

J. H. JOHNSON.

AUTOMATIC WATER FEEDER FOR STEAM BOILERS.

No. 529,652.

Patented Nov. 20, 1894.

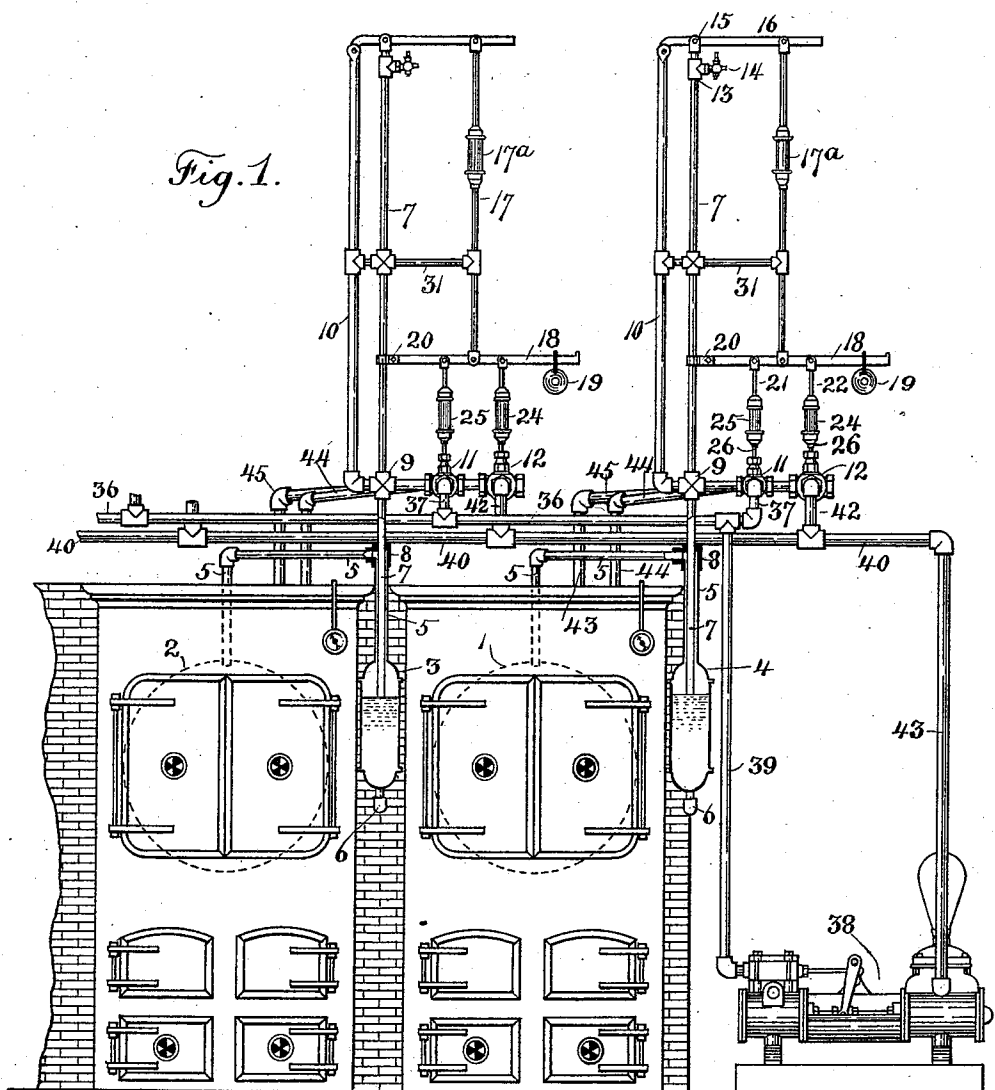
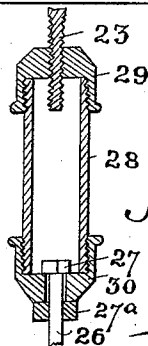


Fig. 2.



WITNESSES:

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Geo. E. Crane.

INVENTOR

Joseph H. Johnson.

BY

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(No Model.)

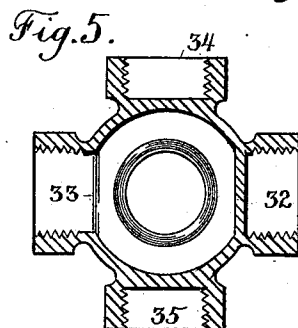
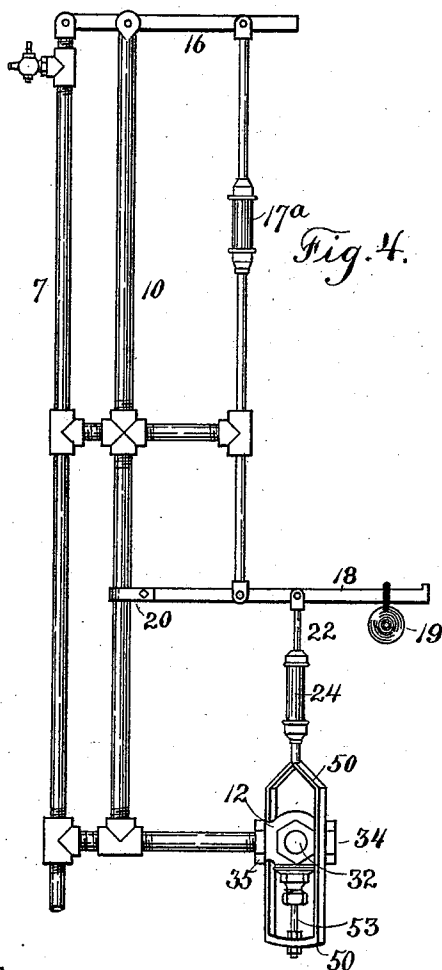
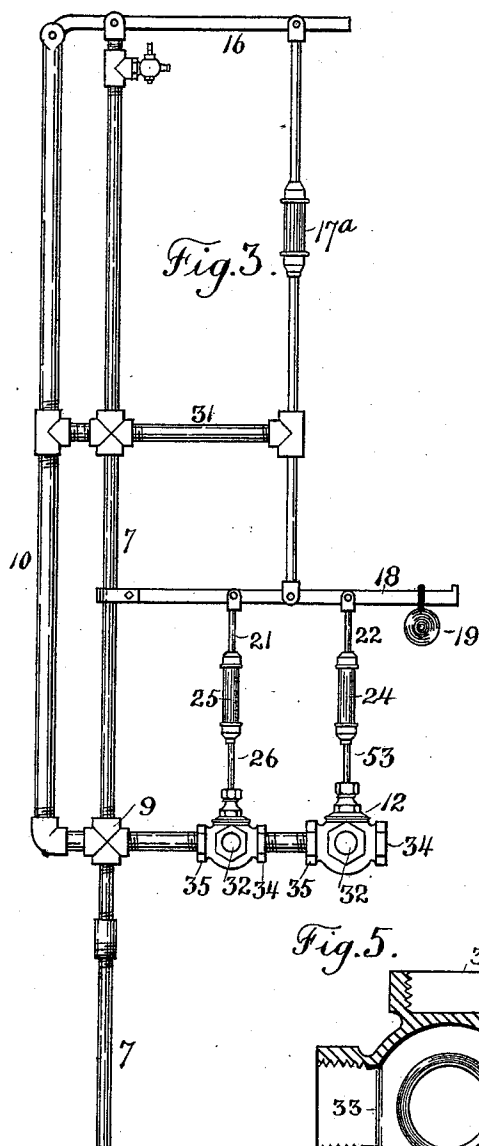
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOSEPH H. JOHNSON, OF BRADFORD, PENNSYLVANIA.

AUTOMATIC WATER-FEEDER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 529,652, dated November 20, 1894.

Application filed January 15, 1894. Serial No. 496,938. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. JOHNSON, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Water-Feeders for Steam-Boilers, of which the following is a specification.

My invention relates to an automatic mechanism actuated and controlled by a thermostatic pipe for feeding and regulating the flow of water to a steam boiler, and the object of my invention is to provide such a water feeder for steam boilers that it will automatically feed water to a boiler and also control the flow of the water, so that it will at all times be kept at any point in the boiler that may be desired; also to provide the water feeders with such connections as to be able to furnish and control the water used in a battery of several boilers, and my invention further consists of certain features of novelty that will be hereinafter more fully described and pointed out in the claims.

Referring to the accompanying drawings which form a part of this specification, Figure 1 represents a battery of two boilers provided with my automatic water feeders in connection with a steam pump. Fig. 2 represents a cross-section view of the swivel adjuster for the valves. Fig. 3 represents an enlarged view of my automatic water feeder as constructed for use with steam pumps and injectors that have no overflow, and similar mechanisms. Fig. 4 represents my automatic water feeder as constructed for use with inspirators, injectors, steam jets, and steam pumps, for single boilers, or with any water line that has head enough to force water against the boiler pressure. Fig. 5 represents a top view of a cross-section of the shell or case of my valves and shows screw-threaded projections for pipe connections on the sides of the case at right angles to the inlet and outlet passage way.

In the said drawings:—1 and 2 represent two of a series of boilers indicated by the dotted circles, and they are provided respectively with water columns 3, 4. These water-columns are constructed in the usual manner and have the upper pipe connection 5 extending from the T 8 and terminating in the

steam space of the boilers and which serves as an equalizer and the lower pipe connection 6, which terminates in the waterspace in the boilers.

7 are the thermostatic pipes which are open at their lower ends and which pass through the equalizing pipes 5 into the steam space of the said water-columns. Each of the thermostatic pipes 7 is provided with a cross 9, to which connections are made for supporting the standard 10, the steam valve 11 and the water valve 12. They are further provided with the T 13 to which is connected the petcock 14 and the clevis-plug 15.

16 is a lever pivoted on the plug 15 and it is movably secured at one end to the top of the standard 10, and at the other end it is pivotally secured to the draw-bar 17 whose lower end is pivotally secured to a lever 18 on which is suspended the weight 19. The draw-bars 17 are provided with the adjustable swivel 17^a of substantially the same construction as that shown in Fig. 2 for regulating the lift of the lever 18, which varies during the successive expansions and contractions of the pipe. This lever 18 is movably secured to the pipe 7 by means of a yoke 20, and it has connected to it through the medium of the connecting rods 21 and 22, of the swivels 24 and 25, the water and steam valves. These swivels allow of the adjustment of the lift of the said valves from their seats so that the flow of water and steam may be accurately regulated. These swivels (see Fig. 2) are composed of the rods 23 and 26 connected respectively to the lever 18 and the valve stems, of the reducers 29 and 30 and the pipe section 28. The rod 23 is screw-threaded at its lower end, so that the swivel may be adjusted, and the rod 26 is provided with the head 27 and a collar 27^a which prevent the said rod from moving up and down as the swivel is adjusted.

The above-described swivels are used for economy only, although any other swivel accomplishing the same result may be used.

31 is a pipe connection which acts as a brace and also a guide for the thermostatic pipe 7, and the draw-bar 17.

In Fig. 5 I have shown the construction of the steam and water valve casings.

32 is the inlet of the valve case and 33 is the outlet, while 34 and 35 are screw-threaded

annular rings for the connections supporting the valves. They are shown internally threaded which I prefer, but the same result would be obtained by threading them externally.

36 is the steam pipe line which extends across the battery of boilers, and it has a connection 37 with each of the steam valves 11 and feeds the steam pump 38 through the steam pipe 39.

40 is the water pipe line which also extends across the battery of boilers and it has the connections 42 with the water valves 12 and is fed by means of the pipe 43 from the steam pump 38.

44 are pipe connections from the steam space in the boilers to the steam valves 11.

45 are the boiler water feed pipes and connect with the water valve 12.

The above description relates to my automatic water feed in connection with a battery of several boilers as shown in Fig. 1.

In the construction of my automatic water feeder for use with inspirators, (shown in Fig. 4) I reverse the position of the standard 10 and the thermostatic pipe 7 and cause the standard 10 to act as a fulcrum for the lever 16. This reverses the movement of the lever from that shown in Figs. 1 and 3. The lever bar 18, is attached to the standard 10 by means of the yoke 20 to which it is pivoted. In Fig. 4 the water valve 12 is placed upside down and the valve stem 25 is connected to the adjusting swivel 24 by means of the yoke 50.

The object of constructing the single boiler feeder with the valve 12 upside down as shown in Fig. 4 is so that it may be connected to a steam pump, inspirators or injectors with overflows, or with a gravity system of water lines. The valve is seated when the automatic water feeder is in an inactive state and when the thermostatic pipe expands it will be seen that such action causes the valve to open and a contraction of the thermostatic pipe 7 closes it.

The operation of my automatic water feeders with a battery of boilers is as follows:—The boilers are connected up in a similar manner to that shown in Fig. 1, the lower end of the thermostatic pipe 7 placed at the water line in the boiler and the weight 19 set on a lever 18 at a point to counteract the steam pressure of the boilers. When the water falls below this line the steam from the steam space passes into the thermostatic pipes and causes them to expand longitudinally. This action causes the outer end of lever 16 to rise and thereby raise the valve lever 18, which in turn raises the steam valve 11 which allows a free passage of steam from the steam space in the boilers through the pipe connection 44 and 39 to the steam pump 38, and it also raises the water valve 12 which allows a free passage of water from the steam pump 38 through the water feed pipes 43 and 45 into the boilers. The instant that the water

reaches the bottom of the thermostatic pipes, the steam cannot enter them, and they cool down and contract to their normal condition, thereby closing the valves. It will be seen that should the water become low in boiler 1, the automatic feeder connected with it, will only act, the valves of the automatic water feeder of boiler 2 remaining closed, and if the water in boiler 2 becomes low its automatic feeder will act, and that of boiler 1 will remain inactive.

My automatic water feeder can also be made to act as a check on the safety valve in this manner: Suppose that the safety valve is set to blow off at ninety pounds pressure. Whatever steam pressure there is in the boiler is conveyed through the steam pipe connection 40 to the under side of the steam valve 11, and the weight 19 set to counteract this pressure, so that if the weight 19 is set on the valve lever 18 at such a point as to be raised at a boiler pressure of ninety-five pounds and the safety valve does not act when ninety pounds pressure is reached, then when ninety-five pounds pressure is reached the weight 19 is overcome and the valves 11 and 12 open and cause the steam pump to force water into the boiler until the steam pressure is reduced.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In an automatic water feeder for steam boilers, the combination of the water supply, the boiler, the water column in connection therewith, a thermostatic pipe in connection with the steam boiler and water column, a steam and water valve for controlling respectively the steam to the water supply and the water to the boiler; a standard supported by the thermostatic pipe and having a lever pivoted thereto at its upper end and connected with the thermostatic pipe, a weighted lever pivoted on the thermostatic pipe and connected with the steam and water valves, and a rod connecting the weighted lever with the pivoted lever on the standard, substantially as shown and described.

2. In an automatic water feeder for steam boilers, the combination of the water supply, the boiler, the water column in connection therewith, a thermostatic pipe in connection with the steam boiler and water column, a steam and water valve for controlling respectively the steam to the water supply, and the water to the boiler; a standard supported by the thermostatic pipe and having a lever pivoted thereto at its upper end and connected with the thermostatic pipe, a weighted lever pivoted on the thermostatic pipe and connected with the steam and water valves, a rod connected with the weighted lever, and a swivel connecting the rod with the pivoted lever on the standard, for regulating the lift of the weighted lever, substantially as shown and described.

3. In a device for automatically feeding wa-

ter to a boiler, the combination of the boiler,
the water and steam valves the thermostatic
pipe having connection with the boiler the
standard 10 supported by the thermostatic
5 pipe a lever pivoted on the standard at its up-
per end, and connected to the thermostatic
pipe, a weighted lever secured to the thermo-
static pipe, a rod connecting the weighted
lever with the lever pivoted on the standard,
10 and an adjustable connection between the
weighted lever and the water and steam
valves, substantially as shown and described.

4. In a device for automatically feeding wa-
ter to a boiler, the combination of the boiler,
15 the water and steam valves, the thermostatic
pipe in communication with the boiler a

standard supported by the thermostatic pipe,
a lever pivoted on the standard and having
connection with the thermostatic pipe, a
weighted lever pivoted on the thermostatic 20
pipe a rod connecting the weighted lever with
the lever pivoted on the standard, and an ad-
justable connection consisting of the rod 23,
reducers 29 and 30, short pipe 28 and rod 29
between the weighted lever and the water 25
and steam valves, so that the said valves can
be adjusted on their seats, substantially as
shown and described.

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Witnesses:

BENNET NUSBAUM,
W. HAAS.