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METHOD OF DELIVERING FLUID TO A VESSEL CONTAINING VARIABLE PRESSURES.

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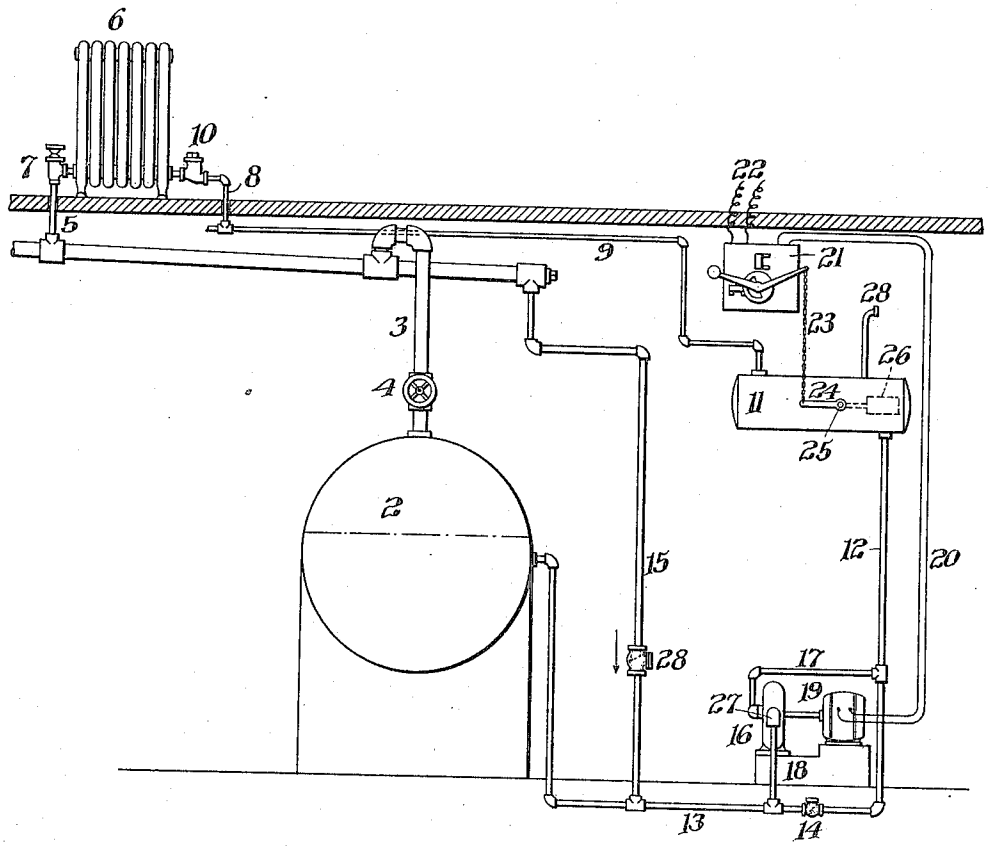

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METHOD OF DELIVERING FLUID TO A VESSEL CONTAINING VARIABLE PRESSURES.

1,145,866. Specification of Letters Patent. Patented July 6, 1915.

Original application filed December 8, 1910, Serial No. 596,198. Divided and this application filed April 29, 1914. Serial No. 835,122.

To all whom it may concern:

Be it known that I, MAX PAUL MILLER, a citizen of the United States, and resident of Collingswood, county of Camden, and State of New Jersey, have invented an Improvement in Methods of Delivering Fluid to a Vessel Containing Variable Pressures, of which the following is a specification.

The object of my invention is to provide a low pressure steam heating system with automatic means for returning the water of condensation into the boiler irrespective of any excessive pressures which may abnormally exist from any cause.

More particularly my object is to provide a gravity system of steam heating with auxiliary power means for forcing the water of condensation from the returns into the boiler whenever the pressure in the boiler increases abnormally to such extent that the normal possible static head of water in the returns will not be sufficient to return the water against said abnormal boiler pressure, the said power means being put into action under the control of the static head, whereby the low pressure operates economically under normal conditions without the use of power means for returning the water to the boiler and at the same time operates automatically to insure the return of the water to the boiler under abnormal conditions.

This application is a division of my application, Serial No. 596,198, filed December 8, 1910, on which Patent No. 1,098,676, was granted June 2, 1914, and relates to the method set out and described therein.

While my object is, more particularly, to provide a method of returning the water of condensation of a steam heating system to the boiler in an automatic manner and under the general conditions above stated, nevertheless, my invention more broadly considered, comprises a method for supplying fluid to a boiler or closed vessel from any source, wherein under normal conditions gravity may be the power which acts to deliver the fluid to the boiler or vessel against the pressure therein, while at other times gravity is assisted by mechanical means to provide a sufficiently great pressure to insure the delivery of the fluid into the boiler or vessel against a higher pressure than is normally employed, and which may at times exist therein.

My invention will be better understood by reference to the accompanying drawings in connection with the description hereinafter contained.

In the drawings is shown, diagrammatically, an elevation of a steam heating system embodying my invention.

2 is a boiler and supplies steam to the radiators by a steam supply main 3 and branch pipes leading therefrom.

6 is one of the radiators, 5 is the branch steam pipe and 7 is the modulation or control valve.

4 is a main valve in the steam main, 9 is the return main and 8 the branch return leading from the radiator and discharging into the return main.

10 is a return trap in the branch return for permitting the passage of water and air from the radiator into the branch return pipe while preventing or restricting the escape of steam, and this device may conform to any of such devices now upon the market and of which there are numerous types better known as the thermostatic, float and motor types. Instead of such automatic traps, static valves may be employed as will be understood by those skilled in the art. The return main 9 and all others of a similar nature may discharge into a receiver 11 where the condensation water may be collected and passed by pipes 12 and 13 into the boiler 2 by gravity. The receiver 11 is located at a distance above the normal water level in the boiler and is provided with an air vent 28 and with a float 26 which rocks a shaft 25 to which is secured an arm 24 whose function will be hereinafter described.

16 is a pump of any suitable construction and is connected at its suction port with the return pipe 12 by a pipe 17; the discharge port of the pump is connected by a pipe 18 with the return pipe 13. The pipe 12 is also provided with a check valve 14 at a point between the discharge pipe 18 and suction pipe 17. The pump is driven by a motor 19 which by way of illustration is shown as an electric motor. The current to this motor is supplied by circuits 20 and 22 and is controlled by a switch 21 of any suitable

construction. This switch is controlled by a chain 23 connecting with the arm 24 actuated by the float 26 of the receiving tank.

The operation of the apparatus will now be described:—Assuming that a normal low pressure, for example one-half to one pound, be in the steam boiler, the steam will be supplied under the control of the valve 7 to the radiators. The water of condensation produced in the radiators is returned to the boiler by the return pipe 9, receiver 11, return pipe 12 and pipe 13, and in passing from the pipe 12 to the pipe 13, it is passed through a check valve 14. The static head in the pipe 12 insures the return of the water into the boiler against the pressure therein. Any water of condensation from the steam main 3 returns to the boiler by the pipe 15 which discharges into the pipe 13. This drip pipe 15 may be provided with a check valve 28 to permit water of condensation to flow to pipe 13 but prevent flow of water from the pipe 13 upward through said drip pipe 15. So long as the low pressure is maintained in the boiler, the water from the returns will return automatically by gravity.

If now, from any cause the boiler pressure suddenly rises to such a degree that the normal static head will not be sufficient to return the water from the returns, the motor 19 is automatically put into operation by this increased pressure in the boiler exerted through the water column or static head and float and the pump 16 is then employed to positively force the water into the boiler. This action does not occur until the water rises in the pipe 12 and within the receiver 11 sufficiently to operate the float 26 to actuate the switch 21 and thereby supply current to the motor 19. The check valve 14 prevents the pump being short circuited between its suction and discharge pipes. In this way, the pump positively delivers the water into the boiler against the abnormal boiler pressure and continues to do so, so long as the water of condensation is made to actuate the float. The pump should have a check valve which when the motor is at rest will not permit back flow of water from the boiler into the receiver through the pump. If a rotary pump is employed as indicated, such a check valve may be located in the pipe 18 at 27.

This invention is specially useful in apartment houses and places where a janitor is required to attend to many duties aside from the steam heating, and where accidental neglect might cause serious trouble from low water in the boiler aside from the inconvenience from defective steam heating.

I have shown the pump operated by an electric motor because it is a simple and effective application, the current is usually supplied from the street main and hence requires no attention from the janitor, but I do not restrict myself to the use of an electric motor as any other type of motor, such as steam, gas, water, etc., may be used if so desired. It is also to be understood that the controller 21 would be made of a suitable construction to suit the form of motor employed, but in any case, the controller would be operated under the control of the water level in the receiver.

The foregoing description has been made in respect to a specific application of my invention as applied to steam heating systems, but it is to be understood that the boiler 2 may be considered as any receptacle in which a fluid is required to exist under pressure, the fluid therefor being received from any suitable source and supplied to the vessel by the force of gravity produced by the static head in the pipe 12 and tank 11, the static head being sufficient to overcome the normal pressure in the vessel, and in which, further, in case of an increased pressure in the vessel which would support a higher static head, then the mechanical means comprising the motor and pump is automatically put into operation to positively deliver the fluid into the closed vessel against the abnormal or increased temporary pressure provided therein. The means shown, with which to carry out my improved method, is given by way of example and not as a limitation or restriction of my invention. In this application I make no claim to the apparatus as that forms the subject-matter of my application, Serial No. 596,198, aforesaid.

Having now described my invention, what I claim as new and desire to protect by Letters Patent is:—

1. The herein described method of supplying a low pressure steam boiler with water which consists in supplying at times of normal condition of steam pressure water to the boiler by gravity and at times of abnormal steam pressure automatically delivering the water to the boiler by mechanical means, supporting a static head of water by the abnormal pressures which may exist in the boiler, and controlling the operation of the mechanical means by the variations in the static head of the water, whereby under normal conditions of pressure, the water is supplied to the boiler by gravity and under abnormal conditions of pressure therein, the water is automatically mechanically supplied to the boiler against the boiler pressure so long as the said abnormal conditions may exist.

2. The herein described method of supplying a low pressure steam boiler with water which consists in supplying at times of normal conditions of steam pressure water to the boiler by gravity, and at times of ab-

normal steam pressure automatically delivering the water to the boiler by mechanical means operating against the pressure of the boiler and controlled as to time of operation by the abnormal pressure therein.

3. The herein described method of supplying a fluid to a closed vessel containing a pressure, which consists in delivering the fluid thereto under a static head at times of normal pressure in the vessel, and at times of abnormal or increased pressure within the vessel delivering the fluid thereinto by mechanical means, and controlling the time of operation of said mechanical means by the variations in pressure within the vessel.

4. The herein described method of supplying a fluid to a closed vessel containing a pressure, which consists in delivering the fluid thereto under a static head at times of normal pressure in the vessel, and at times of abnormal or increased pressure within the vessel delivering the fluid thereinto by mechanical means, and controlling the time of operation of said mechanical means by variations in the static head.

In testimony of which invention, I hereunto set my hand.

MAX PAUL MILLER.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."