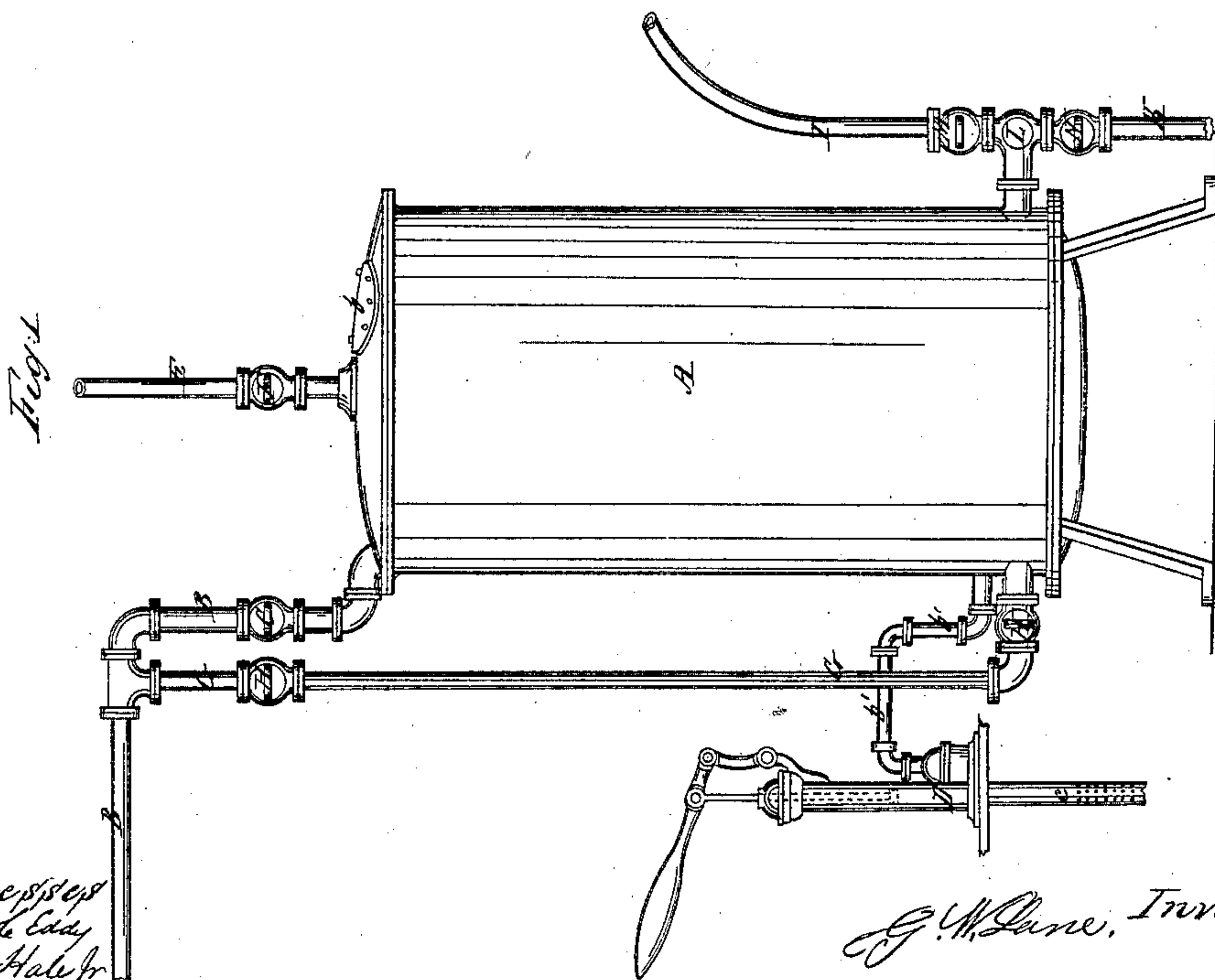
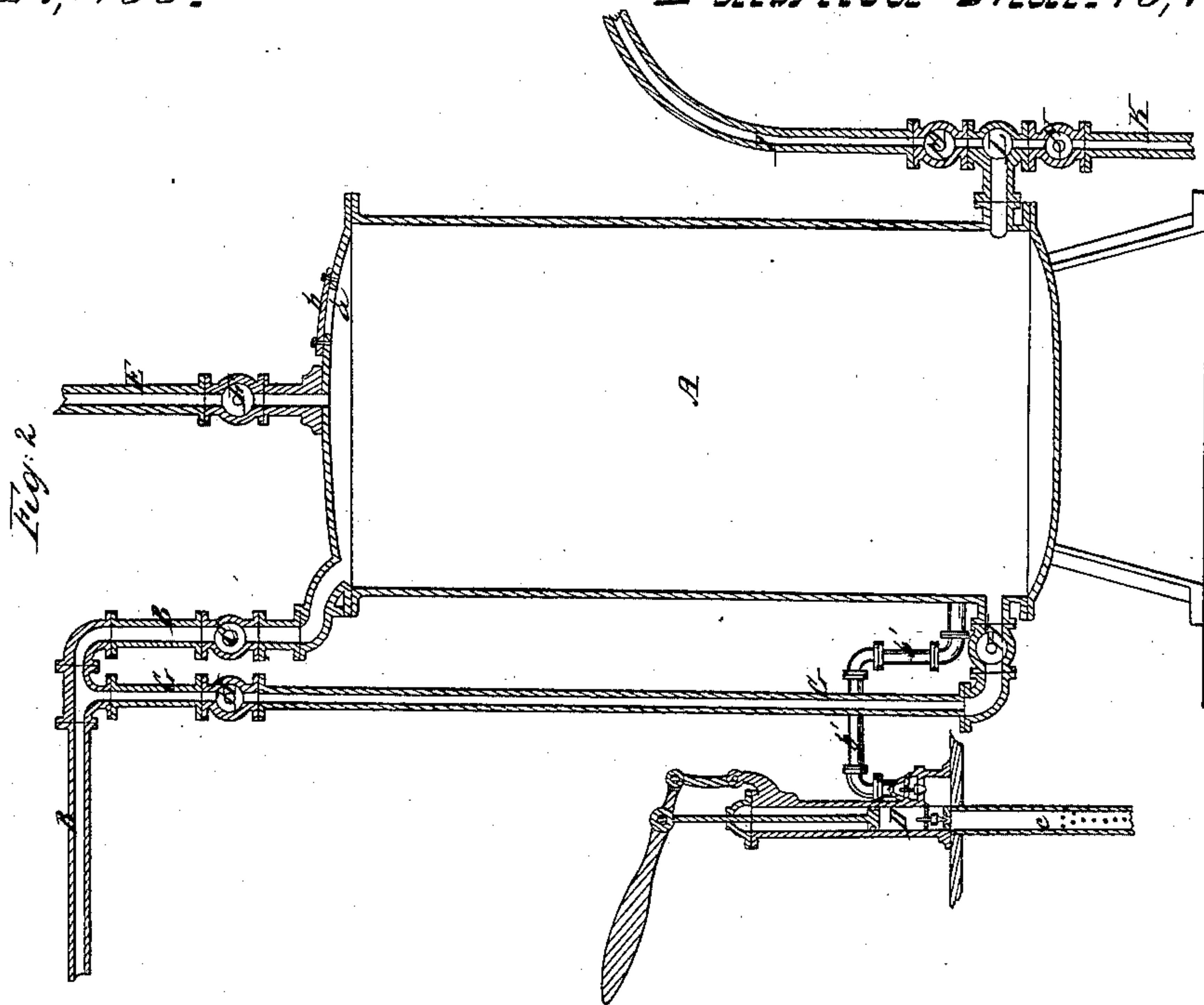


G. W. Lane,

Test Pump,

N^o 27,455.

Patented Mar. 13, 1860.



Witnesses
R. H. Eddy
J. P. Hale Jr

G. W. Lane, Inventor

UNITED STATES PATENT OFFICE.

GEORGE W. LANE, OF BOSTON, MASSACHUSETTS.

METHOD OF TESTING HOLLOW SPHERES FOR WATER-GAGES AND OTHER PURPOSES.

Specification of Letters Patent No. 27,455, dated March 13, 1860.

To all whom it may concern:

Be it known that I, GEORGE W. LANE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and
5 useful mode of testing hollow spheres or floats for water gages for steam boilers or other vessels in which either great heat or pressure or both may be employed; and I do hereby declare that the said mode or process
10 and the apparatus used in carrying on the same is fully described in the following specification and represented in the accompanying drawings.

Figure 1, exhibits the said apparatus in
15 front elevation. Fig. 2, the same in vertical section.

Metallic hollow floats used in steam boilers and other devices for indicating the height of water therein are often defective
20 either in strength or construction even after having been made with much care. The great heat and variations of temperature to which they are subjected while in use often cause them either to leak or collapse, and
25 although a float may have every appearance of being thoroughly made, yet there is no certainty of its being capable of withstanding the pressure and heat of a boiler unless in some proper way before its introduction
30 therein it may have been thoroughly tested. The importance of subjecting a float to a thorough test before being used in a boiler will be obvious, when it is considered how much depends on the accuracy of its operation,
35 or in other words, on its strength to resist pressure and its being perfectly tight so as to prevent either steam or water from being forced into it. With this in view I have invented the hollow float testing
40 apparatus which I shall now proceed to describe.

In carrying out my invention, I employ a strong cylindrical or other proper shaped,
45 air tight vessel A, made of iron or other suitable material capable of withstanding a very high degree of pressure, viz., several hundred pounds per square inch. The stronger the vessel the better. The upper
50 end or head of the vessel should have an opening, *a*, and a closing cover, *b*, or man hole plate so applied as to enable the hollow floats to be tested, to be introduced into the vessel, A, or to be removed therefrom after having been tested. The joint of the cover
55 should be made air and steam tight either by a luting or by a proper packing, and

should be secured to the vessel A, by screws or other proper means.

A pipe or conduit, B, provided with a stopcock C, should be led into the top or
60 upper part of the vessel, A, and from a steam boiler or generator and so as to enable steam produced by the latter to be introduced into the vessel, A. Furthermore, a force pump, D, should be used in connection
65 with the vessel, A, and the means of introducing steam therein, such force pump being so applied as to enable a person to drive water or a liquid into said vessel, A, and so as to cause the same to exert a very high
70 degree of pressure within such vessel. The said force pump and its eduction pipe, *b'*, I prefer to arrange with reference to the vessel, A, as shown in the drawings, the induction pipe of the said pump being shown
75 at, *c*.

A steam discharge pipe, E, provided with a stopcock, F, may lead out of the upper part of the vessel A. So, above the stop, C, a pipe G, provided with either one or more
80 stopcocks, H, may lead from the pipe, B, down into the lower part of the vessel, A, in order, that whenever it may be desirable, steam may be discharged into the lower part of the liquid contents of such vessel. There
85 may also be a water supply pipe, I, and a water discharge pipe K, applied to the vessel, A, either by a double elbow connection, L, (furnished with two stop cocks M N,) or in any other suitable manner there being a
90 stop cock to each pipe. The water supply pipe should lead from a force pump, or from a reservoir, cistern or tank so elevated above the vessel A, as to cause water to flow into the vessel A, and fill it when the stop cock
95 M, may be opened and kept open a sufficient length of time.

In operating with the said apparatus I usually employ or connect with the vessel A,
100 not only an ordinary water gage, but a steam pressure gage, in order to either determine the height of the water, or the pressure either of the steam or water that may be at any time in the said vessel A. Having freed
105 the vessel, A, of water, it is next to be charged with some twenty or any other suitable number of the hollow floats to be tested; after which the cover should be carefully fastened down so as to render its joint steam,
110 air and water tight. Next, close all the stop cocks except the cock C, which should be open so as to permit steam at a very high

degree of pressure (that is at some three or four times that which the floats are destined to bear while in use) to flow through the pipe, B, into the vessel A, so as to fill the said vessel with the steam and thereby heat all the floats in it to a temperature much above two hundred and twelve degrees, Fahrenheit. The heat so applied will expand the metal of which each float is composed. After this application of the hot steam has been carried on a sufficient period, the stop cocks, M and H, may be opened so as to allow water to run into the vessel, A, and steam also to pass into the lower part of such vessel and into and through the water so as to heat the same up to a boiling temperature. By employing the additional pipe, G, the water may be heated to better advantage than it can be by the pipe, B, alone. After the vessel, A, may have been filled with water so heated, all the stop cocks may be closed, and the force pump, D, should be put in operation so as to fill or complete the filling of the vessel, A, and force, under great pressure, hot water into it. By means of the pump we can apply any degree or amount of pressure upon the water, the object of the pump being to enable us to readily obtain a greater pressure than it may be convenient to obtain by the steam of the boiler. This pressure, in case the great heat to which the floats may have

been subjected, may have opened any one or more of the joints of any one of them or may have melted any part of the solder or brazing thereof, will cause water to be driven into such float or should the float not be strong enough to bear the pressure, it will collapse under it. After these tests of heat and pressure by steam and water, the floats may be removed from the vessel, A. Those which may have proved defective, but of sufficient strength, may next be placed over a fire or spirit lamp and heated so as to vaporize or convert into steam, the water which may have entered them. The current or currents of steam issuing from the defective places will indicate where they are, and where solder or other means should be applied for stopping or repairing such places. After the floats may have been repaired, they may be returned to the vessel, A, and be again subjected to the tests of heat, steam and pressure.

I claim—

The above described mode of testing hollow floats to be used in steam boilers or other vessels in which great heat and pressure or either may be employed.

G. W. LANE.

Witnesses:

R. H. EDDY,

J. P. HALE, Jr.