

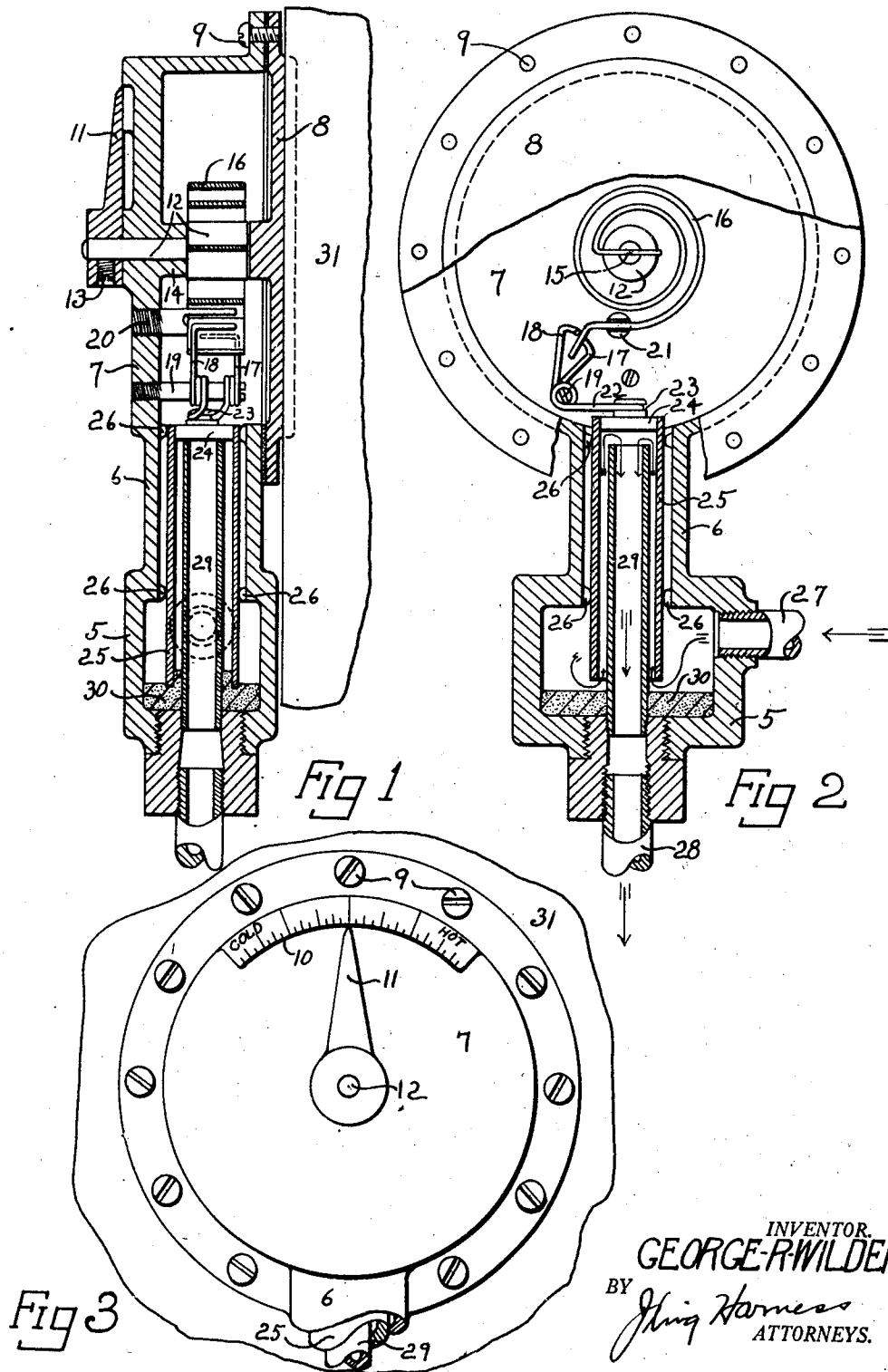
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VALVE

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VALVE.

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It is the primary object of my invention to provide a valve which is preferably thermostatically operated and preferably intended for use in regulating the flow of gas in a water heater.

Generally speaking, my invention comprises the use of a relatively heavy liquid such as mercury together with a movable element for opening and closing a passage between an inlet and outlet for a lighter fluid such as gas.

With the above and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device as described in the specification, claimed in my claims and shown in the accompanying drawings, in which:

Fig. 1 is a sectional view of my improved device with a portion of the tank to which it may be attached shown in elevation.

Fig. 2 is a rear elevation of my improved device, certain parts being broken away and other parts being shown in section to better illustrate the invention.

Fig. 3 is a front elevation of the regulating dial utilized in my improved device.

I have shown a chamber or casing which may be said to comprise a bottom enlarged portion 5, central restricted portion 6 and top enlarged portion 7. The portion 7 is provided with an opening in the back thereof which may be closed by a plate 8 of brass or other suitable material which is secured to the casing by screw studs 9. The face of the portion 7 is provided with an indicating scale 10 across which an indicating finger 11 may move. The finger 11 is mounted on the pin 12 which is secured to rotate therewith by the setscrews 13. The pin 12 is rotatably mounted in the apertured boss 14 and extends within the portion 7 of the chamber. Connected to the pin within the chamber as at 15 is one end of a coil 16 of thermostatic metal. The other end of the coil 16 is positioned between the spring arms 17 and 18 of a bell crank lever device which is made up of a continuous length of spring material and pivoted on the stud 19. A stud 20 is secured in the wall of the chamber 7 and has a split end 21 extended into the chamber and receiving the coil 16 adjacent its end to guide the movement of the same. The lower end of the bell crank lever device is designated as 22 and is looped around the notch 23 on the end of the plug 24 in the tube 25 so as to hold the tube in sus-

pended position. The tube 25 extends through the restricted portion 6 of the chamber being guided therein by spaced projections 26.

The portion 5 of the chamber is provided with an inlet pipe 27 and an outlet pipe 28, the latter extending through the pipe 29 to a point within the restricted portion 6 and also within the tube 25. A quantity of mercury or other suitable heavy liquid 30 is provided in the bottom of the portion 5 of the chamber surrounding the pipe 27.

The device as a whole may be mounted upon a tank 31 which may be considered for the purpose of this application as a conventional water tank, with the plate 8 and coil 16 held directly adjacent the tank. Assuming that the water in the tank is cold the coil 16 will be acted upon to move against the spring arm 18 so as to lift the tube 25 to the position shown in Fig. 2. The pipe 27 may be connected to a suitable supply of light fluid such as gas, the arrows in Fig. 2 indicating the incoming of the gas and the passage of the same between the tube 25 and the pipe 29 to the top of the tube 25 and thence down through the pipe 29 and pipe 28 to a suitable burner for heating the water in the tank (not shown). When the water in the tank has reached a predetermined higher temperature, the heat thereof will be conducted through the tank wall into the portion 7 of the chamber and act upon the coil 16 to cause it to exert pressure on the spring arm 18 of the bell crank lever so as to press the tube 25 downwardly until it engages in the mercury 30. As soon as the tube 25 begins to restrict the flow of gas, pressure change occurs which hastens contact with the mercury and acts to snap the tube 25 into position where the open end thereof is completely immersed in the mercury and the closed end thereof or plug 24 will rest on the open end of the pipe 29. The closing of the end of the pipe 29 will tend to prevent splashing of the mercury up over the end of the pipe, in the event the pipe is not of sufficient length. When the water in the tank has again cooled to cause the coil 16 to act on the spring arm 18 and lift the tube 25, the first breaking of the open end of the tube with the mercury will permit the entry of gas and the pressure of the gas will be exerted against the inner face of the plug 24 so as to snap the tube 25 to its extreme upward position and thereby fully open the valve.

It will be apparent that movement of the indicator finger 11 will tend to wind and unwind the coil 16 dependent upon the direction of its movement, correspondingly adjusting the tension of the coil and the periods at which it will operate to open and close the valve.

It will be apparent that other means than the thermostatic means here shown may be utilized for opening and closing the valve and that various other changes may be made in the arrangement, combination and construction of the various parts of my improved device without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. In a device of the class described, an inlet pipe and an outlet pipe, a common chamber into which said pipes lead, a relatively heavy fluid held in said chamber subject to and movable as a body by pressure from fluid entering the intake and surrounding one of said pipes, a tube enclosing said latter pipe having a closed end extending beyond the end of said pipe and movable to bring its other end into and out of said heavy fluid to make and break connection between said pipes and temperature responsive means for moving the tube.
2. In a device of the class described, a chamber having inlet and outlet openings, the latter extending in the form of a pipe into the interior of the chamber, a tube having an open end enclosing said pipe and a closed end extended beyond the end of the pipe within the chamber, a body of relatively heavy fluid in said chamber around said pipe and below the intake opening, whereby a relatively light fluid may enter the intake, pass between the tube and pipe, thence into the pipe and out of the chamber, and temperature responsive means for moving the tube into the body of relatively heavy fluid to seal the further passage of said light fluid.
3. In a device of the class described, a chamber having inlet and outlet openings, the latter extending in the form of a pipe into the interior of the chamber, a tube having an open end enclosing said pipe and a closed end extended beyond the end of the pipe within the chamber, a body of relatively heavy fluid in said chamber around said pipe and below the intake opening, whereby a relatively light fluid may enter the intake, pass between the tube and pipe, thence into the pipe and out of the chamber, and temperature responsive means for moving the tube into the body of relatively heavy fluid to seal the further passage of said light fluid with the closed end of said tube resting on the open end of said pipe.
4. In a device of the class described, a chamber having inlet and outlet openings, the

latter extending in the form of a pipe into the interior of the chamber, a tube having an open end enclosing said pipe and a closed end extended beyond the end of the pipe within the chamber, a body of relatively heavy fluid in said chamber around said pipe and below the intake opening, whereby a relatively light fluid may enter the intake, pass between the tube and pipe, thence into the pipe and out of the chamber, and means for moving the tube into the body of relatively heavy fluid to seal the further passage of said light fluid and then moving it out of the heavy liquid to break the seal, said means operating in response to temperature variations.

5. In a device of the class described, a chamber having inlet and outlet openings, the latter extending in the form of a pipe into the interior of the chamber, a tube having an open end enclosing said pipe and a closed end extended beyond the end of the pipe within the chamber, a body of relatively heavy fluid in said chamber around said pipe and below the intake opening, whereby a relatively light fluid may enter the intake, pass between the tube and pipe, thence into the pipe and out of the chamber, and means for moving the tube into the body of relatively heavy fluid to seal the further passage of said light fluid and then moving it out of the heavy liquid to break the seal, said means operating in response to temperature variations and comprising a coil of thermostatic metal connected at one end with a bell crank lever, said lever being connected with the tube.

6. A device of the class described comprising a gas intake and gas outlet, a chamber thru which the gas passes, a supply of mercury freely disposed in the chamber subject to the pressure of the gas, a tube in the chamber and temperature responsive means for moving the tube relative to the mercury to alternately immerse one end of the tube in the mercury to close the passage of gas from the intake to the outlet and clear said tube end from the mercury to open the said gas passage, the pressure of the gas assisting to snap the tube free of the mercury and immerse the end thereof in the same in the said alternate movements.

7. A device of the class described comprising a gas intake and gas outlet, a chamber through which the gas passes, a supply of mercury freely disposed in the chamber subject to the pressure of the gas, a tube in the chamber and means for moving the tube relative to the mercury to alternately immerse one end of the tube in the mercury to close the passage of gas from the intake to the outlet and clear said tube end from the mercury to open the said gas passage, the pressure of the gas assisting to snap the tube free of the mercury and immerse the end thereof in the same in the said alternate movements.

8. In combination, a chamber having an inlet passage and an outlet passage, a resiliently supported valve member between said passages subject to the pressure of fluid entering said chamber from said inlet, a heavy liquid in said chamber subject to the pressure of fluid entering said chamber from said inlet, and means for causing a movement between said liquid and said valve member to restrict the flow of said fluid past said valve member 10 whereby the change of pressure on opposite sides of said point of restriction due to said restriction, will cause said resilient means to give and snap said valve member into said liquid thereby completely and instantly seal- 15 ing said outlet to the passage of said fluid.

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