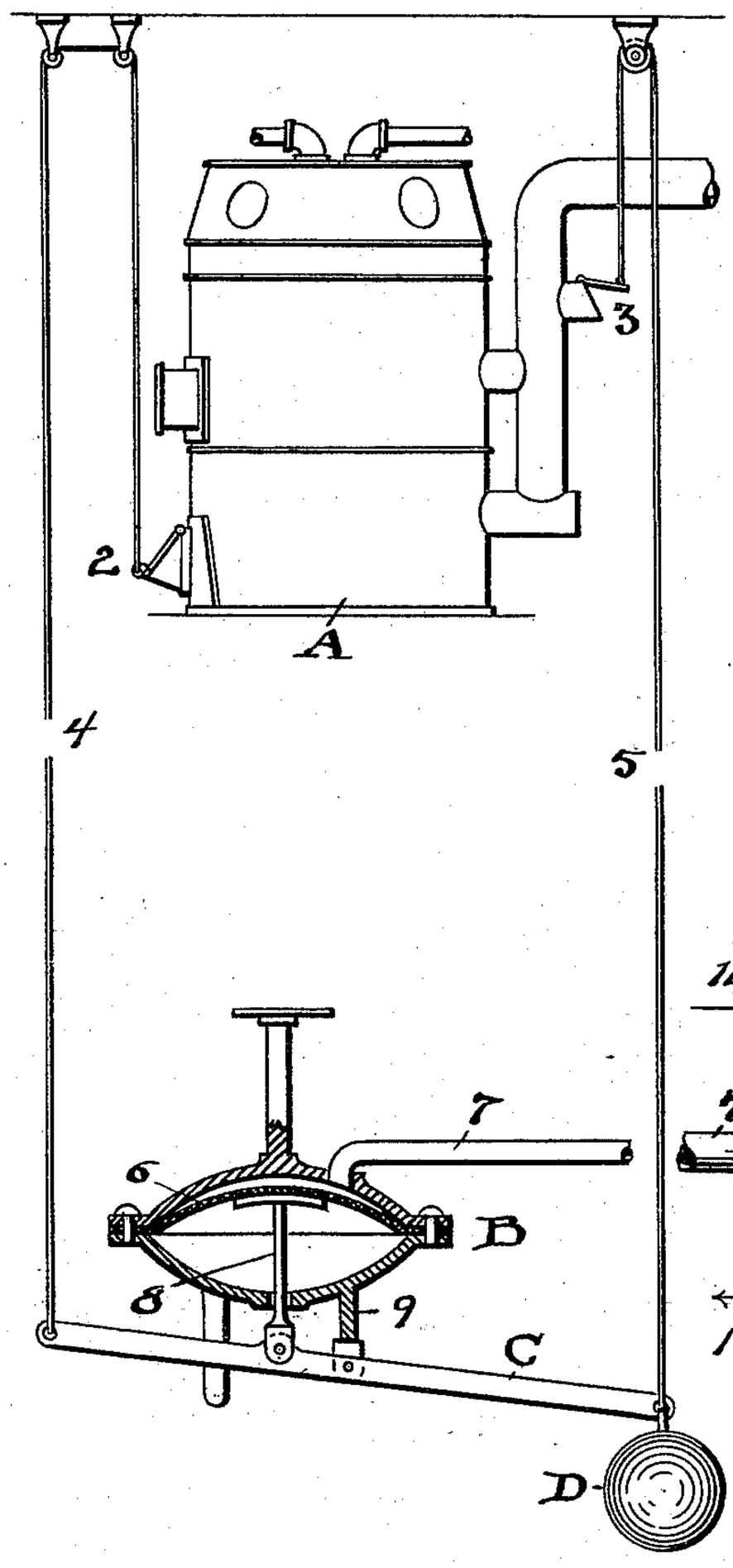
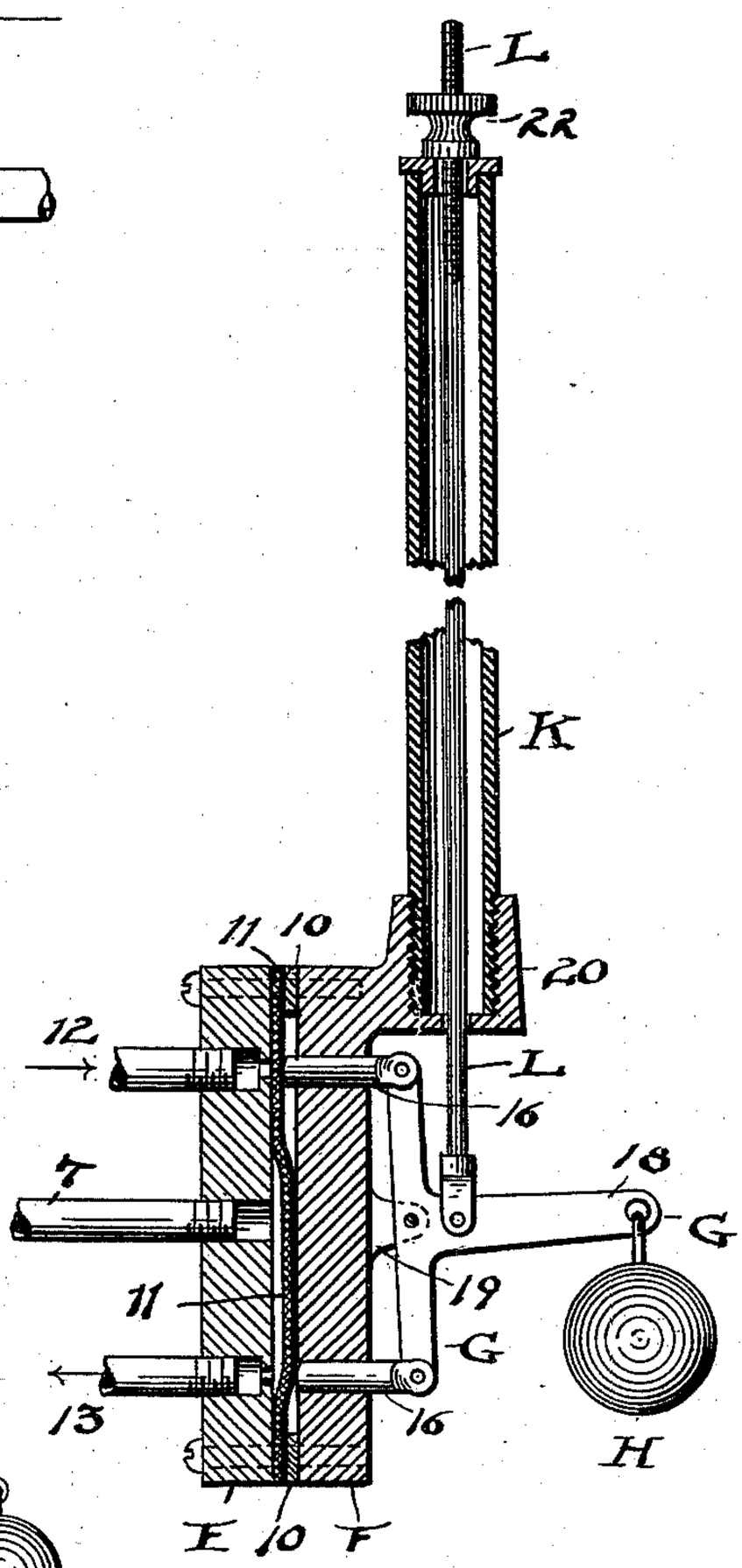
(No Model.)

R. L. SHORT.

MEANS FOR CONTROLLING DAMPERS.

No. 547,461. Patented Oct. 8, 1895.





ATTEST.

R. B. Moser.

G. S. Schaeffer

BY

INVENTOR

Robert L. Short

H. J. Fisher.

ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT L. SHORT, OF CLEVELAND, OHIO.

MEANS FOR CONTROLLING DAMPERS.

SPECIFICATION forming part of Letters Patent No. 547,461, dated October 8, 1895.

Application filed August 17, 1894. Serial No. 520,564. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. SHORT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Means for Controlling the Dampers of Furnaces and Stoves; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to means for controlling the dampers of furnaces and stoves; and the invention consists in the construction and combination of parts, substantially as shown and described, and particularly pointed out in the claims.

The accompanying drawing represents the invention in a single figure or view and is, in a sense, a diagrammatic view of the elements constituting my invention, but shows also the said elements and the parts thereof in working relationship and connection, so as to disclose the manner of their use, although in actual use the parts would be disposed here and there in relationship differing more or less from the drawing, according to the design of the house, but the parts showing the same purpose as here and having substantially similar connections.

The idea of the invention is to utilize the temperature of the room which is heated by the furnace to govern the position of the furnace-dampers, and to this end I employ a medium that is sensitive to heat and cold and will contract or expand according to the temperature it is in, and a hydraulic motor or its equivalent having suitable valve mechanism controlled by said medium for controlling the hydraulic pressure and through such pressure controlling the dampers.

The drawing shows a furnace A, with an air or draft damper 2 and heat or check damper 3, as in an ordinary furnace or heating-stove, and there is nothing peculiar about the furnace here shown nor its dampers, nor in fact is there anything new, broadly, in such dampers being controlled through the cords 4 and 5 and automatic mechanism designed for that purpose, the special mechanism herein shown and described and serving to operate said cords 4 and 5 being the subject-matter of my invention.

B represents what I may term a "hydraulic motor," having the shape substantially of an ellipse in cross-section and provided with a centrally-arranged diaphragm 6, which divides the motor into two chambers. The upper chamber is utilized in this instance as the hydraulic chamber and is provided with a combined inlet and outlet pipe 7, which is the only water-passage to said chamber. Fixed to the center of the said diaphragm 6 is the rod 8, which projects out through the bottom of the lower or air chamber and has pivoted upon its lower end a balance-lever C. This lever is pivoted at about its center upon what is shown here as a leg or projection 9 upon the bottom of the motor B, although this pivot or supporting point for the lever C may be any other suitable device arranged in position to carry said lever about, as the projection 9 does in this instance. On the opposite side or end of the pivot from the pivot point or rod 8 is a counterweight D on said lever, and the cords or wires 4 and 5 are connected with the ends, respectively, of the said lever C. Normally, therefore, if there be no pressure in the water-chamber of the motor B the counterweight D is such as to keep the diaphragm 6 up, as shown, and to close the air-damper of the furnace and to open the check-damper. This is the position of the parts described when the furnace is left, say, for the night, though the operation is the same at all times, day or night. Now in order that the dampers may be reversed more or less by said motor, so as to open the draft-damper and close the check-damper, or to do the reverse of this, I have arranged a system of valves for the motor and a device for operating the said valves which is governed by the temperature of the heated room. Thus we have a water-valve chamber composed of the two valve-blocks or pieces E and F, which are separated by some suitable sort of packing 10 which will serve to separate the blocks and be firm enough to stand the pressure for holding the blocks together by screws and form a close joint, and next to said packing and secured around the edge of the blocks with the

packing is a flexible valve-diaphragm 11. The packing 10 is deep enough to form a valve-chamber between the blocks. One of said blocks is perforated through three several places for pipes 7, 12, and 13. The pipe 7 enters the top chamber of the water-motor B and the center of the said valve-chamber, as shown. The pipe 12 leads off to the water-supply, which we will assume connects with the water-service pipe in a dwelling, and thence to the city main, with water under pressure. The pipe 13 is the exhaust or discharge pipe from the valve-chamber. The valve-block or part F is shown as having two holes or passages from side to side, directly opposite the openings in the block E for the pipes 12 and 13, and two valve-plugs 16 fit closely in said perforations or holes and extend through into the valve-chamber and bear against the valve-diaphragm 11. These plugs 16 are adapted to slide in and out and are pivotally connected with the ends of the cross-arm of the T-shaped rocking lever G, and the stem 18 of the said lever is provided with a counterweight H. This lever is pivoted at its center to an ear or ears 19 on the valve-block F. At its top said block F is shown as having a boss 20, into which is threaded a sensitive tube K, of zinc or other like metal or material, which is exceedingly sensitive to the influences of the temperature and will contract and expand, according to the degree of heat in the room. This tube K is of sufficient length to accomplish the purpose for which it is intended, and of course is to be located in a room which is heated from the furnace A. Projecting through the said tube lengthwise is a valve-controlling rod L, which is supported upon the end of the tube by an adjustable nut 22, threaded on said rod to set the parts. Let us assume now that the furnace has remained as shown for some time and that the room in which the tube K is located has sustained a perceptible change of temperature. As this occurs the tube K is also contracted and shortened and this operates a corresponding change in the position of the valve-plugs as they bear upon the diaphragm 11, and a sufficient contraction of said tube will serve to more or less reverse the position of the said plugs and turn on the hydraulic pressure upon motor B. When the valves become reversed, so as to effect the result just described, the water-passage through pipe 12 and the valve-chamber to the pipe 7 will be opened and the exhaust through pipe 13 will be closed. Then the water flowing in through pipe 12 will flow out through pipe 7 into the motor B and force the diaphragm 6 down. In doing this the lever C will be tilted reversely to the position shown and the check-damper 3 will be closed and the draft-damper 2 opened. The furnace will then take on new life, and the volume of heat being increased the room carrying the tube K will get warm and the said tube will expand, and this will bring the valve-plugs, the water-motor, and the dampers back again to the position shown in the drawing. When this occurs, the water-passage through pipe 12 is closed and the exhaust 13 opened, and by means of the counterweight D the water will be expelled out of the motor B through the pipe 7. The entire operation is of course automatic, and all the mechanism is governed, primarily, by the temperature of the room having the tube K. Obviously there might be considerable modification of the valve mechanism and of the other parts and not depart from the spirit of the invention.

As before stated, the relation of the mechanism, as here shown, is largely diagrammatic, but it serves to illustrate the construction of the parts and working relation of the parts.

It will be understood that while I have herein referred to hydraulic pressure as the medium used for actuating the motor, I may use any other medium that will do the work—such as air-pressure, gas-pressure, or the like. It will also be understood that the relation of the valve-diaphragm and the plugs to the inlet and outlet ports is such that as one port is opened the other is at the same time closed, so that in fact one port only is open at a time, and that slightly—say, a thirty-second of an inch, or thereabout. This makes a delicate movement of the valve-plugs, and as they bear upon a yielding diaphragm the ports become opened and closed by a movement which is so slight as to be scarcely discernible by the eye.

The means herein described may be used with steam-heaters or other heating apparatus of whatever kind or description in which a device of this kind can be made available, and for that matter it can also be used with refrigerating apparatus or the like requiring regulators for the flow of gas or other medium. Indeed, the device may be used wherever its use can be made practical.

Having thus described my invention, what I claim is—

1. Valve mechanism, comprising a valve casing provided with inlet and outlet passages and an intermediate passage and a flexible diaphragm arranged within the casing to close and open said passages, a pair of valve plugs bearing upon said diaphragm, over the inlet and outlet openings, respectively, and a rod to operate said plugs, substantially as set forth.

2. Valve mechanism, comprising a casing having three several fluid passages and a flexible diaphragm arranged in said casing over the said passages, a pair of valve plugs bearing in said diaphragm over the inlet and outlet openings, a bar pivoted at its center and having said plugs fixed to its ends and a rod connected to said bar to actuate the bar, substantially as set forth.

3. The valve casing having inlet and outlet passages and an intermediate out and back flow passage, and separate pipe connections for said several passages, a flexible dia-

phragm over said passages in said casing, a valve plug to bear against said diaphragm over each the inlet and outlet passages, and a closed receptacle connected with the opposite end of the said out and back flow passage having a piston exposed to the water flowing through said out and back flow passage, substantially as set forth.

4. The valve casing described, consisting of the two parts E and F, the part E having three several openings for pipe connections, a flexible diaphragm secured about its edge between said parts E and F, a pivoted member on the outside of part F and plugs pivoted on the ends of said member and extending through the part F opposite the inlet and the outlet openings through part E, substantially as set forth.

5. A water valve casing having an internal chamber, an inlet from the source of water supply entering said chamber and an outlet from said chamber for the waste water and a water passage from and to said chamber separate from the inlet and outlet passages, a flexible valve diaphragm in said chamber and a pair of plugs and a pivoted lever to press said diaphragm against the said inlet and outlet passages alternately, an expansion and contraction tube and a rod in said tube connected with the said pivoted lever, whereby said lever is operated, substantially as set forth.

6. The combination herein described, consisting of the valve casing having inlet and outlet passages, and an out and back flow passage and pipe connections for said passages, a diaphragm over said passages in said valve casing, plugs to bear against said diaphragm and close said inlet and outlet passages alternately and means to operate said plugs, a closed receptacle, and a piston therein connected with the out and back flow passage in the valve casing, and a stove damper and connections connected with the piston in said closed receptacle, substantially as set forth.

ROBERT L. SHORT.

Witnesses:
H. T. FISHER,
GEORGIA SCHAEFFER.