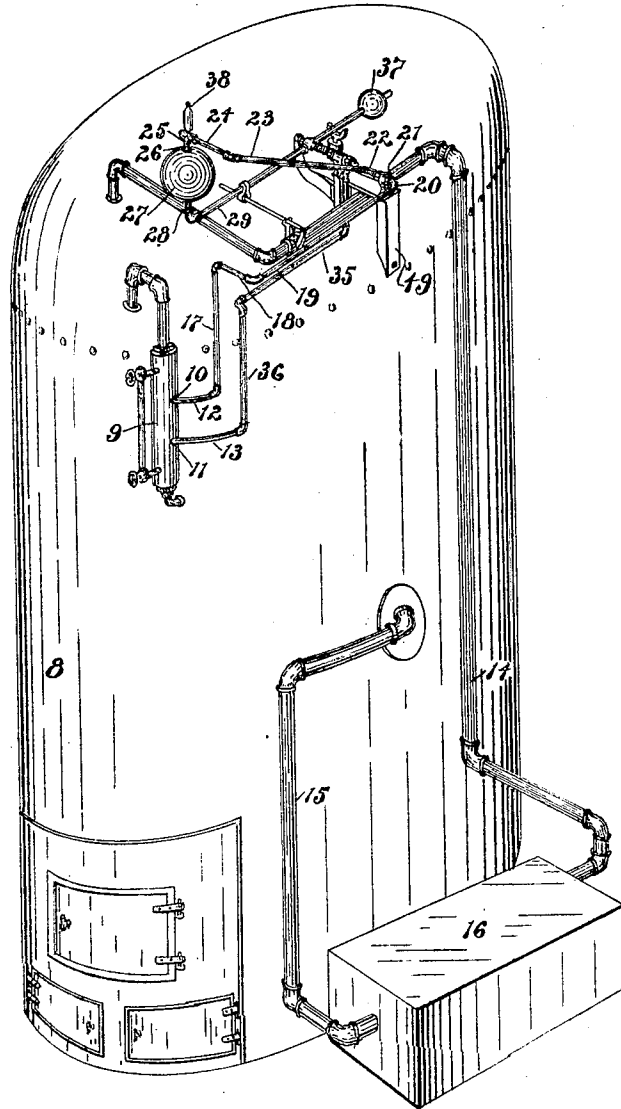


L. A. WHEELER.  
BOILER FEEDER.

APPLICATION FILED FEB. 15, 1905.

3 SHEETS—SHEET 1.

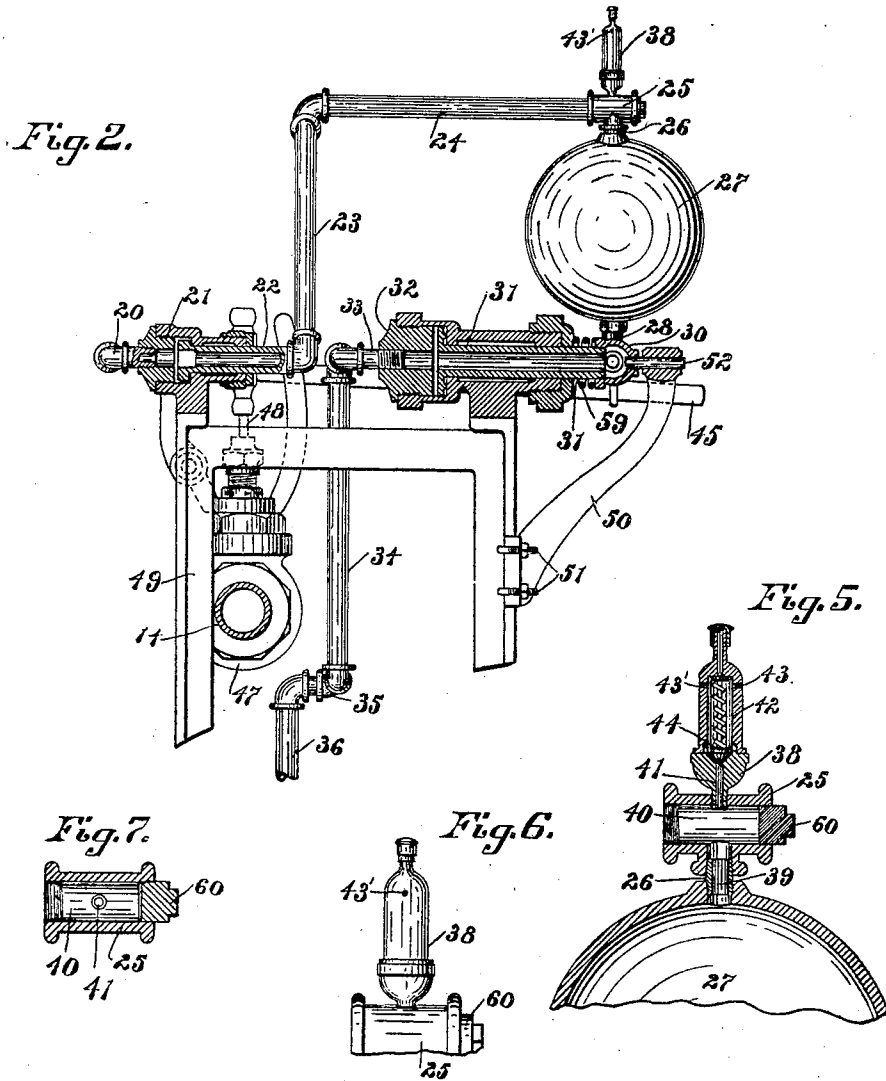
Fig. 1.



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PATENTED JULY 25, 1905.

L. A. WHEELER.  
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APPLICATION FILED FEB. 15, 1905.

3 SHEETS—SHEET 3.

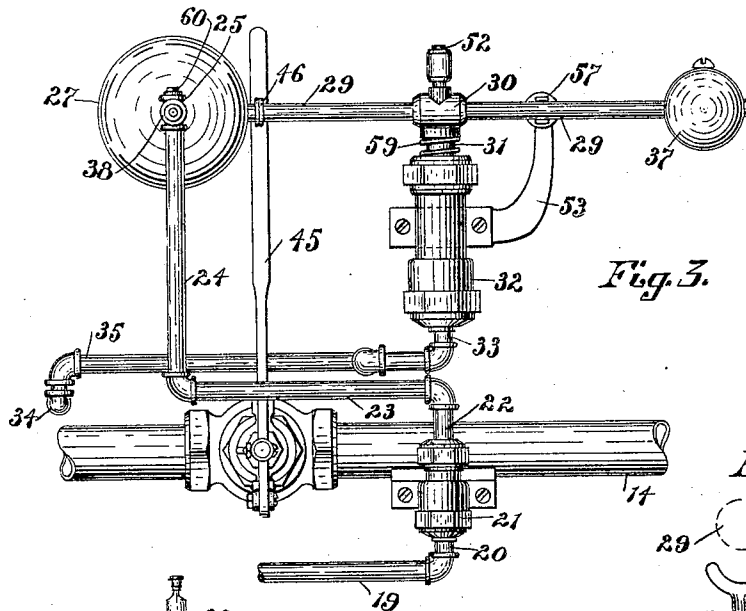


Fig. 3.

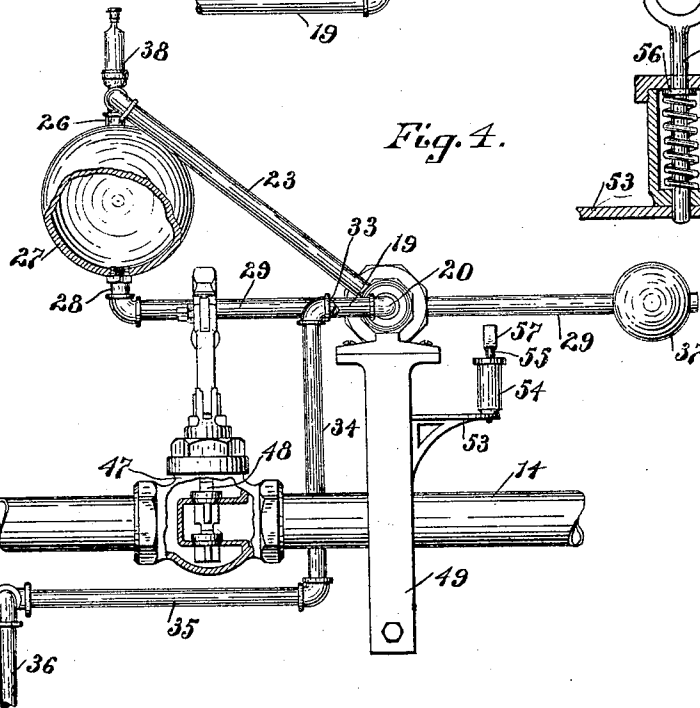


Fig. 4.

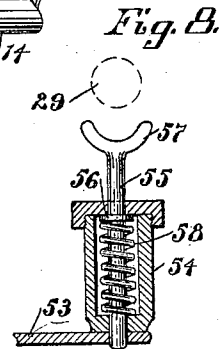


Fig. 5.

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# UNITED STATES PATENT OFFICE.

LOUIS A. WHEELER, OF WOBURN, MASSACHUSETTS, ASSIGNOR TO GRAVITY CONTROLLER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

## BOILER-FEEDER.

No. 795,423.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed February 15, 1905. Serial No. 245,696.

*To all whom it may concern:*

Be it known that I, LOUIS A. WHEELER, a citizen of the United States, residing at Woburn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Boiler-Feeders, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in automatic boiler-feeding devices to be placed upon the top of the boiler, side of the boiler, or, if desired, placed at any distance from and within or without the building containing the boiler, which devices are used for supplying feed-water to steam-boilers; and this invention relates to certain improvements to be used upon such apparatus or upon a machine built similar to what is shown in United States Letters Patent No. 768,542, dated August 23, 1904, in which all the parts are outside of the boiler-shell, but which provides simple and efficient means for maintaining a constant but variant supply to the boiler.

In automatic feeders such as shown in the aforementioned Letters Patent the operation is controlled by the specific gravity of the water in the boiler, whereby the feed-water pump will be automatically set in motion as soon as the water-level in the boiler has lowered below the low-water mark or to a predetermined point and automatically stops when the proper supply has been obtained by the rising of the water-level in the boiler to the required height; and the principal object of this invention is the providing of devices to make said boiler-feeder operable.

The invention consists in the combination of elements and in certain parts of construction entailed in the combination of said elements to obtain the desired result.

A full understanding of the invention can best be given by a detailed description of a preferred construction embodying the various features of the invention, and such a description will now be given in connection with the accompanying drawings, and I attain my object by the mechanism there illustrated showing such preferred construction, and the features forming the invention will then be specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view showing my device attached upon the top of the boiler and con-

nected with the water-column and with the steam-pipe of the feed-pump. Fig. 2 is a vertical sectional view from the rear end of the boiler, showing a sectional view through the center of the rotary joints employed in both of the pipes connected with said water-chamber whereby said chamber is allowed to oscillate. Fig. 3 is a top view of my apparatus. Fig. 4 is a side elevation of the same, portions of the water-chamber and valve being broken away. Fig. 5 is a sectional view through the T-coupling and air-valve of the steam-pipe and water-chamber. Fig. 6 is an elevation of the upper part of the T-coupling and air-valve. Fig. 7 is a sectional view of the T-coupling. Fig. 8 is a view of the supporting device.

Latitude is allowed herein as to details, as they may be changed or varied at will without departing from the spirit of my invention and the same yet remain intact and be protected.

Referring to the drawings, 8 designates a boiler having an ordinary water-column 9, provided with the usual gage-cocks, as at the points 10 and 11. In illustrating my invention I have preferably connected it with the water-column; but in the building of new boilers the water-column may be dispensed with, and the water and steam pipes of my apparatus may be connected direct to the boiler, the points of connection corresponding with the high and low water levels as desired in the boiler; but in making the connection with the ordinary water-column I remove the middle and lower gage-cocks, as at 10 and 11, connecting the pipes of my apparatus into the apertures in the water-column occupied thereby, as these two gage-cocks correspond with the high and low water levels of the boiler, and in that respect said gage-cock apertures are convenient for connecting this apparatus, as they insure a proper location of the connecting-pipes.

The pipe 12, leading from the middle gage-cock opening 10, is the steam-pipe of my apparatus, and I shall call it hereinafter the "steam-pipe," while the pipe 13, leading from the lower gage-cock opening 11, is the water-pipe of my apparatus and will be called the "water-pipe;" but these two pipes 12 and 13 must not be confused with the steam-pipe 14 of the water-pipe 15, connecting with the pump 16, which pump may be any ap-

proved form of forcing or ejecting apparatus, and it is necessary for the successful working of this apparatus that portions of these two pipes 12 and 13 stand in the same horizontal plane. This I have shown in the drawings at the point where the portion 20 of the pipe 12 and the portion 33 of the pipe 13, respectively, enter the rotary joints 21 and 32, and by placing a portion of each of these two pipes in the same plane the apparatus may be placed either on the side or the top of the boiler and at any distance from the boiler without in any degree affecting its successful working. I have also shown the steam-pipe 12 in the drawings extending for a short distance horizontally from the water-column and then extended vertically, as at 17, to the top of the boiler, as is necessary when the apparatus is placed upon the top of the boiler, as shown in Fig. 1. The pipe 12 enters the rotary joint at the point 20, and an opening in the joint allows the steam to pass through into that portion of the steam-pipe (designated 22) which extends from its other end and thence through one or more sections of this pipe 23 24 into the T-shaped coupling 25, thence into the pipe 26, and then into the upper end of the water-chamber 27.

The pipe 26 is provided with a passage 39, allowing steam to pass to and from the chamber 27 into the passage 40 within the T-shaped coupling 25, which coupling has its free end closed by the plug 60. Extending upward from this coupling is the air-valve 38, provided with the duct 41, extending upward through its lower portion from the passage 40 and into the valve-chamber 42, the chamber being provided with a spring-pressed pin 44, by which the duct 41 is normally closed, but which when the steam is condensed in the water-chamber 27, passages 39 and 40, and connecting-pipes will be pressed upward from its seat, allowing the escape of air up into the chamber 42 and outward through the passages 43 43'. I have found from experimenting and testing that such a valve extending from the coupling is absolutely necessary for the successful working of apparatus such as is shown in the drawings, especially when the same is placed upon the side or top of a boiler.

The water-pipe 13, leading from the lower gage-cock opening, extends horizontally from the water-column a certain distance and then rises vertically, as at 36, and from the upper end of the vertical portion said pipe again extends horizontally, as at 35, and again vertically, as at 34, and again horizontally, as at 33, into the rotary joint 32 and thence from the other end, as at 31, into the T-coupling 30, through which runs the piping 29, carrying thereon at one end a weight 37, through which the end of said rod passes and which may be secured in place by a nut. The op-

posite part of said piping 29 extends at its outer end vertically, as at 28, and enters the lower end of the water-chamber 27, so that water or steam can pass from the boiler 8 into the water-column 9, thence through the piping 13, 36, 35, 34, 33, 32, 31, 29, and 28 into the water-chamber 27 and thence through the piping 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, and 12 back into the water column or boiler.

Leading from the steam-space of the boiler is a steam-pipe 14, which supplies steam to the pump 16, adapted to pump the feed-water into the boiler through the pipe 15. Located in the pipe 14 is a valve 47, which controls the passage of steam therethrough. Adapted to operate this valve is a pivoted lever 45, whose free end extends through a yoke 46 on the pipe-section 29. This lever is used to open and close the valve 47 in the pipe 14, which allows steam to pass to the pump 16, which is operated thereby.

The rotary joints, piping, water-chamber, and weight are supported and held in place by the frame 49, which frame may be bolted or screwed upon the top or the side of the boiler. This frame 49 has at its opposite vertical ends T-shaped formations for fastening thereto the bases of the joints and has at one of its vertical ends flanges or wings for fastening by thumb-screws 51 or otherwise clamping thereto the upright-extending arm 50, which is provided at its upper part with a hub in which rotates the piping 52, extending from the T-shaped coupling 30. The arm 50 can freely slide upon this frame 49, but is fastened by the screws 51 at the height desired to take the weight of the water-chamber 27 and the weight 37, and thus lessen the strain upon the piping 29, which extends into the joint 30.

Extending outward from the frame 49 is a shoulder 53, supporting at one end a casing or guide 54, within which is the buffer-rod 55, having a head 57, adapted to receive the downward blow of the pipe 29, caused by the rapid flow of water from the water-chamber 27 and pipes 28 29, and the weight 37 forcing the free end of pipe downward. The head and rod are held in place by a spiral spring 58 within the casing 54, which spring encircles that portion of the buffer-rod 55 which is within the casing and presses upward against the rigid shoulder on the arm 55, which shoulder is pressed by the spring against the inner side of the top part or cover of the casing. It is thus seen that the strain upon the T-shaped coupling 30 is considerably lessened.

By an examination of Fig. 4 it will be seen that the valve 47, which is operated by the lever 45 and controls the passage of the steam to the feed-pump, consists of a body portion which contains the shut-off mechanism, of any description, operated from the rod 48, connecting with the rod 45. It will be readily seen that as the water passes from the cham-

ber 27 the weight 37 raises the chamber, and the lever 45, attached to the chamber end of the pipe 29, is likewise raised and in turn raises the rod 48, opening the valve and allowing the steam to pass into the pump.

On referring to Fig. 2 it will be seen that the sections 21 and 32 are rotary joints, which allow of an oscillation of the water-chamber 27 through the piping 31. This joint consists of a sleeve in one end of which is screwed a plug to which the pipe 31 is connected. Within this sleeve extends the tube 31, having a flange at one end which rests against the annular shoulder on the inner side of the sleeve, as clearly shown and described in the aforementioned patent. Said pipe in the section 21, which stands in horizontal alinement with the section 31 of the water-pipe, is a similar rotary joint of smaller dimensions, whereby as the chamber oscillates said pipes turn in their respective joints to accommodate the movement of the said chamber.

In the operation of the device when the water in the boiler falls so as to allow steam to enter the pipe 12 the steam will flow through said pipe into the water-chamber 27, equalizing the pressure and allowing the water to flow therefrom through the pipes 28 to 36 and into pipe 13, thereby reducing the weight of the water-chamber 27 and permitting the weight 37 to overbalance it, so as to raise said chamber and the chamber end of the pipe 29, as shown in Fig. 1. This movement of said parts actuates the lever 45 to open the valve 47 and allow the steam to pass to the pump 16, which is operated thereby and pumps the feed-water into the boiler through the pipe 15. When the water-level in the boiler has been raised so as to cover the communicating end of pipe 12, steam will be excluded from the chamber 27, and said chamber will fill with water by the pressure within the boiler, the weight of which added to the weight of the chamber will overcome the gravity of the weight 37, when said chamber and its end of the connected pipe 29 will drop down, carrying with them the long end of the lever 45, which closes the valve 47 and cuts off the steam from the pump, thereby causing the pump to cease its operations, in which position the parts remain until the water-level in the boiler falls, so as to again allow steam to enter the chamber 27, when the water will be again discharged therefrom and said parts operated to again place the pump in operation.

It will be seen, therefore, that this device is entirely automatic and is operated by the variations of the water-level in the boiler, preventing said water-level from falling below the point of safety and cutting off the inflowing feed-water when the level has been restored to the required height.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a boiler of an exterior water-chamber, a pipe extending upward from the top of the chamber, an air-valve extending upward from the highest portion of said pipe, a pipe extending downward from the bottom of said chamber, said pipes having bends therein which place a portion of each in the same horizontal plane, a rotary joint in each of the registering horizontal portions of said pipes, said joints standing in axial alinement and allowing of an oscillation of the chamber, said pipes connecting the chamber with the interior of the boiler at different levels, and a weighted arm adapted to overcome the weight of said chamber when empty, substantially as shown.

2. The combination with a boiler of an exterior water-chamber, pipes connecting the top and bottom of said chamber with the interior of the boiler at different levels, said pipes having bends therein which place a portion of each in the same horizontal plane, a rotary joint in each of the registering horizontal portions of said pipes, said joints standing in axial alinement, the pipe connected with the bottom of the chamber having a portion extending rearward of the rotary joints, a weight upon the free end of this pipe adapted to overcome the weight of said chamber when empty, whereby the chamber may be oscillated, and a spring-buffer for limiting the upward movement of the chamber, substantially as shown.

3. The combination with a boiler of an exterior water-chamber situated above the boiler, a pipe extending downward from said chamber and then at right angles, an adjustable slidable weight upon the free end of the pipe adapted to overcome the weight of said chamber when empty, a buffer for limiting the downward movement of the weighted portion of the pipe, a pipe extending upward from the chamber, a T-shaped coupling attached to said pipe, an air-valve in said coupling, a pipe connecting the coupling with the boiler and provided with a horizontal portion, a rotary joint in said horizontal portion, a pipe connecting the weighted pipe with the boiler above said former connection and provided with a horizontal portion, a rotary joint in said horizontal portion in axial alinement with the other rotary joint, substantially as shown.

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

LOUIS A. WHEELER.

Witnesses:

CHARLES F. A. SMITH,  
AGNES M. FAULKNER.