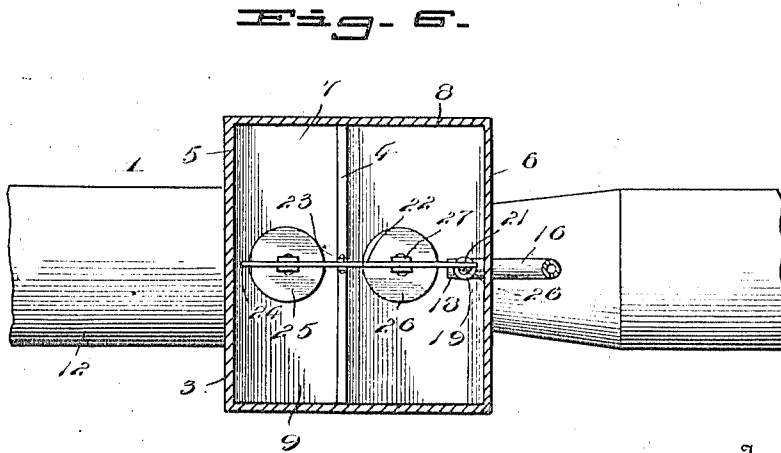
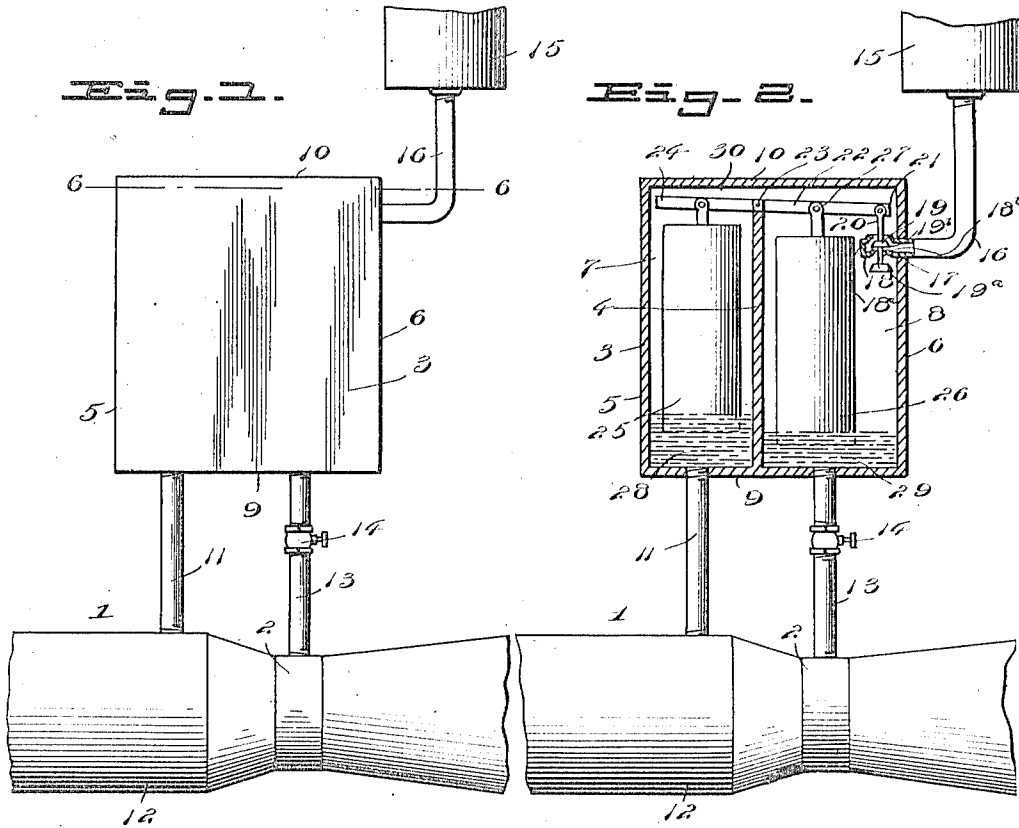


R. HILSCHER.
CHEMICAL FEED DEVICE.
APPLICATION FILED SEPT. 11, 1912.

1,063,971.

Patented June 10, 1913.

2 SHEETS-SHEET 1.



Inventor
Ralph Hilscher

Witnesses.

C. E. Kempel,
Dudley B. Howard

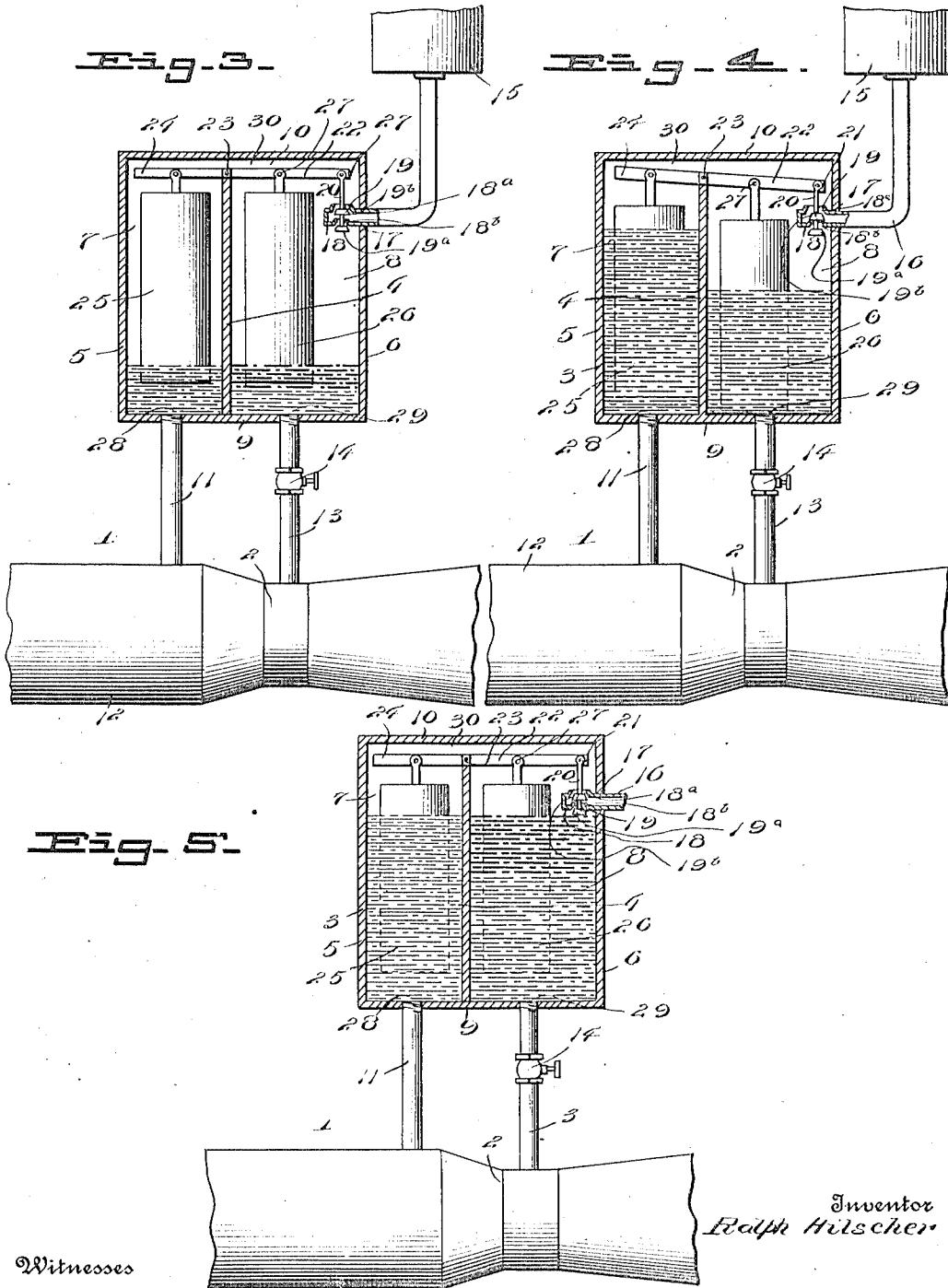
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UNITED STATES PATENT OFFICE.

RALPH HILSCHER, OF URBANA, ILLINOIS.

CHEMICAL-FEED DEVICE.

1,063,971.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed September 11, 1912. Serial No. 719,794.

To all whom it may concern:

Be it known that I, RALPH HILSCHER, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Illinois, have invented new and useful Improvements in Chemical-Feed Devices, of which the following is a specification.

My invention relates to a device for feeding a chemical solution into a water main, or the like, the primary object thereof being to provide means for introducing the solution into the water passing therethrough at a rate directly proportional to the rate of flow of the water in the main. In accomplishing this object, a portion of the main is constricted in cross sectional area by introducing a reduced section, or otherwise, and two water columns are established, one being connected with the full section of the pipe in advance of the reduced section, with respect to the direction in which the water is flowing, and the other water column being connected with the reduced section. The upper portions of these columns are connected with a receptacle. The water column which is connected to the reduced section of the main is provided with an adjustable valve, which may be regulated to afford a predetermined size of orifice for the passage of solution into the main upon flow of water therethrough. Means is also provided within the receptacle for the introduction of chemical solution into the second-named water column, so as to artificially build up and maintain an effective head on the orifice, said means being directly controlled by the effective head. By the term "effective head" is meant substantially the vertical distance from the water level in the first column down to the water level at which the water in the second column would stand were the inlet valve, or means for introducing the chemical solution, kept closed, this difference in level being caused by the pressure within the main as affected by the peculiar construction of the water main at this point. Upon fluctuations of velocities of flow in the main, the relative heights of the water levels in the two columns are correspondingly changed, the levels in the second column being lower than the levels in the first column when there is any flow through the main. The means provided for regulating the admission of chemical solution into the second column, by adjustment

of the inlet valve, is constructed so as to be operated by such changes in the levels of liquids within the two columns, or in other words, the said means operates in direct proportion to the change in the effective head on the orifice, the size of which latter has been previously determined.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a fragmentary front elevation of the specially constructed water main showing the device attached. Fig. 2 is a longitudinal, vertical sectional view taken through the same, showing the difference in heights of the liquids within the water columns when the pressure in the main is at its minimum, and the position of the admission valve as effected by the same. Fig. 3 is a similar sectional view showing the position of the valve when a balance between the two columns has been established by the introduction of a certain amount of chemical solution in the second column. Fig. 4 is a similar view showing the valve open wide under maximum pressure conditions in the main, and before a balance has been established. Fig. 5 is a similar view showing the position of the valve after a balance has been established, when the pressure in the main is at its maximum. Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 1.

In the drawings, 1 designates the water main which is reduced in diameter, as at 2. Adjacent to this portion of the main, I have provided a casing or chamber 3 having a transverse partition wall 4 located between the ends walls 5 and 6 thereof, and which extends from the bottom wall 9 of the casing nearly to the top wall 10 thereof, leaving the two compartments 7 and 8 open into each other at their upper ends. Under certain conditions of installation, hereinafter described, it will be necessary to have this casing of air-tight construction, as just described, while, under other conditions, air-tightness will not be necessary. A pipe 11 connects the full section 12 of the main 1 with the lower end of the first compartment 7, open communication being thus established between the same. A second pipe 13 connects the reduced section 2 of the

main with the lower end of the second compartment 8 of the casing, and an adjustable valve 14 is provided in the said pipe connection. A suitable reservoir 15 adapted to contain the chemical solution, and having means to supply the same under pressure, is provided at a higher level than the casing 3, and is connected to the compartment 8 adjacent the top wall 10 of the casing by means of a suitable pipe 16 which enters the wall 6 through an opening 17 and projects therein for a short distance, as at 18. The portion 18 of the pipe is provided with vertically alined openings 18^a and 18^b which form seats for the upwardly tapering valve plugs 19 and 19^a, respectively, the latter being secured to a vertically reciprocating valve stem 20 in spaced relation to each other and constituting as a whole the admission valve 19^b. The upper end of the valve stem 20 is attached to the extremity 21 of the lever 22, this lever being pivotally connected, as at 23, to the upper edge of the partition wall 4, its opposite end 24 extending into the compartment 7 and being attached to the upper end of a float 25 which extends nearly to the bottom of the compartment 7, so as to be supported by the liquid within this compartment. A second float 26 is provided in the compartment 8 and is attached to the opposite arm of the lever, as at 27, this float being of similar construction and dimensions as the float 25. The valve 19^b is adapted to be opened upon downward motion of the stem 20 due to a difference occurring in the heights of liquids in the two compartments.

In the operation of the device, the valve 14, which is hand controlled, is adjusted to afford a predetermined size of orifice for the passage of liquid therethrough. It will be seen, by reference to Figs. 2 and 4, that, when the pressure within the main is a minimum, the levels at which the liquids stand in the two columns are lower, as shown in Fig. 2, than the levels of the corresponding columns when the pressure is a maximum, as shown in Fig. 4. In either of these limiting cases, or in intermediate cases, when there is a flow of water through the main, the level of water within the column 29, constituted by the pipe 13 and the compartment 8 is lower than the level of the water in the column 28, which latter is constituted by the pipe 11 and the compartment 7, the float 26 being thus lower than the float 25 and the valve 19^b being correspondingly lowered, so as to permit a flow of chemical solution through the same into the compartment 8. When the chemical solution flowing into the compartment 8 raises the level of the water column 29, the float 26 will assume the same height as the float 25, a balance between the two arms of the lever being thus established and the

valve 19^b being nearly closed so as to permit a reduced flow of solution, as shown in Fig. 3. Should the velocity in the main change, the height of liquid in the water column 29 will be proportionately changed with relation to the height of liquid in the column 28, this being due to the previously described reduction in the size of the water main.

In Figs. 3 and 5 are shown the water columns under the two conditions of minimum and maximum pressure in the main, respectively, when the balance of the floats has been established and an amount of chemical is flowing into the compartment 8 through admission valve 19^b equal to the amount that is flowing into the main through the orifice 14 under the prevailing "effective head" which "effective head," as previously set forth, is that difference in levels of the two columns which would be obtained if the admission valve 19^b were held closed. Thus it will be seen that a change in the velocity of flow through the main causes a definite change in the effective head on the orifice, the size of the latter being determined by the adjustment of the valve 14, and the rate of flow of chemical solution through the said orifice into the main is directly proportionate to the prevailing velocity of the water within the main. The said effective head is thus built up and maintained by the introduction of the chemical solution into the water column connected to the reduced section of the main.

In case the static pressure in the main should be subject to variations which would cause fluctuations in the water column 28 not greater than a certain fraction of the length of the float 25, it would not be necessary for the casing to be air-tight, as shown, provided the casing were placed at the proper elevation. In case the pressure in the main should be subject to wide variations, airtightness of the casing, combined with the proper design and operation of the device, would work to maintain the heads of the water columns within the casing, which is essential to the operation of the floats. In the former case, the top of the casing could be entirely removed.

What I claim is:

1. In a device of the class described, the combination with a water main having a reduced section, of a casing disposed above the water main and including two compartments, means for establishing open communication between one of said compartments and the full section of the main in advance of the reduced section, a valved connection between the reduced section of the main and the other compartment, a source of fluid under pressure, a pipe connection between said source and the second compartment, a valve in said pipe connection, a pivoted lever mounted within the said casing, and a float disposed within each compartment and con-

nected to the adjacent arm of the lever, said lever being operatively associated with the valve.

2. In a device of the class described, the
5 combination with a water main having a reduced section, of a casing disposed above the water main and including two compartments, means for establishing open communication between one of said compartments
10 and the full section of the main in advance of the reduced section, a valve connection between the reduced section of the main and the other compartment, a source of fluid

under pressure, a pipe connection between said source and the second compartment, 1
a balanced valve in said pipe connection, a lever pivoted within said casing and operatively associated with said valve, and a float disposed within each compartment and connected to the adjacent lever arm. 2

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

RALPH HILSCHER.

Witnesses:

W. T. STRONQUIST,

A. L. WHITING.