

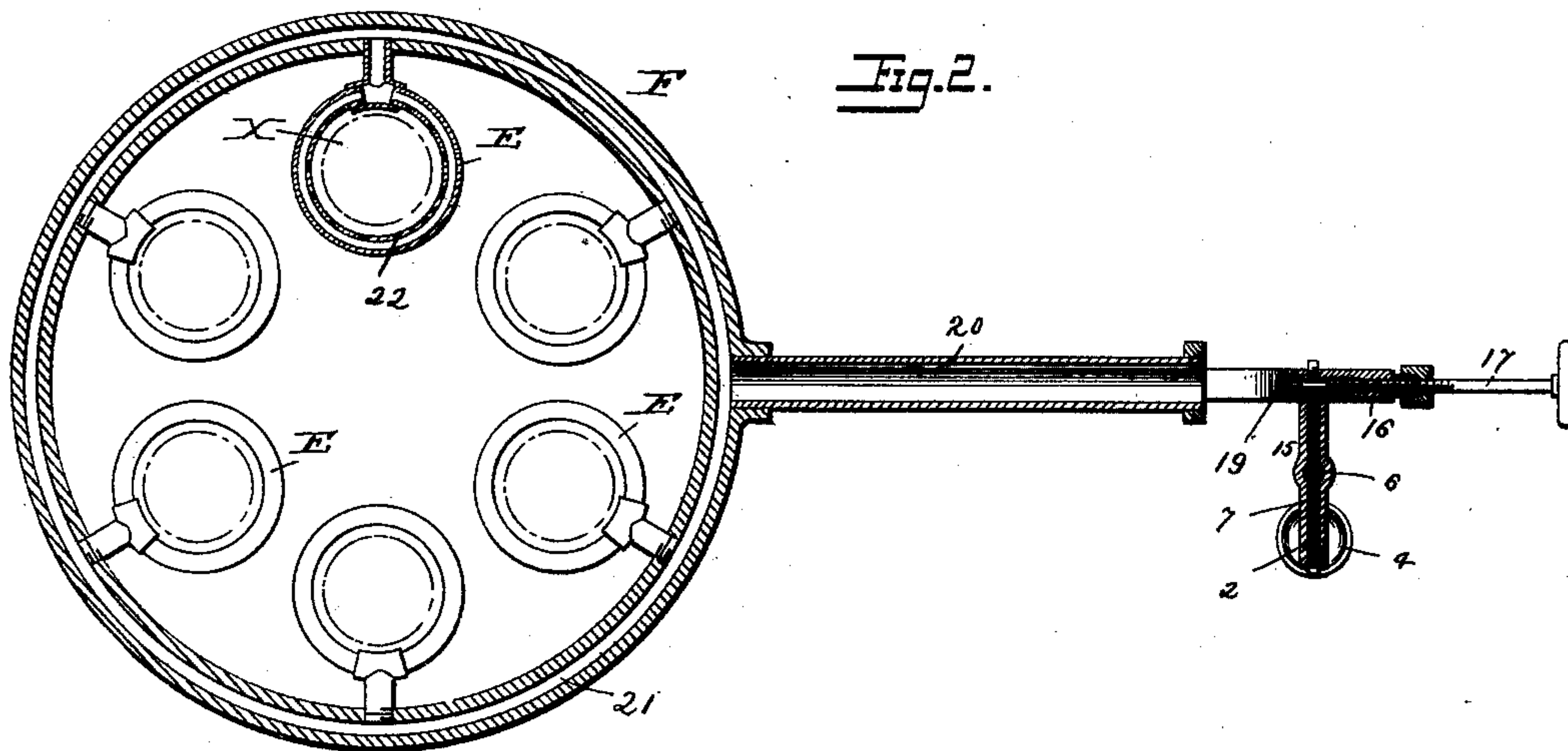
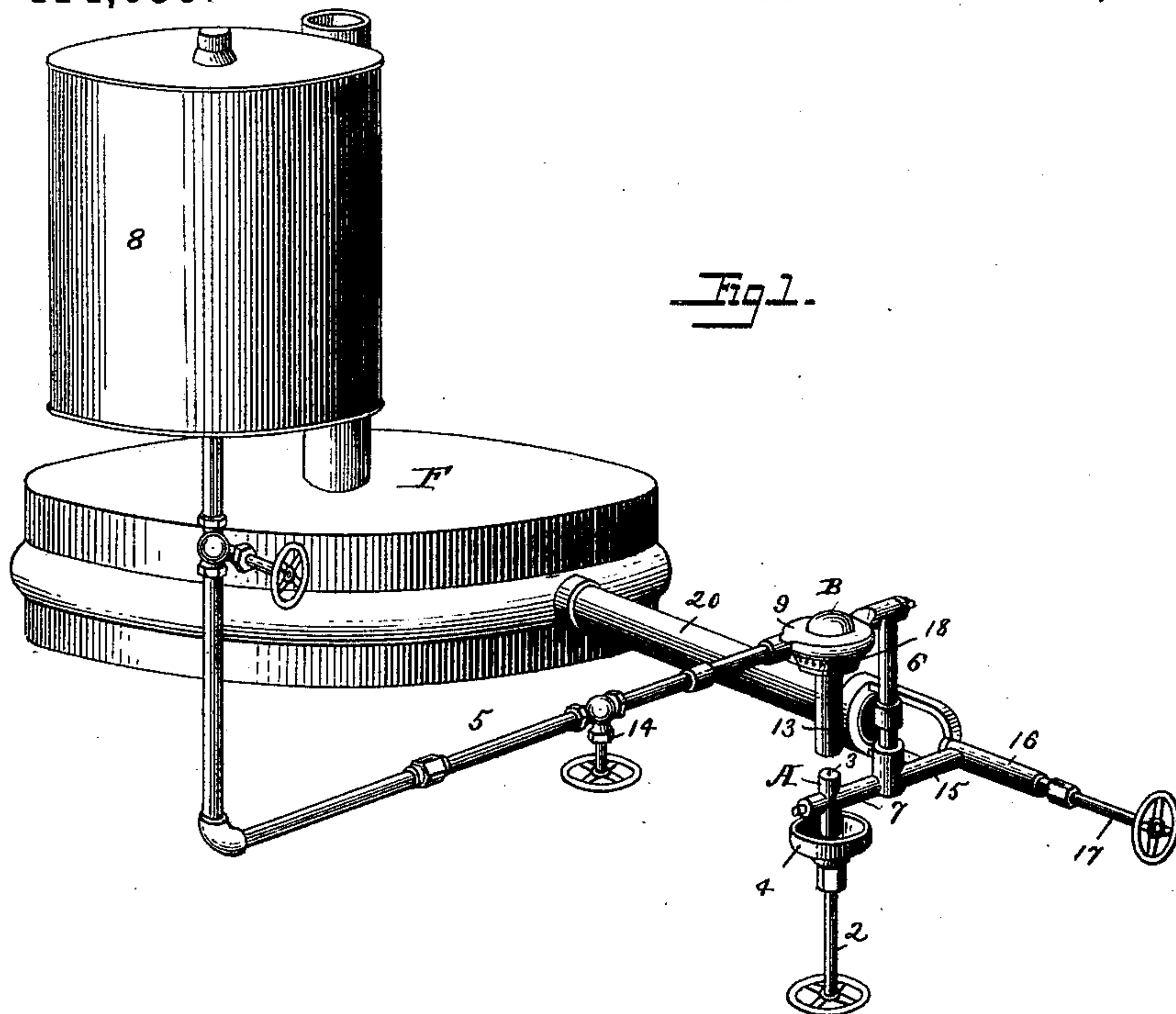
(No Model.)

2 Sheets—Sheet 1.

H. GEFRORER.
HEATING APPARATUS.

No. 414,039.

Patented Oct. 29, 1889.



Witnesses
J. G. Hinkel Jr.
D. R. Johnson

Henry Gefroerer,
Inventor

By Foster Freeman

Attorneys

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

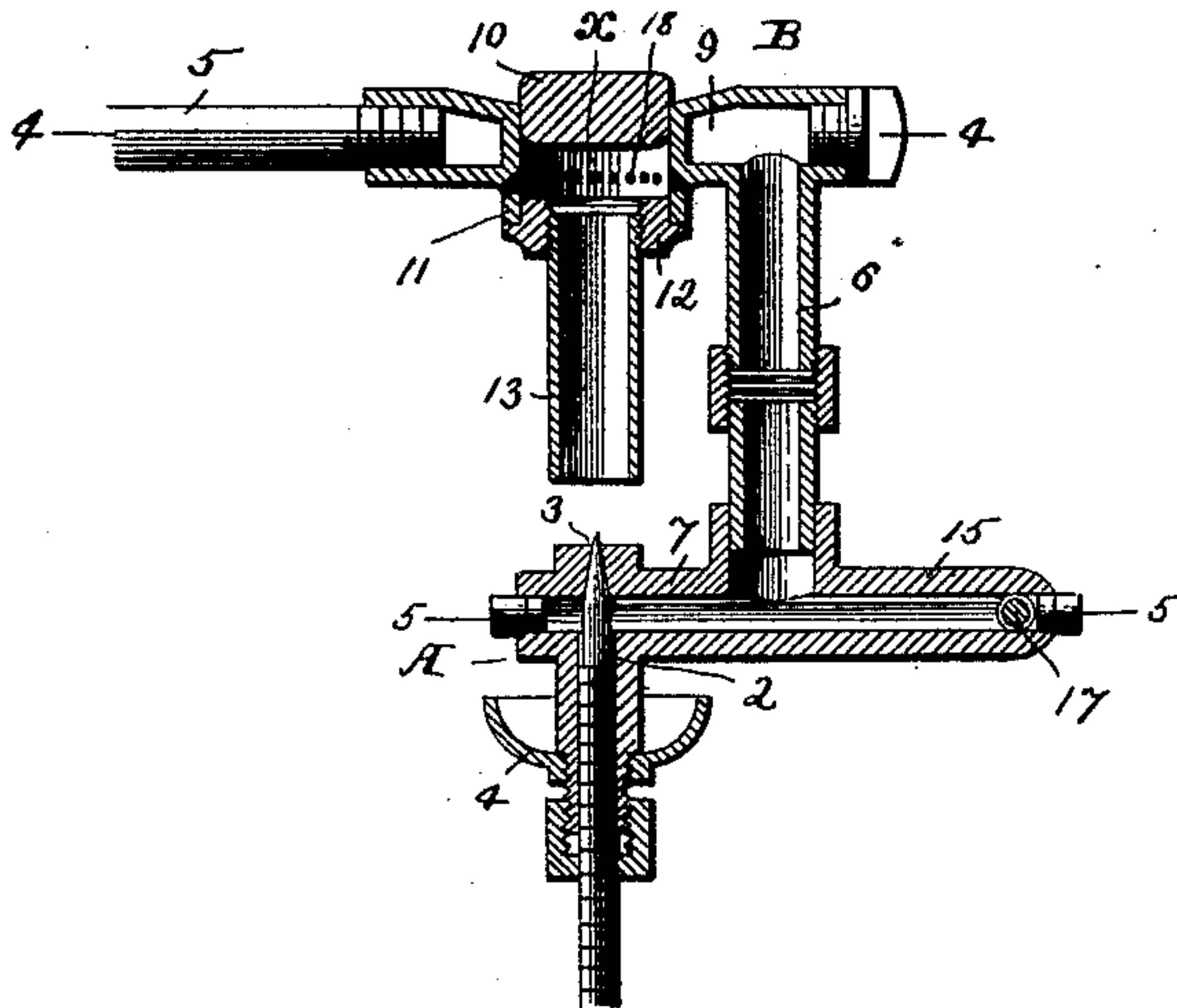


Fig. 5.

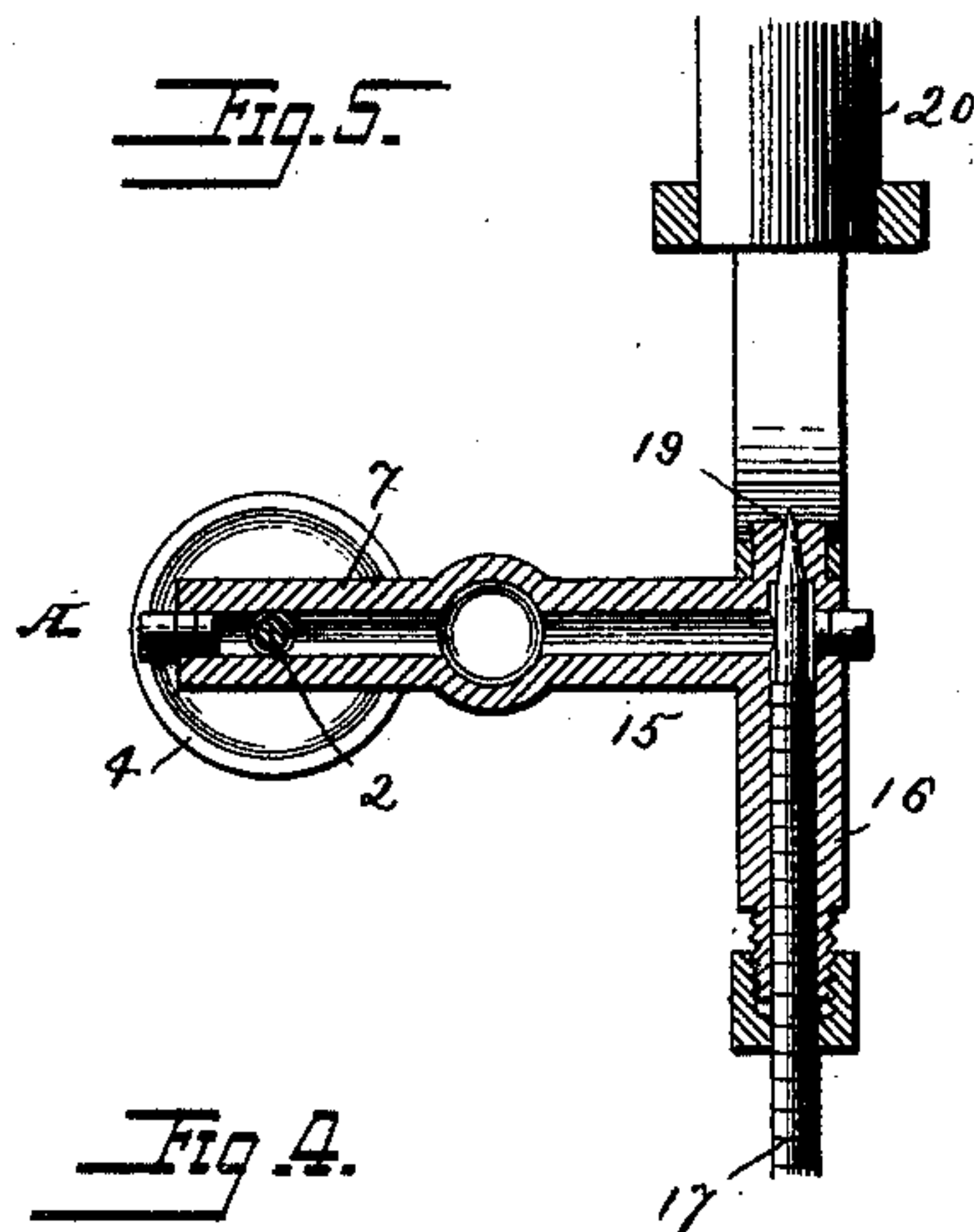
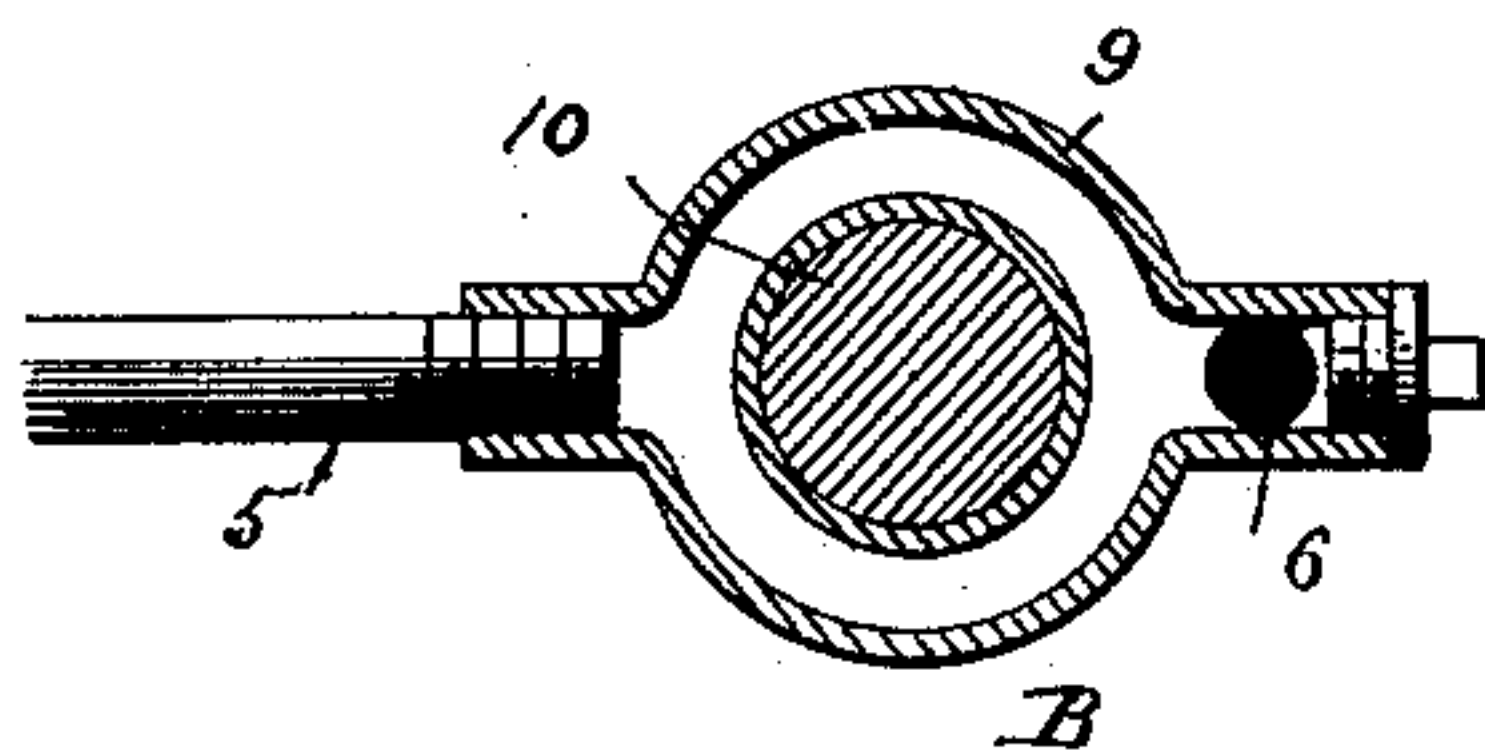


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY GEFRORER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JAMES H. AND FRANK FERGUSON, BOTH OF BRIDGETON, NEW JERSEY.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 414,039, dated October 29, 1889.

Application filed February 21, 1889. Serial No. 300,655. (No model.)

To all whom it may concern:

Be it known that I, HENRY GEFRORER, a citizen of the United States, and a resident of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

My invention is a vapor-heater, constructed, as fully set forth hereinafter, so as to generate a vapor from a volatile fluid and project a stream of the vapor through a surrounding body of air in such manner as to form a compound vapor, which is conducted to the burners, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved heater. Fig. 2 is a sectional plan; Fig. 3, a sectional elevation of the retort and burner, drawn on an enlarged scale; and Fig. 4 is a section on the line 4 4, Fig. 3. Fig. 5 is a horizontal section on the line 5 5, Fig. 3.

The burner A is of any usual or suitable construction, with any desirable number of openings, a single opening 3 being shown, closed by a needle-valve 2, and at the lower part of the burner is the usual starting-cup 4, into which the oil flows when the valve is withdrawn from the opening. Directly above the burner is the retort B, which is in the line of pipe 5 6 7, extending between the reservoir 8 and the burner A, and which is situated directly above the burner, so as to be heated by the flame. The retort, as shown, consists of a hollow ring or case 9, the opening in which is closed by a plug 10, and with a dependent annular flange 11, supporting a block 12, through which extends a tube 13, the lower end of the latter being above the burner, so that the flame from the burner may pass up and into the tube 13 and into the chamber α , inclosed by the flange 11, the block 12, and plug 10, and radial and downward inclined openings 18 direct the flame or the heated gases so that they will play around and beneath the ring 9, thereby highly heating the same and speedily vaporizing all of the oil which flows through the retort, the amount of which oil is regulated by a valve 14 in the

line of the pipe 5. A branch pipe 15 extends from the tube 6 and communicates laterally with the casing 16 of a needle-valve 17, which valve closes an opening 19 in the end of the casing, the said opening being axially in line with a tube 20, the end of which adjacent to the valve-casing is open and a short distance from said casing, so that a stream of vapor flowing under high pressure from the opening 19 is projected across the space between the pipe-casing and the open end of the tube, and, passing into the latter, carries with it a proportion of air, the action being similar to that of an injector, and the mixture of air and vapor, in consequence of the presence of the oxygen in the air, constituting a compound vapor, which, when ignited, has a high heating capacity, the effect of the ignited jets issuing under pressure from any suitable form of burner approximating that of a Bunsen burner.

The pipe 20 may communicate with the burner or burners of the heater, which burners may be of any suitable construction and arrangement, according to the character of the apparatus in which the device is employed and of the objects to be heated. In the drawings the pipe 20 is shown in connection with a series of annular burners E, adapted for heating the irons of a can-soldering machine, said burners E being arranged in a circle and all communicating with an annular pipe 21, connected with the pipe 20, and each annular burner E consisting of a hollow ring having perforations 22, which direct the flame radially inward against the irons represented at X, the whole being inclosed in a hood or case F in a manner which need not be here described.

By the combination of a burner, retort, and injector constructed to insure an automatic mixture of the vapor generated in the retort with a supply of air I am enabled to secure the requisite heat for many purposes with a comparatively small consumption of fuel and to secure a much higher degree of heat than it is possible to obtain in apparatus in which the vapor of the oil alone constitutes the vapor which is burned to effect the heating.

While different forms of retort and burners may be employed in connection with the injector, I prefer that described, because the jet of vapor passing from the opening 3 into the tube 13 will also act upon the principle of an injector to carry with it a quantity of air, which, combined with the vapor, forms a mixture capable of producing a much greater heat than would result from the use of the vapor alone. In this construction the flame may be ignited at the opening 3, or, preferably, at the openings 18.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

In a vapor-heating device, the combination, with the hollow ring 21, an open-ended pipe

20, communicating with the ring, a casing provided with an opening, and a valve arranged opposite the open end of the pipe 20 to inject therein a stream of vapor, a retort for generating the vapor, of a vapor-conduit between the retort and the casing, and the burners communicating with the ring 21, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of the subscribing witnesses.

HENRY GEFRORER.

Witnesses:

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ERNEST H. DAVIS,
JOHN M. THOMAS.