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APPLIANCE FOR FEEDING BOILERS.

APPLICATION FILED MAY 14, 1909.

992,243.

Patented May 16, 1911.

2 SHEETS—SHEET 1.

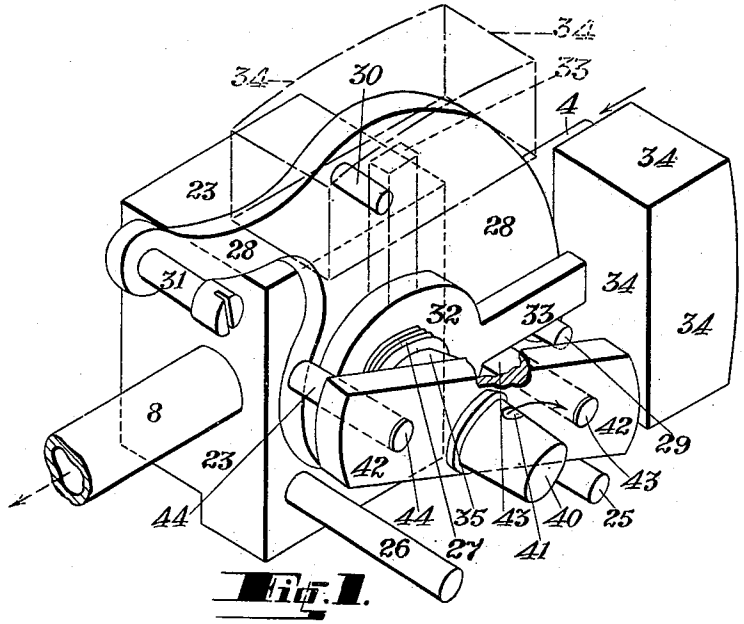

Fig. 1.

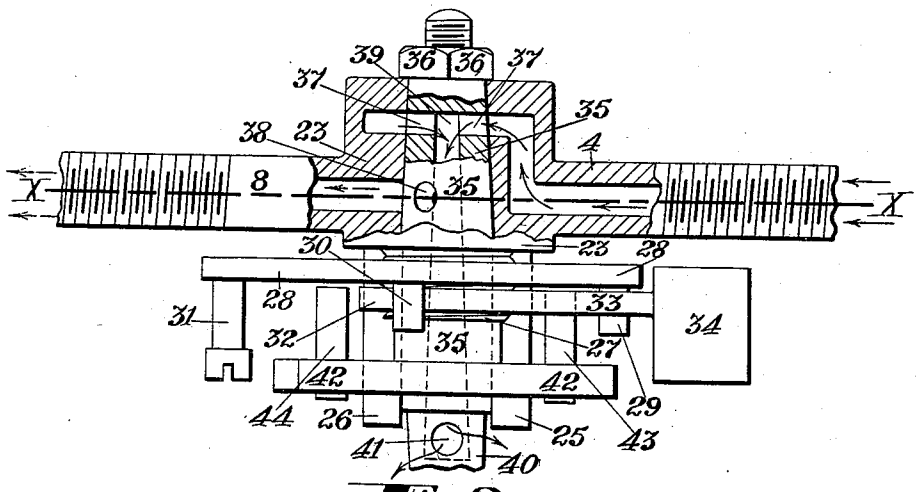

Fig. 2.

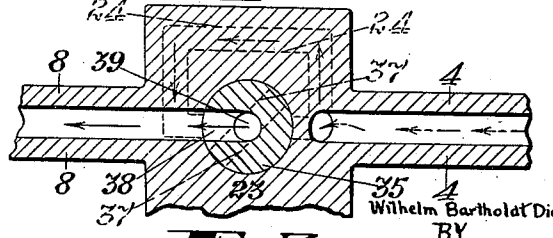

Fig. 3.

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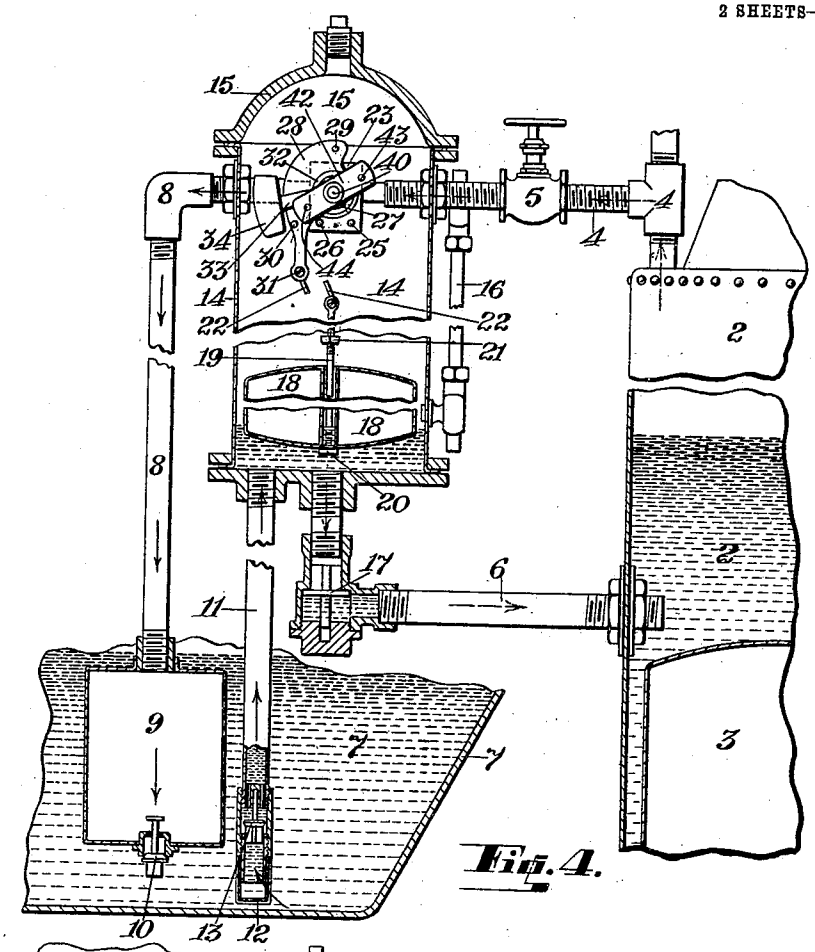

Fig. 4.

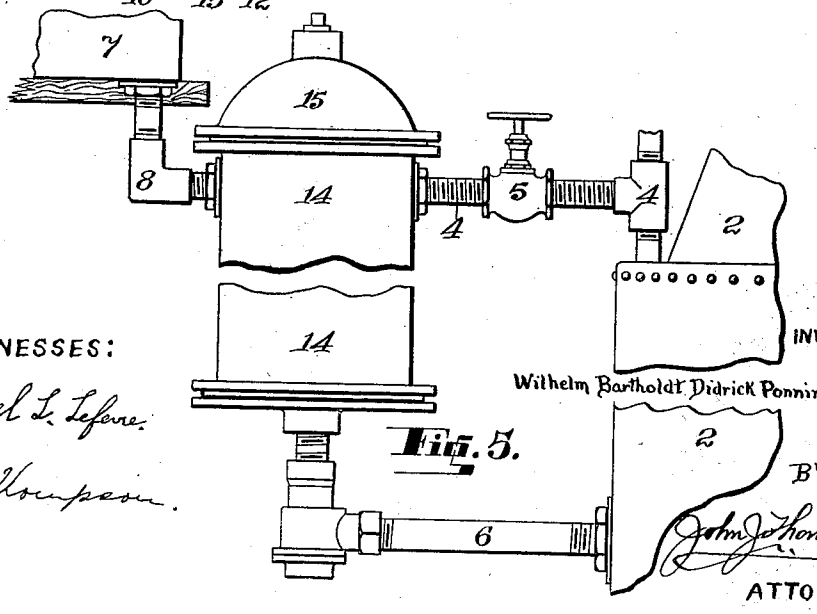

Fig. 5.

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APPLIANCE FOR FEEDING BOILERS.

992,243. Specification of Letters Patent. Patented May 16, 1911.

Application filed May 14, 1909. Serial No. 496,052.

To all whom it may concern:

Be it known that I, WILHELM BARTHOLDT DIDRICK PONNINGHAUS, a subject of the King of Great Britain and Ireland, residing at 26 Nottingham street, Prahran, in the county of Bourke, State of Victoria, Commonwealth of Australia, machinery importer, have invented a certain new and useful Improved Appliance for Feeding Boilers, of which the following is a specification.

This invention relates to that class of appliance used to force water into steam boilers by the aid of a vacuum or partial vacuum.

In the past it has been proposed to feed a boiler automatically from a chamber or casing into which feed water is drawn by a vacuum, the said vacuum being caused by the condensation of steam. The theory has been to cut off and turn on steam from the boiler by the rising and falling of a float in the chamber, the float being adapted to cut off the admittance of steam when the water level was low and permit of the steam then in the chamber being condensed. A vacuum being caused by the condensation, feed water has been sucked into the chamber, the float rising with the said incoming water and being adapted to again turn on steam from the boiler. The water in the chamber has then been gradually forced, by the steam pressure, into the boiler, the float descending with the water level and again cutting off steam. The steam in the chamber has then been condensed and another vacuum formed causing the chamber to again recharge with feed water.

The object of this invention is to provide, upon this principle, a cheap and simple appliance, positive and quick in action, by which water is maintained in a boiler at a predetermined height, and which appliance is not affected in its working by heat from the said boiler.

According to this invention, in the casing adjoining the boiler, steam is admitted by a water and steam controlling mechanism hereinafter described and which mechanism is actuated by a float. Upon the water and float falling to a low level, admittance of steam is cut off and the steam in the casing allowed to escape, through the mechanism aforementioned, and become condensed as hereinafter described. A partial vacuum is formed, by the condensation, inside the said casing and feed water enters. The float rising with the water operates the mechanism allowing steam from the boiler to again enter the casing and force the water into the said boiler.

The appliance is simple in construction, has but few parts, is not liable to derangement and can be easily repaired when occasion requires.

In addition to the foregoing it is easily installed, calls for no special attention and will act under any pressure of steam. By slight modifications it may be used for portable, traction or other more rapidly traveling prime movers.

Referring to the drawings which form a part of this specification—Figure 1 shows a view of the water and steam controlling mechanism of this invention, portion being broken away for convenience of illustration. A hammer is over to the right of its travel and in the position it occupies when steam is entering into the casing. In broken lines the hammer is shown in its highest position and ready to fall either right or left. Fig. 2 shows a part sectional plan of the water and steam controlling mechanism, portions being broken away for convenience of illustration. The hammer is over to the right of its travel and in the position it occupies when steam is entering the casing. Fig. 3 shows a sectional view; a plug of the water and steam controlling mechanism being in the position it occupies when it has cut off the admittance of steam from the boiler. The steam in the casing is escaping for condensation. The plane of section is indicated by line X—X Fig. 2 and a by-pass steam inlet is clearly seen in fragmentary lines. Fig. 4 is a sectional view, on a reduced scale, of the appliance as attached to a boiler. The water in the boiler has fallen to its lowest limit and requires replenishment. The float in the casing has also fallen causing the hammer to fall over to the left. The plug is then in the position indicated in Fig. 3 and steam is exhausting from the casing into a condenser in the feed water tank. Feed water is just about to be drawn into the casing. Fig. 5 is a view of an appliance in which the feed water tank is above the casing into which the water descends by gravity assisted by a partial vacuum. The special condenser is then dispensed with. A gage glass is removed.

Similar numerals of reference indicate

like or corresponding parts where they occur in the several views:—

On reference to the drawings and particularly Fig. 4, it will be seen that 2 is a steam boiler in which is a furnace 3. From the boiler leads a steam pipe 4 controlled by a steam valve 5. Into the boiler passes a water feed pipe 6.

Adjacent to the boiler is a feed water tank 7. In this is situated the water to be fed to the boiler. This water tank is open on the top and into it leads an exhaust pipe 8. At the bottom of this exhaust pipe is situated a condenser 9. The area and conformation of this will depend upon circumstances. In the bottom of the condenser is an outwardly opening escape and non return valve 10. Also passing into the said feed water tank is a suction pipe 11. At the bottom of the suction pipe 11 is situated a strainer 12 and non return valve 13. The said suction pipe may pass into any portion of the casing and if passing into the top thereof an extension from the cap 40 of the hollow plug 35, hereinafter described, causes a steam jet to issue and create a pressure above the water inlet, so that the steam is kept dry and does not condense within the casing. Above the said feed water tank and adjacent to the boiler is situated a copper casing 14. This has a removable top 15 and a gage glass 16. The top and bottom of the casing need not necessarily be of copper. Into and near the top of the said casing passes the steam pipe 4. Also the exhaust pipe. There is also communicating with the bottom of the said casing the suction pipe 11 and the feed pipe 6, in the latter of which is a downwardly moving non return valve 17. Inside the said copper casing 14 is situated a float 18. Through a central hole in the said float is passed a central rod 19. This has a collar 20 at its bottom and near its top an adjusting nut 21 whereby the said float can travel independently of the said rod for any predetermined distance. To the top of the said rod is pivoted the lower end of a connecting rod 22. Instead of the float traveling independently of the said rod it may be fixed to the same. Situated within the said casing and near the top of the same and intermediately situated between the steam pipe 4 and the exhaust pipe 8 is a shell 23 (Figs. 1, 2, 3 and 4). In this shell is a tapered hole to accommodate a plug hereinafter referred to. Across the said shell is formed a by-pass steam inlet 24, shown in fragmentary lines in Fig. 3. This passes steam from the steam pipe 4 at the steam side of the shell to the exhaust side of the shell and the steam pressure upon the said plug is therefore the same and may enter the plug from both sides; and the said plug being in a state of equilibrium moves easily and wears equally around its circumference. Protruding from the said shell is a right stop pin 25. Also a left stop pin 26. Extending from the said shell is an externally threaded protuberance 27. Turning loosely around the said externally threaded protuberance 27 is a tappet plate 28. In this is an internally threaded hole fitting loosely around the externally threaded protuberance 27. The object of threading the protuberance and threading the hole is to maintain the said tappet plate in correct alinement. Protruding from the said tappet plate is a right tappet pin 29 and a left tappet pin 30. Secured to the said tappet plate is an actuating pin 31 to which the upper end of the connecting rod 22 before referred to is pivoted. Said tappet plate is limited in its travel by the right stop pin 25 and the left stop pin 26. Also turning loosely around the externally threaded protuberance 27 is an internally threaded ring 32. This ring is clear and independent of the tappet plate 28. Extending from the ring is an arm 33, on the outer end of which is a hammer 34. This hammer is actuated by the right tappet pin 29 and left tappet pin 30.

Inside the shell before referred to is situated a hollow plug 35 (particularly Figs. 2 and 3). This is retained within the shell by an adjusting nut 36. Extending across and through the said plug is a steam hole 37. Also on one side of the plug is an exhaust hole 38. Extending from the small to the large end of the plug is an escape hole 39 with which the steam hole 37 and the exhaust hole 38 communicate. The escape hole 39 is covered by a cap 40 which distributes the steam over the casing. In the cap are escape holes 41. To the end of the said plug is attached a cross head 42. From this protrudes a right pin 43 and a left pin 44.

Instead of the feed water tank 7 being situated below the casing it may be situated above the same (Fig. 5). The exhaust pipe which becomes an exhaust pipe and a water suction pipe then communicates directly to the feed water tank without the condenser and without the suction pipe before described. The feed water then descends direct into the casing but the appliance is a little slower in action as the controlling mechanism being covered no steam pressure can mount until the water has a sufficient temperature to prevent condensation of the incoming steam.

The cycle of operations with this invention is as follows:—Supposing that the float 18 is rising due to ingoing water it lifts with it the connecting rod 22. As the connecting rod 22 rises it lifts the left hand side of the tappet plate 28. When the left tappet pin 30 strikes the arm 33 of the hammer 34 it lifts the said hammer. Directly the said hammer passes over the top of its center it

falls suddenly to the right. As its arm descends it strikes the right pin 43 in the cross head 42 of the plug 35. The cross head moves circumferentially and with it the plug 35. The movement of the cross head is limited by the right stop pin 25. The steam in the steam pipe 4 passes in through the by-pass 24 into the steam hole 37 in the plug, then into the escape hole 39 in the same and finally into the casing. When the water begins to sink within the casing, by passage into the boiler, the float descends and on the descent of the float the tappet plate 28 moves and the right tappet pin 29 rises and lifts the arm 33 of the hammer. When the hammer reaches the top of its stroke it suddenly falls to the left and strikes the left pin 44 on the cross head 42. The cross head descends and strikes the left stop pin 26. The plug is turned and the steam in the casing 14 is communicated through the holes 41, escape hole 39 and exhaust hole 38, with the exhaust pipe 8. From the exhaust pipe 8 it passes down to the feed water tank where it enters the condenser 9. When some of it has escaped through the escape and non return valve 10 the said valve closes, a vacuum being formed within the said condenser by the condensation of the steam. This vacuum is communicated backwardly into the casing through the passageways before referred to and a partial vacuum is formed within the casing. The valve 17 closes and the partial vacuum sucks up water through the strainer 12, non return valve 13 and suction pipe 11 in the feed water tank and the said water passes into the casing. It rises above the height of the water in the boiler and again elevates the float. There is always a certain amount of warm water remaining in the casing when arranged as just described, and this rises upon the top of the incoming feed water so that when steam is again admitted from the boiler no condensation takes place but operations go on with continuity.

In the modification the steam and water controlling mechanism act in the same way as before described, except that there is no special condenser in the feed water tank from which the water flows into the casing without having to be lifted; but the action is, though efficient, slower as aforesaid.

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

1. In an improved appliance for feeding boilers, comprising a casing, a float within said casing, a rod having its lower end slidably adjustable within said float, a water and steam controlling mechanism mounted within the upper portion of said casing, comprising a member formed with an externally threaded protuberance projecting therefrom, a tappet plate formed with an internally threaded hole fitting loosely upon said protuberance, an actuating pin projecting from said tappet plate, and a connecting link joining said tappet plate, and the rod within said float.

2. In an improved appliance for feeding boilers, comprising a casing, a removable top attached to said casing, a feed water tank adjacent to said casing, a steam exhaust pipe leading from said casing to said feed water tank, a valve controlled water feed pipe connecting said casing to the boiler, a steam pipe connecting said casing to the boiler, a suction pipe connecting the bottom of said casing to the feed water tank, a float mounted within said casing, an actuating rod adjustably and slidably mounted within said float, a water and steam controlling mechanism mounted within the upper portion of said casing and comprising a hollow shell, a taper hollow plug mounted in said shell, a crosshead attached to said taper plug, striking pins secured to said cross-head, a hammer mounted on said shell and adapted to strike said pins, and a tappet plate for moving said hammer and attached to said actuating rod.

3. In an improved appliance for feeding boilers, comprising a casing, a feed water tank adjacent to said casing, a feed water pipe and a steam pipe connecting said casing to the boiler, a downwardly opening valve in said feed pipe, an exhaust water pipe connecting said casing to said feed water tank, a shell mounted within said casing and communicating with said exhaust water pipe and the steam inlet, a threaded protuberance extending from said shell, a right hand and a left hand stop pin secured upon said shell, said shell formed with a by-pass inlet for controlling the water and steam supply, a hollow plug mounted in said shell, a hammer pivoted upon said shell for actuating said hollow plug, a tappet plate mounted on said shell, pins formed on said tappet plate for actuating said hammer by the movement of said plate, and a float in said casing for operating said tappet plate by the upward movement of said float caused by the rise of the water in said casing.

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

WILHELM BARTHOLDT
DIDRICK PONNINGHAUS.

Witnesses:
EDWIN PHILLIPS,
CECIL MCPLASTRIER.