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R. E. COUGHLAN

APPARATUS FOR TREATING BOILERS AND BOILER FEED WATER

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Fig. 1.

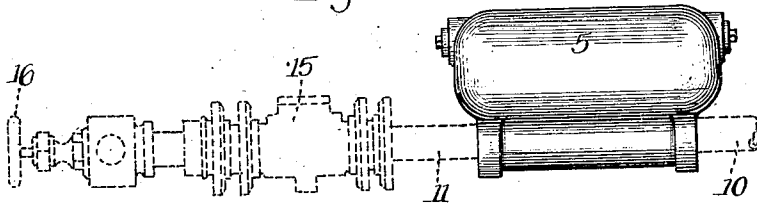


Fig. 2.

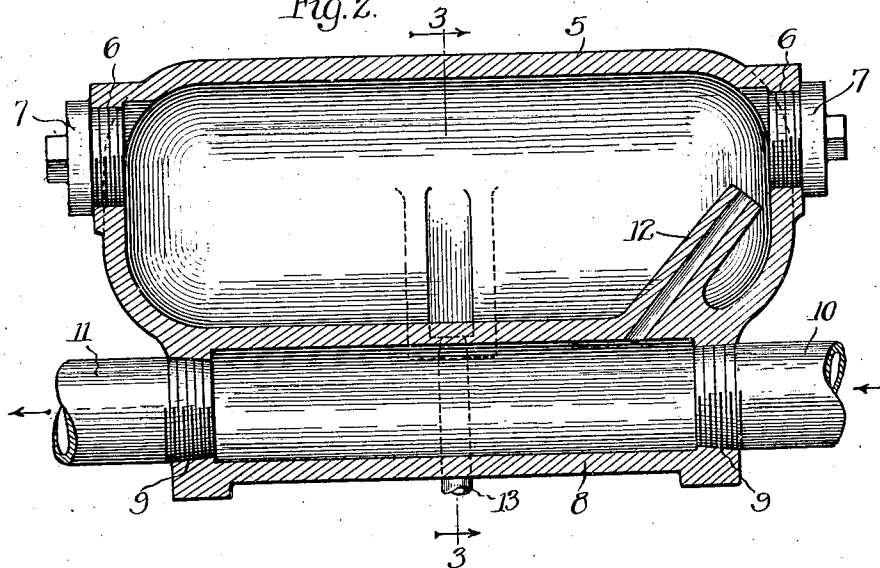
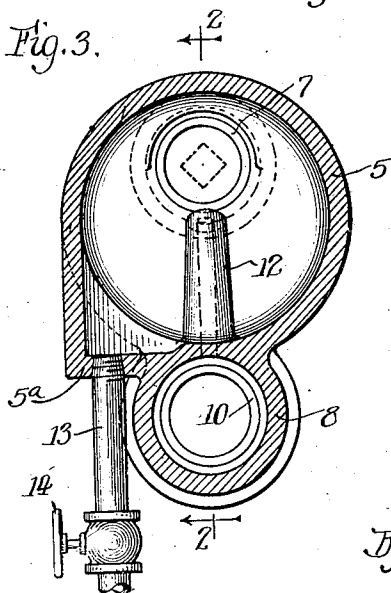


Fig. 3.



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APPARATUS FOR TREATING BOILERS AND BOILER-FEED WATER.

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This invention relates to apparatus for treating boilers and boiler feed water for the purpose of correcting the water and preventing or eliminating the incrustation or corrosion of the interior of the boiler or boiler tubes caused by unsuitable feed water. As is well known, the treatment of boiler feed water for locomotives is usually effected in a softening plant located at the round-houses; or adjacent to the railroad right of way; it sometimes being impractical to furnish all the water supply stations along the line with water-softening equipment. Hence, locomotives frequently have to be laid off to permit cleaning out or renewing parts of the boiler to free the boiler of corroded parts or of the mineral incrustations caused by the use of more or less untreated hard water in the boiler.

One object of my present invention is to provide a simple and efficient water treating device that, when employed in locomotive use, may be mounted on the feed pipe of the locomotive itself so as to insure the treatment of all water that goes into the boiler. Another object is to provide a simple and inexpensive water-treating tank adapted to contain a suitable chemical, which may be directly interposed in, and in part constitute a section of, the feed pipe and be at all times in free communication through a single inflow and outflow duct with the latter. Still another object of the invention is to provide a water-softening device of such a nature that the solution of the chemical or chemicals therein shall be facilitated by the pulsations of the feed water caused by the feed pump or other injector acting through an air cushion created in the chemical-containing tank.

Other objects and attendant advantages of the invention will be apparent to persons skilled in the art as the same becomes better understood by reference to the following detailed description taken in connection with the accompanying drawing in which I have illustrated a practical and approved embodiment of the principle of the invention, and wherein—

Fig. 1 is a side elevation of my improved water-treating feed pipe attachment shown mounted on a locomotive water feed pipe;

Fig. 2 is an enlarged longitudinal section through the tank and its feed pipe section,

herein shown as formed integral therewith;

Fig. 3 is a vertical cross-section on the line 3—3 of Fig. 2.

Referring to the drawing, 5 designates a tank preferably of cast steel or any other suitable material of sufficient strength to safely withstand boiler pressure located any place on the feed line between the boiler check and the feed water injector or pump. As shown, this tank is of substantially cylindrical form and is made at its ends with tapped openings 6 through which any suitable water treating chemical may be introduced into the tank; said openings being normally closed by threaded plugs 7, or any similar fittings used for such purposes.

Below the tank 5 and preferably cast integral therewith is a hollow cylindrical section 8, likewise provided with tapped holes 9 in its ends to receive the threaded ends of pipes 10 and 11 which constitute parts of the boiler feed pipe leading from the usual feed pump or injector (not shown). In the construction shown, the lower cylinder 8 manifestly becomes a part or section of the boiler feed pipe; the water flowing there-through in the direction indicated by the arrows.

Integral with the bottom of the cylinder 5 is an upstanding nipple 12 preferably reaching to about mid-height of the cylinder and preferably inclined toward one of the openings 6 to facilitate inspection and cleaning through said opening when required.

Provision is made for draining the tank 5 when necessary by a drain pipe 13 entered into a laterally offset level portion 5^a of the bottom of the tank; said drain pipe being opened and closed by a cock 14.

This tank may be located anywhere on or adjacent to the feed line, between the boiler check and the feed water injector or pump.

In the use of the apparatus, the tank 5 having been charged with suitable chemicals or other material for treating the water or the interior of the boiler, the tank is closed by the plugs 7, when the feed water injector or pump is put into operation, part of the feed water rushes into the tank through the nipple 12, dissolving the material therein, and compressing the body of

air trapped in the top portion of the tank, thereby forming an air cushion which reacts against the pressure of the incoming water. As this pressure is more or less of a pulsating character, the compressed air co-operates therewith to effect a rising and falling and churning movement of the water and material in the tank, and between successive pulsations enough of the chemically treated water returns through the nipple 12 into the main line of flow and passes thence into the boiler to effectuate the purposes of the device.

From the foregoing it will be seen that, as applied to locomotive practice, the present invention presents a distinct improvement upon both water softening plants and boiler clean-out plants located at fixed division or other points along the line, in that it constitutes part of the locomotive equipment and insures that all of the water going into the boiler shall be treated either for purposes of correcting the water or for purposes of eliminating scale previously formed in the boiler or retarding corrosion. The invention thus saves the time commonly lost in laying up locomotives in the roundhouse for necessary boiler conditioning.

While I have herein shown the device as made in a single piece conveniently adapted for insertion directly in the boiler feed pipe, it is manifest that the tank 5 may be made without the feed pipe section 8, and connected by a suitable pipe connection having an upwardly projecting nipple such as 12 to the feed pipe. In other respects also the specific structural details may be varied from

those shown without departing from the principle or sacrificing any of the advantages of the invention.

I may also mention that while the device of my invention is peculiarly well adapted to locomotive practice, it may manifestly be employed to the same advantage as an accessory of stationary boilers.

I claim—

1. In a device of the character described, the combination with a feed water pipe, of a tank to contain material for feed water or boiler treatment provided with a normally closed filling opening, said tank formed on its lower side with an integral hollow elongated member adapted to be interposed in, and form a part of, said feed water pipe, and a nipple extending from said hollow member upwardly into said tank and inclined toward said opening, to facilitate the cleaning of said nipple through said opening.

2. In a device of the character described, the combination with a feed water pipe, of a closed tank to contain material for feed water or boiler treatment, said tank formed on its lower side with an integral hollow elongated extension adapted to be interposed in said feed water pipe between the feed pump or injector and the boiler check-valve, and constitute a section of said pipe, and a nipple having an unrestricted flow passage extending from said hollow extension upwardly into said tank, and serving both the inflow and return flow of water to and from said tank.

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