No. 874,646.

PATENTED DEC. 24, 1907.

T. L. WILLSON.

BUOY.

APPLICATION FILED AUG. 9, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

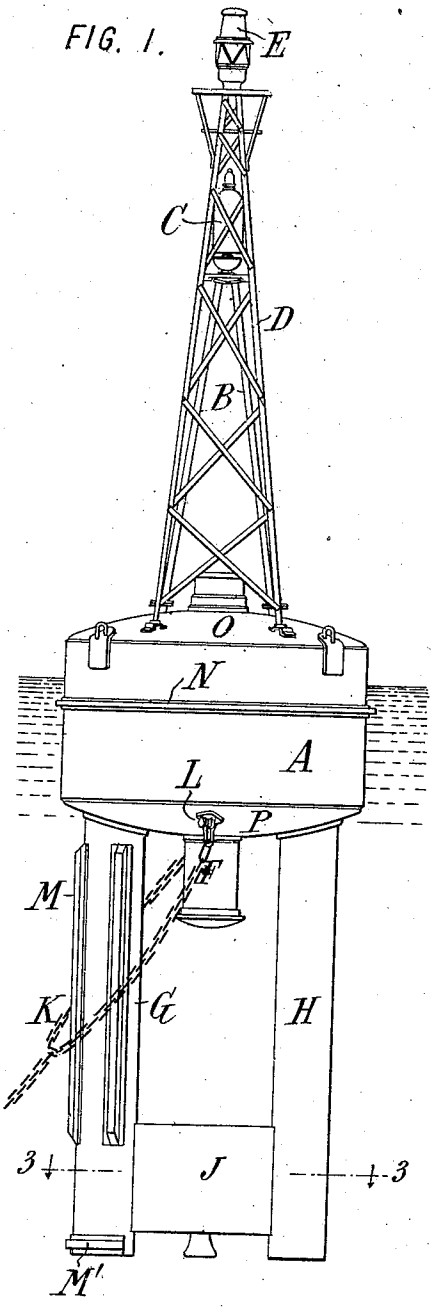


FIG. 2.

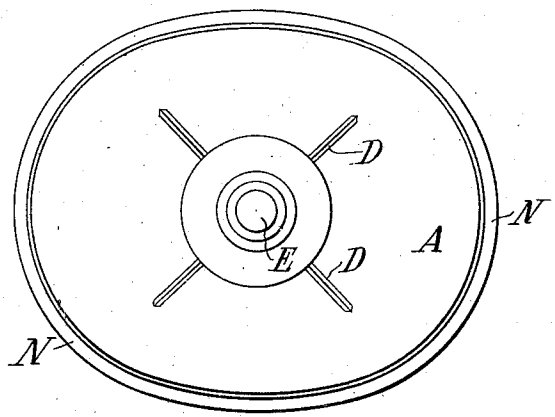
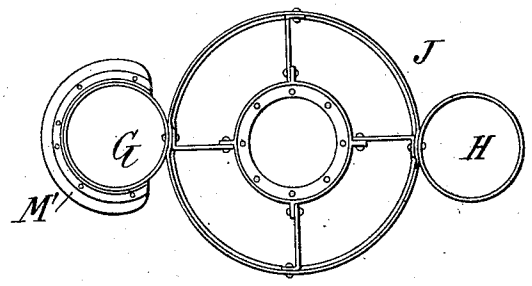


FIG. 3.



WITNESSES:

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2 SHEETS—SHEET 2.

FIG. 4.

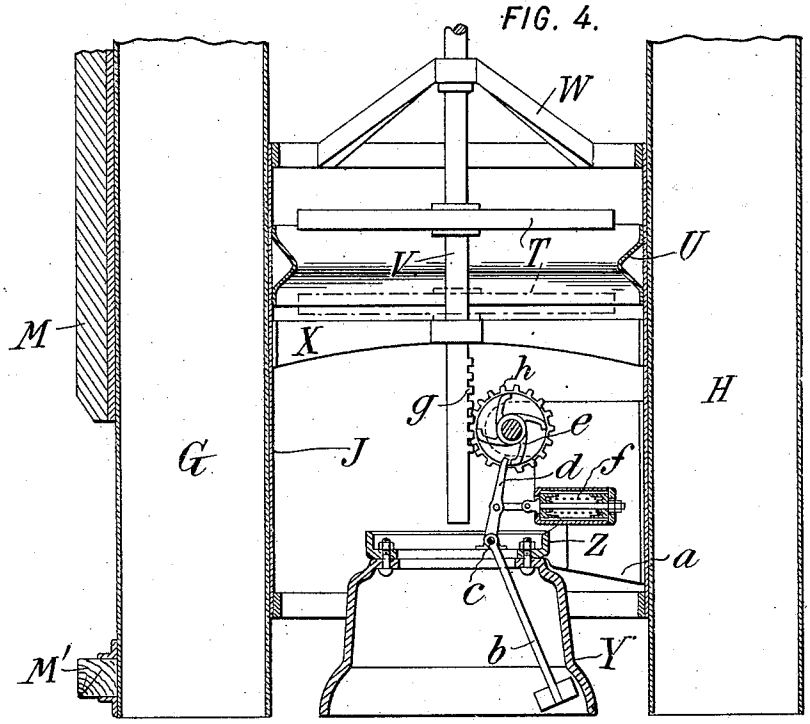


FIG. 6.

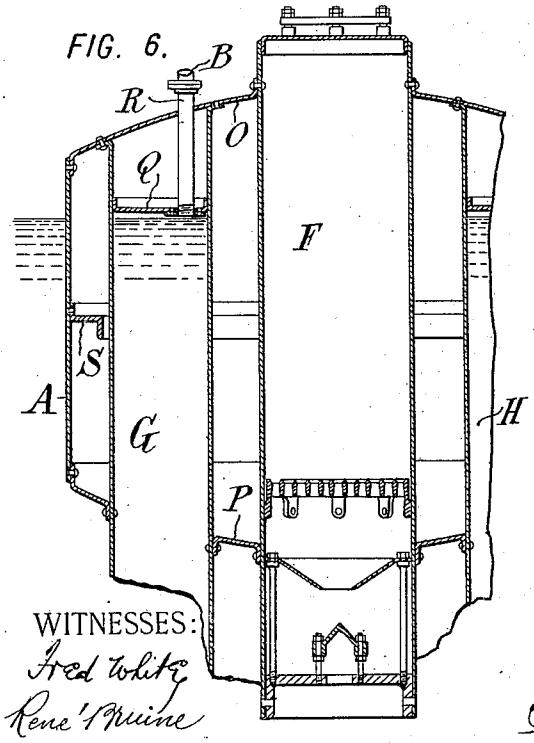
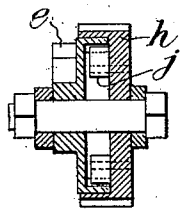


FIG. 5.



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UNITED STATES PATENT OFFICE.

THOMAS L. WILLSON, OF OTTAWA, ONTARIO, CANADA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED STATES MARINE SIGNAL COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BUOY.

No. 874,646. Specification of Letters Patent. Patented Dec. 24, 1907.

Application filed August 9, 1905. Serial No. 273,443.

To all whom it may concern:

Be it known that I, THOMAS L. WILLSON, a subject of the King of Great Britain, residing at Ottawa, Province of Ontario, Canada, have invented certain new and useful Improvements in Buoys, of which the following is a specification.

This invention aims to provide certain improvements especially applicable to large buoys which combine the features of a lighting, a whistling, and a bell buoy, and also certain features applicable to each of this class of buoys separately.

The relative arrangement of the several parts is such as to obtain the best balance for the buoy, to present a minimum resistance to the current, and to stiffen or brace the whole structure strongly against the great shocks to which it is subjected.

Other points of improvement are referred to in detail hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is an elevation of the complete buoy. Fig. 2 is a plan thereof. Fig. 3 is a section on the line 3—3 of Fig. 1, omitting the bell-ringing mechanism. Fig. 4 is a vertical section through the lower end, showing the bell-ringing mechanism. Fig. 5 is a detail of Fig. 4 in cross-section. Fig. 6 is a similar section through the flotation chamber, showing the construction of the air compressor tubes.

Referring to the embodiment of the invention illustrated, A is the flotation chamber, which projects slightly above the water level and which carries a tower D upon a bracket in which is an air whistle C. Preferably also there is mounted upon the head of the flotation chamber on said tower D a lamp E which burns acetylene generated in a tubular generator F, of which only the lower end is shown in Fig. 1. This generator may be of any suitable type, but is preferably constructed and operated substantially as described in detail in my Patent No. 791,119, dated May 30, 1905. The gas tube or generator F is preferably arranged at the center, as shown, and the compression of air for the air whistle is preferably obtained from a plurality of air compressor tubes, two in the present case, G and H, arranged symmetrically about the generator. The tubes G and H extend a considerable distance below the flotation chamber, and their lower ends are connected by a transverse brace J, preferably in the form of a tube, within which a submarine bell and bell-ringing apparatus are carried.

The buoy is moored by means of chains K terminating in a stirrup connected to links L mounted upon the flotation chamber, the two links L being in a plane transverse to the plane of the centers of the air compressor tubes. Thus the buoy floats with the plane of the centers of the compressor tubes parallel to the direction of the current.

The placing of the generator in the center is important in order to preserve the equilibrium of the buoy as the carbid therein is used up and the lime drops through the grating. The arrangement of the generator in the center of the float is made possible by substituting a plurality of compressor tubes for the one usually employed. By this symmetrical arrangement of the air compressor tubes there is avoided any tendency of the buoy to roll such as would occur when it rises and falls on a wave under an eccentric action of the inside pressure and vacuum. Furthermore by the use of a plurality of air compressor tubes, the tubes themselves are stronger than a single tube of the same capacity and the same thickness of metal, especially when the separate tubes are braced together at the bottom.

By the use of two air compressor tubes placed diametrically opposite each other the additional advantage is gained that the mooring chains may be so attached that the two tubes lie in the plane of the current. Thus the strain on the moorings is a minimum, and is less than the strain which would be induced by a single tube of the same air capacity, since the area exposed to the pressure of the current is less. By connecting the lower ends of the compressor tubes the entire structure is greatly strengthened to resist not only the strains occurring in use but those occurring in transportation, and to avoid excessive bending strains upon the points where the tubes pass through the flotation chamber. At the same time the tubular brace shown provides a most convenient location for a submarine bell, and serves also to confine the water and to cause it to act more forcibly and certainly upon the mechanism for operating the bell, as will be hereinafter described.

To prevent chafing the cables or chafing of the buoy by the cables, it is only necessary to provide fenders such as the vertical wooden strips M upon the outer side of the compressor tubes G, and a similar circumferential fender M′ at the lower end of said tube.

To prevent injury to the buoy from ships or floating wreckage or the like, a circumferential fender N surrounds the flotation chamber A near the surface of the water, and consists of a complete ring, preferably of T-rail cross-section, which, by reason of the depth of web and strength of head, is best calculated to receive blows and to strengthen the buoy and save it from injury.

The flotation chamber A is immensely stiffened by the tubes F G and H which pass through the same vertically and which are strongly attached to the opposite heads O and P thereof. For greater stiffness the tubes G and H are run for their full width to the upper head O, where they are connected by a suitable flange and riveted, and a diaphragm Q is interposed in order to limit the effective height of each tube to correspond approximately with the water level outside, so as to leave a minimum clearance above the water piston which compresses the air. From the diaphragm Q a pipe R conducts the air to a pipe B leading to the whistle. As the buoy rises and falls the rising and falling water in the tubes G and H acts like a piston to compress the air in the upper ends of the tubes and force it through the air pipe B and through the whistle. The head O of the flotation chamber is continued over the upper end of the tube G so as to close the latter and hold the tube R more strongly. The side A of the flotation chamber may be stiffened transversely by means of a Z-bar S in the form of a ring extending entirely around the inner face of the chamber and riveted thereto.

The bell-ringing mechanism may be of any suitable design, one arrangement being indicated in Figs. 4 and 5. In this arrangement the tube J, which braces the lower ends of the compressor tubes; carries a disk T which passes up and down through a contracted ring U as the buoy rises and falls and as the water is forced up and down within the tube J. The purpose of the contracted ring is to concentrate the force of the water upon the disk, this force being to some extent dissipated when the disk passes above or below the contracted ring. The two limiting positions of the disk are indicated in full and dotted lines respectively. The disk is carried on a vertical shaft V reciprocating in suitable guides W and X mounted within the tube J. The bell Y is supported at its upper end from a ring Z carried in the center of the tube by means of arms *a* flanged at their outer ends and connected to the tube.

Various mechanisms may be used for transmitting the movement of the disk T or rod V to the clapper of the bell. Preferably the clapper *b* runs down on the inside of the bell, being pivoted at *c* and having a short arm *d* which is moved in one direction by the cams *e* and restored to its normal position by means of the spring *f;* the cams *e* being rotated by means of a rack *g* upon or constituting the lower end of the rod V and engaging a pinion *h* (Fig. 5) which carries pawls *j* which rotate the cams *e* in the proper direction. This mechanism is claimed and described more in detail in my application for patent Serial No. 271,288, filed July 26, 1905.

When the arm *d* is pressed outward and the clapper *b* inward by means of one of the cams *e* the spring *f* is compressed. As the end of the arm *d* escapes over the end of the cam *e* the compressed spring *f* throws the arm *d* back to its original position, and the momentum of the parts carries it beyond its original position until the end of the clapper *b* strikes the bell. The movement of the arm *d* beyond its original position compresses the spring *f* in the opposite direction, so that as soon as the clapper has struck the bell the spring *f* then again draws the arm *d* back to its original position.

Though I have described with great particularity of detail a specific embodiment of my invention, yet it is not to be understood therefrom that the invention is limited to the particular embodiment described. Various modifications thereof in detail and in the arrangement and combination of the parts may be made by those skilled in the art within the appended claims without departure from the invention.

What I claim is:—

1. A combined gas and whistling buoy having a whistle, a flotation chamber, a tubular portion at its center constituting a gas chamber, and air compressing means surrounding said gas chamber for operating the whistle and symmetrically arranged about the center.

2. A combined gas and whistling buoy having a whistle, a tubular portion at its center constituting a gas chamber, and separate air compressor tubes outside of said gas chamber operating the whistle and balancing each other.

3. A combined gas and whistling buoy having a whistle, a tubular portion at the center constituting a gas chamber, and two air compressor tubes outside of said gas chamber operating the whistle and diametrically opposite to and balancing each other.

4. A whistling buoy having a whistle, two air compressor tubes operating the whistle and diametrically opposite each other, and mooring chains attached fixedly to the buoy and extending in the direction of the plane of the two tubes so as to hold the edge of such plane to the current.

5. A combined gas and whistling buoy having a whistle, a tubular portion at the center constituting a gas chamber, and two air compressor tubes operating the whistle and diametrically opposite to and balancing each other, and mooring chains attached fixedly to the buoy and extending in the direction of the plane of the air compressor tubes and the central tubular portion so as to hold the edges of such plane to the current.

6. A whistling buoy having a whistle, a flotation chamber, two air compressor tubes operating said whistle diametrically opposite each other, the upper ends of said tubes extending into and connected to said flotation chamber, and their lower ends being extended below the base of the flotation chamber, and a brace connecting the lower ends of said tubes.

7. A whistling buoy having air compressor tubes connected at their upper ends to the buoyant body of the buoy, a tubular brace connecting the lower ends of said compressor tubes, and a bell-ringing mechanism within said tubular brace operated by said air compressor tubes.

8. A whistling buoy having air compressor tubes connected at their upper ends to the buoyant body of the buoy, a tubular brace connecting the lower ends of said compressor tubes, and a bell-ringing mechanism within said tubular brace, comprising a disk within and approximately equal in diameter to said tubular brace and adapted to be reciprocated by the column of water inclosed in said tubular brace.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS L. WILLSON.

Witnesses:
DOMINGO A. USINA,
FRED WHITE.