

R. F. BLAKE.
TANK MOUNTING.

APPLICATION FILED FEB. 9, 1916.

1,348,538.

Patented Aug. 3, 1920.

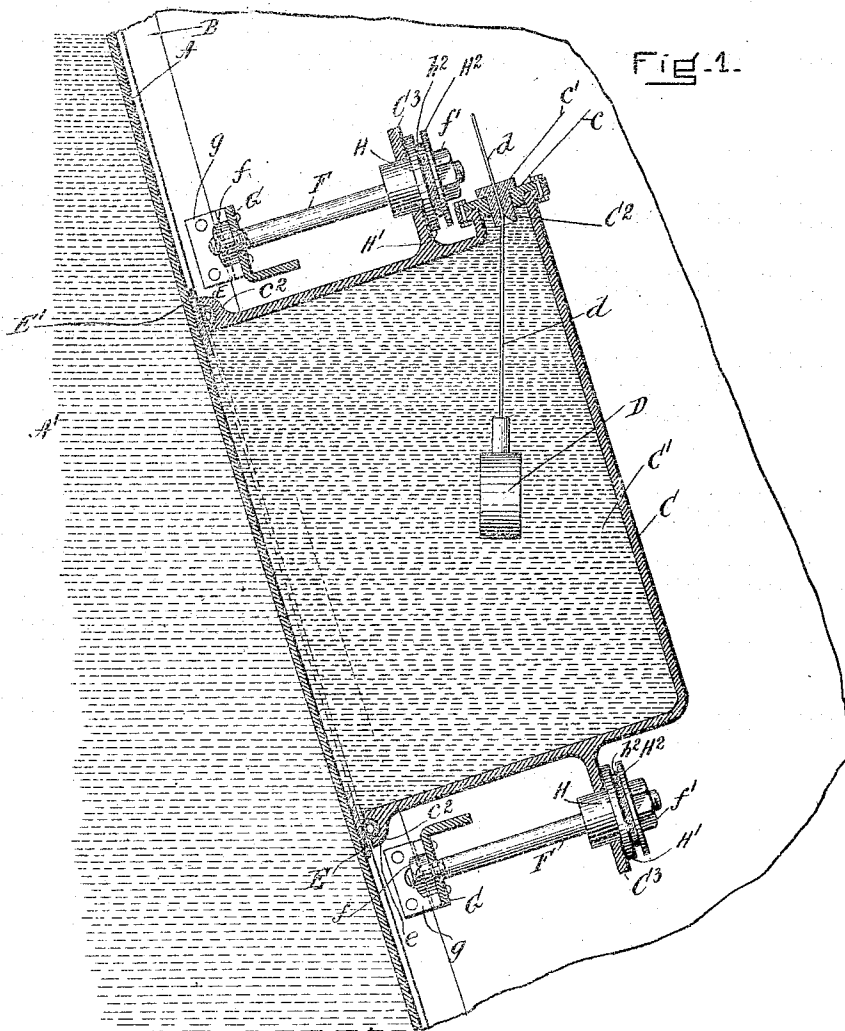


Fig. 1.

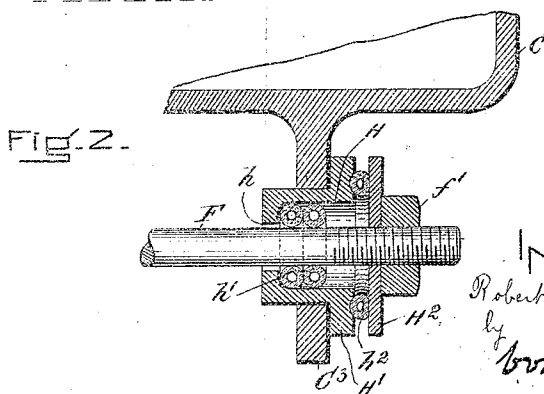


Fig. 2.

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UNITED STATES PATENT OFFICE.

ROBERT FULTON BLAKE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO SUBMARINE SIGNAL COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

TANK-MOUNTING.

1,348,538.

Specification of Letters Patent.

Patented Aug. 3, 1920.

Application filed February 9, 1916. Serial No. 77,148.

To all whom it may concern:

Be it known that I, ROBERT FULTON BLAKE, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Tank-Mountings, of which the following is a specification.

In receiving submarine signals on board ship it has been the custom to attach a cast iron tank to the metallic frame or skin of the ship, which is usually made of steel, with an intervening gasket to make the joint watertight, fill the tank with salt water or other liquid or substantially the same density and suspend in the liquid the microphone or other like instrument which is to receive the sound waves. The instrument transforms the sound waves into electric impulses and transmits them to the receiving telephone, and so used may be called a receiving microphone. Its connecting wires run to the receiving telephone.

After such a tank has been in use for some time the mechanical watertight joint between the tank, the gasket and the supporting plate or skin may become impaired, so that the joint leaks. As this may be due to the creeping of salts into the joint, this leakage can be avoided by electrically insulating the tank from the ship, but when this is done by insulating material of the usual type, *i. e.*, by hard rubber washers, it has been found that disturbing noises are transmitted from the sides and frame of the ship into the tank, thereby producing false signals and interfering with the reception of the true signals. It has finally been discovered that all the above difficulties could be overcome by using spacers so constructed and so constituted as to be insulators not only to electric impulses but also to sound impulses, and this constitutes the subject of my invention.

My invention therefore consists, generally speaking, in the use of both sound and electrical spacers between the tank and the ship's skin as well as between its means of attachment and the ship's frame so that there may be no path for electrical current or sound vibrations between the tank and the ship's frame.

My invention will be understood by reference to the drawings, in which—

Figure 1 is a vertical section of the side wall or skin of the ship and the tank attached thereto in accordance with my invention.

Fig. 2 being an enlarged sectional detail showing one form of the attaching means embodying my invention.

A is the ship's wall or skin and B one of the frames, of which there are a number usual in the construction of the ship, these frames running vertically and forming the support for the skin of the ship which is attached thereto. Within the ship and attached to the frame B, to form a watertight joint with the skin A, is the tank C, which is usually filled with salt water or other suitable fluid C¹ in order that the sound waves which approach the ship through the outside water A¹ may be transmitted to the microphone D, which is hung within the tank, with the least possible loss of energy. The microphone D is supported within the tank by means of wires *d* by which it is connected to the receiving telephone (not shown). The tank C is preferably and usually made of cast iron and has a hand-hole C² which is closed by a cover *c* bolted to the rim thereof. The cover *c* has an opening through it closed by a stopper *c*¹ of rubber or other insulating material through which the wires *d* pass. The tank C may be of any convenient shape. Usually it is square and is provided with a flange *c*² about its edge, which is grooved to receive the spacer E. This spacer is made of insulating material and is in fact preferably a piece of rubber tubing of sufficient thickness and weight to prevent contact between the edge of the tank and the skin of the ship when the tank has been properly attached thereto. A rubber gasket E¹ is also preferably used between the spacer E and the skin A to prevent any possibility of contact between the flange *c*² and the skin A.

The tank is preferably attached to the frames B by a number of bolts F of which two only are shown. In order to attach these bolts to the frames, cross beams G are provided which run from one frame to the

next and are perforated at proper points to receive the bolts C , these cross beams G being attached to the frames B by clips g riveted thereto. To attach the bolts to the tank the tank is provided with lugs C^2 which are cast thereon and perforated to receive the bolts. The arrangement of frames B and cross beams G is one which must be devised and carried out according to the circumstances of any particular case. In the form of attachment shown in the drawings these bolts are preferably rods threaded at each end with nuts f, f' to form the heads at one end thereof, the body of each bolt being passed through one of the openings in one of the cross beams G and passing also through the opening in the lug C^2 . It is a housing which fits into a suitable opening in the lug C^2 , this opening being considerably larger than the body of the bolt F . This housing is cup-shaped and has an opening h somewhat larger than the diameter of the bolt F so that the bolt when properly placed and centered will not be in contact with the housing, being held out of contact by means of spacers h^1 . These spacers are preferably rings of rubber tubing, which may be filled with air or lead, of sufficient size to center the body or shank of the bolt F and F' is out of contact with the housing h . As shown in the drawing, the housing has a flange h^1 which rests on the top surface of the lug C^2 and on it is placed a spacer h^2 and washer h^3 against which the nut f' is screwed down. The spacer h^2 is comprised preferably of a ring of rubber tubing.

The bolts having been properly placed in the cross beams G and the nuts f, f' screwed in place, the tank is brought into position against the skin of the ship, and the spacer h having been first fitted into the groove in the flange h^1 , the washer h^3 having first been put into position; the housings h are then put in place about the bolts and fitted into the openings in the flange C^2 . The spacers h^1 are set into the housings to contain the bolts and hold them out of contact with the flange. The spacer h^2 and the washer h^3 are then put in place, and the whole clamped by means of the nuts f' so that the tank in connection with the spacer h forms a watertight joint with the skin of the ship.

In following out this construction it will be seen that the tank C and the skin of the ship and its frame are electrically insulated from each other by means of the spacers h and also by means of the centering spacers h^1 and the spacers h^2 , all of which are made of insulating material so that there can be no action to cause leakage. It will also be seen that because of the construction of the spacers as well as the ma-

terial of which they are made, the vibrations of the ship will be damped and hence cannot reach the microphone, which will thus be substantially insulated acoustically from the vibrations or foreign noises which interfere with the proper reception of signals, and also from any interfering vibrations of the ship's skin which originate outside the ship, so that the microphone will only receive signals properly so called. Signals are therefore properly received by the receiving transmitter or microphone D and transmitted electrically by it to the telephone.

I do not mean to limit myself to the exact construction shown as the construction and arrangement of the frames is different in almost every ship. Such variations from the arrangement as may be necessary in any given case will occur to those skilled in the art, my invention relating not to the exact means of attachment but to means for insulating the tank both acoustically and electrically to prevent leakage and disturbing noises.

What I claim as my invention is:—

1. Apparatus for submarine signaling comprising a ship's hull, a tank located against the ship's hull, said tank containing a liquid in contact with the ship's hull below the water line, a submarine signaling mechanism located in said liquid whereby said signaling mechanism will be put in good acoustic connection with the water exterior to said ship, and both acoustical and electrical insulating means located between said tank and said ship's hull adapted to prevent liquid leakage from said tank.

2. Apparatus for submarine signaling comprising a ship's hull, a tank located against the ship's hull, said tank containing a liquid in contact with the ship's hull below the water line, a submarine signaling mechanism located in said liquid and electrically insulated from said tank and from said liquid whereby said signaling mechanism will be put in good acoustic connection with the water exterior to the ship and acoustical and electrical insulating means located between said tank and said ship's hull to prevent liquid leakage from said tank.

3. Apparatus for submarine signaling comprising a ship's hull, a tank located against the ship's hull, said tank containing a liquid in contact with the ship's hull below the water line and a submarine signaling mechanism located in said liquid, and means comprising a member tubular in cross section whereby said signaling mechanism will be maintained in good acoustic connection with the water exterior to the ship and will be acoustically and electrically insulated from said ship's walls and liquid leakage from said tank will be prevented.

4. Apparatus for submarine signaling

comprising a ship's hull, a tank located against the ship's hull, said tank containing a liquid in contact with the ship's hull below the water line, a submarine signaling mechanism located in said liquid, and means 5 comprising a member tubular in cross section located between said tank and said ship's hull and adapted to prevent liquid leakage from said tank and serve as an acoustical and electrical insulating means, 10 the edge of said tank resting upon said tubular means being slightly larger than the normal shape of said tubular means whereby contact surfaces of said edge and said tubular means will vary according to 15 the pressure of the tank thereon.

ROBERT FULTON BLAKE