No. 826,735. PATENTED JULY 24, 1906.

F. T. MUELLER.

THERMOSTAT.

APPLICATION FILED JUNE 1, 1904.

Fig. 1.

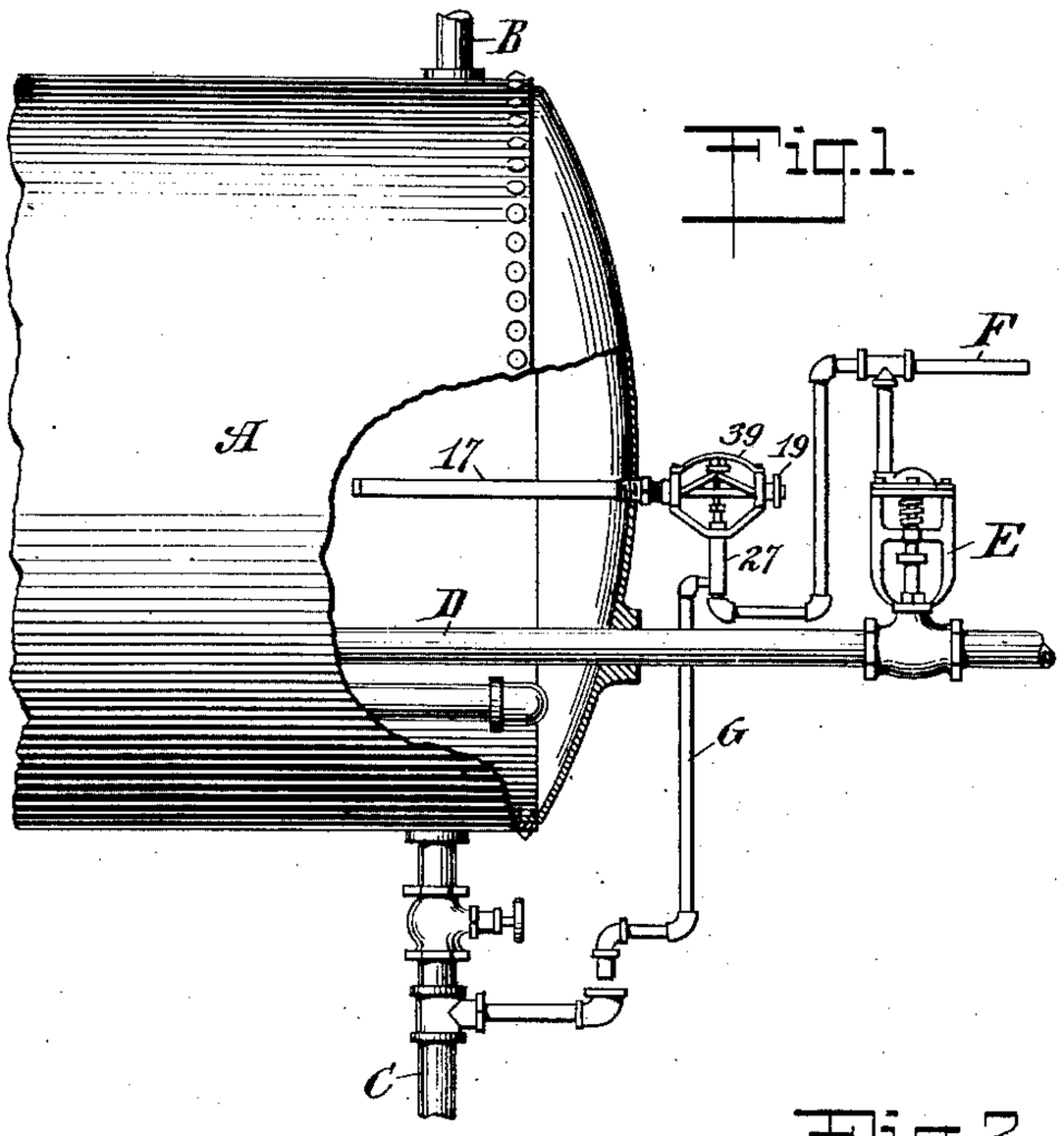


Fig. 4.

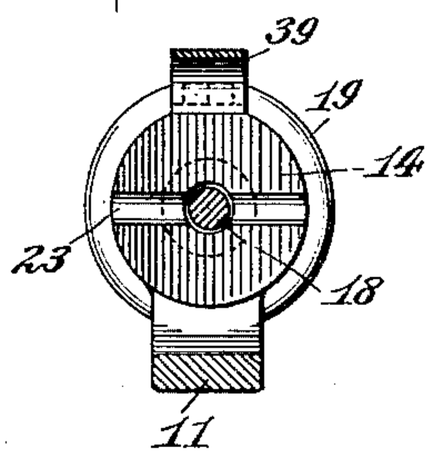


Fig. 2.

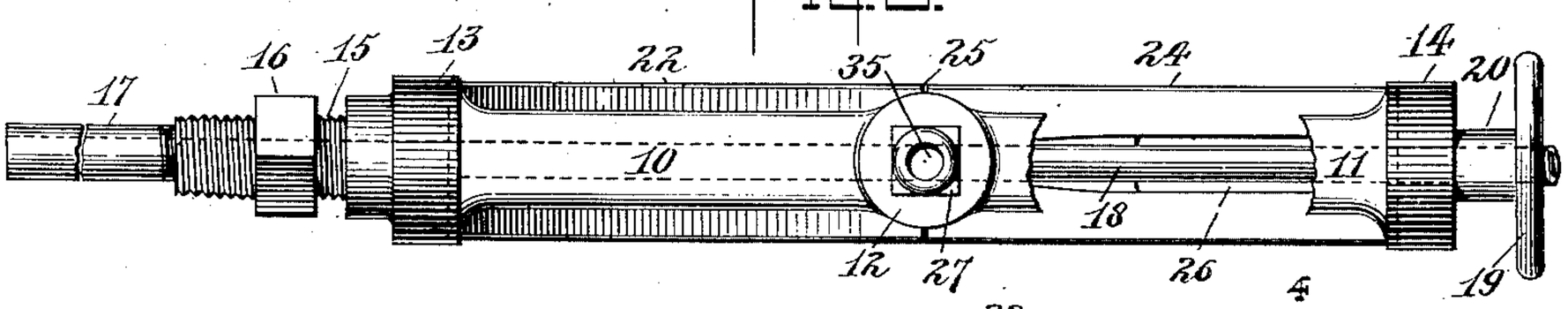


Fig. 3.

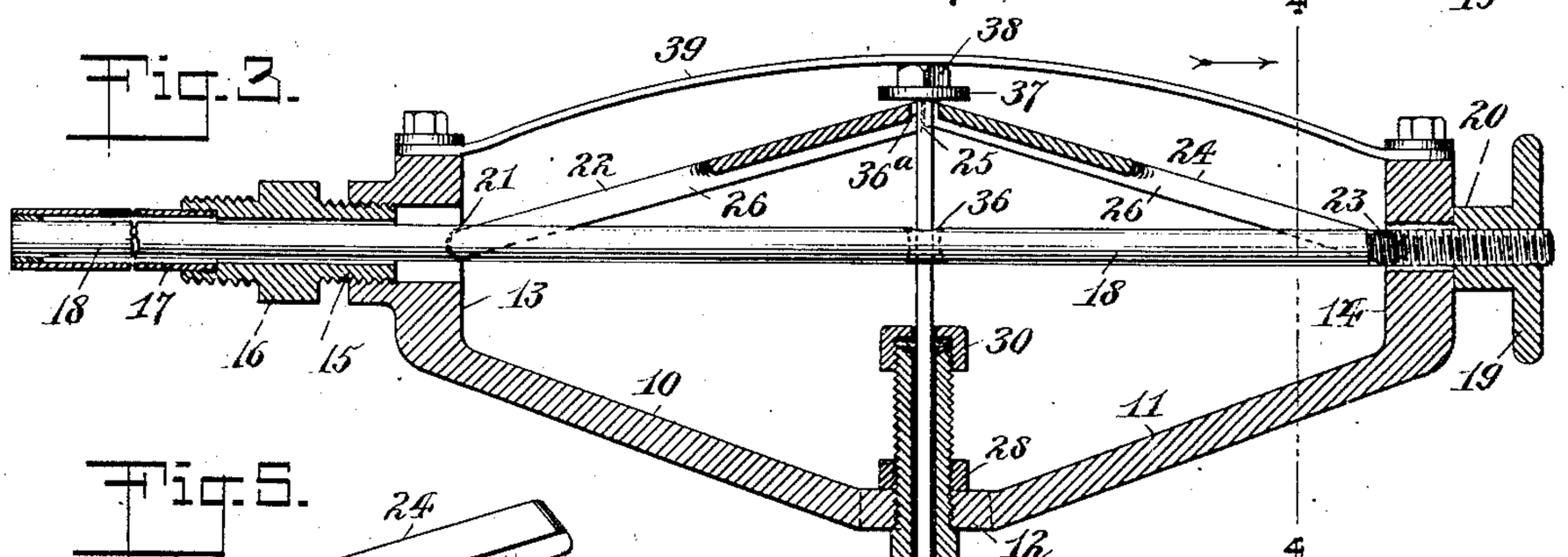
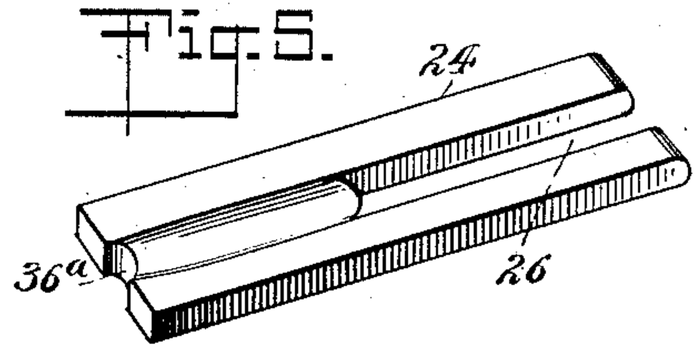


Fig. 5.



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THERMOSTAT.

No. 826,735. Specification of Letters Patent. Patented July 24, 1906.

Application filed June 1, 1904. Serial No. 210,742.

To all whom it may concern:

Be it known that I, FREDERICK T. MUELLER, a citizen of the United States, and a resident of New York, borough of Manhattan, in the county of New York and State of New York, have made and invented certain new and useful Improvements in Thermostats, of which the following is a specification.

My invention relates to an improved thermostat adapted for various purposes—as, for instance, to control the temperature of water in hot-water tanks employed in houses and factories—the object of the same being to provide a device of this character which shall be simple and cheap to manufacture, easily and readily applied, and reliable and effective in operation.

With these and other ends in view my invention consists in certain novel features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in elevation of my improved thermostat as applied to a hot-water tank. Fig. 2 is a top plan view of the device, the tank and its connections being omitted. Fig. 3 is a vertical sectional view thereof. Fig. 4 is a sectional view taken on the line 4 4 of Fig. 3 looking in the direction as indicated by the arrow. Fig. 5 is a detached view in elevation of one of the deflecting-toes.

My improved thermostat is applicable to various uses and for various purposes, and in the drawings I have illustrated it as applied to hot-water tanks, having found in practice that it operates under such conditions and for such purposes with reliability and effectiveness.

Referring to the drawings, A represents a hot-water tank or boiler—such, for instance, as is employed in houses and factories for the distribution of hot water through the building and into which leads the inlet-pipe B for cold water and from which leads the drain-pipe C. For the purpose of heating the water in the tank there is usually employed a steam-coil D, having connected therewith a valve E, operated, for instance, by water-pressure supplied through the pipe F. These various parts, however, form no part of the invention and are illustrated for the purpose of showing one application of the thermostat, which consists of a bracket, preferably formed of cast-iron and with two deflecting-arms 10 11, the metal forming the junction being shaped into a flat disk 12 and of round or circular end pieces 13 14. Into the end 13, which is provided with a central opening, is threaded one end of the sleeve 15, squared or shouldered, as illustrated at 16, to facilitate the turning thereof, the opposite end of the sleeve being threaded into the boiler or tank A. This sleeve 15 is internally threaded to receive one end of the tube or pipe 17, made of expansible metal, preferably brass, which tube or pipe extends inwardly into the boiler or tank A and is intended to be surrounded with the water the temperature of which it is desired to control or regulate. Through this pipe or tube 17 extends the metal rod 18, one end of which is tightly secured to the inner free end of the tube or pipe 17, the opposite end of said rod extending loosely through the sleeve 15 and loosely through the ends 13 and 14 of the bracket, the extreme end of the rod being provided with the disk or wheel 19, threaded thereon, in order that the device may be adjusted and regulated that the valve will operate at a selected temperature, as hereinafter described, it being evident that by properly turning the handle or disk 19, the hub 20 of which bears against the end 14 of the bracket, will force said end 14 toward the end 13, the latter end being held stationary in the boiler by means of the sleeve 15, as hereinbefore described. In the end 13 of the bracket is formed a groove 21, in which fits one end of the deflecting toe-piece 22, a similar groove 23 being formed in the end 14 of said bracket, in which latter groove fits one end of the deflecting toe-piece 24, the opposite end of said pieces 22 and 24 butting against each other, as illustrated at 25, these deflecting toe-pieces being slotted or bifurcated, as illustrated at 26 in Figs. 3 and 5, in order to properly straddle or fit over the rod 18 where the ends of said toe-pieces fit in the grooves formed in the ends 13 and 14 of the bracket.

In the disk 12, formed at the junction of the two deflecting-arms 10 and 11 of the bracket, is formed an opening in which is fitted a valve-casing 27, provided with a shoulder fitting against one side or surface of the disk, that portion of the casing extending within the bracket being threaded and provided with a lock-nut 28, impinging against the opposite side of said disk 12 and firmly holding said casing in position. Through the central passage or opening formed in this casing extends a valve-stem 29, a packing-nut

30 being threaded on the upper end of said valve-casing to prevent any leakage around the stem 29. The lower end of the stem 29 is provided with a valve 31, adapted to seat on the valve-seat 32 when the stem is raised, the lower end of the stem being somewhat reduced in diameter, as illustrated at 33, whereby when the stem is lowered and the valve unseated the water may flow by said valve, around the restricted end of the valve-stem, and through the opening or outlet 34, formed in the casing, the water being admitted through the opening 35, formed in the extreme lower end of the casing 27. The upper end of the stem passes through an opening 36, formed in the rod 18, and through an opening 36ª, formed in the abutting ends of the deflecting toe-pieces 22 24, and provided on its extreme end with a washer or disk 37, bearing on the upper sides or ends of the deflecting toe-pieces 22 24, and a nut 38, this construction and arrangement of parts securing the valve-stem to the deflecting toe-pieces and also preventing the latter from becoming accidentally disengaged from the bracket.

Having thus described the construction of the device, I will now explain its operation in connection with a hot-water tank, as illustrated in the drawings.

Presuming that the water in the tank A has fallen below the temperature at which it is desired to retain it, the tube or pipe 17 will contract, whereby the rod 18 by reason of its being rigidly secured to the inner free end of the tube or pipe 17 and threaded in the wheel or disk 19, which bears against the end 14 of the bracket, will cause said end 14 to be moved slightly in a direction away from the end 13, the latter end 13 being, as described, tightly secured to the tank A. By this slight separation of the two ends of the bracket the arms 10 11, and especially where they converge into the disk 12, will be raised, the valve-casing 27 being also raised. At the same time the abutting ends of the deflecting toe-pieces 22 and 24 will be lowered—that is, the toe-pieces will assume a position more nearly to the horizontal, the valve-stem being carried downwardly by means of the spring 39, bearing against the nut 38, secured to the extreme end of said stem, the ends of which spring are bolted or otherwise secured to the ends 13 14 of the bracket, these movements of the several parts causing the valve-casing to be raised and the stem lowered, thereby unseating the valve 31 from its seat 32. The water-supply from any suitable source—as, for instance, the city main—will then flow through the supply-pipe F into the valve-casing 27, through the inlet-port 35, and out through the pipe G, threaded into the outlet-port 34, formed in the valve-casing, thereby relieving the pressure on the steam-valve E, permitting the same to open and allowing the steam to flow into the steam-coil D, located within the hot-water tank. As the water in the tank is heated by this coil the brass pipe or tube 17 will expand, and as one end thereof is fixed the movement of the metal will necessarily be in a direction toward the inner free end thereof. The result of this expansion of the pipe or tube is to cause the rod 18 to exert a pull or tension in the same direction upon the end 14 of the bracket, into which the end of said rod 18 is threaded, as heretofore described, whereby by reason of which pull or tension the arms 10 and 11 of the bracket, and particularly the disk 12, with its attached valve-casing, will be lowered and the abutting ends of the deflecting toe-pieces raised, causing the valve-stem 29 to be raised until the valve 31 rests against its seat 32, thereby causing the flow of the water through the pipe F, valve-casing 27, and outlet-pipe G to be checked, the pressure thereof being then exerted on the steam-valve E, closing the same and cutting off the supply of steam to the coil D. Should the temperature of the water in the tank A subsequently fall, the brass pipe or tube 17 will contract, as before described, thereby opening the valve and permitting the steam to again enter the coil D, as described in the first instance. It will be understood that by turning the disk or handle 19, threaded on the outer extreme end of the rod 18, the hub 20 of which bears against the end 14 of the arm 11, the said end 14 will be forced in a direction toward the end 13 of the arm 10, such adjustment causing the abutting ends of the deflecting toe-pieces to be raised and also the valve-stem 29, partially closing the valve 31 against its seat, the same as though the expansion member 17 had been expanded. By a slight rise in temperature of the water the valve will be closed. By turning the disk 19 in the opposite direction the abutting ends of the deflecting toe-pieces 22 and 24 will be allowed to lower—that is, assume a position more nearly to the horizontal—the valve-stem being carried downwardly by means of the spring 39, as before described, thereby causing the valve-stem to be lowered and the valve removed to a greater distance from the valve-seat 32. By such adjustment a much greater rise in the temperature of the water will be required to seat the valve, this construction and arrangement of parts permitting the device to be so regulated and adjusted that the water in the tank may be kept or retained at any desired degree of temperature.

From the foregoing it will be understood that the device is exceedingly simple and cheap to construct, easily and readily assembled and attached in place, is automatic and reliable in operation, and by reason of the construction and arrangement of its several parts a slight contraction or expansion of the

brass tube or pipe will cause a much greater movement in the valve in that the valve and valve-stem are moved in one direction and the valve-casing simultaneously moved in the opposite direction.

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

1. In a thermostat, the combination with a pair of deflecting-arms, of an expansible member secured at one end to one of said deflecting-arms, a rod secured at one end to the free end of said expansible member and at its opposite end secured to the other of said deflecting-arms, deflecting toe-pieces abutting at one of their ends and at their opposite ends bearing against the ends of said deflecting-arms, a spring-actuated valve engaging with said deflecting toe-pieces and a valve-casing formed with a valve-seat secured to said deflecting-arm, substantially as described.

2. In a thermostat, the combination with a bracket consisting of two deflecting-arms, of two deflecting toe-pieces abutting at their inner ends and at their outer ends engaging with the outer ends of said deflecting-arms, of an expansible member secured at one end to one of said deflecting-arms, a rod secured at one end to the free end of said expansible member and at its opposite end secured to the other of said deflecting-arms, a valve-casing secured to said deflecting-arms, a valve-stem formed at one end with a valve and at its opposite end engaging with said deflecting toe-pieces, and a spring bearing on the end of said valve-stem, the ends of said spring being secured to the ends of said deflecting-arms, substantially as described..

3. In a thermostat, the combination with a bracket consisting of two deflecting-arms, of deflecting toe-pieces, their inner ends abutting against each other and the outer ends of which engage with said deflecting-arms, an expansible metal pipe secured at one end to the end of one of said deflecting-arms, a rod passing through said pipe and secured at one end to the free end of said pipe and at its opposite end engaging the end of the other of said deflecting-arms, a valve-casing secured to said deflecting-arms, a valve-stem formed at one end with a valve and at its opposite end engaging with said deflecting toe-pieces, and a spring secured at its ends to the ends of said deflecting-arms and engaging with said valve-stem to release said valve from its seat, substantially as described.

4. In a thermostat, the combination with a bracket consisting of two deflecting-arms, of deflecting toe-pieces abutting against each other at their inner ends and at their outer ends engaging with the ends of said deflecting-arms, an expansible metal pipe secured at one end to the end of one of said deflecting-arms, a metal rod secured at one end to the free end of said expansible metal pipe and at its opposite end engaging the end of the other of said deflecting-arms, a disk or handle threaded onto the extreme end of said rod and impinging against the end of said deflecting-arm, a valve-casing secured to said deflecting-arm, a valve-stem formed at one end with a valve and at its opposite end engaging with said deflecting toe-pieces, and a spring secured at its ends to the end of said deflecting-arm and bearing against the outer end of said valve-stem, substantially as described.

Signed at New York, borough of Manhattan, in the county of New York and State of New York, this 21st day of May, A. D. 1904.

FREDERICK T. MUELLER.

Witnesses:
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