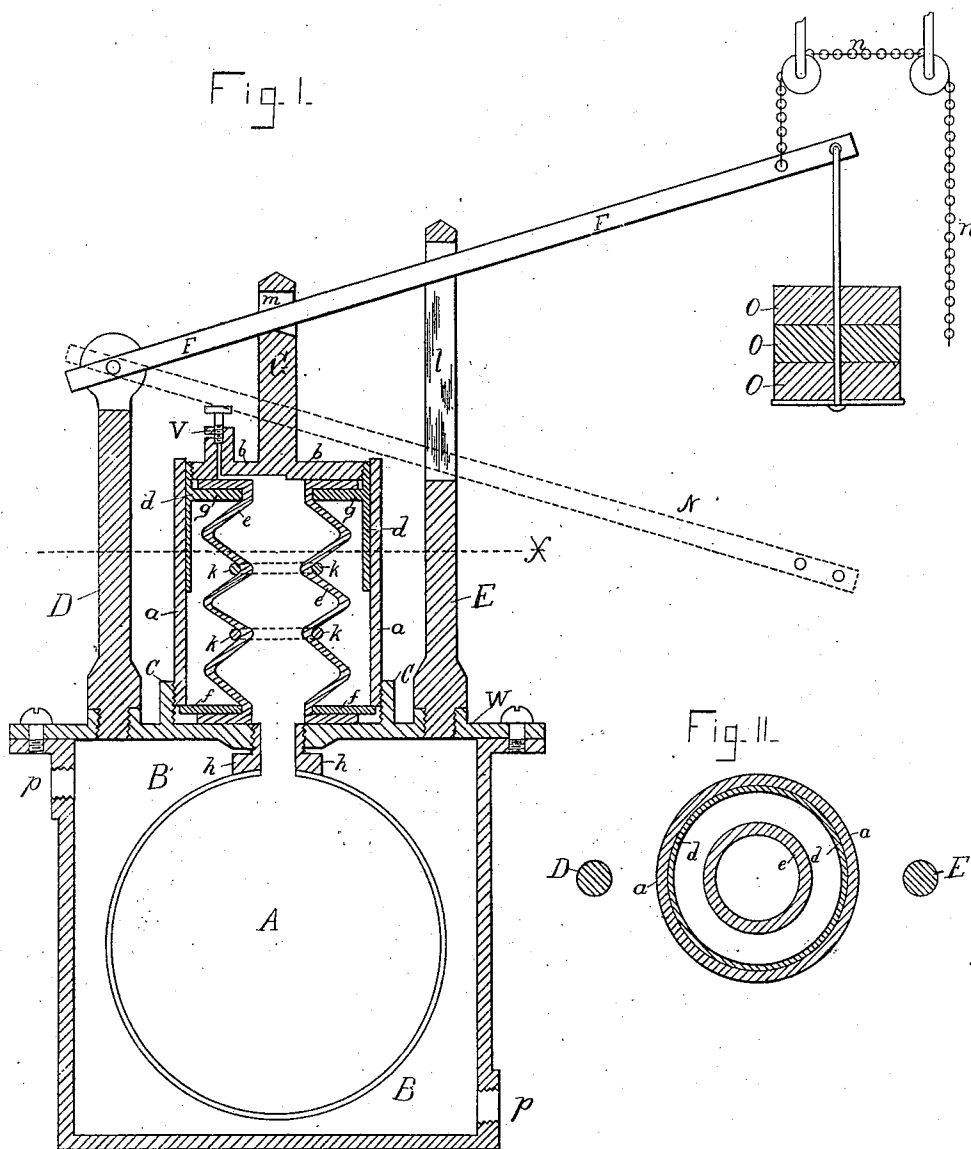


(No Model.)

G. E. DIXON.
AUTOMATIC DRAFT REGULATOR.

No. 397,173.

Patented Feb. 5, 1889.



WITNESSES:
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GEORGE E. DIXON, OF CHICAGO, ILLINOIS.

AUTOMATIC DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 397,173, dated February 5, 1889.

Application filed October 22, 1887. Renewed December 24, 1888. Serial No. 294,565. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. DIXON, a subject of the Queen of Great Britain, a citizen of England, and a resident of Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Automatic Regulators for Hot-Water Heating Apparatus, of which the following is a specification, reference being had to the accompanying drawings, illustrating the invention, in which—

Figure I is a vertical longitudinal section of my improved regulator; Fig. II, a horizontal section of the same on line *x*, Fig. I.

This invention relates to an improvement in regulators for automatically controlling the temperature in hot-water heating apparatus; and, in brief, the invention consists of three principal parts—viz., the expansion-chamber A, the circulating-chamber B, and diaphragm-cylinder *a*, with the other mechanism shown in connection with the diaphragm-cylinder *a*.

b represents the piston which operates therein, and *d* is the piston-guide extending below the piston.

e e is the corrugated flexible tube, which is made of rubber or other suitable material to form what is known as a "bellows diaphragm," which may be elongated and depressed under the piston *b*. The bellows diaphragm is formed with flanged ends, the upper flange being secured between the annular plate *g* and the piston *b*, and the lower flange secured between a flange, *f*, and the top of chamber B, so as to prevent the escape of air or gas. The plate *f* is brought down onto the flange of the diaphragm by the cylinder *a* being screwed down inside of a flange, C, projecting up from the top of the chamber B. By this means the piston *d* may fit closely in cylinder *a*, to prevent any substance from lodging between the cylinder and bellows diaphragm and preventing a free action of the mechanism. Metal rings *k k* are placed around the diaphragm at its narrowest portions to give it the required strength. Posts D E are projected up from the top of chamber B, and a lever, F, is pivoted to post D, and the post E, by means of a slot, *l*, guides the lever in its oscillating movements. The piston-rod G, by means of a slot in its top portion, connects with and operates the lever F,

and the lever, being weighted at *o o o*, will not be raised till a certain known pressure is attained. A chain, *n n*, or other connection may be had with a damper or valve which is to be regulated.

V is a regulating-valve, which communicates with the expansion-chamber A, and it is employed to regulate the pressure therein. The expansion-chamber is inclosed in a circulating-chamber, B, and it communicates with the diaphragm-chamber in cylinder *a* by the screw-nipple *h h*.

Communication is attained between my regulator and a hot-water heating apparatus by flow and return pipes, which are to be connected steam-tight with the ports *p p*. Such pipes allow of a continuous circulation of the water in the heating apparatus through the circulating-chamber B, and the motive power of my regulator is obtained by this circulation.

The essential feature of my invention is the expansion-chamber A, inclosed in the circulating-chamber B, and in this respect my regulator differs from all others now in use.

The operation of my regulator is as follows: Before the heating apparatus is put in operation the expansion-chamber A is to be supplied with air or other expansive medium by means of the valve V, which is then closed, and the weights *o o o* placed on lever F to bring it down to dotted lines N. This will open the damper to the furnace by means of the chain attachment *n n*. The water in the circulating-chamber B, being heated, will expand the air in chamber A and raise the piston *b*, and by means of its rod G the lever F will be raised to close a damper, as may be required to regulate the heat in the furnace, as soon as a fire is started and the water in the circulating-chamber becomes sufficiently hot to circulate.

I do not claim anything new in regulating the heat in a furnace independent of the construction of particularly novel features for regulating the temperature of hot-water heaters, and therefore confine myself to the elements claimed.

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

In a heat-regulator, the combination of the

bellows diaphragm *ee* and the chamber A, communicating with it, the cylinder *a*, surrounding the bellows diaphragm, the piston *b*, and piston-rod G, and the piston provided with a
5 cock, V, and also with an annular guide, *d*, which closely fits the inside of said cylinder and to which the top portion of the bellows

diaphragm is attached, as and for the purpose specified.

GEORGE E. DIXON.

Witnesses:

G. L. CHAPIN,
H. A. SMITH.