

F. STRANDBERG.
WATER GAGE FOR STEAM BOILERS.

APPLICATION FILED MAY 16, 1902.

NO MODEL.

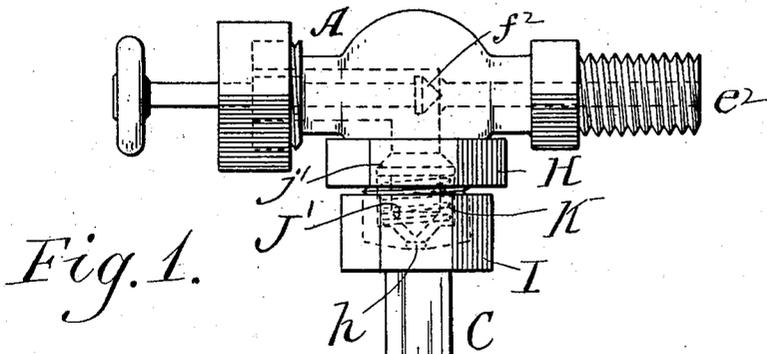


Fig. 1.

Fig. 2.

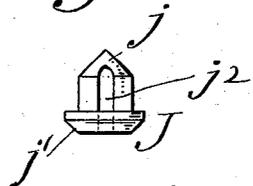
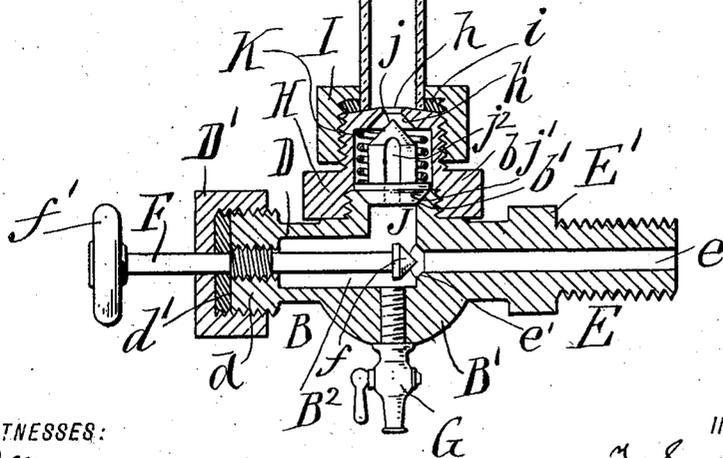
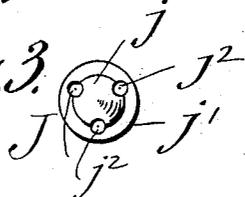


Fig. 3.



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FRIDOLF STRANDBERG, OF BRUNO, MINNESOTA.

WATER-GAGE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 718,228, dated January 13, 1903.

Application filed May 16, 1902. Serial No. 107,549. (No model.)

To all whom it may concern:

Be it known that I, FRIDOLF STRANDBERG, a citizen of the United States, and a resident of Bruno, county of Pine, and State of Minnesota, have invented certain new and useful Improvements in Water-Gages for Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar letters of reference indicate corresponding parts.

The subject of the present invention is a water-gage for steam-boilers; and it has for its principal object the automatic closure of the communication of the gage-tube with the boiler in the event of the former becoming broken and communication with the boiler positively closed by hand independently of the automatic closure to cut off water and steam admission to the gage and permit the withdrawal from the latter of water, including that of condensation, preparatory to the removal of the damaged tube and the substitution of a new one.

With the above and other purposes in view the invention comprises generally head and base members of the gage, each having an inner horizontal tubular extension threaded for connection with the boiler and containing a passage leading to a valve-chamber within its member, said chamber having an aperture opening into the end of the gage-tube of glass, the aperture being contracted by a spring-adjusted valve as to variably regulate the communication between the interior of the tube and the boiler, but positively close said aperture upon a diminution of pressure within the latter, as would be occasioned in case of breakage. A hand-operated valve and petcock interposed between the automatic valve and boiler serve for the positive interruption of boiler communication and withdrawal of water from the gage.

In the development of the invention exemplified herein the head and base members of the gage are provided with the novel arrangement of automatic and hand-operated valves.

There are other improved features and details of construction which are subsequently clearly explained.

In the accompanying drawings, forming

part of this specification, Figure 1 is a side elevation, partly in section, of a water-gage embodying my improvements; and Figs. 2 and 3 are a side and plan view, respectively, of the automatic valve detached.

The head and base members A B of the gage are in the relatively reversed positions and afford bearings for the upper and lower ends of the glass or sight tube C. The construction and arrangement of both of the members are generally similar.

Referring now more particularly to the lower or base member B, it will be understood that it comprises a globular body B', with integral threaded nipple *b* at its top. The body contains a chamber B², which opens through the nipple and also extends within a front horizontal neck D, the outer enlarged end *d* of which is externally threaded and is provided with a small threaded horizontal opening axially alined with a small horizontal passage *e*, leading from the chamber B² longitudinally rearward in a tubular extension E, carrying an integral nut E' and externally threaded for connection to the boiler. The passage *e*, at its point of intersection with the chamber B², is beveled to constitute a seat *e'* for a conical valve *f* on the end of a spindle F, adjustably threaded in the outer end of the neck D, extending beyond the same and carrying a small hand-wheel *f'* for effecting the manipulation of the valve *f*. The movements of the spindle F through the end *d* are rendered steam-tight by the presence of a packing-disk *d'*, snugly embracing the external portion of the stem and retained intimately against the face of the end *d* by a threaded gland D'.

It will be observed that the bottom of the chamber B² is in a lower plane than the passage *e*. A petcock G is screw-seated in and depends from the body B' and affords a discharge from the chamber when requisite.

Screwed onto the nipple *b* is a valve-casing H, the top of which has a vertical aperture *h*, beveled at its lower end to present an under-valve seat *h'*. The upper end of the opening in the nipple *b* is oppositely beveled to form a large and relatively reversed valve-seat *b'*.

Resting upon the valve-casing, so that the aperture *h* will afford communication with its interior, is the glass tube C, its extreme por-

tion being secured steam-tight in position by a packing-disk *i*, snugly encompassing the same, and a gland I, in threaded engagement with the nipple. Within the casing is a valve 5 J, comprising a cylindrical body terminating at its upper end in a conical valve *j*, adapted for the seat *h'*, while a tapering disk valve *j'*, at its lower end, of somewhat larger pressure-surface, is conformable to the seat *b'*.

10 A plurality (three are shown) of equidistantly vertical channels *j²* are located in the exterior of the valve-body and extend into the face of the upper valve and through the lower valve. A coiled extension-spring K, encompassing the valve-body and bearing against the inner face of the casing-top and upper side of the valve *j'*, respectively, normally holds said latter valve to its seat, as indicated in Fig. 1.

20 The dotted lines at the upper portion of Fig. 1 indicate that the upper member is similarly equipped with chambers, passages, valve-casing, spring-actuated valve *J'*, and hand-operated valves *f²*, all coacting and performing the same service as the corresponding parts at the base of the gage. Obviously no petcock is required for the upper member.

25 Assume that the tubular extensions E E² of the lower and upper members are connected with the boiler, so that their passages *e e²*, respectively, are in communication with the interior thereof, and the hand-operated valves *f* and *f²* are in the open positions indicated. The counterbalancing pressure of water and steam or steam alone, according to the water-level with the boiler, will be exerted through the lower and upper passages, through the channels *j²* of the valves J J', and within the tube C, the balanced action permitting the 40 springs to maintain the valves *j* open to a degree variable with the fluctuations in boiler-pressure. Now should the tube C become broken or disturbed at its steam-tight joints, so that a diminution of pressure within the 45 same results, the relatively higher pressure exerted on the under side of the lower valve *j'* and top of upper valve *j'* will move the same against the counter force of the springs K and seat the valves *j* to close the upper and 50 lower apertures *h*, and thereby automatically cut out the tube from all communication with the boiler interior. The seated valves will remain in their closed positions until such time as a new tube can be adjusted or its 55 faulty joints repaired, as the case may be, and to accomplish either of these operations the valves *f f²* are screwed to their seats to positively close all communication with the boiler, after which the petcock G can be 60 opened to withdraw all water, including that of condensation, and the glass tube then properly adjusted. The resumption of the working relation of the tube C and automatic valves can best be effected by gradually opening the valves *f f²*, to avoid subjecting said automatic valves to a too sudden and high 65 pressure at the beginning, which latter action

would have the effect of undesirable movement of the valves J J' to close the apertures *h h*, thus preventing the tube C from being 70 put in circulating communication with the boiler.

The position of the seat *b'* with respect to the seat *h'* and the range of valve movement are such that when either valve *j'* seats its companion valve *j*, while unseated, will not have 75 completely left the recess afforded by the bevel valve-seat *h'* and is therefore prevented from catching against the under side of the casing in rising, as it might if the limit of its 80 lowering movement were below the seat.

From the foregoing description it will be appreciated that a gage embodying my improvements is simple, efficient, and comparatively inexpensive. It can be readily applied 85 and adjusted and be depended upon to automatically cut out its tube in the event of breakage or leakage of the latter. It also conduces to other advantages, as hereinbefore explained. 90

I do not wish to be understood as limiting myself to the particular construction and arrangement shown and described, but reserve the right to such modifications and changes as may be within the spirit of my invention. 95

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

1. In a water-gage for steam-boilers, the combination with a member adapted for communication with a steam-boiler, and presenting the seat *b'*, of a valve-casing screwed on the latter and provided with top aperture and under-valve seat, a valve within said casing and having lower and upper valves for alternately bearing in said seats, and a sight-tube communicating with said aperture. 100 105

2. In a water-gage for steam-boilers, the combination with a member adapted for communication with a steam-boiler and presenting the seat *b'*, of a valve-casing screwed over the latter and provided with a top aperture and under-valve seat, a valve within said casing and having lower and upper valves for alternately bearing in said seats, a sight-tube 110 115 communicating with said aperture, and a hand-operated valve controlling the boiler communication independent of the other said valve.

3. In a water-gage for steam-boilers, the combination with a member adapted for communication with a steam-boiler and presenting the seat *b'*, of a valve-casing screwed over the latter and provided with a top aperture and under-valve seat, a valve within said casing and having lower and upper valves for alternately bearing in said seats, a spring for normally holding the upper valve unseated, and a sight-tube communicating with said aperture. 120 125 130

4. In a water-gage for steam-boilers, the combination with a member adapted for communication with a steam-boiler and presenting the seat *b'*, of a valve-casing screwed over

the latter and provided with a top aperture and under-valve seat, a valve within the casing and having lower and upper valves for alternately bearing in said seats, the range of movement of the valve being such that it never completely leaves the recess of the upper seat, and a sight-tube communicating with the said aperture.

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5. In a water-gage for steam-boilers, the combination with a member adapted for communication with a steam-boiler, and presenting the seat *b'*, of a valve-casing secured over the latter and provided with a top aperture and under-valve seat, a valve within the cas-

ing, having lower and upper valves and chan- 15
nel *j'*, extending through the lower valve and adapted to be closed when the upper valve seats, and a sight-tube communicating with said aperture.

In testimony that I claim the foregoing as 20
my invention I have signed my name, in presence of two witnesses, this 3d day of February, A. D. 1902.

FRIDOLF STRANDBERG.

Witnesses:

WM. F. ROGERS,
CHAS. SANDUN.