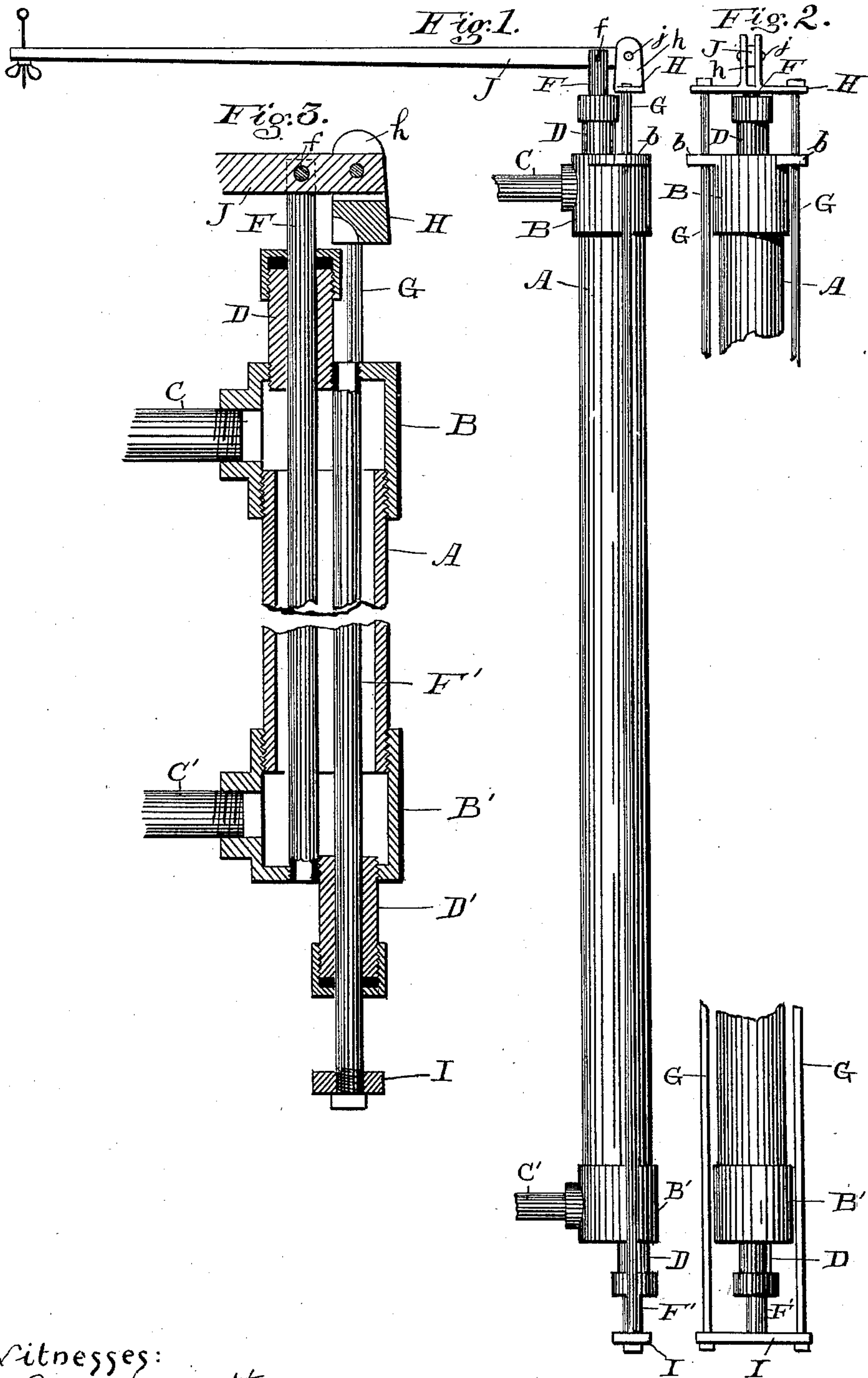


(No Model.)

C. R. NELSON.
DAMPER REGULATOR.

No. 422,091.

Patented Feb. 25, 1890.



Witnesses:
Olyn M. Haggett
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UNITED STATES PATENT OFFICE.

CHARLES R. NELSON, OF PORTLAND, MAINE.

DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 422,091, dated February 25, 1890.

Application filed June 27, 1889. Serial No. 315,779. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. NELSON, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Damper-Regulators; and I do declare the following to be a full, clear, and exact description of the invention, such as it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to damper-regulators for hot-water heaters; and its object is to supply the demand for a regulator which shall be sensitive in its action, simple and cheaply made, and easily kept in repair, and which shall finally give as much motion as possible for the smallest variation of heat.

In my invention I make use of the well-known tendency of various kinds of metal to expand unequally when heated.

My regulator consists, generally, of a pipe or casing through which a current of hot water from the heater is made to pass continually, a pair of metal rods extending lengthwise through it, one end of each rod being secured to opposite ends of the casing, while the other end extends out through a stuffing-box. A long-armed lever is fulcrumed near its end to the end of one of these rods, and a joint or pivot at the end of the lever is connected with the end of the other rod. Thus the expansion of both rods causes them to act in opposite directions on the fulcrums of the lever and tends to move it in one direction, giving a motion double to that which would be produced by the expansion of a single rod.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a part elevation taken at right angles to that of Fig. 1, and Fig. 3 is an enlarged vertical section taken centrally through Fig. 2.

A is a casing, preferably made of iron pipe of large size. It has at each end a cap, one marked B and the other B'. Leading from the cap B is a pipe C, and from the cap B' is a pipe C'. These pipes connect with the

heater in such a way that a circulation of hot water takes place direct from the heater through the casing A. Two rods—preferably of brass, which has great relative expansion— extend lengthwise through the casing A. One end of the rod F is secured firmly to the cap B', preferably by being screwed into a screw-threaded hole cut in said cap. The opposite or upper end, as I have here shown the position of the device, extends out through a stuffing-box D, fixed in the cap B. To the free end of this rod F is fulcrumed a lever J, the fulcrum being a short distance from the end of the lever. I have here shown this fulcrum as being formed by a pivot, but it may abut against the lever, or the latter may simply rest in a bifurcation in the rod, as here shown, without the pivot. The other rod F' is secured in like manner to the cap B, and its lower end extends out through a stuffing-box D' in the cap B'.

Fixed to the end of the rod F' is a yoke I, which is connected at its ends with a yoke H by means of parallel rods G G. Guides *b b* are preferably placed at each side of the cap B to steady these rods as they slide longitudinally. The yoke H is provided with ears *h*, extending upward from its center, between which is pivoted the end of the lever J, already mentioned, by means of a pivot *j*. The two pivots or fulcrums *j* and *f* are comparatively near together, and the lever J has preferably a long arm, so that a small motion of the two fulcrums *f* and *j* in opposite directions produces a considerable motion of the end of the lever J.

The operation of my regulator is obvious from its construction. When the parts become heated by the passage of a current of hot water from the heater, the rods F and F', being of brass or other metal having large expansibility, expand more than the iron of the casing A. As a consequence the rod F pushes upon the pivot *f* and the rod F' pulls down on the pivot *j*, its downward thrust being transferred by means of the rods G to the yoke H. The end of the lever J is thus lifted as the parts become heated, and as they cool it is depressed. The end of the lever, it will be understood, is connected with the damper of the heater by any well-known means in

such a manner that when the lever rises in consequence of increased heat the draft will be closed. It will thus be seen that by means of my device, which is made, preferably, of considerable length, a slight variation in the temperature of the water is at once felt and recorded. The nearness of the pivots *f* and *j* causes a slight expansion to produce a considerable motion, and in a given length of rod an effect is produced double that of a single rod.

The device is applicable to steam as well as hot water where a current is made to pass through the casing.

It is evident that the yokes *I* and *H* and the rods *G* can be replaced by any connections which will transfer a pull from the end of the rod *F'* to the end of the lever *J*.

I claim—

1. The herein-described damper-regulator for hot-water and other heaters, consisting of an elongated tube or casing having connection at each end with the heater, a pair of rods extending lengthwise through said casing, one of said rods, as *F*, being fixed by one end to one end of the casing, the other end extending out through a stuffing-box, as *D*, in the other end of said casing, a lever fulcrumed near its end to the end of said rod *F*, the other rod, as *F'*, being fixed to the other end of said casing and extending out through

a stuffing-box, as *D'*, a joint or pivot at the end of said lever, near the end of said rod *F*, and connected with the end of said rod *F'* by tie-rods, or other suitable connections capable of transmitting a pull, whereby the expansion of said rods *F* and *F'* produces a motion of the free end of said lever in one direction, substantially as shown.

2. The herein-described damper-regulator for hot-water and other heaters, consisting of an elongated tube or casing having connection at each end with the heater, a pair of rods extending lengthwise through said casing, one of said rods, as *F*, being fixed by one end to one end of the casing, the other end extending out through a stuffing-box, as *D*, in the other end of said casing, a lever fulcrumed near its end to the end of said rod *F*, the other rod, as *F'*, being fixed to the other end of said casing and extending out through a stuffing-box, as *D'*, a yoke secured to the end of said rod *F'*, a yoke pivoted to the end of said lever, near the end of said rod *F*, and tie-rods connecting said yokes, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES R. NELSON.

Witnesses:

S. W. BATES,

WM. M. HAGGETT.