

No. 773,580.

PATENTED NOV. 1, 1904.

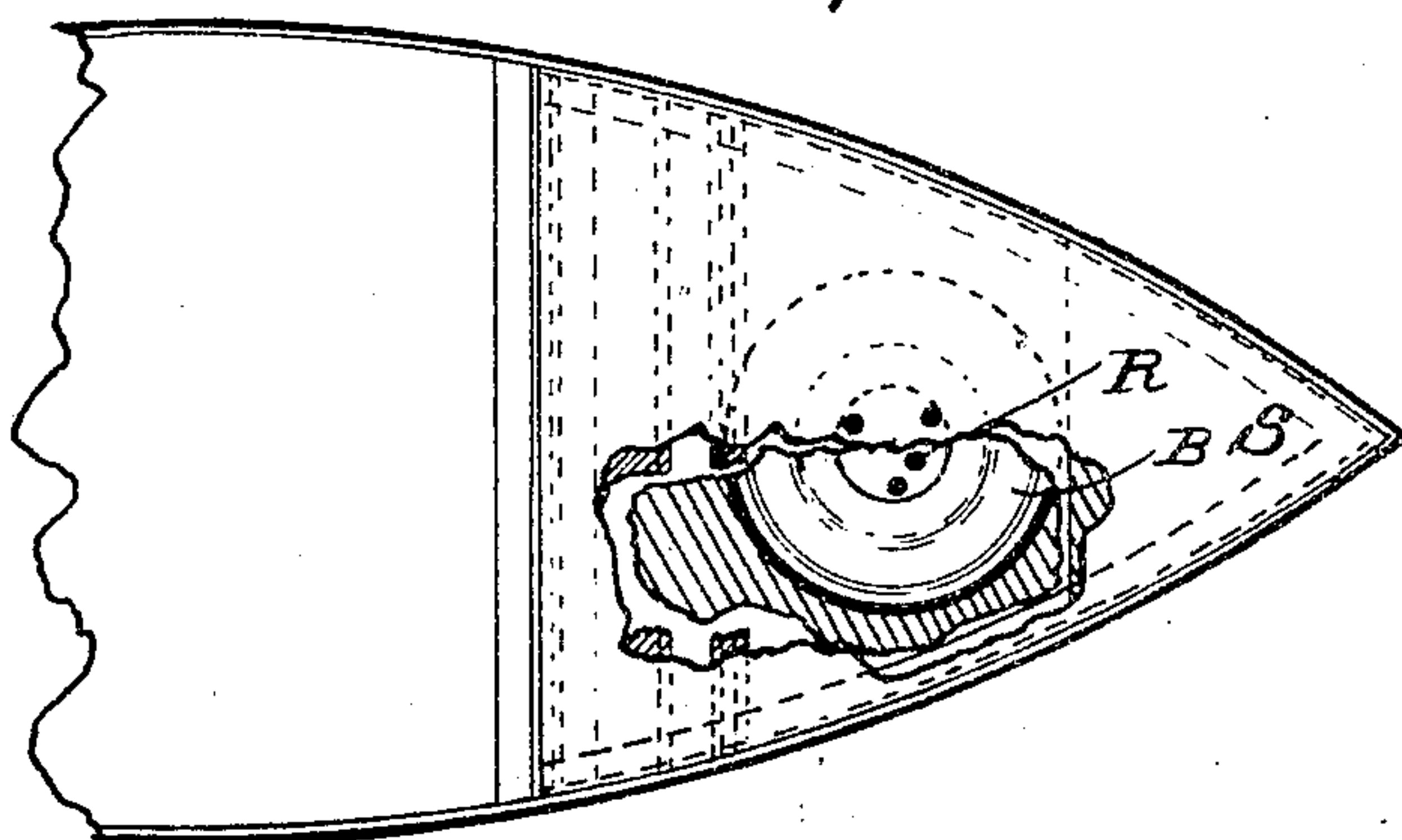
J. B. MILLET & A. J. MUNDY,  
MEANS FOR PRODUCING SOUND VIBRATIONS IN WATER.

APPLICATION FILED OCT. 26, 1903.

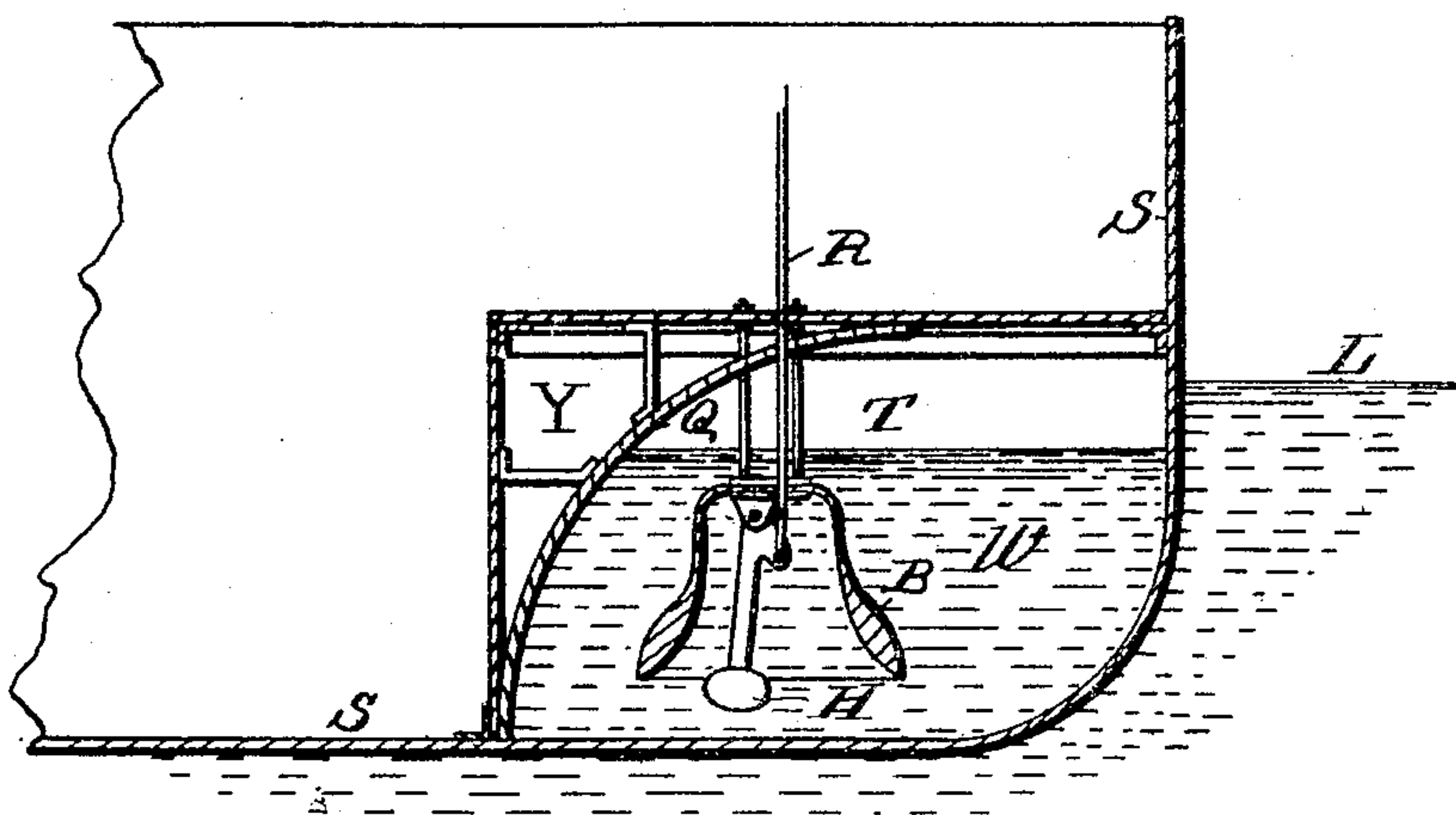
NO MODEL.

2 SHEETS—SHEET 1.

*Fig. 2.*



*Fig. 1.*



Witnesses

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Attorneys

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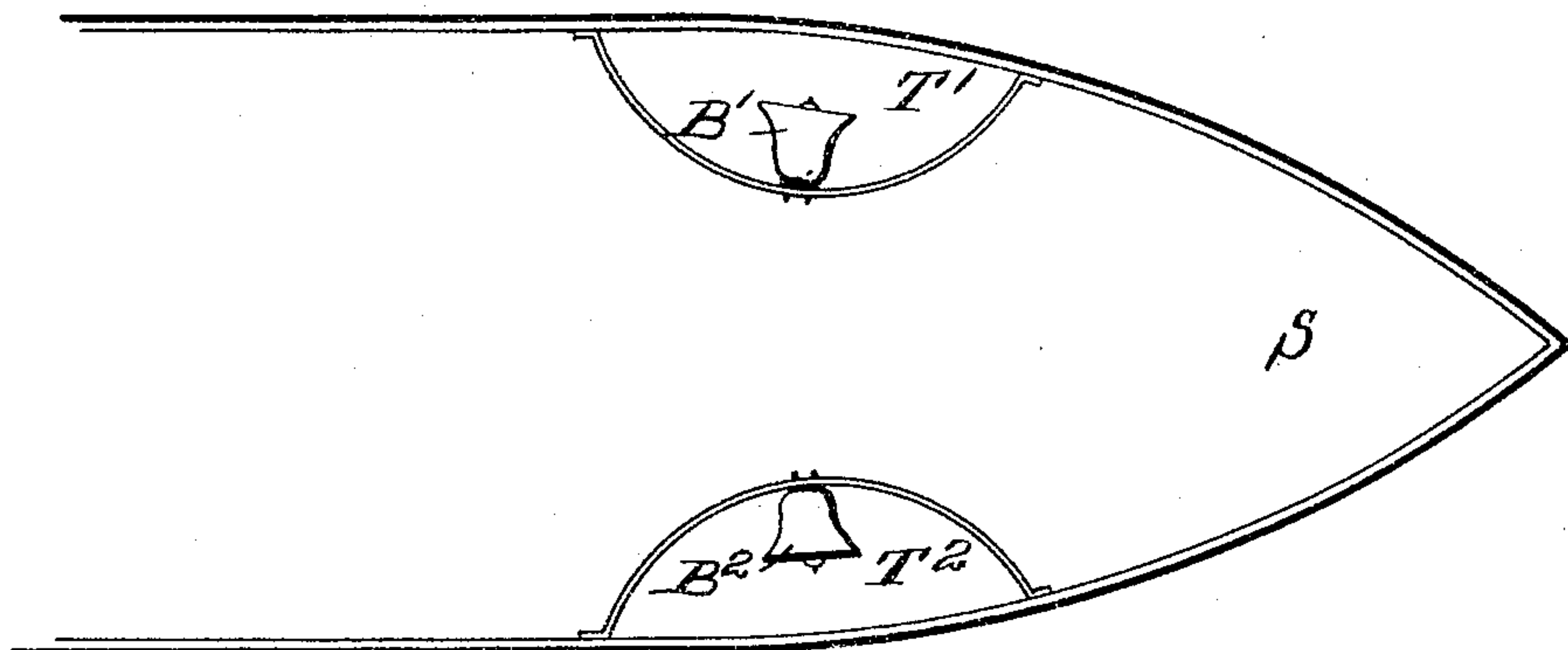
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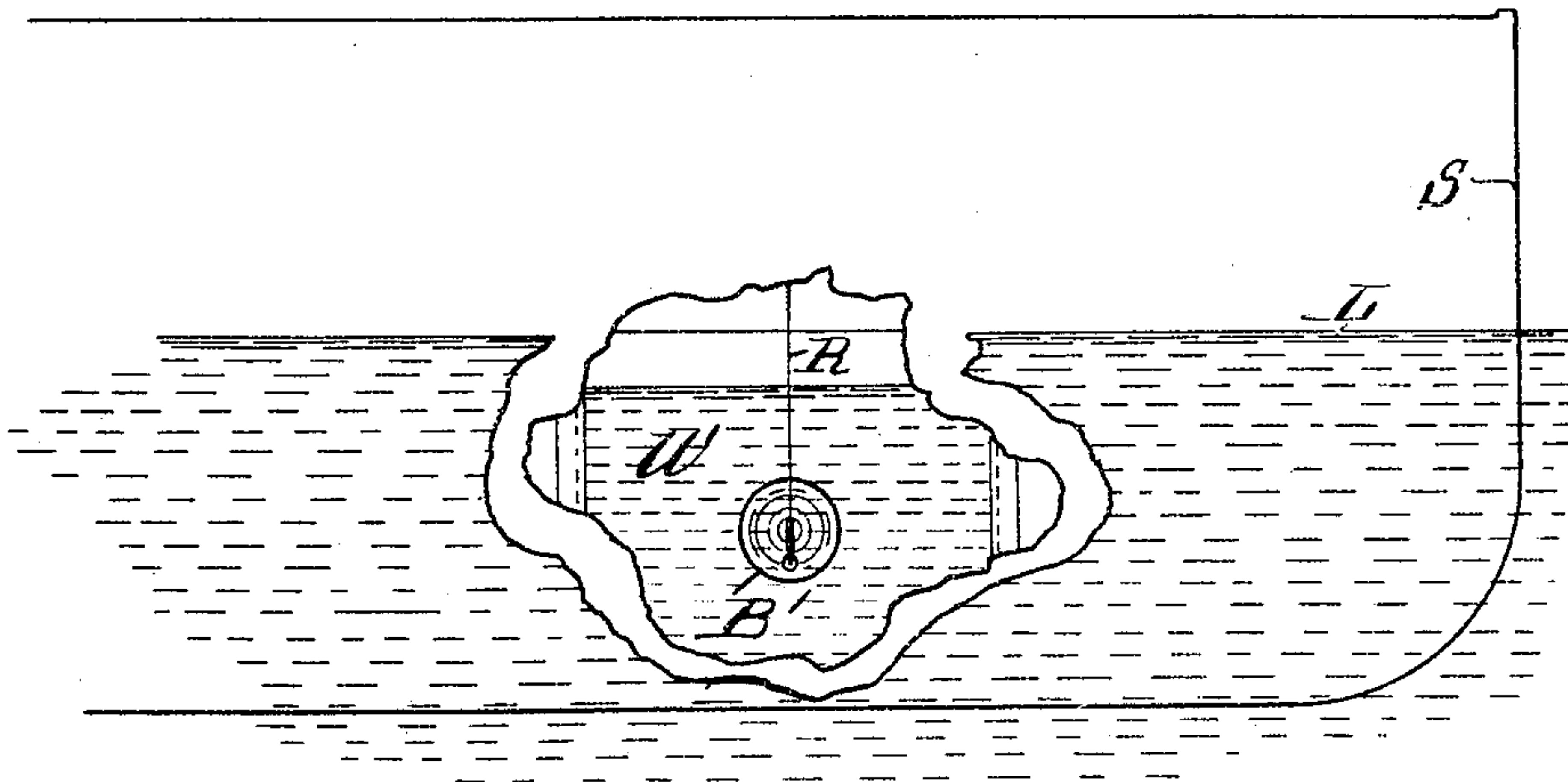
NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

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## MEANS FOR PRODUCING SOUND-VIBRATIONS IN WATER.

SPECIFICATION forming part of Letters Patent No. 773,580, dated November 1, 1904.

Application filed October 26, 1903. Serial No. 178,503. (No model.)

*To all whom it may concern:*

Be it known that we, JOSIAH B. MILLET and ARTHUR J. MUNDY, citizens of the United States, residing in Boston, in the Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Means for Producing Sound-Vibrations in Water; and we do hereby declare the following, when read in connection with the accompanying drawings, to be such a full, clear, and exact description of our invention as will enable others skilled in the art to which it relates to make and use the same.

It has been heretofore discovered that to secure the best results, and indeed to secure any practical results at all over great distances, a submerged sounding device should have its vibrating body or diaphragm in direct contact with the water. This is in order that the sound-waves may be originally produced in the medium by which they are to be transmitted and no losses of energy by reflection, &c., may be incurred by the passage of the sound-waves from one medium—air, for instance—into the transmitting medium, water. Where a signaling device of this sort is to be stationary, the inventor or mechanic is not as a rule restricted as to the size of the device or to the space it may occupy. He may also provide special means for protecting his apparatus from destruction or injury by floating objects. It is, however, specially desirable that vessels and other moving objects be equipped with efficient signaling means, and devices entirely operative and practical for stationary purposes become useless when the attempt is made to attach them to or suspend them from a moving vessel. In the first place, their connections with the vessel are likely to become torn away or seriously injured by contact with passing objects, or if not mechanically affected by such contact at least suffer interruption and confusion in their delivery of signals. Again, the presence of the sounding device at a proper point

on the outside of the vessel may prove a source of inconvenience and annoyance to the handling of the ship, and in instances where the device is merely suspended by cord or similar attachment especial means must be provided for keeping it submerged and in proper position when the vessel is in motion. On the other hand, if the sounding device be on shipboard, even though below the water-line, much of its energy and effectiveness is ordinarily lost in the passage of the sound-waves from the medium of their inception into the water without.

The principal object of our present invention is a special mounting and location of a submarine sounding device on shipboard whereby the sound-waves may originate in water by reason of the device being in contact therewith and yet the device be entirely free of all the inconveniences of a location in the water without the vessel.

Another object of our invention is the location on shipboard of one or more efficient sound-producing devices whereby special indication of courses and directions may be provided.

Yet another object of our invention is a means for reinforcing and reflecting or concentrating the sound-waves emanating from the sounder to points without the ship.

It will be seen from the above that the invention is particularly applicable for communication between a submerged submarine vessel and a station on shore or on board another ship or between two such submerged vessels.

Other objects of our invention will presently appear upon a reading of the specification in connection with the drawings, in which—

Figure 1 is a sectional elevation of our means for mounting the sounding device. Fig. 2 is a plan, partially in broken section, of the means shown in Fig. 1. Fig. 3 is a plan showing our manner of mounting two or



more sounders for more elaborate signaling. Fig. 4 is a sectional elevation of one of the mountings of Fig. 3.

Referring to Fig. 1, S S indicate a section 5 of a ship in the sea or other body of water L. A tank T, which may be the forward or other ballast-tank or tank of special construction, is shown in this instance at the bow of the vessel. This tank is shown as partially filled 10 with water W, and in the water the sounding device A is mounted. The tank may be entirely filled with water; but in any event the amount of water should be sufficient to cover the sounder. Although in the drawings we 15 have shown the sounding device as a bell B and although we prefer in many instances to use a bell, yet it is obvious that the particular form or kind of sounder is immaterial to the present invention. The bell is shown as rigidly 20 mounted upon the upper wall of the tank, and its pivotally-mounted hammer H is operated by a reciprocating rod R from above. As it is immaterial what kind of sounder be used, so it is even more of no particular con- 25 sequence in what way the bell be mounted, so far at least as the principal object of the present invention is concerned.

Coming now to our means for concentrating and reflecting sound, there is shown at Q 30 a curved plate attached at one end to the bottom of the rear of the tank and at the other end to the top thereof at a point forward of this sounding device. This plate is designed and positioned to throw the sound-waves for- 35 ward and down into the water. By thus throwing the sounds ahead of the vessel its position and course are indicated and danger of collision lessened. The space Y between 40 the plate Q and the walls of the tank may be filled with sawdust or other sound-absorbing and non-conducting medium. Although we prefer to equip our tanks with the reflector and although the reflector constitutes in itself an invention of some importance, it is appar- 45 ent that we may omit the same without destroying the usefulness of the principal feature of our present invention. We may even combine the tank and reflector features by building the tank so that the shape and de- 50 sign of certain portions of it cause it to perform the functions of the reflector.

Figs. 3 and 4 illustrate a modification of the apparatus adapted especially for use on 55 ships, whereby not only may warning-signals of the approach of a vessel be given, but the direction in which the vessel is moving may be readily determined by the party receiving the signals. In these figures, T' and T<sup>2</sup> represent two tanks, located, respectively, on 60 the port and starboard sides of the ship S and containing bells B' and B<sup>2</sup>, immersed in the water W, which fills or partially fills the tanks. In the operation of the device as shown in these figures two bells may be

struck alternately with different numbers of 65 strokes—as, for instance, two strokes of the port bell followed by three strokes of the starboard bell. If the vessel has her port side toward the receiving-station, the two- 70 stroke signal not being shadowed by the body of the ship will sound louder than the starboard signal. If the vessel is approaching the receiving-station dead ahead, both signals would be equally loud, and if the starboard 75 side is toward the receiving-station the starboard signal will appear louder. By these means another vessel receiving a signal warn- ing it of the approach of the ship S would be able to direct its course so as to avoid a col- 80 lision. Instead of striking numbers on the port and starboard sides the two bells might be of different pitch or tone, or any suitable means may be used to distinguish the sounds made by the two sounding devices.

The effect of locating the sounding device 85 in water within the structure is practically the same as locating it directly in the sea outside. The water in the tank being in direct contact with the sounder receives the full force and effect of its vibrations. The rela- 90 tively thin walls of the ship being in contact with the sea on one side and with the tank-water on the other deliver the vibrations to the sea with little or no loss, as has been de- 95 termined by continual experimentation. By having the tank-water fresh the corrosive and other effects of the sea-water upon the apparatus are obviated.

Whereas we have shown and described our water-tanks as located on shipboard, we may 100 choose to locate them in any other structure, and instead of water another liquid, as oil or some other non-freezing compound, may be used in the tanks.

Having thus described our invention, what 105 we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for producing sound-vi- 110 brations in water, by which they are transmitted, the combination of a ship, buoy or other floating structure in contact with the body of water through which the signals are to be transmitted, a tank or vessel of liquid 115 inside the said ship or structure, and a sound-producing device immersed in the said internal tank or vessel of liquid, substantially as and for the purposes described.

2. In submarine signaling means, a ship or other structure the wall of which is in con- 120 tact with the water in which the sound-waves are to be transmitted, a body of liquid within said structure in contact with said wall, sound-producing means located in said second body of liquid.

3. In an apparatus for producing sound-vi- 125 brations in water by which they are transmitted, a combination of a ship, buoy, or other floating structure in contact with the body of



water through which the signals are to be transmitted, two or more tanks or vessels of liquid located inside said ship or structure and upon opposite sides thereof, and sound-  
5 producing devices each immersed in one of said tanks or vessels of liquid and each having a characteristic whereby the sound-waves produced by it will be distinguished from those produced by any other sound-producing  
10 devices within the same ship or structure, as described.

4. In submarine signaling means, a tank one wall of which is in contact with water into which the sound-waves are to be trans-

mitted, means contained within said tank 15 whereby signals may be transmitted and reflecting means of substantially the kind described located upon the opposite side of said tank from that through which said sound-waves are to emanate, whereby sound-waves 20 proceeding from said signaling devices may be concentrated, as set forth.

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