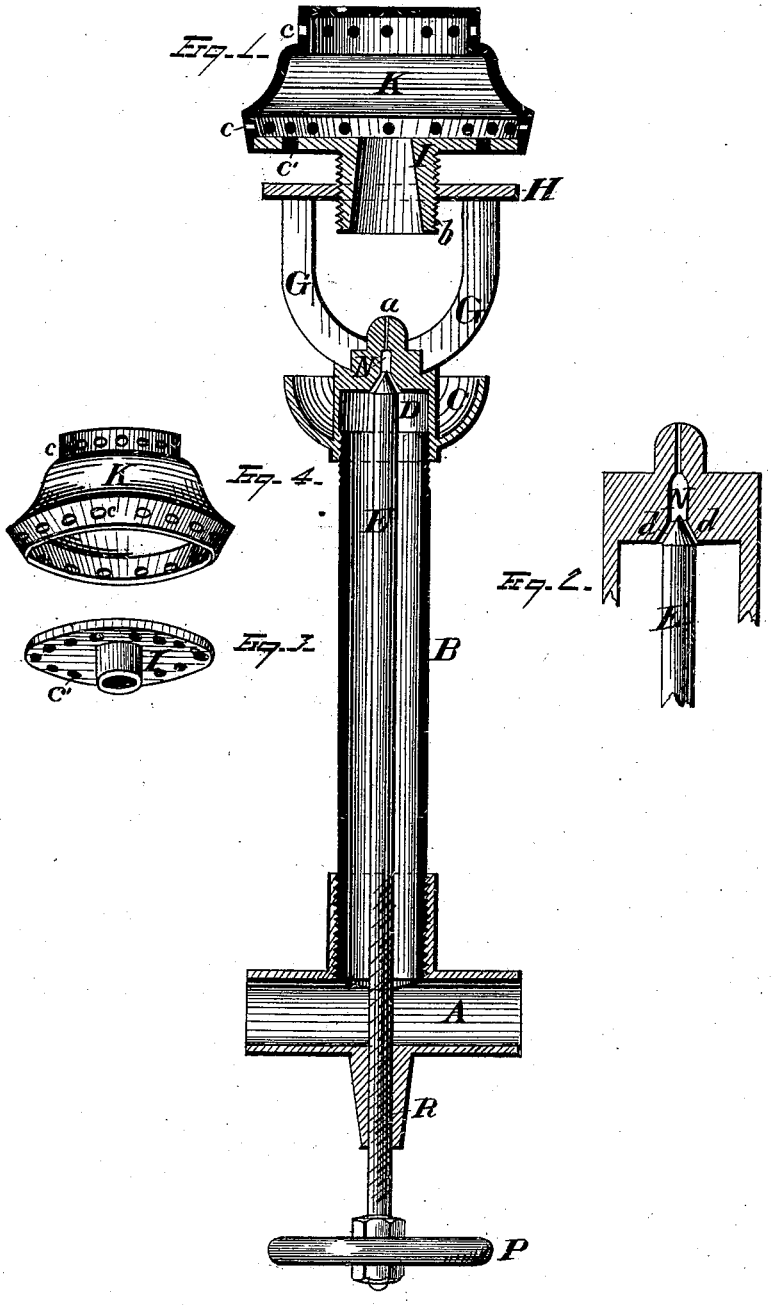
G. W. CLOUGH.

VAPOR-BURNER.

No. 188,283. Patented March 13, 1877.



WITNESSES

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GEORGE W. CLOUGH, OF CLEVELAND, OHIO, ASSIGNOR TO HIMSELF AND WM. W. DAVY, OF SAME PLACE.

IMPROVEMENT IN VAPOR-BURNERS.

Specification forming part of Letters Patent No. **188,283**, dated March 13, 1877; application filed November 18, 1876.

To all whom it may concern:

Be it known that I, GEORGE W. CLOUGH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vapor-Burner; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in vapor-burners; and consists, first, in providing such burners with an expansion-chamber, situated between the outlet and the vaporizing-chamber, whereby a more steady and even flow of the vaporized hydrocarbon fluid is secured.

It also consists in an adjustable plate, which forms the lower part of the burner, whereby the character of the flame can be determined.

It further consists in such parts and combinations as will hereinafter be more fully set forth and claimed.

In the drawing, Figure 1 represents a sectional view of a vapor-burner embodying my invention. Fig. 2 is an enlarged view of that part of the burner embracing the expansion-chamber. Fig. 3 is a detached view of the adjusting-plate. Fig. 4 is a similar view of the perforated combustion-cap.

A is a pipe, which leads from and is connected with an elevated reservoir, (not shown in the drawing,) whence the gasoline or hydrocarbon fluid comes for burning, in the ordinary well-known manner. Connected with said pipe A is the vertical tube B, the upper part of which forms the vaporizing-chamber D. Around said part of the tube B is situated the primary heating-cup C. Above the vaporizing-chamber is placed the expansion-chamber N, from which leads the passage or outlet *a*. The sides of said chamber are beveled or funneled at their lower end, as shown at *d*, and the angle of said bevel is made to correspond with that of the tapering part of the screw-pin valve E, so as to secure a very tight and close fit, in order to effectually prevent leakage. The lower part of the rod of the valve E is screw-threaded, which works in the female screw in the projection R. Said rod is provided with a hand-wheel, P, or other suitable device, by which the supply of the vaporized fluid is regulated. As it is turned in either one or the other direction, the tapering or pin-pointed valve E is lowered or elevated, and thereby an annular space at *d* is formed, or enlarged, contracted, or entirely closed, thus permitting or cutting off the flow of the fluid. H is the top plate, provided with a central opening. It is supported on the arms G G, which rise from the sides of tube B, at the top thereof, and serve to establish a free open space between the mouth of the outlet *a* and the burner, for the purpose of securing combustion. I is the adjusting-plate, provided with a downwardly-projecting guide-pipe, *b*, screw-threaded on the outside, whereby, in connection with the screw-threaded opening of the top plate H, said adjusting-plate I can be elevated or lowered relatively to said top plate. The guide-pipe *b* is situated directly over the outlet *a*, from whence the vaporized fluid passes, through said guide-pipe, into the perforated combustion-cap K. Said adjusting-plate is also provided with a circle of openings or jet-apertures, *c'*.

The object in making the plate I adjustable is to secure in all cases a blue or heating flame. This I have found by experience cannot be obtained in all cases unless the burner is capable of adjustment; but with this improvement the desired result can be reached in all instances, as any difficulties resulting from slight variation in the mechanical construction of different burners, which would, without my improvement, prevent the attainment of a blue or heating flame, can with it, by simple adjustment of the plate I up or down, be at once overcome. K is the perforated combustion-cap, provided with one or more series or circles of jet-apertures, *c*. It fits to the periphery or sides of plate I loosely, so that it can be taken off or removed when desired. One advantage thereby secured is, that in case the opening or outlet *a* becomes clogged or stopped up, the instrument by which to clear it can be passed through the tube *b* from above, in a line with the axis of outlet *a*, thus

diminishing the liability of injury to the outlet, as well as facilitating its cleaning.

By means of the expansion-chamber N a very steady and even flow of the vaporized fluid through the outlet *a* is secured, and any of the fluid which escapes vaporization in the chamber D, and enters the expansion-chamber N, is vaporized therein, so that by this improvement a thorough vaporization of the gasoline or hydrocarbon fluid is secured.

The operation of the device is as follows: The gasoline or hydrocarbon fluid enters the tube B by hydrostatic pressure. To light the burner, turn the wheel P so as to open the valve E. This will cause a jet of fluid to pass through the opening *a* into the combustion-cap K, striking against the roof or top thereof. The fluid will run down into the cup C, and when the same is about half full, close the valve E to stop the flow. Then light the fluid in the cap and let it burn out. This operation heats the upper part of tube B sufficiently to cause vaporization of the fluid to take place in the chamber D thereof. Now, when the valve is opened again the vaporized fluid passes into the combustion-cap, and issues at the jet-apertures *c c c'*, where, when lighted, it burns with a blue flame, which can be regulated as desired by opening the valve more or less. The vaporized fluid that passes from the interior of the combustion-cap K through the jet-apertures *c'* issues between the top plate H and adjusting-plate I, and burns with a blue flame, which forms a continuous sheet around the burner. The heat from the top plate H and from the burner is transmitted, by the arms G and by radiation, to the upper part of tube B to a sufficient extent to continue the vaporization of the gasoline in the chamber D, which was secured, in the first instance, by the direct application of heat by means of the cup C.

Any number of these burners may be connected with and supplied by the same reservoir, limited, of course, only by the capacity of the latter.

The interior of the guide-pipe *b* is preferably made tapering, with the smaller end opening into the combustion-cap K.

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

1. The combination, with the combustion-cap K, of the adjusting-plate I, the latter constructed with guide-pipe *b*, substantially as and for the purpose set forth.

2. The combination, with perforated adjusting-plate I, of the combustion-cap K, removably secured to the outer edge of said adjusting-plate, substantially as and for the purpose forth.

3. In a vapor-burner, the adjusting-plate I, provided with guide-pipe *b* and jet-apertures *c'*, substantially as described.

4. The combination, with plate H, of the perforated adjusting-plate I, provided with guide-pipe *b*, substantially as and for the purpose set forth.

5. In combination with the vaporizing-chamber D, expansion-chamber N, and screw-valve E, the adjusting-plate I and removable cap K, substantially as and for the purpose described.

6. The combination, with the vaporizing-chamber D, expansion chamber N, and screw-valve E, of the adjusting-plate I, top plate H, and removable combustion-cap K, substantially as described.

7. The combination, with the vaporizing-chamber D, expansion-chamber N, screw-valve E, and primary heating-cup C, of the adjusting-plate I, top plate H, and removable combustion-cap K, substantially as described.

8. The combination, with the vaporizing-chamber D, expansion-chamber N, screw-valve E, and primary heating-cup C, of the arms G G, adjusting-plate I, top plate H, and removable combustion-cap K, substantially as described.

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

GEORGE W. CLOUGH.

Witnesses:

FRANCIS TOUMEY,

EDWARD WALSH.