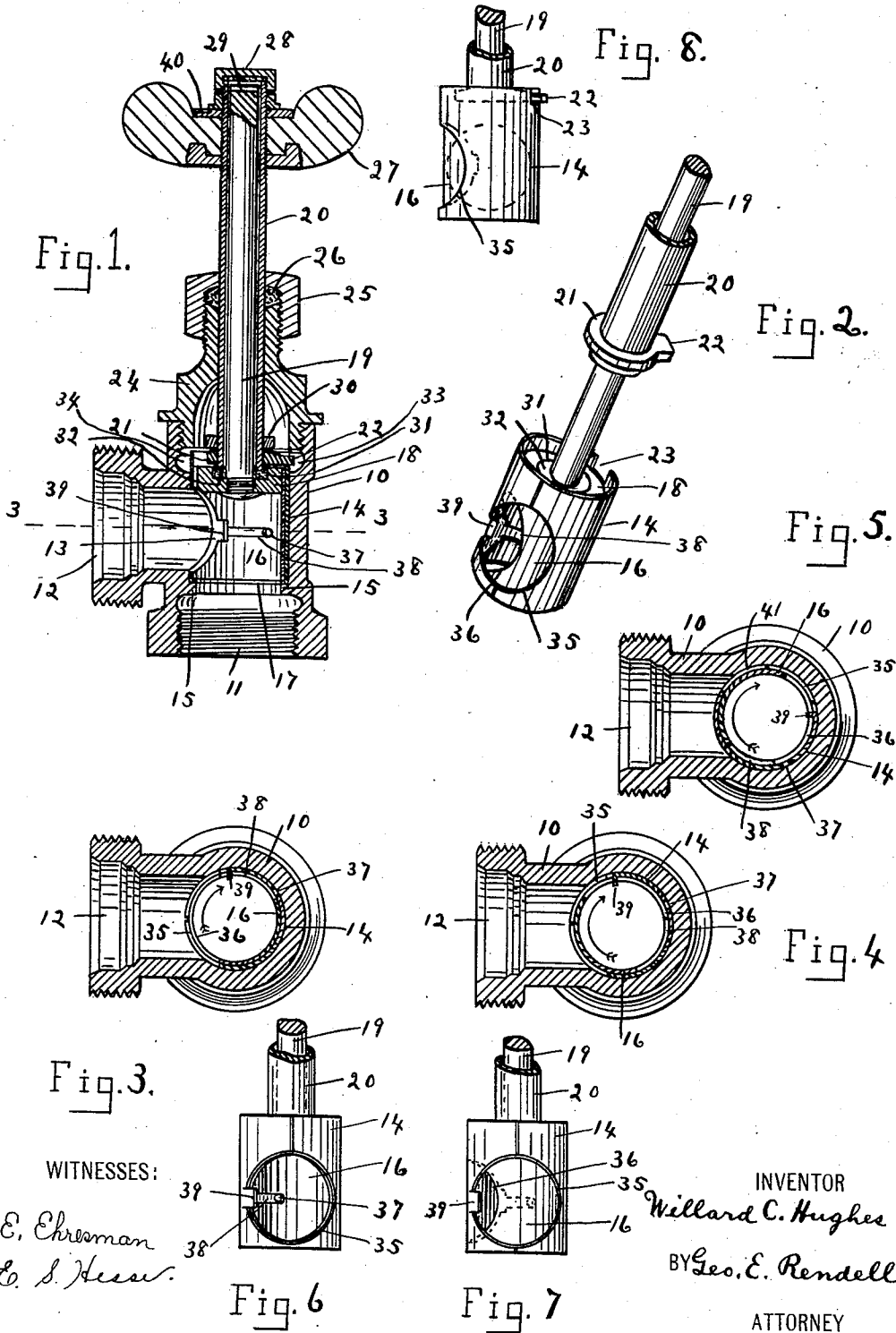


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VALVE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLARD C. HUGHES, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the reference-numerals marked thereon, which form part of this specification.

The object of my present invention is to provide a valve wherein the maximum size of the port can be definitely and at will reduced and also other intermediate openings reduced in actual size without such reduction being apparent to the ordinary observer.

The valve herein described is particularly adapted for use in hot water heating systems but it will be apparent that it is applicable to a great variety of uses where a similar purpose has to be accomplished.

It is generally known that the efficiency of hot water systems depends upon getting a proper relative flow of water through the different radiators in the system and that this flow cannot always be determined before the installation of the system but must in many cases be ascertained by repeated experiments with the system in use. The use of the usual radiator valves to carry on these experiments and particularly to effect such regulation as is found needed, is very unsatisfactory for the reason that they can be so easily tampered with by any one, that the regulation obtained by long testing may be lost by the occupant of the house or any irresponsible person changing the adjustment. It is particularly desirable that the means for testing and effecting the necessary flow when ascertained by testing, be a part of the system and operative without disconnecting or emptying the system and that the adjustment once made be preserved free from interruption by the ordinary adjustment of radiator valves by irresponsible persons.

To accomplish these and other results as will more fully appear, is the purpose of my invention.

Figure 1, is a perpendicular sectional view of a valve embodying my invention. Fig. 2, is a perspective view of the internal moving parts, the outer spindle being raised from contact with the outer gate. Fig. 3, is a

horizontal sectional view on line 3—3 of Fig. 1, with both rotary gates in open position and Fig. 6 is a side elevation of the gates in the same position, as seen from the outlet side of the valve. Figs. 4 and 7 are similar views respectively, with the outer gate open and the inner gate nearly closed. Figs. 5 and 8, are similar views respectively, with the gates in the same relative position as to each other as in Figs. 4 and 7, but with the outer gate nearly closed.

Referring to the drawing in a more particular description 10 is the body of the valve having an inlet end 11 which is internally screw threaded for attachment to the system and an outlet end 12 which is externally threaded to be attached to the radiator by means of a union. Connecting the inlet 11 and outlet 12 and forming the main part of the body 10, is a cylindrical chamber 13, into which fits the outer cylindrical rotary gate 14. The lower end of this gate rests upon an inwardly extending rib 15 of the body 10. Within this outer gate is placed the inner cylindrical rotary gate 16, the lower end of which rests upon an inwardly extending flange 17 formed by turning in the lower edge of the gate 14. The lower end of both gates and the upper end of the outer gate is open but the upper end of the inner gate 16 is closed by a head 18 which may be formed integral therewith but which is preferably a separate piece secured to the gate. An upwardly extending and centrally located spindle 19 is rigidly secured to the head. Surrounding the inner spindle 19, is the outer hollow spindle 20 which has rigidly secured thereto near its lower end a collar 21 from which projects a lug 22 which engages a slot 23 in the upper end of the outer gate which is longer than the inner gate by about the depth of this slot.

The top of the body 10 is covered by a bonnet 24 screw-threaded onto the body 10 in the usual way, and onto the upper end of the bonnet is screwed the packing nut 25 holding the packing 26 against the hollow spindle 20 which projects through the bonnet 24 and the packing nut 25.

Close to the upper end of the hollow spindle 20 is rigidly secured the handle or wheel 27 and onto the top end of the hollow spindle 20 is screwed a cap 28 which covers over the top of the hollow spindle and conceals the inner spindle from view. A slot 29 is provided in the upper end of spindle 19 by

means of which a screw driver can be applied to the spindle 19 to move the same upon the cap 28 being removed.

A yoke 30 crossing the bonnet at its lower end and secured thereto surrounds the spindle 20 and bears upon the collar 21 and so keeps the spindle and with it both gates down in place in the body 10. On the upper surface of the gate head 18 a groove 31 surrounding the spindle 19 affords a pocket to receive a washer packing 32 into which the lower end of the hollow spindle 20 is pressed and thereby water is kept from passing upward between the two spindles. Stops 33 and 34 on the body 10, stop the lug 22 when the outer gate is in open and closed positions respectively.

In the rotating gates 14 and 16 are openings or ports 35 and 36 respectively of substantially the size of the outlet 12 at its end toward the chamber 13, and so located in the gates as to be able to register with each other and with said outlet. In the outer gate 14 a pin head port 37 on the side of the gate opposite to the port 35 affords the usual safety port for allowing a slow circulation of water even when the valve is entirely closed. In the inner gate 16 a slot 38 metering with the port 37, extends from one side of the port 36 to the port 37. On this side of the port 35 in the gate 14 a clip 39 projects inward past the edge of the gate 16 and thereby prevents a rotation of the inner gate 16 in the outer gate 14 from open position except in the direction indicated in Figs. 3, 4 and 5 by the arrows. The arrows also indicate the direction in which, as the valve is here illustrated, the outer gate must be rotated to change from the open position to closed position.

It is now apparent that the outer rotary gate 14 can be operated by means of the hand wheel 27 to open and close the valve in the usual way of hot water radiator valves but that the outer gate 14 will carry within itself the inner gate 16, it being understood that the two gates fit each other closely enough to hold the inner gate in any position in which it is set and that there is no obstacle or force within the valve sufficient of itself to change the relative position of the two gates.

The valves will be installed and the system put into operation with both gates in the open position as shown in Figs. 1, 3 and 6. The position of the outer gate is indicated by the usual arrow mark or notch 40 on the hand wheel, which arrow mark will point straight toward the radiator when the outer gate 14 is in open position. The position of the inner gate 16 is indicated by slot 29 which will point toward the radiator when the inner gate 16 has its port toward the outlet 12.

If after installing and putting the system

into operation it is found that the flow of water has to be regulated, either to keep some radiators from being too hot or to heat others by getting therethrough a greater relative flow by reducing the flow through other radiators this adjustment is obtained and maintained by setting the inner gates 16 of the proper valves around so as to reduce the maximum actual size of the ports therein, the outer gates being left at the open position. This setting to proper position of the inner gate is done, by unscrewing the cap 28 from the top of the hollow spindle 20 and turning the inner spindle 19 around and thereby of course the inner gate to desired position. The angle of the slot 29 to the arrow mark 40 will indicate the extent to which the inner gate has been moved toward closed position. Figs. 4 and 7 show the inner gate 16 almost closed while the outer gate 14 is still open. It is obvious that this experimenting to obtain the proper relative flow of water will be carried on without disconnecting any part of the system and without emptying the same, thereby saving a great deal of time and labor. Upon the proper position of the inner gate 16 being found, the cap 28 is screwed firmly onto the spindle 20 and thereby protects and conceals the only means of disturbing the adjustment obtained. If a valve has been set with its gates in the relative position shown in Figs. 4 and 7, it is evident that a small amount of movement of the hand wheel 27, will close the valve except for the small amount of flow possible through the opening 41 between the inner gate 16 and the wall of the chamber 13 as shown in Figs. 5 and 8. This passage way will serve as a safety port when the valve is in this position and will be open until the outer gate is turned to its closed position when the pin head safety port will come into operation. It is evident that turning the outer gate toward its closed position will not change the relative position of the inner gate to the outer gate and consequently upon the outer gate being turned back to full open position, the adjustment obtained by testing will be still retained.

It is evident that various modifications in and from the construction herein shown can be made without departing from the spirit of my invention as herein claimed.

What I claim as new and desire to secure by Letters Patent is:

1. A valve comprising a body portion having an end port and a side port connected by a cylindrical chamber, an outer cylindrical gate located in said chamber and adapted to rotate therein and having a main port in its side able to mesh with the side port of the body portion, an inner cylindrical gate located within the outer gate and adapted to rotate therein and normally rotating there-

with and having a main port in its side able to mesh with the main port of the outer gate, secondary openings in each of said gates adapted to allow a small circulation through said valve at any closed position of both of the main ports of said gates, said gates being adapted to rotate without change of longitudinal position, means for rotating the outer gate in the chamber and means for rotating the inner gate in the outer gate.

2. A valve consisting of a body portion having an inlet and an outlet connected by a cylindrical chamber, an outer cylindrical gate located in said chamber and adapted to rotate therein and having a port in its side able to mesh with the outlet, an inner cylindrical gate located within the outer gate and adapted to rotate therein and normally rotating therewith and having a port in its side able to mesh with the port of the outer gate, a slot in one gate and an opening in the other gate in alinement with said slot and with the side port of the valve adapted to allow a small circulation through said valve at any closed position of the main gates, said gates being adapted to rotate without change of longitudinal position, means for rotating the outer gate in the chamber and means for rotating the inner gate in the outer gate, substantially as set forth.

3. A valve comprising a body portion having an end port and a side port connected by a cylindrical chamber, an outer cylindrical gate located in said chamber and adapted to rotate therein and having a port in its side able to mesh with the side port of the body portion, an inner cylindrical gate located within the outer gate and adapted to rotate therein and normally rotating therewith and having a port in its side able to

mesh with the side port of the outer gate, said gates being adapted to rotate without change of longitudinal position, means indicating the position of the side port of the outer gate relative to the side port of the chamber, means limiting the motion of said gates relative to each other when their side ports have been fully closed or opened relative to each other, means for rotating the outer gate in the chamber and means for rotating the inner gate in the outer gate.

4. A valve comprising a body portion having an end port and a side port connected by a cylindrical chamber, an outer cylindrical gate located in said chamber and adapted to rotate therein and having a port in its side able to mesh with the side port of the body portion, an inner cylindrical gate located within the outer gate and adapted to rotate therein and normally rotating therewith and having a port in its side able to mesh with the side port of the outer gate said gates being adapted to rotate without change of longitudinal position, means limiting the motion of the outer gate when it has been fully opened or closed relative to the side port of the chamber, means limiting the motion of said gates relative to each other when their side port have been fully closed or opened relative to each other, means for rotating the inner gate in the outer gate.

In witness whereof, I have affixed my signature, in the presence of two witnesses, this 5th day of February 1910.

WILLARD C. HUGHES.

Witnesses:

E. EHRESMAN,
EMMA S. HESSE.