

(No Model.)

2 Sheets—Sheet 1.

L. GARDNER.
GAS REGULATOR.

No. 503,131.

Patented Aug. 15, 1893.

Fig. 1.

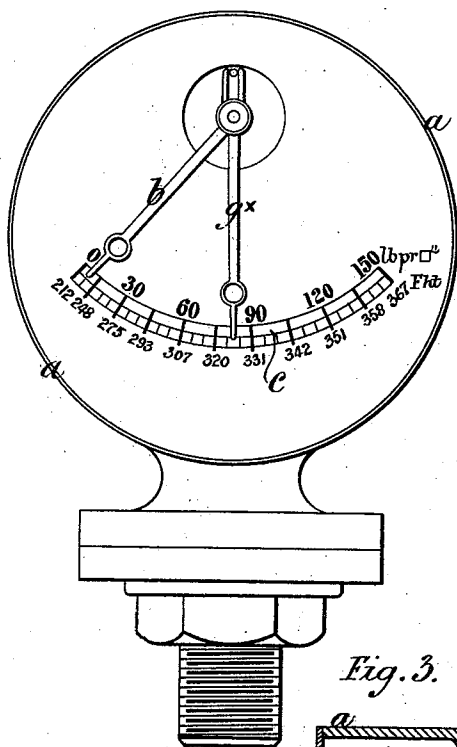


Fig. 2.

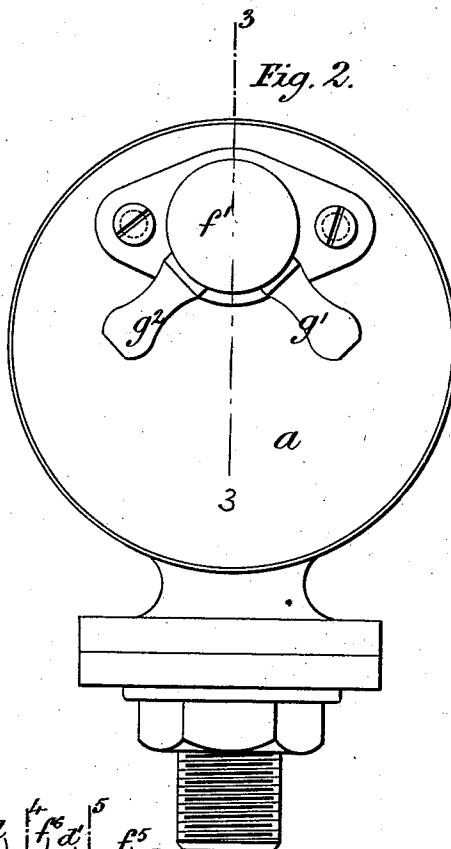
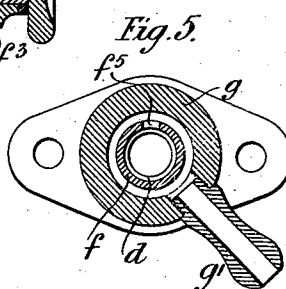
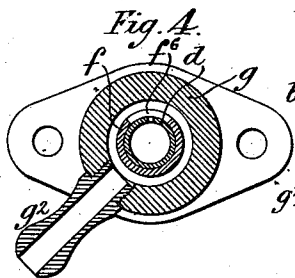
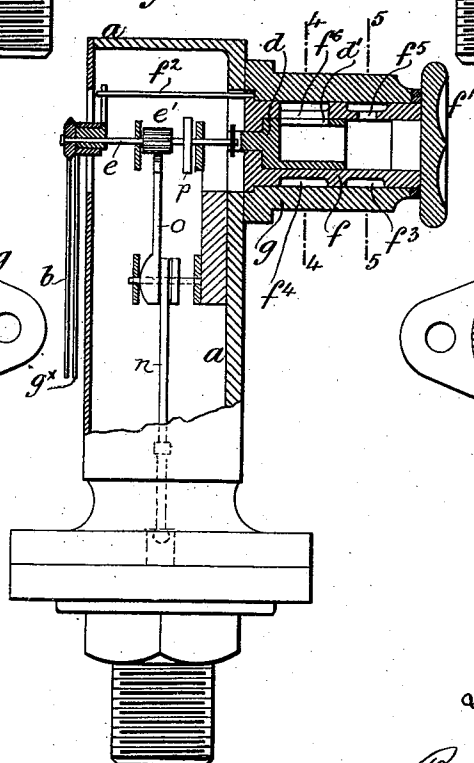


Fig. 3.



Witnesses.
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Lawrence Gardner,
By his Attorneys
Baldwin, Davidson & Wiglit.

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Fig. 6.

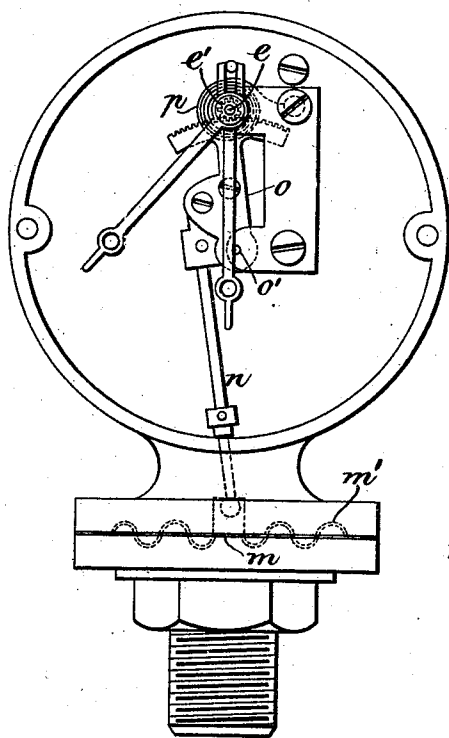
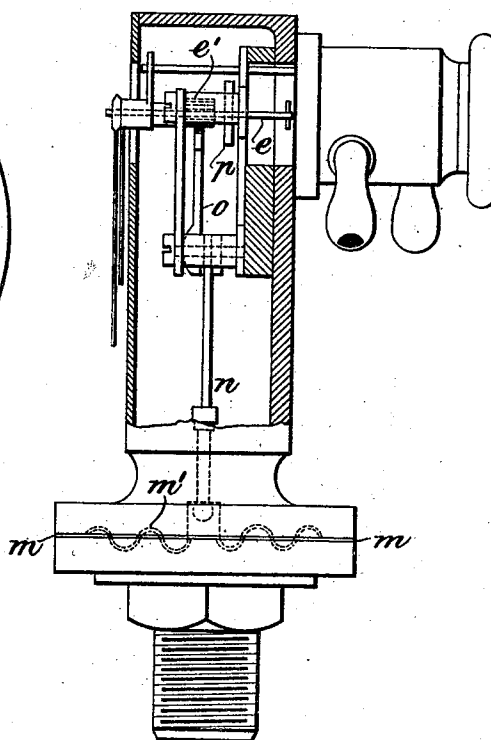


Fig. 7.



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UNITED STATES PATENT OFFICE.

LAWRENCE GARDNER, OF MANCHESTER, ENGLAND.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 503,131, dated August 15, 1893.

Application filed April 18, 1893. Serial No. 470,855. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE GARDNER, engineer, a subject of the Queen of Great Britain, residing at Lund Street, Cornbrook, Manchester, England, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification.

The object of my invention is to regulate the supply of gas to a burner, in such manner as to maintain a constant steam pressure in a boiler heated by the gas flame. I make use of a pressure gage exposed to the steam pressure and having combined with it a cylindrical gas valve connected with the axis of the pressure-gage. This valve turns within a shell which for regulating the pressure can be turned partly round. There are ports in the valve and shell which when they coincide allow gas to pass to the burner.

The instrument is shown by the drawings annexed.

Figure 1 is a front view and shows the dial and pointers. Fig. 2 is a back view. Fig. 3 is a view partly in side elevation and partly in section on the line 3—3 of Fig. 2. Fig. 4 is a section on the line 4, 4 in Fig. 3 and Fig. 5 is a section on the line 5, 5 in Fig. 3. Fig. 6 is a front view of the instrument, with the dial plate removed. Fig. 7 is a side elevation partly in section.

a is a case containing the ordinary mechanism of a steam pressure gage. This mechanism may be that of any common steam pressure gage. The drawings show a thin elastic metal disk *m* with concentric annular corrugations *m'* to increase its flexibility. The steam is admitted to the under side of the disk, and the pressure of the steam deflects the disk upward more or less.

n is a rod abutting at its lower end upon the disk and at its upper jointed to a toothed lever *o* which is centered at *o'*. The teeth upon the lever *o* engage with a pinion *e'* on the axis *e*.

p is a coiled spring fast at one end to the framing and at the other attached to the axis *e*; it tends to press the rod *n* downward toward the disk *m* and conduces to steadiness of movement.

The pressure is indicated in pounds to the square inch by a finger *b* which points to the

figures on the graduated arc *c*. I connect a cylindrical valve *d* with the index axis *e* of the ordinary steam pressure gage in such manner that the valve turns with the axis. The valve is contained within a cylindrical shell *f* and this again is contained within a cylindrical case *g* forming part of or fixed to the case of the pressure gage. These parts fit nicely the one within the other. The shell *f* is capable of being turned round within the outer case by means of a milled head *f'* at its rear end. A pin *f²* projecting forward from the shell moves a second index or pointer *g^x*; this is mounted upon the axis *e* and it marks upon the dial of the instrument the pressure and temperature to which the apparatus is adjusted. The temperature scale I usually graduate to degrees Fahrenheit. The case *g* in which the shell *f* turns has two nozzles *g'* and *g²* fixed upon its exterior one to serve as the gas inlet, and this is connected with the supply pipe, and the other to serve as the outlet, and this is connected with the gas burner. The shell *f* has two annular grooves *f³* *f⁴* on its exterior which serve as passages for the gas. The gas from the inlet nozzle *g'* enters one of the grooves *f³* and by a perforation *f⁵* it passes within the shell. The cylindrical valve *d* within the shell is open at its rear end so that the gas is able to enter also within the valve and there is a narrow slit *d'* in the side of the valve by which the gas can issue when the slit is uncovered. The slit in the valve is uncovered so long as it is opposite any part of a wide hole *f⁶* in the shell and the gas then passes through the hole into the exit groove *f⁴* of the shell and thence to the exit nozzle *g²* and to the burner. The movement of the cylindrical valve caused by increase of steam pressure ultimately causes the slit *d'* in the valve to pass the edge of the hole *f⁶* in the shell and then the gas supply is cut off and this takes place sooner or later according to the position to which the shell *f* has been set by turning the milled head *f'* upon it. Arrangement is made to allow as a minimum enough gas to pass to prevent the extinction of the flame. The gas may be passed in the other direction through the instrument and it will work with equal efficiency.

The instrument above described admits of

adjustment being made in either direction without risk of injury to the apparatus even when the steam pressure is on, as this valve may be turned beyond the point of cut off.

5 This is an advantage which instruments according to my invention have over gas regulators previously in use for a like purpose.

I claim—

10 In a gas regulator serving to maintain a constant steam pressure in a boiler heated by a gas flame, the combination with a steam pressure gage; of a cylindrical valve operated by

the said gage; a cylindrical shell surrounding the valve and capable of being turned independently of the valve; ports or passages 15 in the valve and in the shell; an index or pointer moving with the shell; and a scale indicating the position of the shell and hence the steam pressure at which the gas is turned off substantially as described.

LAWRENCE GARDNER.

Witnesses:

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N. HOWARTH.