

N^o 84,646. Patented Dec. 1, 1868.

Fig. 2

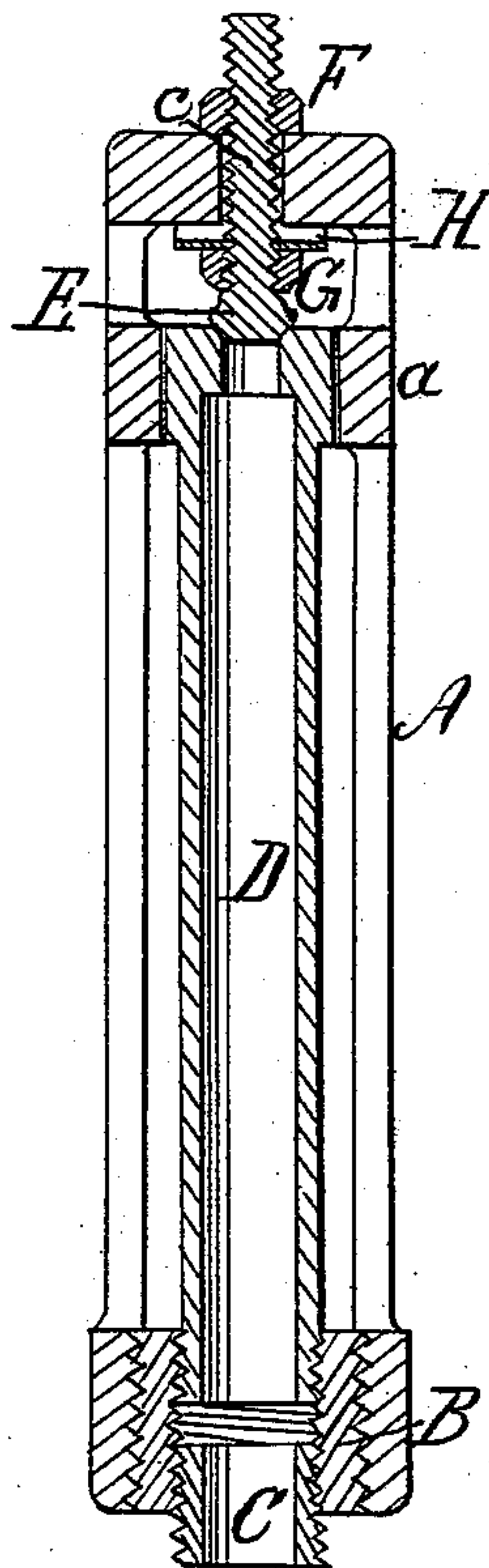
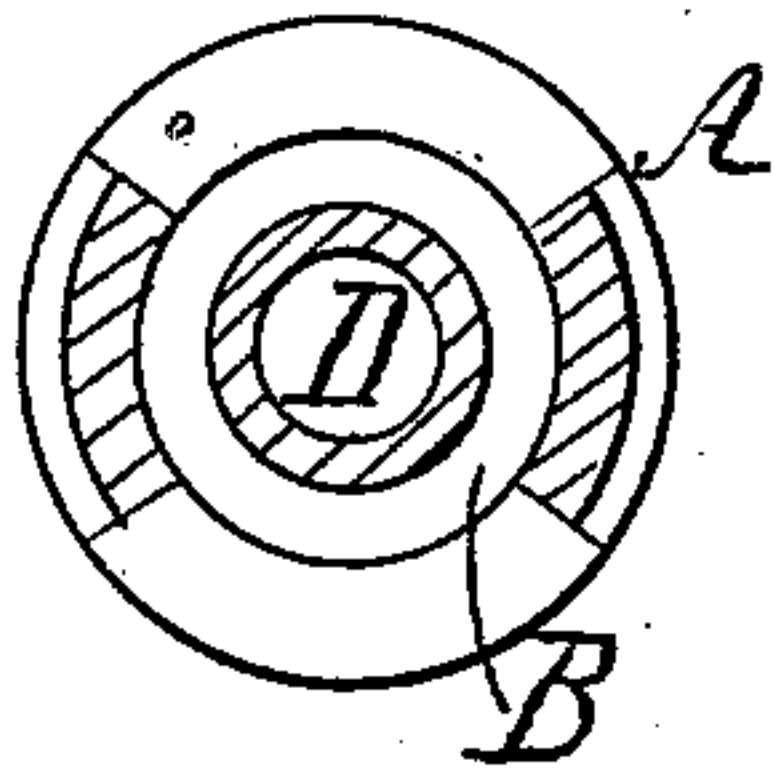


Fig: 3,



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IMPROVEMENT IN LOW-WATER INDICATORS.

Specification forming part of Letters Patent No. 84,646, dated December 1, 1868.

To all whom it may concern:

Be it known that I, JOHN W. RICHARDS, of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Water-Detectors for Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a vertical section of an apparatus or device constructed in accordance with my improvement, as designed for detecting when the water stands at a low level in the boiler; Fig. 2, a similar view of a like device as applicable for indicating when the water stands at a high-boiler level; and Fig. 3, a transverse section through the body of the device, constructed either as represented in Figs. 1 or 2.

Similar letters of reference indicate corresponding parts.

This my improvement consists in a water-detector for steam-boilers, in which a metal tube operates by expansion, in connection with a fixed valve, to detect or signalize the condition of the water in the boiler, and embraces an elastic tie or attachment of the fixed valve to compensate for irregularity in the pressure of the steam; and, furthermore, embraces a tubular character to the fixed valve, and such a suspension and construction of it for indicating low water in the boiler, as that, on becoming heated by escaping steam, it operates conjointly with the expanding-tube to establish a quick and free discharge for the steam.

Referring, in the first instance, to Fig. 1 of the accompanying drawing, which shows the device constructed to operate as a low-water detector, and which may be arranged at any suitable distance from or outside of the boiler, and at such altitude as at the ordinary water-level, it is filled, or nearly so, with water therefrom.

A represents a cast-iron or other suitable frame; B, a nut, screwed therein at the base, and within which is screwed a branch, C, for establishing connection of the detector with the boiler; and, furthermore, within which is screwed a vertical tube, D, made of brass or other suitable expansive material, the same being open at its bottom to the branch C. The

upper end of this expanding tube D is arranged to freely fit through a guide, *a*, in the frame A, and is plugged with a nut, *b*, through which is freely projected from above a valve-stem, *c*, of a valve, E, that, in the operation of the device, opens inward, the seat of the valve being formed in the nut *b*. Said valve-stem, which may be connected with a whistle or any other suitable signaling device at its top, has a passage, *d*, made up through it, terminating below in a branch or lateral opening. F G are nuts for adjusting and securing the valve by its stem to the frame A; and H is an india-rubber or other elastic washer, interposed between the nut F and frame A to secure, in an automatic manner, a compensating character to the device as regards the close fit of the valve against variable irregularities of temperature.

In the operation of the device, as long as the water does not fall too low in the boiler, the comparative coolness of the water in the tube D outside of the boiler and absence of circulation fails to effect any such expansion of said tube as will open or lift it from the valve E; but on the water falling below the proper or safe level in the boiler, then steam takes the place of water in the tube D, and a circulation is kept up between it and the boiler, which, by the increased temperature of the steam, as compared with the water previously standing in the tube, causes the tube D to be expanded, and valve E thereby to be opened, when steam will escape up the passage *d* to sound the alarm, the valve E or its stem *c* also becoming heated by the escaping steam; and, by the manner of suspending said valve, the amount of valvular opening is rapidly increased to effect the discharge.

In Fig. 2 substantially the same device is shown; but as constructed for indicating when the water stands at too high a level in the boiler, the same being similarly connected at its base with the steam-space of the latter, and tube D and valve E similarly suspended from or fitted to the frame; but in such case the valve E is arranged to open outward, as it were, and the rubber washer H reversed so as to yield against upward thrust of the tube on the valve instead of downward pull thereon, nor is the valve-stem *c* made tubular.

In the action of such a modified construc-

tion of the device, so long as water does not stand above the proper level in the boiler the tube D is filled with steam, and by the circulation kept up the valve E kept closed. On water rising, however, too high in the boiler, the tube D becomes filled with water, which, standing outside of the boiler, is comparatively cool, and little or no circulation maintained. This causes the tube D to contract, and so let water escape round or past the valve E by the pressure of the steam within the boiler, and thus to signalize or make known the over-supplied condition of the boiler with water.

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What is here claimed, and desired to be secured by Letters Patent, is—

The fixed valve E, constructed of a tubular character, as described, and hung so as to be capable of expansion away from its seat, for action in concert with the tube D, substantially as described.

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Witnesses:

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A. KINNEY.