N. E. NASH.

BOILER FEEDING APPARATUS.

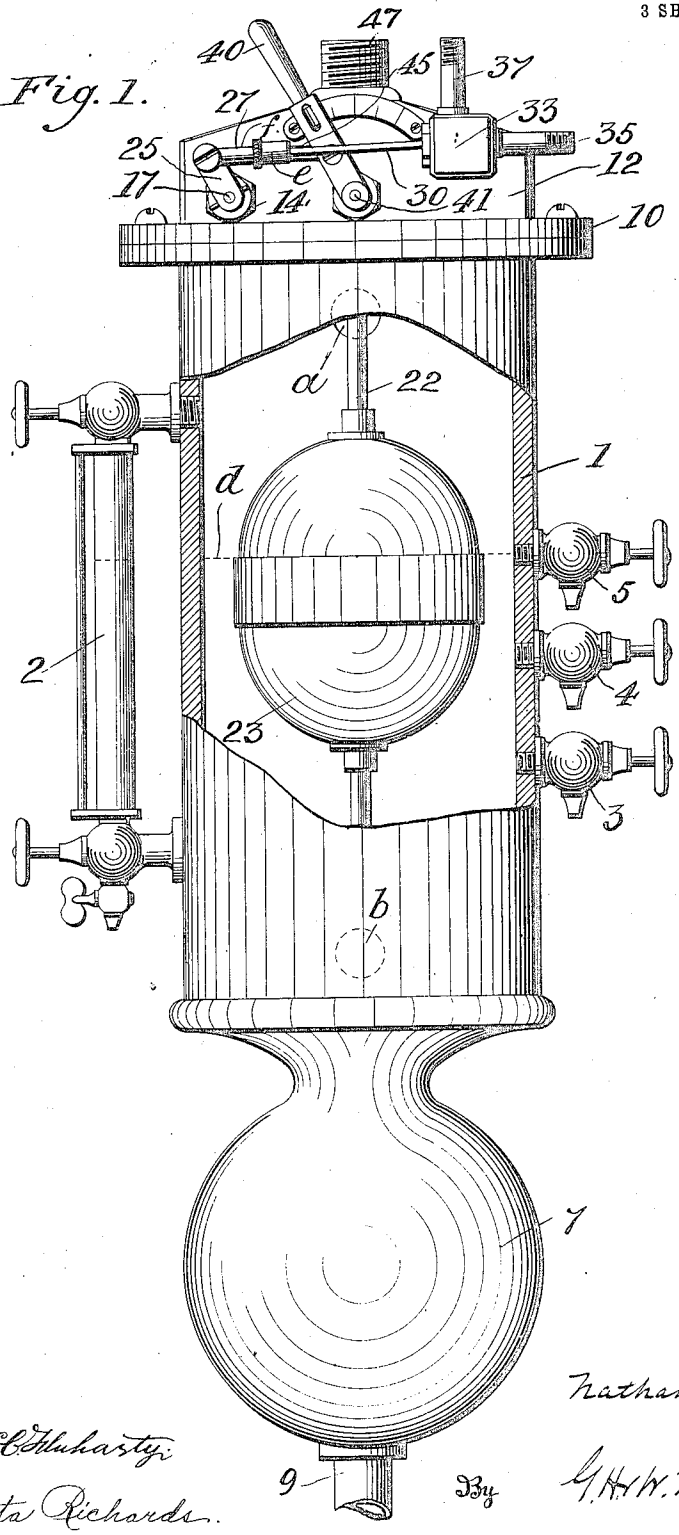
APPLICATION FILED JUNE 17, 1911.

1,031,955.

Patented July 9, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

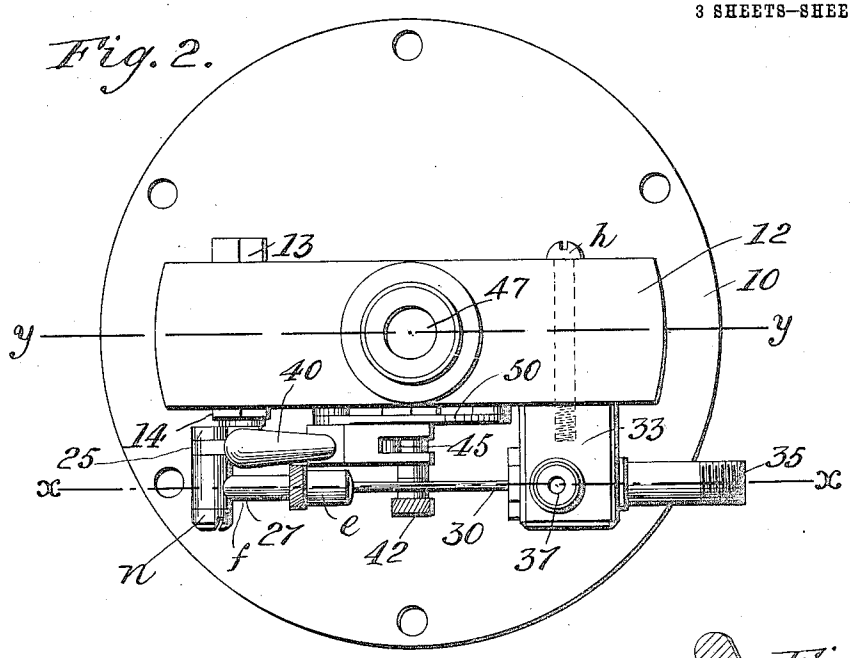


Fig. 7.

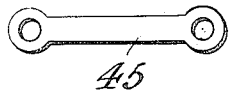


Fig. 8.

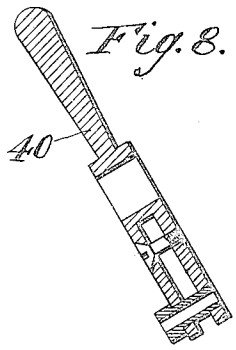
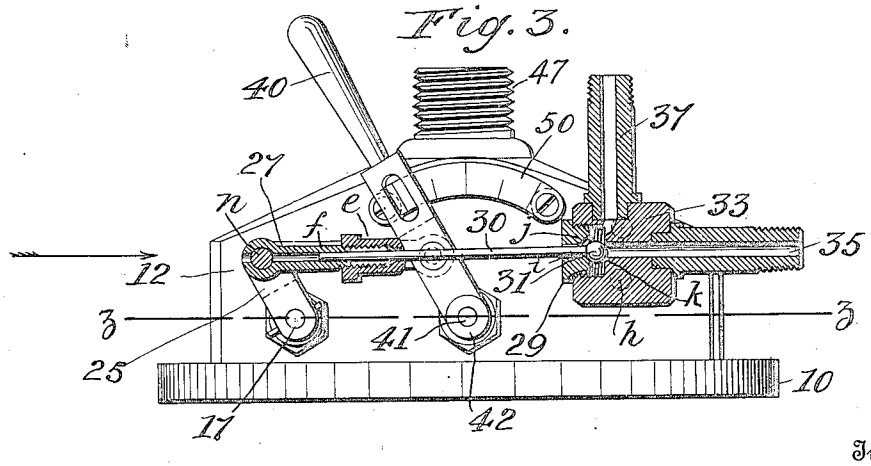


Fig. 3.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 4.

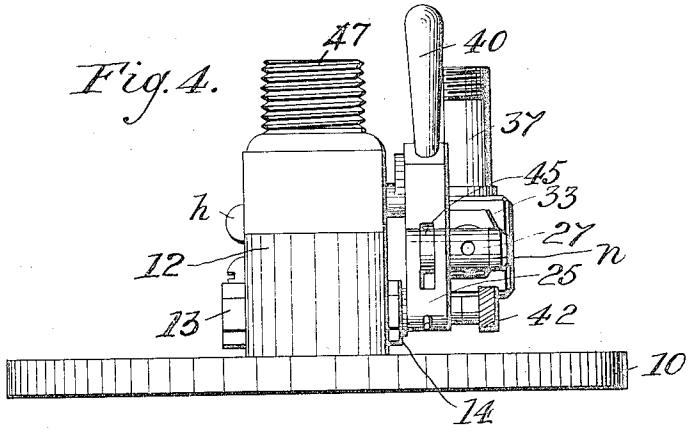


Fig. 5.

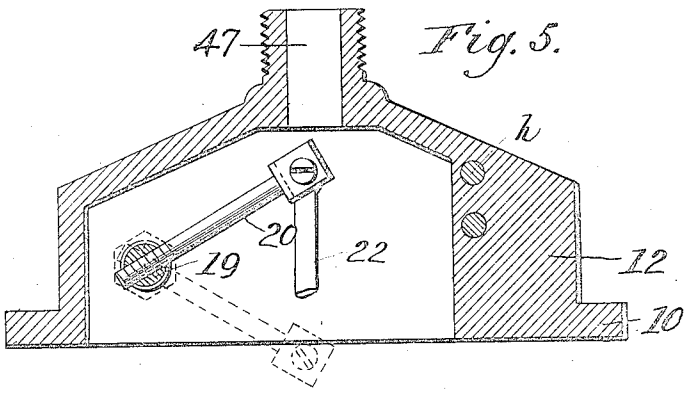
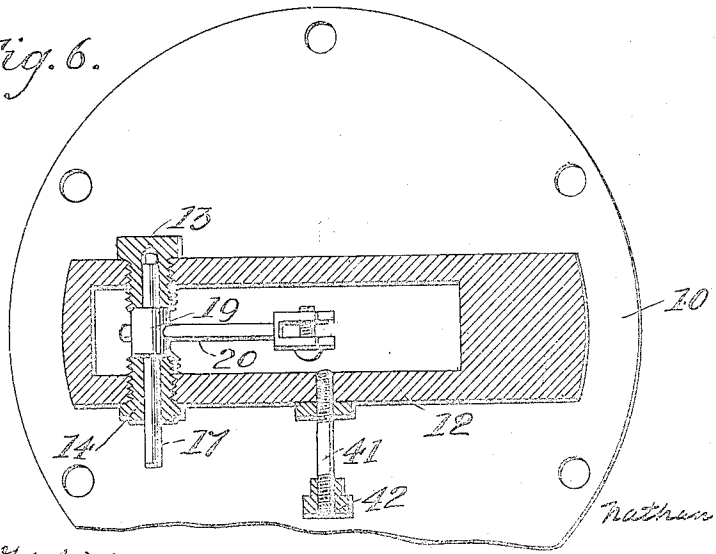


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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BOILER-FEEDING APPARATUS.

1,031,955. Specification of Letters Patent. Patented July 9, 1912.

Application filed June 17, 1911. Serial No. 633,784.

To all whom it may concern:

Be it known that I, NATHAN E. NASH, a citizen of the United States, and resident of the city of Toronto, in the Province of Ontario, Dominion of Canada, have invented certain Improvements in Boiler-Feeding Apparatus, of which the following is a specification.

This invention in common with others of its class is for the purpose of automatically maintaining a predetermined height of water in a steam boiler; and it relates particularly to a boiler feeder in which air under pressure is employed to operate the valve whereby feed water is admitted to the boiler, the movement of the air for the purpose being controlled by certain mechanism which derives its motion primarily from a float which is situated in a vessel in communication with the steam and water spaces of the boiler, and having a column of water therein which is on the same horizontal plane as that in the boiler.

The said invention consists principally, in means whereby the height of water in the boiler can be easily and readily changed, or any changes or fluctuations in the height of the water indicated, should the operation of the controlling devices be for any reason suspended, as will hereinafter fully appear.

In the further description of the said invention which follows, reference is made to the accompanying drawings, forming a part hereof, and in which,—

Figure 1 is a partly sectional front elevation of the improved boiler feeding apparatus. Fig. 2 is a plan of the upper portion of the apparatus. Fig. 3 is a section taken on the dotted line *x*—*x* in Fig. 2. Fig. 4 is an exterior side view of Fig. 3 looking in the direction indicated by the arrow in that figure. Fig. 5 is a section taken on the line *y*—*y* in Fig. 2. Fig. 6 is a section taken on the line *z*—*z* in Fig. 3. Figs. 7 and 8 are detached views of certain parts of the apparatus.

Referring now to the drawings, 1 is a vessel adapted for connection to the steam and water spaces of the boiler by means of the apertures *a* and *b* respectively, and shown only in Fig. 1, and in dotted lines. The pipes leading from the apertures *a* and *b* to the boiler are not shown. The glass water gage on the vessel 1 is designated by 2 and the trial gage cocks by 3, 4 and 5. The surface of the water column in the vessel 1 is indicated in Fig. 1 by *d*. The lower end of the vessel 1 is furnished with a globular extension 7 to receive sediment deposited by the water, and from which the sediment is ejected when necessary through the pipe 9 which is fitted with a suitable cock not shown.

10 is the head of the vessel 1, having thereon the rectangular chamber 12. Extending transversely through the chamber 12 and supported by the bearings 13 and 14 which are screwed into the front and rear walls of chamber, is a rocking shaft 17 having an enlargement 19 against which the ends of the bearings 13 and 14 bear steam tight; and into the said enlargement is screwed the bar 20 as shown in Figs. 5 and 6. To the outer end of the bar 20 is hinged the rod 22, as shown in Fig. 5, and to this rod is secured the float 23 as indicated in Fig. 1. On the portion of the rocking shaft 17 which is exterior of the chamber 12, is fastened an arm 25, and to the end of the arm is pivoted a stem grasping and releasing chuck 27 shown in full lines in Figs. 1, 2 and 4 and in section in Fig. 3.

30 is a stem having at one end thereof a spherical valve 31 which is inclosed within a cavity 29 in a valve chest 33 hereinafter more particularly referred to. The other end of the said stem rests in the chuck 27 in which it is susceptible of a sliding motion when the gland *e* of the chuck is partially unscrewed from the slitted and threaded body portion *f*, but will have no movement independently of the chuck when the gland is tightly set up.

The valve chest 33 before referred to, is fastened to the front wall of the chamber 12 by means of the screws *h* shown in Figs. 2, 3, 4 and 5 and into it are screwed the nozzles 35 and 37 which are in communication with the cavity 29. To the ends of the nozzles are screwed the pipes not shown, leading respectively to a source of air under pressure, and to any suitable motive attachment of the feed water valve of the boiler, adapted when subjected to the action of compressed air, to cause the closing of the said valve, when relieved from air pressure to allow the said valve to open and feed water to the boiler.

As before stated, the nozzles 35 and 37 are in communication with the cavity 29 in the valve chest in which are two opposing seats *j* and *k* upon either one of which

the spherical valve can seat. When the valve is on the seat *j*, the annular space *i*, around the valve stem 30 is closed, and the compressed air has free passage by means of the nozzles 35 and 37 and the cavity 29, to the motive devices of the feed water valve, which then becomes active and close the feed valve. But should the spherical valve be moved so as to open the annular passage *i* around the valve stem 30 and seat itself in the valve seat *k* as shown in Fig. 3, the entrance of compressed air through the nozzle 35 to the cavity 29 and thence through the nozzle 37 to the motive attachment of the feed water valve, is stopped, and the air previously admitted to the motive devices of the feed water valve to close it is allowed to escape through the annular passage *i* to the outer air, and the feed water valve will then open and supply water to the boiler.

40 is a hand operated lever shown in section in Fig. 8, placed loosely on the fixed stud 41 which projects from the front of the chamber 12. The outer end of this stud is threaded and provided with a retaining nut 42.

45 is a link shown separately in Fig. 7, which connects the hand lever 40 with the arm 25 before described; and a bolt *n* is employed to connect the link and the chuck to the said arm, as shown in Figs. 2 and 3.

It will be understood that the valve stem 30 with its valve 31 has no longitudinal movement other than that necessary to carry the valve from one of the valve seats *j* and *k* to the other, but should the gland of the chuck 27 be unscrewed sufficiently to admit of the chuck being slid on the valve stem, the hand lever may be moved in either direction to raise or lower the float 23 in the vessel 1, and thereby establish any water line in the vessel and the boiler that may be desired. Upon the completion of this adjustment, the gland of the chuck is tightened, when the movement of the spherical valve 31 derived primarily from the float will prevent any material fluctuation in the water line.

To provide for cases in which it is not convenient to use the openings *a* and *b* for the purpose described, I provide the chamber 12 with the nozzle 47 which may be used as the steam connection, and instead of using the extension 7 to collect sediment from the water in the vessel 1, the pipe 9 can be connected to the water space of the boiler.

Should it be desired to suspend the automatic function of the apparatus, it is only necessary to cut off the supply of compressed air to the nozzle 35, and by unscrewing the gland *e* render the chuck inoperative as a device to transmit movement to the spherical valve 31. Under such circumstances, the position of the hand lever 40 will indicate the height of water in the boiler, and to adapt it for the purpose, I place on the front of the chamber 12 the graduated sector 50, and slot the lever in order that the marks on the sector which indicate the position of the water level *d* with respect to the gage cocks, 3, 4 and 5 may be read.

I claim as my invention,—

In a boiler feeding apparatus, a vessel adapted to carry water at the same height as the water in the boiler, a float in the said vessel, a horizontal rocking shaft extending through the chamber, a bar projecting from the rocking shaft, from which the float is suspended, an arm on the outer end of the rocking shaft, and a stem grasping and releasing chuck pivoted to the said arm; combined with a valve chest having two nozzles, one of which leads to a source of supply of air under pressure, and the other to where compressed air is to be utilized to operate a boiler-feeding valve, a valve to control the passage of air from the first to the second nozzle, and adapted also to close the first nozzle and at the same time establish communication between the second nozzle and the outer air, a stem extending from the valve in the valve chest, terminating within the chuck, and a hand-operated device connected to the chuck whereby the chuck when rendered inoperative as a clasping device can be longitudinally adjusted with respect to the valve stem, and the vertical position of the float changed, substantially as specified.

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