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DUPLEX SAFETY WATER COLUMN FOR STEAM BOILERS.

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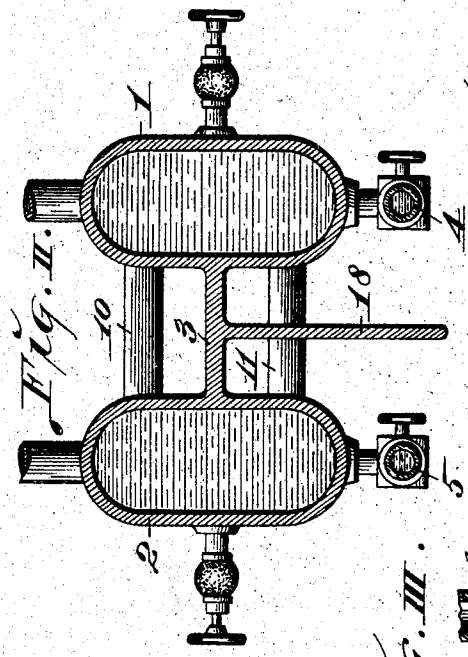


Fig. II.

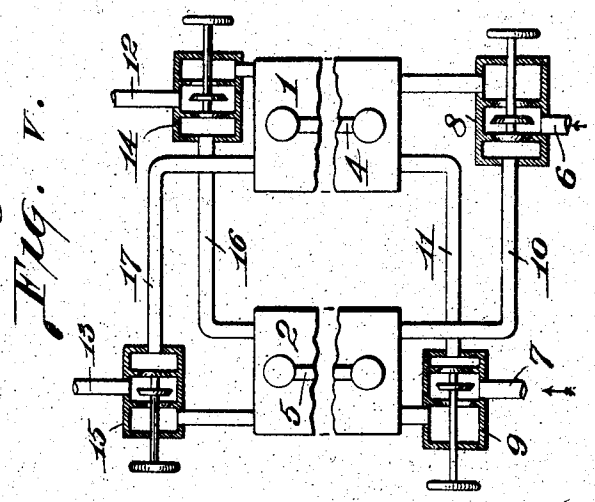


Fig. V.

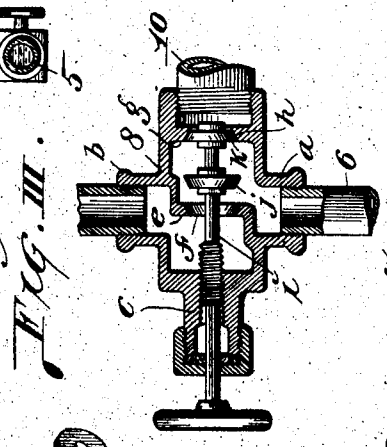


Fig. III.

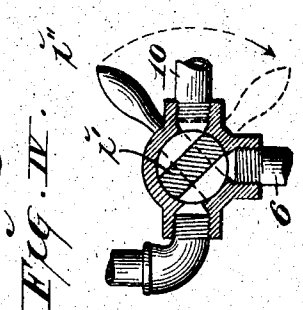


Fig. IV.

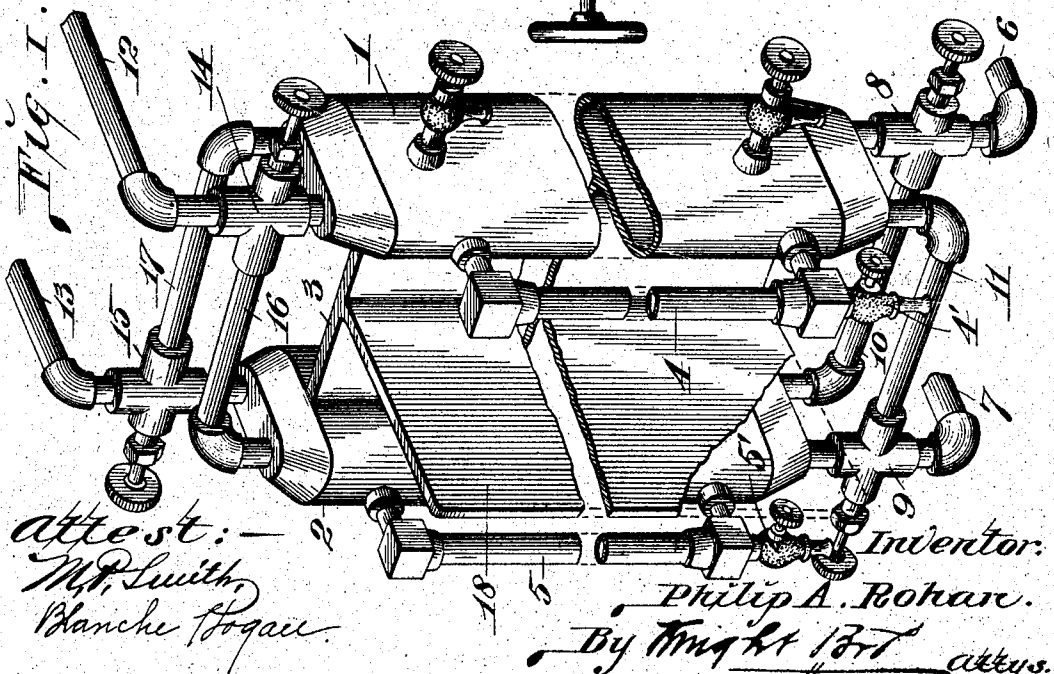


Fig. I.

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DUPLEX SAFETY WATER-COLUMN FOR STEAM-BOILERS.

No. 796,249. Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed February 18, 1905. Serial No. 246,230.

To all whom it may concern:

Be it known that I, PHILIP A. ROHAN, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Duplex Safety Water-Columns for Steam-Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a multiple water-column for steam-boilers and similar appliances through the medium of which the level of water in the boiler or appliance to which the article is applied may be accurately determined at all times and without liability of the mistakes or erroneous indications that have existed in the use of similar articles heretofore employed.

In my column I provide a plurality of steam connections and a plurality of water connections uniting the multiple column to the steam-boiler and provide multiple valves that control the flow through the connection to and from the column members, thereby rendering it an impossibility for the boiler to become drained at any time without draining one or the other of the column members. This is due to the controlling-valves being at all times open to permit circulation of water and steam to both of the column members. I thereby obviate all liability of accidents due to firing in connection with the boiler when there is an absence of water therein.

A column constructed in accordance with my improvement also serves to furnish information to the user of a leak in any of the column connections, which results in the gage associated with the column indicating a false water-line in the boiler. Under such a condition a deficiency of water or a condition of surplus of water becomes present in the boiler, one of which is dangerous and the other of which interferes with the proper capacity of steam being secured.

In my multiple column a plurality of water-gages are utilized, and they each under proper conditions show the same water-level in the boiler to which the column is connected, and if at any time there becomes a variance in the indication of either gage it serves as a warning of a leaky column connection, thereby notifying the user of the existence of such leak and of impending danger.

My multiple column also provides protection to the user from such dangers as arise from either of the column connections becoming clogged from scales or foreign matter, for should such clogged condition arise the water-line in the gage corresponding to the clogged connection would indicate a water-level at variance from that indicated by the gage of the other column, thus warning the user of the existing danger.

My duplex column is so constructed and the valves controlling the connections leading thereto are so disposed that the supply of water and steam to either column member may be readily shut off from the connections leading to the second column member. The merit of this arrangement is that of protection to the user from being scalded while shutting off flow to one column member in the event of breakage of the corresponding gage-tube.

My column includes a shield located between the gage-tubes of the column members that serves as a protection for either of said gage-tubes against breakage by flying fragments in the event of breakage of the other tube.

Figure I is a perspective view of a duplex safety water-column, partly broken out. Fig. II is a horizontal cross-section taken through the water-column. Fig. III is a section of one of the three-way or multiple valves utilized in the connections of the water-column. Fig. IV is a section of a modification of the valve shown in Fig. III. Fig. V is a diagrammatic view of my water-column.

1 and 2 designate the column members of my duplex column, which are preferably united by a web 3, but may be separated. Connected to the column member 1 is a gage-tube 4, and connected to the column member 2 is a gage-tube 5, each of which has communication with its respective column member in order that water may rise therein to a height indicating the water-level in the corresponding column member and in the boiler to which the column is applied. At the lower ends of the gage-tubes are drain-cocks 4′ and 5′.

6 and 7 designate water-connection pipes leading from the boiler to the lower end of the column members 1 and 2. In these pipes are positioned multiple valves 8 and 9, by which the flow of water to the column members may be controlled. The multiple valves are preferably of the three-way form shown in Figs. I, III, and V, each valve being constructed as follows: The housing of the valve has a neck *a*, to which the water-connection

pipe is attached, a neck *b*, to which the pipe-section directly connected to the column member is attached, and necks *c* and *d*. Within the housing is a partition *e*, provided with a port *f*, and a partition *g*, provided with a port *h*. *i* is a valve-rod seated in the housing-neck *c* and extending to the interior of the housing. On this valve-rod is a valve *j*, by which the port *e* is controlled, and a valve *k*, by which the port *h* is controlled.

10 is a conducting-pipe leading from the multiple valve 8 to the column member 2, and 11 is a conducting-pipe leading from the multiple valve 9 to the column member 1.

12 and 13 designate steam-connection pipes leading to the upper ends of the column members 1 and 2 and having interposed therein multiple valves 14 and 15, that are of similar construction to the valves 8 and 9, previously described.

16 is a conducting-pipe leading from the multiple valve 14 to the column member 2, and 17 is a conducting-pipe leading from the multiple valve 15 to the column member 1.

The connection-pipes 6 and 7 serve to conduct water to the lower ends of the column members 1 and 2 directly from the pipe 6 to the column member 1 and from the pipe 7 to the column member 2 when the valves *j* in the multiple valves 8 and 9 are unseated, thereby opening the ports *f* in the valve-housings. When the valves *j* are seated, the valves *k* become unseated, thereby opening the ports *h*, and the water flows from the connection-pipes 6 and 7 into the conducting-pipes 10 and 11 and is delivered to the offset column member instead of being delivered directly to the column member to which the pipe 6 or the pipe 7 corresponds. In like manner to the foregoing the steam which is present in the connection-pipes 12 and 13 is delivered to the column members 1 and 2, respectively, when the ports *f* in the multiple valves 14 and 15 are open, and when the ports *f* are closed and the ports *h* are open in said multiple valves the steam is conducted from the pipe 12 through the conducting-pipe 16 to the column member 2 instead of entering the column member 1 and the steam from the connection-pipe 13 is delivered through the conducting-pipe 17 to the column member 1 instead of entering the column member 2. By the use of the multiple valves in the connection-pipes 6, 7, 12, and 13 a continuous supply of water and steam is constantly maintained in the column members 1 and 2, as the duplicated connections are thereby united to both column members in common in a manner to cause flow of water and steam from each connection to the other column than that to which it directly appertains in the event of the flow being shut off from a direct course to the column member arranged to be directly supplied. This being the case there is absolutely no liability of a failure of supply of water and steam to the column members corresponding to the amount of water in the boiler to which the multiple column is united, and therefore the indication of water-level in the gage-tubes 4 and 5 associated with the column members is kept accurate.

For the purpose of protecting the gage-tubes 4 and 5, I provide between them a shield 18, preferably integral with the web 3, connecting the column members 1 and 2. This shield serves as a separating member and prevents breakage of the second tube by flying fragments of either gage-tube that may become broken. This shield also serves as a background in observing the gage-tubes.

In Fig. IV, I have shown a modification of my multiple valve, which consists of a housing having necks to which the steam and water conducting-pipes are connected and a rotatable plug-valve *i'* in said housing by which the flow of fluid may be controlled to cause it to pass either directly to a column member or indirectly through one of the conducting-pipes leading from the multiple valve to the remote column member. The valve *i'* is operated by a lever *i''*.

I claim as my invention—

1. A multiple water-column of the character described comprising a plurality of column members, water and steam connection pipes leading to said column members, and multiple valves in said connection-pipes; said valves providing communication between one column and the connection-pipe of another column, when the flow to said other column is shut off, substantially as set forth.

2. A multiple water-column of the character described comprising a plurality of column members, water and steam connection pipes leading to said column members, and multiple valves in said connection-pipes; each valve being adjustable to provide communication either between a column and its connection-pipe or between said connection-pipe and another column, substantially as set forth.

3. A multiple water-column of the character described comprising a plurality of column members, water and steam connection pipes leading to said column members, multiple valves in said connection-pipes, and conducting-pipes united to said multiple valves and leading therefrom to the column members; said multiple valves being arranged to control the flow of fluid directly to said column members or to the column members through said conducting-pipes, substantially as set forth.

PHILIP A. ROHAN.

In presence of—
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