

(No Model.)

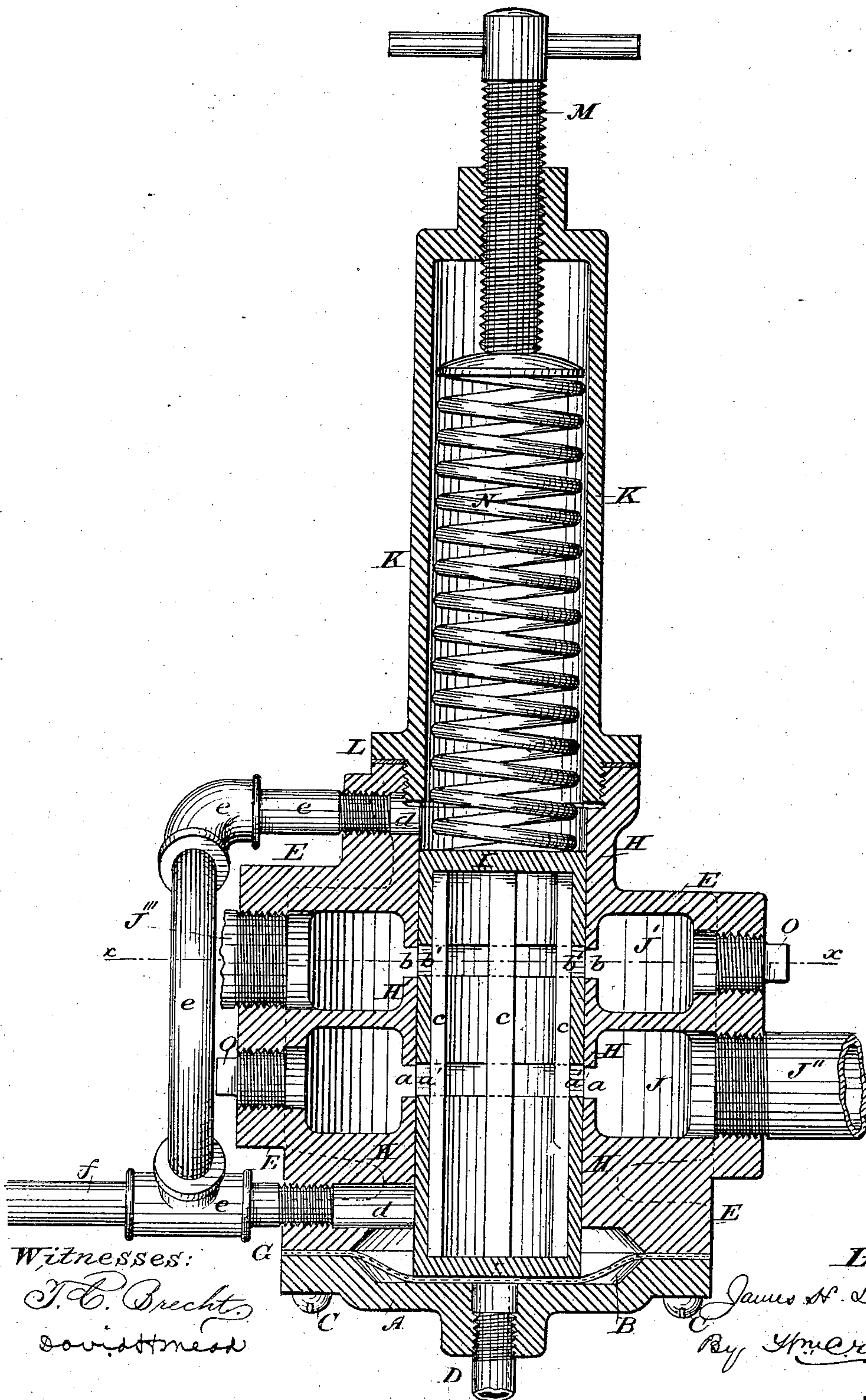
2 Sheets—Sheet 1.

J. H. LUTHER.

GAS REGULATOR OR GOVERNOR.

No. 312,483.

Fig. 1. Patented Feb. 17, 1885.



Witnesses:

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Witness

Inventor:

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(No Model.)

2 Sheets—Sheet 2.

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No. 312,483.

Fig. 2. Patented Feb. 17, 1885.

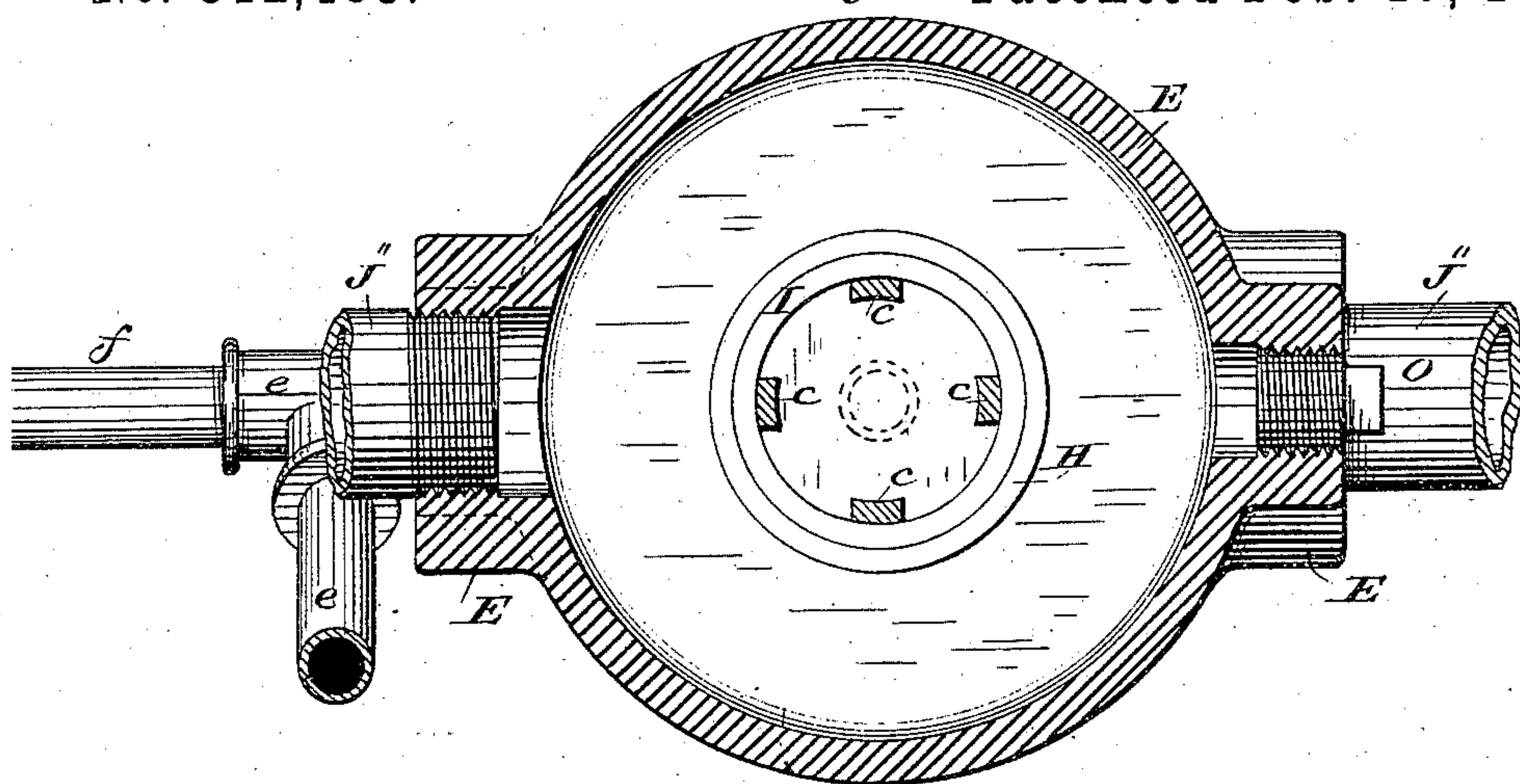
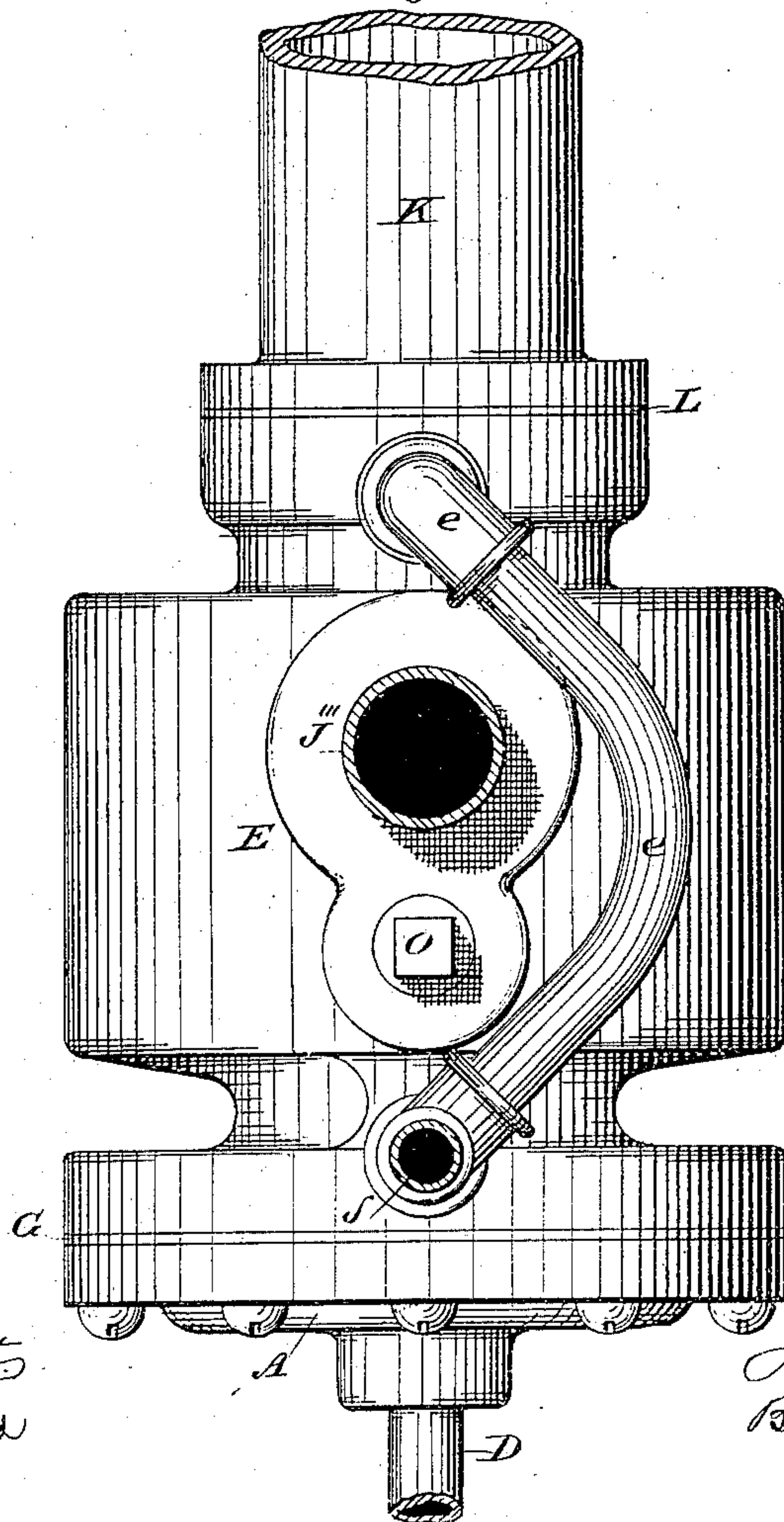


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES H. LUTHER, OF OLEAN, NEW YORK.

GAS REGULATOR OR GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 312,483, dated February 17, 1885.

Application filed December 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, J. H. LUTHER, a citizen of the United States, residing at Olean, New York, have invented new and useful Improvements in Gas Regulators or Governors, of which the following is a specification.

My invention relates to certain improvements in devices for controlling the supply of gases or liquid fuel to steam-boiler furnaces, and particularly to that class illustrated and described in Letters Patent No. 272,282, granted to me February 13, 1883.

The object of my present invention is to improve upon the construction shown in the patent above referred to, in order that the supply of fuel shall be absolutely controlled and a regular pressure in the boiler, to which my regulator may be connected, maintained.

My invention, also, has for its object to provide a means for carrying off any leakage of the fuel which may take place within the regulator, and which, if not removed, would tend to render its operation uncertain or irregular; and with these ends in view my present invention consists, first, in constructing the supply-controlling piston hollow, and arranging it within a cylinder having two annular gas-chambers surrounding said piston and communicating therewith in such manner as hereinafter described, in order that while the inlet and exit of the gas or other fuel shall be automatically controlled, the moving piston is balanced axially and thus rendered sensitive to varying conditions of pressure.

My invention consists, secondly, in connecting the cylinder, both above the inlet-chamber and below the exit-chamber, with escape-pipes for conducting any leakage which may occur either to the furnace for consumption or into the open air, in order that the piston may be relieved from unnecessary pressure, all as will be hereinafter and in detail explained.

In order that those skilled may know how to make and use my invention, I will proceed to describe the same, referring by letter to the accompanying drawings, in which—

Figure 1 is a central vertical section of one of my improved regulators; Fig. 2, a partial side elevation showing the exit part and also the pipe-connection for leading off the leak-

age, and Fig. 3 a horizontal section taken at the line *x x* of Fig. 1.

In actual use the device would be arranged reverse to the position shown at Figs. 1 and 3 of the drawings, and which are so shown to secure an orderly appearance in the drawings.

Similar letters indicate like parts in the several figures of the drawings.

A represents the head of the gas or fuel cylinder, and it consists of a simple cast plate, the interior surface of which is cupped to form a cavity, B, as clearly shown, and is designed to be secured upon the cylinder by bolts C, or in any other suitable manner. It is also tapped centrally to receive a small steam-tube, D, by means of which the steam-pressure in the boiler is exerted upon the head of the supply-controlling piston, as will be presently explained.

E is the gas or fuel cylinder, the head of which is formed with a cavity or cup, F, corresponding with the cavity B in the head or plate A, to which cylinder is secured by bolts, as described, and with an interposed diaphragm, G, of rubber, canvas, or other suitable material, as clearly shown at Fig. 1. The cylinder E is formed with a cylindrical wall, H, (see Figs. 1 and 2,) which surrounds and forms a bearing for the reciprocating piston I.

Surrounding the wall H of the cylinder are two annular gas passages or chambers, J J', one forming an inlet and the other an outlet passage for the gas. These passages are connected, respectively, with the fuel or gas supply pipe J'' and the pipe J''' for conveying the fuel to the furnace or point of combustion. The interior wall, H, of the cylinder E is cut away at about the center of each of the gas-chambers J J', to form ports or passages *a b*, corresponding with similar circumferential ports or passages, *a' b'*, in the wall of the piston I.

In order to provide for the formation of the circumferential chambers *a' b'* in the wall of the piston, the latter is formed with interior longitudinal ribs, *c*. (See Fig. 2.) The piston is formed with solid heads, as most clearly shown in section at Fig. 1. The lower end of the cylinder E has connected with it a cylindrical spring-receiver, K, which may be se-

cured in place by screw-threads or bolts, and preferably with an interposed packing, L. The lower end of this receiver is provided with a hand-screw, M. Within the receiver
 5 is arranged a spiral spring, N, one end bearing against one end of the piston, and the other against a disk or cup interposed between it and the end of the hand-screw, in order that the force of the spring may be controlled in an obvious manner. Now, as the
 10 gas or other fuel for which my device is applicable may under pressure leak slightly between the cylindrical surfaces or bearings between the piston and cylinder and operate to
 15 retard the free and accurate action of the piston, I provide escape-passages $d\ d$ above and below the gas-chamber, and connect the same by suitable pipes, e , with a discharge or conduit pipe, f , for conveying such leakage di-
 20 rect to the furnace, where it is consumed; or I may discharge it into the open air.

From the construction shown and described it will be understood that the gas or liquid fuel under pressure is admitted through in-
 25 let-pipe J'' to the annular chamber J, where it is free to circulate circumferentially and enter through the channels $a\ a'$ in the cylinder and piston to the interior of the latter, from which it escapes through the channels $b'\ b$ to
 30 the exit-chamber J' , and from thence to the conveying-pipe J''' , and as the gas or the fuel is at all times acting with circumferential and radial pressure, it is clear that it will have the effect of balancing the piston axially and
 35 freeing it from any tendency of binding in its bearings. The piston and its ports are so proportioned to the cylinder and its ports that the flow of gas or other fuel, which is dependent upon the register of said ports, will be con-
 40 trolled by the pressure in the boiler exerted through the steam pipe or tube D.

The gas-chambers J J' on the sides opposite to the pipe $J''\ J'''$ are provided with radial openings, which are closed by screw-plugs O
 45 O, the purpose of which construction is to en-

able inspection of the interior of said chambers and also permit the same to be readily blown or cleaned out.

The action of the piston I, as before stated, is controlled by the pressure of the steam in the boiler and the force of the spring N, which latter may, by the screw M, be adjusted to any given steam-pressure. When the steam-pressure is *nil* or minimum, the ports or passages $a\ a'$ and $b'\ b$ will fully register or be entirely
 55 open, and consequently a maximum supply of gas or liquid fuel flowing through the apparatus will be supplied to the furnace to make steam, and as the latter is generated its pressure will be exerted upon the diaphragm G and
 60 head of the piston, forcing the latter downward and correspondingly lessening the area of the passages through which the gas or liquid fuel passes, and thus a decreased supply is fed to the boiler, and vice versa.

What I claim as new, and desire to secure by Letters Patent, is—

1. The hollow piston I, provided with annular or circumferential inlet and outlet passages $a'\ b'$, arranged and adapted to reciprocate within the cylinder E, provided with an-
 70 nular or circumferential gas-chambers J J' , provided with inlet and outlet tubes $J''\ J'''$, and communicating with the interior of the piston through circumferential passages $a\ b$,
 75 whereby the flow of gas or other fuel is controlled and the piston balanced axially, as hereinbefore set forth.

2. In combination with the cylinder E and piston I, arranged and operating as described,
 80 the relief-passages $d\ d$, for the escape of leakage, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES H. LUTHER.

Witnesses:

DAVID H. MEAD,
 ALDIS B. BROWNE.