(No Model.)

L. F. SMITH.

FURNACE DAMPER REGULATOR.

No. 477,275. Patented June 21, 1892.

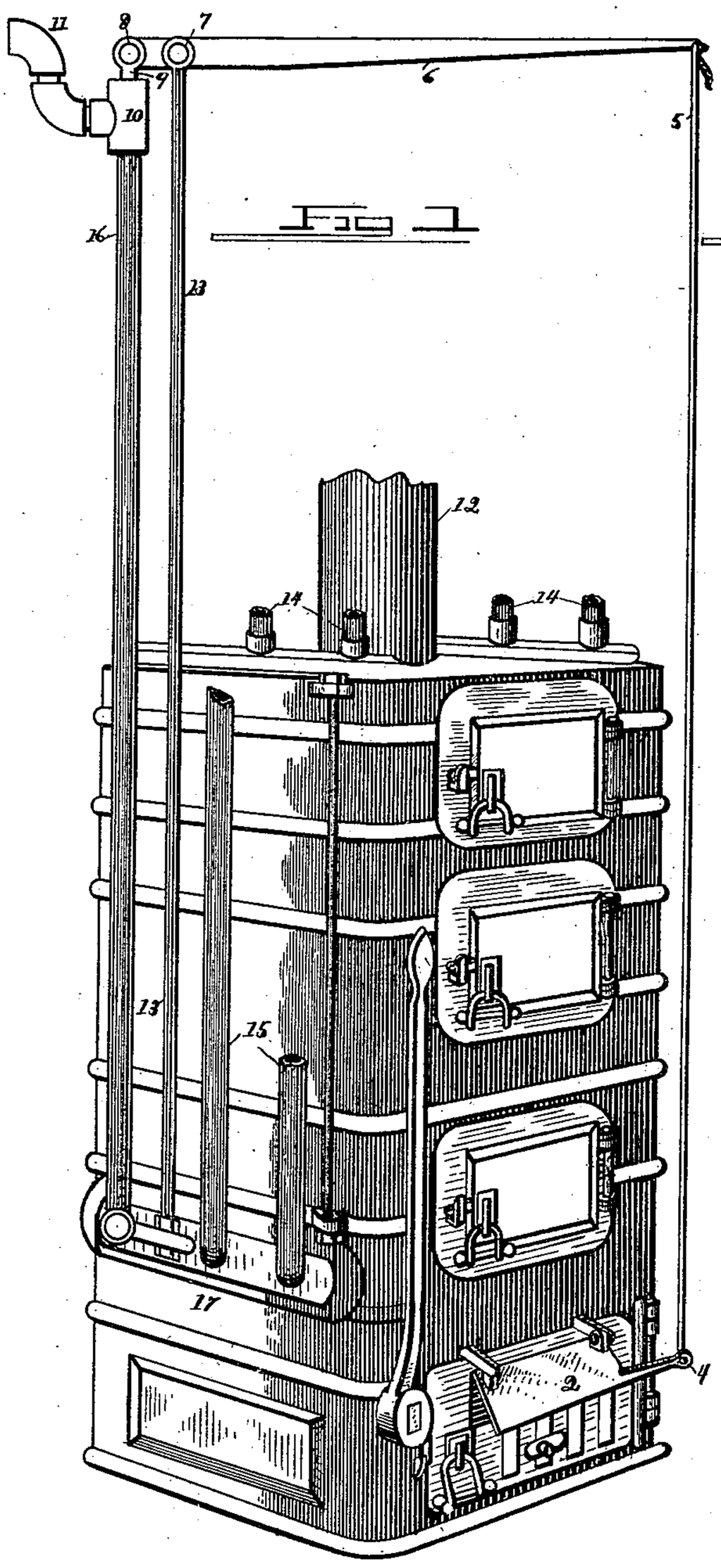

Fig 1

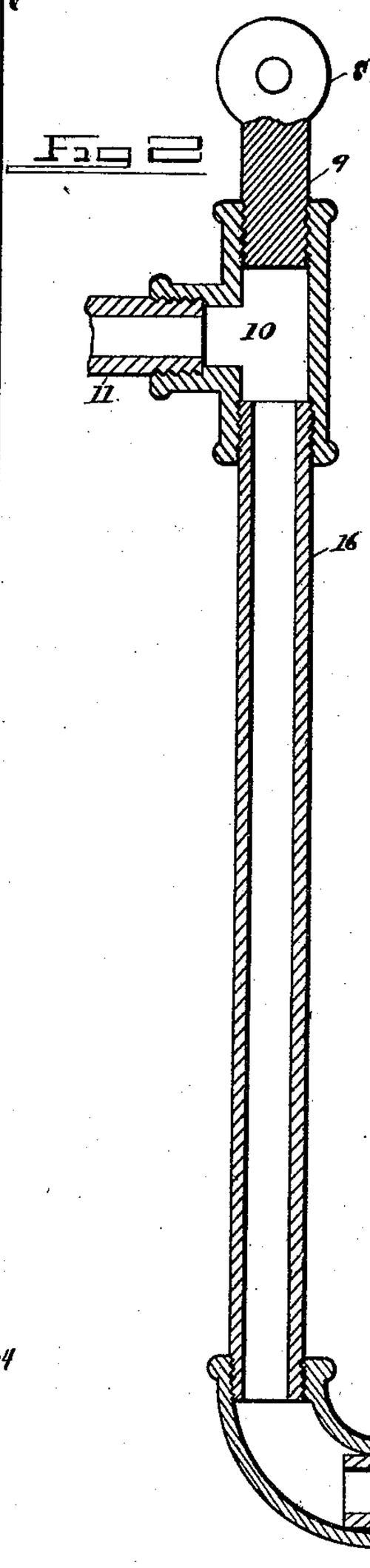

Fig 2

Witnesses

C. W. Seville

Arthur E. Fowell

Inventor

Levi F. Smith

By his Attorney H. Alexander

UNITED STATES PATENT OFFICE.

LEVI F. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

FURNACE-DAMPER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 477,275, dated June 21, 1892.

Application filed August 13, 1891. Serial No. 402,587. (No model.)

To all whom it may concern:

Be it known that I, LEVI F. SMITH, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Furnace-Damper Regulators, of which the following is a specification.

The object of the invention is to provide an automatically-acting simple device whereby the damper of the furnace of a water-heater—such as is ordinarily used for heating houses—may be so controlled that by it, as the water in said heater grows cool, said damper will be opened to let more air into the furnace, or if such water becomes too hot said damper will be closed to exclude air from the fire.

The nature of the invention will be fully understood from the annexed drawings and the following general description, and will be subsequently pointed out in the claims.

Figure 1 is a view in elevation of a water-heater with my invention attached. Fig. 2 is a detail view illustrating the expansion-tube more fully hereinafter described.

1 designates the body of the heater, 14 14 the flow-tubes, and 15 15 16 the return-tubes. Upon the top of the return-tube 16 is mounted a T-joint 10. This makes the connection between the said return-tube 16 and the tube-section 11. In the top of this T-joint 10 is screwed a plug 9, which is provided at its upper end with an ear 8.

An upright bar (designated by 13) is attached by a T to the lower end of the tube 16 at 17, (in this attachment are two adjusting jam-nuts, as illustrated,) and extending upward is surmounted by an ear 7. It is essential to the proper working of the device that bar 13 be rigidly supported, as it constitutes the fulcrum-support of lever 6. This ear 7 is of the same height as the ear 8. These two ears, as illustrated in the drawings, are quite near together. To both is pivotally attached the lever 6, which extends forward to the front of the heater and terminates in the eye 5.

The furnace-damper is constructed with an arm 4, which also terminates in an eye. The eye of this arm and the eye 5 of the lever 6 are connected by the wire-chain rope 3. A chain or bar, however, would serve for the same purpose equally as well, the whole apparatus to be substantially as illustrated in the drawings. The tube 16 should be made of copper or brass or some other metal readily expanded by heat. Water in the heater 1 as soon as it begins to be warm will pass up through the flow-tubes 14 to circulate through the radiators and come back to the heater through the return-pipes 15 15 and 16 in the common and well-known way. As soon as the return water becomes so heated as to expand the tube 16, the tube necessarily lengthens. This tilts the lever 6 on the pivot 7, so that the eye 5 moves downward in proportion to the expansion of the said tube 16. This allows the damper 2 to partly or entirely close, and thereby shuts off so much air from the furnace. By shutting off the air the heat of the fire is diminished and the temperature of the water in the heater lowered. On the other hand, as the temperature of the water in the return-tube 16 decreases the said tube will contract and in so doing tilt the long end of the lever 6 upward, raising the eye 5. This by means of the connection 3 opens the damper 2 and lets air in to increase the heat of the furnace. In this way the heat of the furnace may be regutated, so that it will become very uniform and so save a vast amount of labor and annoyance usually attendant upon watching, managing, and regulating the fire. It will be observed that tube 16 forms a part of one of the return water-pipes, and the temperature of the water passing therethrough will more nearly approximate the temperatare of the water in the radiator above to which said tube is connected. I thus utilize a part of the return service-pipe and the working-water current to regulate the dampers. It is evident that by proper connections a damper might also be worked in the smoke-pipe 12 simultaneously with said furnace-damper; but as I set forth and claim such an apparatus in my application, Serial No. 402,588, dated August 13, 1891, I will not further describe or claim it in this specification. It is also evident that the damper-regulator here-

in described may be used successfully with many other furnaces of forms differing from that herein described.

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

1. The combination of a hot-water-circulating system having in the discharge end of the return-pipe a section or tube of highly-expansible material, a lever having a fixed fulcrum and suitably connected to the upper end of said section or tube, and a damper for the furnace of the heater, also connected to said lever, substantially as described.

2. The combination of a hot-water-circulating system having in the discharge end of the return-pipe a section or tube of highly-expansible material joined to the main portion of the return-pipe by a flexible coupling device, a lever having a fixed fulcrum and suitably connected to the upper end of said section or tube, and a damper for the furnace of the heater, also connected to said lever, substantially as described.

3. The combination of the water-heating furnace and an exterior return-flow water-tube connected rigidly thereto and communicating therewith at its lower end, formed of an expansive metal and connected at its upper end by a joint to the return-water pipe, a vertical bar rigidly mounted on the furnace and rising to the upper end of the tube, an oscillating horizontal lever fulcrumed on the upper end of said bar and having its short arm pivotally connected to the upper end of the tube, the damper for regulating the draft of the furnace, and the chain or rod connecting the long arm of the lever with said damper, all constructed and arranged to operate substantially as set forth.

4. The combination of the water-heating furnace, an exterior return-flow water-pipe formed of an expansive metal rigidly connected by its lower end to and communicating with the heater and rising above the same, the yielding-joint connection between the upper end of said tube and the return-flow piping of which said tube forms part, the vertical bar adjustably secured to the heater and rising beside the tube, the lever fulcrumed on said bar, the connection between the short arm of said lever and the tube located above the junction of the tube and pipe, the damper, and the connection between the long arm of the lever and the damper, whereby the damper is regulated automatically according to the temperature of the return water flowing to the heater, substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention I have hereto signed my name, in presence of two witnesses, this 28th day of March, 1891.

LEVI F. SMITH.

Witnesses:
JOSHUA R. MORGAN,
MARY G. TAYLOR.