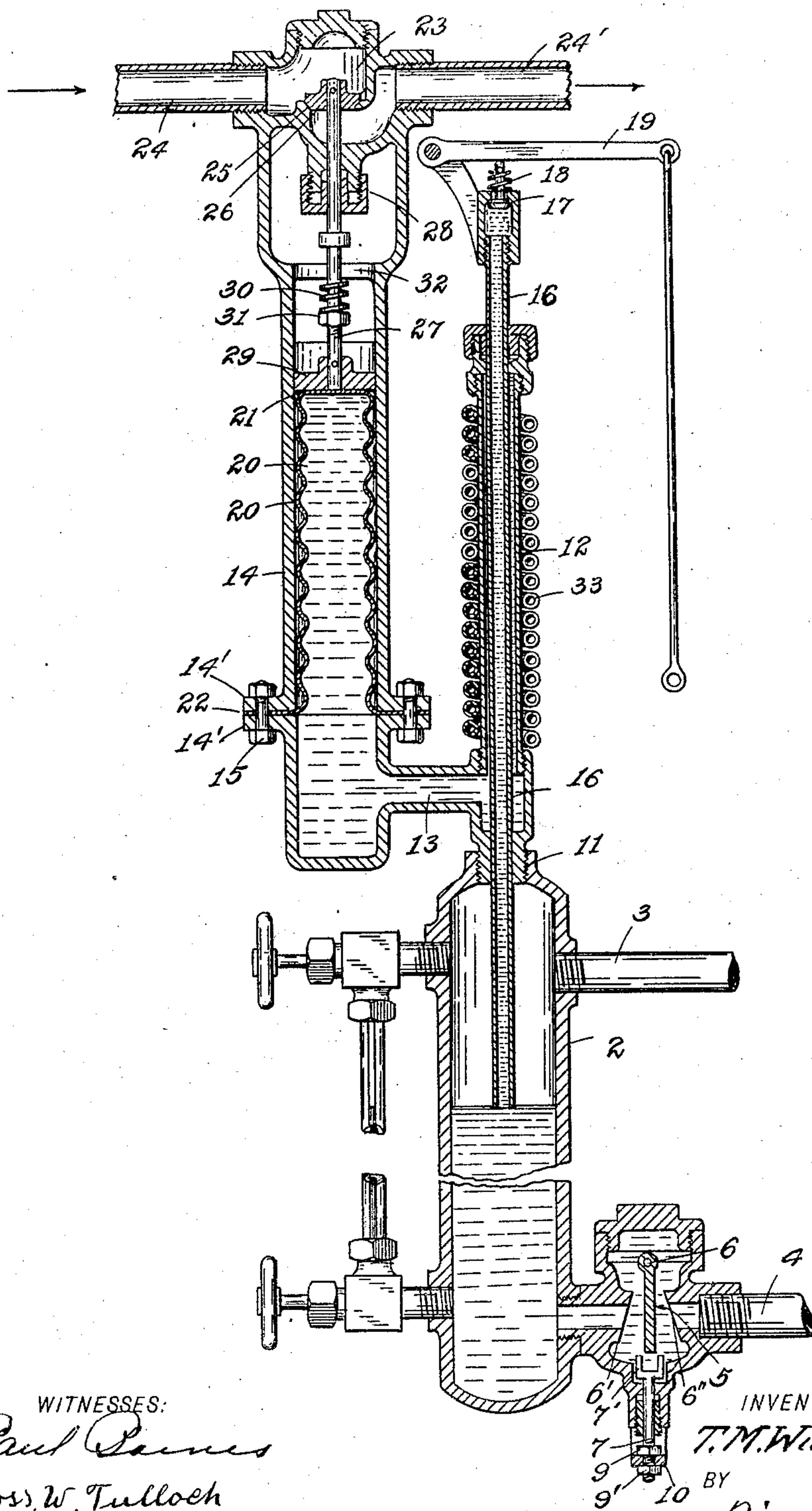


No. 772,303.

PATENTED OCT. 11, 1904.

T. M. WILKINS.  
FEED WATER REGULATOR.  
APPLICATION FILED JAN. 27, 1904.

NO MODEL.



WITNESSES:

*Paul Barnes*  
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INVENTOR

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BY

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# UNITED STATES PATENT OFFICE.

THOMAS M. WILKINS, OF SEATTLE, WASHINGTON, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AUTOMATIC BOILER FEED COMPANY, OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

## FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 772,303, dated October 11, 1904.

Application filed January 27, 1904. Serial No. 190,760. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS M. WILKINS, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Feed-Water Regulators, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to feed-water regulators for steam-boilers; and the present invention consists in the novel construction, arrangement, and adaptation of devices for automatically controlling the quantity of water  
15 supplied to a boiler so as to maintain the water-level therein at a constant predetermined elevation.

The invention has also combined with it a device for overcoming in marine boilers the  
20 swash of water due to the pitching or rocking in a seaway, thereby extending the inventor's field of usefulness to such service.

The object of the invention is the perfection of a feed-pump governor which is actuated by the expansive power of heat and  
25 which can be used with both marine and other type of boilers. This object I attain by the means shown and illustrated in the accompanying drawing, which is a central vertical  
30 section of apparatus embodying my invention attached to the water-gage of a steam-boiler.

The reference-numeral 2 designates a water column or gage of ordinary or suitable construction which is connected to the boiler in  
35 the usual manner by steam-pipe 3 and water-pipe 4, by which communications the water-levels within both the boiler and the gage are maintained in the same horizontal planes.

In marine boilers the water plane is continually changing by reason of the pitching  
40 of the vessel in rough water, and to overcome this and retain the water within the gage to its normal level I introduce within the water-pipe 4 a double-acting flap-valve 5, hinged  
45 at 6 and adapted to be swung by gravity and the flow of water thereby against either of the valve-seats 6' and 6'', positioned upon opposite sides of the valve and which tempo-

rarily prevents ingress or egress of the water thereby. It is, however, oftentimes desirable  
50 to blow the water through the gage for cleansing purposes and to which end a stem 7 extends upwardly through the bottom of the casing 8 for this valve provided with a fork  
7', whereby the valve may be engaged and  
55 held in a position semidistant of the said seats. The said stem is screw-threaded and is moved endwise into or out of engagement by nuts 9 and 9', positioned, respectively,  
60 above and below a bridge-piece 10, integral of the said casing. Secured, as by a screw-threaded extension 11, in axial alinement with the column 2 is a cylindrical vessel 12, which is communicatively connected by pipe 13 to  
65 an upright cylinder 14, preferably formed of two parts and secured integrally together by bolts 15, passing through flanges 14' thereof. Extending from the water-level within the  
70 gage through the cylinder 12 and to some distance above the latter is a tube 16, which is open at lower end and closed at its top end  
by an air-outlet valve 17. This valve is normally held closed by the joint action of the  
75 pressure within the boiler and of a spring 18 when the boiler is in operation or by the spring alone before the boiler-pressure exceeds the  
external atmospheric pressure plus the weight of the valve-opening lever 19 and its attachments. Located within the cylinder 14 is an  
80 annular metallic member 20, having, preferably, annular corrugations 20' and is closed at its top end, as by a diaphragm 21, and has a peripheral flange 22 at its lower end whereby  
85 it may be rigidly secured thereat to and between the flanges 14' of the containing-cylinder. The space within and below the member 20, the annular space of cylinder 12 about  
the tube 16, and the pipe 13 are filled with a liquid, such as water or alcohol, for the purpose to be presently described. 90

Formed or provided upon the upper part of the cylinder 14 is a valve-casing 23, having inlet and outlet steam-openings 24 and 24', respectively, and an intermediate valve-seat 25. Fitted to the said valve-seat is a valve 26,  
95 which is connected integrally by a rod 27,



passing through a suitable stuffing-box, such as 28, with a piston 29 loosely slidable in the cylinder 14 and resting directly upon the afore-said diaphragm 21.

5 A coil-spring 30 is interposed between an adjustment-nut 31 upon rod 27 and a cross-bar 32 of the cylinder 14, by which means the valve 26 is immediately seated when the mem-  
10 ber 20 contracts, irrespective of the steam or other pressures acting upon the valve 26. A tube 33, connected with a source of cold-water supply, is coiled about the cylinder 12 for the purpose of intermittently reducing the tem-  
15 perature of the latter during the operation of the device, which I will now explain.

The water within the gage or water column being supposed to be at its normal level, which is a short distance above the lower end of the pipe 16 and which is then entirely  
20 filled with water, but at a lower temperature than that of the steam within the boiler—under these conditions the temperature of the liquid within the cylinders 12 and 14 is at a relatively low temperature. When the water  
25 within the boiler is consumed for steam or otherwise drawn off, then the water-level will obviously be lowered, and when it falls below the bottom of pipe 16 the water thereof will escape by the force of gravity and be replaced  
30 by steam. When this occurs, the liquid within the cylinder 12 becomes heated by contact-  
ing with the steam-heated pipe 16 and raises the temperature of the liquid to generate steam in this cylinder, and thereby displaces  
35 a portion of the liquid into the adjoining and connected cylinder 14 to distend the member 20 and coincidentally open the throttle-valve 26. This permits the steam from the boiler to ac-  
40 tuate a feed-pump connected on the pipe 24' and force water into the boiler until it reaches a level above the lower end of pipe 16. The water now replaces the steam within this pipe and at the same time cold water is made to flow  
45 through the coil 33 acts to lower the temper-  
ature of the cylinder 12, and thereby contracts the volume of the contained liquid and con-  
dense any steam which may have generated therein. This will contract the metal of the  
50 member 20 and in so doing permit the throt-  
tle-valve being closed by the spring 30.

The invention is automatic and its operation and efficiency accomplishes the purposes for which intended with certainty and despatch.

Having described my invention, what I

claim as new, and desire to secure by Letters 55 Patent, is—

1. In combination with a water-gage for steam-boilers, of an upright cylinder having closed ends and secured in axial alinement to the said gage, another cylinder having an open 60 end and communicatively connected to the first-named cylinder, an expansible cylindrical member interiorly of the last-named cylinder and secured at its lower end thereto, the said member being closed at its top end, a valve 65 and its casing, connection between the said valve and the top of said member, and a pipe extending from the normal level of the water within the said gage and axially through and above the first-named cylinder, substantially 70 as described.

2. The combination with a water-gage for steam-boilers, of pipe 16, the spring-closed air-  
valve 17, an upright cylinder 12 communica-  
tively connected by a pipe 13 to another cyl- 75  
inder 14, a cylindrical expansion member 20 closed at its upper end, a valve 26 and its cas-  
ing having inlet and outlet openings, the pis-  
ton and the rod connection 27 between valve 26 and said piston, a coil of pipe 33 surround- 80  
ing cylinder 12 and a valve 5 located in the water connection between the said gage and the boiler to which attached, substantially as described.

3. The combination with a water-gage for 85 steam-boilers, of pipe 16, the spring-closed air-  
valve 17, an upright cylinder 12 communica-  
tively connected by a pipe 13 to another cyl-  
inder 14, a cylindrical expansion member 20 closed at its upper end, a valve 26 and its cas- 90  
ing having inlet and outlet openings, the pis-  
ton, the rod connection 27 between valve 26 and said piston, substantially as described.

4. The combination with a water-gage, the steam throttle-valve 26 and its casing 23, and 95 the mechanical devices operated by the com-  
bined action of steam and water within the boiler for opening the said valve, of the valve 5 positioned in the water connection between a boiler and the said gage, constructed and ar- 100  
ranged, substantially as and for the purposes described.

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

—THOMAS M. WILKINS.

Witnesses:

PIERRE BARNES,  
M. E. BREWER.