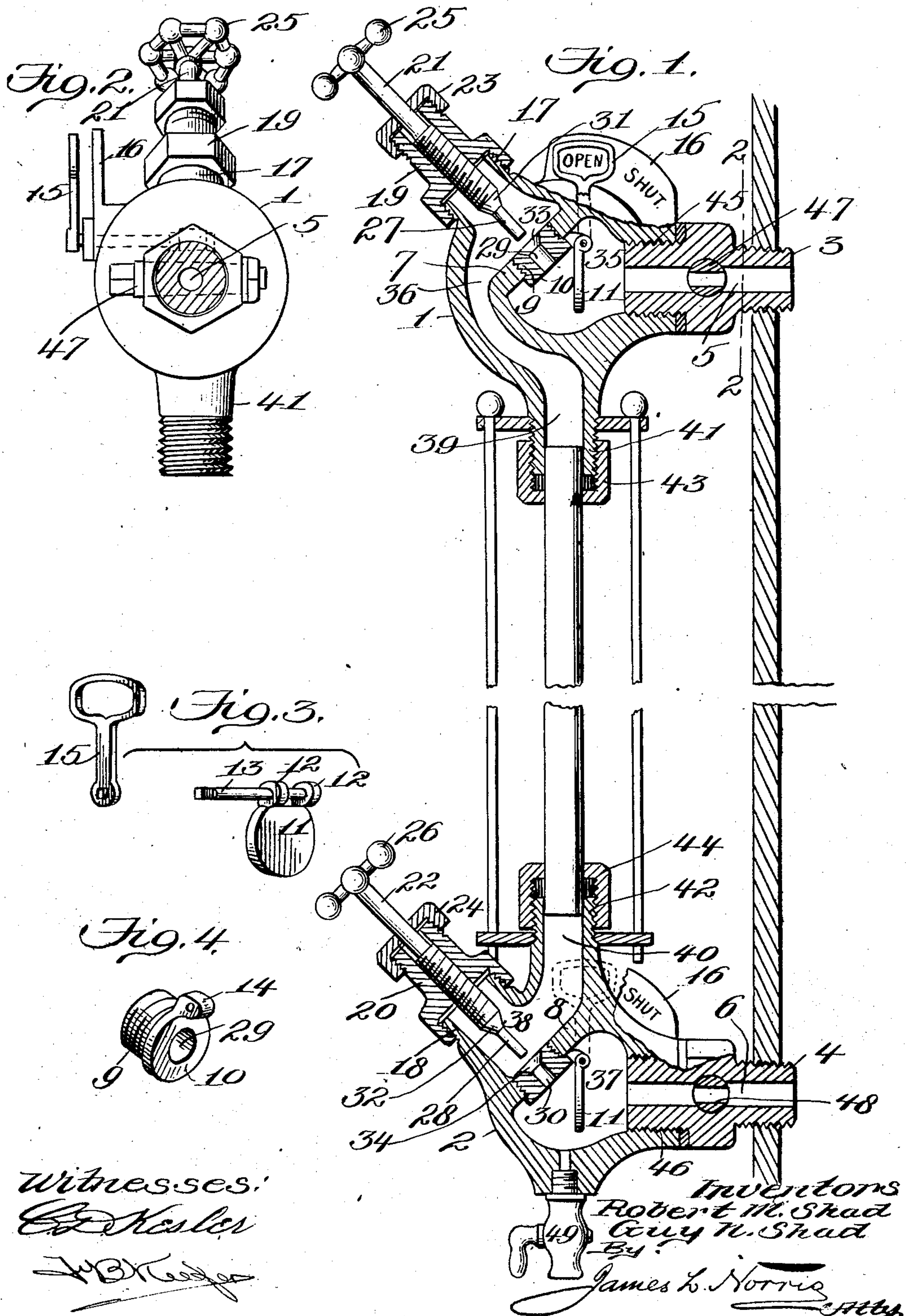


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GAGE GLASS COCK.  
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# UNITED STATES PATENT OFFICE.

ROBERT M. SHAD AND GUY N. SHAD, OF NEW ORLEANS, LOUISIANA.

## GAGE-GLASS COCK.

No. 908,337.

Specification of Letters Patent.

Patented Dec. 29, 1908.

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*To all whom it may concern:*

Be it known that we, ROBERT M. SHAD and GUY N. SHAD, citizens of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Gage-Glass Cocks, of which the following is a specification.

Our present invention relates to improvements in gage glasses adapted for use on steam boilers, ammonia and liquid tanks, and other receptacles for indicating the level of the liquid contained therein, and it has for its object to provide an improved device of this character that is capable of automatically interrupting the flow of the liquid or fluid when the gage glass is broken in order that scalding of the attendants or other damage may be avoided, the interruption of the fluid such as hot water permitting renewal of the glass.

Another object of the invention is to provide means for reestablishing communication between the gage glass and the boiler or other receptacle to which it is applied, and also to prevent accidental shutting off of the gage glass from the boiler while the contents of the glass are being blown off.

A further object of the invention is to provide automatically operating check valves which are so mounted that they may be readily removed and replaced for the purposes of repair and to provide means for cutting off the check valves from the boiler or other receptacle while the check valves are being removed or replaced, this being particularly advantageous when the gage glass is applied to a steam boiler, for the reason that it enables the check valves to be repaired or otherwise adjusted while the boiler is under pressure.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts, all as will be hereinafter more fully described and pointed out particularly in the claims at the end of the specification.

In the accompanying drawing:—Figure 1 represents a central vertical sectional view of a gage glass constructed in accordance with the present invention, the check valves being in normal operative position. Fig. 2 represents a transverse section on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of one of the check valves and the indicator connected thereto. Fig. 4 is a perspective

view of one of the removable check valve seats.

Similar parts are designated by the same reference numerals in the several figures. 60

The gage shown in the present embodiment of our invention comprises generally a pair of upper and lower valve casings 1 and 2 which are provided with the threaded ends 3 and 4, to enter corresponding threaded openings in the boiler or other receptacle to which the gage is applied, these stems being provided with ports 5 and 6, leading into the respective valve casings. The latter are substantially hollow and are divided by the partitions or septums 7 and 8, the latter being provided with automatically operating valves which serve to control communication between the gage glass and the boiler or other receptacle. In the present instance a pair of gravity operated check valves are employed, the partitions or septums being inclined relatively to the vertical in order that check valves of the pivoted type may be employed that would have a normal tendency to remain in open position until the pressure within the gage glass is released, at which time the pressure behind the valves will lift them into engagement with their respective seats and thereby prevent the flow of steam and water from the boiler. 85

In order to facilitate the mounting of the valves and to enable them to be removed and replaced whenever necessary or desirable, it is preferable to mount them removably within the respective valve casings, the valves shown in the present instance being each composed of a bushing 9 and which is threaded into the septum or partition of its respective valve casing and is provided with a valve seat 10 to cooperate with a shutter 11, the latter being provided at its upper edge with hinged lugs 12 in which the pintle 13 is rigidly fitted, the latter passing loosely through a hinge lug 14 on the bushing and serving as a pivotal connection between the latter and the shutter. The pintle preferably extends through one of the walls of the valve casing and is provided at the exterior thereof with an appropriate indicator 15, that shown in the present instance being provided with a looped portion at its upper end to form a sight aperture, the latter being arranged to cooperate with appropriate indicia which is suitably inscribed on a plate 16 arranged on the exterior of the valve casing, the indicia serving to indicate whether the 110



valve or shutter connected to the pintle is in the open or closed position.

The upper and lower valve casings are provided with upwardly inclined bosses 17 and 18 and which are threaded to receive the valve bonnets 19 and 20, the latter in turn being interiorly threaded to receive the respective valve stems 21 and 22, stuffing boxes 23 and 24 on the upper ends of the bonnets serving to pack the valve stems and thereby prevent leakage. The other ends of these valve stems are provided with suitable operating handles or wheels 25 and 26 by means of which the valve stems may be rotated, and the inner ends of the latter are provided with reduced extensions 27 and 28 which are arranged in alinement with and adapted to project through the central apertures 29 and 30 in the bushings of the respective check valves, the extensions being of a length sufficient to engage the pivoted shutters of the respective check valves and thereby unseat them and permit the water or steam to flow from the boiler to the gage glass, the reduced extensions of the respective stems being of a diameter less than that of the passages 29 and 30 in the respective valve seats so as to permit passage of fluid while the extensions extend therethrough.

In order to prevent interruption of communication between the gage glass and the boiler, while the sediment is being blown from the latter, it is preferable to provide conical valve seats 31, 32, arranged in alinement with and adapted to cooperate with the correspondingly formed seats 33 and 34 in the upper sides of the bushings for the respective check valves, the valve seats just described being arranged to cooperate with one another to positively interrupt communication between the boiler and the gage glass after the reduced extensions of the valve stems have unseated the shutters of the respective check valves.

The partitions 7 and 8, as previously stated, divide the upper and lower valve casings into separate compartments 35, 36 and 37, 38, respectively, communication between the compartments of each valve casing being controlled by the check valve and also by the stop valves formed by the valve stems 21 and 22, the compartments 36 and 38 of the respective valve casings having passages 39 and 40 which lead to the gage glass. The opposite ends of the latter are inserted into the oppositely directed stems 41 and 42, the latter being threaded, as usual, to receive the stuffing boxes 43 and 44 which serve to pack the glass and thereby prevent leakage between it and the valve casings.

Access may be had to the interior of the compartments 35 and 37 of the respective valve casings through the openings 45 and 46 into which the stems 3 and 4 are threaded or otherwise detachably secured, and in order

to permit removal of the respective casings to enable the check valves to be repaired while the boiler is under pressure, it is preferable to provide the respective stems with a pair of cut-offs, those shown in the present instance being composed of plug valves 47 and 48 which control the passages through the respective stems and are accessible for operation from the exterior thereof. The pet-cock 49 is arranged on the lower valve casing, as usual, and is preferably tapped into the compartment 37, its purpose being to drain the gage glass and its communicating passages of sediment.

In practice the check valves are normally in open position and the valve stems 21, 22 are retracted so as to withdraw the reduced extensions thereon into a position that will not interfere with the operation of the check valves, the plug valves or cut-offs which control communication through the attaching stems of the respective casings, being also in open position, the sight apertures in the respective indicators registering with those portions of the respective scales which indicate the open positions of the check valves. Should the gage glass become broken, a fall in pressure will occur in the compartments 36 and 38 of the respective valve casings, the pressure in the compartments 35 and 37 thereof causing the check valves to immediately close and thereby interrupt the flow of the water and steam to the gage glass, the check valve remaining in closed position and permitting renewal of the broken glass. After the new glass has been inserted, communication is reestablished by operating the stems 21 and 22 until the reduced extensions thereon pass through the bushings of the respective check valves and dislodge the shutters thereof from their respective seats, and when the pressure in the two compartments of each valve casing is equalized, the shutters of both check valves will remain in open position under the action of gravity. The stems 21 and 22 are then retracted to the position shown in Fig. 1 so that the check valves may be closed automatically should the glass again become broken.

In blowing off the sediment from the gage glass and its communicating passages, there may be a tendency of the check valves to close by reason of the reduction in pressure within the gage glass, and in order to prevent closing of these valves at this time, the stems 21 and 22 are screwed in until the extensions thereon project beyond the seats for the respective shutters preparatory to the opening of the pet-cock, such an adjustment of the stems serving to prevent closing of the check valves during the blowing off operation. Whenever it is desirable or necessary to repack the stuffing boxes for the gage glass, it is only necessary to screw in the valve stems 21, 22 until the valve seats 31



and 32 thereon cooperate with the corresponding valve seats on the check valve openings, communication between the gage glass and the boiler being thereby interrupted so that the stuffing box may be opened entirely without danger of scalding. Either of the check valves may be removed from its respective valve casing while the boiler is under pressure, by shutting off the respective cut off or plug valve in the stem of the casing and then unscrewing the casing from the stem, the opening into which the stem fits providing means of access to the valve. The indicators connected to the check valves will indicate under any circumstances the positions occupied by the respective check valves.

A gage constructed in accordance with our present invention is especially efficient when applied to steam boilers, ammonia tanks and the like wherein it is desirable or necessary to immediately interrupt the flow of steam, ammonia or other liquid to the gage glass should breakage of the latter occur, the gage shown in the present embodiment of our invention being provided with automatically operating valves which operate the moment breakage of the glass occurs, although closure of the automatic valves during blowing off of the glass is prevented by the aid of stop valves which are conveniently operable from the exterior of the valve casings and also serve to positively cut off communication between the glass and the boiler or other receptacle. Moreover, the automatic valves are removably fitted into the respective valve casings so that not only is it possible to cast the latter each in a single piece, but the valves may be readily inserted and removed relatively to their respective casings and even while the boiler is under pressure, by providing a detachable connection between each casing and its respective nipple or attaching stem, and the device is of such a simple and compact construction that it may be manufactured at a reasonable cost and its parts are not liable to get out of order.

We claim as our invention:

1. In a device of the class described, a valve casing having an inclined partition dividing it into separate compartments, one of the latter being adapted to communicate with the gage glass, a boiler connecting stem detachably connected to the casing and communicating with the other of said compartments, a valve mounted on the under side of said partition and capable of insertion and removal while the casing is detached from the stem, and a cut-off forming a part of the stem and serving to prevent escape of fluid while the casing is detached therefrom.

2. A device of the class described comprising a casing provided with an inclined partition for dividing it into separate compartments, one of the latter being adapted to

communicate with the gage glass, an automatic valve embodying a removable bushing fitted in the partition and a shutter arranged at the under side of said inclined partition and having its upper portion pivoted thereto, that compartment of the casing containing the pivoted shutter having an opening therein, a boiler attaching stem detachably fitting said opening and providing means of access to said valve when the casing is detached therefrom, and a cut-off fitted in said stem for preventing escape of fluid after detachment of the casing from the stem.

3. A device of the class described comprising a casing provided with an inclined partition forming separate compartments, one of which is adapted to communicate with the gage glass and the other with the boiler, and a shutter member arranged at the under side of said partition and pivoted at its upper edge, the shutter member when open hanging in a vertical position, and swinging into an inclined position in closing.

4. A device of the class described comprising a casing having an inclined partition dividing it into separate compartments communicating respectively with the gage glass and boiler, the partition being provided with a valve seat, a shutter member arranged in the compartment communicating with the boiler and having its upper edge pivoted to said partition, the shutter member being suspended in a vertical position when open and adapted to swing into an inclined position to cooperate with the valve seat.

5. A device of the class described comprising a hollow casing provided with a partition which divides it into separate compartments adapted to communicate respectively with a gage glass and boiler, the casing being provided with an opening leading to the compartment adapted for connection to the boiler, a boiler connecting stem detachably fitted in said opening and provided with means for cutting off the flow of fluid through the stem, a bushing capable of insertion and removal through said opening in the casing while the latter is detached from the stem, said bushing being detachably fitted in said partition and provided with valve seats arranged at opposite sides of the partition, an automatic valve arranged in the compartment communicating with the boiler, said valve being pivotally suspended at its upper edge and arranged to cooperate with one of the valve seats of the bushing, and a second valve arranged to communicate with the other seat on said bushing.

6. A device of the class described comprising a hollow casing provided with an inclined partition dividing it into separate compartments adapted to communicate respectively with a gage glass and boiler, an automatic valve mounted in the compartment communicating with the boiler and embodying a



freely movable shutter pivotally suspended at its upper edge and adapted to occupy a vertical position when open and arranged to swing into an inclined position beneath the partition when closed, and a controlling device arranged to cooperate with said shutter to move it into open position.

7. A device of the class described comprising a valve casing provided with an inclined partition dividing the casing into separate compartments adapted to communicate respectively with a gage glass and boiler, the partition being provided with a fluid passage connecting the compartments, an automatic valve for controlling communication between the compartments through said passage, said valve comprising a freely movable member pivotally suspended at its upper edge and normally vertical in open position and adapted to swing into an inclined position in closing, and a drain cock fitted in the casing for discharging sediment from the compartment at the under side of the partition and which communicates with the boiler.

8. In a water gage, the combination with a valve casing having an inclined partition therein dividing the casing into separate compartments adapted to communicate respectively with the gage glass and boiler, and a valve seat on the partition inclined relatively to the vertical, of means for controlling communication between the compartments embodying a pendent shutter pivoted at its upper edge and normally suspended in a vertical position and adapted to swing into an inclined position to cooperate with said seat.

9. In a water gage, the combination with a valve casing having a partition dividing it into separate compartments adapted to communicate respectively with the gage glass and boiler, and a valve seat on the partition inclined relatively to the vertical, of means for controlling communication between the compartments embodying a shutter arranged at one side of the partition and pivoted at its upper edge, said shutter when open hanging freely in a vertical position, and a valve stem having a portion thereon adapted to cooperate with the said shutter to unseat it, a valve seat on the said stem and a cooperating valve seat on the partition for interrupting communication between the compartments independently of the said shutter.

10. In a water gage, the combination with a valve casing having a partition therein

for dividing it into separate compartments adapted to communicate respectively with the gage glass and boiler, of a bushing removably fitted in the partition having a passage therethrough and provided with valve seats at opposite ends thereof inclined relatively to the vertical, a check valve arranged at one side of the partition and adapted to swing into an inclined position to cooperate with one of the valve seats of the bushing and normally suspended freely in a vertical position, and an inclined axially adjustable valve stem arranged at the opposite side of the partition having a valve seat thereon adapted to cooperate with a valve seat on the bushing and provided with a reduced extension adapted to project through the passage in the bushing and disengage the check valve from its seat.

11. A device of the class described comprising a valve casing adapted for attachment to a boiler and gage glass, an automatic valve inclosed in the casing for controlling communication between the boiler and gage glass, said valve embodying a freely suspended member pivoted at its upper edge and adapted to occupy a vertical position when open and an inclined position when closed, a pintle turnable with said member, and an indicator movable with the pintle and arranged thereon to counterbalance the weight of said valve member, indicia being provided to cooperate with the indicator for designating the position occupied by the valve member.

12. In a water gage, the combination with a valve casing having an apertured partition dividing it into separate compartments adapted to communicate respectively with the gage glass and boiler, of a bushing removably fitted into the aperture of the partition and having a hinge lug at the upper edge thereof, a shutter adapted to cooperate with one side of the bushing as a valve seat and having hinge lugs adapted to cooperate with that on the bushing, a pintle loosely fitting the lug on the bushing and firmly fitted into the lugs on the shutter and extending to the exterior of the casing, and an indicator arranged on the exterior portion of the pintle.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

ROBERT M. SHAD.  
GUY N. SHAD.

Witnesses:

FRANK W. CHURCH,  
EDWARD PIERSON.