Oct. 13, 1936. D. LUMSDEN 2,057,496

THERMOSTAT

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Fig. 1.

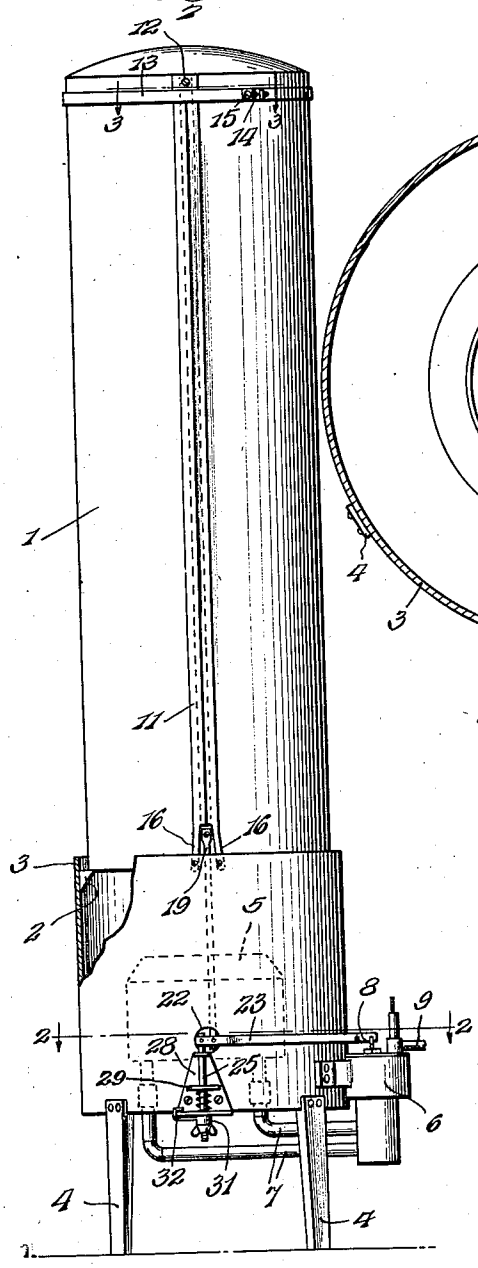


Fig. 2.

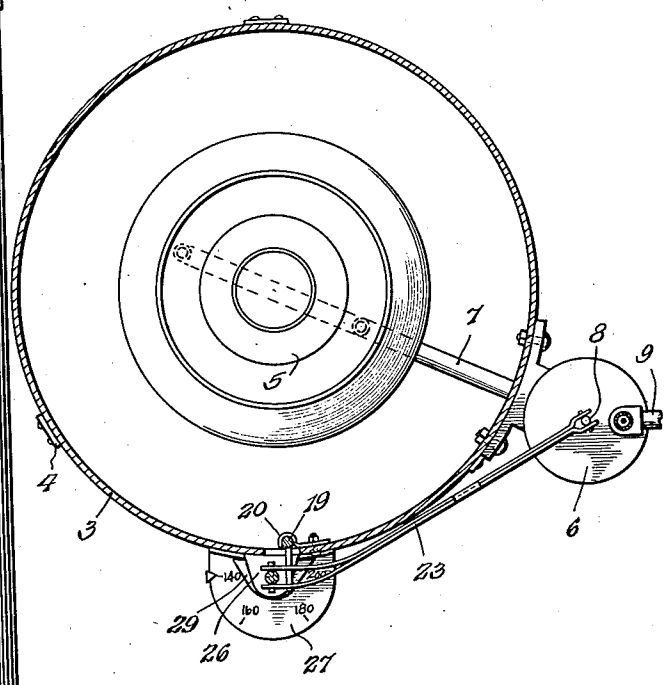
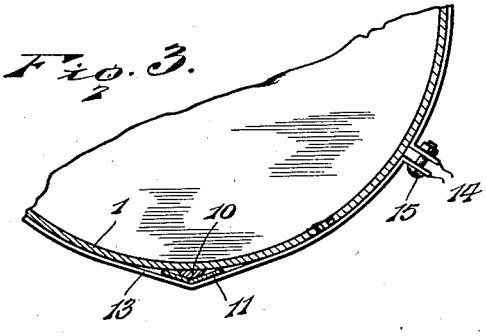


Fig. 3.



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Fig. 4.

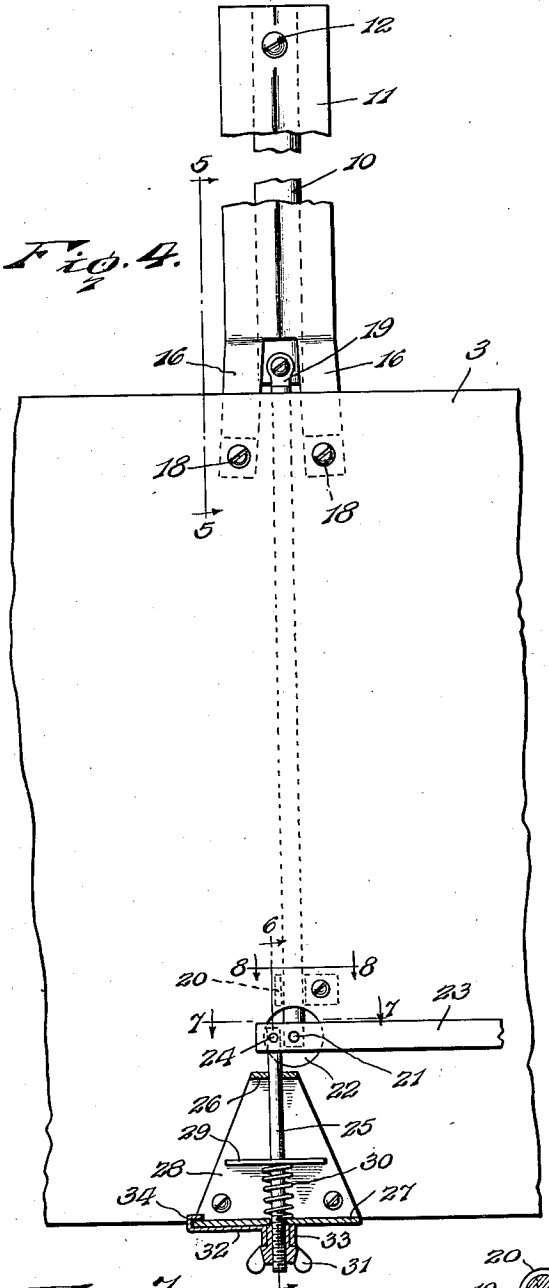


Fig. 5.

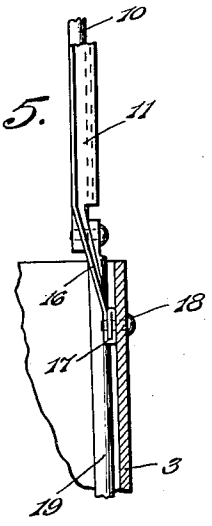


Fig. 6.

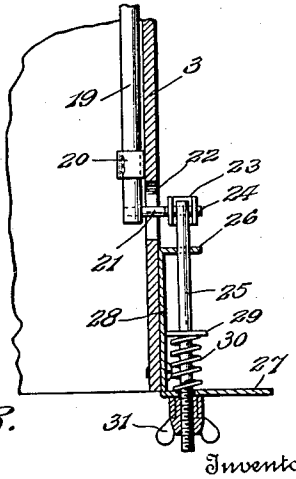


Fig. 7.

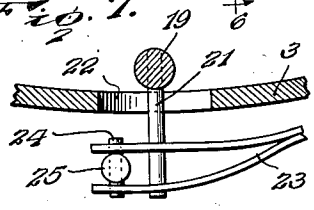
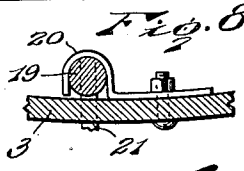


Fig. 8.



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Patented Oct. 13, 1936

2,057,496

UNITED STATES PATENT OFFICE

2,057,496

THERMOSTAT

David Lumsden, Sikeston, Mo.

Application June 21, 1934, Serial No. 731,766

2 Claims. (Cl. 236—33)

This invention relates to thermostatic means for controlling the flow of fluid fuel to a burner and has special reference to mechanism of the type originally shown, described and claimed in an application filed by me August 21, 1933, Serial No. 686,133. The present invention seeks to provide an improved form of thermostatic mechanism which may be readily mounted upon any boiler or tank and will be caused, by the varying temperatures of the shell of the tank, to open and close a valve whereby the flow of fuel will be controlled. In the accompanying drawings which illustrate one form of the present invention:

Figure 1 is a side elevation, partly broken away and in section, of a tank or boiler and the fuel supply elements therefor showing my improved thermostatic mechanism applied thereto.

Figure 2 is an enlarged horizontal section on the line 2—2 of Figure 1.

Figure 3 is an enlarged horizontal section on the line 3—3 of Figure 1.

Figure 4 is an enlarged elevation, with parts in section, of a portion of the thermostatic mechanism.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is a section on the line 6—6 of Figure 4.

Figure 7 is a section on the line 7—7 of Figure 4.

Figure 8 is a section on the line 8—8 of Figure 4.

The boiler or tank 1 is shown as a conventional stand boiler supported at its lower end upon lugs 2 on the inner side of a cylindrical base 3 which is of somewhat larger diameter than the boiler and which, in turn, is supported by legs 4 secured thereto and depending therefrom to rest upon a floor or other fixed support. Arranged within the base 3 is a fuel burner 5 and mounted upon the side of the base is a housing or casing 6 containing a cut-off valve and connected with the burner by pipes 7 to permit a supply of fuel to flow to the burner, the fuel being fed to the cut-off valve, the stem of which is indicated at 8, through a supply pipe 9, as will be understood.

The thermostatic bar comprises an inner bar of aluminum 10 and an outer strip 11 of sheet metal, preferably steel, which are secured together at their upper ends by a screw 12 and are held to the boiler by a clamping band 13 which is provided at its ends with lugs or ears 14 through which a clamping bolt 15 is inserted and secured. The aluminum bar 10 will thus be secured in direct contact with the boiler, as shown in Figure 3, and as it will expand and contract much more rapidly than the outer steel strip, it will, by its expansion and contraction, serve to operate the cut-off valve, as will presently fully appear. The thermostatic bar will be made of standard length, usually about three feet, and may be easily secured to any boiler without requiring any change in the construction of the boiler or the forming of any holes through the shell of the boiler which are apt to produce leaks. The lower end of the covering and supporting strip 11 is bifurcated to form spaced feet 16 which are folded upon themselves at their extremities, as shown at 17 in Figure 5, and disposed against the inner wall of the base 3, stove bolts 18 being inserted through the base and engaged in the reinforced folded extremities of the feet so as to firmly secure the feet and the strip to the base. To the lower end of the aluminum bar 10 is secured a steel rod 19 which extends downwardly within the base at the inner side of the same and has its lower end portion slidably fitted through a guide 20 secured on the inner wall of the base, as shown clearly in Figure 6. The lower extremity of the rod 19 carries a pin 21 which extends laterally outwardly through an opening 22 in the shell of the base 3 and is pivotally engaged in a regulating arm or lever 23 which is disposed at the outer side of the base. The pin 21 is disposed adjacent one end of the lever or regulating arm 23 while the opposite end of said arm or lever is pivoted to the upper end of the stem of the cut-off valve, as shown clearly in Figure 2. In the end of the lever 23, remote from the cut-off valve and close to the pivot 21, is engaged a pin 24 carried by the upper end of a rod or screw 25 and serving as a fulcrum for the lever or regulating arm. This fulcrum rod 25 passes through an upper flange 26 and a lower plate 27 at the opposite ends of a bracket 28 which is secured upon the side of the base 3, as clearly shown in Figures 4 and 6, and the plate 27 has an arcuate edge concentric with the fulcrum rod 25 so that it is utilized as a dial, numerals being inscribed upon the upper face of the plate, as shown in Figure 2, to indicate temperatures. The rod 25 is equipped with a shoulder or abutment 29 above the dial plate and an expansion spring 30 is disposed about the rod between said abutment and the dial plate, as clearly shown. The lower extremity of the rod is threaded and a wing nut 31 is mounted on the threaded extremity and may be turned home against the underside of the plate, rotation of the nut causing a vertical movement of the fulcrum rod against the force of the spring 30 so that the device may be set to oper-

ate at any desired temperature. The abutment 29 bears against the vertical member of the bracket 28 and prevents a torsional action of the rod 25 when turning the wing nut 31. An indicator finger 32 is disposed below the dial plate 27 and has a hub 33 frictionally engaged about the body of the wing nut 31 so that it will turn with the nut, the free end of the indicator or pointer being turned upwardly so as to extend past the edge of the dial plate and the top of the same, as shown at 34, so that it may be caused to register with any selected numeral upon the upper surface of the plate.

In use, the wing nut is turned so that the pointer 34 will be set in the desired position and the tension of the spring 30 will hold the parts frictionally in the set position, the setting of the pointer indicating the temperature at which the flow of fuel will be cut off. The range of temperature between the opening and closing of the valve is determined by the length of the lever 23 and the distance between the centers of the openings 21 and 24, in relation to the expansion and contraction of the aluminum bar.

As the water in the boiler heats, the shell of the boiler will also heat and the rising temperature will be imparted to the thermostatic bar 10 which is in contact therewith. The thermostatic bar will, therefore, expand or elongate and this elongation of the bar will cause the regulating lever or arm 23 to swing downwardly with respect to the fulcrum pin 24 and close the valve. As the boiler cools, the thermostatic bar will contract and, of course, will impart a reverse rocking to the regulating arm so that the cut-off valve will be opened and the flow of fuel re-established. The apparatus is very simple, inexpensive and may be applied to any boiler.

Having thus described the invention, I claim:

1. In an apparatus for the purpose set forth, a tank, a tubular base for said tank, a burner below the tank within the base, a valve for controlling the flow of fuel to the burner carried by said base externally thereof, a thermostatic bar extending vertically against the outer surface of the tank and secured at its upper end to the tank, said bar having its lower portion extending into the base and terminating opposite the opening formed therein, a pin extending from the lower end of the bar outwardly through the opening, a regulating arm pivoted adjacent one end to the pin projecting from the lower end of the thermostatic bar and extending horizontally therefrom externally of the base with its opposite end connected with the cut-off valve, a bracket secured against the outer surface of said base below the openings formed therein, a rod slidable vertically in said bracket and having a threaded lower portion projecting downwardly from the bracket, said rod having its upper end pivoted to the regulating arm adjacent the pivotal connection of the arm with the thermostatic bar, an abutment plate fixed to said rod and extending horizontally with portions projecting from opposite sides thereof, said abutment plate having its inner edge face bearing against the bracket to prevent rotation of the rod, an expansion spring between the lower end of the bracket and said abutment, and a nut on the threaded lower extremity of the rod for shifting the rod vertically and adjusting tension of the spring.

2. An apparatus for the purpose set forth, a tank, a tubular base supporting the tank, a fuel valve carried by said base externally of, a thermostatic bar extending vertically between upper and lower ends of the tank and in contact with the outer surface of the tank, a covering strip extending longitudinally of the bar in overlying relation thereto and having its side portions projecting from the bar and bearing against the outer surface of the tank and its upper end secured to the upper end of the thermostatic bar and its lower end formed with spaced feet secured against the inner surface of the base, a clamping band secured around the tank and extending across upper ends of the strip and bar for binding the same to the tank, a rod secured at its upper end to the thermostatic bar and extending vertically within the base and having its lower end terminating opposite an opening formed in the base, a regulating arm extending horizontally externally of the base, a pin carried by the lower end of the rod and extending outwardly through the opening in the base and through the regulating arm adjacent one end thereof, said regulating arm having its opposite end connected with the fuel control valve, and a vertically adjustable fulcrum carried by said base externally thereof and engaging the regulating arm adjacent the lower end of the thermostatic bar to pivotally mount the regulating arm.

DAVID LUMSDEN.