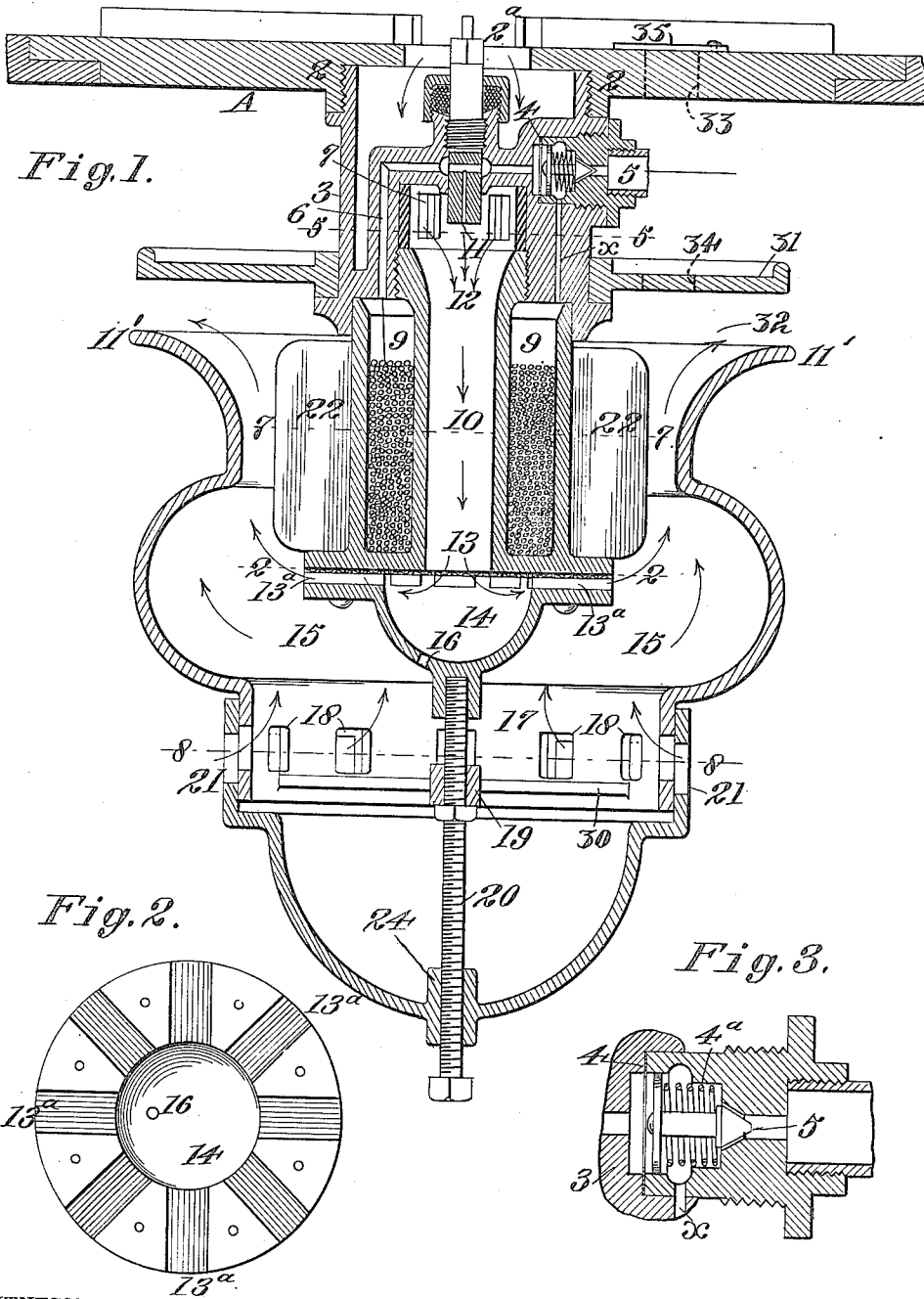


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APPLICATION FILED JUNE 20, 1917.

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Patented June 11, 1918.
2 SHEETS—SHEET 1.



WITNESSES:

Charles Reckles
J. H. Herring

INVENTOR

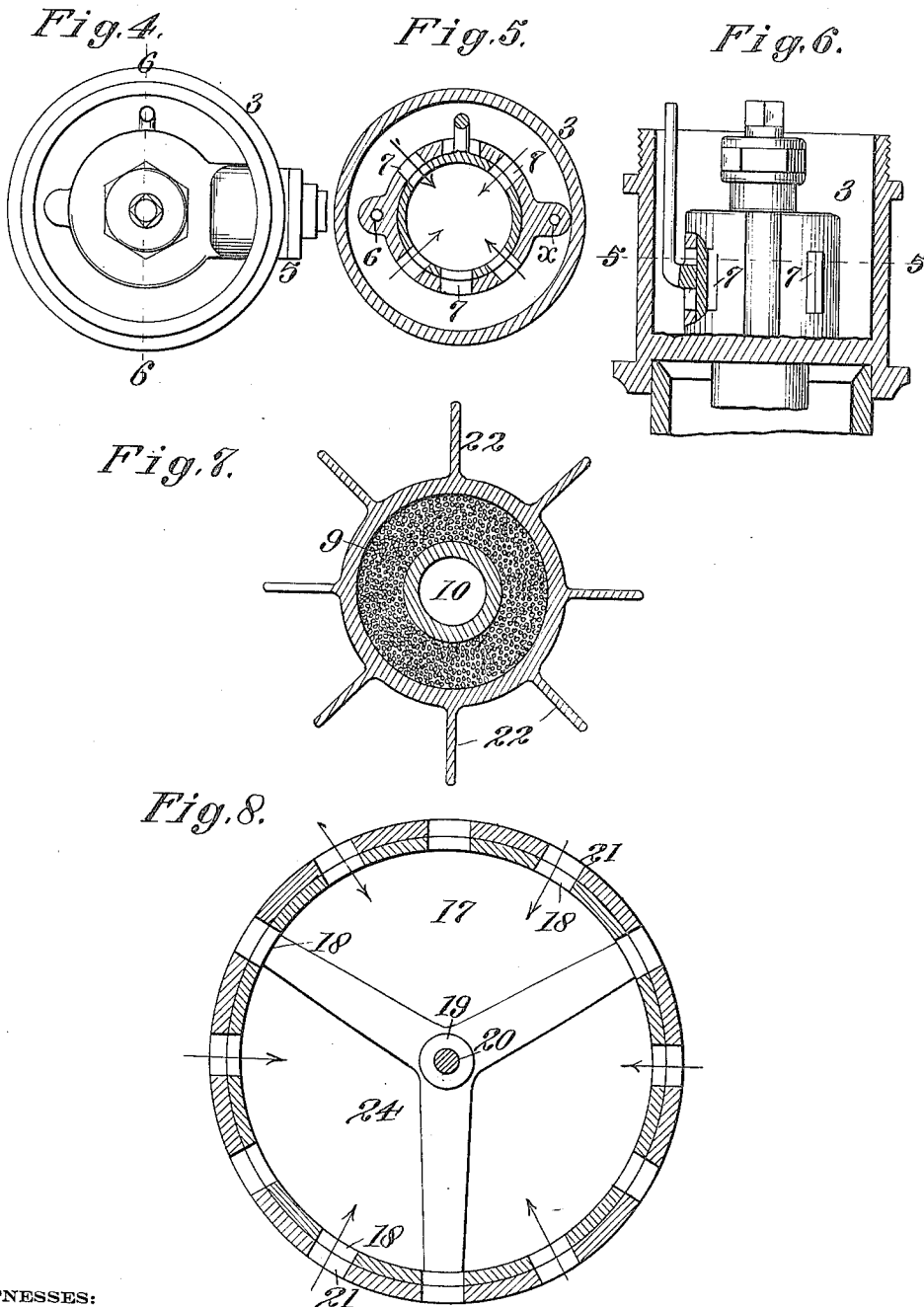
William D. M. Howard.

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UNITED STATES PATENT OFFICE.

WILLIAM DAVIS MERRY HOWARD, OF SAN FRANCISCO, CALIFORNIA.

OIL-BURNER.

1,269,282.

Specification of Letters Patent. Patented June 11, 1918.

Application filed June 20, 1917. Serial No. 175,766.

To all whom it may concern:

Be it known that I, WILLIAM D. M. HOWARD, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented new and useful Improvements in Oil-Burners, of which the following is a specification.

My invention relates to an improvement in oil burners, and is especially applicable to that class in which no wick is employed, and in which a gas or vapor is generated from the oil by heating the same to a temperature less than is necessary to crack it, this gas being mixed with a proper proportion of air through primary and secondary inlets, and eventually delivered through various connections to the point of combustion and service.

The invention comprises a head having a means for securing it suspended beneath a stove lid or equivalent support in the top of the fire pot in which is a port for the admission of air. Through this head the oil is admitted by a regulating valve there- after descending through a passage in the burner head into a retort where it is subjected to heat sufficient to vaporize it. The retort is fitted with a quantity of finely divided non-combustible material through which the oil passes, and a gas thus produced is delivered into a centrally located air mixing chamber and raceway, discharging from that through a wire gauze into a mixing and distributing chamber. During its passage to said raceway air is admitted and mixed with the gas. Thence the carbureted gas passes out through a wire gauze disk into the combustion chamber where it meets air from secondary ports and combustion takes place. The products of combustion and the flame are deflected against the gas producer by the shape of the combustion chamber and eventually discharged in a substantially horizontal sheet of flame into the furnace or fire pot.

It also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the apparatus.

Fig. 2 is a horizontal section through line 2—2 of Fig. 1.

Fig. 3 is an enlarged section of the oil admission devices.

Fig. 4 is a top view of the same.

Fig. 5 is a horizontal section through line 5—5 of Fig. 1.

Fig. 6 is a vertical section through line 6—6 of Fig. 4.

Fig. 7 is a horizontal section through line 7—7 of Fig. 1.

Fig. 8 is a horizontal section through line 8—8 of Fig. 1.

As herein illustrated, A represents the top of the stove or stove lid, or other equivalent support, beneath which the burner 3 is suspended by screwing the head thereto, or by other means, as at 2, so that the apparatus hangs suspended from this support. An open passage 2^a admits air from above. The oil is admitted through a passage and valve 5 which is controlled by a diaphragm 4, against which the gas may act when produced to close the needle valve to an extent depending on the pressure of the gas against the opposite side of the diaphragm, said valve being opened when the pressure exerted by the diaphragm against the valve stem is reduced and the stem is moved by means of an opposing spring 4^a acting for that purpose.

From the inlet 5 the oil passes down through a passage *x* which may be drilled in the burner head 3, and is delivered into the retort which consists of an annular chamber 9 and a central air mixing chamber or carbureter 10. This chamber 9 is preferably filled with small iron shot which acts to subdivide the oil and to heat it, when thus subdivided, so as to form it into a gas without cracking. This gas passes upwardly through the port 6, thence downwardly through a central atomizing jet 11 and being delivered from this, it meets with hot air through adjustable primary air ports 7 opening into the enlargement in the upper part of the head 3, and being thus mixed with the air it passes

down through the convergent Venturi throat 12 of a tube, and thence through the raceway 10, where it is subjected to the interior heat of the annular chamber 9 and primarily
5 of the burning gas in the outer portion of the apparatus.

At the lower end of the raceway 10 is a wire gauze screen 13, through which the generated gas passes, this screen preventing
10 back firing. The gas is delivered through this screen into a distributing chamber 14, thence passing into a combustion chamber 15. A portion of the mixture passes through an opening 16 into an annular air chamber
15 17, into which air is admitted through ports 18 surrounding this chamber. The size of the ports 18 may be varied by means of a screw rod 20 passing through a nut 19 and
20 a nut 24 by which the flash pan may be raised or lowered with relation to the combustion chamber 15 to increase or decrease the size of the port openings which register with the surrounding openings 21.

In the combustion chamber 15, into which
25 the carburated gas is discharged through the horizontal passages 13^a, the gas meets with the secondary air supply from the chamber 17, and striking directly into the curvature of the combustion chamber will be
30 diverted and thrown back against the producer 9, aided by radial wings 22, and is thus heated to convert the oil into gas, as before described. Passing from this point it is again diverted outwardly over the flaring
35 lip 11' of the combustion chamber and discharged outwardly into the fire pot or furnace. By the independent adjustment of the combustion chamber and auxiliary air supply, I am able to regulate the flame to any
40 desired degree producing noiseless combustion.

When starting the burner from a cold state, the oil admitted at 5 passes down through the apparatus into the distributing
45 chamber 14, and from this chamber a portion of the oil flows through a hole 16 and is received in a flash pan or heater 24, where it may be ignited and the resulting flame mixing with air from the ports 18 passes
50 into the combustion chamber and heats the apparatus to a working condition.

The atomizing jet 11 is preferably adjustably mounted in the head 3, as shown, to permit it to be raised or lowered with relation to the primary air inlet opening 7.
55 This is an important feature as it serves as a means for increasing or decreasing the jet action in the Venturi end of the mixing tube, or, in other words, regulates the amount of
60 air admitted at this point.

Another important feature is the adjustable mounting of the combustion chamber 15. This chamber is supported by arms 30

upon the screw rod 20 and may be raised or lowered with relation to a baffle plate 31,
65 mounted upon the head 3. The annular space 32, formed between the combustion chamber and the baffle plate, permits the flame to discharge in an annular, horizontal, sheet-like formation and roaring of the
70 flame may be entirely eliminated by adjusting the said annular opening to increase or decrease the size of the flame. The plate 2, together with the baffle plate 31, are preferably provided with alined openings 33
75 and 34 to permit a taper to be inserted to light the oil in the flash pan when the burner is first started; the upper opening 33 being closed by a pivotally mounted disk 35 after the oil has been ignited. 80

Combustion takes place after the air and gas mixture leaves the distributing chamber 14, as indicated by the arrows, and as the shape of the casting forming the combustion chamber deflects the flame back toward
85 the gas generating chamber containing the shot, it can readily be seen that this will be sufficiently heated to immediately generate gas as oil is admitted through the passage α . The flame, after passing by the gas generating chamber, will, of course, discharge
90 through the annular passage 32 and thereby form an annular sheet-like flame which produces a large heating surface and permits of axial distribution of the heat. Practically speaking, a perfect combustion is obtained by regulating the position of the
95 atomizing jet 11 and the secondary air inlets 18.

Having thus described my invention, 100 what I claim and desire to secure by Letters Patent is—

1. An oil burner comprising a head having a valve-controlled passage through which oil is admitted, an annular retort into which
105 the oil is led and wherein it is gasified, a passage in the head through which the product passes upward, a carbureting chamber extending downwardly through the center of said retort, an adjustable atomizing jet
110 through which the gas passes into said carbureting chamber, means for admitting air into said chamber, a distributing nozzle located below said carbureter chamber, a combustion chamber to which the gas is supplied and in which the mixture burns and its flame is diverted against the exterior of the retort walls and thence to the flame discharge, and means for admitting a secondary air supply to said combustion chamber. 120

2. An oil burner comprising an upper oil receiver, a vaporizing member, an air mixing chamber inclosed thereby, a chamber surrounding said vaporizing member, and suspending means therefor, and a flash pan
125 and secondary air supply member therebe-

neath, said secondary member being independently and vertically adjustable to vary the air inlet thereinto.

3. In an oil burner of the character described, an annular finely subdivided chamber forming a retort in which an oil is gasified, an air mixing chamber thereabove and in communication therewith, a jet tube through which the gas is delivered to said mixing chamber from the gasifying chamber, a tube concentric with the annular retort and leading downwardly from the air mixing chamber, a screen at the bottom of said tube, horizontally disposed discharging passages therefrom, and an exterior combustion chamber surrounding the gasifying chamber.

4. An oil burner of the character described comprising a head, an oil inlet thereto, a retort in communication therewith and forming a part of the head, a centrally disposed gas and air mixing tube extending through the retort, a primary mixing chamber at the upper end of the tube, a combustion chamber surrounding the lower end of the head and a gaseous fuel distributing nozzle at the bottom of said head having horizontal passages through which the fuel is discharged from the head and into the combustion chamber.

5. An oil burner adapted to be positioned within a fire pot, a cover for said fire pot, a burner head secured to and dependent from said cover and comprising a retort, means for delivering a liquid fuel thereto, means for conveying a gaseous fuel therefrom, an air and gas mixing tube extending centrally through said retort and adapted to receive gaseous fuel therefrom, an automatically controlled valve in communication with the liquid fuel inlet means and the gaseous fuel outlet means whereby a definite ratio of flow will be maintained between said liquid and gas, and a burner disposed beneath the retort and fed by the gaseous fuel passing through the air and gas mixing tube.

6. In an oil burner, a head, a flame spreader secured thereto, a gas retort within said head, a burner nozzle in communication with the lower end of said retort, and a combustion chamber supported from the bottom of said retort and adapted to allow the flame to pass upwardly and outwardly around said spreader.

7. An oil burner comprising a head member, a gas generator connected with the head, means for admitting oil to said generator, a tube extending through the generator having primary air inlet openings communicating with its upper end, a gas ejecting nozzle entering the upper end of the tube, means permitting the gas generated to be discharged through said nozzle, a distributing member

below the tube through which the gas from the nozzle and the primary air admitted is adapted to discharge, and a casing surrounding the distributor and the generator in which combustion takes place and from which the flame is adapted to discharge.

8. An oil burner comprising a head member, a gas generator connected with the head, means for admitting oil to said generator, a tube extending through the generator having primary air inlet openings communicating with its upper end, a gas ejecting nozzle entering the upper end of the tube, means permitting the gas generated to be discharged through said nozzle, a distributing member below the tube through which the gas from the nozzle and the primary air admitted is adapted to discharge, a casing surrounding the distributor and the generator in which combustion takes place and from which the flame is adapted to discharge, means for regulating and admitting secondary air to the said casing to promote combustion therein, a baffle plate above the casing, and means for adjusting the position of the casing vertically to increase or decrease the distance between the baffle plate and the top of the casing.

9. An oil burner comprising a head member, a gas generator connected with the head, means for admitting oil to said generator, a tube extending through the generator having primary air inlet openings communicating with its upper end, a gas ejecting nozzle entering the upper end of the tube, means permitting the gas generated to be discharged through said nozzle, a distributing member below the tube through which the gas from the nozzle and the primary air admitted is adapted to discharge, a casing surrounding the distributor and the generator in which combustion takes place and from which the flame is adapted to discharge, means for adjusting the position of the gas nozzle vertically, and means for automatically regulating the volume of oil delivered to the generator.

10. An oil burner comprising a head member, a gas generator connected with the head, means for admitting oil to said generator, a tube extending through the generator having primary air inlet openings communicating with its upper end, a gas ejecting nozzle entering the upper end of the tube, means permitting the gas generated to be discharged through said nozzle, a distributing member below the tube through which the gas from the nozzle and the primary air admitted is adapted to discharge, a casing surrounding the distributor and the generator in which combustion takes place and from which the flame is adapted to discharge, means for regulating and admitting

secondary air to the said casing to promote
combustion therein, a baffle plate above the
casing, means for adjusting the position of
the casing vertically to increase or decrease
5 the distance between the baffle plate and the
top of the casing, means for adjusting the
position of the gas nozzle vertically, means
for automatically regulating the volume of
oil delivered to the generator, a flash pan
10 below the casing, means for admitting oil to

said pan when the burner is first started,
and means permitting access to ignite the
oil in the pan.

In testimony whereof I have hereunto set
my hand in the presence of two subscribing 15
witnesses.

WILLIAM DAVIS MERRY HOWARD.

Witnesses:

JOHN H. HERRING,
W. W. HEALEY.