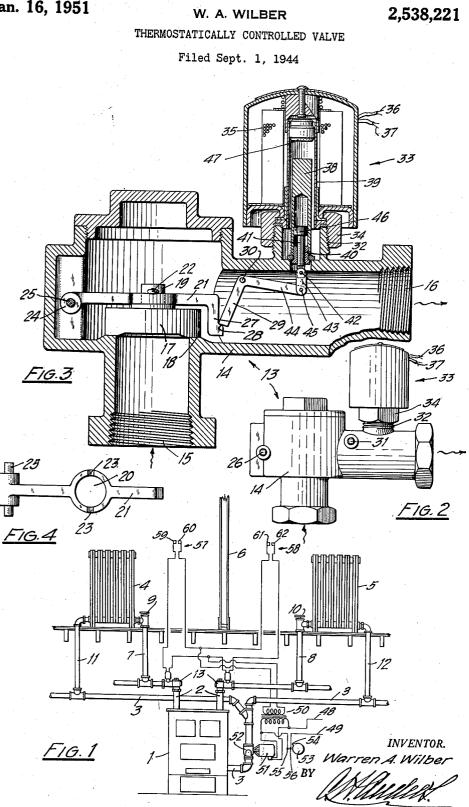
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THERMOSTATICALLY CONTROLLED VALVE

Warren A. Wilber, Albany, N. Y.

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4 Claims. (Cl. 137---139)

1 My invention relates to a valve for use in hot water heating systems in which the temperature in any radiation space may be automatically controlled independent of the temperature in any other radiation space separated therefrom. It relates to a valve adapted to be associated with each radiator or each group of radiators in a given radiation space and which may be thermostatically controlled to regulate the temperature in said space.

In apartment houses, offices and other buildings where there are a plurality of separate radiation spaces it is very desirable that the temperature in each apartment or office be controllable independently of the temperature in any of the other offices or apartments and without the necessity of manually opening and closing radiator valves. Hence, the principal object of my invention is to provide a valve for use in a heating system which will have the foregoing desirable characteristics.

I accomplish these objects by means of the heating system and the valve described below and illustrated in the accompanying drawing in which:

Fig. 1 is a fragmentary diagrammatic elevation view of my hot water heating system;

Fig. 2 is a side elevation view of the control valve;

Fig. 3 is an enlarged vertical section through 30 the control valve with certain portions broken away; and

Fig. 4 is a top plan view of a detail.

Referring to the drawings:

1 is a hot water heating furnace having up-35 takes or water outlets 2 and a return water inlet 3. 4 and 5 are radiators in different radiation spaces separated by the partition 6. Pipes 7 and 8 are adapted to conduct water to the radiators 4 and 5, respectively, through the usual manually 40 controlled valves 9 and 10, and water is returned from the radiators to the heater by means of pipes 11 and 12, respectively, which communicate with the return water inlet 3 in the radiator. Between each of the pipes 7 and 8, respectively, and the uptakes 2 is a special valve 13, the details of which I will now describe.

Each of the valves 13 comprises a casing or body 14 having a water inlet 15 and an outlet 16. Within the body 14 is a closure element 17 50 connected having a seat 18 around the inner end of the inlet passage. The valve is disposed in the heating system so that the seat of the closure element 17 is substantially horizontal. In the top center, the closure element is provided with a cylindrical 55 are closed. 2

boss or stud 19 which extends through the eye 20 in the latch element 21 (see Fig. 4); the latch element being secured to the closure element by means of the cotter pin 22 which extends through a hole in the stud 19 and lies in recess 23 in the element 21.

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In apartment houses, offices and other buildings where there are a plurality of separate radiation spaces it is very desirable that the temperature in each apartment or office be controllable independently of the temperature in any of
At one end, the element 21 is pivoted to the housing as shown at 24; the hole for the pivot pin said space.
10 pipe plug 26. At the other end, the element 21 is provided with a depending portion 27 having an inclined step 28 thereon which is adapted to cooperate with the other latch element comprising the crank 29. The crank 29 is also pivoted

for the pivot pin are closed by pipe plugs 31. The body is provided with an upwardly-extending, exteriorly-threaded nipple 32 to which the

electromagnet 33 is secured by the coupling nut
20 34. No claim of novelty is made to the electromagnet per se which comprises the winding 35 having the terminals 36 and 31 and the armature 38 which is mounted to slide within the tubular core 39. The lower portion of the armature is
25 hollow and is closed at the bottom by means of the plug 40 having a central passage through which the bolt 41 may freely slide. The lower end of the bolt is flattened and pivotally connected at 42 to a link 43 which, in turn, is piv-30 otally connected to the end of arm 44 of the crank

29, as shown at 45.In the position of the parts as shown in Fig. 3.

it will be noted that the lower end of the crank arm overlies and engages the inclined step on the latch 21, thus holding the closure element 17 on its seat 18. The head 46 of the bolt 41 is spaced somewhat above the plug 40 so that the latter, when the electromagnet is energized and the armature 38 is snapped upwardly, will hit the bottom of bolt head 46 a sharp blow thus positively kicking the crank 29 out of engagement with the latch element 21. So long as the electromagnet is energized the crank 29 will be maintained out of locking engagement with the latch element 21 and the closure element will be free to rise to open the valve when acted upon by water pressure on the inlet side thereof.

Referring to Fig. 1, 48 and 49 are electrical power lines, 50 is a transformer, 51 is a motor connected to a pump 52 which is adapted to force a circulation of water through the heater and the pipes leading to those radiators whose associated valves 13 are open and to build up pressure against the closure elements of those valves 13 which are closed.

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53 is a diagrammatic end view of a cam shaft having a cam 54 thereon which is adapted to force the contacts 55 and 56 together. The cam shaft 53 is understood to be driven by a motor, not shown, so that the contacts 55 and 56 are intermittently pushed together. The cam may be provided with a dwell of any length so that the contacts are held together for any desired interval of time. When these contacts are together the motor 51 is directly connected to 10 the power lines and will operate to create a forced circulation of water in the system.

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57 and 58 are thermostats by means of which electrical contact is made between the points 59 and 60 and 61 and 62, respectively. Thus, 15 when points 59 and 60 of thermostat 57 are in contact an electrical circuit is completed through the secondary of the transformer 50 and the particular valve 13 with which the thermostat 51 is associated.

In operation, when there is no demand for 20heat from radiator 4, for example, there is no circulation of hot water through radiator 4 because the closure element 17 in valve 13 associated therewith is held upon its seat by the latch. However, when a demand for heat from 25 radiator 4 occurs, contact points 59 and 60 of the thermostat are brought together, thus permitting the closure element in the valve 13 associated therewith to be forced upwardly and 30 open by the pressure of water on the inlet side thereof, so that, thereafter, hot water circulates through the radiator 4 so long as the pump 51 is in operation. It will thus be apparent that the temperature in each radiating space may be 35 controlled by its individual thermostat independently of the other radiating spaces.

While I have shown only one radiator in each space it is to be understood that any number of radiators may be fed from the pipe controlled by valve 13. It is also to be understood that while I have shown only one valve connected to each of the uptakes 2, the uptake 2 may serve any number of valves controlling the flow of water to any number of radiators or group of radiators.

While I have described my invention in its preferred embodiment it is to be understood that the words which I have used are words of description rather than of limitation and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention.

What I claim is:

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1. A valve adapted for use in a hot water heat-55 ing system comprising a casing provided with an inlet, an outlet, and a passage for the flow of water between said inlet and outlet, a valve seat in said passage, a valve element adapted to cooperate with said seat for closing said pasίθ **τ** sage, a mounting for said element adapting it to be moved away from said seat in the direction of the flow of water through said valve by water pressure acting directly on the inlet side of said element and automatically to reseat itself 65 when said pressure ceases, and electrically controllable means for holding said element on said

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4 seat against said water pressure and automatically locking it on said seat when reseated.

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2. A valve adapted for use in a hot water heating system comprising a casing provided with an inlet, an outlet, and a passage for the flow of water between said inlet and outlet, a valve seat in said passage, a valve element adapted to cooperate with said seat for closing said passage, a mounting for said element adapting it to be moved away from said seat in the direction of the flow of water through said valve by water pressure acting directly on the inlet side of said element and automatically to reseat itself when said pressure ceases, means for automatically locking said element on said seat, when reseated, against water pressure tending to unseat it, and means adapted to be thermostatically controlled cooperating with said locking means for releasing said element.

3. A valve adapted for use in a hot water heating system comprising a casing provided with an inlet, an outlet, and a passage for the flow of water between said inlet and outlet, a valve seat in said passage, a valve element adapted to cooperate with said seat for closing said passage, a mounting for said element adapting it to be moved away from said seat in the direction of the flow of water through said valve by water pressure acting directly on the inlet side of said. element and automatically to reseat itself by gravity when said pressure ceases, means for automatically locking said element on said seat, when reseated, against water pressure tending to unseat it, and means cooperating with said locking means and adapted to be thermostatically controlled for releasing said element.

4. A valve adapted for use in a fluid heating. system and comprising the combination with a casing provided with a fluid inlet, a fluid outlet and a passage for the flow of fluid between said 40 inlet and outlet; of a valve in said passage including a closure element therefor normally in valveclosed position but adapted to be moved in the direction of fluid flow through said passage by, fluid pressure acting directly on the inlet side. 45 of said element to effect an opening of said valve and automatically to move into normal, valve-. closed position when said pressure ceases; means cooperating with said closure element for automatically locking it in valve-closed position; and 50 a solenoid adapted to be controlled by a thermostat and cooperating with said locking means. for releasing said closure element.

WARREN A. WILBER.

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