

J. BURNETT & F. M. WATKINS.
Water-Heater.

No. 226,221.

Patented April 6, 1880.

Fig. 1.

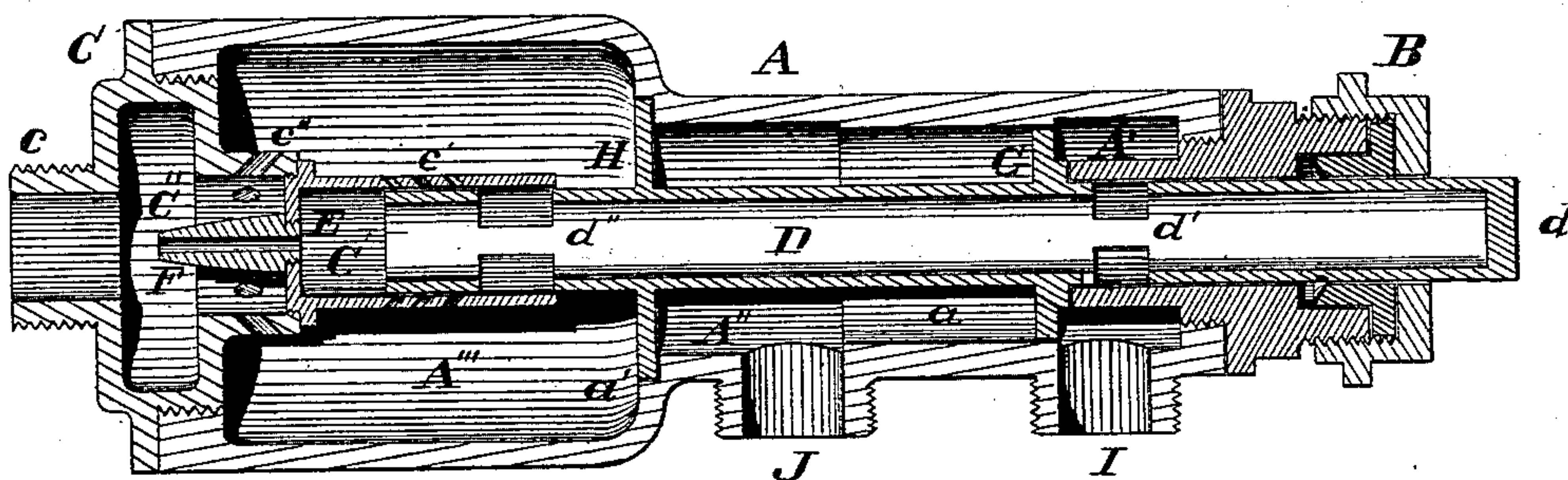


Fig. 2.

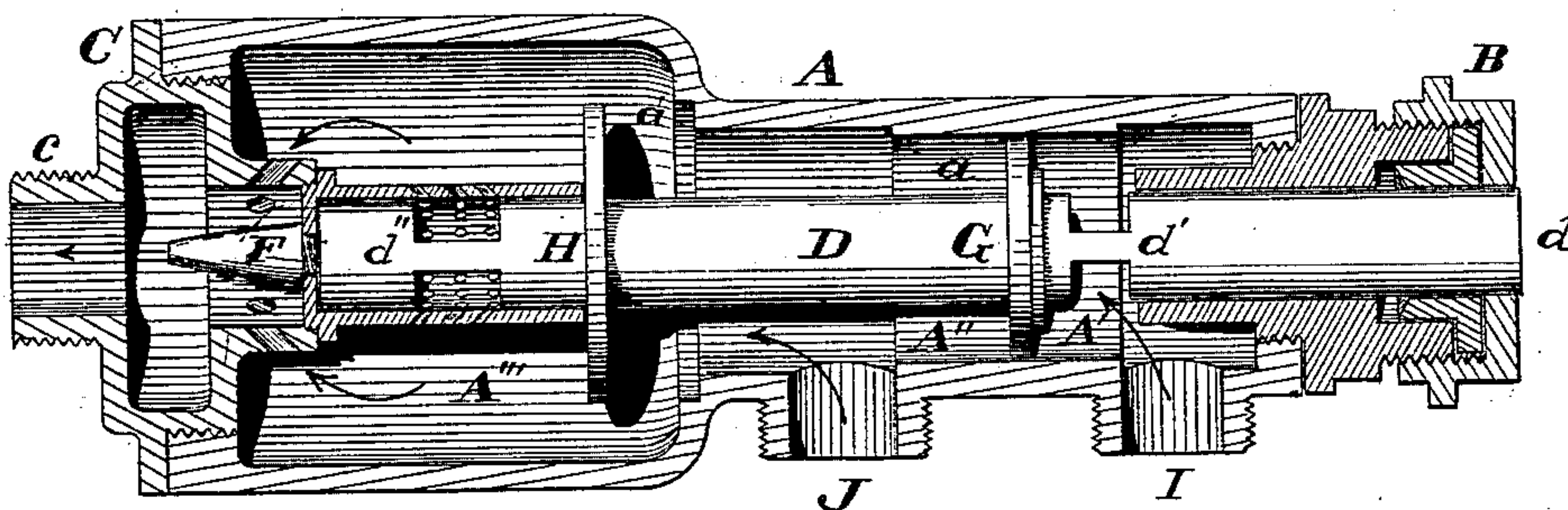
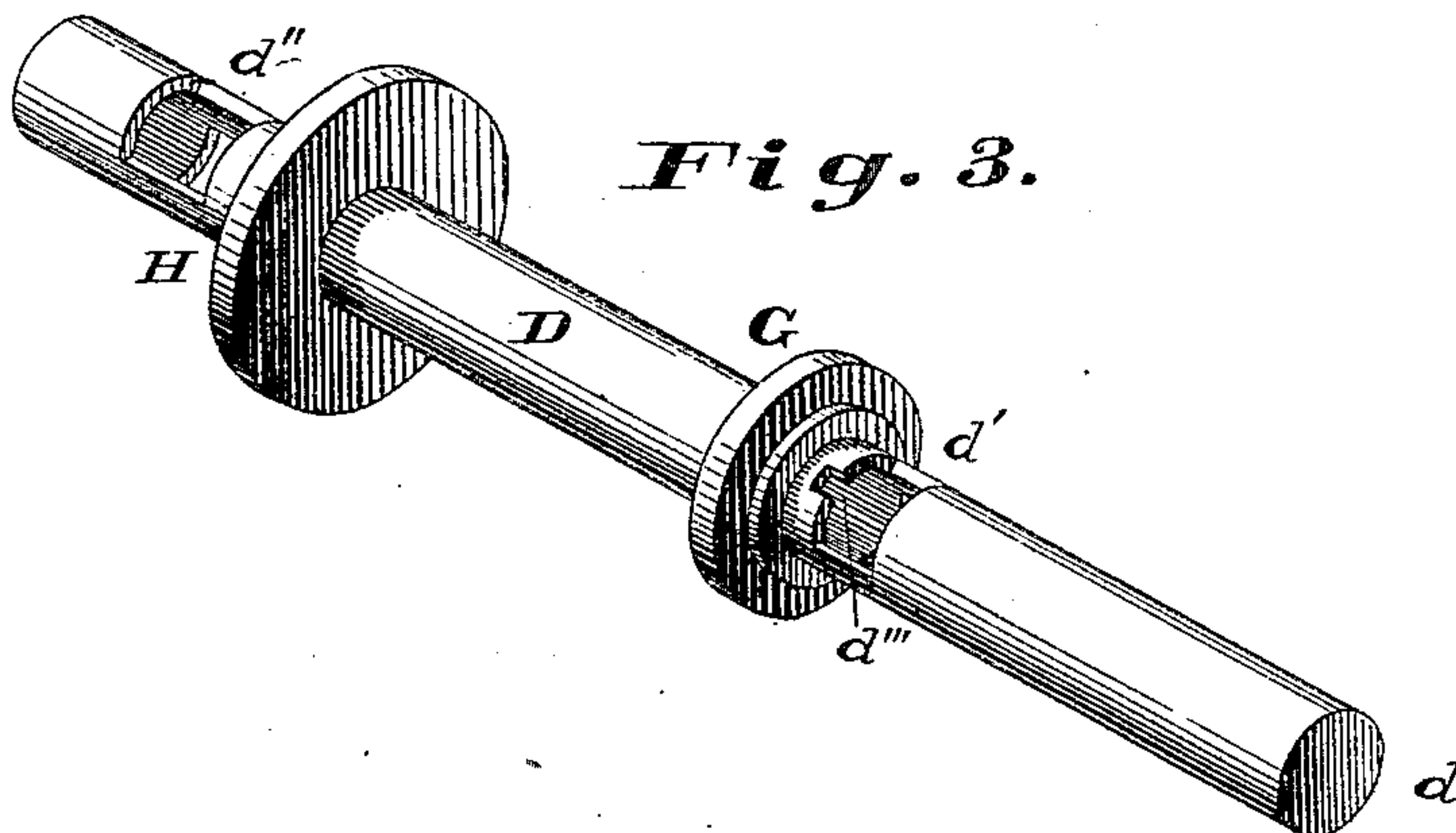


Fig. 3.



Attest

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UNITED STATES PATENT OFFICE.

JOHN BURNETT AND FRANK M. WATKINS, OF CINCINNATI, OHIO.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 226,221, dated April 6, 1880.

Application filed February 24, 1880.

To all whom it may concern:

Be it known that we, JOHN BURNETT and FRANK M. WATKINS, both of Cincinnati, Hamilton county, Ohio, have jointly invented a new and useful Water-Heater, of which the following is a specification.

Our invention relates to a device for heating hydrant or other water on draft. The device is so constructed as to be brought into action automatically by the simple act of opening the water-faucet, and to be reduced to inactivity by the act of closing the faucet, without any care or attention on the part of the user.

An essential and important feature of our device is a sliding tube whose partial relief from pressure on the delivery side, incident to the opening of one or more faucets, renders it subject to the supply-pressure and permits the inflow of both steam and water, causing the latter to become and remain heated so long as the flow continues.

In consequence of the heating action taking place only during the use of the faucets, and in proportion to their number and capacity, no heat is expended except when and where needed, and the expenditure of steam heat is automatically graduated to the varying volume of delivery, be it little or great.

In the accompanying drawings, Figures 1 and 2 are axial sections of our water-heater in its closed and open conditions, respectively. Fig. 3 is a perspective view of our sliding tube.

A is an inclosing-shell having at one end a stuffing-box, B, and at the other end a sleeve, C, whose outer extremity is screw-threaded, *c*, for attachment of a service-pipe provided with one or any number of faucets for the delivery of heated water. Occupying the said stuffing-box and sleeve is our sliding tube D, said tube being closed at one end, *d*, and extending at that end beyond the stuffing-box, and being open at the other end, so as to communicate freely with the interior of the sleeve C. A diaphragm, E, separates the sleeve C into two compartments, C' C'', perforated, as shown at *c'* and *c''*. Chamber C' communicates directly with chamber C'' by means of a nozzle, F, which enters the latter in the line of its axis. The sliding tube D has two flanges, collars, or piston-valves, G H, of unequal diameter, which,

occupying counterbores *a a'* in the shell, form three chambers, A' A'' A'''. The tube D is provided with steam inlet and exit ports at *d'* and *d''*, respectively. Screw-necks I J in the shell A communicate with the steam and water supply, respectively, through suitable pipes. A notch, *d'''*, in inlet *d'* may be provided to facilitate the initial action of the entering steam.

The various supply and delivery pipes, with their faucets, check-valves, &c., may be of common and familiar forms, and are therefore not included in the present illustration:

So long as all the delivery-faucets continue closed the flanged sliding steam-duct D remains in its retracted and inactive position. (Shown in Fig. 1.) The opening of any delivery-faucet, however slightly, operates to relieve pressure on the delivery side of the flanges G H, and permits the steam and water supply pressures to shift the duct or sliding tube D to its open position, as shown in Fig. 2, to bring the inlet-ports *d'* in direct communication with the steam-supply passage I, and at the same time to bring the outlet-ports *d''* in communication with the perforations *c'* in the sleeve C, and thence with the water-heating chamber A'''. In this position of the tube steam from I enters tube D through inlet-ports *d'*, and issues from ports *d''*, through numerous orifices *c'*, into the water-heating chamber A''', and through nozzle F into the water-delivery chamber C'', where it encounters and mingles with the water, which enters at J and escapes through the chambers A''' and C'' on its passage to such of the discharge-faucets as are for the time being open, and by so mingling imparts the desired temperature to such escaping water.

The steam-heating action is thus entirely automatic and remains in force so long as any faucet is open; but at the instant of closure of the faucet last open the hydrostatic pressure, becoming equalized, permits the steam which now fills the tube D to retract the tube by its excess of pressure against the inside of the tube's closed end over that of the atmosphere on its outside. If the discharge be nearly closed, the approximation to equal pressure on both sides of the piston-valves permits the steam within the tube to partially retract it, and in so doing to partially close both its

own ports and those of the water-supply until equilibrium is restored.

The practical mechanic will, of course, adapt the parts of the heater to accordance with the circumstances of the case, such as maximum faucet-delivery, desired heat, available water-pressure, &c., bearing in mind that the steam, while necessarily sufficiently in excess of the water-pressure to fill the tube D and to penetrate the surrounding body of water, must not be so much in excess as to fill chambers A'' A''' to the exclusion of the water-supply.

We claim as new and of our invention—

1. In a water-heater, the flanged sliding steam duct or tube D G H, having one or more inlet-ports, d' , in communication with the steam-supply, and one or more outlet-ports d'' F, in communication with the water-supply, for the automatic heating of water in and by the act of draft, substantially as set forth.

2. In a water-heater, the shell A, provided with steam and cold-water inlets I J, and with a discharge-passage having the two-chambered

perforate sleeve C' C'', in the described combination with the flanged and ported sliding steam-duct D d d' d'' G H, which occupies said sleeve at one end, and a stuffing-box, B, through which it protrudes at the other end of the shell, the whole being combined and operating to heat the water in and by the act of drawing off or tapping the same, substantially as set forth.

3. The combination, in a water-heater, with the automatic sliding steam-duct D, of the sleeve C', whose nozzle F discharges into the delivery-chamber C'', in the manner described.

4. The notch d''' in the wall of the inlet-port d' of the sliding steam-duct D, as and for the purpose set forth.

In testimony of which invention we hereunto set our hands.

JOHN BURNETT.

FRANK M. WATKINS.

Attest:

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