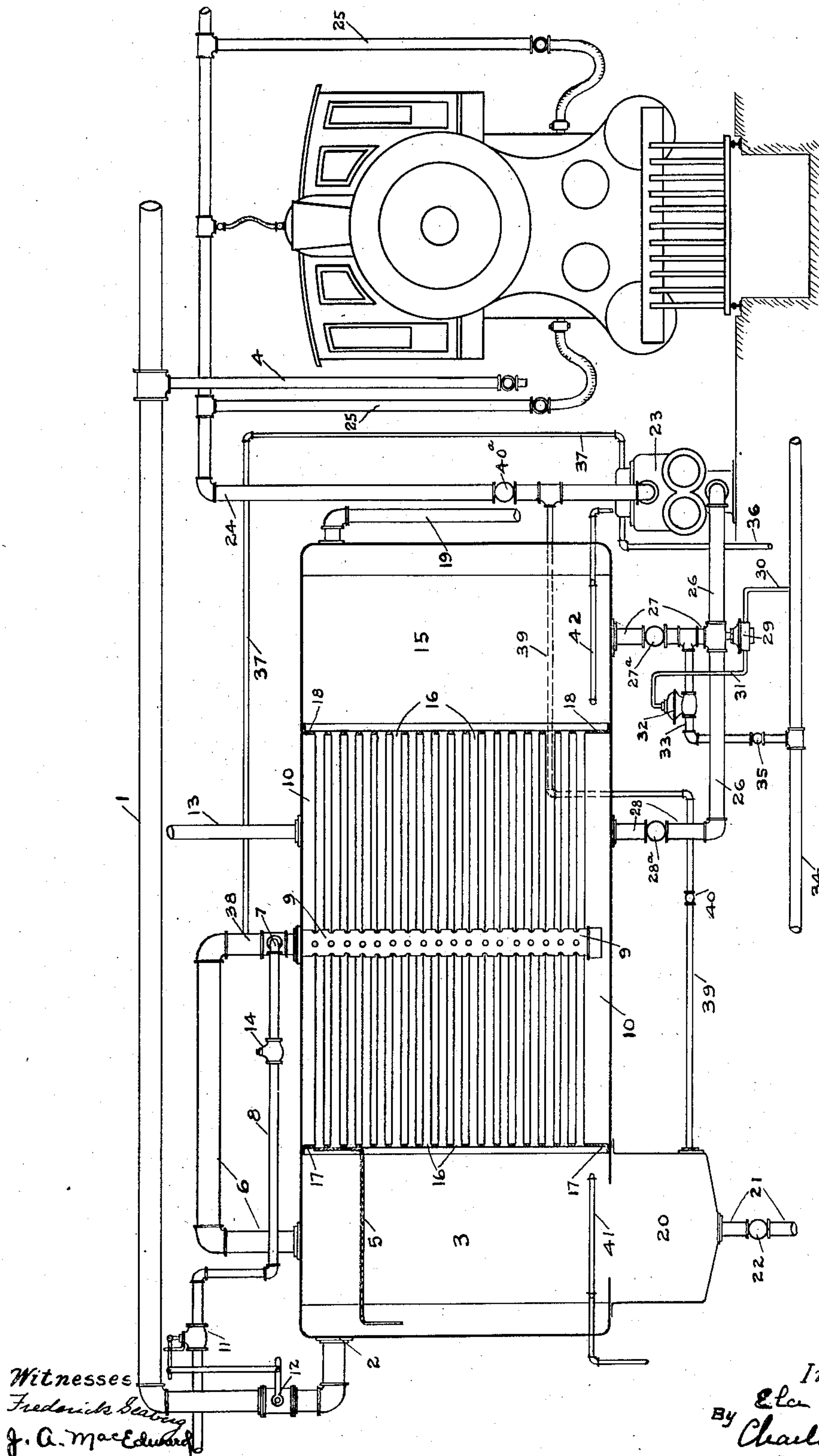


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SYSTEM OF AND APPARATUS FOR WASHING AND REFILLING LOCOMOTIVE BOILERS.
APPLICATION FILED OCT. 4, 1909.

992,834.

Patented May 23, 1911.



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UNITED STATES PATENT OFFICE.

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SYSTEM OF AND APPARATUS FOR WASHING AND REFILLING LOCOMOTIVE-BOILERS.

992,834.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed October 4, 1909. Serial No. 520,932.

To all whom it may concern:

Be it known that I, ELA BERT WHITE, a citizen of the United States, residing in London, England, have invented new and useful Improvements in Systems of and Apparatus for Washing and Refilling Locomotive-Boilers, of which the following is a specification.

This invention relates to improvements in systems of and apparatus for washing and refilling locomotive boilers and more particularly to systems of the kind described and shown in the prior United States patent to Otis and White reissued March 9th, 1909, No. 12,925.

The invention has for its object to provide a system or apparatus that will be more compact and self-contained than the system described in the prior patent referred to, the number of the devices employed being reduced without decreasing the efficiency of the system and apparatus.

According to this invention I employ a single tank comprising a chamber or compartment for receiving and separating the blown off products from the locomotive boiler, a chamber or compartment constituting a receiving and heating chamber for the fresh feed water, and a chamber or compartment constituting the receptacle for the more or less purified water blown out from the locomotive boiler, the receiving chamber for the blown out products also comprising a sludge tank or chamber.

Further features of the invention will appear from the following description and claims.

The accompanying drawing illustrates a method of carrying out this invention. The details shown and described may however be varied without departing from the invention.

Referring to the drawing 1 is the main blow out line of the system which is connected at 2 to the receiving chamber 3 for the blown out water from the locomotive boiler.

4 is the drop pipe at the pit in the round house or engine shed to which the blow off valve of the locomotive is connected.

5 is a plate located in the receiving chamber 3 which acts to break up the blown out products from the locomotive boiler, so that the steam is separated from the muddy

water and passed up pipe 6 to a point 7 where it mixes with and is condensed by cold water admitted along pipe 8, the mixture of the condensed steam and cold water passing down the perforated pipe 9 and into the filling water chamber 10. The supply of cold fresh water admitted along pipe 8 is controlled by a valve 11 actuated by a flap valve 12 which latter is of the same construction as shown and described in the prior patent above referred to, this flap valve being actuated to a greater or lesser extent according to the weight and velocity of the blown out products of the locomotive boiler.

13 is a vapor outlet pipe from the feed water chamber.

A non-return valve 14 is provided in the pipe 8 for the purpose hereinafter described.

15 is a chamber for receiving or containing the more or less purified blown out water from the locomotive and this water is received from chamber 3 along a series of pipes 16 which connects the chamber 3 with the chamber 15. These pipes or tubes are mounted in plates 17 and 18 by which the chambers 3 and 15 are separated from the filling water chamber 10. The pipes 16 are secured in place in the partitions or plates 17 and 18 in any suitable manner, for instance by their ends being expanded in the known way.

19 is an over flow pipe for the more or less purified water chamber 15.

20 is a chamber located beneath the receiving chamber 3 which receives the muddy deposit contained in the water blown out from the locomotive boiler, 21 being the outlet pipe from this mud pan or chamber to the sewer and 22 a valve for shutting off the pipe 21.

23 is a suitable pump to the discharge side of which is connected in the example shown in the drawing the washing and filling water line 24 provided at the pits with drop pipes 25 to which the hose for use in washing and filling the boiler is connected. The intake side of the pump 23 is connected by pipes 26, 27 to the chamber 15 which contains the more or less purified water to be used for washing out the locomotive boiler and the intake side of said pipe is also connected by pipes 26, 28 to the filling water

chamber 10. The pipes 27, 28 are provided with shut off valves 27^a, 28^a for closing the said pipes when desired.

29 is a thermostat located in the path of the washing water and controls the admission of water under pressure from the main 5 34 through pipe 30 to the pipe 31 and automatic tempering valve 32. This valve 32 is located in a pipe 33 connected to the cold 10 water main 34 and pipe 33 is provided with a hand operated cut off valve 35, said pipe 33 being connected as shown to the pipe 27.

36 is the steam supply pipe to the pump and 37 the exhaust pipe connected at 38 to the 15 pipe 6 for conveying the blown out steam to the feed water chamber 10, the arrangement being such that the exhaust steam from the pump 23 is caused to pass into the feed water contained in the chamber 10, to assist in 20 the heating of said water.

39 is a cross pipe connecting the discharge pipe 24 of pump 23 to the mud pan or tank 20 for flushing said tank, 40 being a suitable cut off valve in said pipe 39 and 40^a a cut off 25 valve in pipe 24.

41, 42 are coils of pipe connected to the live steam main through which steam is passed for further heating the water contained respectively in the chambers 3 and 30 15. Similar heating coils may if desired be placed in the chamber 10 for the filling water.

The operation of the apparatus is as follows:—The pipe 4 is connected to the blow 35 off valve of the locomotive the steam and water passes from the locomotive boiler up the pipe 4 and along the main blow off line 1 into the receiving chamber 3 where it falls on to the plate 5. The blown out products 40 are thus broken up and the water runs down into the lower part of the chamber 3 and steam rising and passing along pipe 6. The blown out products passing from pipe 1 operate the flap valve 12 which actuates the 45 valve 11 in the cold water pipe 8 and admits a quantity of cold water along said pipe the amount or quantity of this water being regulated by the amount of opening of the flap valve 12 according to the weight and velocity of the blown out products. 50 The cold water flows along the pipe 8 past the non-return valve 14 and mixes at the point 7 with the steam passing along pipe 6, the steam being thus condensed and the water heated, the mixture flowing down the 55 perforated pipe 9 and thence into the chamber 10 where it is accumulated to be used later on for filling the locomotive boiler. While the blown out water is in the chamber 60 3 and the mud therein settles to the bottom of the chamber into the mud pan 20, the water thus more or less purified passing along the pipes 16 into the washing water chamber 15. As the water blown out from 65 the locomotive boiler is of course very hot

its passage along the pipe 16 tends to further heat the water in the chamber 10.

To wash out the locomotive when it has been emptied of its boiler products, the valve 27^a in the pipe 27 is opened, and the 70 pump 23 is started, and water is drawn from the chamber 15 through the pipes 27, 26 and pumped along the pipe 24 to the drop 25 and the hose for washing out the boiler. This washing water in passing 75 along the pipes 27, 26 acts on the thermostat 29 and according to the temperature of said water more or less water under pressure is admitted to the tempering valve 32, opening said valve to a greater or lesser extent and 80 admitting an equivalent quantity of water along the pipe 33 to mix with the heated water from the chamber 15 and bring said water to the desired temperature for washing out. When the boiler has been washed out the 85 valve 27^a is closed as is also the cut off valve 35 in the cold water pipe 33 and the valve 28^a in the pipe 28 is opened. Hot water is then drawn from the chamber 10, along the pipes 28, 26 and pumped along pipe 24 and drop 90 pipe 25 to fill the locomotive boiler. Although this filling water passes and acts on the thermostat 29 it will not cause cold water to be mixed with the filling water as although the water actuates the valve 32 wa- 95 ter cannot pass along the pipe 33 as the valve 35 is closed.

The non-return valve 14 is provided in the pipe 7 to prevent back pressure on the cold water supply on the water in the cham- 100 ber 10 rising to an abnormal extent, the said valve in fact thus acting as a cut off valve to shut off the cold water supply when the tank 10 is full.

The chambers 10 and 15 may if desired be 105 provided with float operating valve in the cold water supply line and so arranged that on the water in the chambers 10 and 15 falling below predetermined levels cold water can be admitted to the said chambers to 110 bring the water up to the desired level. Thermostats would be provided in the chambers 3 and 15 which would act to admit live steam to the coils 41, 42 should the temperature of the water in these chambers fall be- 115 low the predetermined degree, the thermostats of course shutting off said steam when the temperature of the water has been sufficiently raised.

Although it is not at present considered 120 necessary a heating coil may be provided as above stated in the chamber 10 and a thermostat provided to automatically admit and cut off steam from said coil according to the temperature of the water in the chamber. 125

If it is desired to use this system for large installations separate washing and filling lines may be connected to the pipe 28 for pumping the filling water along the ad- 130 ditional pipe line.

A suitable flow pipe may if desired be provided for the chamber 10 and circulating lines may be provided for the washing and filling lines.

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

1. A locomotive boiler washing and filling system comprising a tank having separate storage chambers, means for mingling the
10 steam blown off from the locomotive with the fresh water, means for conveying the mingled fresh water and blown out steam into one of said chambers, said means consisting of a pipe having a perforated portion
15 depending within said chamber, and means for conveying the water blown off from the locomotive to the tank and for storing said blown off water in the other chamber.

2. A locomotive boiler washing and filling system comprising a tank, means for separately storing therein a body of fresh water and the water blown off from the locomotive, whereby the heat from the stored
20 blow off water is indirectly imparted to the filling water and means for heating the fresh water by directly mingling therewith the steam blown off from the locomotive.

3. A locomotive boiler washing and filling system comprising a tank, means for storing a body of fresh water therein, means for heating the said water by directly mingling therein a portion of the blown off contents of the locomotive and by indirectly conveying to said water the heat units from the
25 remaining blown off contents of the locomotive.

4. A locomotive boiler washing and filling system comprising a tank having separate chambers, means for supplying a body
30 of fresh water to one of said chambers, means for conveying the water blown off from the locomotive to the other chamber, means for mingling the steam blown off from the locomotive with the fresh water
35 and means for imparting to said fresh water the heat units of the water blown off from the locomotive without mingling the fresh and blown off waters.

5. A locomotive boiler washing and filling system comprising a tank having a middle storage chamber and end storage cham-

bers, tubes extending through the middle chamber and affording communication between the end chambers, means for conducting the blown off water to one of the end
55 chambers, means for supplying fresh water to the middle chamber, and means for mingling the steam blown off from the locomotive with the fresh water.

6. A locomotive boiler washing and filling system comprising a tank having a middle storage chamber and end storage chambers, tubes extending through the middle chamber and affording communication between the end chambers, means for conducting the blown off water to one of the end
60 chambers, means for supplying fresh water to the middle chamber, and means for mingling the steam blown off from the locomotive with the fresh water, and means for conveying the said blown off and fresh waters to the locomotive as wash out and filling water respectively.

7. A locomotive boiler washing and filling system comprising a single tank having separate storage chambers, means for conveying the blown off contents from the locomotive to said tank, and means for conveying part of said contents to one of said chambers and the remainder of said contents to
75 another chamber, and means operated by the blown off contents for admitting a body of fresh water to one of the storage chambers.

8. A locomotive boiler washing and filling system comprising a receptacle, means
80 for conveying the blown off water and steam to the receptacle wherein the steam and water are separated, means for imparting the heat units of the blown off water to a fresh body of water without mingling the blown
85 off water and the fresh water, and further means for imparting the heat units from the blown off steam to the fresh body of water, and means for mingling the water of condensation with said fresh body of water.

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

ELA BERT WHITE.

Witnesses:

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W. W. LEWES.