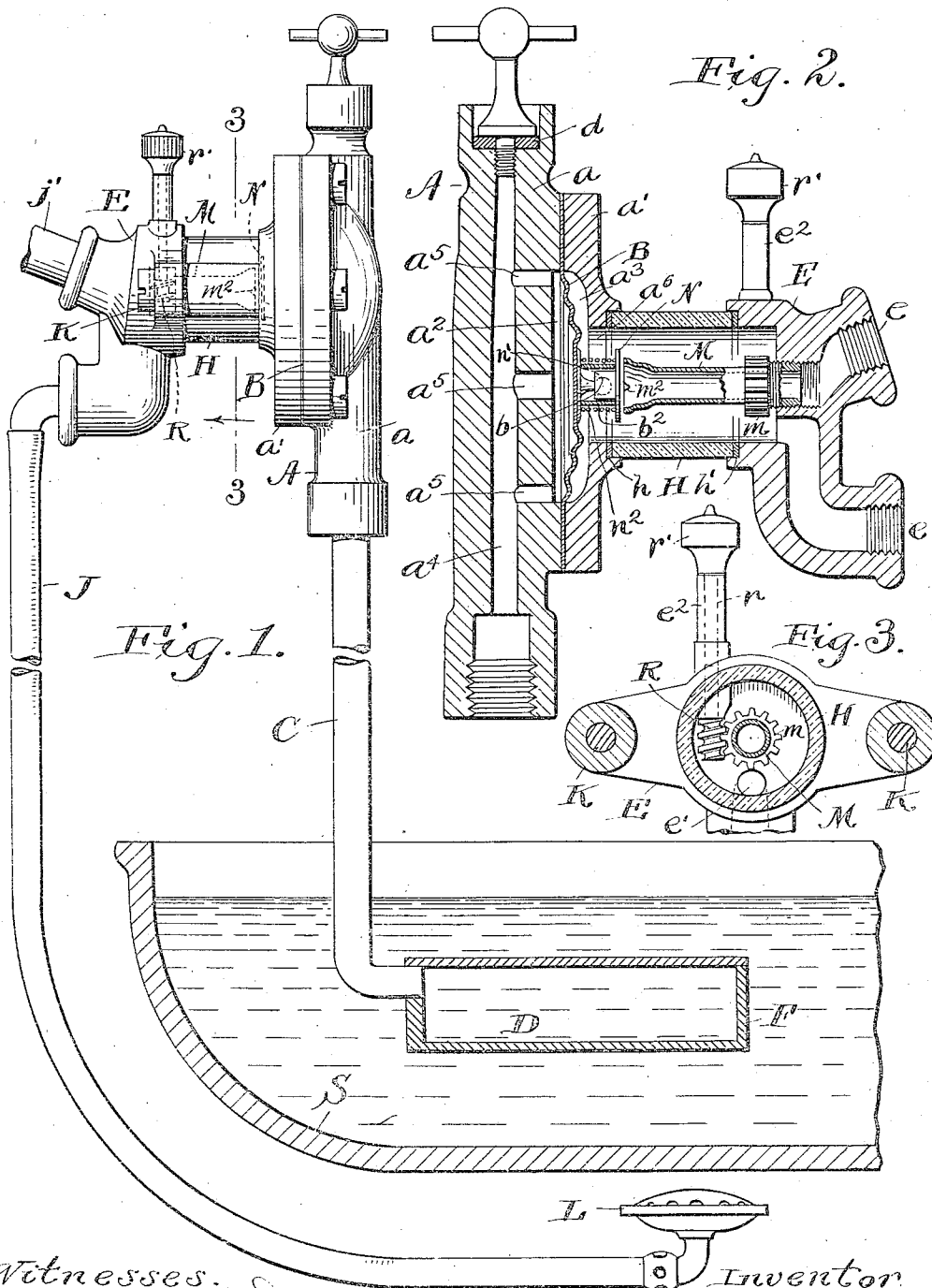


A. A. FROEHLICH.
THERMOSTATIC FUEL REGULATOR.
APPLICATION FILED FEB. 16, 1911.

1,058,171.

Patented Apr. 8, 1913.



Witnesses.

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ALBERT ANTON FROEHLICH, OF TOLEDO, OHIO.

THERMOSTATIC FUEL-REGULATOR.

1,058,171.

Specification of Letters Patent.

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Application filed February 16, 1911. Serial No. 608,987.

To all whom it may concern:

Be it known that I, ALBERT ANTON FROEHLICH, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Improvement in Thermostatic Fuel-Regulators, of which the following is a full, clear, and exact description.

The object of this invention is to automatically control the flow of fuel to a burner, to the end that whatever fluid is heated by said burner may be held at substantially uniform temperature.

The improvements relate particularly to the valve mechanism, and to the means for adjusting the device to maintain any desired temperature of the fluid heated by the burner.

The invention embodied in the best form known to me is shown in the accompanying drawings, and is hereinafter clearly described and the novel characteristics are defined by the appended claims.

In the drawing, Figure 1 is a side elevation of the invention. Fig. 2 is a central vertical longitudinal section; and Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Referring to the parts by letters, B represents a flexible metallic diaphragm arranged so that a fluid pressure thermostat of any familiar construction may act against one side thereof. In the specific construction shown, this diaphragm is made of thin metal with a plurality of circular corrugations to render it sufficiently flexible; and its edges are clamped between the two parts a , a' of a casing A,—the proximate faces of said casing being hollowed out to leave sufficient space for the flexing of the diaphragm. The hollowed out space behind this diaphragm is a part of the inclosed space which contains an expansible fluid D, as mercury. The remainder of this space, as shown, includes the vertical passageway a^4 in the casing member a , the ports a^5 connecting this passageway with the hollowed out space behind the diaphragm, the vertical tube C which screws into the lower end of the casing member a , so as to communicate with the passageway a^4 and the reservoir F, connected with the lower end of the tube C.

A casting E is connected with the casing A by suitable screws K. The tube H, which is preferably made of glass, extends between the casing and the casting, and serves as a part of the conduit through which the fuel

will flow from its source of supply to the burner L. Packing rings h , h' , may be interposed between the ends of this tube, and the casing member a' and the casting E to make the joints tight. The casting E is formed with two ports e , e' , one serving as the inlet port for the fuel and the other as the outlet port therefor. In the construction shown, the port e is the inlet port, and e' is the outlet port. The pipe J is connected with the latter port and leads to the burner L, and the pipe j' is connected with the inlet port e .

A tube M is screwed into the casting E so as to communicate with one of said ports, and this tube projects from its point of support, within the tube H toward the diaphragm B. This tube M also serves as a part of the conduit through which the fuel flows. The free end of this tube M is fashioned to serve as a seat for the engagement of a valve N which is carried by the diaphragm B. Fixed to the tube M is a worm wheel m . Engaging with this worm wheel is a worm R, the shaft r of which is rotatably mounted in a bearing e^2 carried by the casting E. This shaft projects out from this bearing and has an operating knob r' . By turning this shaft the tube M is turned; and, because it is threaded into this support, this tube, by turning, will move endwise toward or away from the valve N. This valve, as shown, is a disk having a ball socket piece n' fixed to its rear side. This socket piece embraces the ball shaped end of a post b which is fixed to the diaphragm. This permits the valve disk N to have a ball and socket action which will insure its accurate seating against the end of the tube M. There is, by preference, a tube b^2 fixed to the diaphragm around the post b , the length of this tube being such that it limits the permissible movements of the valve disk N, within such range that it will always be in a position to be engaged and straightened up by the tube M. A coiled spring n^2 may surround this tube b^2 and thrust endwise against the diaphragm and against the projecting part of the disk valve N, so as to assist in holding it in operative position.

The operation of the device will be clear to one familiar with the art.

The expansion by heat of the fluid thermostat will flex the diaphragm and move the valve N toward the tube M and thereby diminish or nearly cut off the flow of fuel

through said tube. It is not desirable that the flow of fuel shall be entirely cut off, and therefore a V-shaped notch m^2 may be cut in the end of the tube M,—this notch being of such size that the fuel flowing through it when the valve is closed, will keep the burner going. To adjust the device to preserve any required temperature in, for example, a pot S of molten metal which the burner heats, and in which the reservoir F of the fluid pressure thermostat is immersed, the tube M is turned in one direction or the other by means of the worm R.

Having described my invention, I claim:

1. In a thermostatic fuel regulator, the combination of two tubes, one within the other and each serving as a part of the conduit through which the fuel flows, a flexible diaphragm, a fluid pressure thermostat acting against one face of said diaphragm, and a valve fixed to the opposite face of said diaphragm and adapted to be moved thereby toward and from the inner of the two tubes specified in order to more or less completely close said tube, and means for adjusting the last mentioned tube toward or from the said valve.

2. In a thermostatic fuel regulator, the combination of two tubes, one within the other and each serving as a part of the conduit through which the fuel flows, and the inner tube being screwed into its support, means operable from the outside of said casting for turning the inner tube, a flexible diaphragm, a fluid pressure thermostat acting against one face of said diaphragm, and a valve fixed to the opposite face of said diaphragm and adapted to be moved thereby toward or from the end of the inner tube specified to more or less completely close the opening thereof.

3. In a thermostatic fuel regulator, the combination of two tubes, one within the other and each serving as a part of the conduit through which the fuel flows, and the inner tube being screwed into its support, a worm wheel fixed to said tube and a worm engaging said worm wheel, a flexible diaphragm, a fluid pressure thermostat acting against one face of said diaphragm, and a valve fixed to the opposite face of said diaphragm and adapted to be moved thereby toward or from the end of the inner tube specified to more or less completely close the opening thereof.

4. In a thermostatic fuel regulator, the combination of a casing formed of two hollowed out parts, a flexible diaphragm

clamped between said parts, a fluid pressure thermostat acting against one face of said diaphragm, a casting containing two ports, a tube held between the casting and casing, a second tube which lies within the first mentioned tube and screws into the casting in communication with one of the ports therein and extends therefrom toward the diaphragm, and a valve fixed to the diaphragm and movable thereby toward and from the end of the inner tube.

5. In a thermostatic fuel regulator, the combination of two tubes, one within the other, each serving as a part of the conduit through which the fuel flows, a flexible diaphragm, a fluid pressure thermostat acting against one face of said diaphragm, a ball headed post fixed to said diaphragm, a disk valve arranged in opposition to the open end of the inner tube and having a ball socket on its rear side which embraces the ball shaped end of said post, and means for adjusting the last mentioned tube toward or from the said valve.

6. In a thermostatic fuel regulator, the combination of two tubes, one within the other, each serving as a part of the conduit through which the fuel flows, a flexible diaphragm, a fluid pressure thermostat acting against one face of said diaphragm, a ball headed post fixed to said diaphragm, a disk valve arranged in opposition to the open end of the inner tube and having a ball socket on its rear side which embraces the ball shaped end of said post, a tube surrounding the ball shaped post fixed to the diaphragm to limit the movement of said valve.

7. In a thermostatic fuel regulator, the combination of two tubes, one within the other, each serving as a part of the conduit through which the fuel flows, a flexible diaphragm, a fluid pressure thermostat acting against one face of said diaphragm, a ball headed post fixed to said diaphragm, a disk valve arranged in opposition to the open end of the inner tube and having a ball socket on its rear side which embraces the ball shaped end of said post, and a spring for holding said valve in operative position.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

ALBERT ANTON FROEHLICH.

Witnesses:

G. E. MAYERS,
F. L. BASEY.