

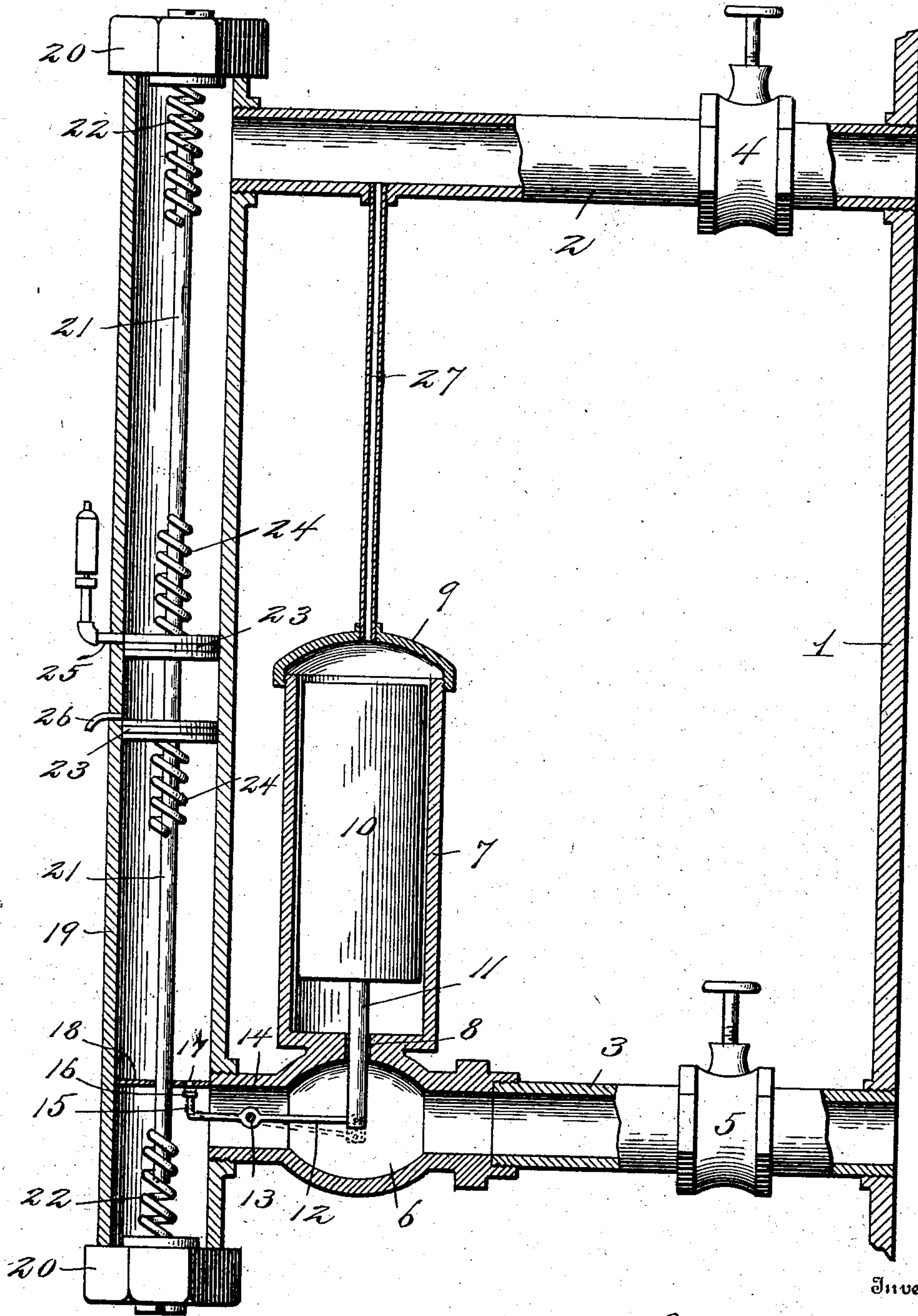
No. 721,772.

PATENTED MAR. 3, 1903.

G. C. BAILEY.
INDICATOR.

APPLICATION FILED JUNE 3, 1902.

NO MODEL.



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UNITED STATES PATENT OFFICE.

GEORGE CLINTON BAILEY, OF BLUEFIELD, WEST VIRGINIA.

INDICATOR.

SPECIFICATION forming part of Letters Patent No. 721,772, dated March 3, 1903.

Application filed June 3, 1902. Serial No. 110,093. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CLINTON BAILEY, a citizen of the United States, residing at Bluefield, in the county of Mercer and State of West Virginia, have invented new and useful Improvements in Low-Water Indicators, of which the following is a specification.

This invention relates to a low-water indicator for locomotives; and the object of the same is to provide a simple and effective organization of devices whereby an audible signal will be given when the water becomes too low in the boiler.

The invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

The drawing represents a sectional elevation of a portion of a boiler and the improved low-water indicator applied thereto in operative position.

The improved device is attached to the outside of the boiler 1 of a locomotive and comprises an upper steam-pipe 2 and a lower water-pipe 3, respectively, having controlling-valves 4 and 5. To the outer terminal of the pipe 3 a chambered union or coupling 6 is attached, and has a cylinder 7 rising vertically therefrom and communicating therewith through the medium of an opening 8 between the chamber of the coupling and the cylinder, and on top of the latter is a cap 9. A float 10 is movably mounted in the cylinder 7 and has a depending stem 11 extending through the opening 8 into the chamber of the coupling 6. The inner end of a valve-rod 12 is movably attached to the lower end of the stem, said rod being fulcrumed, as at 13, within the outer extremity 14 of the coupling 6 and extended beyond the said terminal and formed with an upwardly-projecting angular arm 15, carrying a valve 16, cooperating with an opening 17 in a diaphragm 18, horizontally disposed in an upright piston cylinder or pipe 19. The piston-cylinder 19 is supported by and has communication with the outer terminals of the pipe 2 and the coupling 6, respectively, the terminal 14 of the coupling 6 entering the lower extremity of the piston-cylinder below the diaphragm 18. The piston-cylinder 19 has upper and

lower closing-caps 20 of similar construction, and extending longitudinally through the cylinder is a piston-rod 21, which is movable and attached at opposite extremities to springs 22, also secured to the inner central portions of the caps 20. On the piston-rod 21 are a pair of pistons 23, spaced apart from each other and held in normal position by springs 24, secured thereto and to the piston-rod, one spring being used with each piston. The pistons 23 are normally located at a central point, vertically considered, in relation to the piston chamber or pipe 19, and at said point the latter has a whistle 25 connected thereto and an exhaust-pipe 26 below the plane of attachment of the whistle. To set up an equilibrium when the water and steam are in what may be said to be normal condition in the boiler, a connecting-pipe 27 runs from the center of the cap 9 of the cylinder 7 to the pipe 2 at a distance outwardly from the valve 4 of the latter pipe.

The piston-rod 21 and pistons 23 through the medium of the coil-springs connected thereto, as set forth, are held in proper positions relatively to the whistle connection and the exhaust-pipe, the said springs being primarily selected to set up about forty pounds resistance. When the boiler is fully supplied with water, a portion thereof flows through pipe 3 into the coupling 6 and elevates the float 10, thereby opening the valve 16 and permitting a part of the water to flow upwardly above the diaphragm 18 against the lower piston 23, and the steam flows through the pipe 2 and impacts against the upper piston 23, thereby making the pressure equal on both pistons, the latter operating similar to follower-heads; and when under this equalizing pressure they will remain in normal position until such time as the water becomes low in the boiler and flows out from beneath the float 10. When the water is relieved from the cylinder 7 and the float gravitates or lowers, the valve 16 is closed against the opening 17, it being understood that when the water in the cylinder 7 runs out or lowers it will proportionately lower in the piston cylinder or pipe 19, and thus relieve the lower piston 23 of sustaining pressure. Under these conditions the steam passing through the pipe 2, which may be, for instance, under one hun-

dred and forty pounds pressure, forces the upper piston 23 downwardly and opens the connection to the whistle 25, permitting the steam to pass into the latter and give a low-
 5 water alarm. When the boiler is again supplied with a sufficient quantity of water, the parts of the apparatus resume the position shown in the drawing and the steam-supply is cut off from the whistle, thereby causing a
 10 cessation of the signal or alarm. The purpose of permitting steam to enter the cylinder 7 from the pipe 2 and impact against the upper end of the float 10 is to keep the said float adjusted to the water at all times, and
 15 thereby provide for a sensitive operation of the several parts in the event of low water. Furthermore, it will be seen that the connections of the valve-rod 12 and the stem 8 are exceptionally sensitive, and the valve 16 will
 20 respond to the slightest movement of the float 10. What resistance-pressure may be present in the cylinder or pipe 19 between the pistons will be relieved through the exhaust-pipe 26. When the water and steam
 25 pressure against both pistons is equal, the piston-rod and pistons will uniformly shift or move in the piston cylinder or pipe 19 against the resistance set up by the springs 22; but
 30 when the pressure becomes unequal either of the pistons may move against the resistance of the springs 24, directly connected thereto.

It will be seen that the improved water-indicator is positive in its operation and will reliably inform an engineer or other attendant of the existence of low water in a boiler.
 35 The parts being comparatively simple in construction can be manufactured at a minimum cost, and in the application of the indicator it will be seen that it is only necessary
 40 to attach the inner terminals of the two pipes 2 and 3.

Having thus fully described the invention, what is claimed as new is—

1. An indicator of the class set forth, having upper and lower steam and water pipes
 45 with valves therein, a float device supported by the lower pipe and having a steam connection with the upper pipe, a piston-cylinder attached to the outer ends of the pipes
 50 and having a piston-rod and a pair of pistons movably mounted therein and under spring tension, a diaphragm disposed in the piston-cylinder and provided with an opening, a valve connected to the float device and coop-

erating with said opening in the diaphragm, 55 and a whistle attached to the piston-cylinder.

2. An indicator of the class set forth, comprising upper and lower connecting-pipes, the lower connecting-pipe having a float device, a piston-cylinder attached to the outer ex- 60 tremities of the said pipes and having a signal device at an intermediate point, pistons movably mounted in the said cylinder and spaced apart from each other, and means under control of the float device automatically 65 operative to shut off the lower portion of the piston-cylinder from communication with the lower pipe.

3. An indicator of the class set forth, comprising upper and lower steam and water con- 70 nections, and a cooperating float device, a piston-cylinder attached to the outer terminals of said connections and having a diaphragm in the lower portion with an opening therein, a valve connected to the float device and au- 75 tomatically operating to close the said opening, a pair of spaced pistons movably mounted in the said piston-cylinder, and a whistle attached to said cylinder and controlled in its operation by the movement of the pistons. 80

4. In an indicator of the class set forth, the combination with an upper steam-pipe and a lower water-pipe having a float device in op- 85 erative relation thereto, of a piston-cylinder having valve means operating therewith and actuated by the float device, a signal on the piston-cylinder, and a pair of spaced pistons movably mounted in the said piston-cylinder.

5. In an indicator of the class set forth, the combination with upper and lower pipes for 90 the passage therethrough of steam and water respectively, and a float connected to both pipes, of a piston-cylinder attached to the outer terminals of the device, valve mechanism operating in conjunction with the piston- 95 cylinder and actuated by the float device, a signal-whistle connected to the piston-cylinder, and a pair of spaced pistons movably mounted in the piston-cylinder between the location of the valve mechanism and the at- 100 tachment of the upper steam-pipe to said cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE CLINTON BAILEY.

Witnesses:

C. A. BRADSHAW,
 SARAH D. MILLER.