(No Model.)

R. MORE, Jr.

HYDROCARBON BURNER.

No. 584,951. Patented June 22, 1897.

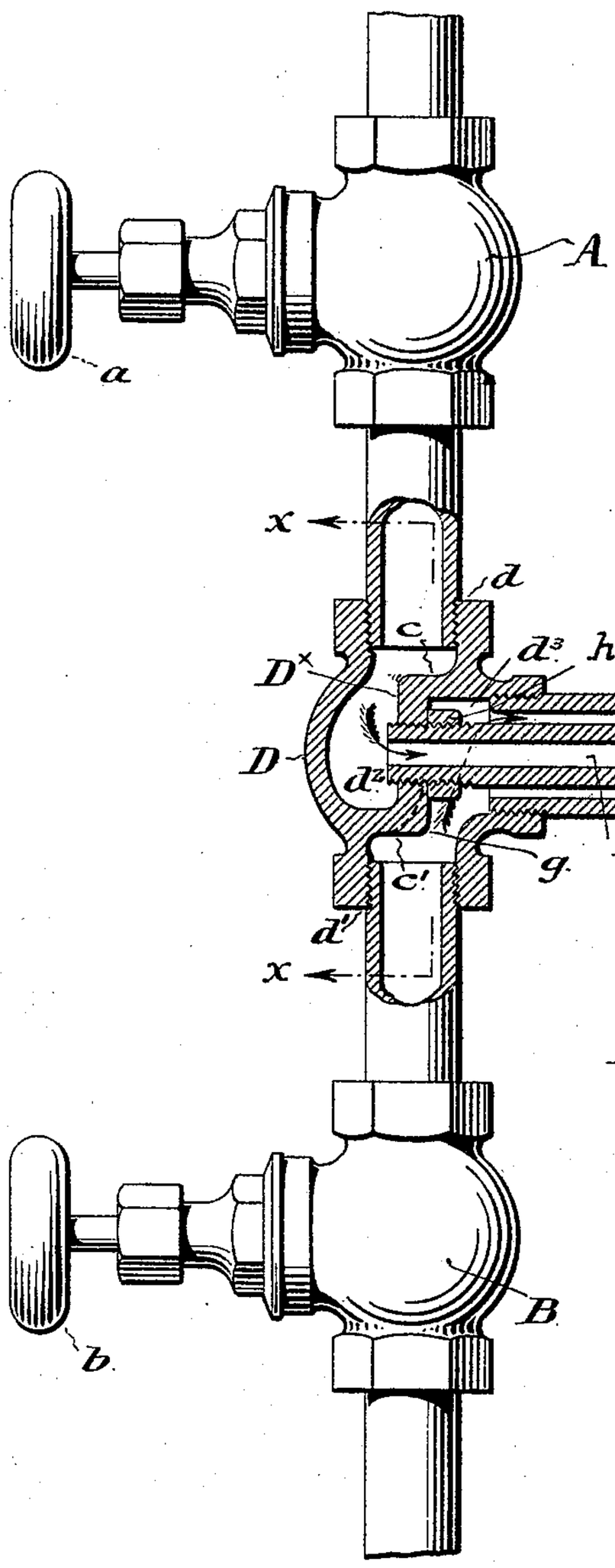

FIG. 1.

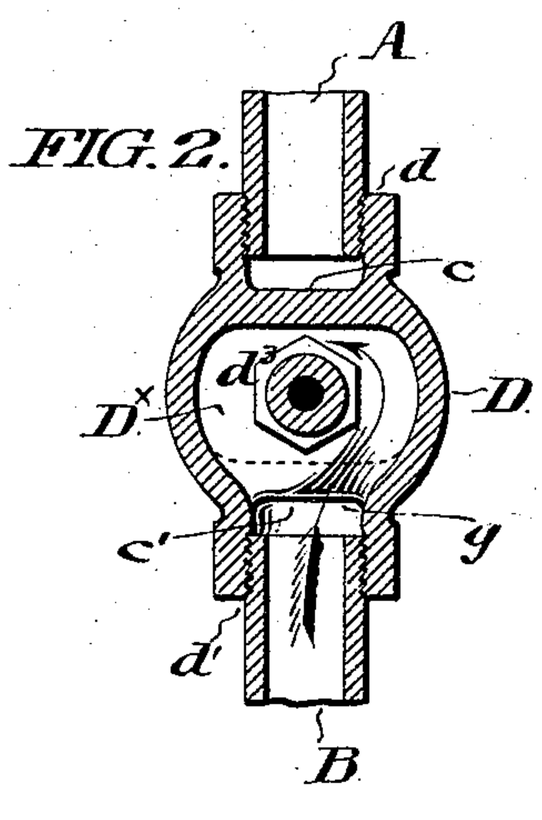

FIG. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

ROBERT MORE, JR., OF BRIDGETON, NEW JERSEY.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 584,951, dated June 22, 1897.

Application filed November 21, 1896. Serial No. 612,931. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MORE, Jr., a citizen of the United States, residing at Bridgeton, in the county of Cumberland, in the State of New Jersey, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

My invention aims to provide a hydrocarbon burner of a novel form, and so constructed and arranged that not only is a very perfect admixture of the oil and steam, compressed air, or other fluid, effected prior to their combustion, but also the flame remains close to the mouth or outlet of the burner, with the result that when the burner is set in position the flame will always exist at the same point in relation to its mouth, and consequently the location of an oven, crucible, or other object to be heated may be so fixed that it will uniformly receive the maximum heat.

In the accompanying drawings, I show and herein I describe a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 is a view in side elevation, partly in section, of a hydrocarbon burner, embodying a good form of my invention.

Figure 2 is a sectional elevation of the same, section being supposed on the dotted line *x*—*x* of Figure 1, and sight being taken in the direction of the arrows applied to said line.

In the accompanying drawings,

A indicates an oil supply tube, controlled by a cock or valve *a* of the usual construction.

B is a steam or compressed air supply tube controlled by a cock or valve *b* of the usual construction.

The tubes A and B in the form shown, lead to and are entered in and threaded with respect to the oppositely facing ports *d d'* of a shell or casting D, the interior of which is by a diaphragm $D^{\times}$ divided into two chambers d^2 d^3.

The oil tube A, as will be observed, opens through the port *d* into the oil chamber d^2, and the steam or air tube B opens through the port *d'* into the steam or air chamber d^3.

The body of the diaphragm $D^{\times}$ is shown as in line with the axes of the ports *d d'*, and is connected to the body of the shell or casting by two angular extensions *c c'*.

E is a burner tube, of considerable diameter, mounted in the wall of the casting D, and opening into the steam or air chamber d^3; F is an oil tube of considerably less diameter than the burner tube, supported within and in axial relation to said burner tube, being maintained in such position by the engagement of its inner end in a suitable opening formed for it in and extending through, the diaphragm $D^{\times}$, the result of this arrangement being that the inner end of the oil tube F opens into the oil chamber d^2.

As will be understood, the oil fed through the tube A will pass through the oil chamber d^2, and through the oil tube F, and emerge from the outer end of the latter, while the steam or compressed air fed from the pipe B will pass through the steam chamber d^3, and through the annular space between the burner tube and the oil tube, until it reaches the mouth of the oil tube, at which point it will commingle with the oil emerging therefrom.

As will be observed in Figure 2, the oil tube F extends horizontally through the center of the steam or air chamber, so that the entering volume of steam or air would tend, in the absence of provision to the contrary, to divide, with the result that half of the steam or air would pass to one side, and the other half to the other side of said tube, and thereupon said steam or air would ascend the burner tube in a direct forward movement.

I have found that by imparting to the steam or air a spiral movement as it passes along the burner tube, said steam or air will upon coming to the mouth of the oil tube very completely sub-divide the oil issuing therefrom, and commingle with it, such sub-division and commingling being very much more thoroughly accomplished than when the steam or air moves in a straight direction along the burner tube as hereinbefore referred to.

I impart this spiral movement to the steam or air by feeding a greater amount of it within the chamber d^3 on one side of the oil tube than on the other, and in the form of my invention shown in the drawings accomplish

this by forming a channel *g* of graduated depth in the corner or angle of the diaphragm $D^{\times}$ facing the entering volume of steam or air and to one side of the oil tube as shown in Figure 2, thus giving said diaphragm a partly spiral form.

As will be understood, the major part of the steam or air will enter the chamber d^3 in a direction tangential to it, and, as a result of the annular form of the channel through which the steam or air must pass to the point of combustion, the volume of steam or air thus entering the steam or air chamber will take on a regular spiral movement.

The burner tube E is, as shown in Figure 1, reduced in diameter in the usual manner, at a point in the vicinity of the mouth of the oil tube, to carry the volume of steam or air into contact with the volume of oil emerging from said oil tube,—said reduced portion of the burner tube being designated *e*,—and I provide said tube with an axial extension G preferably continuous of said reduced portion, and expanded to form a flaring or trumpet mouth.

In the operation of my hydrocarbon burner, the flame exists as to its base within the flaring or trumpet mouth of the burner tube, and produces a uniform and high heat.

Exactly what influence the trumpet mouth of the burner tube has upon the combustion taking place in the burner, I am unable to state; the fact however remains that by the use of this trumpet mouth extension the intensity and uniformity of the heat produced, and the steadiness of the flame and its proximity to the burner are all materially increased.

The proximity of the flame to the burner maintains the oil in the oil tube and in the oil chamber in a heated condition, thus increasing its fluidity, whereby the clogging of the bore of the oil tube, which is liable to occur where crude oil is used in a cold condition, is prevented, and the efficiency of the burner as a whole increased. In order to slightly retard the passage of the oil through the oil chamber and oil tube, and therefore hold it longer subject to the heating action of the flame of the burner before being used, I prefer to project the inner end of the oil tube slightly beyond the diaphragm, so that when the burner is held in a vertical position the oil must before it passes into the oil pipe and down through the latter, first surmount the end wall of said oil tube.

h is a lock nut mounted on the oil tube by which the oil tube may be firmly secured in any position of adjustment as will be understood, the oil tube may be adjusted to regulate the size of the passage between its outlet end and the inner wall of the burner tube E.

It will of course be understood that the precise form and arrangement shown in the accompanying drawings, and herein described constitutes simply the preferred embodiment of my invention, and that numerous modifications of mechanical construction may be made without departing from the spirit of my invention.

Having thus described my invention, I claim—

1. In combination with the steam or air and oil supply pipes, a shell or casting into which said pipes discharge, a diaphragm extending through said shell or casting, said diaphragm serving to divide the interior of the casting into two chambers, a burner tube leading from one of said chambers, an oil tube mounted within said burner tube, and leading from the other of said chambers, said diaphragm being so formed or arranged that it exists in front of the mouth of the air or steam tube, and is as to part of its structure of spiral form, so as to impart spiral motion to the steam or air, substantially as set forth.

2. In combination with the steam or air and oil supply pipes, a shell or casting into which said pipes discharge, a diaphragm extending through said shell or casting and permanently connected to it, said diaphragm serving to divide the interior of the casting into two chambers, a burner tube leading from one of said chambers, an oil tube mounted within and concentric with respect to said burner tube, leading from the other of said chambers, and a channel or groove formed in the diaphragm at one side of the oil tube and in front of the steam or air supply pipe, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 13th day of November, A. D. 1896.

ROBT. MORE, JR.

In presence of—
J. BONSALL TAYLOR,
THOS. K. LANCASTER.