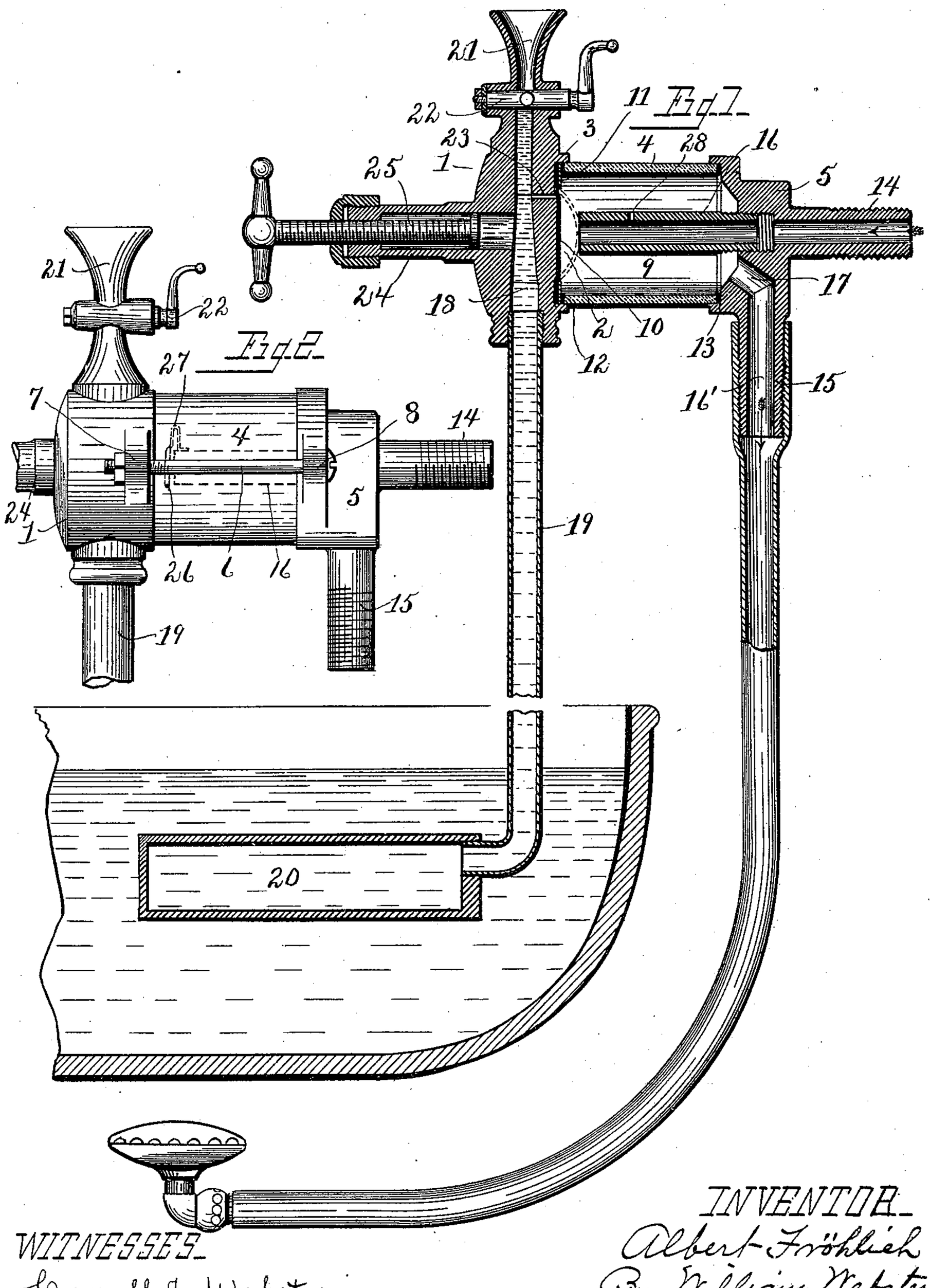
(No Model.)

A. FRÖHLICH.

GAS REGULATOR.

No. 566,977. Patented Sept. 1, 1896.



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ALBERT FRÖHLICH, OF TOLEDO, OHIO.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 566,977, dated September 1, 1896.

Application filed June 4, 1894. Serial No. 513,498. (No model.)

To all whom it may concern:

Be it known that I, ALBERT FRÖHLICH, of Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Gas-Regulators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form part of this specification.

My invention relates to a gas-regulator, and has for its object to regulate the flow of gas and amount of heat necessary to hold the temperature of molten metal or analogous substance to an even predetermined point.

The invention consists in the use of mercury or analogous expansible material which shall by its expansion or contraction regulate the flow of the gas through the regulator, thereby increasing or diminishing the flow of gas, and consequently of heat, arising from the combustion thereof as the molten metal lowers or raises in temperature.

In the drawings, Figure 1 is a sectional elevation of the gas-regulator constructed and arranged in accordance with my invention. Fig. 2 is a side elevation of the same, showing a modified form comprising a valve for controlling the entrance of the gas into the regulator.

1 designates a header having a depression 2 at the side thereof, thereby forming an annular flange 3, in which fits one end of a cylinder 4, preferably glass or of transparent material, and upon the opposite end of the tube is a header 5, secured to the same in like manner, the parts being held in an assembled position by bolts 6, one upon each side of the same, passed through perforations in lugs 7 and 8 upon the headers 1 and 5, respectively. By this construction there is formed a chamber 9, which I will designate the "gas-chamber," which is air-tight, this being accomplished as follows: Between the end of the cylinder 4 and the header 1 is interposed, first, a rubber or analogous elastic diaphragm 10, which is of a size to fill the depression 2 in the header 1. Bearing upon the diaphragm is an annular metal ring 11, and interposed between the ring 11 and the end of the tube 4 is a rubber gasket 12, there being a rubber gasket 13 interposed between the opposite end of the tube and the gasket 5. By this means, when the bolts 6 are turned to assemble the parts, they are brought together, the rubber interposed between the same making a tight joint, which will effectually prevent the escape of the gas. Header 5 is provided with tubular extensions 14 and 15 for the entrance and exit of the gas, and screwed into the casting opposite the bore of the tubular extension 14 and extending into the chamber 9 is a tube 16, the inner end of said tube extending to a point near the header 1, the bore 16′ of the tubular extension 15 being angled, as at 17, and opening into the chamber 9. Therefore the gas will flow from any source of supply through tube 16 into the chamber 9, through the tubular extension 15 to the burner, it being understood that the extensions 14 and 15 are connected with the supply and burner pipes, respectively. Header 1 has a vertical passage-way 18, and communicating with the lower end thereof is a pipe 19, which is secured at the opposite end with the reservoir 20. The upper end of the passage-way 18 is enlarged, as at 21, being formed funnel-shaped, and below the same is a cock 22, and leading from the passage-way 18 through the header 1 to the diaphragm 10 is an opening 23. Therefore when cock 22 is opened and mercury or analogous material is poured into the funnel 21 the reservoir 20, pipe 19, passage-way 18, and opening 23 are filled, when the valve is closed, the diaphragm having sufficient elasticity to prevent the same from being expanded. Therefore when the regulator is not in operation all the parts are in substantially the position as shown in Fig. 1, and upon the expansion of the mercury or analogous material the same will be forced through the opening 23 and the diaphragm will be forced away from its seat, thereby decreasing the space between the same and the opening of the tube 16 and gradually cutting off the flow of gas into the gas-chamber 9, and consequently to the burner.

In order to control the force of the expansion of the mercury upon the diaphragm, so as to regulate the fire to produce different unvarying temperatures, the casting 1 is formed with a tubular extension 24, in which

is a screw-threaded bolt 25. Therefore by screwing the bolt clear back when the mercury is poured into the regulator, by screwing the bolt forward, any desired initial pressure may be given the mercury, causing the expansion under the heat to allow of a full or decreased amount of gas as the bolt is screwed out or in, that is, if the material to be melted melts to a required degree at a low temperature, there will not be as much fire required as if it were at a high temperature. Therefore the bolt is screwed in, compressing the mercury, which forces through the opening 23, but normally holds the diaphragm extended to a point near the end of the tube 16; but if the material would melt to the required consistency at a high temperature more fire is necessary. Therefore the bolt is screwed outward, removing the pressure upon the mercury, and consequently allowing the diaphragm to spring in away from the end of the tube.

In Fig. 2 is shown a modification comprising an auxiliary valve 26 upon the end of the tube 16, which is normally held upon the tube by means of a spring 27, the operation being the same, the diaphragm acting upon the valve, the valve closing the end of the tube. In order to prevent an entire cut-off of the flow of the gas due to an increased pressure of the same, which would quickly raise the temperature of the mercury, entirely cutting off the supply of gas, I have provided a diminutive orifice 28 in the tube 16, which will allow of the escape of a sufficient quantity of the gas to at all times keep the flame of the burner from going out.

While I have described the regulator as a gas-regulator, it will be readily understood that it is equally well adapted for regulating the flow of liquid fuel, and while I have described the same as a regulator to regulate the temperature of molten metal it will be equally well understood that the device can be used to regulate the temperature of a room, the operation being the same.

What I claim is—

In a gas-regulator, the combination of a cylinder, headers therefor, one of the headers being provided with an inlet-port and an outlet-port, a valve-seat surrounding the inlet-port, the other header being provided with a chamber and a passage forming communication with this chamber and the cylinder, a flexible diaphragm designed to act as a valve clamped over the passage, and a fluid-pressure thermostat communicating with the chamber of the last-mentioned header, the expansion of the fluid being designed to press the diaphragm out toward the valve-seat arranged on the opposite header.

In testimony that I claim the foregoing as my own I hereby affix my signature in presence of two witnesses.

ALBERT FRÖHLICH.

Witnesses:

CARROLL J. WEBSTER,

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