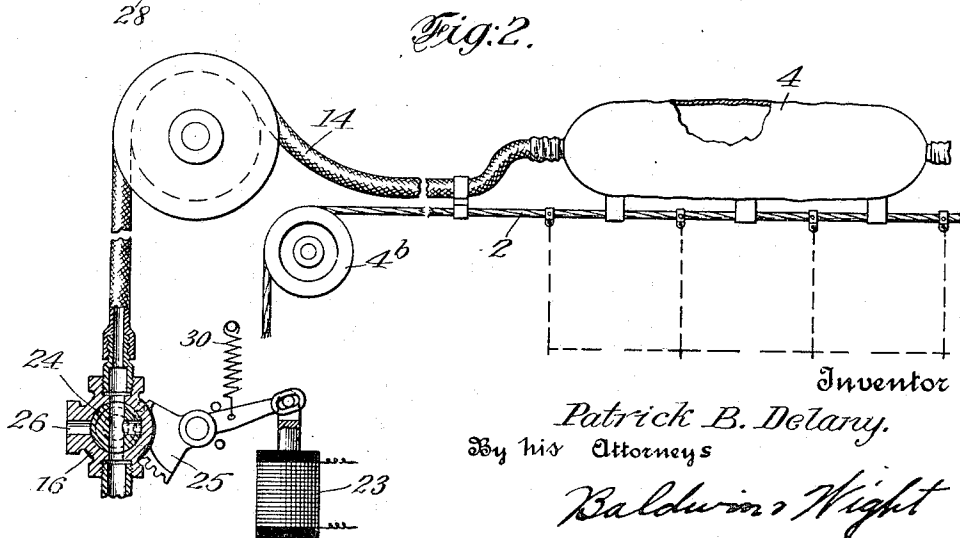
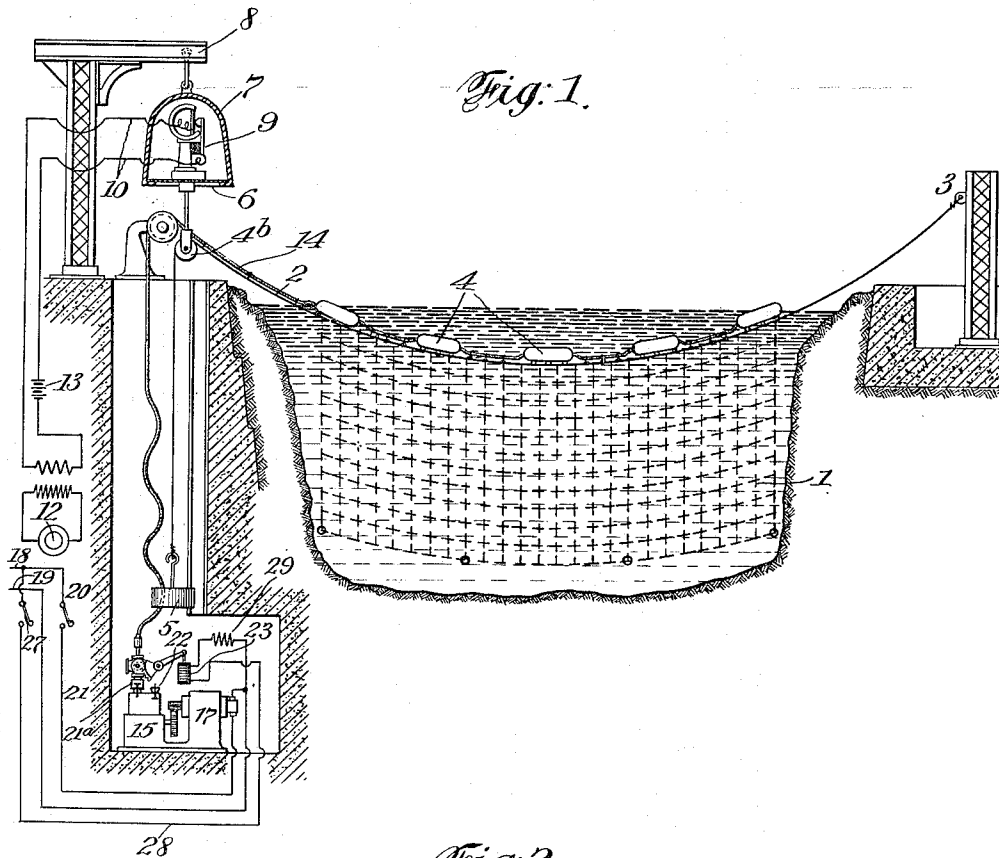


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 APPLICATION FILED APR. 21, 1917.

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Patented Dec. 17, 1918.  
 2 SHEETS—SHEET 1.

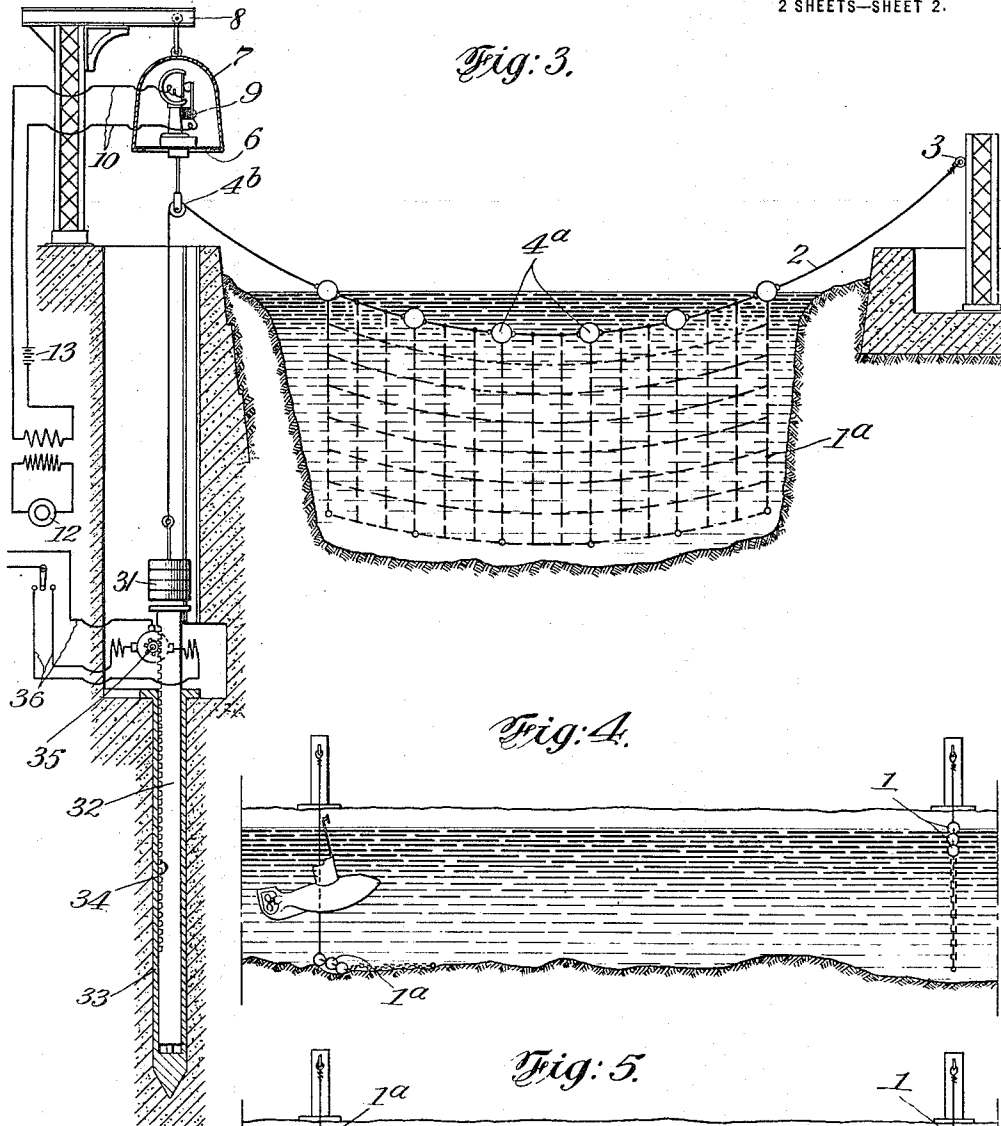


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Inventor

Patrick B. Delany  
 By his Attorneys

Baldwin & Wight

# UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF SOUTH ORANGE, NEW JERSEY.

APPARATUS FOR DETECTING AND CAPTURING SUBMARINES.

1,287,908.

Specification of Letters Patent.

Patented Dec. 17, 1918.

Application filed April 21, 1917. Serial No. 163,657.

*To all whom it may concern:*

Be it known that I, PATRICK B. DELANY, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Detecting and Capturing Submarines, of which the following is a specification.

My invention contemplates an improved apparatus for detecting and capturing submarines. It comprehends employing a pair of nets, one of which, the obstruction net, is normally in position to arrest the passage of a submerged craft, while the other or detention net is normally lowered on the bed of the stream and adapted to be elevated into operative position to prevent the escape of the craft in a reverse direction. The essential idea of the invention is means rendered effective by the contact of the craft with a net for conveying intelligence of the fact to an observer's station.

As illustrated in the accompanying drawings, Figure 1 shows an obstruction net in the position effective to stop a craft passing partially or wholly submerged through a stream and also the medium for communicating to a watcher's station the intelligence that the craft has encountered the net. Fig. 2 is a detail of the means for raising and lowering the net. Fig. 3 shows the detention net in its operative position. Fig. 4 shows the detention net lowered upon the bed of a stream to permit the passage of a craft while the obstruction net is in a position to arrest its passage and Fig. 5 shows both nets in position.

The following features of construction are preferably common to both of the nets: A cable 2 is permanently anchored at one side of the stream as by a tower 3. The cable carries suitable buoys to aid in supporting the net and relieve the strain upon the cable. These may consist of pneumatic bags 4 as shown in Figs. 1 and 2 or floats 4<sup>a</sup> as shown in Fig. 3.

At the opposite side of the stream the cable is shown passing over a sheave 4<sup>b</sup> and attached to a weight designated at 5 in Fig. 1 and at 31 in Fig. 3. The sheave is

suspended from the iron head or steel diaphragm 6 of a cylinder 7 supported by a beam 8 on a suitable tower. Within the cylinder and mounted on the head 6 I have shown a microphone transmitter 9 in circuit through conductors 10 with a telephone receiver or other indicator 12 at the observer's station. A battery 13 is included in the circuit.

As appropriate means for moving the obstruction net 1 into and out of operative position I may employ the instrumentalities shown in Figs. 1 and 2. It will be understood that this net does not require frequent changes as it will normally be in operative position. I prefer to operate the net by the extent of inflation of the bags 4. When fully inflated they raise the net into the position shown and when deflated they permit it to fall by gravity, the weight 5 aiding in holding the net elevated. In order to inflate the bags a flexible tube 14 is shown communicating with each of the bags in series and connected to a pump 15 and an exhaust valve 16. The pump may be operated by a motor 17 to which current is supplied from the line conductors 18, 19 through the switch 20 and the branch conductor 21. When the switch is closed the motor operates the pump and inflates the bags, thus elevating the net. When the required elevation is attained the switch 20 is opened whereupon the check valve 21<sup>a</sup> prevents the outflow of air from the tube 14 and the bags. The check valve may also serve as an outlet valve for the pump, the valve 22 serving as an inlet.

To deflate the bags the valve 16 is opened preferably by energizing a solenoid 23 which rotates the valve plug 24 through the toothed sector 25 to connect the tube 14 with the outlet 26. The solenoid circuit includes the line wires 18 and 19, the switch 27 and the branch conductor 28. A resistance 29 is preferably included in the solenoid circuit. A spring 30 is adapted to normally bring the valve to non exhausting position and provide a passage through the valve from the pump to the tube and bags.

The detention net 1<sup>a</sup> is adapted for prompt

action and to be rendered effective immediately upon a craft coming into contact with the obstruction net. As appropriate means for moving this net into and out of operative position I preferably employ the means shown in Fig. 3. The weight 31 is shown mounted on a rod 32 vertically movable within a casing 33 which may be sunk into the river bank. The rod is formed with a rack 34 engaged by a pinion 35 on the armature shaft of a motor whose line circuit is indicated at 36 and under the control of a switch 37, whereby the motor may be maintained inactive or operated to raise or lower the rod and the weight. Obviously the weight tends to aid in quickly raising the net.

From the foregoing it will be understood that when a vessel contacts with the obstruction net 1 it creates a tension of the cable 2 on the drum head 6 and renders the head sensitive to the vibrations set up in the net. The agitation of the drum head operates the microphone transmitter 9 which transmits the disturbances to the telephone or other indicator 12. The operator at the observer's station having the mechanism for controlling the detention net 1<sup>a</sup> directly under his control may immediately operate the switch 37 to cause the motor 35 to become active and permit the weight 31 to quickly lower and elevate the net.

If the craft thus trapped goes about and endeavors to escape its contact with the detention net 1<sup>a</sup> will result in the mechanical transmission of the vibrations to the observer's station just as in the manner above described when the craft encounters the obstruction net.

It will be understood that while I have specified nets as appropriate means for arresting the travel of the craft, yet any equivalent arrangement may be employed, the main feature of my invention being the method of detection by the mechanical transmission of the vibration set up in the net or other obstruction to the microphone detector.

I claim as my invention:

1. An apparatus for detecting the presence of vessels comprising a net across the path of travel of the vessel, a cable for supporting said net, supports from which the cable is suspended, a diaphragm carried by one or more of said supports and connected with said cable, and means operated by the diaphragm for recording the vibrations thereof whereby mechanical vibrations of the cable may be detected.

2. An apparatus for detecting the presence of vessels comprising a net across the path of travel of the vessel, a cable from which the net is suspended, supports at the ends of said net, a diaphragm secured to

one of said supports, cable-supporting means carried by said diaphragm whereby mechanical vibrations of the cable operate the diaphragm, means operated by said diaphragm for recording the vibrations thereof, and means for raising and lowering the net without destroying the operative relation of the diaphragm with the cable.

3. An apparatus for recording contact with a submarine hindrance below the water, comprising a receiver of mechanical vibrations located above the water, a tensioned member connected to said hindrance and to said receiver for transmitting mechanical vibrations thereto, and means adjacent said receiver for transforming said mechanical vibrations into electrical vibrations for signal purposes.

4. An apparatus for recording contact with a submarine hindrance below the water, comprising a receiver of mechanical vibrations located above the water, a tensioned member rigidly connected to said hindrance and adjustably connected to said receiver for transmitting mechanical vibrations thereto, and means adjacent said receiver for transforming said mechanical vibrations into electrical vibrations for signal purposes.

5. An apparatus for recording contact of a vessel with a water-way protecting device, comprising a receiver of mechanical vibrations located above the water, a tensioned member connecting said projecting device and said receiver for mechanically transmitting mechanical vibrations caused by contact of said device with said receiver, and a microphone actuated by said mechanical vibrations above the water and transforming the same into electrical vibrations for final recordation.

6. Means for the detection of vessels, comprising a tensioned wire or cable suspended at one end from a metallic diaphragm located at a receiving station above the water and audibly responsive to mechanical vibrations produced by contact of a vessel with said wire or cable, and a microphone at said receiving station responsive to said mechanical vibrations.

7. Means for the detection of vessels, comprising a tensioned wire or cable adjustably suspended at one end from a metallic diaphragm located at a receiving station above the water and audibly responsive to mechanical vibrations caused by contact of a vessel with said wire or cable, and a microphone at said receiving station responsive to said mechanical vibrations.

8. Means for the detection and detention of vessels, comprising a series of hindrances adapted to be raised and lowered at will, a receiver of mechanical vibrations connected to one of said series of hindrances by a ten-

sioned member, and a microphone responsive to said mechanical vibrations for indicating when another of said series of hindrances should be raised.

- 5 9. An apparatus for the detection of vessels, comprising a waterway hindrance, a diaphragm supported above the water so as to be audibly responsive to mechanical vi-

bration, and a tensioned member mechanically connecting said hindrance and said 10 diaphragm for mechanically transmitting to the diaphragm vibrations caused by contact of a vessel with the hindrance.

In testimony whereof I have hereunto subscribed my name.

PATRICK B. DELANY.