J. H. TAYLOR.

WATER CIRCULATOR.

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1,163,704.

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Fig. 1

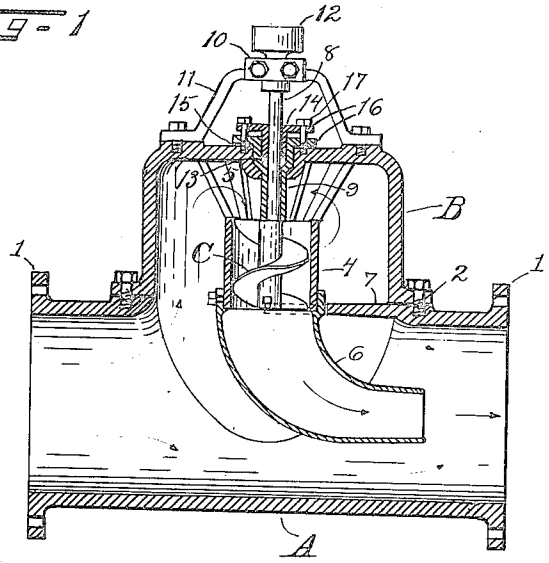
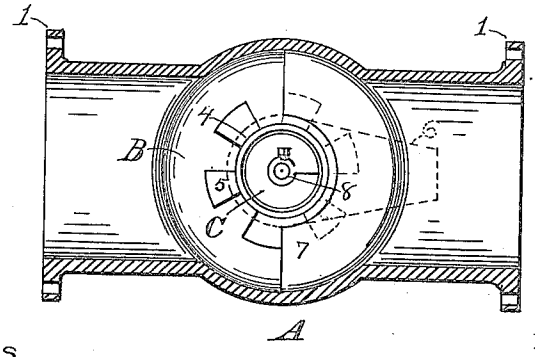


Fig. 2



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WATER-CIRCULATOR.

1,163,704. Specification of Letters Patent. Patented Dec. 14, 1915.

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To all whom it may concern:

Be it known that I, JOHN H. TAYLOR, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Water-Circulators, of which the following is a specification.

The present invention more particularly relates to water circulators employed in connection with water heating boilers for augmenting the flow of water from the boiler to and from the radiators employed in the heating system.

From the fact that water to circulate must be heated to nearly the boiling point before any perceptible flow in the circulating system is manifest, it is found that considerable time is consumed before adequate results are obtained from the heating system owing to the flow of water therethrough, and to produce the desired flow of water an intensive fire must be employed to heat the same. It is also experienced that when the circulation of water has been established the water should not fall below a certain degree of heat to perpetuate the circulation thereof. The method is unscientific from the fact the water to freely circulate must be unnecessarily heated at times when but a moderately heated atmosphere is desired, and that to keep the water in circulation the boiler fires must be constantly supplied with fuel, which not only requires extra time for an attendant but also overly consumes the fuel supply at an additional expense.

The present invention has for its objects to evercome the objections enumerated and at the same time provide a water circulator that can be installed in any ordinary water heating system by an artisan of ordinary ability; whereby the same will not be restricted to any particular position to successfully operate; be simple in construction, readily accessible to operate and thoroughly dependable to circulate water under all conditions of temperature. With these and other objects in view, the invention will be hereinafter more fully set forth and described.

In the drawings illustrating an embodiment of my invention, Figure 1 is a longitudinal section bisecting the circulator chamber on a plane of its axis. Fig. 2 is a longitudinal section transverse to the circulator chamber, looking into said chamber.

Like marks of reference refer to corresponding parts throughout the views in which—

A represents the induction and eduction conduit; B the head of the circulator chamber; C the mechanically-operated spiral propeller circulator.

In the installation of the water circulator the conduit A is placed in either the main flow or return pipe between the boiler and radiators, and the clearance area of its opening equals or exceeds the area of the hot water pipes leading to and from the same for the purpose of affording an unobstructed flow of water therethrough at any and all times. The said conduit A as shown, has the two end bolting flanges 1, 1, for attachment between the flanged heads of the water circulating main of a heating system, and is fitted with gaskets and made water tight at the connections in the customary manner. One side of this conduit is formed with an opening having an outwardly-formed bolting flange to which a correspondingly-formed flange 2 of the circulator chamber-head B is attached.

Projecting interiorly from the closed end of the head B and terminating nominally flush with the flanged end thereof, a concentrically-formed cylinder 4 is provided, and between this cylinder and the closed end of the head an open-walled flaring induction chamber 5 is formed. Attached to the free end of this cylinder a curved reduced-ended nozzle 6 is fitted. This nozzle projects in central alinement with the conduit A and extends toward the eductor end thereof and in the direction of the flowing water.

Located within the neck of the head B and closing substantially one-half the area of the orifice between the head and the conduit A, a retarding plate or diaphragm 7 is provided. This plate occupies a position immediately to the side of the nozzle 6 and its free edge is diametrically at right angles with the center of the cylinder, and its office is to retard any backward tendency of water flowing past the nozzle in the conduit A.

Journaled to rotate in the cylinder 4, the spiral water circulator C is fitted. This circulator is attached to a shaft 8 which extends through a bearing 9, the latter of which

fits through a central opening in the head B and is supported near the outer extremity in a box 10 of a bracket 11 bolted to the closed end of the head. The shaft is operated by a small driving wheel 12 at the extremity thereof through the medium of any suitable motive power. The bearing 9 is preferably of bronze or antifriction metal and is formed with an enlarged outer opening for receiving a watertight gasket 13 held in position by a follower 14 of similar or like material to said bearing, a watertight gasket 15 also being fitted between said bearing and the head B. Both the bearing and the follower are formed with ears 16, through which retaining cap-screws 17 engage screw-threaded holes in said head.

In operation the water circulator C is propelled in a direction to draw the water into the conduit A, as indicated by the arrows *x*, *x*. As a portion of the water is drawn into the cylinder 4 by the rapidly revolving circulator C, the flow of the water is accelerated. The nozzle having its exit opening centrally of the conduit A and ejecting water under pressure at high velocity, a partial vacuum to the rear of the nozzle opening is created, which action performs the function of a siphon to draw the water through the conduit A and the circulating system connected therewith, while at the same time the augmented current from the nozzle further facilitates the flow of water through the circulating system connected with the radiators, or vice versa.

It would be obvious to effectually heat a large apartment of any description or character, or even a medium sized one, by means of water heated sufficiently to create a circulation, considerable time would necessarily elapse before sufficient heat could be generated to raise the water in a boiler to a circulating point after the fires were started, whereas by the foregoing method even moderately warm water may be drawn from the boiler and forced through the radiators to facilitate the heating of an apartment immediately following the starting of the circulator.

While the principal characteristics of my invention have been herein disclosed, to those skilled in the art to which it appertains it might be evident that certain details of construction could be resorted to in carrying out its operation without departing from the novelty and intent of my invention, and I hold myself entitled to such modifications as may be expedient and compatible with the spirit and intent of its application.

Having, therefore, described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a water circulator, a water conduit, an open-ended cylinder in said conduit, a reducing nozzle fitted to one end of said cylinder, a spiral circulator journaled to rotate in said cylinder, and means to rotate said circulator to force water out of said cylinder through said nozzle.

2. In a water circulator, a water conduit, an open-ended cylinder in said conduit, a spiral circulator journaled to rotate in said conduit, a nozzle fitted to one end of said cylinder and having its discharge opening concentric within said conduit, and means to rotate said circulator to force water out of said nozzle.

3. In a water circulator, a water conduit, an open-ended cylinder disposed within said conduit and having a free passage for water about its circumference, a reduced nozzle fitted to one end of said cylinder and opening in the same plane with the bore of said conduit, a spiral circulator journaled to rotate in said cylinder, and means to rotate said circulator to force water from the exit of said nozzle.

4. A water circulator comprising an open-ended conduit having an offset forming a chamber opening into said conduit, a concentrically-spaced open-ended cylinder formed within said offset chamber, a nozzle fitted to said cylinder and opening in alinement with said conduit, a spiral circulator journaled to operate in said cylinder and rotate in a direction to draw water into said cylinder and eject it from said nozzle.

5. A water circulator comprising an open-ended conduit having an offset chamber opening into said conduit, a spaced concentrically-formed open-ended cylinder formed in said offset chamber, a nozzle extending from said cylinder in alinement within said conduit, a retarding plate separating said tube from said offset chamber adjacent to said nozzle, a spiral circulator journaled to rotate in said cylinder to force water from said cylinder through said nozzle.

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