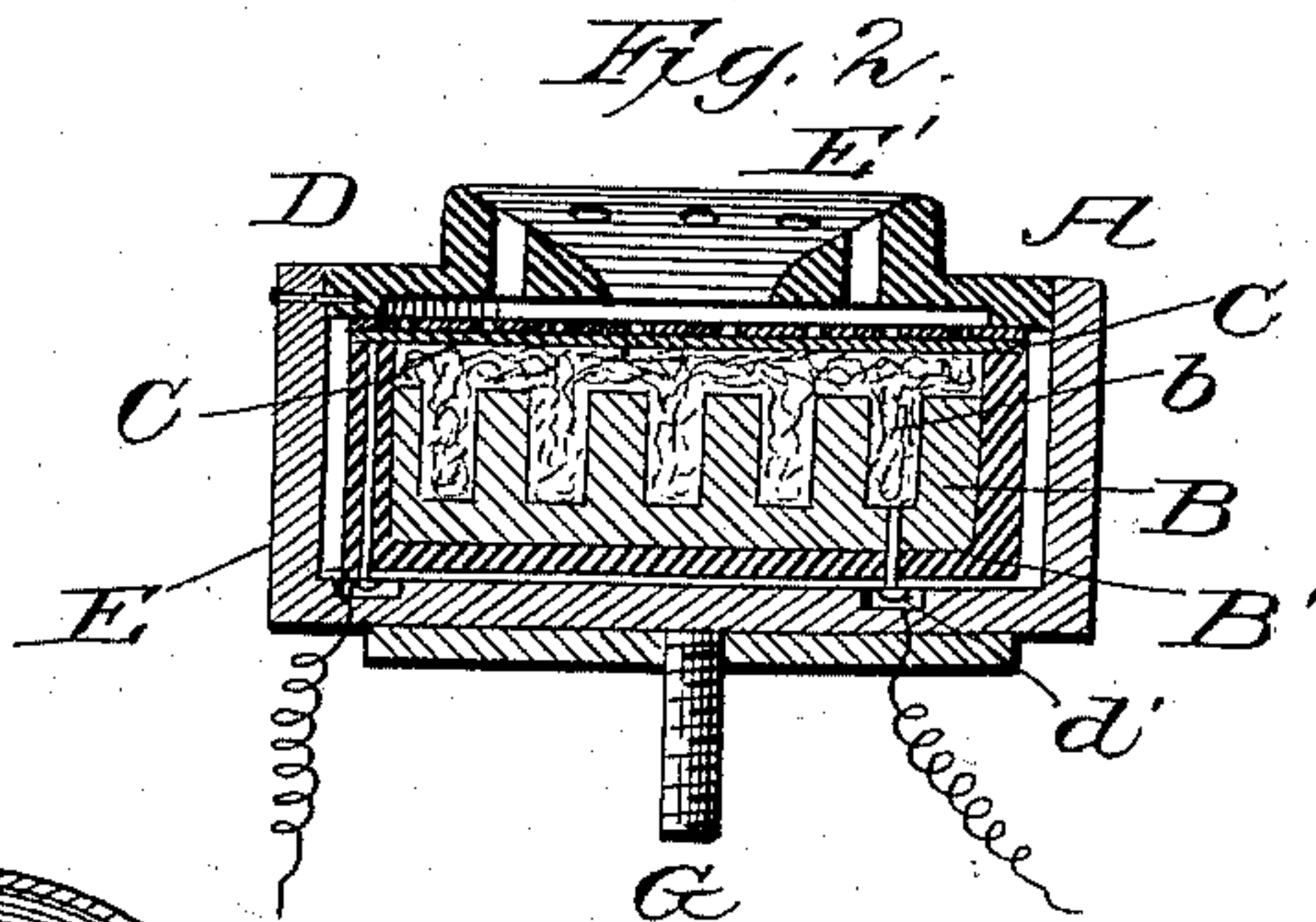
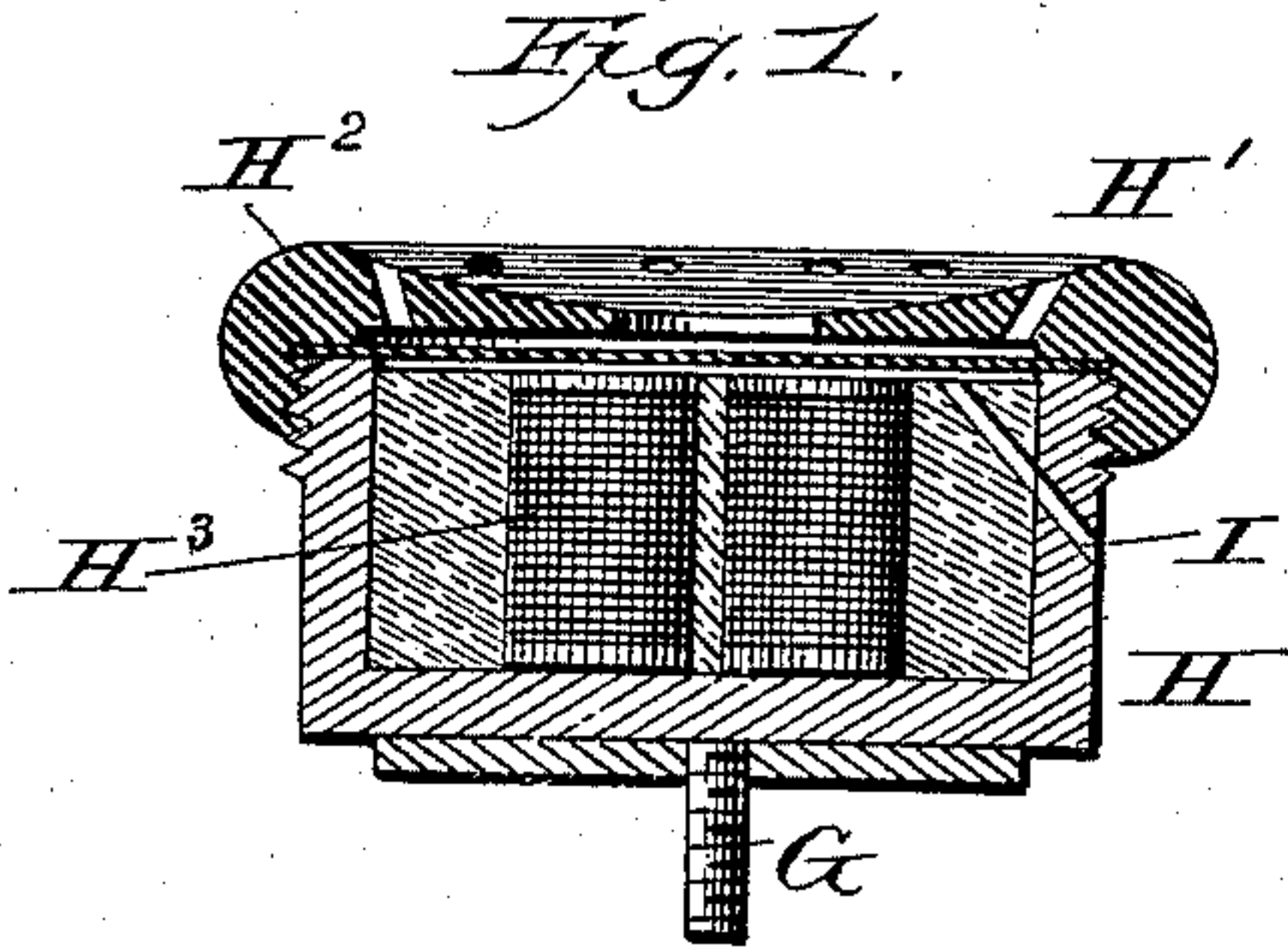
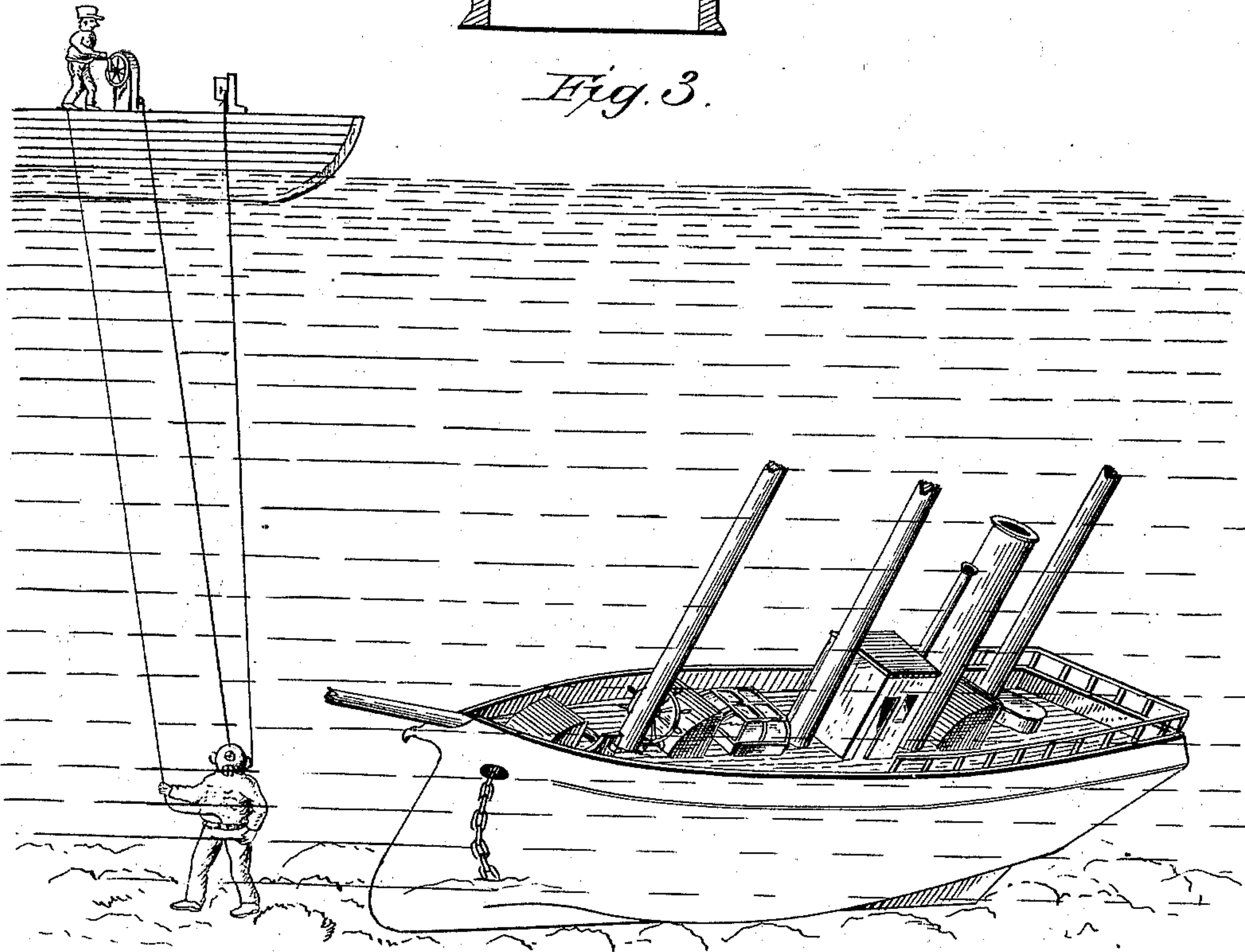


Fig. 3.



WITNESSES
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Fig. 4.

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HENRY FINCH, OF MICHIGAN CITY, INDIANA.

SUBMARINE TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 476,007, dated May 31, 1892.

Application filed October 23, 1891. Serial No. 409,573. (No model.)

To all whom it may concern:

Be it known that I, HENRY FINCH, of Michigan City, county of La Porte, State of Indiana, have invented new and useful Improvements in Submarine Telephones, of which the following is a full and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that class of telephonic systems for use to establish communication from land under water, and is particularly adapted for divers' use or in the construction of pneumatic foundations; and the object of my invention is to so construct the telephones that the moisture arising from the condensation of the diver's breath or other moisture shall not affect the working of the telephones by short-circuiting on the connecting wire or wires of the helices, and to provide means whereby the increased pressure consequent to the use of the device under water is prevented from affecting the working of the same by providing for an equal pressure of air upon the inner face of the diaphragm; and to these ends my invention consists, first, in embedding the helices of the magnet of the receiver in wax or similar material, and, second, in providing means whereby the pressure of the air is admitted behind the diaphragm, and consequently maintains the diaphragm in equilibrium regardless of the depth of water to which the telephone is carried, all as hereinafter explained.

In the accompanying drawings, Figure 1 is a section through the receiver, showing the electro-magnet embedded in the water-resisting compound and the opening for the admission of air behind the diaphragm. Fig. 2 is a section through the transmitter. Fig. 3 shows one manner of connecting and mounting the transmitter and receiver in a diver's helmet. Fig. 4 shows a diver operating on a wreck.

The transmitter A is of the form employing a granulated or powdered conducting material, and consists of a case B, composed of metal, having a series of small receptacles *b* therein for the reception of such material, and which case fits within an insulating-case B', preferably of vulcanite rubber. The rim of the insulating-case extends above the face of the case B, forming an enlarged receptacle

for the conducting material above the receptacles therein, and upon the edge of the rim is placed the diaphragm C', composed of any desired material suitable for that purpose. Over this diaphragm is placed a metallic cover D, having a series of perforations therein, which by means of a screw *d*, passing through the rim of the case B', clamps the diaphragm in place, the screw also forming the connection between the diaphragm and one connecting-wire, the other wire being connected to a screw *d'*, extending through the cases B and B' and in contact with the granulated conducting material, completing the circuit from the diaphragm through such conducting material. These cases are mounted in a case E, having a suitable cap or cover, and in which the mouthpiece E' is formed.

Where the device is used in connection with a diver's helmet, as K, the same is secured to the helmet by means of a screw-bolt G, suitably packed, and the stuffing-boxes F may pass through the helmet, or additional stuffing-boxes may be employed therein, as shall be found most desirable.

The receiver consists of the case H, the ear-piece H', and diaphragm H², and the case has mounted therein the coils or helices H³, connected with the line-wires through stuffing-boxes F'. These helices are embedded in wax or a similar water-resisting compound entirely surrounding the same, for a purpose hereinafter explained. An opening I is formed in the case and extends through the wax and communicates with the space behind the diaphragm to permit an equal air-pressure upon both sides of the diaphragm.

By embedding the helices in the wax or other water-resisting compound it will be seen that the short-circuiting of the current is prevented which has heretofore been found to be the case and has been the cause of preventing the use of telephones where there is great moisture in the air, especially below the surface of the earth or under water, and especially so where the same has been used by divers, where a great amount of water is collected, owing, among other causes, to the condensation of the diver's breath. This defect is entirely remedied by my improvement and the working of the device rendered positive.

Another defect which my invention as

above described is especially designed to remedy is that of sustaining the diaphragm in equilibrium.

As is well known, the pressure increases
5 with the depth at which submarine work is being done, owing to the necessity of establishing an equilibrium between the pressure of water on one side and that of the air surrounding the diver or workman on the other
10 side, and as a consequence heretofore where the diaphragm was suspended in a closed case the confined air acted to force the diaphragm inward toward the magnet and to resist an outward vibration; but with my im-
15 provement, where the air is admitted to both sides of the diaphragm equally, the diaphragm is always in equilibrium and will be sensitive to the slightest interruptions in the current. It will thus be seen that, while I am
20 enabled to admit the air upon both sides of the diaphragm, the condensation of the moisture therein is prevented from in any way affecting the working of the device.

While the double magnet is shown and described, it will, however, be readily apparent 25 that a single magnet and helix may be employed.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A telephone comprising an electro-magnet embedded in a water-resisting compound, substantially as and for the purpose set forth. 30

2. A telephone comprising an electro-magnet surrounded by a water-tight case and embedded in a water-resisting compound, with an air-admission extending from the outside of the case to the space behind the diaphragm, substantially as and for the purpose set forth. 35

In testimony whereof I have hereunto set my hand this 28th day of August, A. D. 1891. 40

HENRY FINCH.

Witnesses:

H. B. IMHULL,
E. C. WELLS.