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F. O. PAIGE

METHOD OF TREATING BOILER FEED WATER

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Fig. 1.

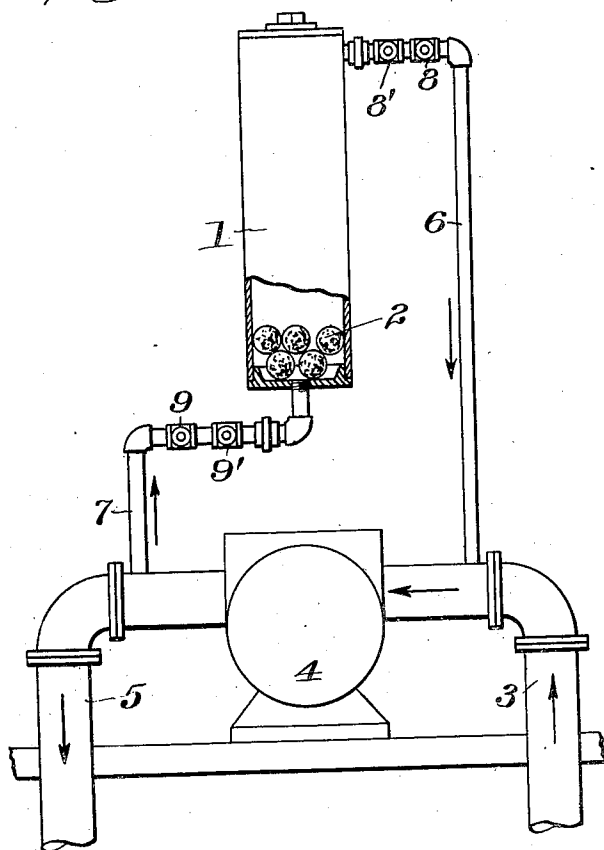
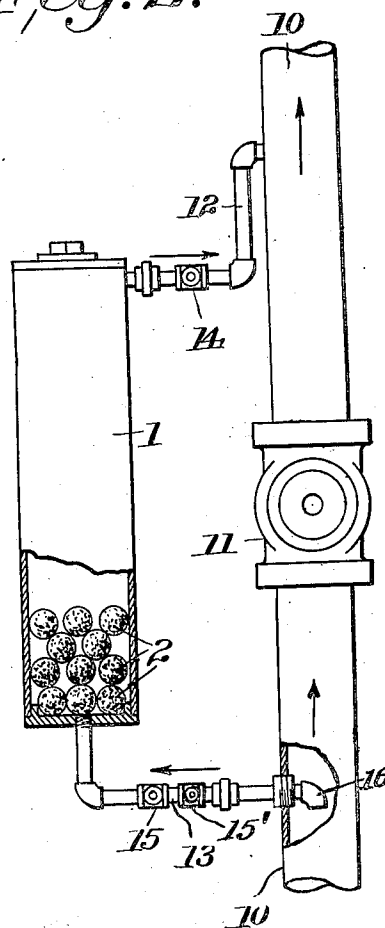


Fig. 2.



Inventor.

Fred O. Paige,

By Frederick V. Winters

Attorney.

UNITED STATES PATENT OFFICE.

FRED O. FAIGE, OF NEW YORK, N. Y.

METHOD OF TREATING BOILER FEED WATER.

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This invention relates to a method of treating the water to be used in locomotive boilers in order to remove scale, oil and grease and prevent foaming, pitting, corrosion and galvanic action in said boilers.

It has been found quite difficult for a railroad company to satisfactorily treat the water used in locomotive boilers by placing chemicals either in the boilers or tender tanks because of the great variety of water used along the line of the railroad. Where a chemical treatment may be suitable for one kind of water it may be detrimental when applied to another kind of water. It is, therefore, desirable to treat the water at its source, or in the wayside tank, providing it can be done satisfactorily. Attempts have been made to apply the chemicals to the wayside tanks in liquid or powdered form through various feeding devices, but they have not been satisfactory.

The object of the present invention is accomplished by providing a method or system of supplying the chemicals to the wayside tanks of a railroad in such a form and in such quantities as will permit the proper treatment of various compositions of water available in different localities or points along the railroad. The invention will be first hereinafter described in connection with the accompanying drawings, which constitute part of this specification, and then more specifically defined in the claims at the end of the description.

In the accompanying drawings, wherein similar reference characters are used to designate corresponding parts throughout the several views:—

Figure 1 is an elevation of the apparatus used in the practice of the present invention when a pump is employed for feeding the water through the chemical holding reservoir or container.

Figure 2 is a similar view of the apparatus used where no pump is employed.

The proportionate quantity of the chemical compound used in the treatment of the water actually consumed at a wayside station in a given set time is first determined and the amount of water allowed to pass through the chemical container or reservoir 1 is made dependent on the observed or known time it takes to dissolve the thus determined quantity of chemical compound when in the form of compressed balls, spheres, or the like, with respect to the flow

of the water through the container. In order to insure the uniform dissolution of the chemical compound it is prepared in ball or spherical shape and compressed to such a constituency that it will take anywhere from 8 to 24 hours for it to dissolve under conditions such as prevail in the reservoir 1 wherein the balls are subjected as mobile units to the dissolving flow of passing water. These spherical pieces of the chemical compound are indicated at 2 in the containers 1 in Figures 1 and 2, said containers being shown partly in section. While the spherical shape of the pieces or chemical compound are preferably used because it ensures uniform dissolution and maintenance of its shape until entirely dissolved, it will be understood that other shapes may be used which give substantially the same results. Said pieces of chemical compound are also preferably made in pound size so that it is not necessary to measure or weigh them to determine the number to be placed in the container 1 to meet any particular requirements, but the size as well as the shape of said pieces may be varied if desired.

Where a comparatively small amount of chemical compound is required to treat the water in a particular wayside tank, the container or reservoir 1 is made smaller than where the water in another tank requires a greater amount of said chemical compound. Any number of different sizes of containers or reservoirs may be employed as may be necessary to meet different requirements. It will be noted that inasmuch as the size and number of balls or chemical compound which will be dissolved in a certain quantity of flowing water in a given time is known, the dimensions of the several sizes of containers may also be determined with reference thereto. Thus, when the composition of the water to be treated requires only from 1 to 5 balls of the chemical compound to be dissolved in 24 hours, a container 6 inches in diameter and 15 inches in length may be used, while if from 6 to 25 balls of the compound are to be dissolved in 24 hours to meet the requirements of another compound of water, then a container, which is 8 inches in diameter and 30 inches in length would be employed. The size and shape of the containers may, however, obviously be varied according to requirements.

In Figure 1 the pipe 3 is used for pumping water from a well (not shown) by means of

the pump 4, the water being discharged from the pump into the tank (not shown) via pipe 5. A by-pass pipe 7 leads from the pipe 5 to the bottom of the container 1 while another by-pass pipe 6 extends from the top of said container to the pipe 3, so that water is by-passed through said container around the pump when the latter is in operation. As indicated by the arrows, the suction from the pump draws water from pipe 5 through by-pass 7 into the bottom of the container 1 and out the top of said container via by-pass pipe 6 to pipe 5. In passing through said container the water is impregnated with the chemical dissolved from the balls 2, and said impregnated water is drawn through the pump from pipe 3 to pipe 5 and delivered by the latter pipe to the tank.

It will be noted that the water by-passed around the pump so as to circulate through the chemical container 1 enters said container at the bottom below the balls 2 and flows out of the top of said container so that there is no tendency for the balls to clog up the outlet pipe as would be the case if the outlet were in the bottom just below the balls where the inlet is in the present apparatus. It will also be noted that two valves may be arranged in either or both of the pipes 7 and 6, so that one valve may be set or adjusted to permit just the desired amount of water to by-pass the pump, according to the quantity of chemical it is desired to have dissolved in a given time and supplied to the wayside tank, while the other valve in the same pipe operated for turning the system on or off without disturbing said set or adjusted valve. As shown in Figure 1 two valves 9 and 9' are placed in the pipe 7 and two valves 8 and 8' also arranged in the pipe 6. Either of the valves in either of said pipes may be used as the setting valve and the other used for turning the system on or off. For instance, valve 9' may be adjusted or set at any desired point and left there, and the system then turned off or on by means of the valve 9, or the same result may be accomplished by a similar use of the valves 8 and 8'.

In Figure 2 the pipe 10 through which the water is conducted to the wayside tank (not shown) has a valve 11 therein and by-pass pipes 13 and 12 leading from said pipe 10 at opposite sides of said valve 11 to the bottom and top, respectively, of the container 1 for the chemical compound balls 2. This form of the invention is designed to be used without a pump where water under pressure of city mains or the like is available. The water passes through said pipe 10 in the direction indicated by the arrows and is controlled by said valve 11. The pipe 13 leading to the bottom of the container 1 is fitted with an elbow 16 facing the oncoming current of water in the pipe 10, whereby

some of said water is deflected or by-passed through said pipe 13, the chemical container 1 and pipe 12. It will be noted that the water enters the bottom of said container and flows out the top thereof, as in Figure 1. The by-pass pipe 13 is fitted with two valves 15 and 15' serving the same purpose as the valves 9 and 9' or 8 and 8' in Figure 1, while the pipe 12 is fitted with a single valve 14 although two valves may be used therein if desired.

In order to distinguish the form or condition of the chemicals used by me from solutions, powders or small granules, the use of which I do not claim, I state in my claims that the chemicals are in the form of agglomerated units. While I have stated that I may use these chemicals in pound units, it is obvious that I may employ them in units of larger or smaller size, but the size should not be so small as to approach too closely the form of mere granules not permitting a substantially free passage of water between them or rendering them liable to be carried as units out of the container by the flow of the water.

I claim:

1. The method of treating water with boiler compounds at a wayside tank for subsequent use in locomotive boilers, which comprises establishing a flow of such water to the wayside tank, simultaneously diverting a portion of said flow, passing said diverted portion over chemicals in the form of agglomerated units, in such a manner as to cause a dissolution of the chemicals and maintain only such a concentration as not to cause substantial precipitation in the untreated portion irrespective of whether the flow is continuous or intermittent, and reuniting said chemically treated portion of the water with the untreated portion.

2. The method of treating water with boiler compounds at a wayside tank for subsequent use in locomotive boilers, which comprises establishing a flow of such water to the wayside tank, simultaneously diverting a portion of said flow, passing said diverted portion upwardly through chemicals in the form of agglomerated units, in such a manner as to cause a dissolution of the chemicals and maintain only such a concentration as not to cause substantial precipitation in the untreated portion irrespective of whether the flow is continuous or intermittent, and reuniting said chemically treated portion of the water with the untreated portion.

3. The method of treating water with boiler compounds at a wayside tank for subsequent use in locomotive boilers, which comprises establishing a flow of such water to the wayside tank, simultaneously diverting a portion of said flow, passing said diverted portion through chemicals in the form of agglomerated units located within a liquid

container and resting substantially on the entire bottom thereof, in such a manner as to cause a dissolution of the chemicals and maintain only such a concentration as not to cause substantial precipitation in the untreated portion and reuniting said chemically treated portion of the water with the untreated portion.

4. The method of treating water with boiler compounds at a wayside tank for subsequent use in locomotive boilers, which comprises establishing a flow of such water to the wayside tank, simultaneously diverting a portion of said flow, passing said diverted portion through chemicals in the form of agglomerated units within a substantially sealed liquid container, in such a manner as to cause a dissolution of the chemicals and maintain only such a concentration as not to cause substantial precipitation in the untreated portion irrespective of whether the flow is continuous or intermittent and reuniting said chemically treated portion of the water with said flow.

In testimony whereof I have signed my name to this specification.

FRED O. PAIGE.