

(No Model.)

2 Sheets—Sheet 1.

A. L. WOODWORTH.
CURRENT ACTUATED BELL-BUOY.

No. 556,234.

Patented Mar. 10, 1896.

Fig. 1.

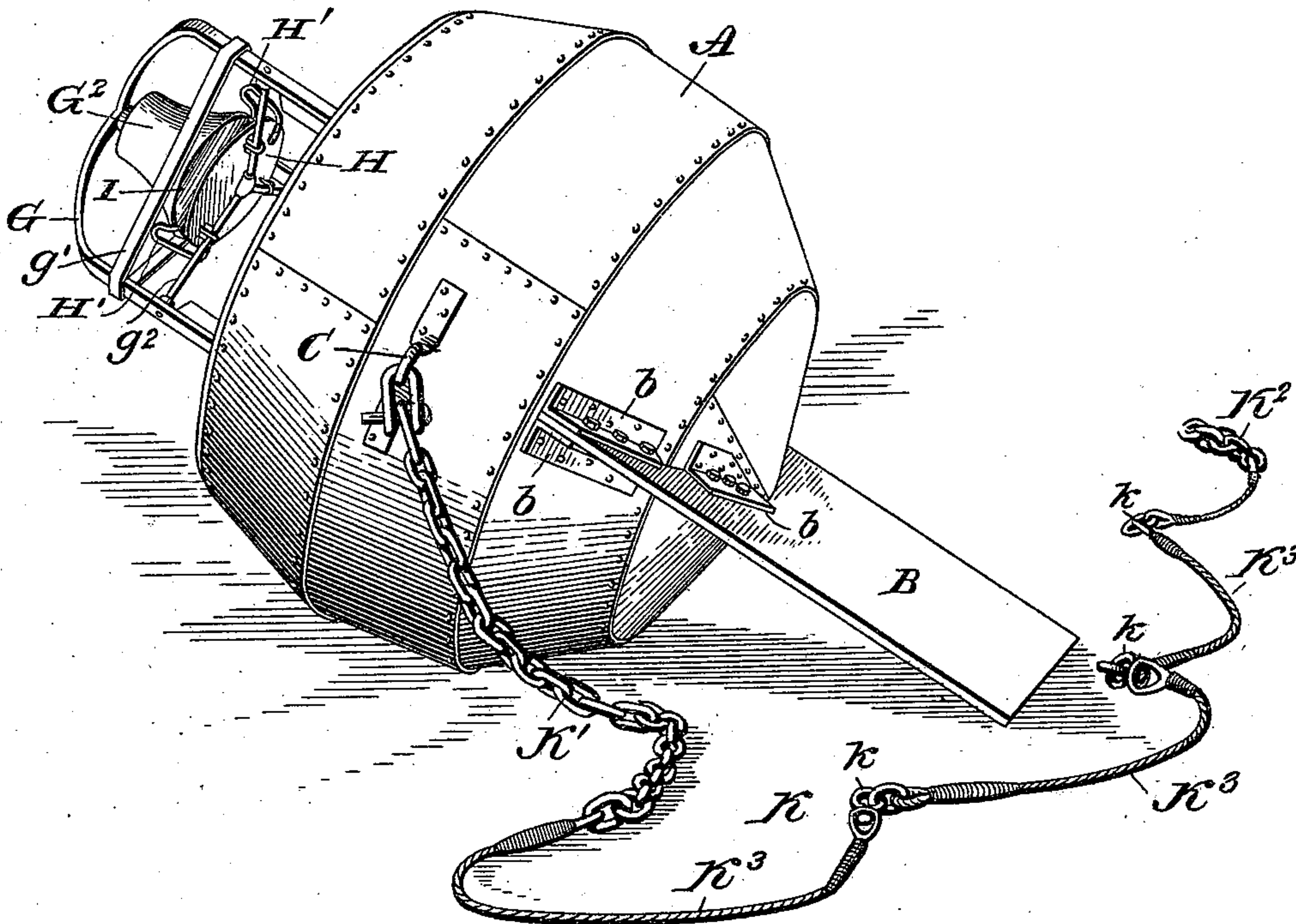
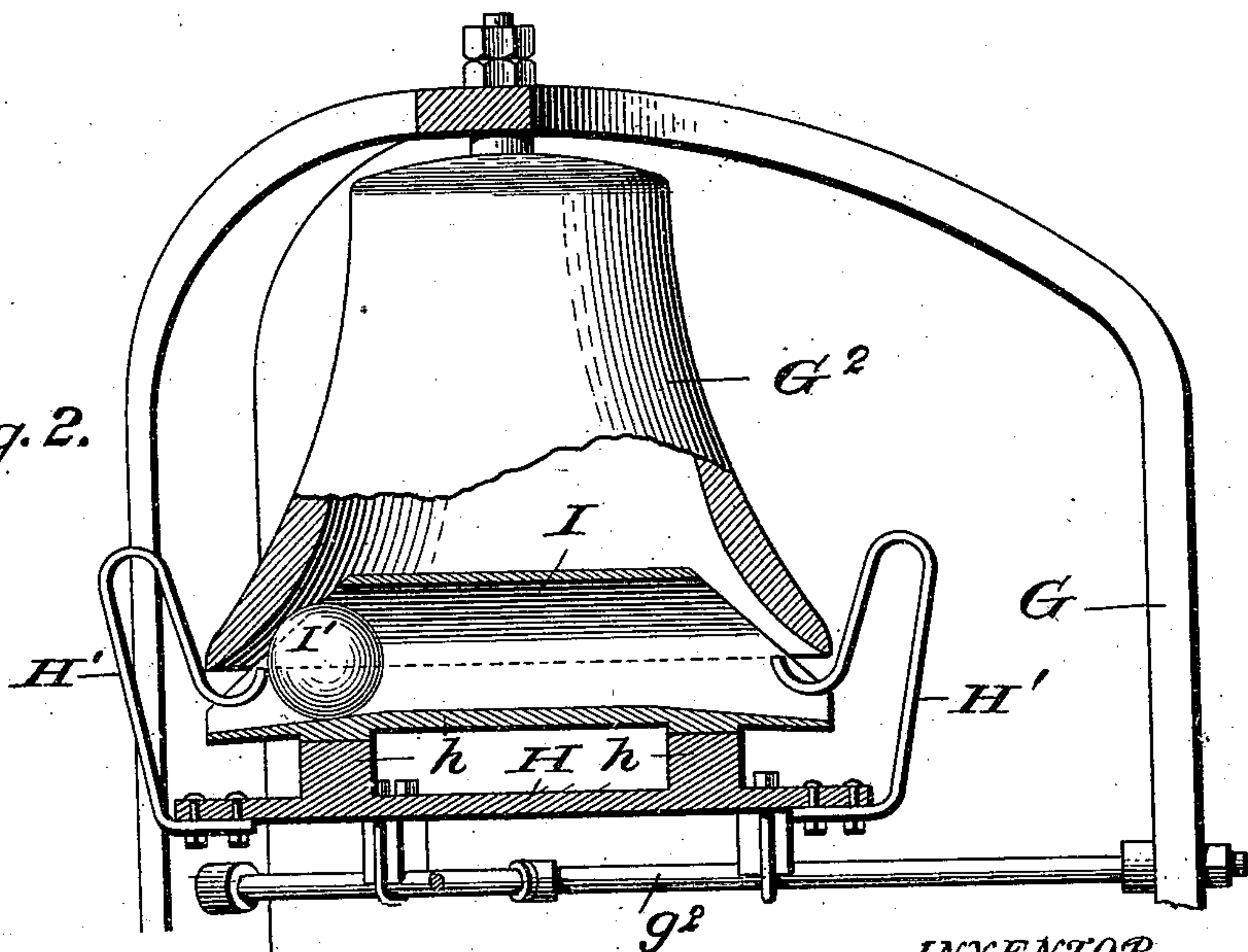
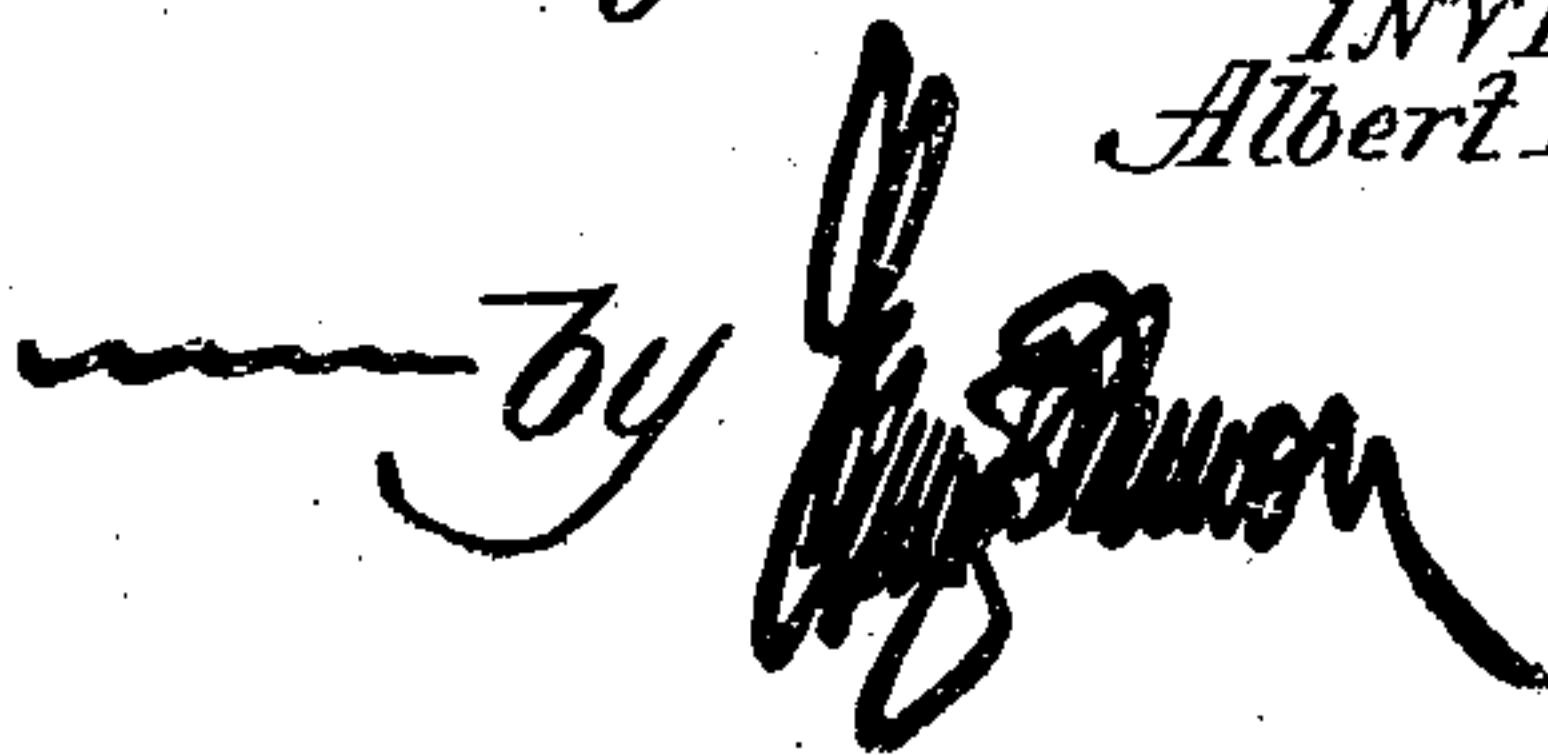


Fig. 2.



WITNESSES
L. S. Elliott.
M. Johnson

INVENTOR
Albert L. Woodworth

by 

Attorney

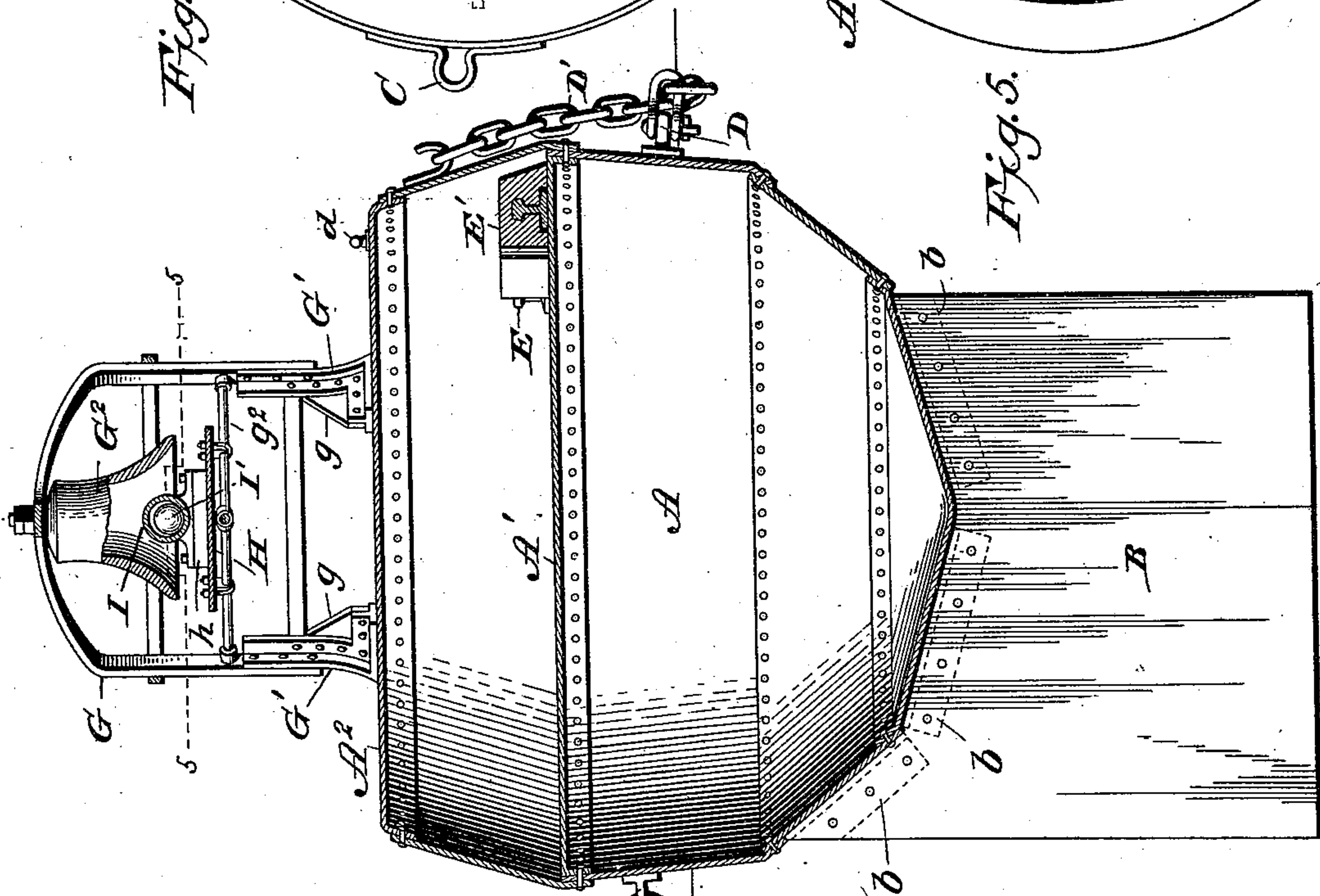
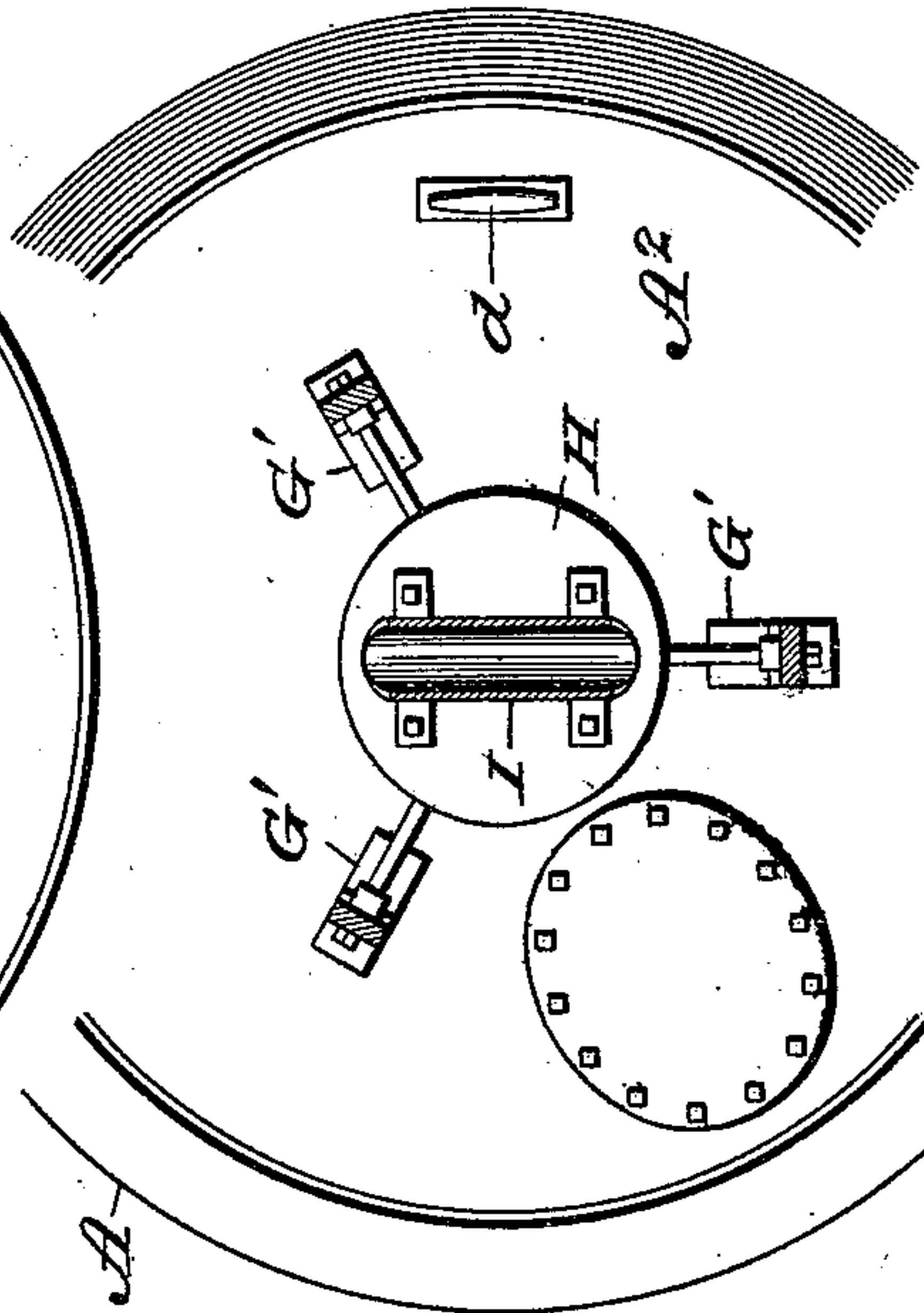
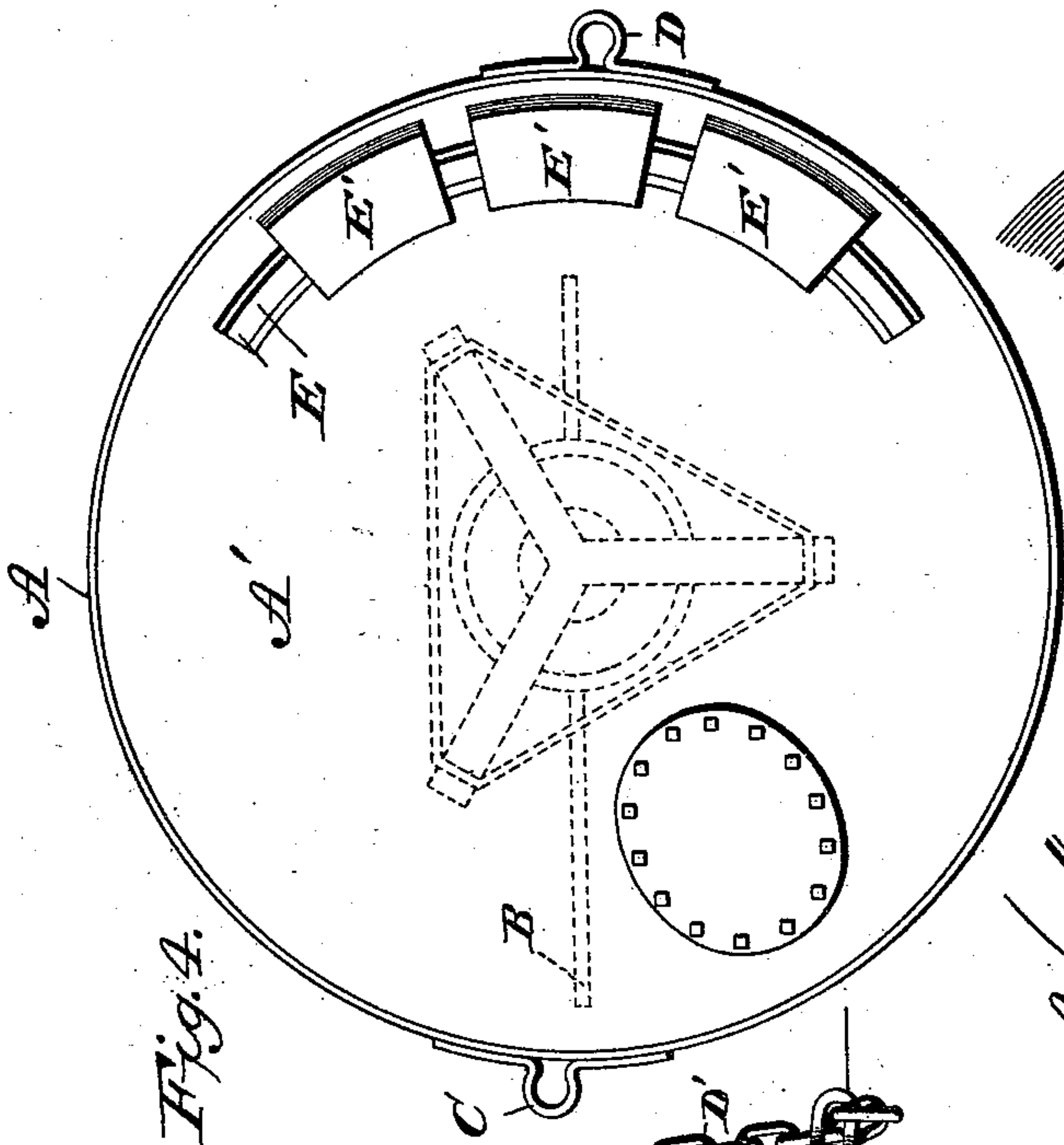
(No Model.)

2 Sheets—Sheet 2.

A. L. WOODWORTH.
CURRENT ACTUATED BELL BUOY.

No. 556,234.

Patented Mar. 10, 1896.



WITNESSES
L. S. Elliott,
W. M. Johnson

Fig. 3.

Albert L. Woodworth
INVENTOR

by *[Signature]* Attorney

UNITED STATES PATENT OFFICE.

ALBERT L. WOODWORTH, OF NORFOLK, VIRGINIA.

CURRENT-ACTUATED BELL-BUOY.

SPECIFICATION forming part of Letters Patent No. 556,234, dated March 10, 1896.

Application filed September 21, 1895. Serial No. 563,246. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. WOODWORTH, a citizen of the United States of America, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Current-Actuated Bell-Buoys; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a buoy of improved construction having a blade or fin and a superstructure carrying a bell which is sounded when the buoy lists or its position is shifted by the action of either the tide or waves; and the invention consists in the improved construction and arrangement of the parts embodying the construction of the float and location of the blade or fin thereon, the blade or fin depending from the under side of the float and attached thereto so that a greater portion will be to one side of the center of said float and at right angles with a tube carrying a ball which strikes the bell.

The invention further consists in placing the mooring-eye at or slightly above the water-line of the buoy and in the employment of improved means of ballasting the buoy and in the arrangement and combination of the parts, as will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a perspective view of a bell or alarm buoy constructed in accordance with my invention. Fig. 2 is a sectional view of the alarm mechanism which is carried by the superstructure. Fig. 3 is a vertical sectional view of the buoy. Fig. 4 is a plan view of the float with the upper section removed and the superstructure shown in dotted lines, and Fig. 5 is a sectional view on the line 5 5 of Fig. 3.

A designates the float, which is approximately semispherical and is provided with an inner deck or diaphragm, A', and an upper

deck, A², presenting two compartments, either one of which is of sufficient capacity to float the buoy should the other become filled with water by reason of an accident. The part of the float below the diaphragm A' is of the usual shape, while the sides above the diaphragm incline inwardly, as shown.

B designates the fin or blade, which is attached to the bottom of the float by means of angle-plates b. The angle-plates are riveted to the float and are provided with bolt-holes which register with bolt-holes in the upper part of the fin or blade, so that bolts may be employed to provide for removing the fin or blade when desired. The blade or fin is attached to the bottom of the float so that a greater portion thereof will be to one side of the vertical center of said float, the greater portion being located on the same side of the float to which the mooring-eye C is attached. The mooring-eye is located to one side of a line drawn on the vertical edge of the fin and above the water-line of the float. On the side of the float opposite the mooring-eye C is attached an eye D, to which is connected a short chain D', which may be employed in lifting and towing the buoy, and on the deck A² is secured a cleat d to provide an additional fastening means for a rope or other connection.

The inner deck or diaphragm, A', has rigidly secured thereon a curved bar or T-rail E adapted to receive weights E', said weights having recesses which correspond with the upper part of the rail. The weights are movable on the rail and are held in place by being bolted or otherwise connected thereto. These weights are for the purpose of properly balancing the buoy, the set of the buoy being tested in still water before being put into service. The upper and lower decks of the float are provided with manholes to provide for access to the inside of said float, the manholes having suitable covers.

G designates the superstructure which is secured to the deck A² of the float and is braced by angle-pieces G' reinforced at their corners by plates g riveted to the webs of said angle-pieces. To the upper end of the superstructure is attached the bell G² so that it will be suspended within the same. The superstructure is provided with cross-bars g' and

g^2 , and to the cross-bars g^2 is connected, by means of U-bolts and nuts, a plate H having upwardly-projecting portions h , to which a tube I is secured. The bottom of the tube I is inclined downwardly at each end, leaving an intermediate horizontal plane, and within this tube is located a ball I' , which will normally rest on one of the inclined surfaces of said tube. To the plate H are attached springs II' , which are bent in the form of a loop and the free ends being bent to lie within the ends of the tube I adjacent to the lower edge of the bell. It will be noted that the upper part of the ends of the tube or ball-guide I are cut away so that the tube will not come in contact with the bell. The ball-guide or tube is mounted on the plate H so that it will be at right angles with the blade or fin B.

K designates the mooring-cable, which consists of end sections or chains K^1 and K^2 and intermediate short sections K^3 , of wire cable. The end or chain section K^1 is coupled to the mooring-eye C of the buoy and the chain-section K^2 is attached to the mooring anchor or stone. The intermediate wire-cable sections are connected to each other and to the chain-sections by rings or links k , an eye or grommet being let into the ends of the wire cables so that the rings will engage therewith. One or more of the wire-cable sections are provided with a swivel-joint k' . Many advantages arise from this particular construction of the mooring-cable: First, such a cable is lighter than the ordinary chain cable of the same strength; second, it is more easily handled, as the sections may be placed parallel with each other and in paying out there will be no liability of kinking or twisting, the swivel-joint k' permitting the cable to straighten out. The rings also provide means for connecting handling-irons to the cable. Chain-sections are provided at the ends of the cable, as wire-cable sections would not answer at these points for the reason that at the upper end the fin or blade of the buoy would be likely to cut the strands by contact therewith and at the lower end of the cable the anchor or mooring-stone would do the same thing.

Having described the construction of my invention, the operation is as follows: When the buoy is properly ballasted and moored it will be extremely sensitive to the action of the waves and tidal currents, and the tidal currents acting upon the blade or fin will cause the buoy to swerve and list from side to side, thus actuating the ball to sound an alarm. The bottom of the tube in which the ball is located presents two inclined surfaces and an intermediate horizontal plane, and provides for the retention of the ball at one end until the buoy has assumed a considerable inclination, when said ball will race down the tube and strike the bell with great force. This construction prevents the ball creeping from one end of the tube to the other, which it would do if a straight tube was provided.

The configuration of the float is such as to

provide sufficient free board so that the deck will not be submerged, and the position of the blade or fin enables the buoy to regain its equilibrium after being swerved to one side by the current and gives an automatic listing movement from side to side, it being noted that the current influences on the blade causes the buoy to sheer and throw the blade across the line of the current, in which position the current will act to cause the buoy to list.

In my prior patent, No. 388,384, dated August 21, 1888, I employed in connection with the bell-buoy a mooring-fin and a fin at an angle therewith, thus positioning the fins so that a greater part would be to one side of the center, and the present invention is designed as an improvement thereon.

I am aware that heretofore it has been proposed to provide a nautical alarm-buoy having a plate with a horizontal central portion and inclined surfaces extending therefrom, said plate or table being grooved and adapted to carry a ball for striking the bell, the table being also provided with retracting-springs. I am also aware that a bell-buoy has been provided with a plurality of balls confined in separate guides or housings. I lay no claim broadly to such inventions, as I employ but a single tube or housing for the ball and position it at right angles to the blade or fin, so that the ball which sounds the alarm is actuated by the oscillation or listing of the buoy caused by the current or tidal influences acting on the blade or fin.

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

1. In a bell-buoy, the combination, of a float having a blade or fin attached to the bottom thereof so as to extend on each side of the center, the greater area of the blade or fin being on the side to which the mooring-chain is attached, for the purpose set forth.

2. The combination in a bell-buoy, of a float, a blade or fin attached to the bottom of the float so that a greater area will be to one side of the vertical center thereof, a mooring-eye attached to the float on the side having the greater area of fin and to one side of a line drawn on the vertical edge of said fin, and bell-sounding mechanism carried by the deck of the float, substantially as shown and for the purpose set forth.

3. In combination with a buoy or float having a flat blade or fin attached so as to depend from the bottom thereof, said blade having a greater area to one side of the center of the buoy, a mooring-eye secured on one side of the float, and adjustable counterbalancing-weights located within the float, substantially as shown and for the purpose set forth.

4. The combination with a bell-buoy having a superstructure mounted thereon which carries a fixed bell and a platform, of a tube carried by the platform, said tube lying partially within the bell and having an unim-

peded passage from end to end, the base of the central portion of the passage being horizontal and the ends inclined downward; together with a single ball located within the tube, and springs attached to the platform upon which the tube is mounted, the springs being bent so that their free ends will enter the space between the bell and tube, substantially as shown.

10 5. A sounding mechanism for bell-buoys, consisting of a single tube supported below the bell said tube having a central horizontal plane and downwardly-inclined surfaces leading therefrom to the ends of the tube, a ball
15 located within the tube, and springs carried by the plate which supports the tube, said springs being bent so as to extend below the lower edge of the bell and into the tube, substantially as shown.

20 6. In a bell-buoy, the combination, of a float having a deck or diaphragm A' and upper deck A² upon which is mounted a superstructure carrying a bell and alarm mechanism, a

fin or blade attached to the bottom of the float so as to depend therefrom, and a rail E secured to the deck A' and carrying adjustable weights E', substantially as shown and for the purpose set forth. 25

7. In combination with a bell-buoy having a fin B attached to the bottom thereof so as to extend on each side of the center of the buoy, the greater area of the fin being to one side of the center thereof; of a mooring-eye secured to the body portion of the buoy above the water-line and out of line with the vertical edge of the fin, and on the side of the buoy having the greater area of fin; the sides of the buoy above the normal water-line and mooring-eye "tumbling home," substantially as shown and for the purpose set forth. 30 35 40

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT L. WOODWORTH.

Witnesses: .

J. H. HOWELL,

M. L. GREENWOOD.