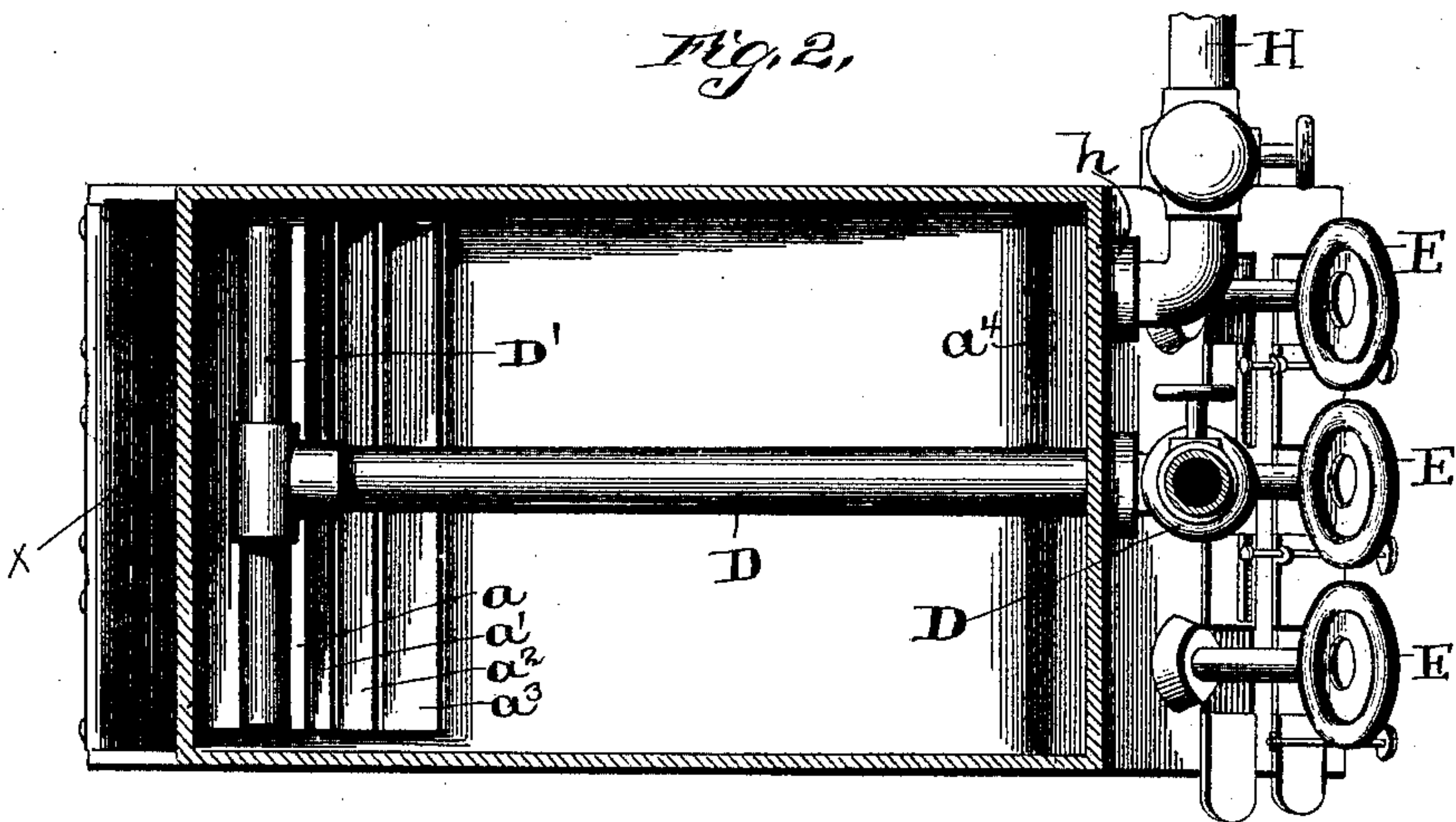
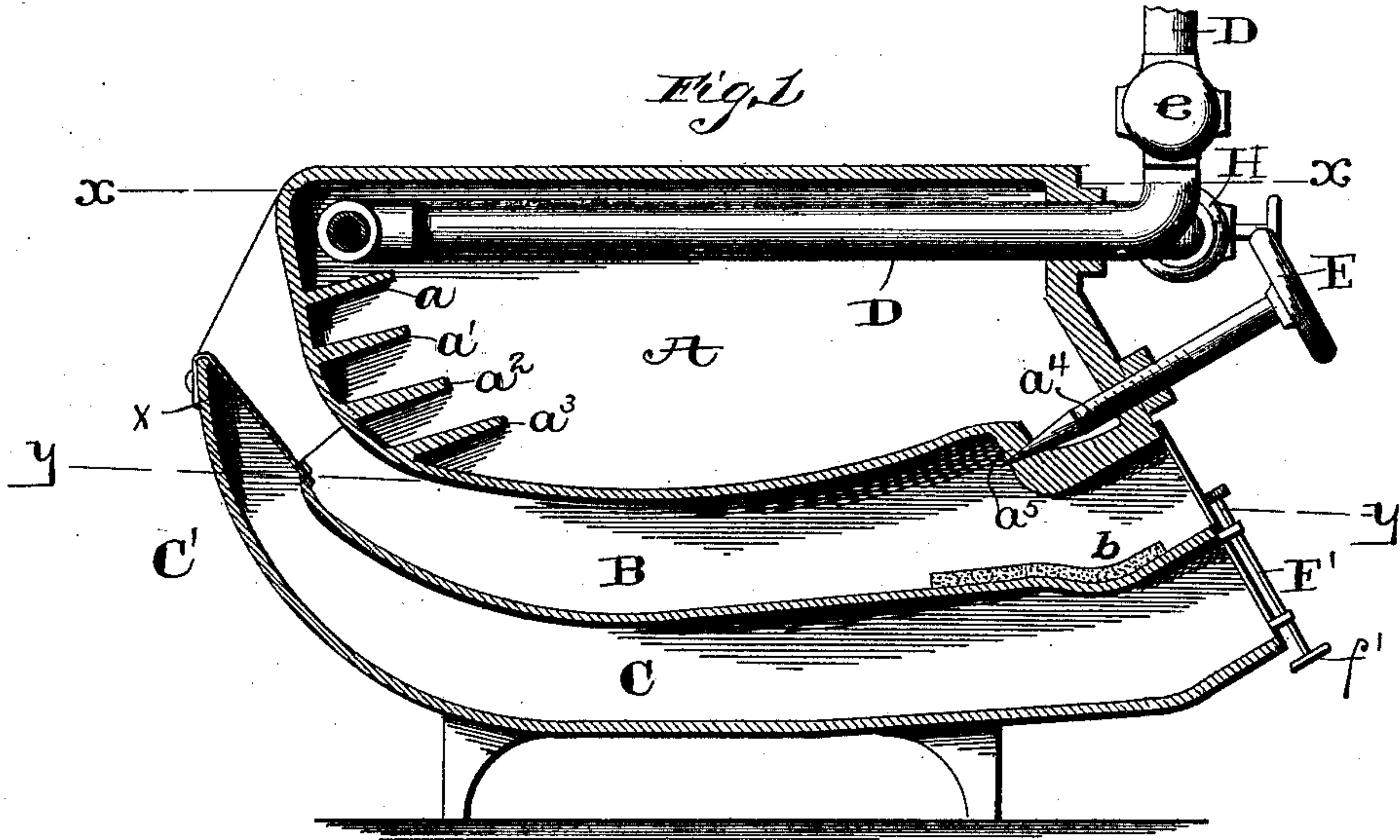


T. D. McCLARY.

VAPOR OR DECOMPOSING HYDROCARBON BURNER.

No. 437,310.

Patented Sept. 30, 1890.



Witnesses:

W. B. Taylor,
R. H. Paul.

Inventor

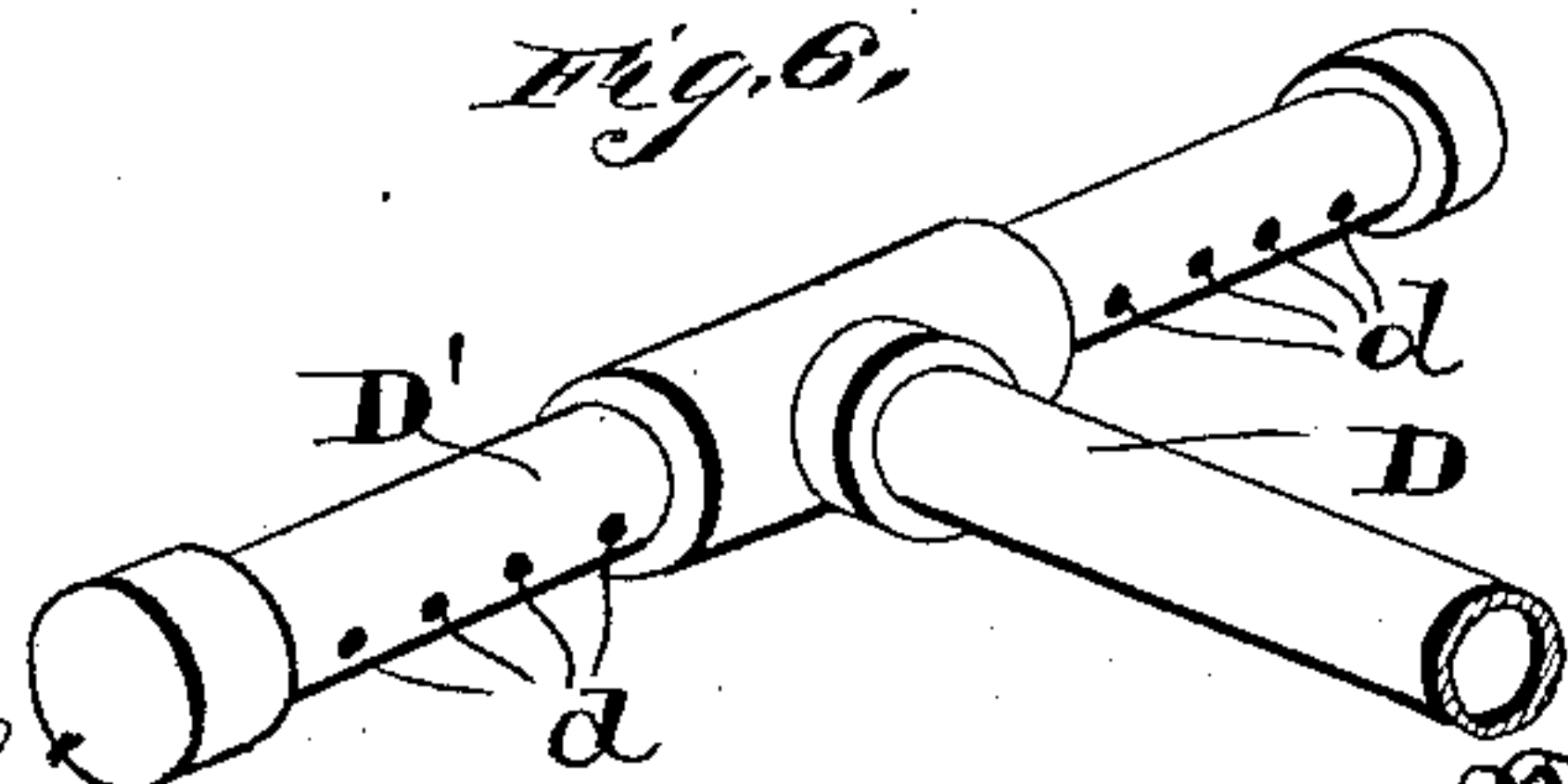
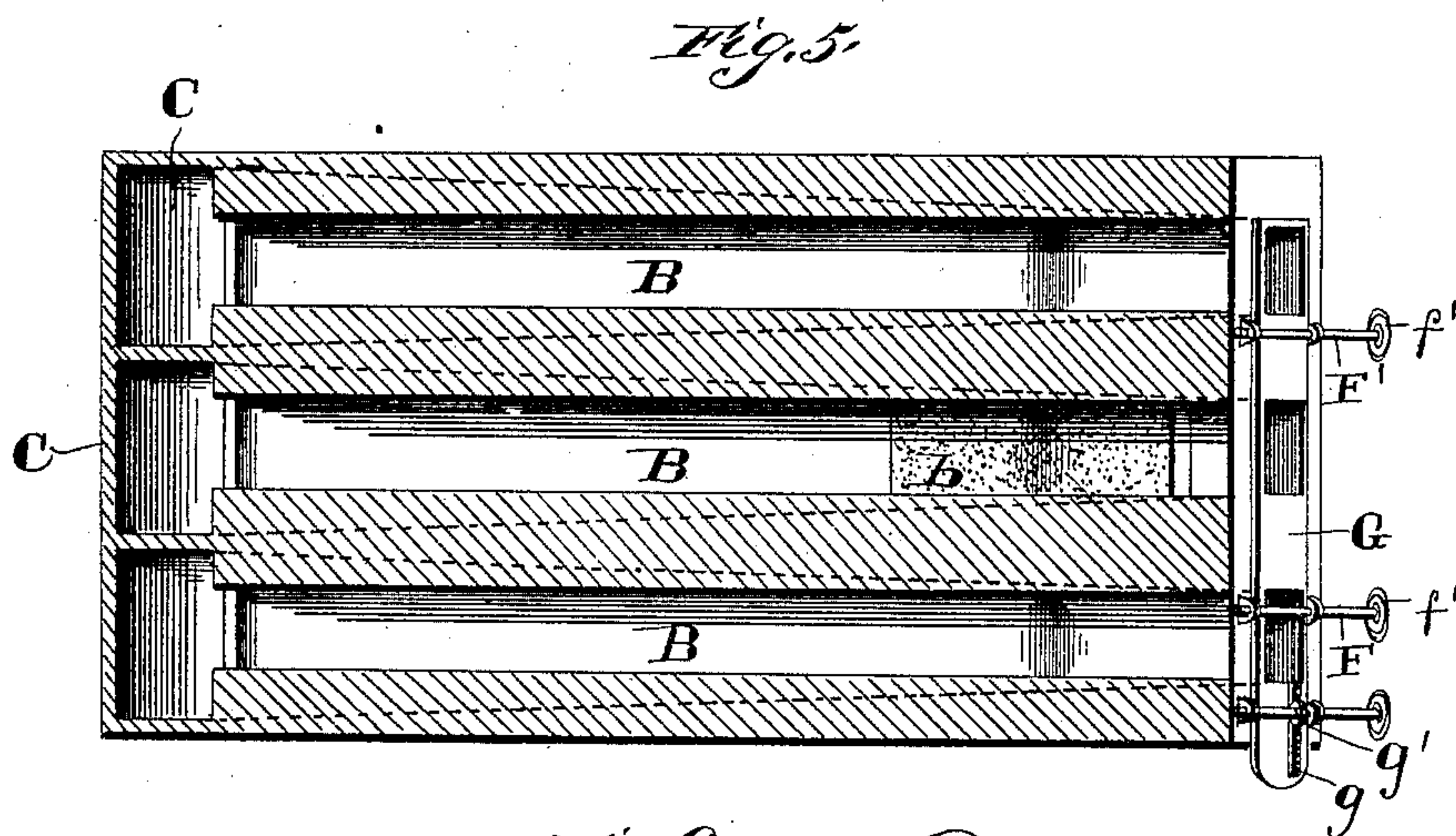
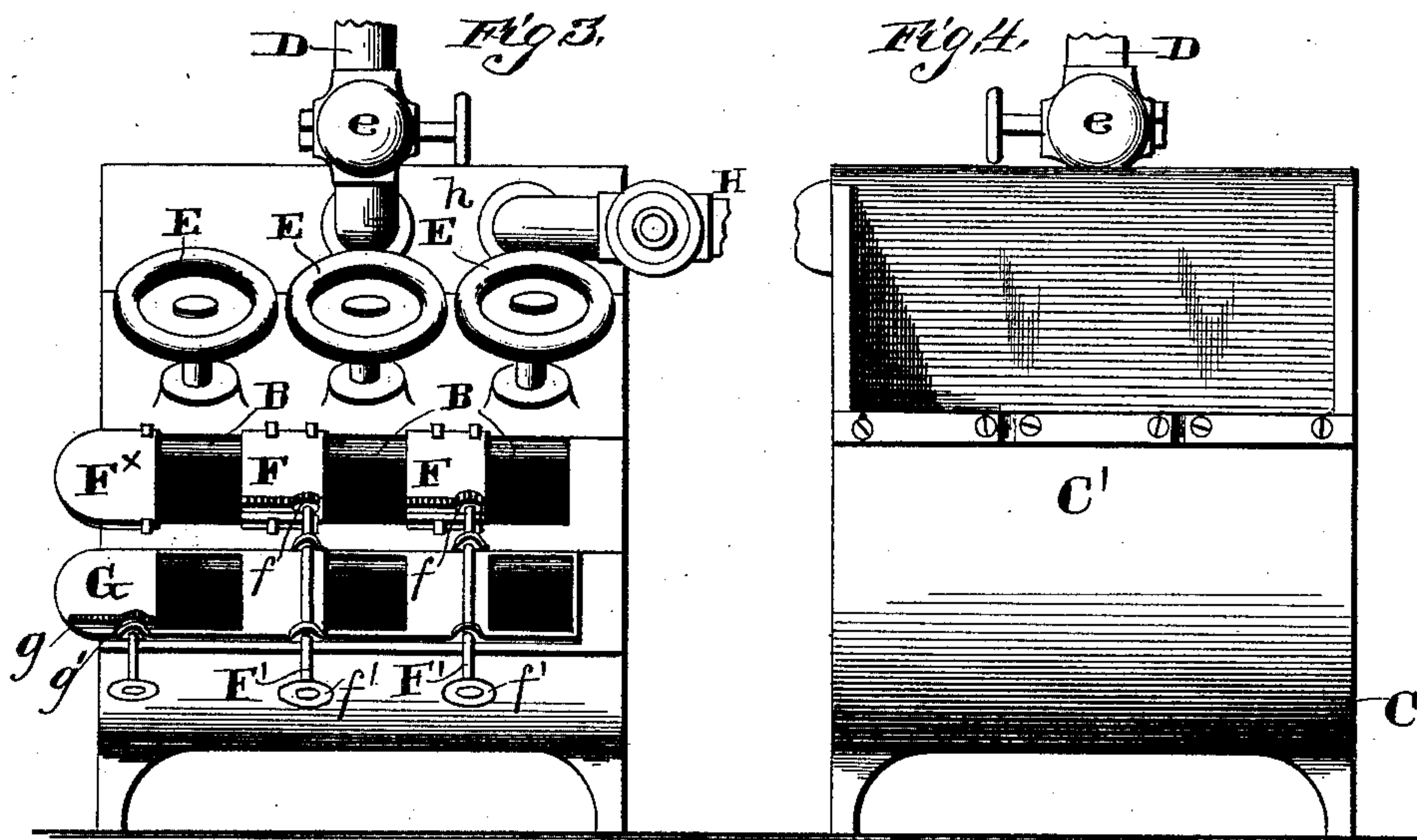
Thomas D. McClary
By his Atty
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(No Model.)

3 Sheets—Sheet 3.

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Fig. 7.

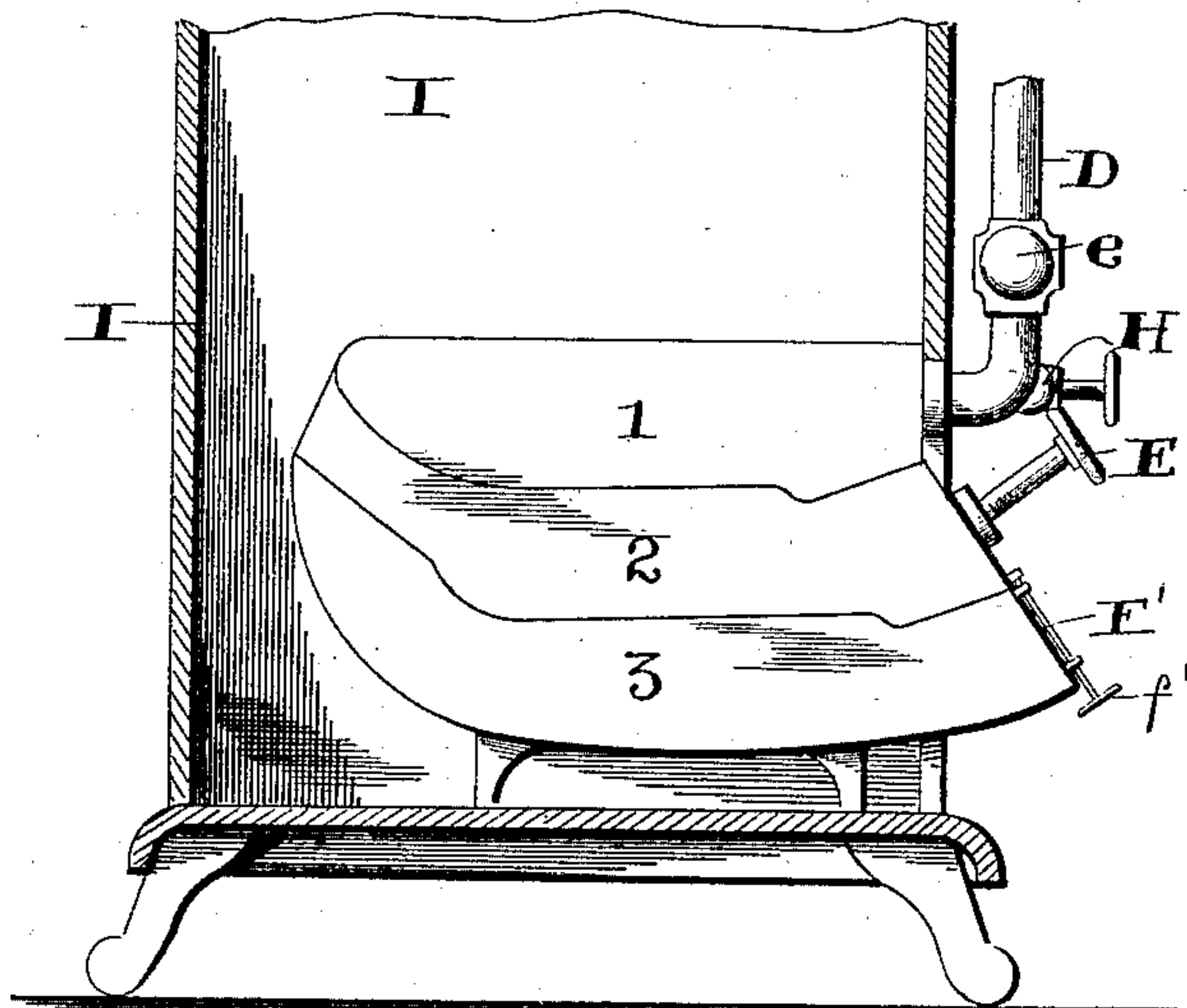
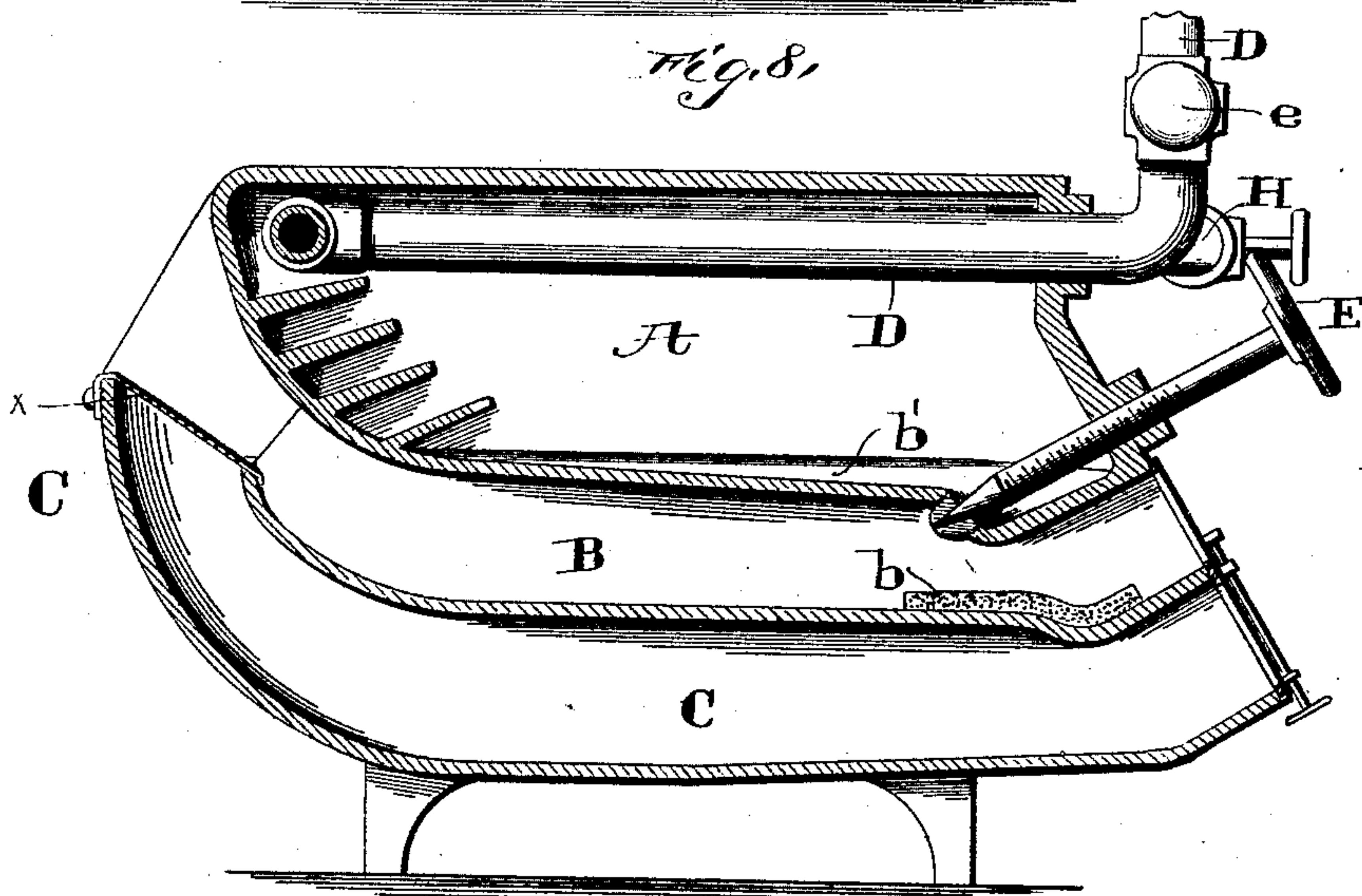


Fig. 8.



Witnesses

R. H. Paul
Edmund S. Clarkson

Inventor

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UNITED STATES PATENT OFFICE.

THOMAS D. McCLARY, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
TO GLEN W. COOPER, OF SAME PLACE.

VAPOR OR DECOMPOSING HYDROCARBON BURNER.

SPECIFICATION forming part of Letters Patent No. 437,310, dated September 30, 1890.

Application filed July 27, 1889. Serial No. 318,987. (No model.)

To all whom it may concern:

Be it known that I, THOMAS D. McCLARY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Vapor or Decomposing Hydrocarbon Burners; 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.

My invention relates to burners for vaporizing or decomposing and burning hydrocarbons, more especially that class or grade of petroleum products which is known as "kerosene," and which is very generally in use throughout the country for lighting dwellings and other buildings. Most of the devices now in use for this purpose are capable of burning only the lighter product, such as gasoline, &c. These products are very inflammable, and many serious accidents have resulted from their use, causing destruction to life and property.

My invention has for its object to provide a burner mainly for heating purposes, which will burn the heavier petroleum product kerosene or other analogous hydrocarbon, the use of which will give as good if not better results than the burners employing the lighter products.

My invention has also for its object to provide a burner which will burn either natural or manufactured gas, and which can be connected with gas-supply pipes and with an oil-supply, so that in case of failure of either fuel-supply the other can be instantly introduced into the burner with little or no loss of time.

The invention consists in certain constructions and combinations of parts.

One form of which I have contemplated embodying my invention is illustrated in the accompanying drawings, and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 is a longitudinal vertical section of a burner embodying my invention. Fig. 2 is a horizontal section on line $x x$, Fig. 1. Fig. 3 is a rear

and Fig. 4 is a front elevation. Fig. 5 is a horizontal section on line $y y$, Fig. 1. Fig. 6 is a perspective of the forward end of the oil-supply pipe. Fig. 7 is a sectional view of a stove with one of my burners in position therein, the sectional line of the stove being at one side of the burner. Fig. 8 is a section on line $z z$, Fig. 4.

My improved burner has at the top a heating and vaporizing or decomposing chamber A. An oil-supply pipe D enters this chamber at the rear end near the top of the chamber and extends forward to near the front wall of the same, where it is connected by a T-connection to the pipe D', extending at right angles thereto. This pipe D' is provided along its under side with a series of fine openings d , these being located, preferably, to the rear of the center of the pipe. The front wall of the chamber A is provided with shelves $a a' a^2 a^3$, extending transversely the whole extent of said wall. These shelves are preferably of such relative length that the shelf a' extends a little farther rearward than shelf a , and shelf a^2 extends a little farther rearward than shelf a' , and so on. The upper surface of the shelves preferably incline slightly toward the wall of the chamber, although good results can be obtained by having the surfaces of the shelves level. The upper shelf extends so far rearwardly that it will catch all the oil that will escape from the perforations in pipe D'.

The bottom of the chamber A is of the form shown, having adjacent to the rear wall the depression a^4 , the forward wall of the depressed portion being provided with three jet-orifices a^5 . A needle-valve E for each orifice passes through the rear wall of the chamber A. The valve-stem is preferably screw-threaded and engages screw-threads in the wall of the chamber or of a bushing inserted therein for advancing and retracting the valve. Beneath the chamber A are three passages B B B—one for each jet-orifice—which are open at each end and constitute the mixing-chambers. These passages or mixing-chambers conform in shape to the bottom of the chamber A, except that they are made of slightly less extent vertically near the front

of the burner. I prefer to provide the passages or mixing-chambers B B B with short portions of wicking b , of asbestos or other fibrous material, which are located so as to receive the liquid oil dropping from the jet-orifices a^5 . This fibrous material enables me to readily light heavy hydrocarbons or oils for the preliminary heating of the burner when it is desired to start the burner. The heavy oils cannot otherwise be lighted by ordinary means.

The main portion of the bottom of chamber A inclines from the rear forwardly, and I prefer to form the bottom of the said chamber over one of the passages B, as shown in Fig. 8, with a groove or depression b' , the bottom of which inclines slightly toward the jet-orifice, so that the oil admitted to chamber A may be drained from the chamber through the jet-orifice of this passage. It will be understood that each of the jet-orifices may have a like groove or depression leading to it, if preferred; but one, it is believed, will be all that will be found necessary, and I prefer that one of the jet-orifices near the center should be provided with this construction.

One of the difficulties experienced in burning heavy hydrocarbon oils and some of the natural gases is that such gases or the vapors of such oils contain so large an amount of carbon that a sufficient amount of air cannot be mixed with the gas or vapor in the mixing-chamber to insure complete combustion. In order to provide a sufficient amount of air for this purpose, I construct my burner with the passages C C C, one below each of the passages or mixing-chambers B B B. These passages conform to the general shape of the passages B, and are, like them, of greater area at the rear of the burner. They are of less vertical extent at the front of the burner, but are of increased extent laterally at that point. I prefer to construct them with their side walls following the dotted lines in Fig. 5. The bottoms of these passages at their forward ends curve upwardly, as at C' , so that such passages will discharge against the flame or volume of mixed air and gas or vapor issuing from the passages B B B. The discharge ends of the passages C C C are preferably covered by a plate x , of fine perforated metal or wire-gauze, as shown in Figs. 1, 2, and 8. This plate I prefer to secure by causing its lower or rearedge to enter notches or recesses in the partitions between passages B B B and by securing the forward or upper edge to the front of the wall C' of the air-passages C; but it may be secured in any other manner to suit the views of other constructors.

To regulate the amount of air admitted to the passages B B B, I provide sliding valves F^x F F, and I prefer to provide them with racks and operate them by shafts F' , having pinions f and hand-wheels f' ; but they may be constructed to be operated directly by hand, as shown in the instance of the valve

F^x in Fig. 3. The passages C C C are also provided with means for regulating the amount of air admitted to them. In this instance I have shown the burner as provided with a single sliding valve G for this purpose, and this is shown as adapted to be moved to effect the object desired by a rack-and-pinion construction $g g'$, similar to that employed in connection with the valves F F. It is obvious that the air-passages may be each provided with a single valve or that the mixing-chambers may be controlled by a single sliding valve, and also that other forms of valves may be employed. The construction shown secures good results, and I prefer to operate all of the valves by shafts having hand-wheels and connected with the valves by some means to insure their movement on turning the shafts.

In order that the burner may be adapted for burning gas as well as liquids, I provide the rear wall of the chamber A with a screw-threaded aperture h , which when the burner is used for liquids alone may be closed by a screw-plug, but with which a gas-supply pipe II may be at any time connected. For convenience in casting I generally construct my burner in three parts 1, 2, and 3, as shown in Fig. 7, making the passages in each of the two lower parts open at the top, and closing them by the bottom of the part above it.

In Fig. 7 the burner is shown in position in a heating-stove I. Such stove is provided with an aperture at the rear, through which a portion of the burner slightly projects, so that all the valves may be readily accessible. The front of the stove is open or provided with transparent material, (not shown,) so that the flame of the burner can be seen, and the stove is preferably provided with an exit for the products of combustion, having a slight draft in the direction of the arrow shown in the figure.

The pipe D is provided with a suitable cock e and the pipe H with a cock e' for controlling the same.

The operation of the device will be easily understood from the foregoing description. When it is desired to start the burner with the hydrocarbon liquid, a small quantity of the liquid is admitted to chamber A through pipe D and to the passages B B B through the jet-orifices d . It is then lighted at the wicks b and allowed to burn until the walls of the chamber A are heated to a sufficient degree to vaporize the oil within the chamber. The needle-valves will then be withdrawn and the vapor will issue from them into the mixing-chamber, where it will be mixed with air in the usual way and burn at the front of the burner above the ends of the passages B B B. An additional amount of air will be supplied through the passages C C C, which will be directed against the flame and will supply the needed amount of air for the combustion of the carbon of the vapor. The flame will impinge upon the front wall of the burner and raise the same and the shelves $a a' a^2 a^3$ to a

high degree of heat, so as to effectively decompose the liquid upon them. The air supplied by the passages C C C has the tendency to force the flame back against the front wall of the burner in a thin sheet, heating all parts of the same in an even manner. The supply of liquid to the pipe D' is regulated by the cock e.

The users of natural gas are often seriously inconvenienced by the sudden failure of the supply from some cause, and it is therefore desirable that the burner employed shall be adapted for the use of other fuel. By providing the burner with both pipes D and H and connecting them with the proper gas and liquid fuel supplies, in case of the failure of the gaseous fuel the liquid can be immediately admitted to the burner already heated by the gas-flame and the necessary fire secured without apparent interruption.

The provision for an additional air-supply makes the burner of great value as a burner for natural gas, as it is thereby enabled to consume substantially all of the carbon of the gas and avoids the deposits of carbon, which are a source of trouble and annoyance in many other burners. The burner has also the merit of securing the effective heating of the gas before it is brought to the point at which combustion takes place, thereby securing a greater economy in the consumption of the gaseous fuel. I have also contemplated the use of my burner in connection with a supply of water or other non-luminous gas, and at the same time admitting a small portion of oil to the vaporizing or decomposing chamber and burning the vapor with the heated gas whenever it may be desired to do so.

It will be understood that the burner may be constructed with one, two, or three or any other number of jet-orifices to suit the wishes of the users or constructors.

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

1. In a hydrocarbon-burner, the combination, with a heating and vaporizing or decomposing chamber, of a narrow mixing-passage extending along one side of the said chamber and deriving heat therefrom, said passage having an air and vapor inlet at one end and discharging at its other end against a wall of the said chamber, said discharge end forming the combustion-point of the burner, substantially as described.

2. In a hydrocarbon-burner, the combination, with a heating and vaporizing or decomposing chamber, of a mixing-chamber lying adjacent to one of the walls thereof, the said heating and decomposing chamber having a portion of its wall nearest the mixing-chamber provided with a sharp bend toward the mixing-chamber and an opening through the

bend communicating with the mixing-chamber.

3. The combination of the heating and vaporizing or decomposing chamber, the mixing-chamber, and the air-supply passage delivering air directly to the flame of the burner, substantially as described.

4. The combination, with the heating and vaporizing or decomposing chamber, of the mixing-chamber and the air-supply chamber having a series of discharge-apertures at different portions of the flame, substantially as described.

5. A hydrocarbon-burner composed of two or more sections superimposed one upon the other, the two lower being provided with passages from the rear to the front of the burner, the bottom of the top portion forming one wall of the passages in the section below and the bottom of this section forming one wall of the passages of the lower section, substantially as described.

6. In a hydrocarbon-burner, the combination, with a heating or vaporizing or decomposing chamber, of an adjacent mixing-chamber, and an air-supply passage discharging near the burning-point, and valves for controlling the admission of air to the mixing-chamber and to the air-supply passage, substantially as described.

7. A combined gas and hydrocarbon burner having a heating and vaporizing or decomposing chamber, a gas-supply connected with said chamber, a liquid-supply for said chamber, a mixing-chamber connected with said heating and vaporizing or decomposing chamber, and an air-supply passage discharging near the discharge end of the mixing-chamber, substantially as described.

8. A liquid-hydrocarbon burner having a heating and vaporizing or decomposing chamber, a mixing-chamber beneath the same, the said heating and vaporizing or decomposing chamber being provided with a jet-orifice opening into the mixing-chamber, and a wick of fibrous material beneath said jet-orifice, substantially as described.

9. A liquid-hydrocarbon burner having a heating and vaporizing or decomposing chamber having jet-orifices in a depressed portion at the rear of the chamber, the main portion of the bottom of the chamber inclining from near the said depression to a point forward of the same and having a narrow groove extending from the lower forward portion back to a jet-orifice, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS D. McCLARY.

Witnesses:

JOSEPH L. ATKINS,
S. G. HOPKINS.