C. E. ROBINSON.

Atomizers for Burning Hydrocarbon.

No. 158,316. Patented Dec. 29, 1874.

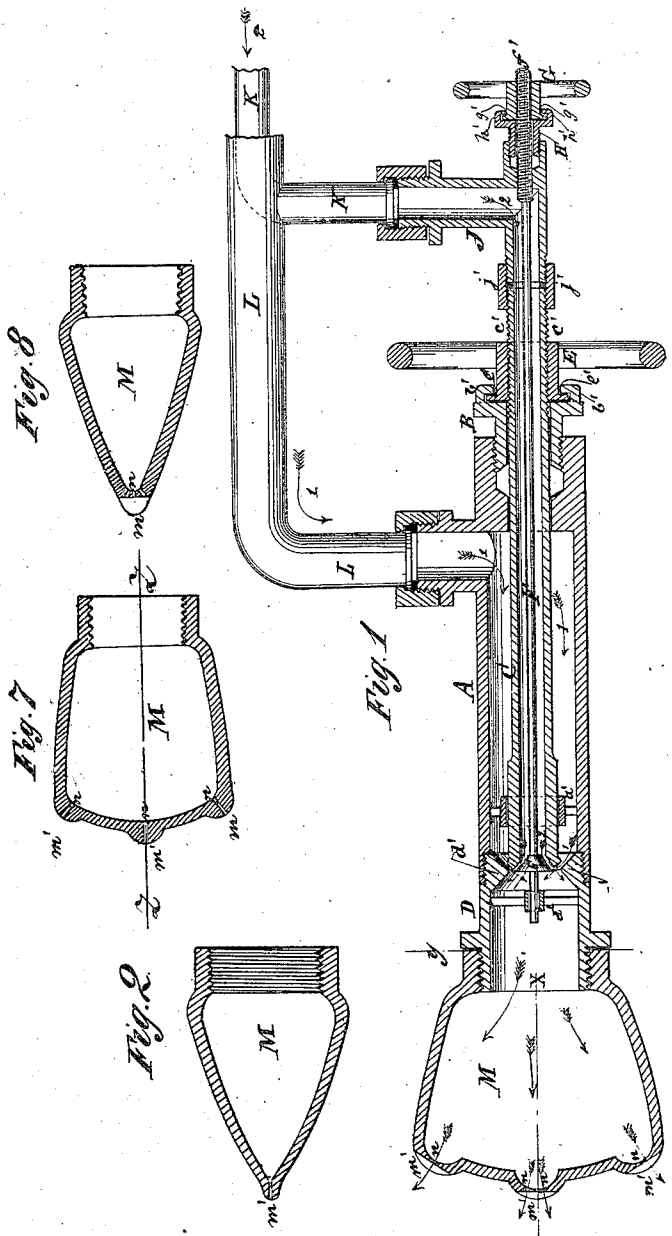

Fig. 1

Fig. 8

Fig. 7

Fig. 2

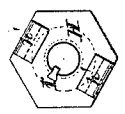

Fig. 5

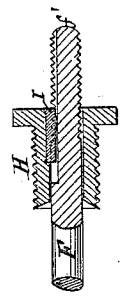

Fig. 6

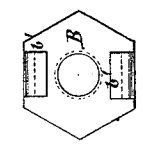

Fig. 4

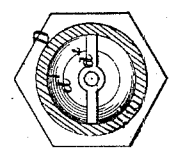

Fig. 3

Witnesses:

G. H. Richardson

Wm. H. Morris

Inventor:

Chas. E. Robinson

UNITED STATES PATENT OFFICE.

CHARLES E. ROBINSON, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND GEORGE M. CHURCH, OF SAME PLACE.

IMPROVEMENT IN ATOMIZERS FOR BURNING HYDROCARBON.

Specification forming part of Letters Patent No. **158,316**, dated December 29, 1874; application filed December 12, 1874.

To all whom it may concern:

Be it known that I, CHARLES E. ROBINSON, of the city of Brooklyn, in the county of Kings and State of New York, have invented an Improved Atomizer, of which the following is a specification:

My invention consists in the construction and combination of the liquid or oil valve and the gas or steam valve in an atomizer in such a manner that, while the steam-valve surrounds the oil-valve, both may be adjusted independent of each other, to regulate the quantitative proportion of the oil and steam jets, the outer valve being so arranged, with respect to the valve-seat, that the oil and steam, in issuing from their respective valves, will form jets of the shape of thin, hollow cones inverted toward each other and intersecting each other, thereby insuring their thorough mixture and atomization. It further consists in the combination of the valves with the induction-pipes, and also the adjustment for the valves, as will be hereinafter described with reference to the accompanying drawing, in which—

Figure 1 is a longitudinal section of an atomizer constructed according to my present invention. Fig. 2 is a detail section of the burner, taken through the line *x x* of Fig. 1. Fig. 3 is a cross-section taken through the line *y y* of Fig. 1. Figs. 4 and 5 are end views of the stuffing-boxes for the steam and oil valves, respectively. Fig. 6 is a detail longitudinal section of oil-valve stem and stuffing-box. Fig. 7 is a detail section of a modification of the burner. Fig. 8 is a section of the same taken through the line *z z* of Fig. 7.

Similar letters of reference indicate corresponding parts in the several figures.

A is a tube closed in one end, and there provided with the stuffing-box B for tightening around the stem of the steam-valve, which, at or near the other end, is guided in a bridge-piece, *a'*, formed in or attached to the tube A. C is the steam-valve, consisting of a tube, one end of which is turned conical outside to form the steam-valve surface proper, and also conical inside to form the seat for the oil-valve. D is a short tube joining by screw-threads the tube A to the burner. In this tube D is provided the seat d^1 for the valve C, and also a bridge-piece, d^2, for guiding the elongated stem of the oil-valve. The stem of the steam-valve C is threaded, at *c'*, on the outside a distance from its outer end for the reception of a hand-nut, E, provided with a circular flange, *e'*, which revolves in lugs *b'* formed on the stuffing-box B. The hand-nut E being thus held in position onto the stuffing-box B, a turning of the same on the threads of the valve-stem C will cause the latter to slide back or forth, as the case may be, thereby regulating the size of the steam-valve opening at d^1, and consequently the quantity of steam required to atomize the oil. F is the oil valve and stem working inside of the steam valve and stem C. It is threaded at *f'* a distance from its outer end, and regulated by the hand-nut G, having a circular flange, *g'*, revolving in lugs or cleats, *h'*, on the stuffing-box H in a manner exactly similar to that above described of regulating the steam-valve C. To prevent the stem of the oil-valve F from turning with the nut, (whereby the necessary sliding motion would be defeated,) a key, I, is fastened in the stuffing-box H, and fits in a groove provided in the end *f'* of the valve-stem F. The stuffing-box H is secured at the end of a T-joint, J, forming an elongation to the pipe C, to which it is united by an ordinary pipe fitting, *j'*. K is the oil-supply pipe, and L the steam-supply pipe. For heating the oil, its pipe K is carried for some distance inside of the steam-pipe L until it branches off to the T-joint J and atomizer, the steam-pipe L being secured by coupling to the tube A, and the oil-pipe K being secured as well to the pipe L as to the T-joint J, and the latter being firmly secured to the valve-stem C. This last is therefore prevented from turning with the hand-nut E, while the distance, from the atomizer to the portion of the steam-pipe parallel thereto, is made sufficiently large to allow them to spring and yield so as not to interfere with the sliding motion of the valve C when being adjusted. The passage of the steam is indicated on the drawing by arrows 1, and that of the oil by arrows 2. The oil being forced in by steam-pressure from a separate steam-pipe, and the valve-

openings at F C d^1 being of the shape of two hollow cones inverted toward each other, the jets of oil and steam must assume the shape corresponding, and, intersecting each other, become most thoroughly atomized and mixed before entering the burner. M is the burner, made, preferably, of the shape shown in the drawing.

In order to secure the most economical and effective combustion of the atomized oil and steam for fuel in a furnace, I construct the openings in the burner as follows: I make a fine slit or cut, m', either lengthwise, as shown in Figs. 1 and 2, or crosswise, as shown in Figs. 7 and 8, and not quite through the thickness of the metal in the burner M. In the bottom of the cut m' I then make one or more very small holes, n. By now closing the slits partially, so that the thickness of the cut will be less than the diameter of the holes n, the gas-jets issuing through the holes n will be flattened out and spread in the slits m', leaving the burner as thin flames of intense heat.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an atomizer, the combination of a valve-seat, d^1, and the valves F C, one placed inside of the other, and both adjustable by means of the hand-nuts E G, in the manner substantially as specified.

2. The combination of the valve F, the tubular valve C, the valve-seat, and the pipes A, L, and K, substantially as and for the purpose described.

3. The combination of the stuffing-box H, having lugs h', with the key I, valve-stem f', and hand-nut G, substantially as and for the purpose described.

CHAS. E. ROBINSON.

Witnesses:
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