

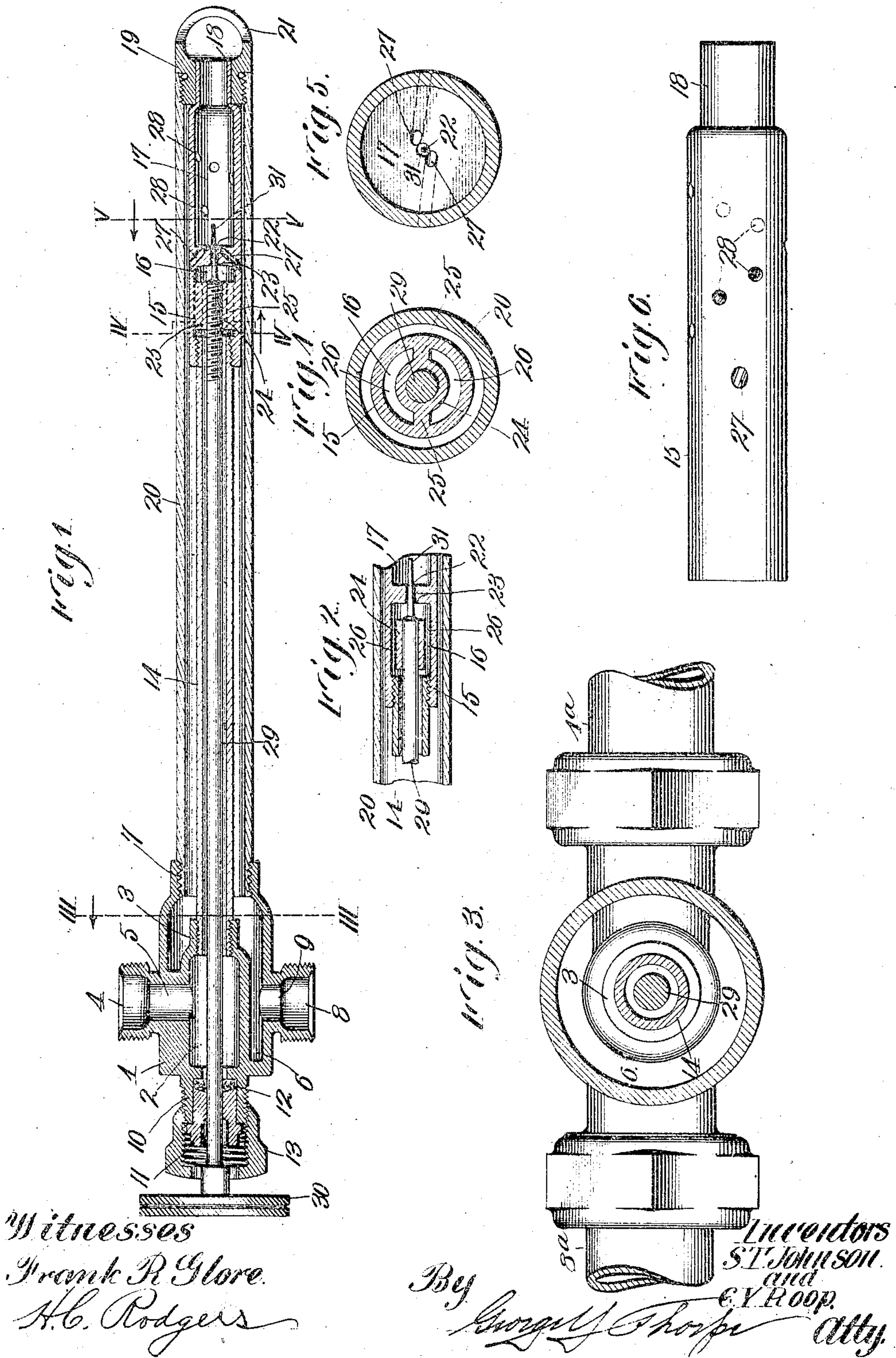
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S. T. JOHNSON & C. Y. ROOP.

OIL BURNER.

APPLICATION FILED JULY 23, 1906.



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UNITED STATES PATENT OFFICE.

SEWARD T. JOHNSON AND CHRISTIAN Y. ROOP, OF OAKLAND, CALIFORNIA.

OIL-BURNER.

No. 865,783.

Specification of Letters Patent.

Patented Sept. 10, 1907.

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To all whom it may concern:

Be it known that we, SEWARD T. JOHNSON and CHRISTIAN Y. ROOP, citizens of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

This invention relates to oil burners of that type in which steam is employed to disintegrate oil that the oxygen of the air may more effectively combine with the atomized oil and produce a combustible gas, and our object is to produce a burner of this character in which the steam is injected into the atomizer so as to impart a whirling movement to the particles of the oil to effect an expeditious and thorough disintegration of the same in order that it may instantly combine with the oxygen of the air as it leaves the tip of the burner, such union resulting in a gas susceptible of perfect combustion.

With this general object in view and others as hereinafter appear the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawing, in which—

Figure 1, is a central horizontal section of a burner embodying my invention, with the needle valve in elevation. Fig. 2, is a central vertical section of a portion of the burner. Fig. 3, is a full-sized section taken on the line III—III of Fig. 1. Fig. 4, is a full-sized section taken on the line IV—IV of Fig. 1. Fig. 5, is a full-sized section taken on the line V—V of Fig. 1. Fig. 6, is a full-sized elevation of the atomizing chamber and valve-seat element of the burner.

In the said drawing, 1 indicates a tubular casting having a central bore or chamber 2, threaded at its front end as at 3, and connecting said chamber with the tubular arm 4 to which an oil supply pipe 4^a, is adapted to be connected, is a laterally extending passage 5. The casting 1 is also provided with a chamber 6 concentrically surrounding the tubular part of the casting containing the central bore or passage, and projecting beyond the end of said part and provided with internal threads 7 at its front end, and connecting said chamber 6 with the tubular arm 8 adapted to be connected with a steam supply pipe 8^a is a passage 9.

Projecting rearwardly from and communicating centrally with the oil chamber 2, is a hollow threaded boss 10, into which fits a packing gland 11, and interposed between said gland and the perforated end of the casting between the oil chamber 2 and the gland, is a packing ring 12.

13 indicates a hollow nut fitting over the packing gland and screwed upon the threaded boss 10 for the purpose of clamping the gland in position.

14 indicates a tube having its threaded end engaging the threaded end 3 of chamber 2, and screwed upon the front end of said tube is a tubular atomizer 15, the same being divided into a rear chamber 16, and a front or atomizing chamber 17, and at its extreme front end the atomizer is diametrically reduced as at 18 to fit snugly in the burner cap 19, held upon the reduced end of the atomizer by means of a steam tube 20 of diameter to provide a surrounding space between it and tube 14 and atomizer 15, said space extending from the inner end of the burner cap to the front end of the steam chamber 6 with which the rear end of the steam tube communicates as shown, said cap having a burner orifice 21 of any suitable type though that shown is adapted to produce a wide or fan-like flame.

The atomizer partition, hereinbefore referred to, is provided with a centrally-disposed orifice 22 terminating at its rear or inner end in a valve seat 23, and cast or secured within and concentrically of the rear chamber is a valve tube 24 which terminates short of the opposite ends of said chamber, the support for the valve tube being one or more ribs 25 which extend radially from said tube to the outer wall of the atomizer, the two ribs shown dividing the rear chamber into a pair of similar and substantially semi-cylindrical passages 26 which communicate at their rear ends with the tube 14 and at their front ends with the orifice 22.

In order to inject the steam from the space or chamber surrounding the atomizer into the atomizing chamber, the atomizer is preferably provided with two forwardly converging passages 27, which as shown most clearly in Fig. 5, discharge fine jets of steam into the rear end of the atomizing chamber contiguous to the front end of orifice 22, the said passages being disposed at opposite sides of the center of the orifice for the purpose of imparting a whirling or revolving movement to the oil which is susceptible of ready disintegration because of being previously heated by its passage through the steam-heated tube 14 and the rear chamber of the atomizer. The whirling action of the oil is sustained and increased during its entire passage through the atomizer to insure its complete disintegration, by the employment of additional steam jets along the length of the atomizing chamber, these additional or supplemental jets entering said chamber through a series of perforations 28 in the wall of the atomizing chamber forward of the atomizer partition, such perforations being drilled or otherwise formed at a slight angle to the axis of the atomizing chamber that the steam, like that entering through passages 27, will enter at a tangent to the disintegrated or disintegrating oil therein.

For the purpose of controlling the oil supply, we provide a valve consisting of a long rod or stem 29 of smaller diameter than tube 14 and extending com-

pletely through the same and the packing gland and into the valve tube 24 which is threaded to receive the threaded front end of said stem. The rear end of the stem is provided with a hand wheel 30 and terminates at its front end in a forwardly tapering needle valve 31 to extend through the orifice 22, the proportions of the valve being such that when the stem is screwed forward its full distance the base or larger end of the valve completely closes orifice 22. The opposite manipulation of the stem unseats the valve and opens communication between the oil supply and the atomizing chamber for the purpose of admitting a greater volume of oil into the latter.

In practice the oil is adapted to be fed under pressure through arm 4 and passage 5 into the oil chamber 2, and passes thence through tube 14 in cylindrical form because of the rod in said tube, and during such passage is subject to the heat of the steam in the outer or steam tube 20, said steam entering said tube under pressure, by way of arm 8, passage 9 and steam chamber 6. By the time the oil reaches the orifice of the atomizer it is susceptible of quick disintegration and in such condition passes through the said orifice into the atomizing chamber where it is superheated and receives the impact of the forwardly converging jets of steam through passages 27 and is subsequently influenced by the jets of steam entering through perforations 28. Under this treatment the oil is thoroughly and instantly disintegrated and prepared for a perfect union with the oxygen of the air after it leaves the burner; the result of such union being a combustible gas of maximum heat-producing property. The volume of heat produced is of course regulated by the needle valve and when the latter is screwed forward its full distance the supply of oil is cut off and the flame thereby extinguished. If the burner is to be used again shortly, the passage of steam may continue in order to keep the generator hot. Should the orifice become clogged it can be readily and easily cleaned by proper manipulation of the valve. Although the description refers to the use of steam to effect the disintegration of the oil it will be understood of course that air under pressure may be employed, the air effecting practically instantaneous disintegration of the oil and mixing with the latter to produce a combustible gas which will burn fiercely at or near the tip of the burner.

From the above description, it will be apparent that we have produced an oil burner possessing the features of advantage enumerated as desirable and we wish it to be understood that we do not wish to be restricted to the exact details of construction shown and described as obvious modifications will suggest themselves to one skilled in the art.

Having thus described the invention what we claim as new and desire to secure by Letters Patent, is:—

1. A burner having an oil passage and a fluid passage surrounding the oil passage, an atomizer in and surrounded by the fluid passage and provided with a rear chamber in communication with the oil passage, and a front chamber in communication with the fluid passage, and with a central orifice connecting the rear chamber and the front chamber, a burner cap fitting on the front end of the atomizer and closing the front end of the fluid passage and communicating centrally with the said front chamber, and a valve stem extending through the oil passage and into the atomizer and terminating in a tapering

needle valve adapted to extend into the central orifice of the same.

2. A burner having an oil passage and a fluid passage surrounding the oil passage, an atomizer in and surrounded by the fluid passage and provided with a rear chamber in communication with the oil passage, and a front chamber, and with an orifice connecting the two chambers, and also provided with a passage extending forwardly and inwardly through its wall and connecting the said fluid passage with the said front chamber and disposed to discharge fluid into the latter tangentially, a burner cap fitting on the front end of the atomizer and closing the front end of the fluid passage and communicating centrally with the said front chamber, and a valve stem extending through the oil passage and into the atomizer and terminating in a tapering needle valve adapted to extend into the orifice therein.

3. A burner having an oil passage and a surrounding fluid passage, an atomizer within the fluid passage provided with a rear chamber communicating with the oil passage, and a front chamber and an orifice centrally connecting said chambers and provided also with a forwardly and inwardly extending passage connecting the said fluid passage with the front chamber of the atomizer and extending at a tangent to the longitudinal center of said orifice, a burner cap closing the front end of the fluid passage and fitting on the front end of the atomizer and communicating with the front chamber of the same, and a valve for controlling the orifice connecting the rear and front chambers of the atomizer.

4. A burner having an oil passage and a surrounding fluid passage, an atomizer within the fluid passage and provided with a rear chamber communicating with the oil passage, a front chamber and an orifice centrally connecting said chambers and provided also with a forwardly and inwardly extending tangential passage connecting said fluid passage with the said front chamber, and provided furthermore with tangential perforations disposed along its length establishing communication between the fluid passage and the front chamber, a burner cap closing the front end of the fluid passage and communicating with the front chamber of the atomizer, and a valve controlling the orifice connecting the rear and front chambers of the atomizer.

5. A burner comprising a casting having a central longitudinally extending chamber and a surrounding longitudinal chamber and having a laterally projecting tubular arm communicating with the central chamber and a laterally projecting tubular arm communicating with the outer chamber, a tube communicating at its rear end with the central chamber, an atomizer secured upon the front end of said tube and provided with a rear chamber and a front chamber and with an orifice connecting said chambers and with a forwardly and inwardly extending passage extending from the outer side of the atomizer to the front chamber and disposed tangentially with respect to said orifice, an outer tube communicating with the outer chamber of the casting and of greater internal diameter than the external diameter of the atomizer and surrounding the latter, a cap fitting upon the front end of the atomizer and secured to the outer tube and closing the front end of the space between the latter and the atomizer and provided with a burner orifice, a valve extending centrally through the tubular casting and into the atomizer and provided with a needle point to extend more or less through or be wholly withdrawn from the jet orifice and provided also with a handle at its rear end, and a packing box secured to the rear end of the casting and around the valve stem to close the rear end of the central chamber in said casting.

6. In an oil burner, a cylindrical tubular atomizer having an integral partition dividing it into front and rear chambers having open ends, the said partition having a central orifice forming a communication between the two chambers and with passages beyond the center forming communications between the front chamber and the surrounding space.

7. The combination of an oil tube, a fluid tube surrounding the oil tube and extending beyond the end of the same, a cylindrical atomizer secured on the end of the oil tube and extending forward to the end of the fluid tube,

the atomizer having a transverse partition dividing it into front and rear chambers, said partition having a central orifice connecting the two chambers, and tangential passages forming communications between the
5 fluid tube and the front chamber of the atomizer, and the said front chamber having tangential openings in its wall, a valve guide in the rear chamber of the atomizer, a valve extending through the oil tube and said guide and entering the central orifice in the partition of the atomizer, and a

cap secured in and closing the front end of the fluid tube 10 and fitting over the front end of the atomizer.

In testimony whereof we affix our signatures, in the presence of two witnesses.

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