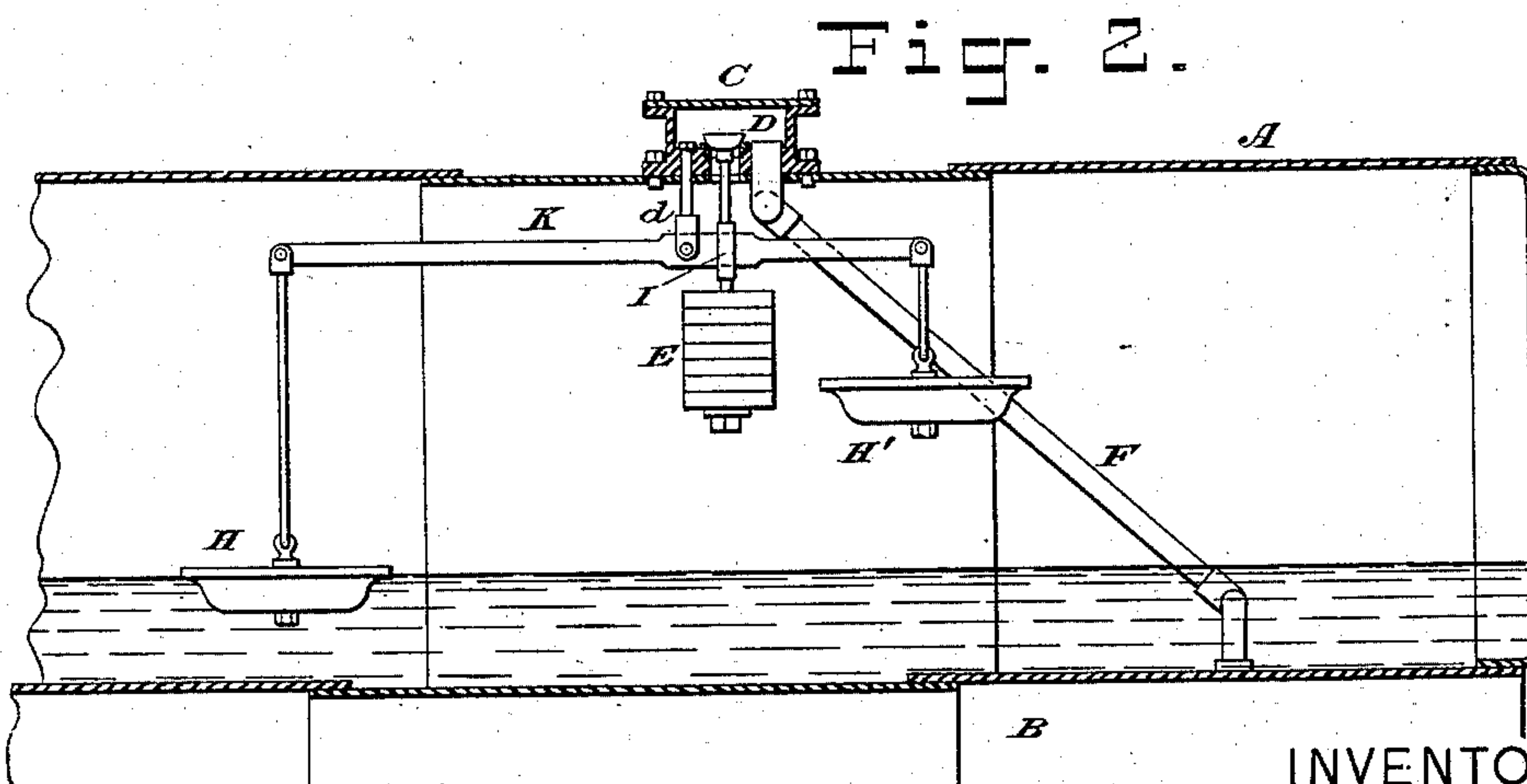
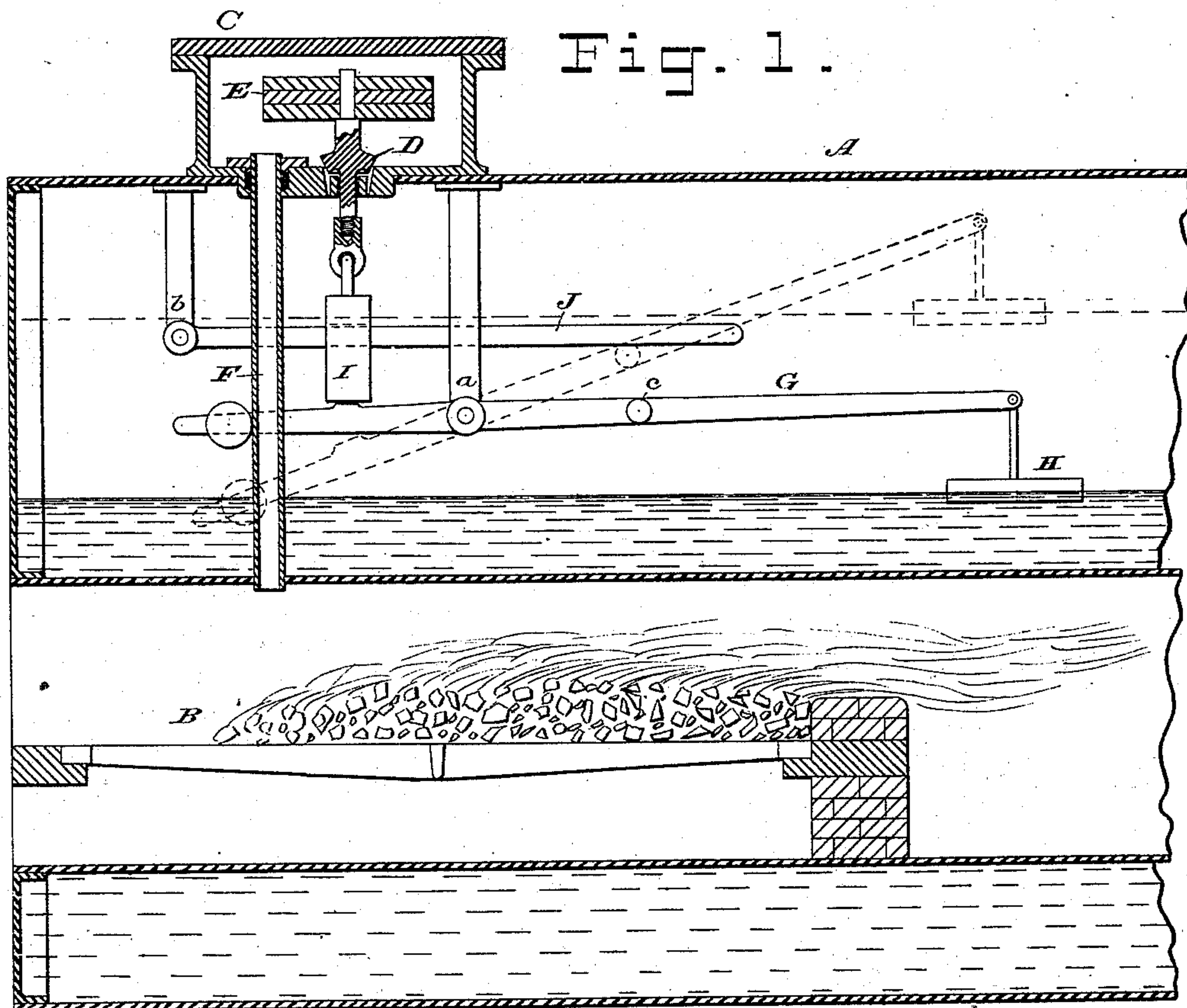


(No Model.)
T. C. FAWCETT & J. C. HARGREAVES.

MEANS FOR PREVENTING BOILER EXPLOSIONS.

No. 282,292.

Patented July 31, 1883.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS C. FAWCETT AND JOHN C. HARGREAVES, OF LEEDS, COUNTY OF YORK, ENGLAND.

MEANS FOR PREVENTING BOILER EXPLOSIONS.

SPECIFICATION forming part of Letters Patent No. 282,292, dated July 31, 1883.

Application filed May 5, 1883. (No model.) Patented in England February 6, 1883, No. 654.

To all whom it may concern:

Be it known that we, THOMAS C. FAWCETT and JOHN C. HARGREAVES, both subjects of the Queen of Great Britain, and residents of Leeds, in the county of York, England, have jointly invented certain Improvements in Apparatus for Preventing Boiler Explosions, of which the following is a specification.

Our invention seeks to obviate the derangements in steam-generators, which arise from the water in the said generator getting too high or low. This derangement frequently causes the explosion or bursting of the boiler from excess of pressure, and from other causes not well understood.

Our invention comprises three distinctive co-operative features—namely, a lever and float to open the safety-valve when the water rises to a predetermined height, a lever and float to open the safety-valve when the water falls to a predetermined level, and means for admitting the steam which escapes in either of the said contingencies to the fire-box to extinguish the fire.

In the drawings, which serve to illustrate our invention, Figure 1 is a longitudinal sectional elevation of a steam-generator and its furnace provided with our improvements, and Fig. 2 is a similar view illustrating a modification.

A represents the shell of the boiler, and B the furnace in a flue in the same.

C is a tight steam-chest mounted on the top of the boiler and inclosing the safety-valve D, which is pressed down to its seat, normally, by weights E. A pipe, F, leads from the steam-chest C to the furnace B, either through the boiler, as shown, or exteriorly, as desired. The drawings show the water-level at its lowest point consistent with safety, and the highest level to which it is desired the water shall rise is indicated in Fig. 1 by the dotted line. The means for opening the safety-valve D when the water falls to a predetermined level comprises a lever, G, fulcrumed at *a*, and provided with a float-weight, H, on its longer arm. When the float H falls the short arm of the lever takes under a weight or pendent part, I, of the safety-valve and lifts the latter.

The steam then escapes through the valve-aperture, chest C, and pipe F into the furnace and extinguishes the fire, or at least dampens it to a considerable extent. The means for opening the safety-valve when the water rises to a predetermined level comprises a lever, J, fulcrumed at *b*, and arranged to pass loosely through a slot in the pendant I. When the float-weight H rises, a pin or projection, *c*, on the lever G takes under the long arm of lever J, and through it and the pendant I raises the valve D and permits the steam to escape to the furnace or fire B.

Fig. 2 illustrates a modification, in which but one lever, K, is employed, and two floats. The low-water float or weight H is suspended from the long arm of the lever, and the high-water float H' is secured to the short arm of the same. When the water falls below the predetermined level, the weight of float H, acting on the long arm of lever K, raises the valve D. When the water rises to a predetermined height it lifts the float H', and, through the short arm of the lever, the valve D. The float-weight H in Fig. 1 performs the functions of both float and weight, opening the valve by its buoyancy when the water reaches its highest level, and by its weight when the water reaches its lowest point. In Fig. 2 the float H' acts by its buoyancy, while H by its weight. The lever J in Fig. 1 is of the second class and the lever G of the first class.

Having thus described our invention, we claim—

1. The combination, with a steam-generator and its safety-valve, of the lever J of the second class, arranged to take under the valve, the lever G of the first class, arranged to take under the valve, and provided with a projection, *c*, and the float-weight H, connected with the long arm of lever G, all arranged to operate substantially as set forth.

2. The combination, with a steam-generator, of the valve D, provided with a weight, E, and slotted pendant I, the lever J, fulcrumed at *b*, and arranged to pass through I, the lever G, fulcrumed at *a*, provided with a projection, *c*, and the float-weight H, all arranged to operate substantially as set forth.

3. The combination, with the generator and
its furnace, of the steam-chest C, the pipe F,
leading from said chest to the furnace, the
valve D, provided with a weight, E, and pend-
5 ant I, the levers J and G, fulcrumed and ar-
ranged as shown, and the float-weight H, all
combined and arranged to operate substan-
tially as set forth.

In witness whereof we have hereunto signed
our names in the presence of two subscribing to
witnesses.

THOS. C. FAWCETT.

JOHN C. HARGREAVES.

Witnesses:

CHAS. GILLIARD,
JOHN W. TASKER.