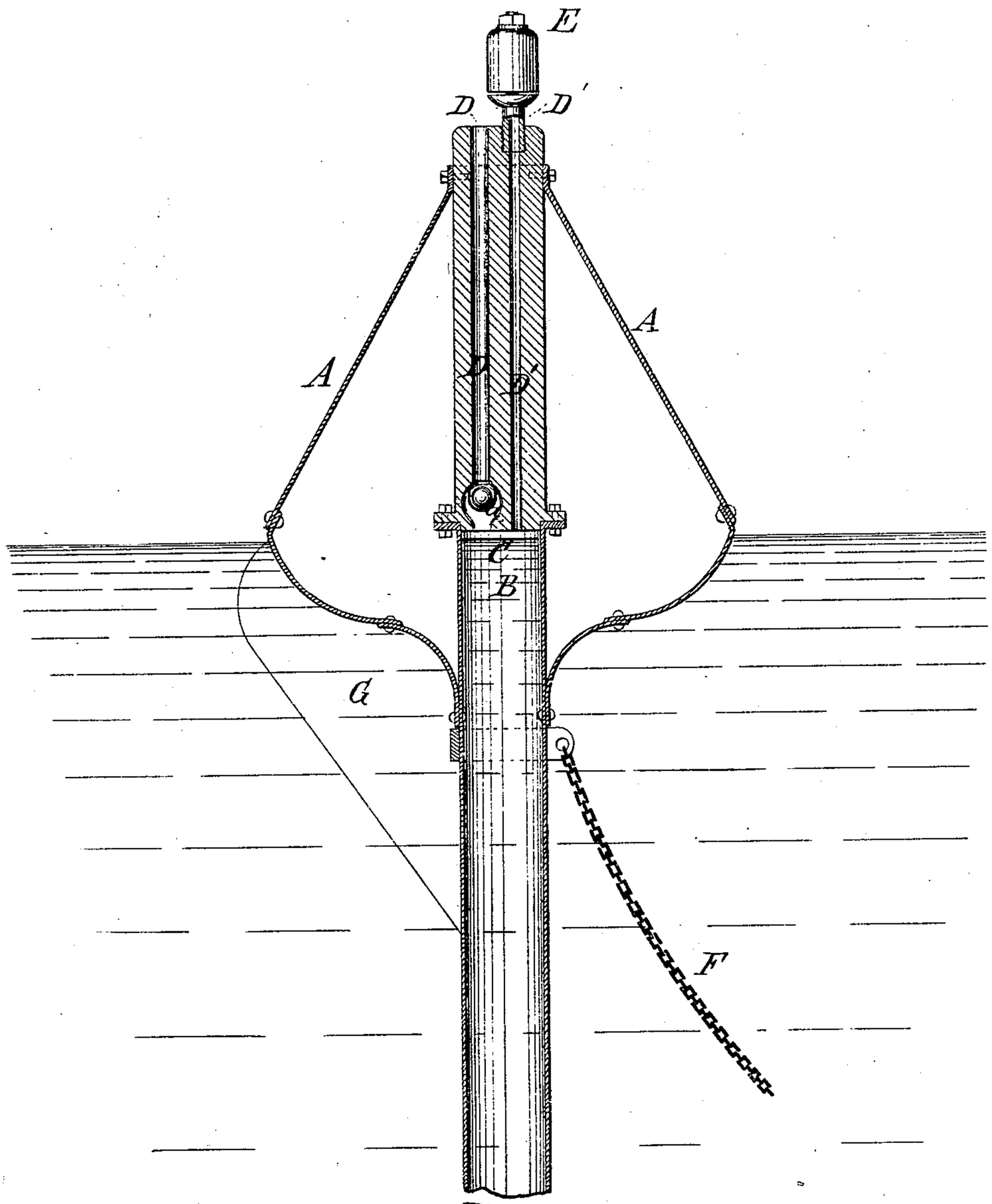
J. M. COURTENAY.

AUTOMATIC SIGNAL BUOY.

No. 178,911. Patented June 20, 1876.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN M. COURTENAY, OF CORNWALL ON THE HUDSON, ASSIGNOR OF ONE-THIRD HIS RIGHT TO JAMES BIGLER, OF NEWBURG, AND TWO-THIRDS TO MARGARET J. COURTENAY, OF CORNWALL ON THE HUDSON, N. Y.

IMPROVEMENT IN AUTOMATIC SIGNAL-BUOYS.

Specification forming part of Letters Patent No. **178,911**, dated June 20, 1876; application filed April 19, 1876.

To all whom it may concern:

Be it known that I, JOHN MARVIN COURTENAY, of Cornwall, on the Hudson, county of Orange and State of New York, have invented a new and Improved Automatic Signal-Buoy, of which the following is a specification:

The accompanying drawing represents a vertical central section of my improved automatic signal-buoy.

My invention has reference to an improved signal-buoy, in which the power of the surface-waves, in connection with the weight of the buoy, is jointly utilized in a very simple and effective manner for the compression of air for automatic signals and other purposes in foggy and stormy weather, so as to indicate the position of the buoy, and guide the vessels in their proper course.

The invention consists of a buoy with a central downwardly-extending tube, of such length that it reaches to a depth of water not affected by the surface-waves. The central tube terminates at the mean water-level, and has an air-entrance pipe and bottom valve, and an air-exit pipe with whistle or other sounding device at the top, to be operated by the raising and lowering of the buoy by the action of the waves and the compression of the air in the central tube. The buoy is connected near its base to a slack anchoring-cable, to permit the rise and fall of the buoy vertically with the motion of the waves, while a rudder-plate at the opposite side of the tube steadies the buoy against any rotating motion by the waves.

Similar letters of reference indicate corresponding parts.

In the drawing, A represents a buoy, which is constructed in the customary manner of plate-iron riveted together. The size and weight of the buoy are determined according to the pressure of atmosphere required in the tube. A tube, B, of suitable diameter is arranged at the center of the buoy, and firmly riveted to the lower end of the same. The central tube is extended below the buoy to such depth below the mean water-level that the open lower end reaches the body of water not affected by the motion of the surface-waves. The depth required for this purpose may be about thirty feet, more or less, it being absolutely necessary that the lower end of the tube shall, even in the most stormy weather, extend below any action or disturbance caused by the waves on the surface of the water. This furnishes a column of water at the inside of the tube that not only conduces to the steady vertical position of the whole buoy during the up-and-down motion of the same, but produces also a constant water-level within the tube that is not influenced by the wave-motion of the surface-water. The constant water-level retained in the tube is that of the mean water-level. At or near the level of this constant water-level in the tube B is a horizontal diaphragm or partition-plate, C, which communicates with the upper end of the buoy by two tubes, D and D′, of which tube D is of larger diameter than tube D′, and provided at the lower end with a ball or other valve, *a*. The tube D serves as an air-entrance tube, while the smaller tube D′, that is open at both ends, serves as the exit or discharge tube for the air. To the upper end of the exit-tube D′ is attached a whistle or other suitable sounding device, E, of sufficient power, which is sounded by the pressure of the air into the air-chamber of the main tube between the diaphragm and water-level. The compression of the air is produced by the action of the waves, which first lift the buoy to a certain height, so that the air-space is enlarged, and the air allowed to enter through tube D and the bottom valve. The receding motion of the waves, in connection with the weight of the buoy, produces the rapid descending of the buoy, and, as the water-level remains constant, a sudden compression of the air, which closes the valve of the entrance-tube and forces the compressed air with considerable power through the exit-tube, so as to sound the device. The greater the dimension of the buoy, and consequently the weight of the same, and the proportionate length of the tube B, the greater will be the pressure of air in the tube B. The higher the action of the waves lifts the buoy, the longer will be the duration of the signals. When the water is less disturbed

so as to throw smaller waves, the signals will be shorter, sounding with equal force but at greater intervals. The elements that control the automatic soundings are the power of the waves to lift the buoy and the weight of the buoy, which, in connection with the stationary column of water, produce the compression of the air, and consequently the working of the whistle. This allows an exact mathematical computation of the pressure, as the same is produced by the weight of the buoy and the height of the column of water within the tube. The buoy is anchored by a wire cable, F, attached to the central tube at some distance below the buoy. The cable is made sufficiently slack to permit the buoy to follow readily the motion of the water. A rudder-plate, G, extends at the side opposite to that to which the cable is attached from the lower part of the buoy to a suitable depth along the tube, imparting a steadying and stearing action to the buoy, and obviating any rotating motion. The upright position and motion of the buoy is not interfered with by the cable, as the parts are balanced more or less, and held in vertical, or nearly vertical, position by the weight of the tube and the action of the water upon the same. The action of wind and waves produces thus, in connection with the weight of the buoy, in reliable, powerful, and automatic manner, a means of compressing air capable of sounding any instrument now blown by steam or air to its full extent, whether the buoy is placed at mid ocean or near the coast, and give thereby means of averting danger in stormy weather, by reducing the dangers of the coast and guiding vessels in stormy and foggy weather.

The form of the buoy, just above the line of flotation, is so enlarged that for one foot rise of water on the buoy above the ordinary line of flotation, the displacement becomes twice the capacity of that part of the float submerged, thus quickening the ascent of the buoy by the wave.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A signal-buoy, having a central downwardly-extending tube with a diaphragm at mean water-level, said diaphragm having an opening communicating by an air-entrance tube with bottom valve, and an air-exit tube with the upper end of the buoy, substantially as shown and described.

2. The signal-buoy, with central downwardly-extending tube attached to an anchoring-cable at a point below the buoy, and having a rudder or steadying plate extending from the base of the buoy to the bottom tube, substantially as specified.

3. The combination of water-tube B, diaphragm C, valved air-inlet tube D, and air-exit tube D′, the latter provided with a suitable whistling attachment, as and for the purpose specified.

JOHN M. COURTENAY.

Witnesses:
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