E. B. THOMPSON AND E. B. CARR.

METHOD FOR TRANSFERRING LIQUIDS.

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1,419,478. Patented June 13, 1922.

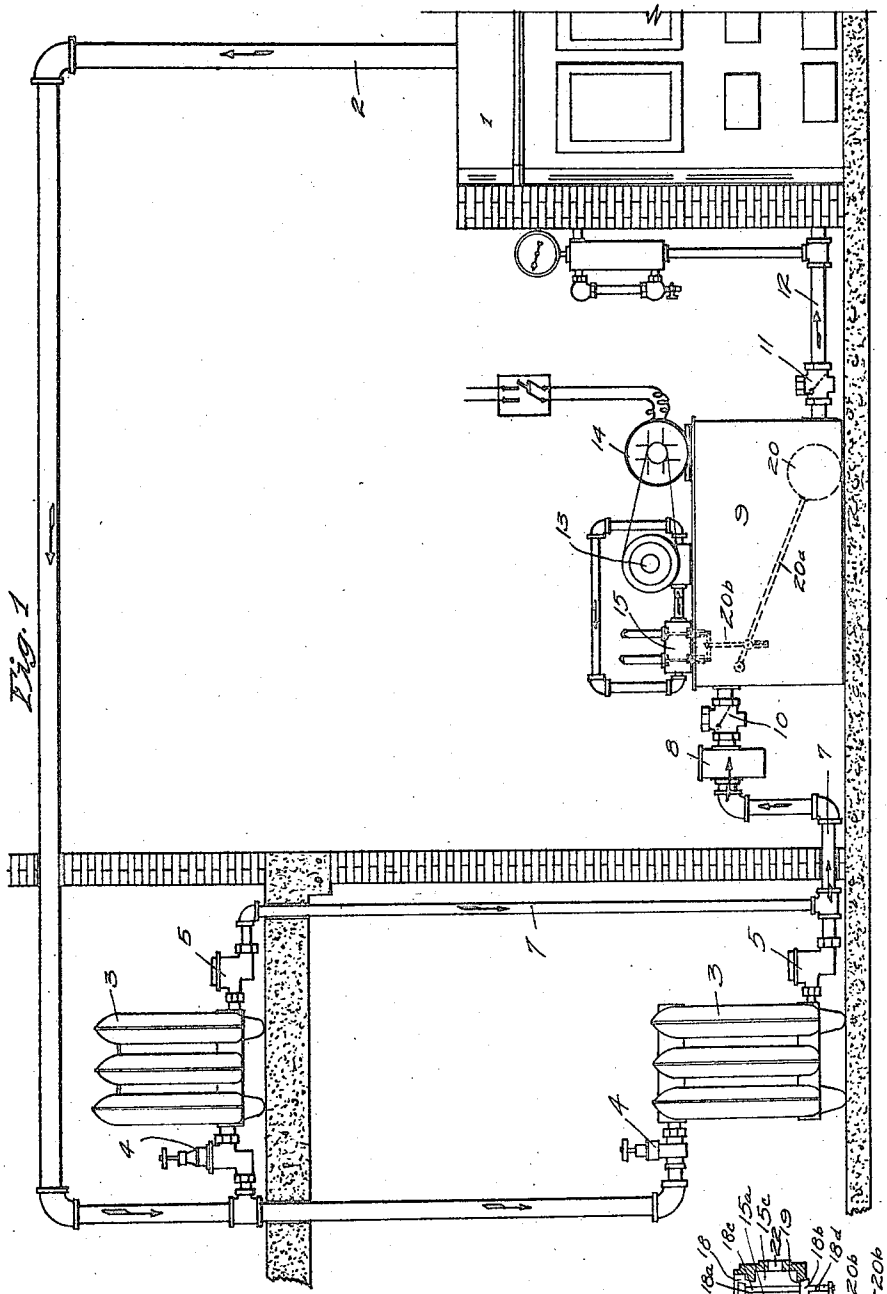


Fig. 1

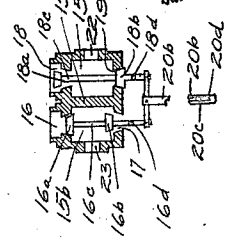


Fig. 2

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METHOD FOR TRANSFERRING LIQUIDS.

1,419,478. Specification of Letters Patent. Patented June 13, 1922.

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To all whom it may concern:

Be it known that we, ELMER B. THOMPSON and ELZA B. CARR, citizens of the United States, and residents of Des Moines, in the county of Polk and State of Iowa, have invented a certain new and useful Method for Transferring Liquids, of which the following is a specification.

The object of our invention is to provide a method and apparatus for removing gaseous fluid and water from the return piping of a steam heating system and discharging such fluid to atmosphere and the water to the boiler.

In order that steam may enter the radiators of a heating system, it is first necessary to remove the air from both the piping and the radiators. It has been found highly desirable to remove this air by a suction creating device. Under certain conditions as for instance, when part of the radiators are below the boiler water line, it is necessary to return the water of condensation back to the boiler with a pump or other means. Numerous devices for removing the air and returning the water to the boiler [illegible] has two failings; first, it binds and acts as a brake on the shaft causing undue friction and making necessary the use of additional power to drive the pump; and second, this binding and rubbing action on the shaft tends to wear grooves in the shaft so that it is difficult to keep the stuffing box from leaking water.

Our method eliminates all the above objectionable features heretofore common to pumping equipments of the types referred to.

Since numerous methods of removing water and air from the return pipes of a steam heating system have been in use, we do not broadly claim the invention of the removal of such air and water, but confine our claims to the method of removing the air and condensation water from the return piping, discharging the air to atmosphere, and returning the condensation water to the boiler without passing the condensation water through the pump.

In the accompanying drawings:

Figure 1 shows a diagrammatic view of a steam heating system with which our [illegible]

the port 17 opening to the interior of the chamber 9. For coacting with the ports, there are provided valves 16^a and 16^b, which are connected by a common stem 16^c, which projects downwardly into the interior of the chamber 9.

In the downwardly projecting portion of the valve stem 16^c is a joint 16^d.

In the compartment 15^c is a port 18 opening to the chamber 9. Valves 18^a and 18^b connected by a common stem 18^c are designed to coact with the ports 18 and 19. The stem 18^c has a joint 18^d, which projects downwardly into the chamber 9.

A float 20, within the chamber 9, has a stem or arm 20^a pivoted at its end, opposite the float and pivotally and slidably connected with the arm 20^b which is connected with the respective valve stems 16^c and 18^c, by a pin 20^c travelling in the slot 20^d of said arm 20^b.

The pump 13 has one port connected by a suitable pipe with the compartment 15^b and another port connected by a pipe with the compartment 15^c.

Where our improved method is used in connection with a steam heating system for removing air and water from the return piping and discharging the air to the atmosphere and the water back to the boiler, the operation is as follows:

When steam is generated in the boiler 1, the motor 14 is started by closing an electric switch 21 for operating the pump. Assuming that the float 20 is down, the pump will operate to create a vacuum in the chamber 9. The valve 18^b will be down and air will be drawn from the chamber 9 through the port 19 and thence through the compartment 15^c to the pump and discharged through the compartment 15^b through the port 16 to atmosphere.

This operation will draw the air from the radiator and piping, so that steam may enter the radiators with less pressure, than would otherwise be necessary. When the steam fills the radiators, the steam traps 5 will close.

When the steam condenses, the trap 5 opens to allow the water of condensation and to allow air to pass into the return pipe 7. The partial vacuum in the receiving chamber 9 will cause this water and air to be drawn into the receiving chamber.

The float 20 in the chamber 9, will close the valves 16^a and 18^b due to the rising height of water in the chamber reaching a certain predetermined amount whereupon the action of the pump will be reversed.

Air will now be drawn through the port 18 from the atmosphere through the compartment 15^c to the pump and will be discharged through the compartment 15^b through the port 17 into the chamber 9.

As the water in the receiving chamber 9 is reduced to a certain predetermined volume the float 20 will be lowered to position for reversing the valves and the operation will be reversed, that is a partial vacuum will be created in the chamber 9, drawing air and water from the return piping. This cycle will continue as long as water comes to the chamber 9.

The check valve 10 will prevent the movement of air or water into the return pipe 7 and it is obvious that the water in the chamber 9 will be forced through the valve 11 to the boiler.

The valve structure herein shown and described is simply for purposes of illustration. Various types of valve structures might be used, and the illustration is simply for the purpose of setting forth some operative structure.

A great variety of arrangement of the valve, motor and pump may be employed. Various mechanisms may be used for operating the pump.

It will be seen that the weight of the water or the height of the water may be employed for operating a valve for reversing the operation of the air pump.

It is possible to provide other suitable mechanism for operating the controlling valves according to volume or weight of the liquid in the receiving chamber, for instance, by suspending the chamber on one end of a balanced lever, which lever might be operatively connected with the controlling valve structure.

It will be noted that even where a float is used and controlled by the height of the liquid the control is regulated or varied according to the volume of the liquid.

What we claim as new and our invention is:

1. The method of removing gaseous fluid and water of condensation from the return piping of a steam heating system and returning the water of condensation to the boiler which comprises, creating a vacuum in a receiving chamber which is connected to the return piping and to the boiler and is adapted to receive gaseous fluid and water from the return piping when under sufficient vacuum and to discharge water to the boiler when under sufficient pressure, discontinuing the vacuum when the level of water in the receiving chamber reaches a predetermined maximum and creating sufficient pressure in said chamber to discharge the water into the boiler.

2. The method of removing gaseous fluid and water of condensation from the return piping of a steam heating system and returning the water to the boiler which comprises, creating a vacuum in a receiving chamber which is connected to the return piping and to the boiler and is adapted to receive gaseous fluid and water from the return

piping when under sufficient vacuum and to discharge water to the boiler when under sufficient pressure, discharging gaseous fluid contained in and introduced into the receiver to atmosphere, discontinuing the vacuum when the level of water in the receiving chamber reaches a predetermined maximum and creating sufficient pressure in said chamber to discharge the water into the boiler.

3. The method of removing gaseous fluid and water of condensation from the return piping of a steam heating system and returning the water of condensation to the boiler which comprises, creating a vacuum in a receiving chamber which is connected to the return piping and to the boiler and is adapted to receive gaseous fluid and water from the return piping when under sufficient vacuum and to discharge water to the boiler when under sufficient pressure, discontinuing the vacuum when the level of the water in the receiving chamber reaches a predetermined maximum and creating sufficient pressure in said chamber to discharge the water into the boiler, and discontinuing the pressure and again creating a vacuum in said chamber when the level of water therein reaches a predetermined minimum.

4. The combination with the boiler and the return piping of a steam heating system, of a receiver connected to said return piping and to said boiler and adapted to receive gaseous fluid and water of condensation from said piping when under sufficient vacuum and to discharge water to the boiler when under sufficient pressure, and means for alternately creating a vacuum and pressure in said receiver.

5. The combination with the boiler and the return piping of a steam heating system, of a receiver connected to said return piping and to said boiler and adapted to receive gaseous fluid and water of condensation from said piping when under sufficient vacuum and to discharge water to the boiler when under sufficient pressure, an air pump, a passage connecting said air pump to said receiver, and a plural way valve structure in said passage adapted in one position of its movable parts to cause the pump when in action to withdraw gaseous fluid from said receiver and in another position of said parts to cause the pump when in action to deliver gaseous fluid into said receiver.

6. The combination with the boiler and the return piping of a steam heating system, of a receiver connected to said return piping and to said boiler and adapted to receive gaseous fluid and water of condensation from said piping when under sufficient vacuum and to discharge water to the boiler when under sufficient pressure, an air pump, a passage connecting said air pump to said receiver, and a plural way valve structure in said passage adapted in one position of its movable parts to cause the pump when in action to withdraw gaseous fluid from said receiver and in another position of said parts to cause the pump when in action to deliver gaseous fluid into said receiver, and means for moving said movable parts to said positions alternately in response to predetermined levels of water in said receiver.

Des Moines, Iowa, January 3, 1921.

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