(No Model.) 2 Sheets—Sheet 1.

A. J. WRIGHT.

ALARM INDICATOR.

No. 362,138. Patented May 3, 1887.

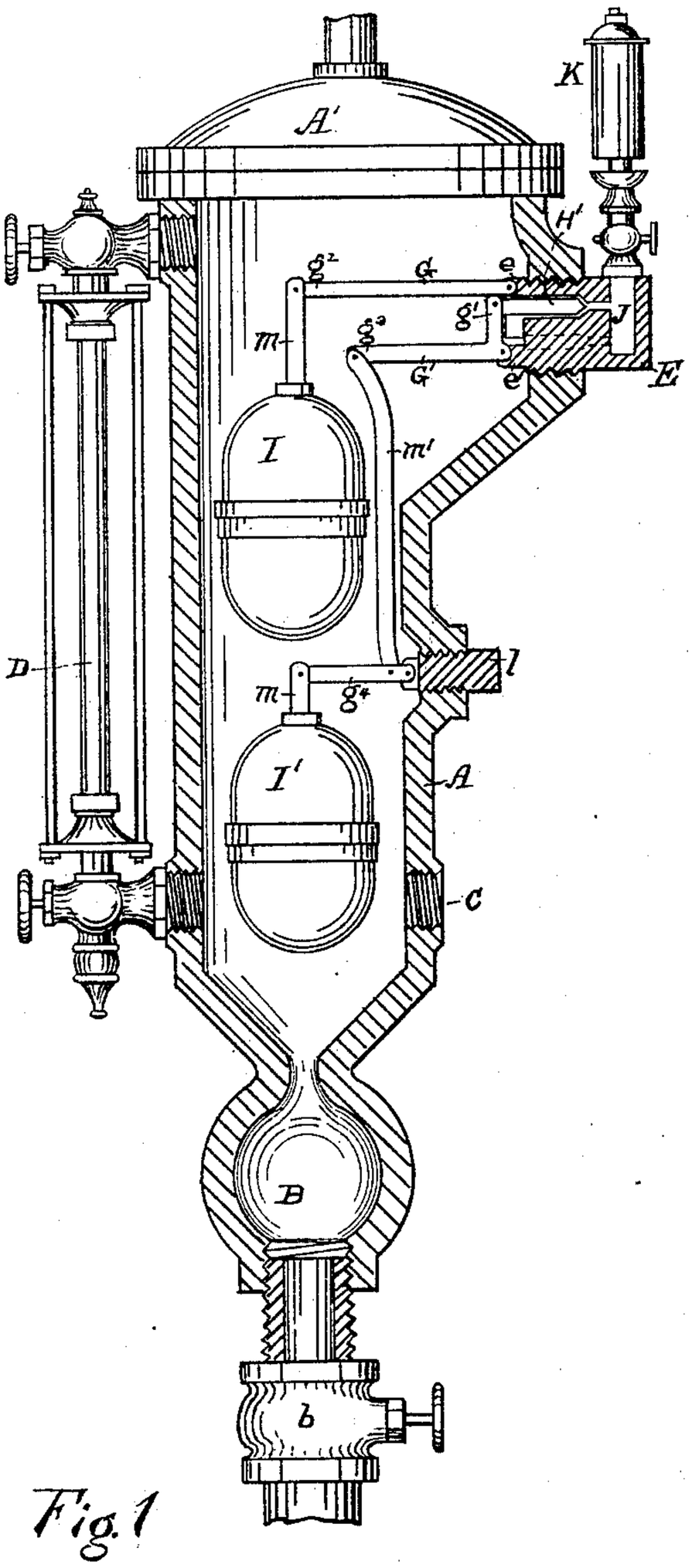

Fig. 1

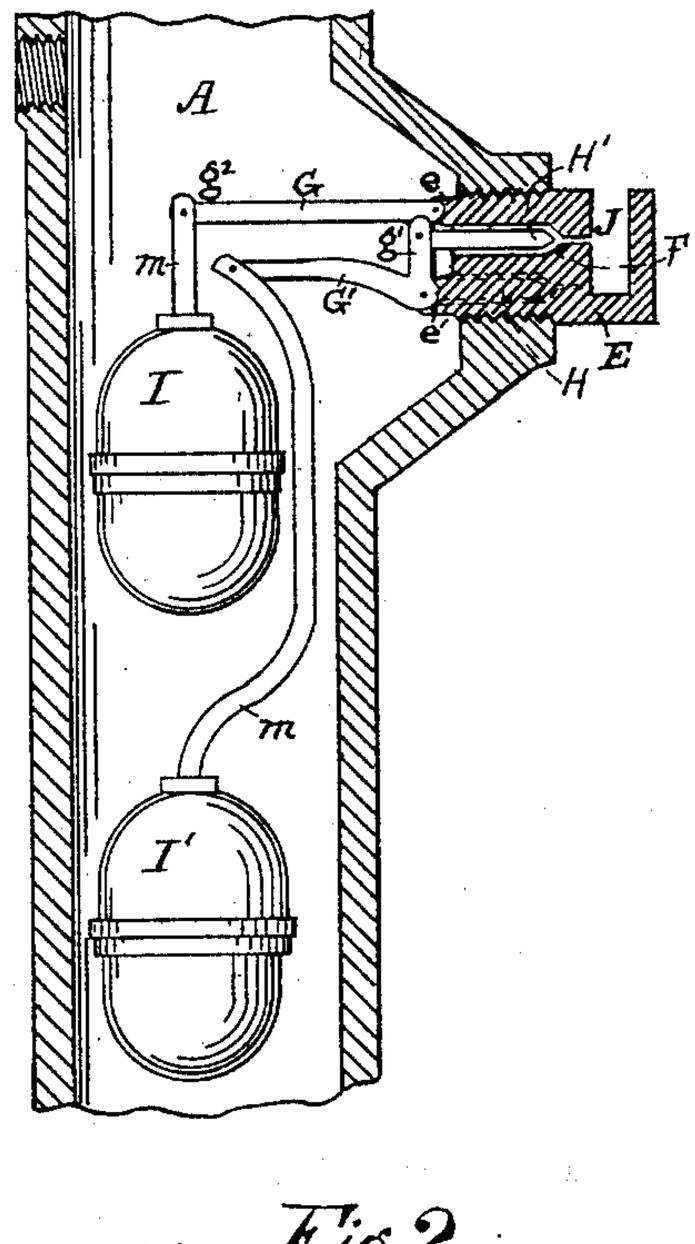

Fig. 2

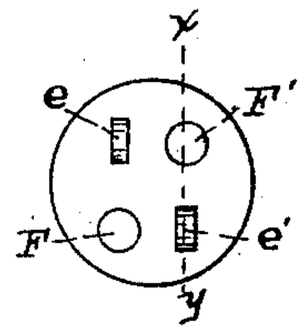

Fig. 3

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PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. J. WRIGHT.

ALARM INDICATOR.

No. 362,138. Patented May 3, 1887.

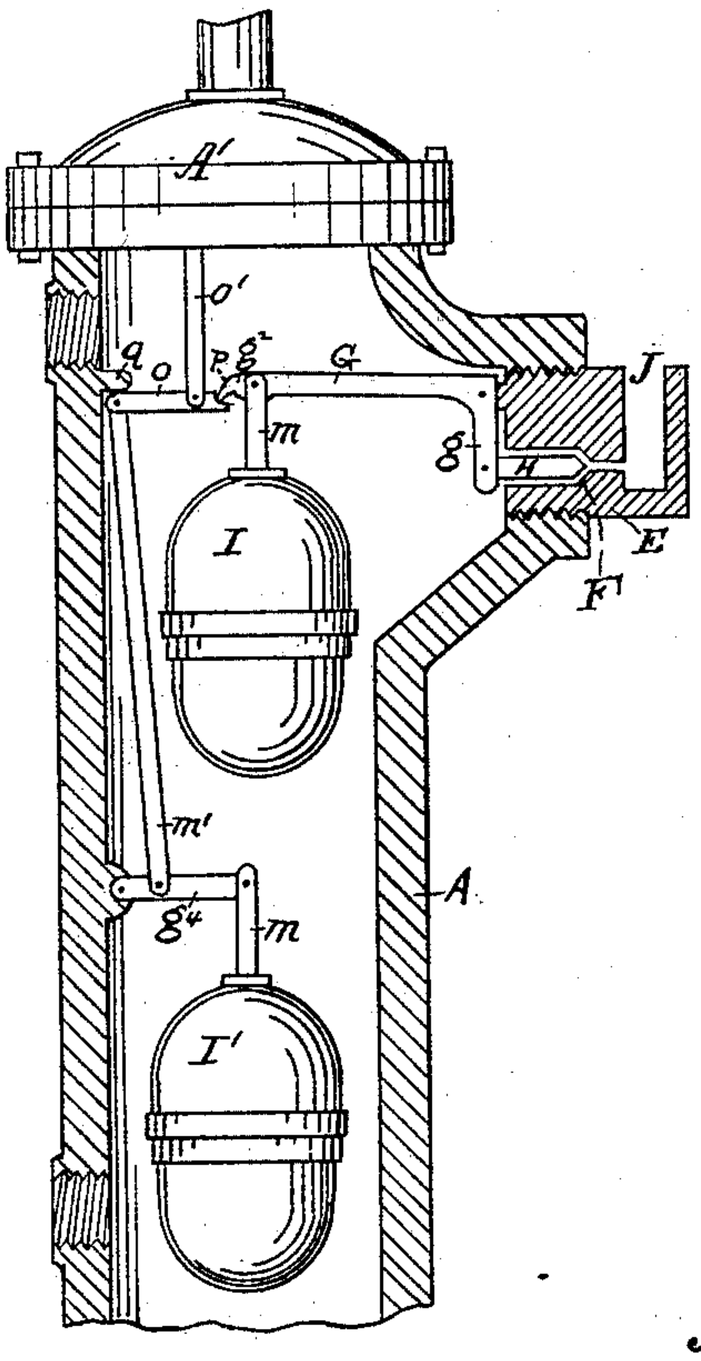

Fig. 4

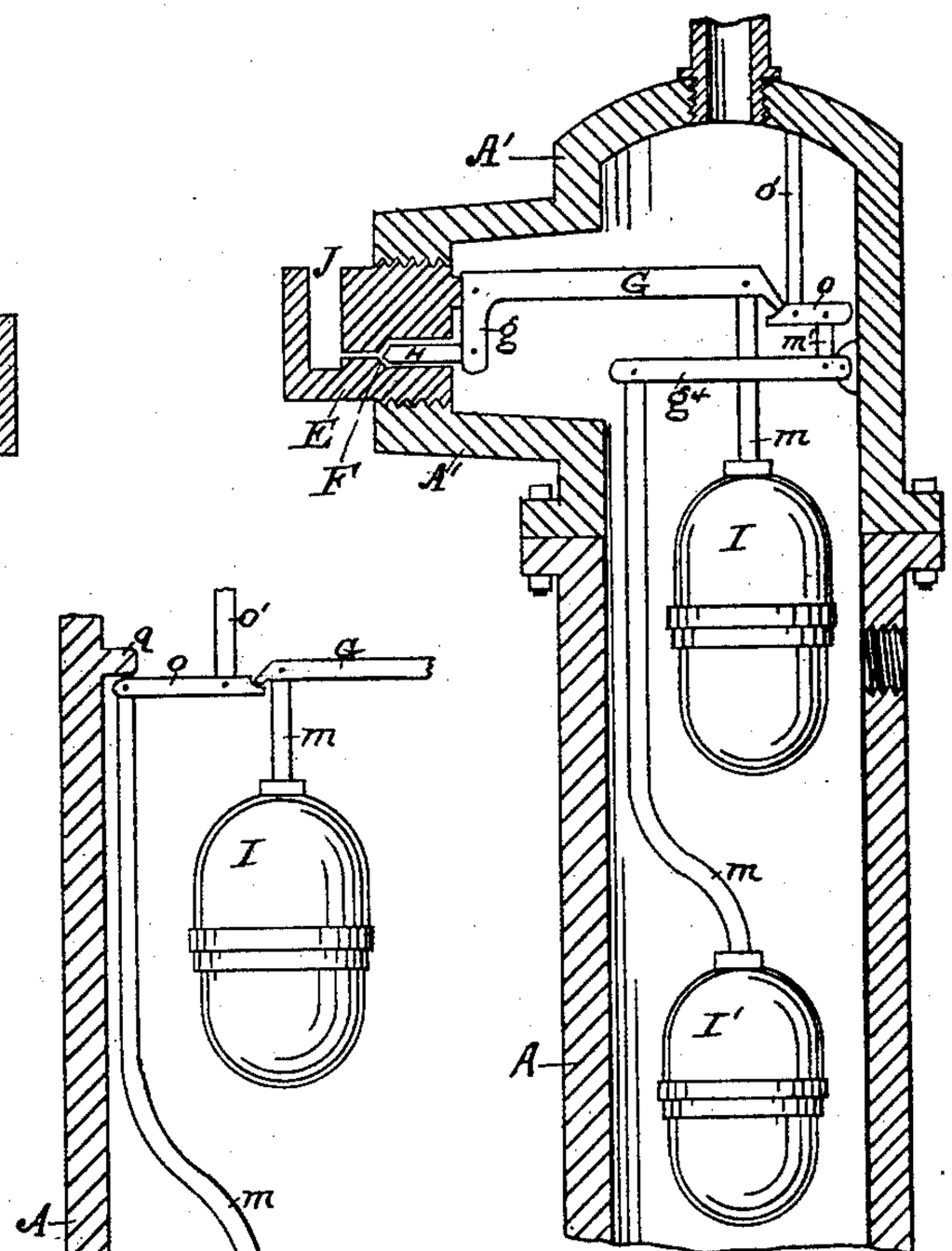

Fig. 5

Fig. 6

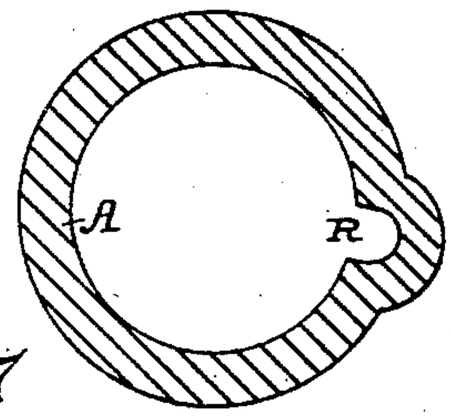

Fig. 7

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UNITED STATES PATENT OFFICE.

ALLEN J. WRIGHT, OF CLEVELAND, OHIO.

ALARM-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 362,138, dated May 3, 1887.

Application filed June 11, 1886. Serial No. 204,901. (No model.)

To all whom it may concern:

Be it known that I, ALLEN J. WRIGHT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Water-Column Alarm-Indicators; and I hereby declare that the following is a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My improvements relate to automatic high and low water alarm-indicators in which an alarm—such as a steam-whistle or any other suitable alarm—is automatically sounded whenever the water either rises above or falls below certain limits, previously determined; and my improvements consist, in the first place, in arranging all the valves and joints above the level to which water will ordinarily rise in the indicator-chamber and locating both the high-water and low-water alarm-valves (in case more than one valve is used) in one valve-plug, whereby the construction of the apparatus is simplified and improved, its cost reduced, and its operation rendered more certain than where some of the valves are so placed as to be sometimes submerged in water, as is the case in existing forms of water-column alarm-indicators; secondly, in using the same valve for both high and low water alarm; and, finally, in such construction and arrangement of parts as enables the valve-plug, valves, floats, and all joints connected therewith to be attached to the removable cap of the water-chamber of the indicator, whereby, in addition to being removed from contact with the water, they are readily removable for examination or repairs without the necessity of disconnecting the levers and valves, as by taking off the cap all the internal parts are removed in mass therewith.

In the drawings, Figure 1 is an elevation of the apparatus complete and partly in section, one-half of the water-chamber being removed to exhibit the internal parts, which are shown in position. Fig. 2 is a sectional view of a part of the apparatus, showing a modification of the arrangement of the internal parts and the valve-levers. Fig. 3 is a plan view of the internal face of the valve-plug E, shown in section in Figs. 1 and 2, on the line *x y* of Fig. 3. Fig. 4 is a partial sectional view exhibiting a modified arrangement of internal parts, whereby a single valve is utilized for both high-water and low-water alarm. Fig. 6 exhibits, in a detached view, another arrangement of the internal parts to accomplish the same object of utilizing one valve for both alarms. Fig. 5 is a partial sectional view exhibiting a construction and arrangement of parts whereby all the internal parts are attached within the cap of the indicator-chamber and removable therewith. Fig. 7 is a transverse sectional view of the body of an indicator water-chamber provided with a recess, as hereinafter described.

Similar letters refer to similar parts in the drawings, and the internal parts are shown in elevation in all of the figures and views and the water chamber walls in section.

In the drawings, A is the body or shell of the water-chamber of the indicator, commonly called the "indicator-chamber" or "water-column chamber," and is preferably composed of cast metal. A′ is a removable cap thereto. B is a sediment-chamber. *b* is a blow-off cock or valve; C, a water-inlet, to be connected with the boiler, to which the alarm-indicator is to be attached; and D is a glass indicator-tube. These parts B, *b*, C, and D form no part of my present invention, but are shown and described to illustrate its operation.

E is a valve-plug screwed into the side of chamber A, near the top or into the cap A′, and containing two valve seats, F F′, located substantially as shown in Fig. 3, when two valves are used, each communicating by a suitable channel with a cavity, J, formed in the outer part of the plug E, which cavity in turn connects with an ordinary steam-whistle, K, as shown in Fig. 1, or with any other suitable alarm.

The valve-plug E bears on its inner face two lugs, *e e′*, one opposite each valve-seat, as shown in Fig. 3, to which lugs are pivoted, respectively, the crank-levers G G′, to the short arms *g g′* of which levers are pivoted, respectively, the plug-valves H H′, which are preferably formed with conical ends and fitted to move loosely in the valve-seats, so that an extremely slight opening of the valve will allow steam to pass out into the cavity J and sound the alarm, while the conical end of the valve will partially enter and infallibly close the outlet from the valve-seat when the valve is closed.

To the long arms g^2 g^3 of the valve-levers G G′ are respectively attached the floats I I′, either directly, as shown in Fig. 2, or by attaching the lower float to an intermediate lever, g^4, pivoted to a plug, l, screwed into the side of chamber A, or to a lug on the wall of the chamber A, and connected by a rod, m', to the long arm g^3 of the lever G′. The floats themselves I prefer to attach to their respective levers by means of a rod, m, rigidly attached to the float and pivotally attached to the lever.

The floats I and I′ are so located in the chamber A that the upper one at its point of flotation is at the limit desired for high water, while the lower float at its point of flotation is at the limit desired for low water, so that it will, as soon as the water sinks below that limit, be deprived of support and will descend, and thereby open the valve connected with it, while as soon as the water rises above the point of flotation of the upper float that float will rise with the water and open its corresponding valve, so that the alarm-whistle will be sounded in any case when the water in the indicator-chamber A either rises above the high-water limit or sinks below the low-water limit. To insure this action, the upper float, I, is connected with the valve H, which is arranged to open with the upward movement of the lever G, and the lower float, I′, is connected with the valve H′, which is arranged to open with the downward movement of the lever G′, by which arrangement both valves are kept firmly closed—H by the weight of float I and lever G, and H′ by the upward pressure of float I′—so long as the water in the chamber remains between the flotation-points of the two floats, as previously determined; and in attaching my improved alarm-indicator to a boiler it is to be set at such a height as will bring the flotation-points of the floats at the limits specified—viz., I at the high-water limit, and I′ at the low-water limit—and when this is done the float I′ will usually be completely submerged at the ordinary height of the water, while the plug l and lever g^4 will be above water.

On account of the well-known fact that all waters used in the production of steam in boilers deposit more or less sediment, scale, and other impurities, it is highly desirable that the valves and joints employed in a water-alarm indicator should be removed if possible from contact with the water, which is accomplished, as described, by the mechanism shown in Fig. 1, in which the only part liable to be affected by sediment or scale is the lever g^4 and the joints connected with it, which will only be reached by water on rare occasions, and may be so loosely fitted as to obviate any difficulty arising from their occasional submergence in water. In order, however, to remove any possibility of damage to any joints by water highly charged with impurities, as is sometimes found to be the case with boiler-waters. I so far modify the construction of my alarm-indicators, when designed to be used upon boilers fed with such impure waters, as to place not only the valves, but also all joints, above the highest ordinary level of the water, and this I accomplish by prolonging the rod m of the lower float, I′, in a curved form, so as to pass by and around the upper float, I, into the upper part of the indicator-chamber, and dispensing with the intermediate lever, g^4, plug l, and connecting-rod m'. I attach the float-rod m of float I′ by a pivoted joint directly to the long arm g^3 of the valve-lever G′, as shown in Fig. 2.

In most cases the indicator-chamber may be made of sufficient size to readily accommodate the floats with the float-rod of the lower float passing up and around the upper float, all moving freely in the chamber, as shown in Fig. 2; but in some situations, as upon portable engines, &c., it is essential to reduce the weight of the indicator to the lowest possible limit to avoid injury from jarring and for other reasons. In such cases it is necessary to construct the indicator-chamber as narrow as possible; and to admit of the arrangement shown in Fig. 2 in such cases, I construct the indicator-chamber but slightly larger than the diameter of the floats, and form a recess, R, Fig. 7, in one side thereof, extending lengthwise of the chamber for a sufficient length, and of a size to easily admit the rod m of the lower float and permit it to play loosely therein. The curved portion of the lower float-rod enters this recess below the upper float and passes up along the recess to a point well above the upper float, where it emerges and passes up through the indicator-chamber to the lever G′, where it is attached, as previously described.

A modified form of my alarm-indicator is shown in Fig. 4, in which one of the valves shown in Figs. 1 and 2 is dispensed with, and a simplified and cheaper form of construction is obtained, whereby one valve serves for both high-water and low-water alarm. In this case I attach the connecting-rod m', rising from the lever g^4, not to the valve-lever itself, but by a pivot to the longer end of another intermediate lever, o, which is pivoted to a bracket or lug, o', extending from the cap A′, or from an independent bridge-piece, and which lever o is supported so that its short end rests below and almost in contact with a short projecting end, p, of the lever G, to which the float I is connected at the extreme inner end of the long arm g^2 of said lever G. The valve H′ and its valve-seat F′, with the lever G′, are dispensed with, and by means of a step or prop, q, the lever o is maintained in the relation to lever G, just described. The valve H is thus kept closed by the weight of float I on the lever G until the rising of the water in the chamber A lifts float I, or until the falling of the water deprives float I′ of support, in which last case the depression of lever g^4, acting by compound leverage through lever o, lifts the lever G and opens the valve. If preferred, however, the rod m of the float I′ may be prolonged in the form shown in Fig. 5, and attached to the long

arm of the lever *o*, as shown in Fig. 6, and the lever g^4 and rod *m'* may be dispensed with, and this construction is desirable and preferable in many cases.

By the construction shown in Fig. 5 I locate the lever *o* and the lever g^4 and connecting-rod *m'*, if they are used, together with the valve-plug, valve or valves, and the valve-levers, all within the cap A', which is made larger to permit the change of construction, and to which the levers and valves are attached. This allows of the removal of the floats, valves, and levers all at once without disconnecting them, by simply removing the cap A', and facilitates repairs when needed. It is obvious that the arrangement of valves and levers shown in Fig. 2 may also be constructed so as to locate them within the cap A' when formed to receive them, and this is part of my improvement.

What I claim as my invention is—

1. A water-column alarm-indicator constructed with a water-column chamber separate from the boiler and containing floats and levers for operating high-water and low-water alarm-valves located in a single valve-plug inserted in the water-column chamber, substantially as described.

2. In a water-column alarm-indicator separate from the boiler and adapted and arranged to be located and operated at a distance therefrom, a valve-plug containing both high and low water alarm-valves located above the high-water line and operated by levers and floats, substantially as described.

3. In a water-column alarm-indicator, the valve-plug E, located above the high-water line and containing the high-water alarm-valve H and low-water alarm-valve H', actuated by levers and floats, substantially as described.

4. In a water-column alarm-indicator separate from the boiler and adapted to be located and operated at a distance therefrom, a valve-plug containing a combined high-water and low-water alarm-valve operated by straight and crank levers actuated by floats, substantially as and for the purpose described.

5. In a water-column alarm-indicator separate from the boiler and adapted to be located and operated at a distance therefrom, the valve-plug E, containing the combined high and low water alarm-valve H, operated by the levers G and *o*, actuated by floats, substantially as shown and described.

6. The combination of the levers G' and g^4 and connecting-rod *m'* with the float I' and valve H', contained in a water-column chamber separate from the boiler, for operating the low-water alarm placed above the high-water line, substantially as described.

7. The combination of the levers *o* and g^4, connecting-rod *m'*, and float I' with the lever G and valve H, contained in a water-column chamber separate from the boiler, for operating a single valve for both high-water and low-water alarm, substantially as described.

8. In a water-column alarm-indicator operated by floats and valves, a curved float-rod passing from the lower float around the upper float, for operating a low-water alarm-valve located above the high-water line, substantially as described.

9. In a combined high and low water alarm-indicator operated by floats and valves, a recess formed in the water-column chamber and integral therewith, located and adapted to receive the float-rod of the low-water float and permit the same to pass around and above the high-water float outside the general cavity of the indicator-chamber, substantially as and for the purposes described.

10. In a water-column alarm-indicator separate from the boiler and adapted to be located and operated at a distance therefrom, the cap A', containing the valve-plug E, with valve H, levers G, *o*, and g^4, connecting-rod *m'*, and floats I and I', connected with said valve, substantially as shown and described.

11. In a water-column alarm-indicator separate from the boiler and adapted to be located and operated at a distance therefrom, the cap A', containing the valve-plug E, with valves H H', levers G G', connected with said valves, and floats I I', attached to said levers, substantially as described.

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