J. MUSGRAVE.
Vapor-Burner.

No. 198,411. Patented Dec. 18, 1877.

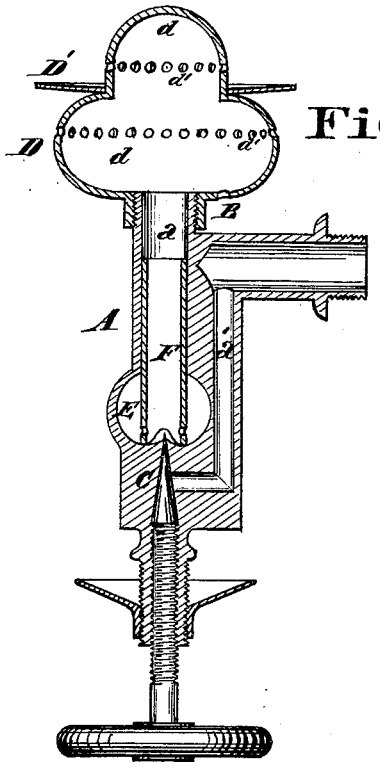

Fig. 1.

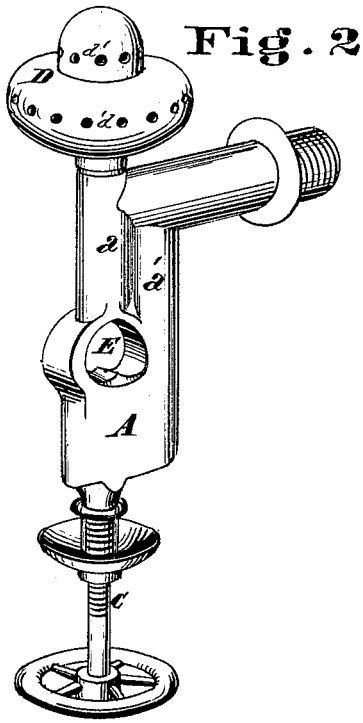

Fig. 2.

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JAMES MUSGRAVE, OF CINCINNATI, OHIO.

IMPROVEMENT IN VAPOR-BURNERS.

Specification forming part of Letters Patent No. **198,411**, dated December 18, 1877; application filed August 14, 1877.

To all whom it may concern:

Be it known that I, JAMES MUSGRAVE, M. D., of Cincinnati, Hamilton county, State of Ohio, have invented a certain new and useful Improvement in Gas or Gasoline Heating Burners, which improvement is fully set forth in the following specification and accompanying drawing, in which—

Figure 1 is a vertical central section of my burner, and Fig. 2 is a perspective view.

The object of my invention is to give the burner such a construction as to obtain a great area of flame from a small burner and effective disposition of jets, and the largest amount of heat possible from the gas or gasoline consumed, and such as to enable the heating of it before it reaches the exit by inexpensive means, and, in addition, such as to render the burner convertible from a gasoline-burner to a gas-burner.

My invention consists, first, in constructing the burner with two chambers of unequal sizes, and of peculiar shape, each with a row of jet-apertures, for the purpose of obtaining a great area of jet-surface, and such a disposition of the jets and current of gas within this area that each set of jets will assist in the efficient production of heat by the other; second, in the combination, with the double-chamber burner, of an annular plate or washer placed over the upper chamber between the two rows of jets, so that it causes the spreading and intermingling of the jets; third, in the formation of the burner-case in one piece, with vapor-passages in opposite directions and close proximity, and, in connection therewith, the provision of a jet playing upon the descending passage, so that heat is directly conducted to a long stretch of pipe, through which the fluid has to pass before it reaches the burner proper; fourth, in the combination, with the gasoline-burner, of a detachable and adjustable tube, which not only converts the burner into a burner for ordinary street or other gas, but regulates the supply of air necessary for it, so as to produce the desired result.

A is the case or shell of the burner. It is cast or otherwise formed with two passages, *a a'*, close together, and conveying the fluid in opposite directions, so that the heat communicated by conduction from the burner down the pipe *a* will be directly conducted to the metal around passage *a'*, and be used to generate the gas from the fluid. To further provide for the heating of the pipe *a'*, I play upon its upper end with a jet, B, of flame from the lower part of the burner.

C is the valve for regulating the bent for the the supply of the gas or gasoline to be consumed, and D represents the burner. The burner has two chambers, *d d*, one of greater diameter than the other, and each provided with a row of jets, *d'*, which materially assist each other, and give a great extent of flame of great power and efficiency for heating purposes, the upper one of the two chambers *d* being of the configuration shown, so that it is really a chamber distinctly separate in function from the lower one, acts to check the upward current of gas and retain it, so that it becomes heated, and, as the escape at the upper jets is insufficient, the return-current is directed by the sides of the chamber directly downward, and not toward the lower jets.

By the use of the two chambers, therefore, the current is eddied, so that its escape by the jet-apertures is obstructed sufficiently to enable it to acquire a high temperature, and thereby give a more perfect combustion than has heretofore been obtained.

As a whole, the burner is very efficient in the generation and application of heat to cooking-vessels or steam-generating vessels, for which purposes it is principally designed. I prefer to interpose between the two rows of jets the flange or washer D', to spread the jets, and also to scatter and intermingle them, assisting in the combustion, and purifying and intensifying the flame. Under the pipe *a*, and immediately over the vapor-vent of the valve C, a side opening, E, is made in the burner-shell for the admission of air.

In using the burner for gasoline the opening is left unobstructed, as shown in Fig. 2; but for street or other gas, I introduce a pipe, F, and to provide for its control of the admission of air and change in amount admitted, I make the lower end of the tube fish-mouthed, as shown, and chamfer off the edge of the opening E at the bottom on each side. When the pipe F is in the position shown in Fig. 1, it admits the maximum amount of air. When

turned a quarter of a revolution it admits the least amount, as the lips of the fish-mouth fall over the chamfered bottom of the opening E. By the slight rotation of this tube F, therefore, the supply of air may be adjusted.

It is obvious that this burner can be used with street-gas as well as gas or vapor evolved from gas or gasoline machines, or with gasoline for any purpose in which an application or use of heat is desired.

I claim—

1. The burner D, having two chambers, *d d'*, of unequal diameters, each having a ring of jets, the lower chamber having a configuration giving a flat top for the upper jets to play over, and the upper chamber having a cylindrical portion with the jets in, surmounted by a semispherical dome, to give direction to the current, substantially as and for the purpose specified.

2. In combination with the burner D, having two chambers of unequal size, and each a ring of jets, the interposed detachable flange or washer D', substantially as and for the purpose specified.

3. The burner-case A, having opposing passages *a a'* within one shell or casting, in combination with a burner having a heating-jet, B, for the descending pipe *a'*, substantially as and for the purpose specified.

4. In combination with the burner-case A *a*, having side opening E, the adjustable fish-mouthed tube F, connected and operating substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand this 10th day of August, 1877.

JAMES MUSGRAVE, M. D.

Witnesses:
VINCENT SCHWAB,
JOHN WAGGONER.