

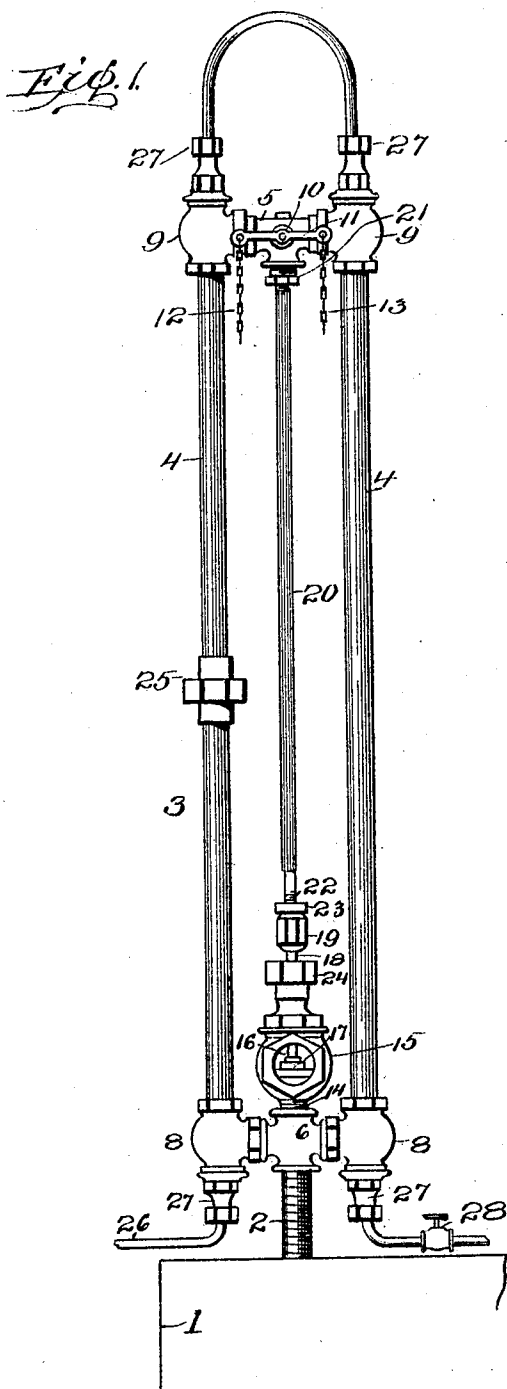
No. 794,906.

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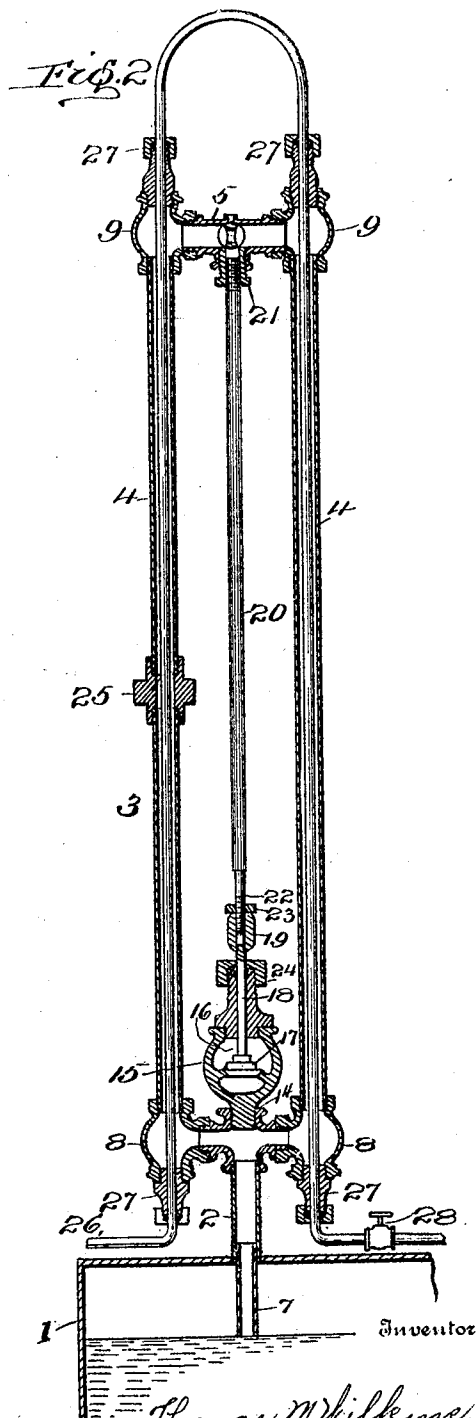
T. M. WILKINS.

DEVICE FOR AUTOMATICALLY FILLING STEAM BOILERS.

APPLICATION FILED JUNE 21, 1904.



Witnesses
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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, A CORPORATION OF WASHINGTON.

DEVICE FOR AUTOMATICALLY FILLING STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 794,906, dated July 18, 1905.

Application filed June 21, 1904. Serial No. 213,567.

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 Devices for Automatically Filling Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in feed-water regulators for steam-boilers.

The object of the present invention is to improve the construction of an automatic mechanism for controlling valve means which is adapted to govern the supply-water to a boiler.

Another object of the invention is to improve the construction of a feed-water regulator which comprises in its construction valve means, expansible means coöperating with said valve means, and means assembled with said valve and expansible means for governing the operation thereof.

A still further object of the invention is to provide an effective and quick-acting device for automatically actuating valve means whereby the water within a boiler may be retained at approximately a predetermined level.

With these and other objects in view the invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the claims hereto appended.

In the drawings, Figure 1 is a view in side elevation of a feed-water regulating mechanism constructed in accordance with the present invention. Fig. 2 is a vertical sectional view of a mechanism constructed similarly to that depicted in Fig. 1.

In carrying out the present invention I secure upon a boiler-casing a valve mechanism, expansible means coöperating with said valve mechanism, and means coacting with said valve mechanism and expansible means for

controlling movement of said valve means, thereby governing the supply of water to the boiler by controlling steam supplied from said boiler to a pump employed in the construction of a mechanism, as hereinafter specifically described.

Referring to the drawings by numerals, 1 designates a boiler of any preferred type, upon which is secured, by means of an externally and internally screw-threaded sleeve 2, the regulating mechanism 3. A rectangular expansible tubular frame which is secured upon sleeve 2 comprises in its construction a plurality of expansible metallic tubings 4 4, which are approximately the same diameter throughout their length and which are secured in a communicating parallel assembled position by means of parallel communicating members 5 and 6, which lie in approximately a horizontal plane. The member 6 is a four-way coupling-tubing, into one of the openings of which is mounted tubing 2, which is secured to the outer shell of the boiler 1. By means of the internally-screw-threaded surface formed upon member 2 a removable tubing 7 is secured in an assembled position with said member. By practical experience it is found that water should be maintained in a boiler at a given height, and for this reason the pipe 7 is in each instance of such length as to extend to the water-surface which should be maintained in the boiler. It will be obvious that the length of this tubing is entirely optional with the constructor and therefore, the height of the water within the boiler is at all times easily maintained owing to the peculiar construction of the regulating mechanism.

The two horizontal openings of member 6 are connected in a communicating position with elbow-couplings 8 8. The elbow-couplings are provided with internal screw-threads, which are adapted to permit of the insertion of the lower screw-threaded ends of expansible tubes 4 4. Secured upon the upper or opposite ends of tubings 4 4 is a pair of elbow-couplings 9 9, which are constructed similarly to 8 8. The horizontal communicating member 5 comprises in its construction a hollow

tubing which is provided with three externally-screw-threaded openings. Said member 5 is also provided with suitable means for connecting the same in a communicating position with coupling members 9 9 for the purpose of providing a continuous communication throughout the entire length of tubings 4 4 and members 5 and 6.

Removably mounted in the longitudinal communicating member 5 is a suitable air-escape or auxiliary valve 10, which is provided with a port adapted to register with a similarly-constructed port formed upon the member 5 when the valve is moved by arm 11 and chains 12 and 13 into a position whereby the ports are placed in communication. The purpose of the construction of this valve is to allow the escape of atmosphere from the boiler when it is found necessary, as it is frequently the case that a certain amount of air accumulates in the boiler while the same is being filled.

Secured within the upper opening 14 of member 6 is a suitable valve-casing 15, which is preferably provided with openings 16, formed in diametrically opposite positions therein. A valve 17 is movably seated within said valve-casing 15. A stem 18 is secured to valve 17 and is provided with a screw-threaded end surface, upon which is removably mounted a coupling member 19. A solid rod 20 is removably secured to member 5 by means of a gland or fastening member 21, which is secured to the right-angular extension of member 5 and within the apertured portion thereof. Said solid rod 20 is screw-threaded near each end thereof, and the end 22 is adapted to be removably connected to coupling member 19, which permits of the adjustment of the position of valve 17 within its casing. After the adjustment of valve 17 to its seated position has been obtained jam-nut 23 is moved into engagement with coupling member 19, and said member is positively locked in its adjusted position. A packing-box 24 is secured upon valve-casing 15 for the purpose of forming a steam-tight connection for the valve-casing 15 and valve-stem 18, thereby obviating the possibility of escapement of steam or other liquids from between the movable stem and the packing-box 24.

For the purpose of facilitating the assembling of the metallic expansible tubes 4 4 and the communicating connecting means I preferably employ a union structure 25, which is secured upon one of the tubes 4. By reason of this construction it necessarily follows that one of said tubes 4 is constructed of a plurality of sections, which are obviously of the same diameter throughout their length. A cooling-pipe 26 is axially positioned within tubes 4 4, extending throughout the entire length thereof, and is removably secured in such position by means of packing-boxes 27, secured upon members 8 8 and 9 9, employed

in the construction of the mechanism. The specific construction of these boxes is not hereinafter described, as I employ such construction as is common in the art to which this invention relates. The packing-boxes 27 are provided for the purpose of forming an air-tight joint, so as to prevent the escape-ment of steam at the point of entrance and exit of the continuous cooling-pipe 26, which is mounted centrally within tubings 4 4 for the purpose of condensing the steam which is contained within said tubes. Interposed upon the length of said cooling-tubing 26, and preferably near the entrance thereof into the lower portion of one of the tubes 4, is valve means 28. The purpose of this valve means is to regulate the passage of cooling liquids through tubing 26. Water is preferably passed through cooling-pipe 26 for the purpose of cooling the same; but owing to climatic conditions it may be found desirable to discontinue the use of water and employ air as a substitution therefor. Having thus specified the general element in the construction of the coacting parts of the mechanism, I will proceed to describe the relative position of said elements with the other features of the present invention when assembled with a boiler of suitable construction and the operation of such elements. After the regulating mechanism has been positioned upon the shell of the boiler and provided with pipe 7 it will be apparent from the foregoing description that if the water in the boiler-tubes has fallen below the lower end of pipe 7 steam will be permitted to pass into the expansible tubes 4 4, thereby heating the same and causing expansion thereof. Synchronously with the expansion of tubes 4 4 solid rod 20 will be lifted, thereby raising valve 17 from its seated position, as it is obvious from the foregoing description that valve member 17 and rod 20 are adjustably connected. With the raising of valve 17 steam is permitted to pass through valve-casing 15 by communicating means connected with the dome of the boiler 1, and from the valve-casing 15 steam is conducted by any suitable means to the force-pump or other means for controlling the flow of liquids into the boiler. The force-pump, which is connected by communicating means with valve-casing 15, is adapted not only to force the water into the boiler, but also to force cooling liquids through pipe 26. While the valve 17 is continued in an open position, the force-pump will continue its operation. When the water in the boiler has reached a sufficient level to close the lower end of tubing 7, the steam is automatically cut off from tubings 4 4, thereby discontinuing the actuation of the pump by means of the contraction of tubings 4 4 and the closing of the valve positioned within casing 15. Upon the cutting off of the steam from said members 4 4 the steam contained therein will be condensed by means of the

cooling-tubings 26, and upon the condensation of the steam the expansible tubings 4 4 will be contracted, and consequently the valve will be closed. After the vapors in the tubings 4 4 have been condensed the liquids formed thereby will be added to by the discharge of liquids from the boiler into tubes 4 4. While such injected liquids will be of a degree of temperature greater than that contained in cooling-tubing 26, the liquids from the boiler into tubing 4 4 will be cooled in comparatively a short time and subsequently will materially assist in cooling metallic tubings 4 4, thereby assisting in the contraction of the expansible tubings for positively retaining the valve in a seated position. When the water in the boiler has been sufficiently evaporated to permit of the discharge of steam through member 7 into the metallic expansible means, the valve means will be actuated, thereby permitting the operation of the pump and subsequently the filling of the boiler and the passage of cooling liquids through the cooling means which is mounted within the expansible valve-actuating means. After sufficient water has been discharged into the boiler the steam is cut off from the feed-water regulating mechanism and the operation of the pump is discontinued. The operation of the feed-water mechanism is automatically repeated, as above described, whenever the water has fallen below a predetermined level, such level being fixed by means of the tubing 7. In the case of the boiler being fed by a gravity system instead of employing a pump valve 17 will control the injecting of water into the boiler. In the construction of the mechanism the different parts thereof are preferably formed of brass material, and especially the expansible tubes 4 4 and their communicating connecting members.

While I have depicted in the accompanying drawings and described in the foregoing description the preferred form of my invention, it will be apparent to one versed in the art to which the present invention relates that certain alterations, modifications, and changes may be made in the construction of each feed-water regulating mechanism in accordance with the present invention, and I therefore reserve the right to make such alterations, modifications, and changes which shall fairly fall within the scope and spirit of the present invention.

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

1. A water-feeding mechanism, comprising expansible means, valve means assembled with said expansible means, cooling means assembled with said expansible means, adjustable connecting means mounted upon said valve means and secured to the expansible means, and auxiliary valve means formed upon said expansible means.

2. A device of the character described, comprising a plurality of expansible members, valve means interposed between said members, connecting means secured to said valve and expansible means, a cooling member extending throughout the length of said expansible members, and an exhaust device.

3. In a device of the character described, the combination of a plurality of approximately parallel expansible members, communicating, parallel, connecting means secured to said members, valve means carried by one of said communicating, connecting means, connecting means carried by said expansible member and secured to said valve means, cooling means assembled with said expansible members and an exhaust device on one of the connecting means.

4. In a device of the character described, the combination of a plurality of expansible means, valve means interposed between said expansible means, connecting means secured to said valve and expansible means, auxiliary valve means formed upon said expansible means, and cooling means assembled with said expansible means.

5. In a device of the character described, the combination of a plurality of expansible members, valve means assembled with said expansible members, adjustable connecting means secured to said expansible members and valve means, an auxiliary valve formed upon said expansible members, and cooling means assembled with said expansible members.

6. A device of the character described, comprising a plurality of parallel expansible members, a plurality of valves assembled with said members, cooling means assembled within said members, means for controlling the supply of liquids adapted to be passed through said cooling means and an exhaust device intermediate of and communicating with the expansible members.

7. A mechanism of the class described, comprising a tubing secured to a boiler structure, parallel, hollow, communicating means secured to said tubing, valve means assembled with said parallel means, connecting means secured to said parallel and valve means, an auxiliary valve assembled with said parallel means, and cooling means, assembled with said diverging means.

8. In a device of the character described, the combination with a boiler structure, of a tubing projecting internally and externally of said structure, a plurality of expansible tubings connected in communicating positions with said tubing, a valve-casing connected to said expansible tubings, a valve mounted therein, adjustable connecting means secured to said valve and expansible tubings, a valve-cooling casing removably mounted within said expansible tubings, and auxiliary valve means mounted upon said expansible tubings.

9. In a device of the character described,

the combination with a boiler-casing, of a tubing mounted upon said casing and extending interiorly and exteriorly thereof, a plurality of parallel tubings secured in a communicating position upon said tubing secured to the casing, a valve-casing secured intermediate of said tubings, a valve mounted within said casing, a solid member secured to said valve and said parallel tubings, a single tubing secured axially of said parallel tubings and extending throughout the entire length thereof, valve means secured upon said axially-positioned tubing, and auxiliary valve means assembled with said parallel tubing.

10. In a device of the character described, the combination of a plurality of approximately parallel tubings, a plurality of parallel communicating connecting members secured to said tubings, a valve-casing secured to one of said connecting members, a valve mounted therein, a solid member secured upon the other connecting member and to said valve, a single cooling-casing mounted within said approximately parallel tubings and extending throughout the entire length thereof, and communicating means secured to the lower connecting member and to a suitable support.

11. In combination, with a boiler structure or the like, of a tubing secured thereto and extending interiorly thereof, a tubing secured at right angles to and communicating with said tubing, a plurality of expansible, parallel tubings secured in communicating position near one of their ends to the tubing mounted upon the tubing secured to the boiler structure, a connecting-tubing secured to said parallel tubings near their opposite end providing communication between said parallel tubings, a valved tubing secured axially within said expansible tubings, a rotary valve posi-

tioned within said connecting-tubing, and reciprocatory valve means assembled with said tubings.

12. A device of the character described, comprising a plurality of expansible tubings, connecting-tubings secured to said parallel tubings in communicating positions, rotary and reciprocatory valve means carried by said connecting-tubings, and a single valved tubing positioned within the expansible tubings.

13. A device of the character described, comprising a plurality of approximately parallel, expansible members, connecting members secured to said expansible members, valve means carried by each of said connecting members, and a single valved member mounted within said expansible members.

14. A device of the character described, comprising a tubular, rectangular, expansible frame, valve means carried by said frame, an exhausting device within the frame, and a single valved tubing positioned within a portion of said frame.

15. A mechanism of the class described, comprising a plurality of expansible parallel tubings, one of said expansible tubings comprising a plurality of sections, a union connecting said sections, a plurality of parallel connecting-tubings secured to said expansible tubings and providing communication therebetween, rotary valve means positioned within one of said connecting members, reciprocatory valve means carried by the other connecting member, and a valved cooling member positioned within said expansible tubings.

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

THOMAS M. WILKINS.

Witnesses:

G. WARD KEMP,
GEO. BEAMAN.