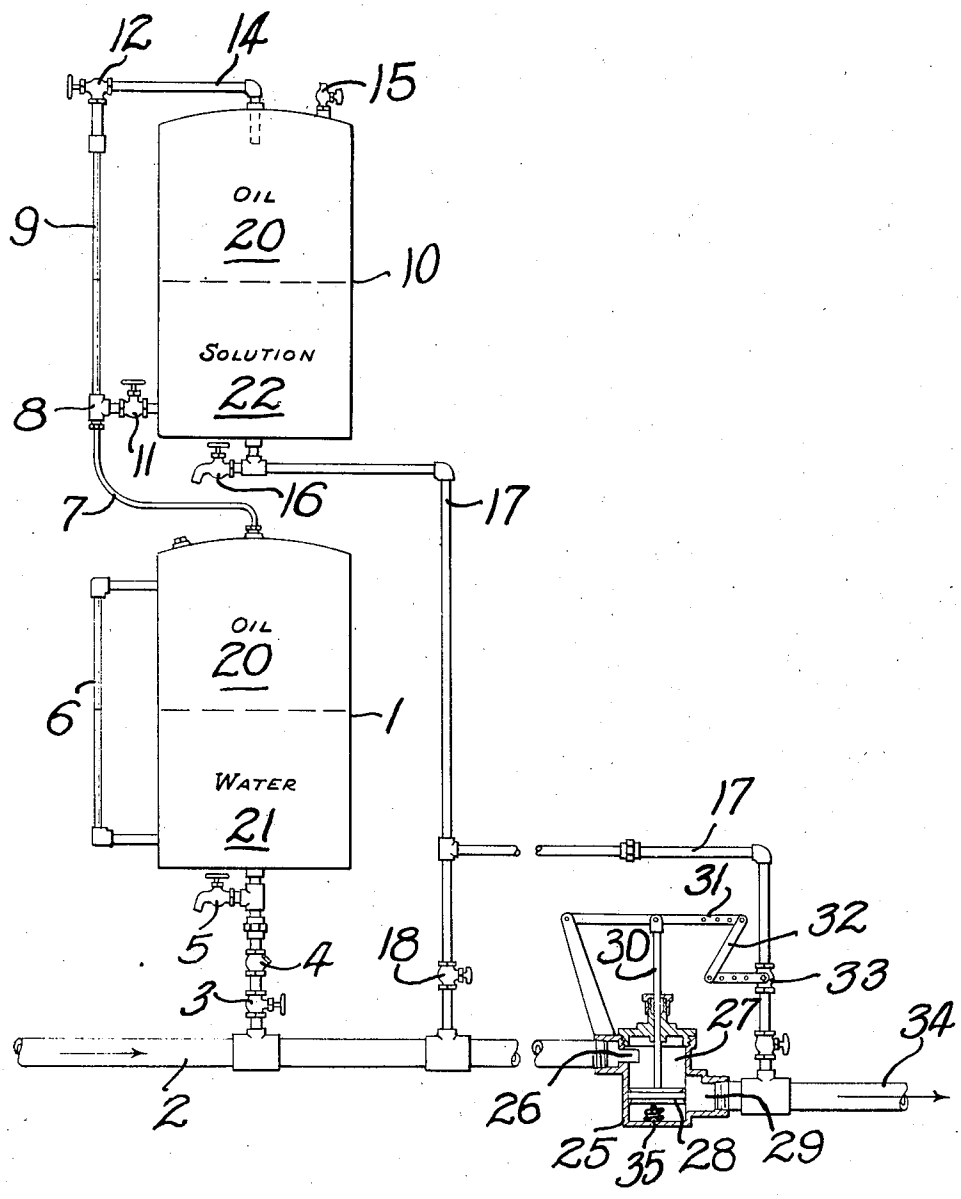
Oct. 29, 1940. R. H. CARTIER ET AL 2,219,763

PROPORTIONER

Filed Feb. 21, 1938



INVENTORS.
MILTON R. CARLTON
ROBERT H. CARTIER
BY
Lippincott & Metcalf
ATTORNEYS.

Patented Oct. 29, 1940

2,219,763

UNITED STATES PATENT OFFICE

2,219,763

PROPORTIONER

Robert H. Cartier and Milton R. Carlton,
San Francisco, Calif.

Application February 21, 1938, Serial No. 191,668

1 Claim. (Cl. 210—31)

Our invention relates to proportioners, and more particularly to a proportioner wherein the sole feeding forces are obtained by gravity.

The primary object of our invention is to provide a means for introducing small quantities of material such as a chemical solution, for example, into a pipe line.

A further object of our invention is to provide such an apparatus wherein differential pressure devices, such as Pitot tubes, venturies, etc., are unnecessary in the main pipe line.

Other objects of our invention will be apparent or will be specifically pointed out in the description forming a part of this specification, but we do not limit ourselves to the embodiment of the invention herein described, as various forms may be adopted within the scope of the claims.

Our invention may be more fully understood by direct reference to the drawing, which is a diagrammatic representation of one form of our invention, showing a preferred regulating valve partly in section.

We are aware that proportioners have been made heretofore, utilizing liquids such as oil, which are immiscible in either the material carried in the pipe or with the solution to be fed to the pipe, and wherein oil, as a typical example of such a separated material, separates the solution from the material in the pipe. Ordinarily the proportioners are applied to water lines, and light oils are used to separate the water in the pipe lines from the solution to be fed to the pipe lines. In such prior devices, however, the pressures utilized for causing the solution to be fed into the pipe have been developed by the use of some means which creates a higher pressure on the intake side of the proportioner than that on the outlet side, such differential pressure being caused by Pitot tubes, venturies, restricted valves, etc. We have found, however, that we may utilize the force of gravity alone to cause material to be fed to a pipe line, thus doing away with all differential pressure devices in the pipe line itself.

In a simple form, our invention is shown in the drawing, and here a primary tank 1 is connected at the bottom to a pipe line 2 through the customary valve 3, check valve 4 and drain cock 5. The primary tank is provided with the usual visual gauge glass 6.

The top of the primary tank 1 is provided with a preferably small outlet pipe 7, and this may be in the form of copper tubing, the copper tubing leading directly to the lower gland 8 of a gauge glass of a secondary tank 10 placed above primary tank 1. Between the lower gland 8 of gauge glass 9 and tank 10 is a shut-off valve 11, and the upper end of gauge glass 9 enters an upper valve 12, upper pipe 14 leading from valve 12 to the top of secondary tank 10. The top of upper tank 10 is provided with an air release 15.

The lower part of secondary tank 10 is provided with a drain cock 16 and a delivery pipe 17 leading directly to pipe line 2 through a shut-off cock 18. If there is a continuous flow in pipe line 2, as there is in many cases, no further apparatus is needed and no constriction or other differential pressure valve is necessary between the water intake and the delivery pipe 17.

We prefer to obtain our sole delivery pressure by positioning a body of oil, or similar material immiscible in either the liquid in the pipe line or the solution and lighter than both, 20, in the primary tank 1, and this oil is preferably lighter than water so that it will rise by gravity to the top of tank 1 above water 21 coming in from pipe line 2. Solution 22, to be fed to the line, is placed in the upper tank 10. Inasmuch as the top of primary tank 1 is connected to the top of secondary tank 10, the oil continues to rise and passes slowly through gauge glass 9 to the top of secondary tank 10, displacing the solution therein and forcing it through the delivery tube 17 into pipe line 2. Various pressures may be obtained by varying the distance tank 10 is placed above tank 1.

We have found that with all other pressures equalized, very little pressure need be developed in order to force the solution from tank 10 into pipe line 2. Furthermore, the oil 20 can be seen in gauge glass 9 as it passes upwardly through the solution to join the oil in tank 10, and the delivery can be regulated, if desired, but at all times the globules of oil passing through gauge glass 9 give visual indication that solution 22 is being fed to pipe line 2.

In case it is desired to feed the material to a pipe line having a variable flow, we may desire to use a flow regulating valve 25 in pipe line 2. This valve has an intake port 26 entering into an intake chamber 27 in which a piston 28 operates, this piston, under normal conditions, partially closing outlet 29. The piston 28 is provided with an operating rod 30 extending outside the valve connecting lever arms 31 and 32 to a needle valve 33 placed in delivery line 17. As water is drawn through outlet 34, piston 28 is pushed downwardly, due to the force of the water passing through the valve, thus opening needle valve 33 and allowing a solution to flow into the outlet 34. Upon discontinuance of flow through outlet

34, piston 28 is returned to its normal position by piston spring 35.

In view of the fact that the delivery of solution is accomplished irrespective of any pressure drop within valve 25, it is obvious that delivery pipe 17 may enter the pipe line at any position, either ahead of or behind valve 25.

We claim:

A proportioner comprising in combination with a pipe line carrying a liquid and having substantially zero pressure drop between two predetermined points, a primary tank, a connection from the bottom of said primary tank to said pipe line at one of said predetermined points, a secondary tank placed completely above said primary tank, a connection from the bottom of said secondary tank to said pipe line at the other of said predetermined points, a connection from the top of said primary tank to the top of said secondary tank, a liquid treating solution in said secondary tank, a body of liquid in said tanks immiscible with either said liquid in said pipe line or said solution and lighter than both, positioned to separate said solution from said liquid in said pipe line, the differences in weight being the sole force displacing said solution from said upper tank into said pipe line, a regulating valve positioned in the connection between the bottom of said secondary tank and said pipe line, and means exposed to the flow in said pipe line to operate said valve in accordance with the amount of flow in said pipe line.

ROBERT H. CARTIER.
MILTON R. CARLTON.