

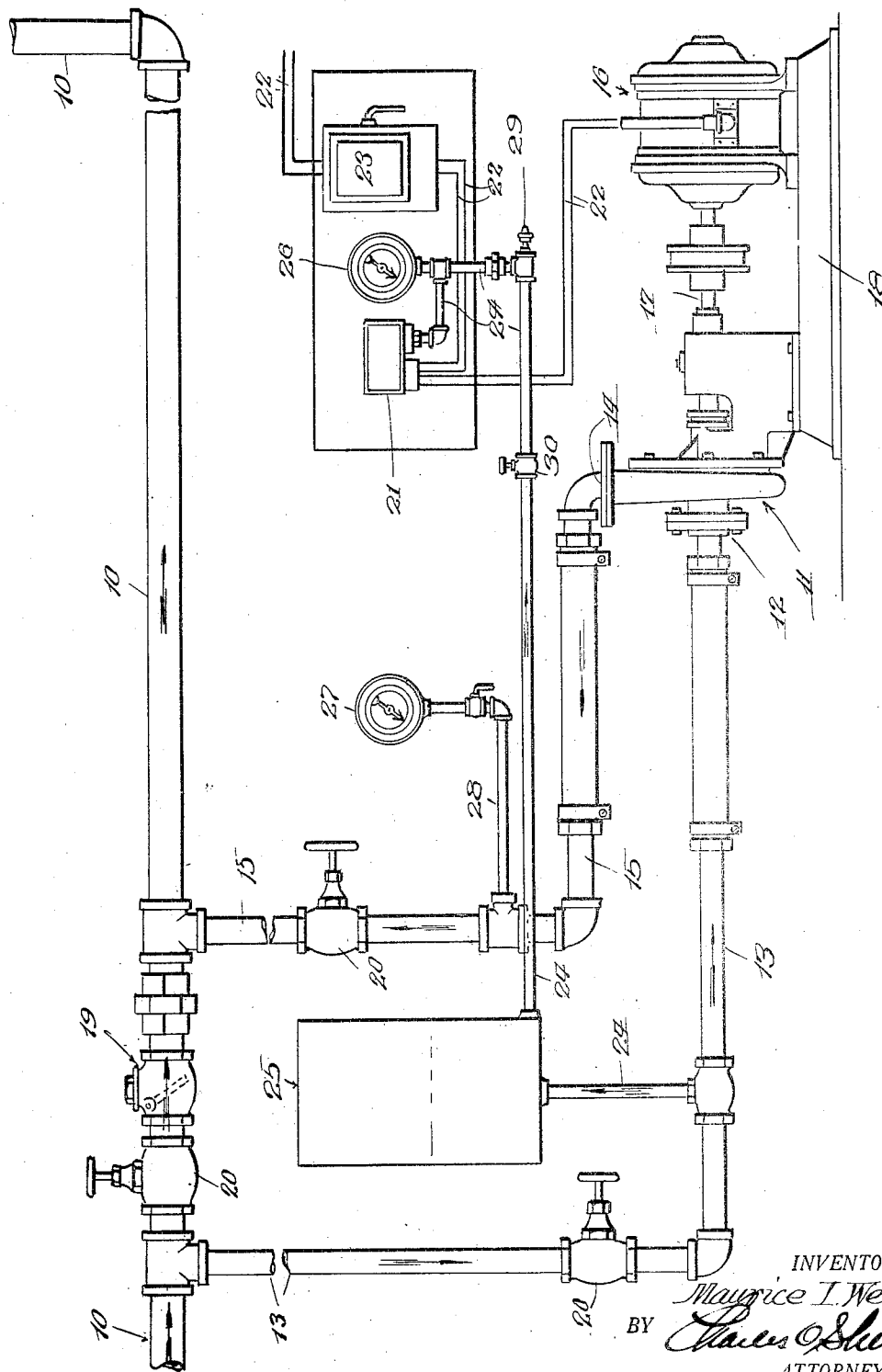
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CONSTANT WATER SUPPLY SYSTEM

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CONSTANT WATER-SUPPLY SYSTEM

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This invention relates to constant water supply systems, and its principal object is to provide automatically controlled means for constantly supplying water under pressure to the upper floors in relatively tall buildings, regardless of the fluctuation of pressure in the main supply or service pipe.

It is well known that the pressure in the city water supply sometimes becomes so low that the water is not available in the upper stories of relatively tall buildings, for instance, in buildings of three or four stories high. Such low pressure occurs particularly in the summer when a great deal of water is being used for sprinkling purposes, and it sometimes occurs when there is a fire in the locality and consequently a large quantity of water is withdrawn from the water mains for extinguishing the fire. The water pressure being thus lowered, persons in the upper floors of a building are unable to obtain water. In accordance with the present invention, water is constantly supplied to the upper floors despite the fluctuations of the pressure in the mains, and the means for supplying the water is entirely automatic in its operation requiring the ordinary care and attention for its maintenance.

The invention consists, therefore, in a pump having its suction end and its discharge end connected to the main water supply pipe of the building in which the system is installed, and having a pressure switch in communication with its suction end, arranged to cause the pump to be started whenever the pressure at the suction end falls below a predetermined point. The invention further consists in apparatus as above set forth in which the suction end of the pump is in communication with an air cushion which is also connected with the pressure switch, whereby ordinary fluctuation of pressure may not cause operation of the switch.

The invention further consists in the several novel features hereinafter set forth and claimed.

The invention is clearly illustrated in the drawing accompanying this specification in which the figure is a diagrammatic view illustrating one application of the invention.

Referring to said drawing, which illustrates a simple embodiment of the invention, the reference character 10 designates the main water supply pipe of a building, which pipe is usually connected with the water mains in the street, leads to the top of the building and has branches at the several floors provided with the usual faucets through which water is discharged. As is well understood, the normal city water pressure is sufficient to raise the water to the upper end of the water supply pipe 10, but when the pressure therein falls, the water flows very slowly through the faucets at the higher levels and sometimes it entirely stops, depending, of course, upon the pressure in the mains.

In order to preserve a substantially constant water supply at the higher floors, I provide a water pump 11, preferably in the form of an electric motor driven rotary water pump, and connect the suction end 12 of the pump with the main water supply pipe 10 by a branch pipe 13. The discharge end 14 of the pump also is connected to the main water supply pipe by a branch pipe 15. Suitable T couplings and elbow fittings are provided, as is well understood, for making the connections between the branch pipes 13 and 15 and the main water supply pipe 10. The electric motor for operating the pump is seen at 16 and is connected to the pump by a shaft 17. Conveniently, the motor and pump are mounted upon a base 18 and form a unitary structure, although this is not necessary to the invention, broadly considered.

Interposed in the main water supply pipe 10, between its connections with its branch pipes 13 and 15 is a check valve 19 opening in the direction of the arrow thereon, which valve permits the passage of water through the main water supply pipe past the connection with the branch pipe 13, but prevents the pump from forcing water back into the mains. If desired, manually operated valves may be interposed in the main water supply pipe 10 and branch pipes 13 and 15, as shown, whereby the water may be shut off at the valves for the purpose of making repairs or for any other desired purpose.

Connected with the suction end of the

5 pump 11 is a pressure switch 21 of any suitable construction, which pressure switch is interposed in the electric circuit for the electric motor 16. The electric wires 22 for the motor usually run to a control switch 23 and from thence through the pressure switch 21 and to the motor. The pressure switch is set so as to close the circuit to the motor whenever the pressure on the suction side of the pump falls below a predetermined amount, and to break the circuit to the motor whenever the pressure reaches a predetermined high point.

10 As shown, the pressure switch 21 is connected to the branch pipe 13 by a pipe 24 in which may be interposed an air cushion 25, here shown in the form of a tank into which air under pressure is admitted, which has substantially the same pressure as that of the normal pressure in the water mains. A pressure gauge 26 is usually provided on the pipe 24, whereby the pressure on the suction side of the pump may be observed, particularly when setting the pressure switch. A pressure gauge 27 may also be provided on the discharge side of the pump, which pressure gauge is connected to the branch pipe 15 by a pipe 28.

15 Conveniently, a ball valve or other check valve 29 is provided upon the pipe 24, through which ball valve compressed air may be introduced to the pressure switch 24 when adjusting the same. A valve 30 is interposed in the pipe 24 between the pressure switch 35 and air cushion 25, which valve may be closed when setting the pressure switch. Said valve, however, is normally open in order that the pressure switch may be constantly in communication with the suction end of the pump.

20 In the operation of the apparatus, the pressure switch is adjusted so as to close the circuit to the electric motor whenever the pressure on the suction end of the pump falls below a predetermined point. The pressure switch is adjusted when the apparatus is installed, and, at that time, the valve 30 is closed and a hand pump or other small air pump is connected to the ball valve 29 and the pressure in the pressure switch raised to a pressure corresponding to that of the normal pressure in the water mains. The pressure applied to the pressure switch is indicated by the pressure gauge 26, and by adjusting the mechanism of the pressure switch, it may be set so as to close the circuit to the motor when the pressure falls below the predetermined one, and to break the circuit whenever the pressure reaches a high predetermined point. The valve 30 is then opened and the apparatus is in condition for operation.

25 When the air cushion 25 is employed, compressed air is supplied to it, for instance, by the same hand pump that is used in setting the pressure switch, the pressure in the air

cushion being raised to one corresponding to the pressure in the water mains. It will be understood that when the pressure in the water mains, and, consequently, in the water supply pipe 10 remains at normal, water will be available at the top of the water supply pipe 10 as well as at any other place in its length, and while the pressure is normal the motor and pump will remain idle.

30 In case the pressure on the suction side of the pump is temporarily lowered, the pressure in the air cushion will serve to prevent the pressure switch from closing the circuit to the motor, but in case the pressure in the water supply pipe falls considerably and the pressure remains low for a sufficient length of time to lower the pressure in the pressure switch beyond the predetermined low point, then the pressure switch closes the circuit and starts the motor. The pump thereupon operates to draw the water from the main water supply pipe 10 and through the branch pipe 13 and discharge it through the branch pipe 15 and into the water supply pipe 10 at the other side of the check valve 19, thereby forcing the water to the highest outlets or faucets connected to the water supply pipe and its branches, and the pump continues to operate so long as the pressure on its suction side remains below the normal pressure in the water mains.

35 As soon as the pressure in the water mains has been restored to normal, the pressure switch is again actuated and the circuit to the motor is broken, whereby the operation of the pump is stopped and water is supplied to the highest points in the water supply pipe by the city pressure. It will be observed that the operation of the apparatus is entirely automatic, and that the operation of the pump is controlled by variations of pressure at its suction side.

40 More or less variation of the exact details of construction is possible without departing from the spirit of this invention. I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend, in the following claims, to point out all of the invention disclosed herein.

45 I claim as new, and desire to secure by Letters Patent:

1. A water supply system comprising, in combination, a water supply pipe, two branch pipes leading therefrom, a motor operated pump having its suction end and its discharge end connected to said branch pipes, there being a check valve in said water supply pipe between its connections with the suction end and discharge end of the pump, and a motor controlling pressure operated switch, in communication with the suction end of the pump.

2. A water supply system comprising, in

combination, a water supply pipe, two branch
pipes leading therefrom, an electric motor
driven rotary water pump having its suction
end and its discharge end connected to said
5 branch pipes, there being a check valve in
said water supply pipe between its connec-
tions with the suction end and discharge end
of the pump, and a pressure switch in com-
munication with the suction end of the pump
10 and interposed in the electric circuit for the
motor, said switch being arranged to close
the circuit to the motor whenever the pres-
sure at the suction side of the pump falls be-
low a predetermined point.

15 3. A water supply system comprising in
combination a city water supply pipe having
an incoming and an outgoing section, and
an upright part connected to said outgoing
section for supplying water to higher eleva-
20 tions, an electric motor operated pump hav-
ing its suction end connected to said incom-
ing section and its discharge end connected
to said outgoing section of the water supply
pipe and arranged to force water only into the
25 outgoing section of the water supply pipe,
and a pressure switch in communication with
the suction end of the pump, said pressure
switch being controlled solely by variations
of pressure in said incoming section of the
30 water supply pipe and acting to start and
stop the electric motor of the pump.

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