

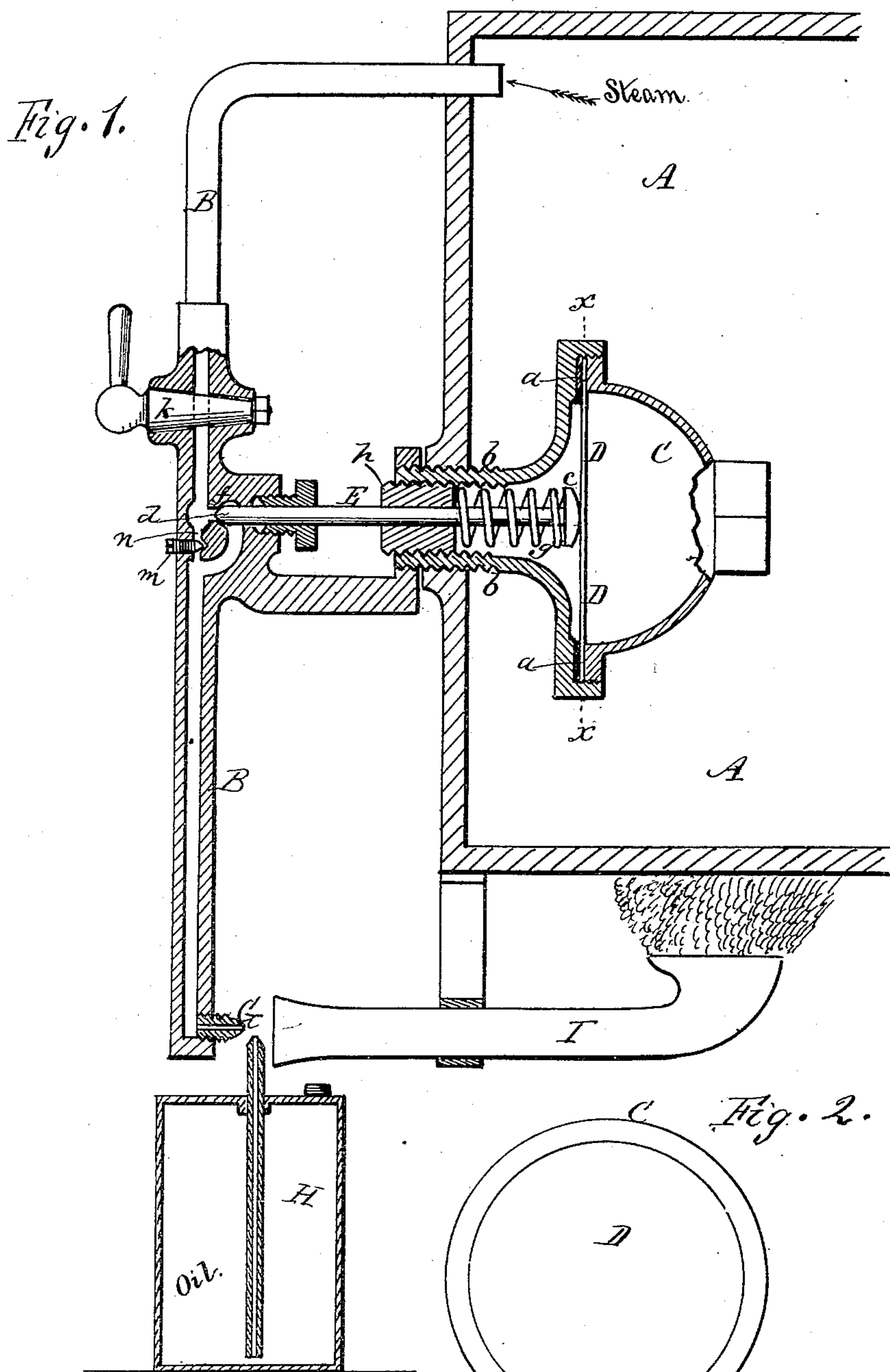
(No Model.)

S. BRAGGINS.

REGULATOR FOR CONTROLLING COMBUSTION IN FURNACES.

No. 318,688.

Patented May 26, 1885.



Attest.
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UNITED STATES PATENT OFFICE.

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REGULATOR FOR CONTROLLING COMBUSTION IN FURNACES.

SPECIFICATION forming part of Letters Patent No. 318,688, dated May 26, 1885.

Application filed October 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, SETH BRAGGINS, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain
5 new and useful Improvement in Regulators for Controlling Combustion in Furnaces and for other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had
10 to the accompanying drawings, in which—

Figure 1 is a sectional view of a portion of a steam-boiler, showing my improvement applied thereto. Fig. 2 is an elevation of the outer half of the bulb and the diaphragm, look-
15 ing from the right of line *x x* in Fig. 1.

My improvement relates to a regulator for controlling steam from a steam-boiler for the purpose of injecting liquid fuel under the boiler to produce combustion, also for other
20 purposes, as hereinafter more fully described. This result is obtained by the employment of a hermetically-sealed bulb or chamber containing a suitable liquid, the bulb being inserted in the water or steam space of the boiler, and the
25 expansion and contraction of the liquid in the bulb being made to act upon a valve that correspondingly opens and closes the steam-passage that leads to the point where the steam is applied, thus controlling the action of the steam
30 by the temperature inside the boiler in contradistinction to controlling it by the pressure inside or by other means before known.

To illustrate my invention I have shown in the drawings a steam-boiler with an attach-
35 ment applied to control the combustion applied to the furnace to generate the steam.

In the drawings, A shows the boiler, which may be of any ordinary construction.

B is a steam-pipe, which leads from the
40 boiler, through which the steam is conducted to control the action.

C is a hermetically-sealed bulb or chamber, which is inserted inside the boiler at any desired point, where it receives the full benefit
45 of the interior heat. This bulb may be of any desired form and constructed in any desired way; but it is preferably of the half-spherical form shown in the drawings, by which greater strength is secured, and is made in two parts,
50 by which access may be gained to the interior.

D is a thin diaphragm stretched across the interior of the bulb, the same being made of sheet metal or other suitable material. The fluid to be acted upon by the heat is placed in
55 the hollow of the bulb back of the diaphragm, and as it is expanded or contracted by the heat in the boiler it correspondingly acts upon the diaphragm. The edges of the diaphragm are preferably soldered to one half of the bulb,
60 and a packing, *a*, is inserted between the two halves, as shown in Fig. 1, to tighten the parts. The bulb is provided with a screw-stem, *b*, which screws through the side of the boiler, or is attached in place in any desired
65 way.

E is a rod forming the valve for cutting off the steam and regulating the flow of the same in the steam-pipe. It rests in suitable bearings, and at the inner end it has a head, *c*,
70 which rests against the diaphragm, while at the outer end it has a conical end, *d*, that forms the valve proper, and enters a correspondingly-conical seat, *f*, in the steam-pipe.

g is a spiral or other spring that rests at one
75 end against the head *c* and at the other against a screw-plug, *h*, or other stop, by which means the valve-rod is always kept pressed up against the diaphragm. It will be seen that as the diaphragm is operated forward and back by
80 the expansion or contraction of the fluid in the bulb, the valve will be made to close or open the passage of the pipe, thereby controlling the passage and force of the steam.

G is an injector or atomizer at the lower
85 end of the steam-pipe B, by which the oil for supporting the combustion is drawn from a tank, H, and forced forward through a funnel, I, where it is emitted in spray beneath the boiler. The combustion will be graded ex-
90 actly by the force of the steam that passes through the pipe.

k is a two-way cock in the steam-pipe above the valve, by which the steam can be cut off
95 at any time.

m is a small screw that screws through the steam-pipe across a small branch passage, *n*, of the pipe around the valve, by which a small flow of steam may be sustained when the valve is closed for sustaining the combustion. If desired, a lamp may also be used to
100 maintain combustion.

By the use of a bulb or chamber placed in the boiler, as described, and filled with a suitable liquid, the flow of steam through the pipe can be graded with the greatest degree of exactness, since the valve will be operated in proportion to the pressure of the steam.

It is well known that the heat in the boiler increases in exact ratio with the pressure of the steam.

The ordinary mode of controlling the flow of steam is by a set-valve operated by hand or by a regulator operated by the direct pressure of the steam as it escapes from the boiler. My plan is more effective than either, for the reason that it is automatic and it is not subject to the sudden impulses and fluctuations that occur where the pressure of the steam is relied upon to do the governing, by reason of the irregularities in the pressure caused by the letting on and cutting off of the steam, in the steam-pipe that runs the machinery, under different loads.

This invention is applicable not only to boilers for the purpose of producing combustion, but also to stills, heating apparatus of various kinds, incubators, and other apparatus where a valve, damper, or register may be controlled by the action of the steam that passes through the steam-pipe.

Any kind of liquid or any mixture of them may be used according to the purpose to which the apparatus is applied. If desired, instead of filling the bulb with liquid, it may be only partially filled, or only a small quantity be used, and the effect be produced by the vaporization of the liquid.

I am aware that a cylinder or bulb operating by variations of temperature in the vessel containing it has been used to regulate the flow of hot air or steam for maintaining a uniform temperature in incubators. Such I disclaim.

Having described my invention, what I claim

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

1. The combination, with a steam boiler or generator, of a steam-pipe extending therefrom, a valve or cut-off adapted to open or close the passage through the pipe, and a device located in the boiler adapted to actuate the valve, and consisting of a closed bulb or chamber containing a fluid, substantially as herein set forth.

2. The combination, with a steam boiler or generator, of a steam-pipe extending therefrom, a valve or cut-off adapted to open or close the passage through the pipe, a device located in the boiler adapted to actuate the valve, and consisting of a closed bulb or chamber containing a fluid, and an atomizer connected with the steam-pipe for raising oil from a reservoir to support combustion under the boiler, substantially as herein set forth.

3. The combination, with a steam boiler or generator, and with a steam-pipe extending therefrom, of a bulb or chamber located in the boiler, having a movable diaphragm on one side, and a neck or projection for securing it to one side of the boiler, and a cut-off valve located between the diaphragm of the bulb or chamber and a valve-seat in the steam-pipe, substantially as and for the purpose herein specified.

4. The combination, with the steam-pipe B and valve-rod E, of a branch pipe, *n*, connecting the steam-passage around the valve, and a screw, *m*, screwing into the pipe across the branch pipe, as and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SETH BRAGGINS.

Witnesses:

R. F. OSGOOD,
P. A. COSTICH.