G. M. WOLVERTON.

AIR, OIL, AND GAS BURNER.

APPLICATION FILED NOV. 25, 1914.

1,166,959.

Patented Jan. 4, 1916.

Fig. 1.

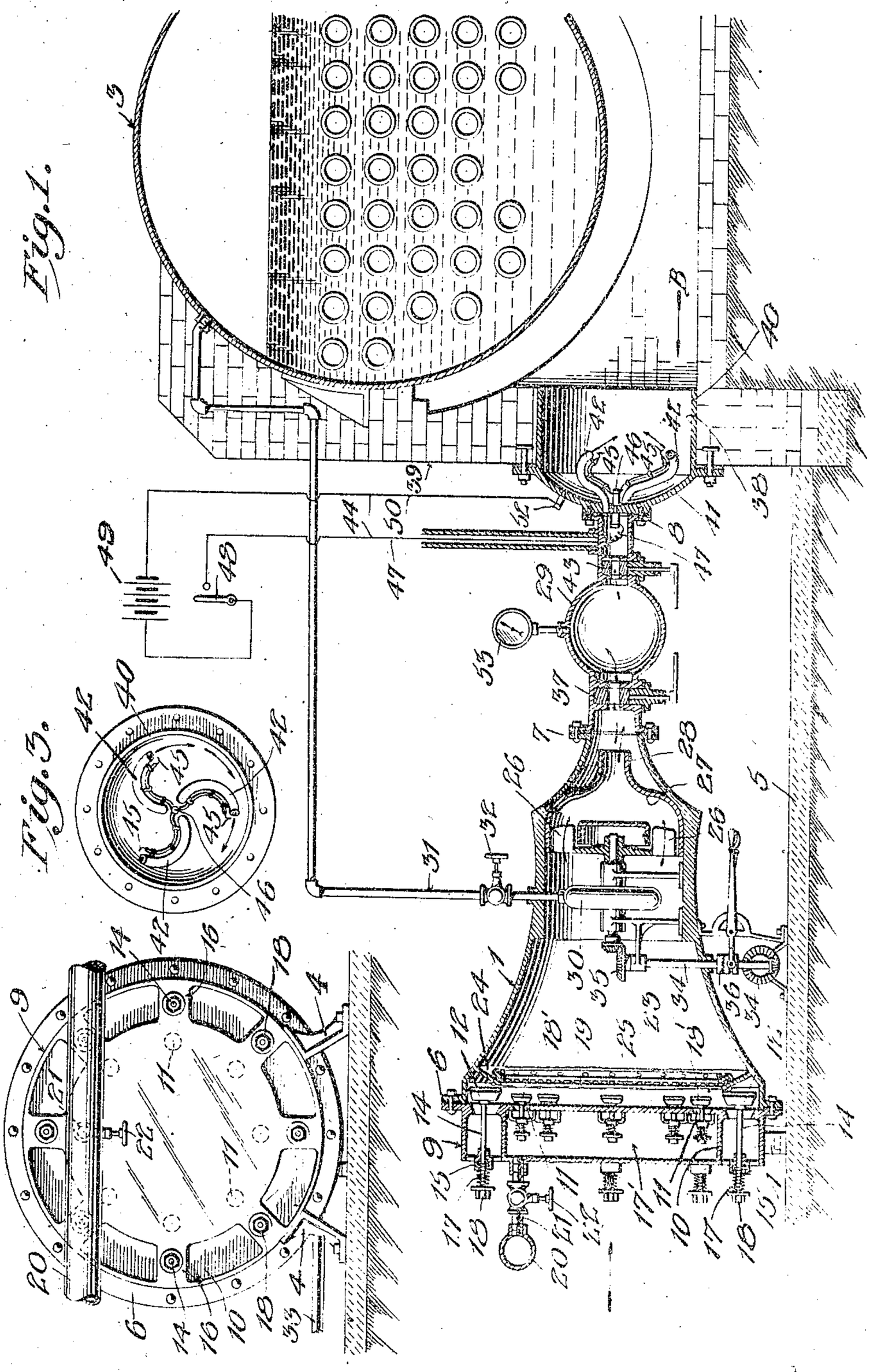

Fig. 3.

Fig. 2.

Witnesses:

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1,166,959. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed November 25, 1914. Serial No. 874,091.

To all whom it may concern:

Be it known that I, GEORGE M. WOLVERTON, a citizen of the United States, residing at Elton, in the Parish of Jefferson Davis and State of Louisiana, have invented certain new and useful Improvements in Air, Oil, and Gas Burners, of which the following is a specification.

My invention relates to new and useful improvements in gas burners and more especially to that type employing a gas embodying a mixture of oil and air formed within the burner casing before passing to the burner jets or nozzles.

Among the various objects of the present invention is to provide; First, a gas burner, a portion of the casing of which provides a chamber in which the constituent parts of the gas are thoroughly admixed which parts in the present case are oil and air; second, to provide in a unitary structure, an oil reservoir, a mixing chamber, a pressure supply device, a compression chamber, burner nozzle and ignition means; third, to provide a gas burner having a self contained means for compressing the gases mixed in the apparatus and for keeping said gases under constant pressure; fourth, to provide in association with said pressure device which keeps the pressure of the gas constant, a compression bowl which maintains the pressure of the gases at the nozzle tips uniform thereby avoiding pulsating currents of gases issuing from said nozzles which causes an irregular size of flame which may at one moment grow small and at another large depending upon the pressure in the usual storage tanks.

An objection which has been heretofore experienced with various types of combined oil and air burners with which I am familiar is that the oil and air were fed from different sources under varying heads of pressure, the oil and air being fed to substantially the burner mouth and in a number of instances the pressure behind the two fluids being at a variance the mixture will vary in its proportion of constituent elements as well as vary in its velocity when emerging from the burner mouth.

With my apparatus the gases are thoroughly mixed at a time greatly in advance of the time from which they emerge from the burner mouth, and between which periods of mixture and emerging from the burner mouth they are subjected in their mixed state to a pressure in addition to and independent of the head under which they flow into the mixing chamber. Further, although the pressure creating means should vary from one cause or another, the provision of the compression bowl would always hold the pressure of the gases as they emerge from the burner mouth uniform so long as the apparatus was in operation.

With the foregoing explanation of the advantage of my invention over and as compared with previous gaseous fuel burners with which I am familiar I now refer to the drawings forming a part of this specification in which—

Figure 1 is a longitudinal sectional elevation of my complete apparatus illustrating its application to use with a horizontal water tube boiler of the usual type. Fig. 2 is an end elevation of the apparatus viewing the same from the direction of the arrow in Fig. 1, and Fig. 3 is an end elevation of the burner nozzles viewing the same from the direction of the arrow B in Fig. 1.

Referring now more specifically to the drawings by numerals of reference, 1 indicates the casing of the apparatus, the same being supported in proper position with relation to the boiler 3 as herein shown by legs or standards 4 suitably secured to said casing and resting on the floor or other support 5 as shown. The casing 1 is preferably bell-shaped or generally conical in cross section and is built in sections united together to form a unitary structure by flanges 6, 7, and 8. That which I will term the first section I will designate by 9 the same being cylindrical in cross-section and provided with a flange 10 having an annular series of uniformly spaced valve seats 11 which coöperate with a series of pop-valves 12, the stems 14 of which are slidably mounted in sleeves 15 carried by an annular series of spacing members 16. A spring 17 normally holds each valve to its seat in the usual manner, the tension of the spring being regulated by the nuts 18 to such a degree that while normally seated, they will become unseated by exhaust pressure within the apparatus to allow air to be fed thereto for purposes hereinafter specified. Mounted concentrically within the cylindrical section 9 and spaced from the latter by the spacing members 16 is an oil supply reservoir 17 which is adapted to supply oil to the apparatus through the medium of an annular

series of valves 18′, said valves 18′ being placed preferably near the edge of inside face 19 of the reservoir and a valve in the annular series of oil valves being arranged adjacent a valve in the annular series of air valves whereby the air as it enters the apparatus through its valve will more readily commingle with the oil passing at the same time through its respective valve in the reservoir. In other words the air as it passes through its valve is compelled to pass the oil valve to which it is coincident thus taking up and carrying a certain amount of oil with it.

In the operation of the apparatus it is necessary that the auxiliary oil reservoir or tank 17′ should be kept filled at all times so that oil will flow from all the valves and I therefore use a main supply tank (not shown) which feeds the said reservoir through feed pipes 20 and 21 controlled by a valve 22.

For the purpose of mixing the air and oil which is introduced into the apparatus in the manner above described I provide a second section or mixing room or chamber 23 generally of conical shape in longitudinal section and connected with the first section 9 by the flanges 6. Supported within the chamber 23 through the medium of an annular flange 24 in the section 23 is a mixing screen 25 of close mesh wire fabric, the oil and air passing through said screen being caused to admix; that is to say the oil is broken up into very fine particles and in this condition more readily mixes with the air passing at the same time through the screen.

Mounted within the section 10 by suitable means, I provide a gas compressor of the rotary type comprising a member having a plurality of compressor blades 26 and housed within a casing 27 the forward or delivery end of which terminates in a contracted mouth 28 arranged in close proximity to the compression bowl 29 into which it delivers the compressed gases. For the purpose of driving the rotary compressor, I provide a rotary steam turbine 30, mounted upon the same shaft as the compressor, which receives its motive fluid in the form of steam from the boiler 3 through the medium of the pipe 31 having a valve 32 to control the flow of steam to said turbine. This form of driving means will be employed after the apparatus has been working sufficient time to generate steam in the boiler, but when the burner is first started and there is no steam in the boiler to provide motive power for the turbine, I employ an external driving means consisting of a gas engine the drive shaft 33 of which is geared to the compressor shaft by the shafting 34 and gears 35.

When the burner has been running sufficient time to generate the required amount of steam to operate the turbine, the clutch 36 is thrown out and the compressor driven by the steam turbine, the valve 32 being operated to admit steam in required quantities to said steam turbine. This compressor serves a two fold function, the first to create a suction pressure at the oil and air valves causing the same to open to admit air and oil in proportional quantities, said compressor causing the air and oil to be drawn through the screen after which time they are thoroughly mixed into gas which is then stored in the mixing chamber 23, and the second, to compress the gases thus formed into a compression bowl 29. This compression bowl which constitutes the third section of the apparatus and which is connected with the second section by the flanges 7 is preferably spherical in shape and serves to compress and hold the gases produced under a constant pressure when passing to the burners. Communication between the mixing chamber 23 and the compression bowl 29 is controlled by a valve 37. A compression gage 53 is tapped into the bowl 29 for indicating the pressure of the gases therein. Set into an opening 38 in the masonry supporting structure 39 for the boiler 3 is a metallic fire drum 40 the front of which is in the form of a dome 41 having flanged connections 8 with the compression bowl 29. Mounted in the inner wall of the dome 41 are a plurality of burners or jets 42 each of which is bent in the arc of a circle as shown in Fig. 3 whereby the gas and consequently the flames issuing therefrom are compelled to travel forward in a circle or whirl-spray. For various reasons I have found this feature to be advantageous over the straight or direct flame. Communication between the compression bowl and the burners is controlled through the medium of a valve 43. For initially lighting the gases as they issue from the burners or jets 42 to start the apparatus in operation I provide an ignition system consisting of a plurality of ignition wires 44, each of the burners 42 carrying a wire 45 respectively which is insulated from the burner by a fire insulating covering which latter acts also to electrically insulate said wires from the metallic burners. The ends of the wires are of course uncovered to provide one sparking terminal of the system. The wires connected with the several burners are joined to a common terminal 46 also insulated from heat and electricity. A lead wire 47 connects the terminal 46 through a switch 48 with the battery 49 the return wire 50 leading from the battery 51 and being grounded in the metal dome at 52, thus completing the circuit.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A gaseous fuel burner comprising a

casing, an oil supply device, an air supply means, a mixing device within said casing and adjacent the air and oil supply means, a mixing and storing chamber, a pressure producing means within said mixing chamber, a compression chamber communicating with said mixing chamber and a plurality of burners communicating with said compression chamber.

2. A gaseous fuel burner comprising in combination with a casing forming a mixing chamber, an oil supply reservoir arranged in one end thereof and having an annular series of oil feed valves arranged adjacent the edge of one face thereof, an annular series of air valves arranged in said casing and adjacent said oil feed valves, a mixing screen arranged in front of said oil valves, a pressure producing gas compressor supported within said casing, a compression chamber in communication with said mixing chamber, a fire drum connected with said compression chamber and a plurality of arcuate burner tubes mounted in said drum and communicating with said compression chamber.

3. A gaseous fuel burner comprising in combination with a fuel supply and mixing means, a gas pressure producing means, a chamber for receiving and holding the gases compressed thereby, a fire drum, a plurality of burners mounted therein and in communication with said gas holding chamber, an ignition point connected with each of said burners and insulated therefrom, and an ignition circuit for producing an igniting spark at the tips of said burners for starting the burner.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE M. WOLVERTON.

Witnesses:

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