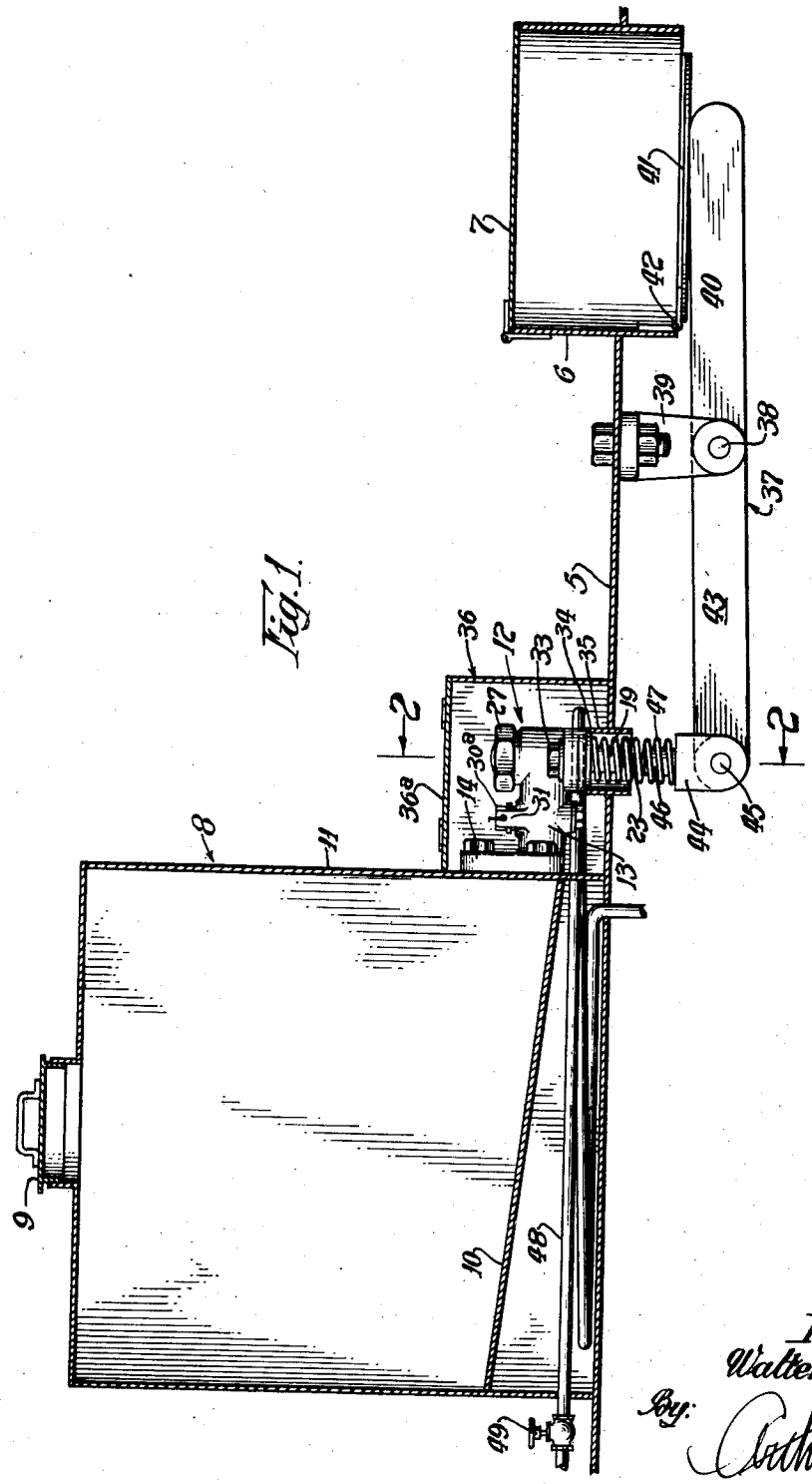
June 10, 1941. W. H. HINSCH 2,244,698

FLUID TREATMENT APPARATUS

Filed Jan. 20, 1938 2 Sheets-Sheet 1



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FLUID TREATMENT APPARATUS

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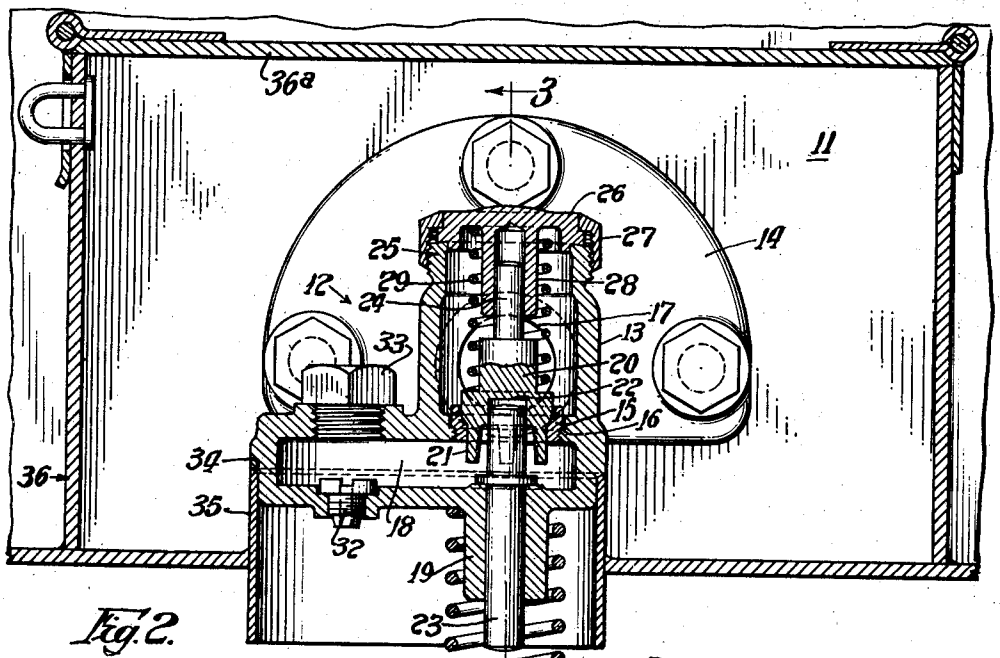


Fig. 2.

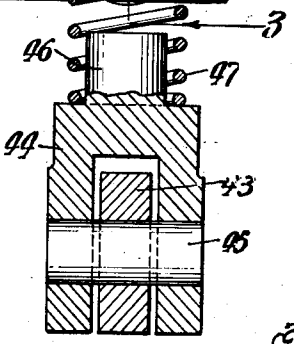


Fig. 4.

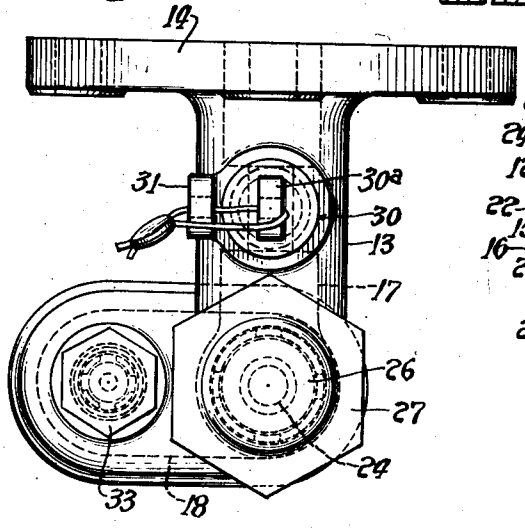
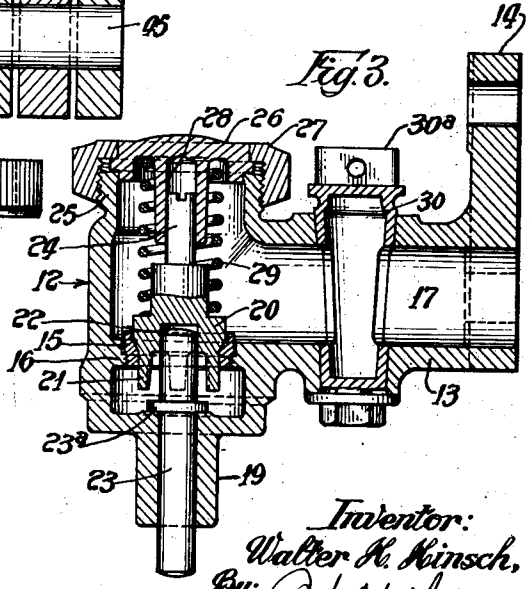


Fig. 3.



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Patented June 10, 1941

2,244,698

UNITED STATES PATENT OFFICE

2,244,698

FLUID TREATMENT APPARATUS

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Application January 20, 1938, Serial No. 185,856

4 Claims. (Cl. 210—30)

This invention relates to improvements in fluid treatment apparatus and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The present invention is more particularly concerned with apparatus for use in connection with the tender tank of a locomotive for treating the water thereof concurrently with the taking on of untreated water. Apparatus hereto devised for tender tank water treatment is open to certain objections. In some instances the jarring and jolting caused by rough roadbed conditions, produces actuation of certain of the parts to an extent sufficient to discharge reagent into the tender tank and destroy the desired proportioning between reagent and water. Also, in some apparatus of this kind, tampering with certain parts to make them inoperative, is often in evidence. Again, other parts thereof are so disposed as to be inaccessible for servicing or required draining of the reagent from the holder therefor, for such servicing.

One of the objects of the present invention is to provide a fluid treating apparatus especially adapted for use in connection with locomotive tender tanks, which avoids the objections above mentioned in connection with apparatus of this kind now in use.

Another object of the invention is to provide apparatus of this kind, which is more accurate and positive in its use and is not affected by rough road bed conditions.

A further object of the invention is to provide apparatus of this kind, which is substantially tamperproof and is readily adapted for servicing without requiring the drainage of the treatment reagent for that purpose.

The above mentioned objects of the invention, as well as others, together with the several advantages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a longitudinal vertical sectional view through the top end portion of a locomotive tender tank to which the improved apparatus has been applied.

Fig. 2 is a transverse vertical sectional view on an enlarged scale, through a part of the apparatus as taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view through a control valve embodied in the apparatus, the plane of the section being indicated by the line 3—3 of Fig. 2.

Fig. 4 is a top plan view of the valve appearing in Fig. 3.

The improved apparatus is herein illustrated and is herein described as embodied in a locomotive tender for treating the water supplied to the reservoir or tank thereof with a proportioned amount of reagent, but this is to be considered only in the illustrative sense and not in a limiting sense.

Referring now in detail to that embodiment of the invention illustrated in the accompanying drawings, 5 indicates as a whole the top horizontal wall of the reservoir or tank of a locomotive tender of conventional construction and having a water inlet or manhole 6 provided with a cover 7. Also mounted on the wall 5 is a container or holder 8 for a supply of reagent adapted to be discharged into the reservoir or tank as will later appear. As shown herein, the holder which is adapted to hold a reagent in liquid or fluid form, has a filling opening in its top with which is associated a cover 9. The bottom wall 10 of the reagent holder is preferably inclined downwardly toward one of the upright walls 11 thereof as appears in Fig. 1.

12 indicates as a whole, a valve for controlling the discharge of reagent from the holder 8 into the tender tank. This valve includes a hollow body 13 having a vertical flange 14 bolted to a bottom portion of the wall 11 about an opening therein so that the reagent flows into the valve body. A valve seat bushing 15 is removably secured in a horizontal wall part 16 of the body and which wall part separates the inlet passage 17 of the body from a laterally extending outlet passage 18. Below the bottom of the passage 18, in line with the valve seat bushing 15, the body is formed with a boss 19 in which a certain valve stem has guided bearing as will later appear.

A valve member 20 is engaged on the seat of the bushing 15 so as to normally close off communication between the inlet and outlet passages 17 and 18. This valve member is formed at its bottom end with depending, arcuately spaced guides 21 for sliding engagement in the bushing 15 so that this end of the valve member has a guided movement in the bushing. In the bottom of the valve member is a downwardly opening axial recess 22 to receive the top end of an actuating stem 23, the bottom portion of which has sliding bearing in the boss 19 and extends a suitable distance below the same. A shoulder 23a on the stem so engages on the top end of the boss 19 as to limit the downward movement of the stem to a definite position. On the top side of the valve member 20 is an axial boss and extension 24.

The valve body is further formed to provide an

upwardly opening tubular neck 25 arranged axially of the valve member 20. A disk-like cap 26 closes the neck and is removably secured in place by a bonnet ring 27 threaded onto the neck. The cap includes a depending sleeve 28 in which the extension 24 of the valve member 20 has sliding guided engagement. An expansion spring 29 is disposed between the valve member 20 and the cap 26 and operates normally to hold the valve member against its seat in the bushing 15. It is apparent from the above that the valve member is so engaged at its top and bottom as to have a true guided movement.

The valve body 13 is formed between the flange 14 and the valve member 20 to receive a plug valve 30 whereby the passage 17 may be opened or closed. The head 30a of the plug valve and an upstanding boss 31 on the valve body are formed to receive a seal as shown in Fig. 4 and which seal is employed to lock this valve in its open condition.

32 indicates an orifice nipple threaded into the bottom wall of the body at a point laterally of the valve member 20 so as to communicate with the outlet passage 18 of the valve body. A removable plug 33 is provided in the body above the nipple and which plug permits access to the nipple for inspection and servicing. The body and its lateral extension is formed to provide an annular tapered shoulder 34 which seats in sealing engagement upon the top edge of a collar 35 opening through the top wall 5 of the tender tank. This collar surrounds the bottom end of the valve body as a whole and forms the passage by which the reagent discharged through the orifice nipple, passes into the tank to mix with the water therein. To prevent tampering with the valve 12 as a whole, it is enclosed in a box-like casing 36, engaged with both the top wall 5 of the tender and the wall 11 of the reagent holder. This casing is provided with a hinged cover 36a which may be locked in its closed position, such as by a seal or padlock.

Within and extending longitudinally of the tender tank is a valve actuating lever 37 which is pivoted at a point 38 between its ends to a fulcrum bracket 39 depending from the bottom surface of the wall 5 at a point between the manhole 6 and casing 36. One end of said lever constitutes an arm 40 which extends into that area outlined by the manhole 6. This end of the arm normally engages the underside of a screen or paddle 41 of considerable area which is pivoted or hinged as at 42 to a portion of the bottom edge of the manhole. Preferably the area of this screen or paddle, when compared to that of the manhole, is such as to substantially proximate the same. Thus, when water is being discharged into the manhole as from a water column, a penstock or like wayside water supply, said water is bound to engage the screen or paddle, the force or pressure of the water swinging the screen or paddle downwardly.

The opposite end of the lever 37 constitutes a second arm 43 which terminates at about the axial plane of the valve stem 23. A clevis 44 is pivoted as at 45 to the arm 43 and carries an upstanding boss 46, the clevis forming a seat for one end of a spring 47, the other end of which surrounds the boss 19 of the valve body 13. When the arm 40 of the lever 37 is depressed, the arm 43 is elevated to first compress the spring 47, after which the boss 46 engages the valve stem 23 to raise the same and thus lift the valve member 20 off its seat as provided by the bushing 15, said spring normally urging the lever arm 43 downwardly. Thus the spring constitutes a yielding lost motion connection between the lever arm 43 and the valve stem 23.

A steam coil 48 is disposed beneath the bottom wall 10 of the holder and a portion of said coil is disposed within the casing 36 in a manner to surround the valve 12 therein. A valve 49 is provided in the inlet end of this coil and its outlet end is arranged to pass through the wall 5 to discharge into the interior of the tank. This coil may be connected to a convenient steam line of the associated locomotive and its function is to prevent freezing of the reagent in the tank and the freezing up of the valve in weather of low temperature.

Assume that it is necessary to take on a supply of water for the tank of the tender. The manhole cover 7 is swung into its open position and water is discharged from a penstock or column through the manhole 6 into the tank. The stream of water, of course, impinges against the screen or paddle 41 and swings it downwardly, the amount of such movement being dependent upon the volume and pressure of the water stream passing through the manhole. As the arm 40 of the lever 37 is engaged with the underside of the paddle or screen, it swings downwardly therewith about the pivot 38 for said lever. This swings the other arm 43 of said lever upwardly, and the initial part of said swing is absorbed by the spring 47, after which the boss 46 of the clevis 44 engages the bottom end of the valve stem 23. The valve stem 23 is then moved upwardly against further action of the spring 47 to lift the valve member 20 off its seat on the bushing 28 against the action of the spring 29.

With the plug valve 30 in its open position, reagent fluid may now flow through the passage 17, bushing 15 into passage 18 out through the orifice nipple 32 for discharge through the collar 35 into the water in the tank. By reason of the turbulence produced in the tank by the incoming water, a thorough mixture of the water and reagent is had.

When the desired amount of water has been taken on, the penstock or column is closed off so that the discharge of water into the manhole ceases. Both of the springs 47 and 29 which were previously under compression now expand to their normal condition. In this expansion of said springs, the valve member 20 is forced by the spring 29 into engagement upon its seat in the bushing 15, closing off further passage of reagent through the valve. The expansion of the spring 47 then returns the lever 37 to normal position along with the screen or paddle 41. In this position the boss 46 on the clevis 44 is spaced from the bottom end of the valve stem 23.

In the passage of the tender over a rough road bed, the jarring and jolting the tender receives tends to cause a limited rocking movement of the lever 37, which is resisted by the spring 47 to an extent which prevents engagement of the boss 46 with the valve stem. Thus, under rough road bed conditions, the tendency of the lever 37 to rock and actuate the valve to open the same is overcome so that there is no irregular opening and closing of the valve to destroy the proportioning between water and reagent.

Assume that it is desired either to inspect or service parts of the valve 12. The cover 36a for the casing 36 is opened, the seal for the plug valve 30 is removed and said valve is closed to prevent the passage of reagent through the inlet

passage 17 of the valve. By removing the bonnet 27 and cap 26, full access is had to the parts associated with the valve member 20. Should it be desired to inspect the orifice nipple 32, the plug 33 may be removed, thus exposing the nipple for removal and replacement. Thereafter the parts of the valve 12 as a whole are replaced, the plug valve 30 opened and sealed in this position and the cover for the casing 36 closed and locked and the parts are ready for future operations.

It is to be observed from Fig. 1 that the top edge of the manhole extends a considerable distance above the top edge of the collar 35. In some instances, engine crews will fill the water to a level a short distance below the top edge of the manhole, which is above the top edge of the collar 35. However, due to the seated fit, as provided between the shoulder 34 on the valve casing and the top edge of the collar 35, no water can leak through at this point to spill over onto the deck of the tender as provided by the top wall 5 of the tank.

It is apparent from the above that accidental opening of the valve 12 cannot occur under rocking movement of the lever 37 by reason of rough road bed conditions, so that the proportioning ratio is maintained substantially constant. As the reagent controlling valve is disposed outside the tank, it may be readily serviced and this without requiring the draining of the reagent holder.

While in describing the invention I have referred in detail to the form, arrangement and construction of the parts involved, the same is to be considered only in the illustrative sense and not in the restrictive sense so that I do not desire to be limited thereby except as may be specifically set forth in the appended claims.

I claim as my invention:

1. In combination with the tank of a locomotive tender having a filling opening, means on the tender for holding a supply of reagent, means providing a passageway for the movement of reagent from said supply into said tank, means for controlling the movement of reagent through said passageway, means movable in response to the untreated water entering the tank through the filling opening and including a part adapted to engage said controlling means for actuating the same, and means providing a lost motion connection between said controlling means and said part of said movable means.

2. In combination with the tank of a locomotive tender having a filling opening, means on the tender for holding a supply of reagent, means providing a passageway for the movement of reagent from said supply into said tank, means for controlling the movement of reagent through said passageway, means movable in response to the water entering the tank through said filling opening and including a part adapted to engage said controlling means for actuating the same, and yielding means associated with said part for absorbing the initial portion of the movement of said part into actuating engagement with said controlling means.

3. A fluid treating apparatus comprising in combination with the tank of a locomotive tender having a top wall with a filling opening therein, means on said tender for holding a reagent supply, means providing a passageway for the movement of reagent from said supply into said tank, means accessible from outside the tank and the supply holding means respectively for controlling the movement of reagent through said passageway, and means in said tank and having a part so arranged with respect to the filling opening as to be actuated by the untreated water as it is discharging through the filling opening and having a second part arranged to engage and actuate said controlling means.

4. A fluid treating apparatus comprising in combination with the tank of a locomotive tender having a top wall, means providing a filling opening for said tank having its top edge disposed at an elevation above that of the said top wall, a second tank on said tender tank for holding a supply of reagent, means providing a second opening in said top wall for the discharge of reagent therethrough into the first mentioned tank and having its top edge disposed at an elevation below the elevation of the said filling opening, a valve casing secured to the outside of said second tank and engaged with substantially a sealing fit upon the edge of said second opening and having a passageway for the movement of reagent therethrough from said second tank into the first mentioned one, and a valve element in said casing for controlling the movement of reagent through said passageway.

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