(No Model.)

W. METZINGER.

VAPOR BURNER.

No. 382,892. Patented May 15, 1888.

Fig. 1.

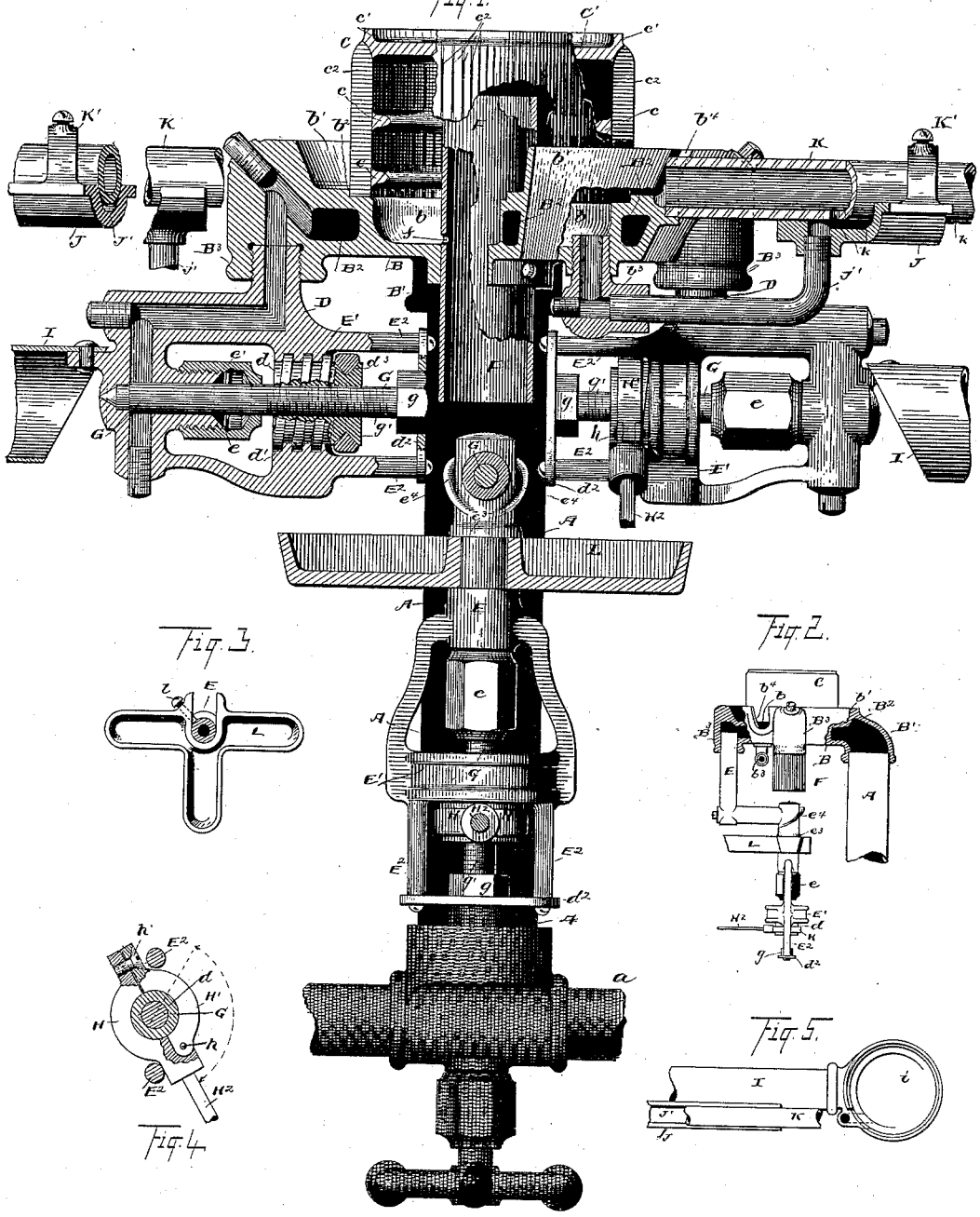

Fig. 3.

Fig. 2.

Fig. 4.

Fig. 5.

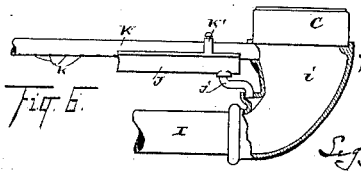

Fig. 6.

WITNESSES
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WILLIAM METZINGER, OF CLEVELAND, OHIO.

VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 382,892, dated May 15, 1888.

Application filed June 17, 1887. Serial No. 241,621. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM METZINGER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vapor-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 pertains to make and use the same.

My invention relates to improvements in vapor-burners; and it consists in certain features of construction and in combination of parts, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation, partly in section, of a vapor-burner embodying my invention, portions being broken away to reduce the size of the drawings and to show the internal construction. Fig. 2 is a reduced side elevation, partly in section, of a portion of the construction shown in Fig. 1. Fig. 3 is a plan of the lighting-cup. Fig. 4 is a detail of clutch connected with the valve mechanism. Figs. 5 and 6 are respectively plan and elevation in detail, hereinafter described.

A represents the stand-pipe connected at the lower end with the supply-pipe *a*, both of ordinary construction.

B is the retort or generator, having a cap-like rearward projection, B′, that is screw-threaded internally to receive the upper end of the stand-pipe, the latter by means of a duct leading through the cap being in open relation with the generating-chamber B^2, the said chamber being cored in the walls of the retort. The retort has an upwardly-projecting rim, *b*′, with an internal ledge recessed at b^2 to form a seat for the burner C. Directly under the burner the retort at *b* is substantially cup-shaped. The shell of the burner is cylindrical, with internal ribs, *c*, and imperforate cap C′, and upwardly-projecting rim *c*′. A series of narrow slits, c^2, is made through the burner-casing, the said slits extending from top to bottom of the casing proper, but leaving the rib *c* intact. With this arrangement of parts the burner is sufficiently strong for all practical purposes, and the jets of flame from the lower portions of the slits are made to impinge the rim *b*′, by means of which the retort is kept intensely heated. The rim *c*′ of the burner forms a shield between the cap C′ and the flame, and thus directs the flame outward and away from the cap C′, thereby preventing the latter from being overheated. Without such protection the cap would be kept nearly at a white heat, and would so be burned out, as is frequently the case with various other forms of burners. A central hole is made through the bottom wall of the retort to receive the upright commingling-tube F, the latter having a drip-hole, *f*, in position to drain the cup *b* of the retort. The retort has any desired number of depending bosses, B^3, the same being bored and screw-threaded internally, the one for receiving an arm, E, and the other for receiving the different arms D, the former for supplying gasoline or vapor for initial heat and for supplying the top burner, and the latter for supplying heat to the side burners.

The manner of drilling and plugging the arms to form continuous ducts leading from the chamber B^2 to the various needle-valves is well known, and is clearly shown at the left hand in Fig. 1, a description thereof in detail being considered unnecessary. The only novel feature connected with these arms is the valve mechanism, the latter being alike in the different arms, except that the valve and jet-orifice of the arm E open upwardly while those of the arms D open laterally; but this difference in the position of the valve is caused by the different shapes of the arms. (See Figs. 1 and 2.)

Each arm E and D has a thimble, E′, and legs E^2 cast integral therewith, the thimbles being screw-threaded internally for engaging screw-threads or worm made externally on the sleeve *d*, the legs E^2 being connected with and made to support a cross-bar, d^2. This cross-bar has a hole made to receive with an easy fit the head *g* of the needle-valve G. This head has an irregular form to correspond to the shape of the opening in the cross-bar, so that it may move endwise in the latter, but not laterally. A head or enlarged part of the needle-valve is not essential for this purpose, but is advisable on account of the small size of the needle-valve. The needle-valve has a screw-threaded portion, *g*′, for engaging the corresponding internal thread of the sleeve *d*. The external threads, *d*′, of the sleeve have quick lead, and are, perhaps, more properly

called a "worm," and as the aggregate lead of the internal and external threads is utilized in shifting the valve endwise the sleeve *d* need be rotated only a short distance for the purpose. The outer end of the sleeve has an annular external groove, d^3, the groove forming a seat for the clamp H, the latter being shown more clearly in Fig. 4. The clamp has two jaws, H and H′, pivoted together at *h* and secured at the other end by a screw, *h*′. The clutch operates the sleeve by friction, and by means of the screw *h*′ the clutch may be adjusted to bring the handle H^2 in the desired position, the legs E^2 forming stops to limit the movement of the clutch in either direction. A stuffing-box, *e*, is provided with cap *e*′ for packing the needle-valve. With the ordinary screw-threaded needle-valve, by reason of the rotative movement of the valve as it engages the valve-seat, the latter is abraded and soon worn away more or less, thereby injuring and enlarging the jet-orifice, to avoid which a lever movement has sometimes been arranged to operate the needle-valve. With the lever attachment it is difficult to nicely gage the valve, as the latter is moved endwise but a trifle from its closed position to a full opening. With my improved mechanism, already described, both these difficulties are overcome. The valve, being held from turning, does not grind out the valve-seat, and by means of the screw-threaded devices and handle the valve is quickly operated and can be nicely adjusted.

The commingling-tubes I, leading to the extreme burners, are old, and therefore need not be described. Only the extremes of these tubes are shown, the inner end being shown in Fig. 1 and the outer ends in Figs. 5 and 6.

What is supposed to be a novel device for lighting the extreme burners is as follows: J are troughs extending from near the retort to near the extreme burner. In these troughs are laid, respectively, lighting-tubes K, the parts being held in firm contact by clamp K′, the ends and edges of the trough being made to fit the tube snugly, leaving a space, J′, between the tube and trough, except at the ends of the latter. A small tube, *j*, leads from the concavity of the trough at its outer end and discharges into the elbows *i* of the tube I, as shown in Fig. 6. At the inner end of the trough a tube, *j*′, leading from the trough, connects with the elbow b^3, the latter being screwed into a threaded hole at the bottom of the cup *b* of the retort. A continuous passage-way is thus had from the cup *b* under the central burner to the elbow of the commingling-tube I, near the outside burner. The tube K has a few small perforations, *k*, in the under side thereof, inside the trough. The outer end of the tube K discharges into the elbow *i* of the commingling-tube and directly under the outside burner. The inner end of this tube K comes close to the retort B and in front of a slit, b^4, made in the rim *b*′, so that a jet of flame from the central burner could enter the tube K.

In operating the central burner there can hardly be said to be any pressure of vapor in the chamber under this burner—that is to say, in the cups *b*—but rather a current of commingled air and vapor passes out through the slit c^2 of this burner, which, being the case, there can be no tendency of the air and vapor to take the tortuous course through the trough J and tubes *j* and *j*′; but as soon as the needle valve is opened to direct vapor into a commingling tube, I, a current of air and vapor is established therein, and this current produces a suction that draws a limited amount of vapor from the cup *b* through the trough and connecting-tube, and some of this vapor finds its way into the tube K through the perforations of the latter. As this occurs a slight explosion is had, caused by the commingling of the vapor and air in the tube K, and the ignition of the same from the central burner through the slit b^4 and the flame from such explosion reaches the outer burner and lights it.

It will be readily understood by persons skilled in the art that the admixture of air and gas in the commingling-tube is not explosive for want of sufficient air in such admixture. Enough air is admitted into the lighting-tube to render the admixture of air and gas therein slightly explosive, and the flames from such explosives, flashing out through the openings of the burner-cone, ignite the gases escaping from the commingling-tube through openings in the same burner-cone, as such ignition could not for want of air take place inside the commingling tube or cone.

The lighting of the outside burner in the manner described follows almost immediately the admission of vapor into the commingling-tube leading to such outside burner. After the outside burner is lighted, a succession of explosions is kept up in the tube K; but these explosions are so slight as to cause no annoyance—in fact, are only heard with close attention—and whatever vapor may continue to pass through the trough and lighting-tube only adds to the effectiveness of such outside burner. The lighting-cup L is shown in Fig. 3, is made to slide rearward to its place on the arm E, the lighting-cup being provided with a set-screw, *l*, for holding the cup in place.

A hub, e^3, on the arm E projects over the inner rim of the cup L to prevent the gasoline from finding a passage between the said rim and the arm, and, on the contrary, to direct the gasoline into the cup, and the lip e^4, having a groove therein, extends obliquely a part of the way around the arm E to direct the gasoline flowing therein over the hub e^3 into the cup L.

With the exception as hereinbefore described, the vapor-burner is operated in the usual manner.

What I claim is—

1. The combination, with a needle-valve having a screw-threaded portion and a thimble screw-threaded internally, of a sleeve mounted on the valve, said sleeve being screw-

threaded externally and internally for engaging the threads of the thimble and of the valve, and an adjustable clamp or clutch adapted to grip the sleeve for operating the latter, substantially as set forth.

2. The combination, with a needle-valve having a screw-threaded portion and an angular portion adapted to extend through a similar-shaped opening, wherein said valve may have an endwise movement, but not a rotary movement, and a stationary thimble screw-threaded internally, of a sleeve mounted on the valve, said sleeve being screw-threaded externally and internally for engaging the threads of the thimble and of the valve, and an adjustable clamp or clutch adapted to grip the sleeve for operating the latter, substantially as set forth.

3. The combination, with a needle-valve, a stationary thimble, and a sleeve adapted to turn in the thimble, said sleeve being internally threaded for the reception of the needle-valve, of an adjustable friction clamp or clutch mounted on the sleeve for operating the same, substantially as set forth.

4. The combination, with the valve and a sleeve for reciprocating the valve, of an adjustable friction-clutch, the latter consisting of a pair of pivoted jaws and a screw for holding said jaws together, a suitable handle connected with the clutch, and legs for limiting the movement of the clutch in either direction, substantially as set forth.

5. The combination, with a burner having cylindrical slotted shell and imperforate top and upwardly-projecting rim, of one or more internal circumferential ribs integral with the shell, substantially as set forth.

6. The combination, with retort, lateral commingling-tube, and outside burner, of a lighting-tube, trough, and connecting-tubes for the trough, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 21st day of May, 1887.

WILLIAM METZINGER.

Witnesses:

CHAS. H. DORER,

ALBERT E. LYNCH.