V. F. DAVIS.

DAMPER AND TEMPERATURE REGULATOR.

APPLICATION FILED MAR. 9, 1908.

908,077.

Patented Dec. 29, 1908.

3 SHEETS—SHEET 1.

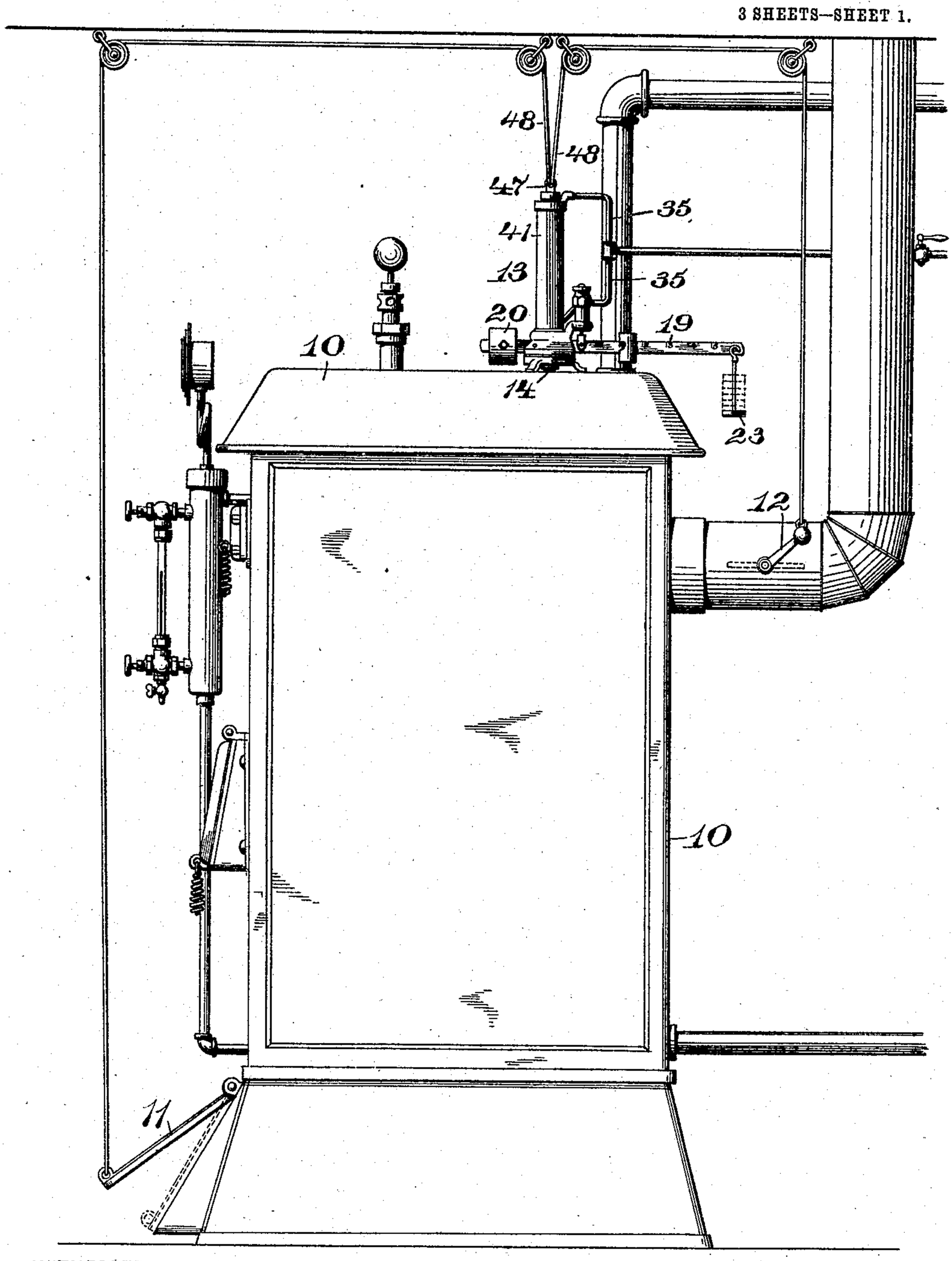

Fig. 1

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3 SHEETS—SHEET 2.

Fig. 2

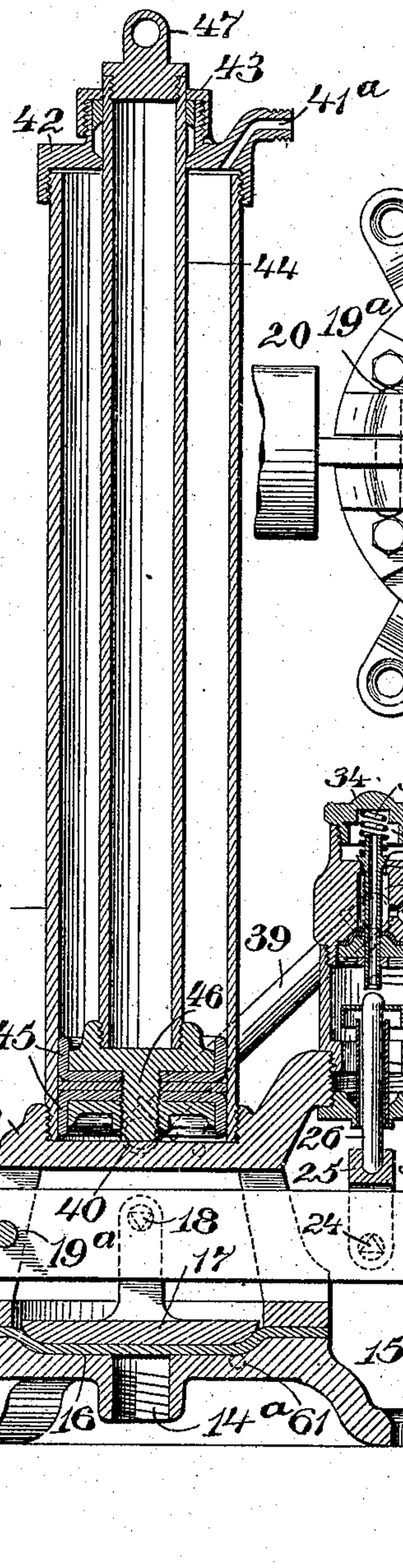


Fig. 3

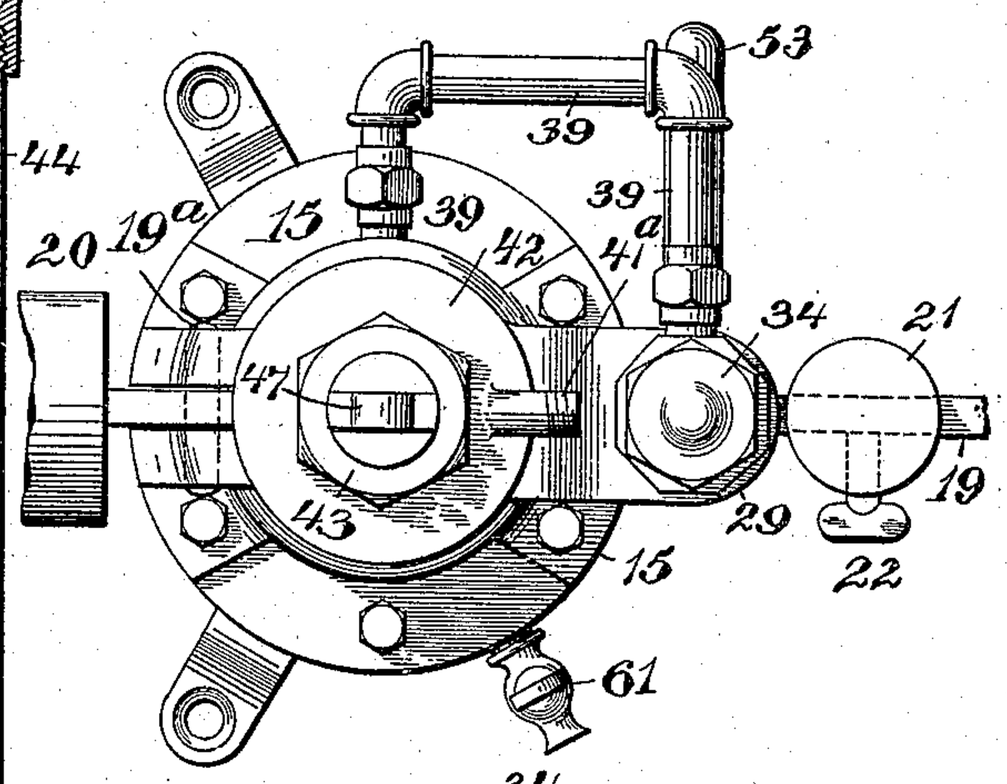
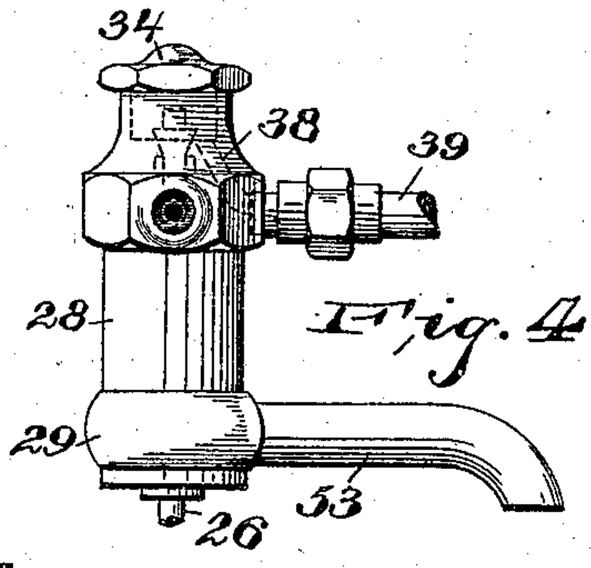


Fig. 4



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3 SHEETS—SHEET 3.

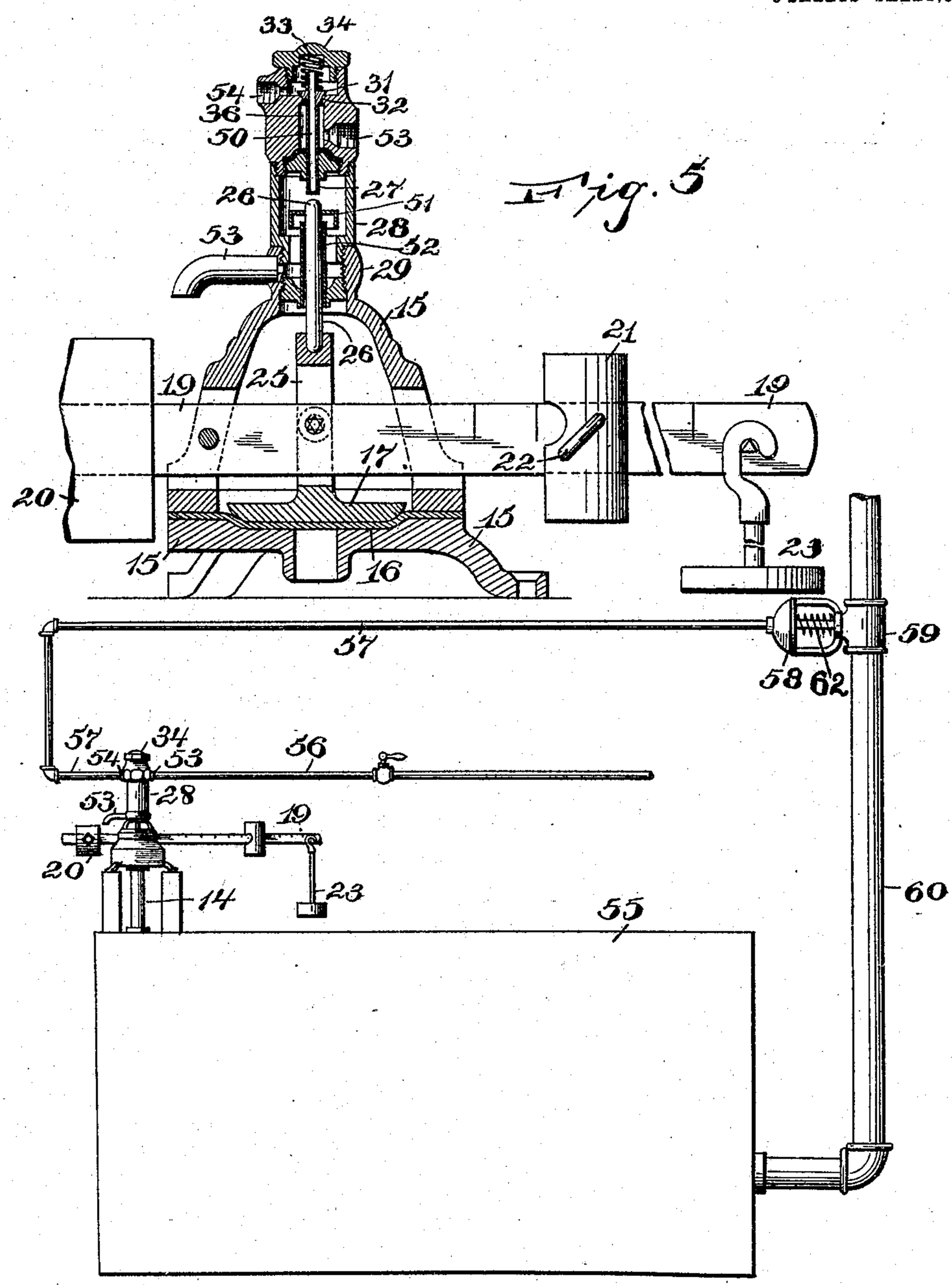

Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE.

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DAMPER AND TEMPERATURE REGULATOR.

No. 908,077. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed March 9, 1908. Serial No. 419,874.

To all whom it may concern:

Be it known that I, VERNER F. DAVIS, a citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Damper and Temperature Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention consists of a regulator, actuated by a fluid under pressure, that is adapted to regulate dampers and valves so that a predetermined temperature in a receptacle can be maintained automatically.

The invention consists of a cylinder having a piston with a piston rod projecting therefrom, which piston rod is used to actuate the damper or similar device, the piston being actuated by a fluid pressure, in both directions, so that the return of the piston is positive and steady.

The invention further consists of an improved method of admitting fluid under pressure to one end of the cylinder to actuate the piston, the means automatically draining the water from this end of the cylinder, and this admitting and draining mechanism being actuated by means of a diaphragm, which in turn is moved by steam or other pressure, and a sliding weight or a similar device is used to govern the amount of pressure necessary to actuate the regulator.

The invention is illustrated in the accompanying drawings, in which Figure 1 is a side view of an ordinary house heating boiler, equipped with the improved regulator, showing the regulator attached to the dampers of the heater. Fig. 2 is a vertical section of the regulator. Fig. 3 is a top view of the same, and Fig. 4 is an end view of a part of the regulator, showing the outlet for the waste fluid. Fig. 5 is a section of a modified form of construction, and Fig. 6 is a view of one of the systems in which this modified construction can be used, showing how it is installed in the system.

In Fig. 1 is illustrated an ordinary house heater 10 which is provided, on the front, with a clinker-door 11 which is used to admit air beneath the fire, and with a damper 12, which damper regulates the draft to the flue. Installed at any suitable point, but shown in the drawings as being placed on the top of the heater, is the regulator 13 which is connected by means of a steam pipe 14 which is connected at 14ª to the regulator, the connection 14ª being shown in Fig. 2. The regulator consists of a base 15 having suitable legs on which it stands, and secured in the base is a diaphragm 16 fitting over the connection 14ª of the pipe 14, whereby the diaphragm is raised when the pressure in the pipe 14 arrives at a predetermined point.

When the diaphragm is raised it lifts a plate 17 with standards thereon, and by means of the knife edges 18 it lifts the long end of the lever 19, this lever being pivoted on the pin 19ª and being provided with a counterweight 20. A sliding weight 21 is used to vary the pressure necessary to raise the diaphragm and the lever 19, this weight 21 being fastened in place by a suitable set screw 22, and where a very high pressure is to be used, additional weights can be placed on the end weight 23. At a suitable point on the long end of the lever 19 are arranged the knife edges 24, one on each side of the lever, which knife edges engage and actuate a saddle 25 which is connected to a rod 26, the upper end of which, when the long end of the lever 19 is lifted, engages the lower end of a stem 27, the stem 27 being tubular, the rod 26 and the stem 27 being inside of the casing 28. The casing 28 is fastened, in any manner, to a bracket 29 secured or integral with the base 15, and is closed on the bottom by means of a plug 30.

When the rod 26 rides up and engages the bottom of the tubular stem 27, it closes the tubular stem 27 and lifts it up against the action of the spring 33, which is regulated by the cap 34, so that the valve 31, on the stem 37, is lifted from its seat 32, and the fluid under pressure, whether water or air, but preferably water, is admitted through the pipe opening 35ª from one of the pipes 35, shown in Fig. 1. This fluid under pressure passes into the chamber 36 up past the valve 31 into the chamber 37, from which it passes down through a passage 38, shown in Fig. 4, into a pipe 39 which is connected, at its end as at 40 in Fig. 2, to the bottom of the cylinder 41. The cylinder 41 is closed at the top by means of a cap 42 which has an opening 41ª forming a pipe connection for the other pipe 35, shown in Fig. 1, whereby the pressure is the

same on both ends of the cylinder. The cap 42 is provided with the usual form of stuffing box 43, and through the cap and the stuffing box slides a piston rod 44, provided on its lower end with a piston 45 which is held on the piston rod 44 by means of nuts which screw on as usual to a stem 46, which stem is a little longer, or extends further down than the piston, so that room is left for the admission of fluid under pressure beneath the piston, when the piston is at its lowest point. When the fluid under pressure is admitted through the primary valve previously described, which is situated within the casing 28, and has passed through the pipe 39, it forces the piston 45 and its piston rod 44 upward against the pressure coming in through the opening 41[a], because the piston rod is made of a diameter sufficient to make a noticeable difference in the area of the upper and lower surfaces of the piston, whereby the surface and pressure are much larger underneath the piston than above it. When the piston rod rides upward, its end 47, to which are attached the ropes or wires 48, shown in Fig. 1, permits these ropes 48 to be relaxed to allow the dampers 11 and 12 to close. When they have remained closed sufficiently long enough to cause a decrease of pressure below the desired point, the long end of the lever 19 descends by reason of the settling of the disk or plate 17 on the diaphragm 16, and the rod 26 on the saddle 25 is pulled down, which allows the valve 31 to be forced down by the spring 33 onto its seat 32, and thus the supply of fluid under pressure to the cylinder below the piston, by means of the pipe 39, is shut off. The rod 26 then uncovers the duct 50 in the tubular stem 27, this duct being open at both ends, and the fluid under pressure beneath the piston 45 runs out through the pipe 39 and the passage 38 into the chamber 37, then down through the duct in the stem 27 to the interior of the casing 28, being prevented from passing down through a tube 52, through which the rod 26 slides, by means of a plate 51 which sheds the water, if water is used, and the water under pressure passes out through a spout 53 to any desired receptacle or pipe.

The operation of this regulator is positive, and the regulator is compact and at the same time sensitive. It is also adapted for high or low pressures, and it can be used in conjunction with any particular system.

A modified form of regulator is shown in Fig. 5, where the primary valve and its operating saddle 25 is placed over the center of the disk 17 so as to give a direct action thereon. The operation of the primary valve in this construction is the same as in the previously described one, but the pipe openings 53 and 54 connect with an inlet pipe 56 carrying a fluid under pressure, and with an outlet pipe 57 leading to a diaphragm valve 58, which in turn closes an inlet valve 59 in the steam or other pipe 60 which supplies a tank, such as a vulcanized tank, and thus maintains a pressure at a desired point. When the pressure falls below a certain point, the operation of the primary valve is the same as before, the rod 26 dropping to uncover the hollow stem 27 and allowing the water or other fluid under pressure to pass down through the primary valve and out through the spout 53, thus relieving the pressure on the diaphragm valve 58, and allowing the spring 62 to close the inlet valve 59 of the steam pipe 60.

It will of course be understood that the diaphragm valve 58 will work a damper instead of the inlet valve 59, the figure simply showing one adaptation of the regulator.

In the construction shown in Figs. 2 and 3, I prefer to install a pet-cock 61 directly beneath the diaphragm 16, to draw off, if necessary, any water that might accumulate underneath the diaphragm.

Having thus described my invention, what I claim is:—

1. In a regulator, a fluid pressure motor, an inlet pipe thereto to admit fluid under pressure, a primary valve in the inlet pipe, the primary valve consisting of a casing, a hollow tubular stem in the casing having a valve on its exterior, the valve normally resting on a valve seat in the casing and acting as a closure between the pipe connections of the primary valve, the duct through the hollow stem being open when the valve is shut, means for operating the hollow stem to open the valve, the means when operating the stem also closing the duct of the stem, and a normally open outlet pipe leading from the valve casing.

2. In a regulator, a primary valve consisting of a casing having a pair of chambers at the top thereof, each chamber having a pipe opening, a hollow valve stem adapted to reciprocate through the chambers, a valve on the exterior of the hollow stem and being adapted to be seated normally on a valve seat between the chambers, a rod arranged to reciprocate and operating to close one end of the hollow stem and lift the stem to open the valve between the chambers, the rod when in its normal position allowing the valve to seat itself in opening the hollow stem, a spout leading from the valve casing below the hollow stem, and means for reciprocating the rod.

3. In a regulator, a primary valve consisting of a casing having a pair of chambers at the top thereof, each chamber having a pipe opening, a hollow valve stem adapted to reciprocate through the chambers, a valve on the exterior of the hollow stem and being adapted to be seated normally on a valve seat between the chambers, a rod arranged

to reciprocate and operating to close one end of the hollow stem and lift the stem to open the valve between the chambers, the rod when in its normal position allowing the valve to seat itself in opening the hollow stem, a sleeve in the bottom of the casing through which the rod reciprocates, a plate secured to the rod above the sleeve, a spout leading from the casing from below the hollow stem, and means for reciprocating the rod.

In testimony, that I claim the foregoing, I have hereunto set my hand this 23d day of November, 1907.

VERNER F. DAVIS.

Witnesses:
WM. H. CAMFIELD,
E. A. PELL.