No. 607,406. Patented July 12, 1898.

J. S. COE.

THERMOSTATIC GAS REGULATOR.

(Application filed Jan. 4, 1898.)

(No Model.)

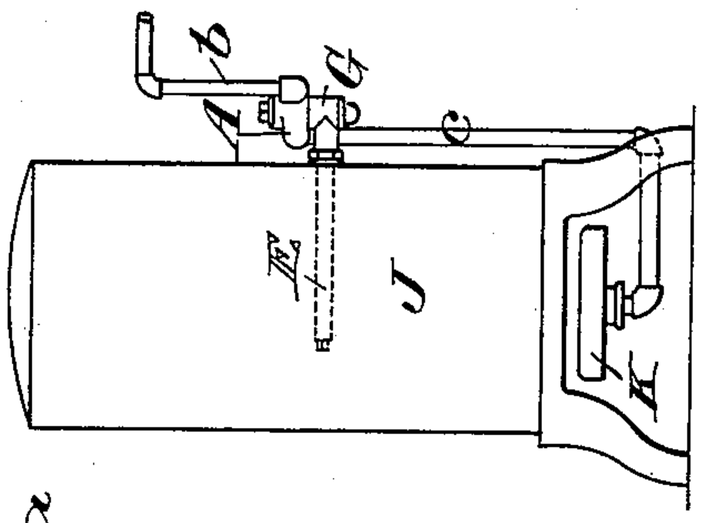

Fig. 4.

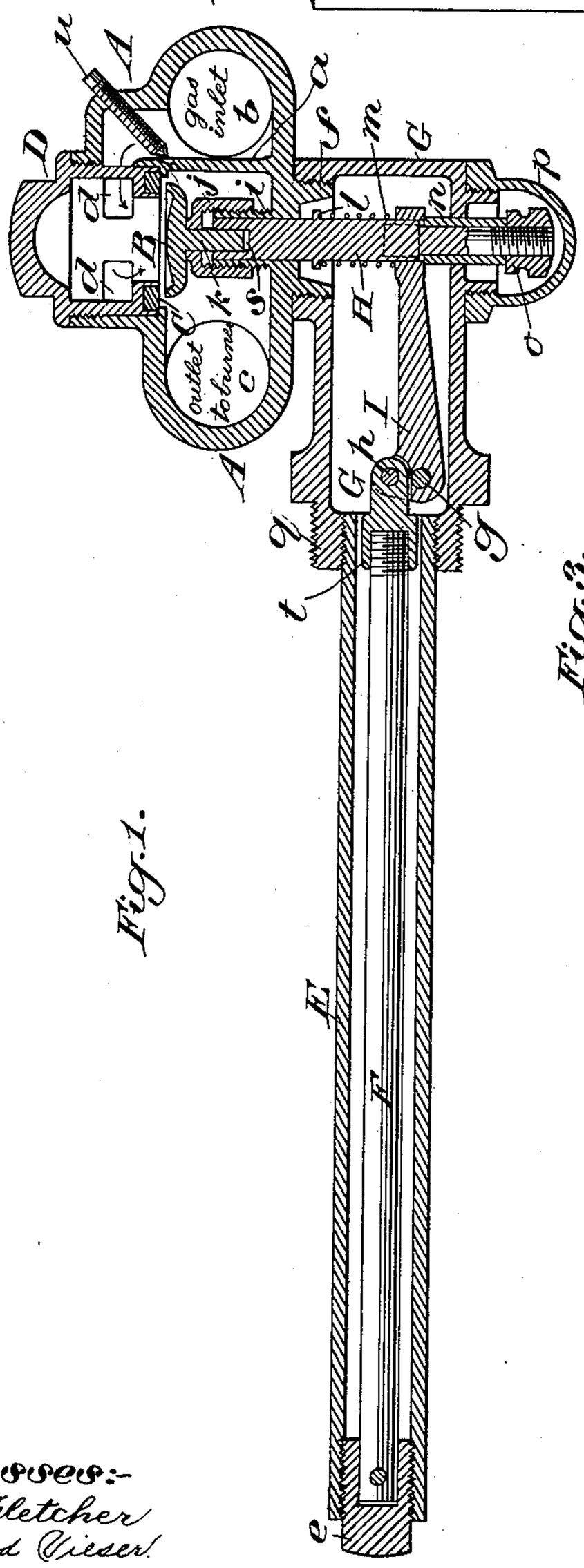

Fig. 1.

Fig. 3.

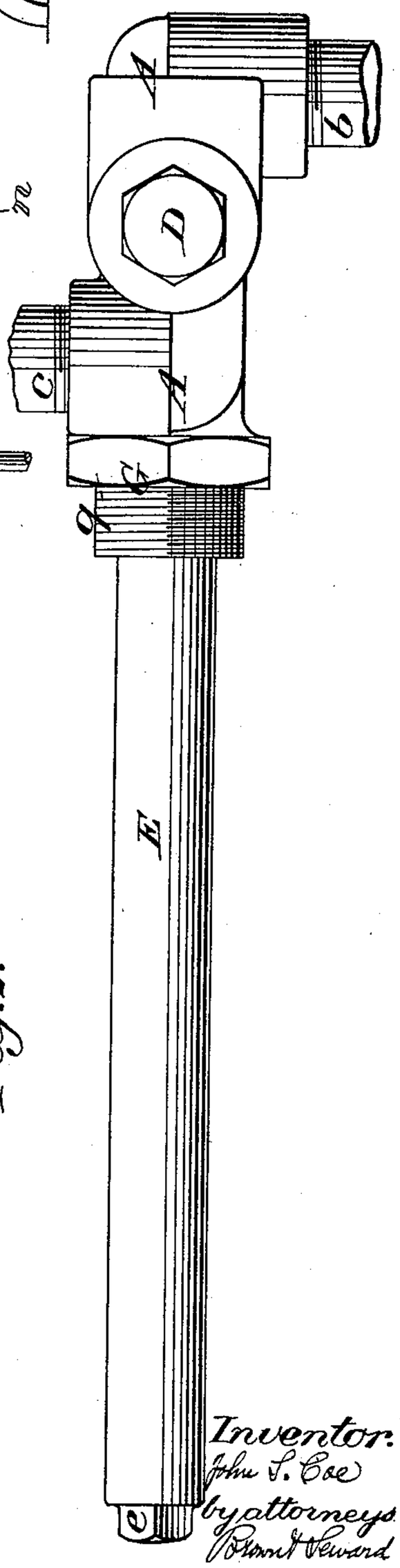

Fig. 2.

Witnesses:-
M. E. Fletcher
Edward Vieser

Inventor:
John S. Coe
by attorneys
Brown & Seward

UNITED STATES PATENT OFFICE.

JOHN S. COE, OF PATERSON, NEW JERSEY.

THERMOSTATIC GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 607,406, dated July 12, 1898.

Application filed January 4, 1898. Serial No. 666,558. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. COE, a citizen of the United States, and a resident of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Thermostatic Gas-Regulators, of which the following is a specification.

The object of this invention is to provide, in apparatus which is heated by gas—a gas-heated boiler or water-heating apparatus, for example—for so automatically regulating the supply of gas as to meet requirements.

I will first describe the invention with reference to the accompanying drawings and afterward point out its novelty in claims.

Figure 1 represents a longitudinal vertical section of a thermostatic gas-regulator embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is a detail view which will be hereinafter explained. Fig. 4 represents an elevation of a gas-heated house-boiler having the thermostatic gas-regulator applied.

Similar letters of reference designate corresponding parts in all the figures.

A is a valve-box containing the regulating-valve B and the seat C therefor. Across this box is a partition *a*, on one side of which is the gas-inlet *b* and on the other side of which is the valve-seat C and the outlet *c* to the burner. The valve B is of the puppet kind. Its seat is represented as consisting of a ring of soft metal or suitable material inserted into a groove in a cap D, which is screwed into the top of the box, and in which there are ports *d*, which are always in communication with the gas-inlet *b*, but are shut off from the outlet *c* when the valve is seated.

E and F constitute the two active members of a thermostat composed of any two materials of different degrees of expansibility by heat, E being represented as a tube of copper or brass, and F a rod of iron within said tube, one end of said rod being fastened to a plug *e*, which closes the corresponding end of the tube. The other end of the tube E is screwed tightly into a hollow head-piece G, which also carries the valve-box A, the latter being screwed into the said head-piece at *f*. Through this head-piece G of the thermostat there passes a spindle H, which forms a connection between the valve B and the longer arm of an elbow-lever I, which works on a fulcrum *g*, fixed within the valve-box. The shorter arm of this lever H is connected with the rod F of the thermostat by a pin *h*. The head *t* of this rod is so fitted to the interior of the tube E that the said rod may move freely in a longitudinal direction without material lateral vibration.

The upper part of the valve-spindle H, which is bored to receive the stem *k* of the valve B, works through the bottom of the valve-box A and through a guide which consists of a fixed socket *i*, projecting upward within the valve-box. Over this socket is screwed a cap *j*, which constitutes a guide for the valve-stem *k* and a stop to limit the descent or opening of the valve. The valve-spindle H passes through the longer arm of the lever I and also through an opening in the bottom of the hollow head-piece G of the thermostat, the portion of the said spindle which passes through the said lever and the corresponding opening in the lever being flattened, as shown in Fig. 3, which represents a plan of said lever and a section of the spindle, to prevent the turning of the spindle. At some distance above the lever I the spindle H is provided with a shoulder *l*, between which and the lever a coil-spring *m* is applied around the spindle. Under the lever I there is fitted to the spindle a sleeve *n*, the upper end of which abuts against the under side of the lever and the lower end of which passes through an opening in the bottom of the head-piece G. Below this sleeve *n* a nut *o* is fitted to the screw-threaded lower end of the stem, which projects through the said sleeve. The said spring *m* holds up the valve-spindle as high as permitted by the sleeve *n*. The screwing up of the nut *o* draws down the spindle H relatively to the valve-stem, so as to adjust a space *s* (see Fig. 1) which is left between the lower end of the valve-stem and the bottom of the bore of the spindle H, which receives said stem. This adjustment is to regulate the degree of heat at which the thermostat is to close the valve, as will be hereinafter explained. The nut *o* is covered and protected by a cap *p*, which is screwed to the head-piece G. The head-piece is represented as provided with a screw *q*, through which it is to be attached to the ap-

paratus containing the water or body to be heated—as, for example, to the boiler J, Fig. 4—in such manner that the tube E projects into the said water or body. In this figure, K represents the gas-burner, to which gas for heating the boiler is supplied by the pipe *c*.

The operation of the regulator is as follows: So long as the liquid or body to be heated remains below the temperature required the parts remain in the relative positions shown in Fig. 1—that is to say, the valve B remains open at rest on the stationary but adjustable guide-cap *j* and the spindle H is held by the thermostat-lever I in such position that there remains a space at *s* between the bottom of the valve-stem *k* and the bottom of the bore provided for said stem in the spindle. As the temperature rises the greater expansion and elongation of the member F of the thermostat as compared with that of the member E causes, through the lever I, the rising of the spindle H. When in this rise of the spindle the bottom of the bore thereof has reached the bottom of the valve-stem, the continued upward movement of the stem produced by the further expansion of the thermostat produces the upward and closing movement of the valve. This closing movement may be so regulated as to take place with any desired temperature by means of the nut *o* on the lower end of the spindle, which adjusts the space *s* and the range which is allowed to the spindle before it begins to close the valve, the spindle thus constituting an adjustable connection between the thermostat and the regulating-valve. If after the closing of the valve the thermostat should so continue its action on the lever I as to continue the upward movement of the longer arm thereof, the spring *m* between the said lever and the shoulder on the valve-spindle would yield to such movement.

In order to provide against the shutting off of the gas entirely, I have represented in the partition *a* of the valve-box, as shown in Fig. 1, a by-passage, the opening of which is adjusted from outside the valve-box by means of a screw *u*, which is screwed through the outside of the valve-box and the point of which constitutes a conical valve adapted to said passage.

What I claim as my invention is—

1. In a thermostatic gas-regulator, the combination of a thermostat, a valve-box, a valve and a seat therefor in said box, a valve-operating spindle capable of a longitudinal movement independently of the valve and forming a connection between the thermostat and the valve, a guide for said spindle consisting of a fixed socket projecting within the valve-box, a screw-cap on said socket forming both a guide for the stem of the valve and an adjustable stop to limit the opening of the valve, substantially as herein described.

2. In a thermostatic gas-regulator, the combination of a thermostat, a valve-box, a valve and a seat therefor in said box, a valve-operating spindle in line with the stem of the valve and capable of a longitudinal movement independently of the valve, a lever connecting said spindle with the thermostat, a stop in the valve-box for limiting the opening movement of the valve, and a screw adjustment between said lever and spindle for adjusting the said spindle to the valve, substantially as herein described.

3. In a thermostatic gas-regulator, the combination of a tube constituting one member of a thermostat and having one end closed and at the other end a hollow head-piece, a valve-box mounted on said hollow head-piece, a valve in said box, a valve-operating spindle passing between the said hollow head-piece and valve-box and capable of a longitudinal movement independently of the valve, a rod constituting the other member of a thermostat attached to the closed end of said tube and passing through its other end to said hollow head-piece, a lever in said hollow head-piece connecting the said spindle with the said rod, and means for adjusting said spindle to said lever and valve, substantially as herein described.

JOHN S. COE.

Witnesses:
FREDK. HAYNES,
L. M. EGBERT.