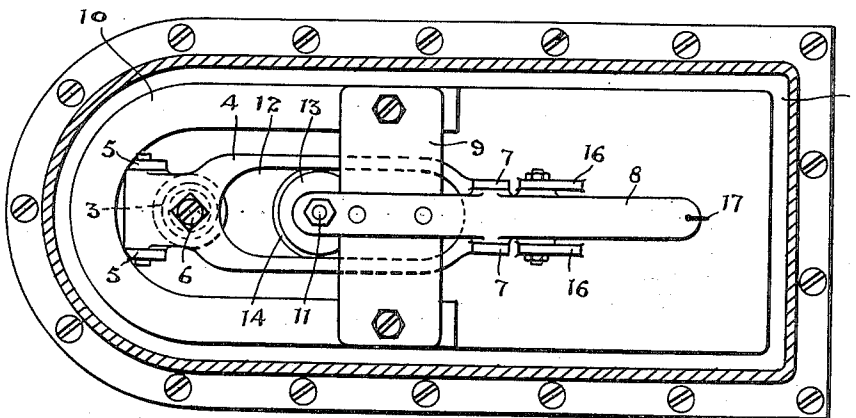
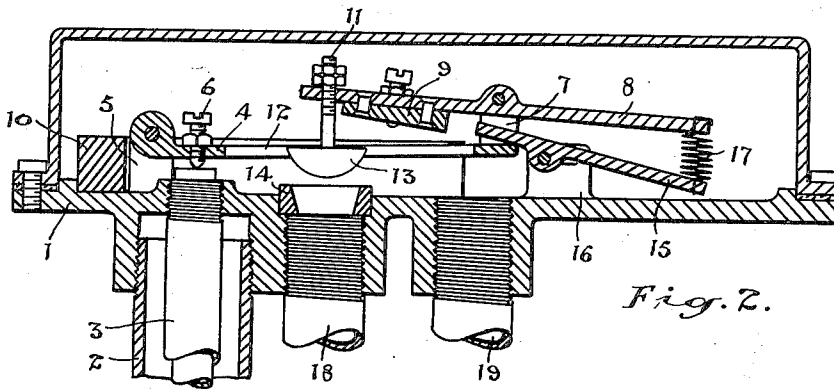
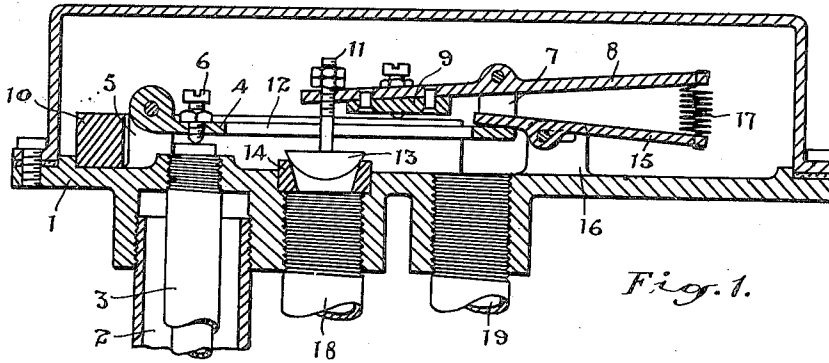


B. RYAN.
THERMOSTATIC CONTROLLER FOR GAS WATER HEATERS.
APPLICATION FILED NOV. 29, 1919.

1,404,898.

Patented Jan. 31, 1922.



Inventor.
Bernard Ryan
by H. J. Demme, atty.

UNITED STATES PATENT OFFICE.

BERNARD RYAN, OF NEW YORK, N. Y.

THERMOSTATIC CONTROLLER FOR GAS WATER HEATERS.

1,404,898.

Specification of Letters Patent.

Patented Jan. 31, 1922.

Application filed November 29, 1919. Serial No. 341,529.

To all whom it may concern:

Be it known that I, BERNARD RYAN, a subject of the King of Great Britain, and resident of the city of New York, State of New York, in the United States of America, have invented certain new and useful Improvements in a Thermostatic Controller for Gas Water Heaters, described in the following specification and illustrated in the accompanying drawings, that form part of the same.

The principal objects of the invention are, to devise an apparatus for positively controlling the flow of gas to the burner of gas water heaters in such a manner as to ensure a rapid opening and closing of the valve, thereby obviating the dangers incident to back firing and, further to devise a structure which will not be liable to dis-arrangement of adjustment during installation.

A further and very important object is to produce an apparatus which may be set very accurately so that it will operate within a very restricted range in change of temperature of the water.

The principal feature of the invention consists in the novel construction and arrangement of parts, whereby the operating of the lever directly engaging the gas valve is accelerated by the operation of a lever introduced between the valve operating lever and the lever actuated directly by the thermostat, and whereby the gas pipe connection to the burner is brought into close proximity to the main support of the thermostat mechanism.

In the drawings, Figure 1 is a longitudinal sectional elevational view showing the position of the parts when the gas valve is closed.

Figure 2 is a view similar to Figure 1 showing the position of the parts when the valve is opened.

Figure 3 is a plan view of the apparatus. The present invention is an improved structure for the type of thermostatic control wherein the valve is retained closed by magnetic force and in the application of the device herein shown a casing 1 for closing the thermostatic control apparatus is supported upon a pipe 2 connected with the water circulating system of the heating apparatus.

A thermostat 3 preferably of the carbon stick and copper tube structure is secured

in the base of the casing 1 and extends into the pipe 2.

Within the casing 1 a lever 4 is pivotally mounted in the bearing lugs 5 arranged adjacent to the thermostat and a set screw 6 extends through said lever and bears upon the end of the thermostat, thus forming an adjustable connection between the lever and the thermostat.

The outer end of the lever 4 is formed with a pair of lug projections 7 between which is pivotally mounted a lever 8 one end of which extends over the lever 4 to a point adjacent to the thermostat. Upon one end of the lever 8 is secured a steel armature 9 which extends transversely of the casing and is adapted to co-operate with the magnet 10 placed within the casing.

A valve rod 11 extends through a hole in the end of the lever 8 and through an enlarged hole 12 in the lever 4 and a valve 13 is secured to the end of said rod below the lever 4 and engages a valve seat 14 in the bottom of the casing arranged close to the connection of the casing with the pipe 2.

The gas pipe is thus brought close to the large water pipe support and there will be very little risk of mechanics straining the mechanism in the connecting of the pipes.

An intermediate lever 15 is pivotally supported between the lugs 16 extending upwardly from the bottom of the casing 1 and one end of this lever extends between the lugs 7 of the lever 4 resting freely upon the top of the lever. The opposite end of the lever 15 is connected with the outward end of the lever 8 by a coil tension spring 17. This arrangement of levers produces a very rapid movement of the valve.

The thermostat pushing against the lever 4 swings the outer end upwardly carrying with it the lever 8, thereby tending to lift the valve from its seat and as the lever 4 moves upwardly it swings the lever 15 upon its bearing thereby moving the outer end in a downward direction. The downward movement pulling against the spring 17 tends to swing the lever 8 on its pivot on the lever 4, consequently the movement of the inward end of the lever 8 is greatly accelerated. The magnetic pull upon the armature 9 holds the valve closed until the upward pull of the lever 8 overcomes the magnetic pull and by the accelerated movement obtained by the mechanism described

the action of the valve is extremely rapid. Inversely the action of closing of the valve is also rapid, though the quick closing is not as important as the quick opening.

5 Many adjustments may be introduced into the structure in order to obtain the desired action in varying the lengths of the several levers but the principal adjustment is in the location of the pivotal point of the intermediate lever 15. The supporting lugs 16 are
10 here shown provided with horizontal slots to allow the pivot pin carrying the lever 15 to be adjusted so as to increase or decrease the length of its leverage between its pivot
15 point and the point of contact with the lever 4. The lever 4 is preferably formed with a rounded end surface to engage the lever 15.

In the operation of this device, when the
20 temperature of the water in the pipe 2 reaches a predetermined low point the thermostat lifts upwardly on the screw 6 thereby swinging the lever 4 upwardly on its pivot. The free end of the lever 4 engaging
25 the lever 15 swings it on its pivot so that the outward end moves away from the lever 8. Simultaneously the lever 8 is moved upwardly as it is carried on the lever 4. The pull of the magnet 10 holds the armature 9
30 and the lever 8 tilts on its pivot, the outer end moving the reverse direction to the movement of the lever 15. The tension of the spring 17 is thus increased very rapidly and when this tension overcomes the mag-
35 netic pull the lever 8 swings on its pivot with a snap action which causes the valve 13 to be lifted from its seat with a very quick movement thus allowing the full volume of gas to flow into the feed pipe 18
40 leading to the gas burner.

The gas is fed to the casing through the inlet 19 and the casing 1 retains a volume of gas which is immediately released on the lifting of the valve from its seat and the
45 burner will be lighted without danger of backfiring which is caused by a slow feed of gas mixing with air in the feed pipe making a lean mixture which explodes in the bunsen.

50 When the temperature of the water is raised to the desired degree the thermostat recedes and allows the lever 4 to swing downwardly. This allows the levers 15 and 8 to swing upon their respective pivots while the
55 lever 8 is lowered directly and when the armature reaches the zone of influence of the magnetic pull of the magnet it is pulled down with a snap and the valve is lowered to its seat where it is retained closed by the
60 gas pressure.

It will be understood from this description that the operation of the mechanism is extremely simple and it will be apparent that it may be adjusted so that the opera-
65 tion will be very accurate, that is to say, the

leverages may be so arranged in relation to the pull of the magnet and the tension of the spring 17 as to effect the operation of the valve upon a change of a very few degrees in the temperature of the water.

What I claim as my invention is:—

1. In a thermostatic controller for gas water heaters, the combination with a casing connected with a gas supply and having an outlet to the burner, a valve controlling the
75 outlet, a pair of levers pivotally connected and operating the gas valve, a thermostat and magnet controlling said levers, of a lever interposed between the aforesaid levers and imparting an accelerating movement to
80 the lever engaging the gas valve.

2. In a thermostatic controller for gas water heaters, the combination with a casing connected with a gas supply and having an
85 outlet to the burner, a valve controlling the outlet, a pair of levers pivotally connected and operating the gas valve, a thermostat and magnet controlling said levers, of a lever interposed between the aforesaid levers having one end thereof engaging the lever
90 connected with the thermostat, and a tension spring connected to the free end of the intermediate lever and to the free end of the lever operating the gas valve.

3. In a thermostatic controller for gas
95 water heaters, the combination with a casing connected with the gas supply, a thermostat, and a lever operated by said thermostat, of a gas outlet from said casing arranged intermediate of the length of said lever, a lever
100 pivoted intermediate of its length on the free end of the aforesaid lever, a valve operatively connected with the inward end of the latter lever and closing said gas outlet, and a lever pivotally supported intermediate of its
105 length from said casing and having its inward end engaging the free end of the thermostatic lever and its outward end flexibly connected with the lever supported on the thermostat lever.

4. In a thermostatic controller for gas water heaters, the combination with a casing connected with the gas supply, a thermostat, and a lever operated by said thermostat, of a
115 gas outlet from said casing arranged intermediate of the length of said lever, a lever pivoted intermediate of its length on the free end of the aforesaid lever, a valve operatively connected with the inward end of the latter lever and closing said gas outlet, a lever piv-
120 otally supported intermediate of its length from said casing and having its inward end engaging the free end of the thermostatic lever and its outward end flexibly connected with the lever supported on the thermostat
125 lever, and a coil tension spring connecting the free end of the latter lever with the free end of the valve supporting lever.

BERNARD RYAN.