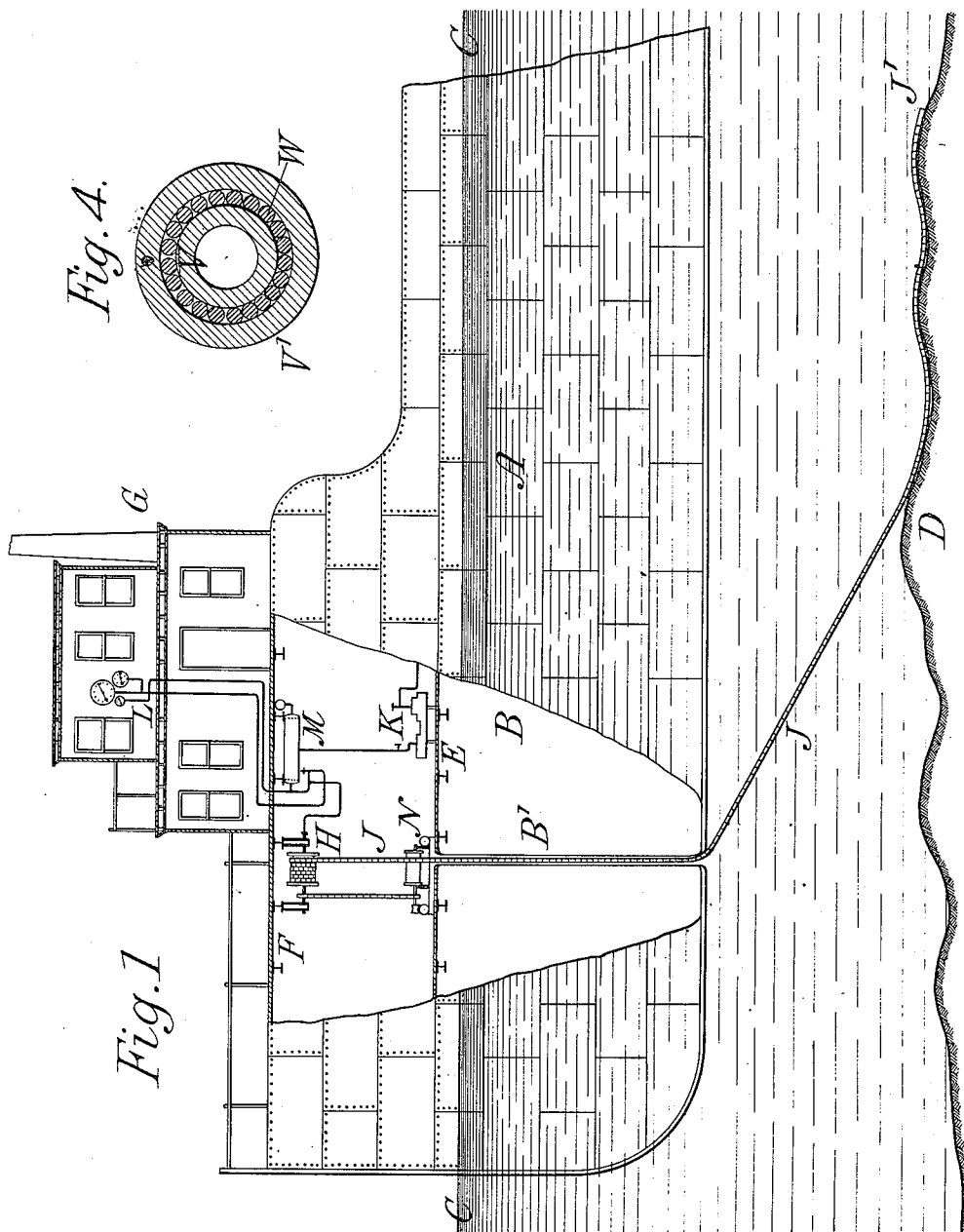


1,122,343.



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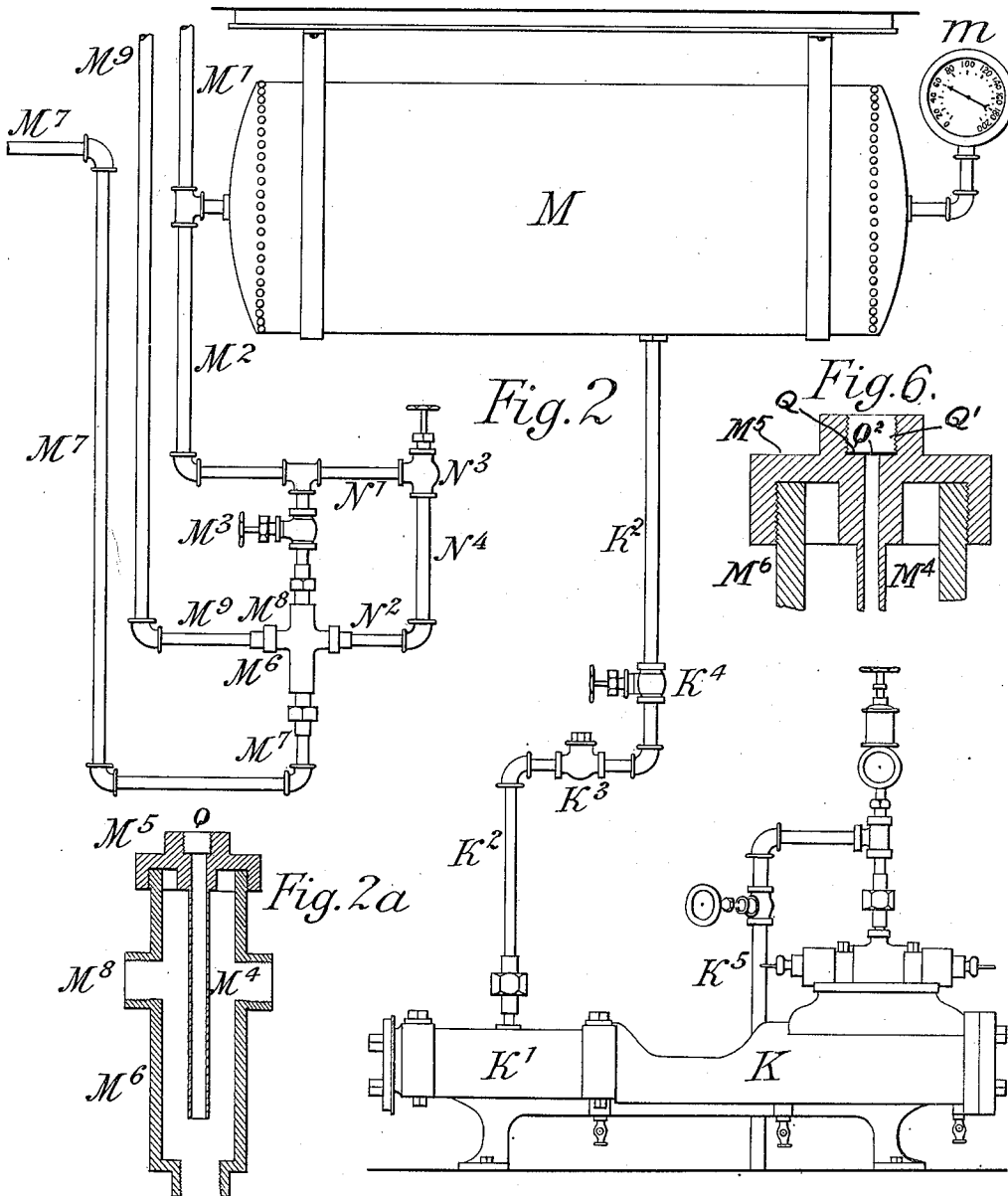
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APPLICATION FILED OCT. 28, 1912.

1,122,343.

Patented Dec. 29, 1914.

4 SHEETS-SHEET 2.



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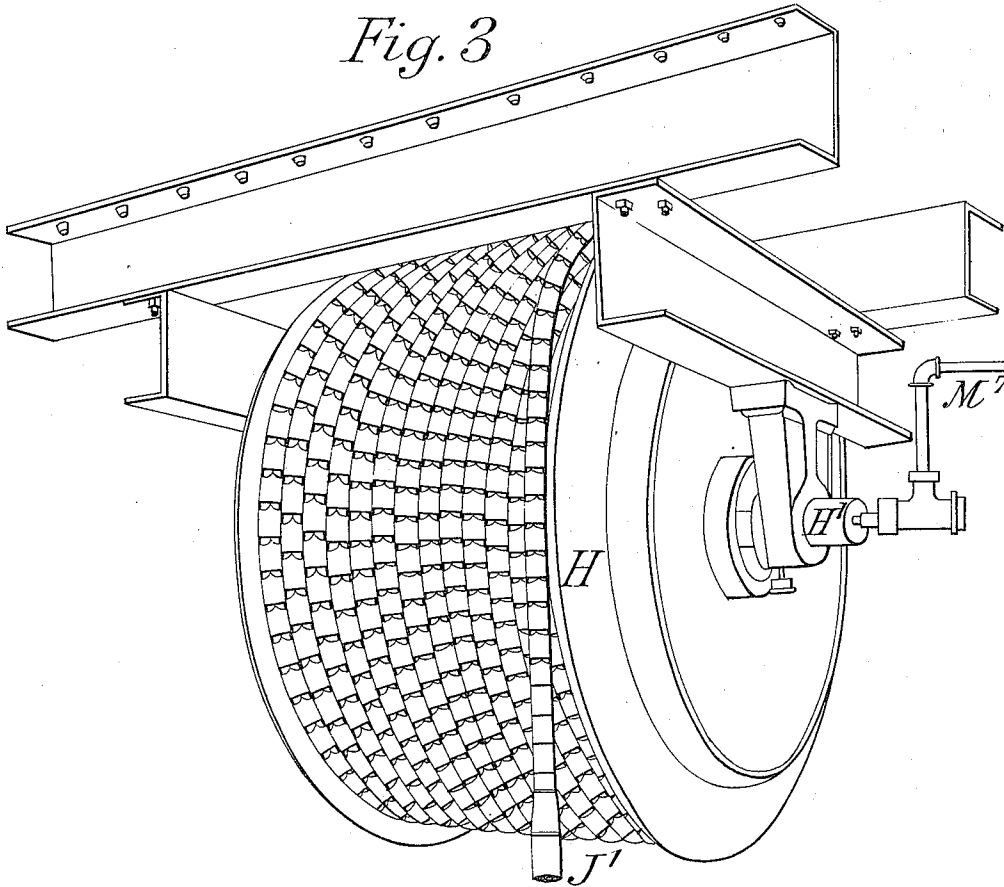
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Fig. 3



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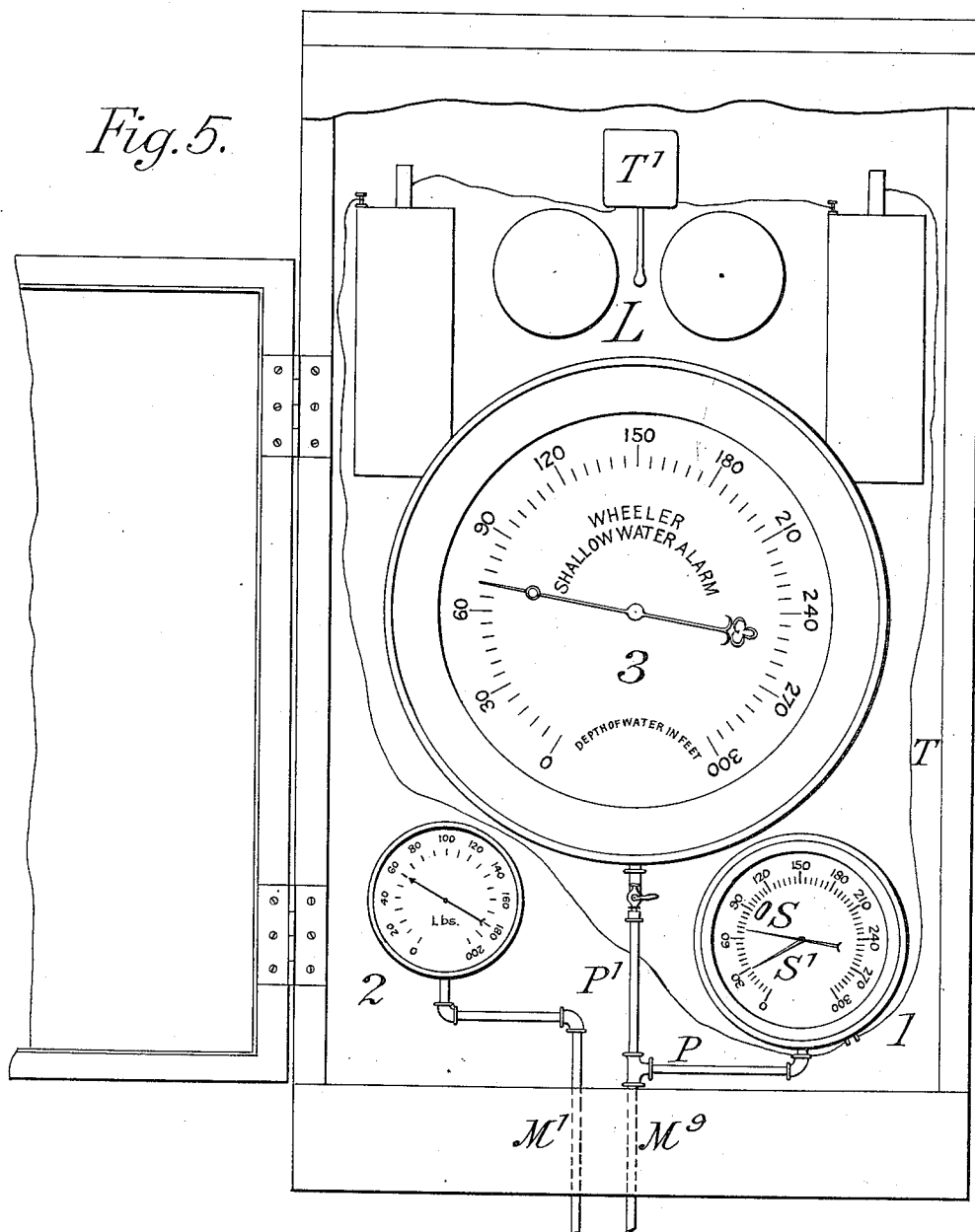
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4 SHEETS—SHEET 4.

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Fig. 5.



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SHOAL-INDICATOR.

1,122,343.

Specification of Letters Patent.

Patented Dec. 29, 1914.

Application filed October 28, 1912. Serial No. 728,063.

To all whom it may concern:

Be it known that I, EBEN S. WHEELER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Shoal-Indicators, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to shoal indicators combined with vessels or other floating objects in which it is desirable that the existence of the depth of shoal water shall be indicated at all times and the means whereby it is indicated under the eye of the pilot, and whereby in most cases shoaling is indicated soon enough to avoid grounding.

The apparatus herein described is an improvement upon that heretofore set forth in my Patent No. 804,570 of November 14, 1905.

The invention herein described consists of the various arrangements and combinations set forth and claimed in the claims.

In the drawings: Figure 1, illustrates the apparatus as carried in the bow of a vessel and when indicating a shoal thereunder, a portion of the vessel being broken away to show the interior. In this figure I have chosen as an illustration the ordinary freight carrier in which the indicators are placed in a pilot house well forward on the fore-castle deck of a vessel. Fig. 2, illustrates the details of the means for providing and controlling air pressures, being a portion of Fig. 1 upon an enlarged scale. Fig. 3, is substantially a continuation of Fig. 2 illustrating the hollow journaled reel and its mounting upon which the sounding line is wound when not in use. Figs. 2^a, 4, and 6 illustrate details of construction. Fig. 5, illustrates the gages and indicating devices which are under observation by the pilot or other officer and supposedly located in the pilot house.

Similar letters refer to similar parts.

In the drawings, A represents a vessel employing my invention, a portion of which is cut away at B so as to show the interior so far as the same relates to my invention.

C, is the assumed water line.

D, is the shoal over which the vessel is supposed to be passing.

E, is the main deck of the vessel.

F, is the fore-castle deck.

G, is the pilot house. One side of the pilot house is supposed to be removed so as to show so much of the interior as carries the indicating apparatus, the wheel and other steering accessories being omitted.

H, is a hollow journaled reel upon which is wound a sounding line J which is of peculiar construction and is shown as sectioned in Fig. 4.

K, represents an air pump, shown as driven by steam.

L, is the indicating board carrying the indicators as will be hereinafter described.

M, is an air reservoir attached to the underside of the fore-castle deck F.

N, indicates a motor which may be either steam or electric, which may be used to rotate the hollow journaled reel H and thereby unwind or wind up the sounding line J. As the power used does not involve this invention it is therefore not indicated, there being nothing new in regard thereto.

Referring to the detail Fig. 2 the reservoir M has connected therewith an independent gage *m* to indicate the pressure therein. This gage is merely a matter of convenience so that the operator of the pump may know the pressure which has been delivered in the tank. The tank M is preferably hung from the underside of the fore-castle deck although it is obvious that it might be placed in any convenient place or position. It is connected to an air pump K located in any convenient place as the main deck, the details of which are not shown, as they are all old and well known. Its object is simply to furnish air pressure from the air pump cylinder K¹ to the pipe K² K². A check valve K³ is interposed in this line and also an ordinary compression cock K⁴ by which the pipe may be shut off and pressure retained in the tank M, if the pump is not in operation. Steam may be supplied to the pump by the pipe K⁵ governed and controlled by suitable valves. The pressure from the tank M is conveyed through the tube or pipe M¹ to the gage 2 Fig. 5 and as this is a direct connection without interruption, it also registers the amount of pressure in the tank M and should correspond with the gage *m*. A branch pipe M² connects the tank M past a needle valve M³ which may be opened to the extent desired and to a specially devised ap-

paratus, shown in Fig. 2^a, in which the pipe M⁴ passes through the head M⁵ into a drum M⁶. The object of this drum M⁶ is to prevent the impulses of the pump acting against the air pressure in the tank M from being conveyed as such impulses to the sounding line, it being found quite necessary that the sounding line be kept free from impulses and that the pressure thereon shall be constant and steady. A pipe M⁷ is removably attached to the end of the drum M⁶ and runs from that point to the hub H¹ of the hollow journaled reel H, see Fig. 3. This pipe is continued from Fig. 2 to Fig. 3 and the two figures might be placed in juxtaposition so as to show such continuation. This reel may be attached to the underside of the forecandle deck, as shown in Fig. 1. Reels of this connection whereby gaseous or other fluids may enter the journal through a swivel or box, are old and a complete detailed description thereof is unnecessary. Communication with the hollow journal H¹ is afforded to the sounding tube J. This tube being flexible owing to its construction as hereinafter described, may be wound entirely upon the reel H, or it may be drawn off the reel and inserted to its available extent in an exit pipe B¹ running from the main deck above the water line at or near the keel or lower portion of the vessel upon which the apparatus is mounted. The tube J being heavily armored as described in the patent to George Westinghouse, No. 267,473, of Nov. 14, 1882, it is, of course, much heavier than the water and readily descends therein. The outer end J¹ of this tube is open and the water is permitted to freely enter therein and of course if there were no air pressure or air resistance therein, it would rise to the level of the water line of the vessel carrying the apparatus. It is obvious that no matter what the angle of the tube or its length which is under water which might be much more than the depth of water underneath the keel of the vessel, as shown in Fig. 1, the hydrostatic pressure will be precisely the same and correspond with the vertical depth only. It is obvious also that provided the pipes are properly proportioned so that the friction of the passage of air therethrough can be practically negligible that only so much air pressure would be received from the tank as would overcome this hydrostatic pressure because when so overcome it escapes from the outer end J¹ of the sounding tube J. Inasmuch as the hydrostatic pressure of water is well known it is obvious that by observing this air pressure which could be and is properly translated into terms of feet on the gage, that the observer would at once instantly note the depth of water to which the outer end J¹ of the sounding tube J has descended.

Owing to the sudden variations of depth to which the end J¹ of the sounding tube may be subjected, it may be found that the air pressure would not operate with sufficient sensitiveness to correctly indicate such depth especially if the pressure in the air tank was much greater than necessary (usually double) so that the rush of air through the pipe, if not otherwise controlled, would be excessive. It is desirable however to have what might be termed a reserved pressure in the air tank M above that necessary to operate the apparatus, and to permit this I have interposed a needle valve M³ a diaphragm Q (in the joint Q¹) in which there is a small perforation Q² (see Fig. 6) preferably about one hundredth of an inch in diameter. The device shown in Fig. 2^a in conjunction with the valve M³ permits the throttling of the air so as to permit of a somewhat heavier and more uniform pressure being maintained in the tank M, and yet only allows enough air to pass through the sounding tube to correctly indicate the depth by the pressure necessary to drive or keep the water out of it. The apparatus shown in Fig. 2^a which is in the nature of a muffler which equalizes suddenly developed air pressures due to the strokes of the pump transmitted through the tank M, supplements the action of the needle valve M³. This apparatus serves to retain the somewhat higher pressure necessary for the tube J so as to promptly indicate increased depth without correspondingly increasing the power of the air pump. Otherwise if only sufficient pressure was kept in the tank M, say, to indicate a depth of 25 feet, a sudden descent to 50 feet would not be indicated until that air pressure had been doubled by the increased action of the pump, whereas if the pressure in the tank can be kept sufficiently high, it is certain that the air pressure in the line will quickly respond to depths which will be promptly noted by the proper gage to which the tube J is directly connected.

In case the tube J with its connections should need clearing out or in case it should be required to be certain that it will operate, it sometimes may be necessary to force a strong blast of air therethrough regardless of depth to which the tube might be subjected or in fact before it was unwound from the hollow journaled reel H, or while in position shown in Fig. 3. To accomplish this I have provided a bypass arrangement from the pipe line M² around the needle valve M³ and into the casing M⁵ and thence to the pipe M⁷. This by-pass arrangement is shown as pipes N⁴, N¹, N² and is controlled by an appropriate valve N³. The muffling apparatus of Fig. 2^a has two connections M⁷ and M⁸. Referring to the connection M⁸ which is shown connected to a pipe M⁹, in

Fig. 2 by a union. The pipe in the pilot house is divided, one branch P going to a gage 1 indicating pressure, the other branch P¹ going to a gage 3 indicating depth of water in feet. The pressure on this gage being transposed into foot depths. Gage 1 may have thereon at any point a contact switch S over which the pointer S¹ may pass and with which it may effect the contact. One terminal T of this switch may pass to the usual bell actuating apparatus T¹ concerning the details of which has already been stated, there is nothing new and which need not therefore be described. The other terminal passes to the other side of the apparatus and the line is also appropriately connected to a battery or other source of electricity, not shown. It is obvious that when the pointer S¹ touches the contact or switch S that the electrical connection will be made and the bell would ring and as this may be a short contact, it would ring only when it passes over such contact. The contact however might be made long enough on the indication of shallow water, so to speak, so that the bell would ring at all times when a certain shallow depth of a shoal was reached and indicated, and would not ring at depths beyond that point because the pointer would be carried beyond the contact piece and the electric circuit therefore would be broken. On shoaling again the electric circuit would be reinstated as soon as the pointer had fallen back to the position indicating shallow water. It is clear that this switch could be put upon either gage 1 or gage 3, it is immaterial which, and, therefore, I do not confine myself to be applied to any point. It is obvious also that such an electrical apparatus with such contacts might be established with both gages and that one bell could be rung in the pilot house and the other could be rung in the captain's cabin, or even in the engineer's room, if it be a steamer, and thereby indicate by signaling to the engineer for slowing down when danger of shoaling had been reached.

The armored line used for my purpose consists of a flexible tube V preferably rubber surrounded by wire strands W to strengthen it and the whole encircled by cylindrical hollow hard metal segments V¹, such as those described in the said Westinghouse patent. The interior tube V is intended to be impervious to both water and air. The cylindrical hard metal segments which encircle the whole are to prevent chafing while making it substantially a flexible metal tube, the segments being so

jointed that they can articulate one upon the other in passing down through the exit pipe and out through the bottom of the vessel. The segments also prevent injury to the tube as it is drawn along over the bottom or on a shoal which may be covered with rocks or other obstructions which would tend to destroy any ordinary tube or cable.

Having thus described my invention what I desire to claim is:

1. In combination with a vessel having a well located therein reaching from the bottom thereof to a point above the water line, a flexible sounding tube adapted to extend therethrough, means carried by the said vessel for forcing air through said tube and connected with the upper end thereof and means carried by said vessel for withdrawing, coiling and supporting said tube when not in use and allowing it to be uncoiled and delivered to the bottom of said vessel when in use, substantially as described.

2. The combination with an air tank of means for supplying air thereto under pressure, a flexible sounding tube, means for delivering air from said tank to said sounding tube including a hollow journaled reel upon which said tube may be wound, one end of said tube being connected to the hollow journal thereof, and means for delivering air to said journal, interposed means for reducing the air pressure delivered to said tube and contained therein, a gage adapted to indicate air pressure in said tube and connected with the means for delivering air thereto at a point on the sounding tube side of said reducing means, substantially as described.

3. In a shallow water alarm, the combination of a reservoir adapted to carry a relatively heavy pressure of air, a flexible sounding tube, means for supplying air to said reservoir, means leading from said reservoir to said sounding tube, said means carrying a diaphragm with a relatively small perforation, and means for muffling impulses therefrom connected with said tube, whereby air under reduced pressure is delivered to said flexible sounding tube and adapted to balance water pressure therein, and means attached to said tube to indicate the pressure therein, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

Witnesses:

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STUART C. BARNES,
R. A. PARKER.