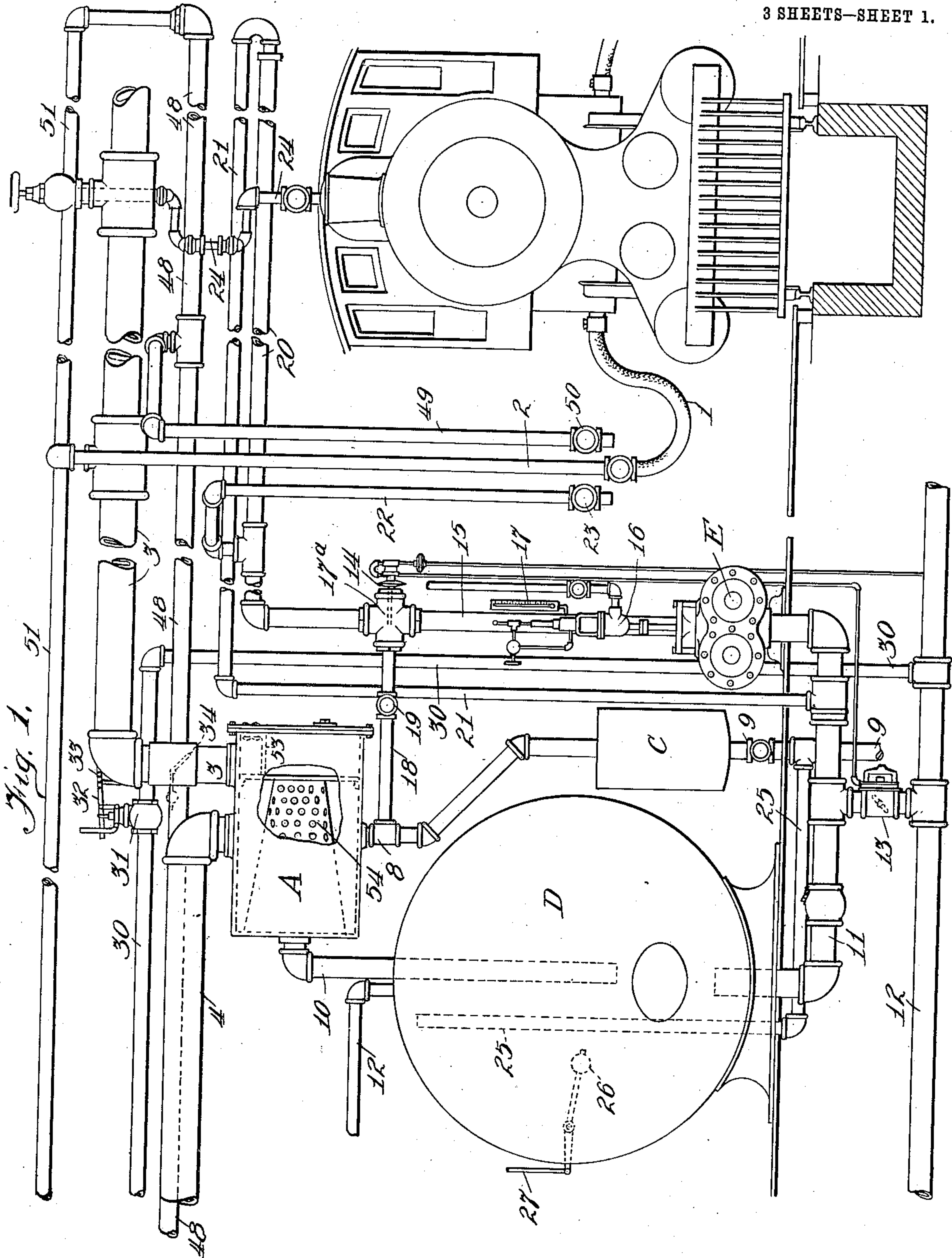


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Patented Sept. 14, 1909.  
3 SHEETS—SHEET 1.



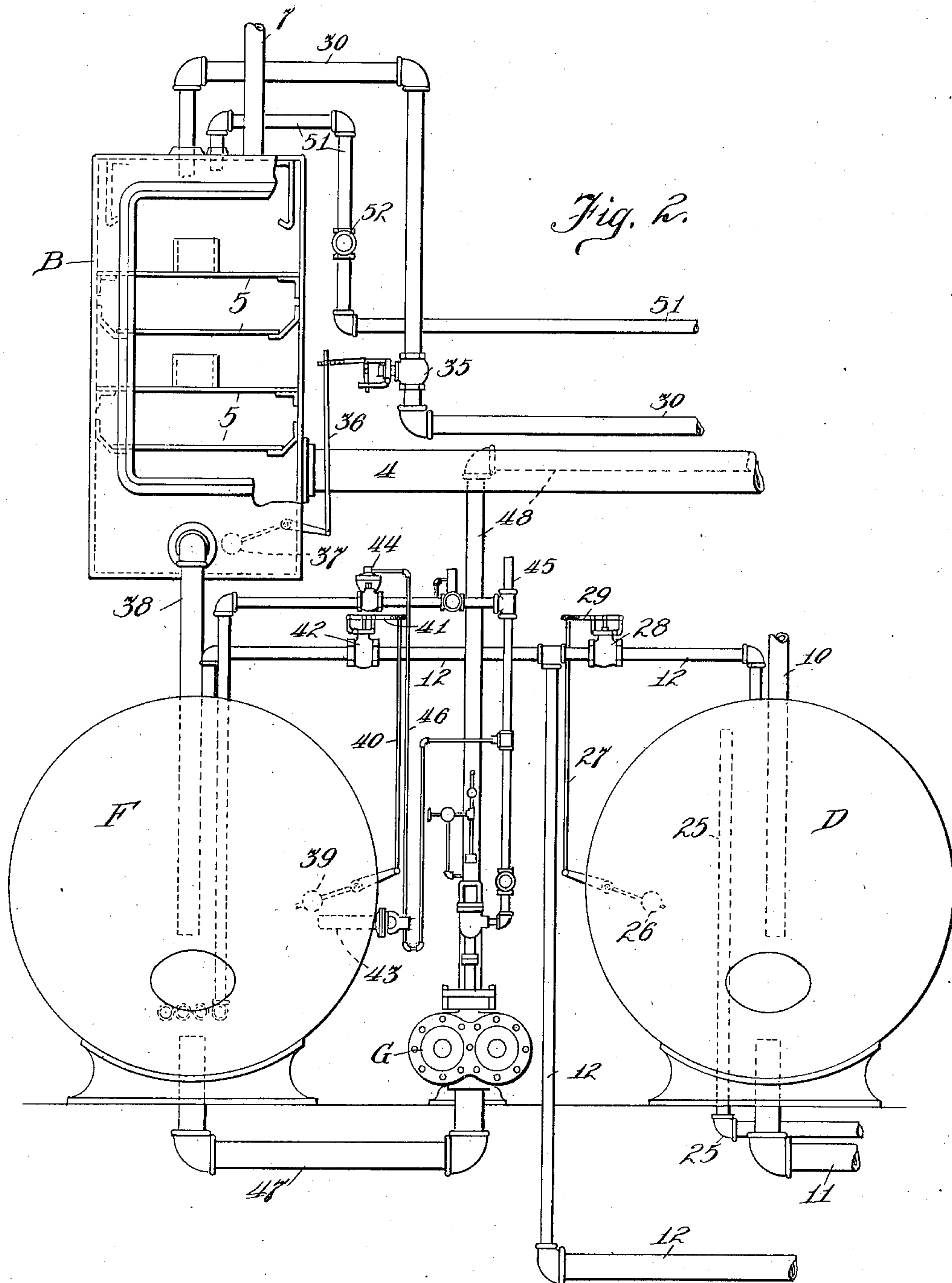
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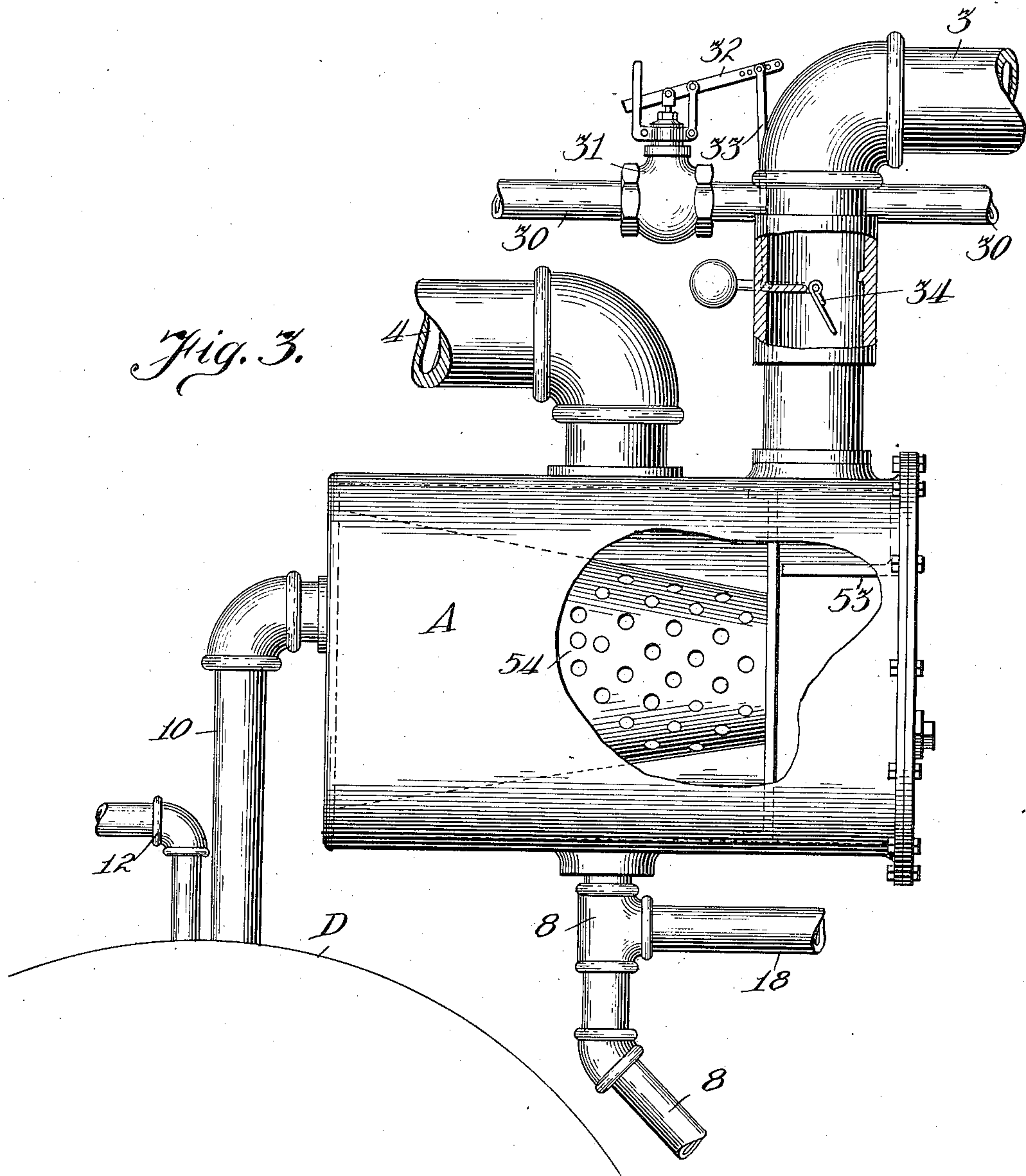


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# UNITED STATES PATENT OFFICE.

WILLIAM WHITE, OF CHICAGO, ILLINOIS.

## SYSTEM OF WASHING AND FILLING LOCOMOTIVE-BOILERS.

933,937.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed June 8, 1908. Serial No. 437,385.

*To all whom it may concern:*

Be it known that I, WILLIAM WHITE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Systems of Washing and Filling Locomotive-Boilers, of which the following is a specification, reference being had to the accompanying drawings, which form a part of my specification.

My invention relates to a system more especially adapted for use in washing out and filling locomotive boilers, and the devices employed permit of the use of the steam and water taken from the locomotives brought into the round-house for washing out.

The object of the invention is to provide a system wherein the water and steam blown from locomotive-boilers may be utilized; the water separated from its impurities and the cleaned water used for washing out the boilers to remove the collected sediment and scale therein; and the heat units of the discharge from the locomotive-boilers, utilized, as will more fully hereinafter appear.

The further object of the invention is to provide means whereby the automatic operation of the system will be insured as soon as the device is coupled to the locomotive-boiler and its blown-off contents received, thus providing for the use of the heat-units in connection with the water to be used for washing and filling the boilers after they have been blown off.

My invention is illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of a portion of a round-house showing a locomotive and a portion of my system with parts broken away in order to more clearly illustrate the invention. Fig. 2 is an elevation of the remainder of the system, showing a part of Fig. 1, in order to show the connection; a part also being shown broken away in order to show the internal construction of such parts. Fig. 3, is an enlarged detail view of a portion of the system, with parts broken away.

In Fig. 1 I have shown a locomotive connected by flexible hose 1, pipes 2 and 3, with the upper part of a separating-chamber A. The pipe 3 communicates with chamber A preferably at one end as shown, so that the water and steam discharged from pipe 3, will encounter mechanism to be later described, whereby an effective and quick separation

will be insured. Leading from the top of chamber A, is pipe 4, whereby the steam is conveyed to a heater B, near its bottom. The heater B, is provided with a plurality of shelves 5, the shelves being arranged one above the other in the manner employed in what is known as an "open" heater, wherein the inflowing water is brought into direct contact with the steam. The heater is provided at its top with a vapor-escape or conduit 7, leading into the air.

Extending from the bottom of separating-chamber A, is a drain-pipe 8, which leads to the sludge-chamber C, the latter having a sewer connection through pipe 9. The separating-chamber is also connected by pipe 10 with receiving or wash-out water tank D, into which the filtered water flows and is stored until it is desired to wash out the boilers. Leading from the bottom of tank D, is an exit or wash-out line 11, which connects with a pump E. Connected with pipe 11, before it reaches pump E, is a cold or fresh water line 12, with a tempering-valve 13, intervening, whereby the supply of cold water to pipe 11 to temper the water taken from tank D, is regulated; the valve 13, being controlled by the thermostat 14. The water under pressure then passes from pump E up through pipe 15; the pump being provided with the usual governor as at 16, and a thermometer 17, whereby the temperature of the pressure-water may be noted.

17<sup>a</sup>, is a cross in which thermostat 14 is located, and from which pipe 18 leads to sludge-pipe 8; this branch being provided with a valve at 19, whereby the flow into the sludge-pipe 8 is cut-off.

The wash-out line 15, connects with distributing pipe 20, which in turn is also connected with a return or circulating-pipe 21. Distributing pipe 20 may be of any length and provided with any number of branches 22, having cut-off valves 23, where hose 1 is attached when the boiler is to be washed.

24, is a steam-blow-out line leading from the boiler-top to the main blow-out line 3; the steam blow-out line being provided with suitable valves whereby the line may be closed.

Tank D, is provided with an over-flow pipe 25, which extends almost to the top of the tank, and connects with pipe 9 which leads to a sewer connection.

Suitably mounted within tank D, at a pre-



determined point, is a float 26, which is connected with rod 27, which in turn connects with a valve 28, located in a branch of the cold water line 12, which branch takes into the top of tank D. The upper end of rod 27, and the end of the lever 29 connected to the valve-stem are provided with a series of alined openings, whereby the connection between rod 27 and lever 29 may be altered, thereby altering the degree of operation of valve 28 when float 26 drops below a given point, thus allowing a predetermined quantity of cold fresh water to enter tank D. Leading from the main cold water line 12, is another branch line 30 which takes into the top of heater B, (see Fig. 2). This branch-pipe 30 is provided with valve 31 secured to the stem of which is lever 32, which latter connects with rod 33. This rod is operatively connected with flop-valve 34 located in receiving and conveying means 3, intermediate the locomotive-boiler and separator A. The lever of this valve is likewise preferably provided with perforations to permit of adjustment whereby valve 31 may be operated the desired degree and cold water in the desired quantity permitted to flow through line 30 to the top of heater B. By having valve 34 located in the receiving and conveying means at a point intermediate of the locomotive or initial point and the separating-tank A, the action of the blown-out steam and water flowing in on top of the valve will compel a positive and quick action of flop-valve 34, which in turn at once operates valve 31, permitting a flow of cold water to heater B. 35, is another valve in cold water line 30, which is operated by rod 36, having pivotal connection with float 37 (see Fig. 2); the purpose of this valve and float is to shut off the supply of water to heater B, after it has reached a determined point.

Heater B, is connected at or near its bottom, by pipe 38 with filling-tank F, whereby the heated water may flow into tank F. The fresh cold water line 12, also connects with tank F; and the admission of the fresh water through pipe 12 is regulated by float 39, which is connected by rod 40 with lever 41 operatively connected with the stem of valve 42.

Located in tank F is a thermostat 43, which controls valve 44 in line 45 containing live steam which operates pump G; the thermostat admitting pressure to valve 44 through pipe 46. When the temperature of the water in filling-tank F, falls below a predetermined point or degree, the thermostatically-controlled valve 44 will operate and admit live steam to the tank, thereby increasing the temperature of the filling-water within.

The filling water is conveyed from tank F, through pipe 47 to a pump G, and on through

pipe-line 48 to the point of use. Line 48 is provided with the desired number of distributing pipes 49 which are provided with valves as at 50, and at which point the flexible hose connection with the locomotive-boiler is made when the boiler is to be filled. As is well known in devices of this kind, it is necessary to provide this filling-line 48 with a return or circulating-pipe 51, which I have preferably shown as taking into heater B. This circulating-pipe 51 is provided with valve 52, whereby circulation through the pipe may be shut off when desired.

In order to bring about the proper operation of my improved system, it is essential that the operation of the valve by the blown-out products be made positive, thereby insuring the automatic operation of the valve in a water-supply line to supply the heater, thus utilizing all the heat-units conveyed to the heater. This I accomplish by using a valve of the nature shown at 34 and located at the point indicated, that is, intermediate of the separator and the boilers from which the products are blown. It is apparent that not only the pressure of the steam, but also the weight and velocity of the water, will immediately act on this valve and compel it to "flop" or tilt, permitting the water and steam to pass into the separating and filtering tank A, where it will impinge upon the baffle-plate 53, located immediately beneath the orifice of pipe 3. The effect of this baffle-plate 53, is to spread the hot water and steam out in chamber or tank A directly beneath the orifice of pipe 4 and over the filter or screen 54 secured in tank A and which incloses a chamber from which out-flow pipe 10 leads to carry the filtered water to tank D. By diverting and spreading the products in the manner just described, it is evident that the steam will quickly rise within pipe 4 and flow to the heater B, as before described.

Instead of employing the baffle-plate, any other suitable mechanism may be employed whereby the result desired may be had, but I believe the construction shown and described, whereby the blown-out products are spread or thrown out somewhat in a sheet or film or spray form, to be the simplest and at the same time very effective.

In the operation of my system the locomotive is brought into the round-house full of hot water and steam and the flexible pipes 1 are connected to the several outlets, and the valves opened, so that the pressure in the boiler will force the water and steam through pipe 2 to main pipe or other receiving and conveying means 3, in which is located valve 34. The weight and pressure of the blown-out products will force open valve 34, and with it valve 31, and passing on into tank A where it impinges upon the diverting mechanism or baffle-plate 53.



From this tank the steam passes directly through pipe 4 into heater B, where it comes into direct contact with a sufficient amount of cold water admitted by valve 31 to pipe 30 taking into the top of heater B. As the degree of operation of valve 31 is controlled by the degree of movement of valve 34, the quantity of cold water admitted to heater B will be in proportion to the quantity of steam flowing into the heater, as it is evident that as the pressure of the steam and the weight and velocity of the blown-out water diminishes, the extent or degree to which valve 34 is opened will lessen, thus simultaneously diminishing the fresh water supply to the heater B, so that no greater quantity of water is allowed to flow into heater B than the amount of steam entering heater B will properly heat; thus a predetermined proportion is maintained. As previously described the proper proportion of water to the heat-units admitted to the heater is determined by the adjustment of the lever and rod connected with the valves. The fresh water is thus heated to the desired temperature, and then flows through pipe 38 into storage tank F. The blown-out water from the locomotive contains a considerable quantity of scaly sediment, which is forced by filter 54 to fall to the bottom of tank A, from which point it is carried with a small quantity of water through pipe 8 into sludge-tank C; while the hot water which passes through filter 54 in tank A, flows through pipe 10 into tank D. The water in this tank is normally maintained at a predetermined level; and whenever the water is drawn off so as to fall beneath this level, float 26 will drop, which will operate valve 28, admitting water through pipe 12. The pump E, draws the water from the base of tank D, through pipe 11; the water being maintained at the proper temperature as hereinbefore described. Pump E, forces the wash-out water through pipe 20 to the proper points where it is connected with the boiler. Simultaneously with this operation, filling-water is being heated in heater B and stored in tank F, as before described, and when the boiler has been washed, it is coupled to the distributing pipes of filling-pipe 48, through which the heated fresh water is pumped from tank F by pump G. Thus it will be seen that with my improved system the fluid contents blown out from the locomotive, after being separated and filtered, are used, in part, for washing-out the boilers and in part to heat the water to fill the boilers.

As appears from the foregoing description of my invention I utilize the weight and velocity of the blown-out products, in addition to the pressure they exert, to automatically control a water-supply, which, in the system shown and described, is intended

for the heater of a filling-water supply; but it is apparent that the water-supply may be used for any purpose other than the one set forth.

While I have shown and described a specific form and arrangement, it will be readily understood that the same might be altered in certain details without departing from the spirit of my invention, and I do not wish to be understood as limiting myself to the exact construction shown and described, but

What I do claim as my invention and wish to secure by Letters Patent, is:—

1. A boiler washing and filling system, comprising tanks to contain the washout-water and filling-water, means for receiving and conveying the blown-out products from the boiler, a heater provided with a water-supply and adapted to receive the steam contained in the blown-out products, and mechanism located in the path of the blown-out products and adapted to be operated by the weight and velocity of said products, whereby, upon the operation of said mechanism, the water-supply is controlled.

2. A boiler washing and filling system, comprising means for receiving and conveying the blown-out products from the boiler, a water-supply, and mechanism located in said receiving and conveying means, adapted to be operated by the blown-out products, said mechanism having operative connection with the water-supply, whereby the latter will be controlled upon the operation of said mechanism.

3. Blow-off mechanism for locomotive-boilers, comprising means for receiving and conveying the blown-off steam and water from the boiler, a water-supply, and mechanism located in the path of and adapted to be operated by the blown-off steam and water whereby the water-supply is controlled.

4. A boiler washing and filling system, comprising a washout-water supply and a filling-water supply, means for receiving the blown-out products from the boiler, and mechanism located in the path of and adapted to be operated by the blown-out products from the boiler, whereby the filling-water supply is maintained.

5. A boiler washing and filling system, comprising tanks to contain the wash-out and filling water, means for receiving the blown-out products from the boiler, a heater provided with a water-supply and adapted to receive the heat-units of the steam contained in the blown-out products, and mechanism located in the path of the blown-out products whereby the water-supply for the heater is opened and controlled.

6. A boiler washing and filling system, comprising tanks, means for conveying the blown-out products from the boiler to the tanks, a heater, means whereby the products



are separated and the heat-units of the steam conveyed to the heater, and mechanism intermediate of the heater and initial point of the system, adapted to be operated by the  
5 blown-out products, to open and control a water-supply for the heater.

7. A boiler washing and filling system, comprising a washout-water supply and a filling-water supply, means for receiving the  
10 blown-out products from the boiler, and mechanism located in the path of the blown-out products and adapted to be operated by the weight and pressure of the blown-out products whereby the filling-water supply is  
15 controlled.

8. A boiler washing and filling system, comprising a washout-water tank, a filling-water tank, a separating-tank, means for conveying the blown-out products from the  
20 boiler to the separating-tank, a heater adapted to receive a water-supply, means whereby the separated products in the separating-tank are conveyed to the washout-water tank and said heater, and mechanism located in  
25 the path of the blown-out products intermediate of the boiler and the separating-tank whereby the heater water-supply is controlled.

9. A boiler washing and filling system,  
30 comprising tanks, means for receiving the blown-out products from the boiler, a heater having a water-supply, means whereby the blown-out products are separated and the steam conveyed to the heater, and mechanism intermediate of the heater and initial  
35 point of the system and adapted to be operated by the blown-out products, whereby the water-supply for the heater is opened and controlled.

10. A boiler washing and filling system,  
40 comprising a washout-water tank, a filling-water tank, a heater adapted to receive a water-supply, means for receiving the blown-out products from the boiler, separating-mechanism located in said means whereby  
45 the water is conveyed to the washout-water tank and the steam conveyed to the heater, and mechanism situated in the receiving-means and adapted to be operated by the  
50 blown-out products, whereby, upon its movement, the heater water-supply is operated.

11. A boiler washing and filling system, comprising tanks, means for receiving the  
55 blown-out products from the boiler, a heater provided with a water-supply, means adapted to be operated by the pressure and weight of the blown-out products, and mechanism connected with the last-mentioned  
60 means whereby the quantity of water admitted to the heater upon each operation of said means is predetermined.

12. A boiler washing and filling system, comprising a washout-water tank, a filling-water tank, and a heater having connection  
65 with a water-supply, means for receiving

the blown-out products from the boiler and provided with separating-mechanism whereby the water is conveyed to the washout-water tank and the steam conveyed to the heater, a valve situated in the receiving-  
70 means and adapted to be operated by the blown-out products, said valve arranged to control the heater water-supply.

13. A boiler washing and filling system, comprising a washout-water supply and a  
75 filling water-supply, means for receiving the blown-out products from the boiler, means, located in the path of the blown-out products, to be operated by the pressure and weight of the blown-out products and open  
80 the filling-water supply, and mechanism whereby the extent of opening of the filling-water supply upon the operation of the means located in the path of the blown-out  
85 products is predetermined.

14. A boiler washing and filling system, comprising a washout-water tank, a filling-water tank, a source of water supply therefor, a heater interposed between the filling-water tank and the source of water-supply,  
90 a pipe-line leading from the boiler to the washout-water tank, a separator and filter located in said pipe-line and connected with the washout-water tank and said heater, and means located in said pipe-line between the  
95 boiler and separator and adapted to be operated by the blown-out products from the boiler, thereby controlling the source of water-supply for the filling-water tank.

15. A boiler washing and filling system,  
100 comprising tanks, means for conveying the blown-out products from the boiler, a heater having connection with a water-supply and adapted to transfer the heat-units of the steam contained in the blown-out products  
105 to the water-supply, and mechanism intermediate of the heater and initial point of the system adapted to be operated by the blown-out products to open and control the water-supply for the heater.  
110

16. A boiler washing and filling system, comprising a washout-water reservoir and a filling-water reservoir, a source of water-supply for said filling-water reservoir, a  
115 pipe-line adapted to convey the blown-out products from the boiler to the washout-water reservoir, a separator and filter located in said pipe-line whereby the water is conveyed to the washout-water reservoir and the heat-units of the blown-out products  
120 made to mingle with the source of water-supply for the filling-water reservoir, and a gravity-acting valve in said pipe-line intermediate of the boiler and separator, said valve having controlling connection with a  
125 valve in the source of water-supply, whereby, upon the passage of the blown-out products the gravity-acting valve will be operated and the valve in the water-supply source  
130 opened.



17. Blow-off mechanism for locomotive-boilers comprising means for conveying the blown-off steam and water from the boiler, a filling-water supply means, and means for  
5 controlling the filling-water supply by the pressure of the blown-off steam and the weight and velocity of the blown-off water.

18. A boiler washing and filling system, comprising a tank, means for conveying the  
10 blown-out products from the boiler to said tank, a heater provided with a source of water-supply, means whereby the products are separated and the heat-units of the steam conveyed to the heater, valves in the  
15 water-supply source and the blown-out product conveying means, the valve in the conveying-means being located between the separating-means and the boiler and adapted to be opened by the blown-out products,  
20 adjustable mechanism connecting the said valves, whereby, upon the opening of the valve in the conveying-means, the valve in the water-supply source will be operated to a predetermined degree.

25 19. A boiler washing and filling system, comprising a washout-water tank, and a filling-water tank, a source of water-supply for said last-named tank, conveying-means whereby the blown-out products are brought  
30 from the boiler to the washout-water tank, a separator and filter intermediate of the boiler and washout-water tank whereby the water is filtered and the steam conveyed into contact with the water-supply for the  
35 filling-water tank, mechanism in advance of the separator and filter and in the path of the blown-out products, whereby, upon the operation thereof, said water-supply will be simultaneously opened.

40 20. Blow-off mechanism for locomotive-boilers, comprising means for conveying the blown-off steam and water from the boiler, a filling-water supply means, means for controlling the filling-water supply by the pres-  
45 sure of the blown-off steam and the weight

and velocity of the blown-off water, and mechanism whereby the extent of control of said water-supply is predetermined.

21. Blow-off mechanism for locomotive-boilers comprising means for conveying the  
50 blown-off steam and water from the boiler, a filling-water supply means, mechanism whereby the blown-off steam is brought into contact with the filling-water supply, and means operated by the pressure of the blown-  
55 off steam and the weight and velocity of the blown-off water, whereby the amount of water and steam contacting is maintained in predetermined proportions.

22. A boiler washing and filling system, 60 comprising a washout-water tank and a filling-water tank, means for receiving and conveying the blown-out products from the boiler, a heater provided with a source of water-supply, means whereby the products 65 are separated and a portion of the heat-units of the blown-out products conveyed to the heater, valves in the heater water-supply source and in said conveying-means, adjustable mechanism connecting said valves, the 70 valve in the conveying-means being arranged to operate by the weight and velocity of the blown-out products, whereby the water-supply valve will be operated a prede-  
75 termined degree.

23. A locomotive boiler washing and filling system, comprising washout and filling water supply means, means for separating the contents of a locomotive boiler and for mingling the separated contents with the 80 washout and filling water respectively, and mechanism located in advance of the separating means and adapted to be operated by the weight and velocity of the blown-out contents, whereby the filling water supply is 85 controlled.

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