No. 748,897. PATENTED JAN. 5, 1904.

J. A. WALKLEY.

HYDROCARBON BURNER.

APPLICATION FILED JULY 30, 1902.

NO MODEL.

Fig. IX

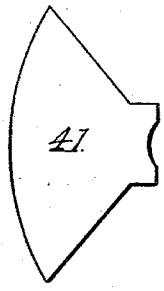


Fig. I

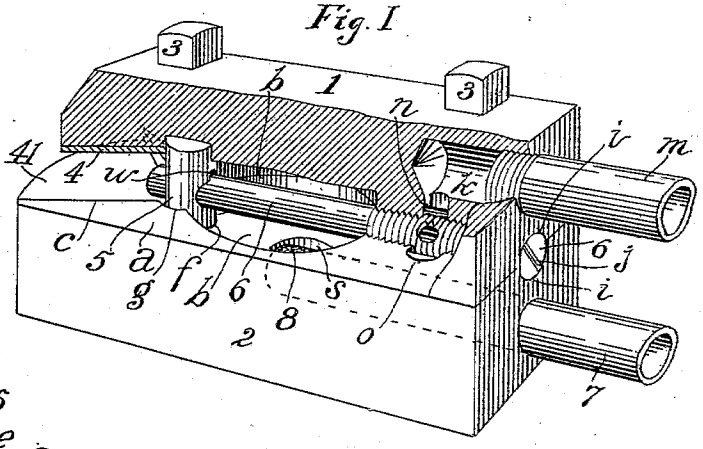


Fig. V

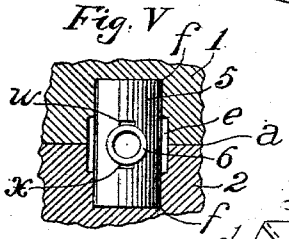


Fig. II

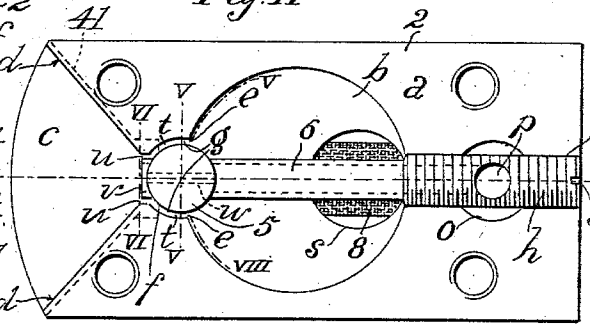


Fig. VIII

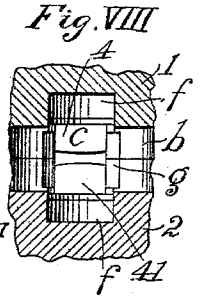


Fig. VI

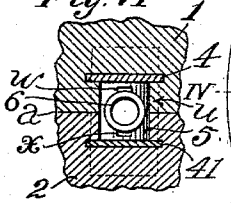


Fig. III

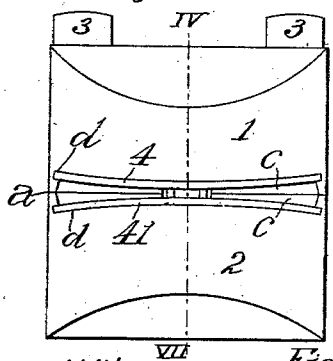


Fig. IV

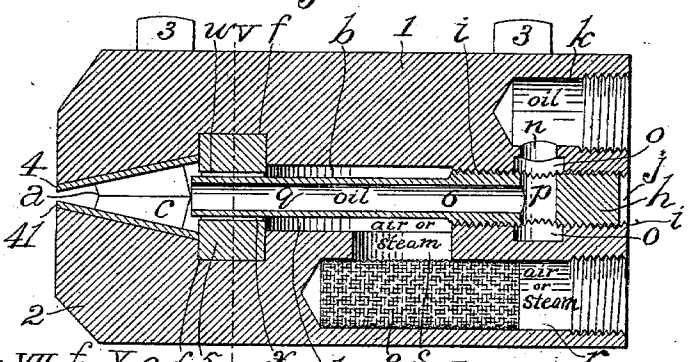
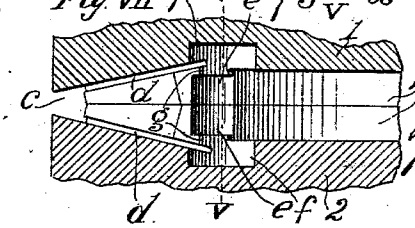


Fig. VII



Witnesses

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by

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his attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 748,897. Patented January 5, 1904.

UNITED STATES PATENT OFFICE.

JAMES A. WALKLEY, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO CHARLES A. HAMMEL, OF LOS ANGELES, CALIFORNIA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 748,897, dated January 5, 1904.

Application filed July 30, 1902. Serial No. 117,715. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WALKLEY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Hydrocarbon-Burner, of which the following is a specification.

This invention relates to means for atomizing liquid by a fluid, as air or steam under pressure.

An object of this invention is to provide superior means for atomizing crude petroleum and then vaporizing it and afterward introducing it into the fire-box of the furnace in such a manner as to produce a most perfect combustion and satisfactory distribution of the flame.

Another object of this invention is to provide a serviceable atomizer the wearing parts of which may be readily renewed in order to maintain a uniform outlet or discharge opening at minimum cost of time and attention.

A further object is to provide an atomizer which is readily adjustable to increase or decrease the spread of flame and also to vary the action of the expansive fluid upon the issuing liquid.

Another object is to provide means for preventing the admission of any scale or any object which might clog the steam-passage and which might interfere mechanically with the action of the burner.

Another object is to provide for ready manufacture and construction and ease of assembling, taking apart, and reassembling the device.

The accompanying drawings illustrate the invention.

Figure I is a broken perspective view of an atomizer constructed in accordance with my invention. Fig. II is a plan of the member of the atomizer which is lowermost in Fig. I. The liquid-tube and its supporting-post and liquid-abutment are also shown in place. Fig. III is an elevation of the discharge end of the atomizer. Fig. IV is a vertical axial section on line IV VII, Figs. II and III. Fig. V is a fragmental sectional view on line V V, Figs. II and IV, showing intact the end of the oil-tube and a post which supports the same and forms an abutment at the front of the fluid-chamber for giving direction to the issuing fluid. Fig. VI is a fragmental sectional elevation on line indicated by VI VI, Fig. II. Fig. VII is a fragmental sectional elevation on line IV VII, Fig. II, omitting the oil-tube and its post. Fig. VIII is a fragmental section on line V VIII, Fig. II. Fig. IX is a plan of one of the wearing-plates detached.

1 2 designate two sections of the atomizer-body, which may be solid blocks of metal fastened together by cap-screws 3 and may be identically the same, with the exceptions which will be hereinafter noted. Their construction will be readily understood by reference to the drawings. The sections are each provided with a flat joining face *a* to form together a steam-tight joint. In each face is a cavity *b*, which for convenience of manufacture is desirably circular. Each face is also furnished at the outlet end with a flaring recess *c*, having grooves *d* at opposite corners in which wearing-plates 4 41 may be respectively seated, one for each of said recesses. The wearing-plates are slightly bowed and when slipped into place the spring of the plates frictionally retains them in position. The plates are thus attached, so as to be easily removable. The chamber *b* and the recess *c* are connected by the recess *e*, the walls of which are in arcs of a circle.

f designates seats for a post 5, which is desirably cylindrical and is seated concentrically with the semicircular walls *g* of the passage at *e*, so that when the post 5 is in place there are curved passages, as at *e*, around the sides of the cylindrical post. Said post 5 is perforated transversely to receive the discharge end of a longitudinally-adjustable oil-tube 6, which is desirably formed of a steel rod drilled from one end a part of the way toward the other to form the tube and having a screw-threaded solid portion *h* at its rear end which is screwed into the screw-threaded seats *i* in the sections 1 and 2 and desirably having a slot *j* to receive a screw-driver by which it may be turned for adjusting the oil-tube relative to the post 5 and the passages *e*.

One of the sections receives the oil and the other the expansive fluid.

k designates an oil-inlet formed in the section 1, into which the oil-supply pipe *m* may be screwed, and *n* is a passage leading from the inlet *k* to a receptacle or chamber *o*, formed in parts in the two sections and extending around the adjustable oil-tube 6, which is provided with intersecting bores *p* and *q*, the first of which extends across the oil-tube to communicate with said chamber *o*, which is desirably circular for ease of construction, being formed by boring cavities into the two joining faces.

7 is the pipe for supplying an expansive fluid, such as air or steam, for atomizing the liquid supplied through the pipe *m*.

r is a longitudinal passage in the section 2 into which the pipe 7 may be screwed and which passage is provided with a screen 8, desirably cylindrical.

s is a passage leading from the passage *r* into the bottom of the cavity *b* in the member 2. The screen 8 is desirably cylindrical to fit the passage *r* and to extend across the passage *s* for the purpose of intercepting any scale or other hard objects which might otherwise pass into the atomizer under the pressure of air or steam.

The screen 8 is removable and extends across the mouth of the passage *s* and may be readily withdrawn endwise from the air or steam passage *r* for cleaning, though it will seldom require cleaning, being free from liability to clog. By means of this screen I avoid the difficulty which has heretofore been experienced with atomizers having narrow slots through which steam or air is forced and in which scale from the boiler has heretofore from time to time been driven into the narrow slots, thus closing them and preventing the proper action of the burner. By the construction shown the screen is perfectly supported against displacement or distortion by the steam-blast.

The discharge ends of the members 1 and 2 and the wearing-plates 4 and 41 are desirably formed in the segment of a circle in order to give a proper spread to the issuing mixture of expansive fluid and the atomized and vaporized liquid or fuel carried thereby.

When the post 5 is in place, the outlet from the chamber *b* is desirably formed of four passages, two of which are each desirably composed of a curved portion *t*, converging forwardly in the arcs of a circle, and a straight portion *u*, which extends forward as an upright slot, and the two slots unite to form one slot, through which the outlet end *v* of the oil-tube 6 extends. The effect of the walls of these two curved passages is to direct the expansive fluid forward and crosswise over and under the end of the tube 6 and forwardly and sidewise away from the tube 6 at the points which lie in the horizontal plane with the axis of the tube. The spreading action of the steam may be varied by moving the projecting end of the tube 6 forward or backward, being increased when the tube is moved forward and decreased on the reverse movement.

w and *x* are two other passages arranged, respectively, immediately above and below the tube 6 to direct two jets of the fluid straight forward parallel with the extended axis of the tube 6 to strike upon the inclined upper and lower faces of the walls of the outlet-recess *c*. By the arrangement set forth of the passages *w*, *x*, and *t* there are produced two pairs of diversely-directed streams of fluid. The oblique faces of the plates 4 and 41, which form said walls, direct toward each other the two jets, which issue through the passages *t* the upper jet downward and the under jet upward. The action of these several passages produce within the cavity formed by the recesses *c* a pressure of fluid subject to violent internal commotion producing a forcible breaking-up action on the oil, which thus becomes broken up and vaporized and will then issue from the outlet between the plates 4 and 41.

The purpose of forming the front end of the atomizer in the arc of a circle is to facilitate and direct the lateral spread of the flame.

By referring to Figs. IV, V, and VII it may be understood that the recesses *e* in the members 1 and 2, respectively, to form the curved passages around the post 5 terminate at their inner ends approximately in the same plane with the passages *w* and *x*, so that the portion of the fluid which passes through the passages at *e* will strike upon the slanting walls formed by the plates 4 and 41, thereby being deflected and broken up to heighten the breaking and tearing effect of the expansive fluid within the outlet-cavity.

Having described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An atomizer having a cavity at its outlet end provided with two oppositely forwardly diverging walls and two opposite forwardly-converging walls; a tube for supplying liquid to said cavity; said atomizer having a pair of curved passages converging toward their outlets, and terminating rearwardly of the end of said tube for conducting jets or streams of fluid to break up the liquid which issues from the tube.

2. An atomizer having a cavity at its outlet end, an adjustable oil-tube projecting into the cavity, said atomizer having a pair of opposite curved passages converging toward the outlet of the tube for applying diversely-directed jets or streams of fluid to vaporize the liquid supplied to the cavity.

3. An atomizer having a cavity at its outlet end, provided with two opposite forwardly-converging walls, and two opposite forwardly-diverging walls; an internal chamber, means for supplying an expansive fluid to said chamber, forwardly-converging opposite curved passages leading from the chamber, and opening into said cavity; passages leading from said chamber into said cavity at the in-

ner ends of said forwardly-converging walls and directed toward said converging walls respectively, and means for supplying liquid to the cavity between said passages.

4. An atomizer having an internal chamber, and an outlet-cavity, means for supplying expansive fluid to the chamber, said atomizer having a pair of curved passages which converge and a pair of straight passages communicating between the chamber and the outlet-cavity to admit expansive fluid from one to the other, and means for supplying liquid to the outlet-cavity where the same will be acted upon by the fluid passing from the internal chamber.

5. An atomizer comprizing two members, joined together and hollowed on their joining faces to form an internal chamber, an outlet-cavity and a passage communicating between said chamber and cavity, the walls of said passage being in the arcs of a circle, a post arranged in said passage and having curved faces concentric with said arcs and being transversely perforated; a tube in said perforation, passages being provided above and below the tube leading from said chamber into said cavity, means for supplying an expansive fluid to said chamber, and means for supplying oil to said tube.

6. Two members joined together and having between them a chamber and an outlet-cavity and a passage leading from the chamber to the outlet-cavity, and each provided with a screw-threaded channel, one of said members being provided with an inlet communicating with said chamber and the other with an inlet communicating with the screw-threaded channel; a post seated in said passage; and a member tubular at one end and mounted in, and opening through the post and screw-threaded at the other end, and there seated in the screw-threaded channel, and provided with a lateral opening leading from said channel into the tube.

7. An atomizer formed of two members fitted together and having a chamber and an outlet-cavity between them, means for supplying an expansive fluid to the chamber, an adjustable tube closed at one end and opening at the other end into the outlet-cavity, and means for supplying liquid to said adjustable tube.

8. An atomizer formed of two members fitted together and having an outlet-cavity, and a circular chamber between them, two opposite walls of which converge toward the outlet, and two diverge toward the outlet, a tube extending diametrically through said chamber for supplying liquid to the said cavity and adjustable toward and from the outlet thereof, and passages for directing an expansive fluid forwardly past the open end of said tube, means for supplying liquid to the tube, and means for supplying an expansive fluid to said passages.

9. An atomizer having removable flat, bowed wearing-plates forming the walls of its outlet.

10. An atomizer comprising two members fastened together and having between them a chamber, passages and outlet for the material to be atomized, means for supplying liquid through one of said members, means for supplying a fluid through the other member, a tube screwed between the members to conduct liquid from one of the members to the space between them, a perforated perpendicular post between the two members and supporting the open end of said tube.

11. An atomizer comprising two members fastened together and having between them a chamber, passages and outlet for the material to be atomized, means for supplying liquid through one of such members, means for supplying a fluid through the other member, a tube screwed between the members to conduct liquid from one of the members to the space between them, and a support between the members for the open end of said tube.

12. An atomizer having an outlet-cavity two of the walls of which diverge from each other toward the outlet, and two converge toward the outlet; a tube for supplying liquid to the outlet-cavity and two pairs of opposite passages for directing jets or streams of expansive fluid past the end of the tube and onto the converging walls of the outlet-cavity, one pair of passages being curved to converge toward their outlets, the other pair of passages being parallel.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 25th day of July, 1902.

JAMES A. WALKLEY.

Witnesses:

JAMES R. TOWNSEND,

JULIA TOWNSEND.