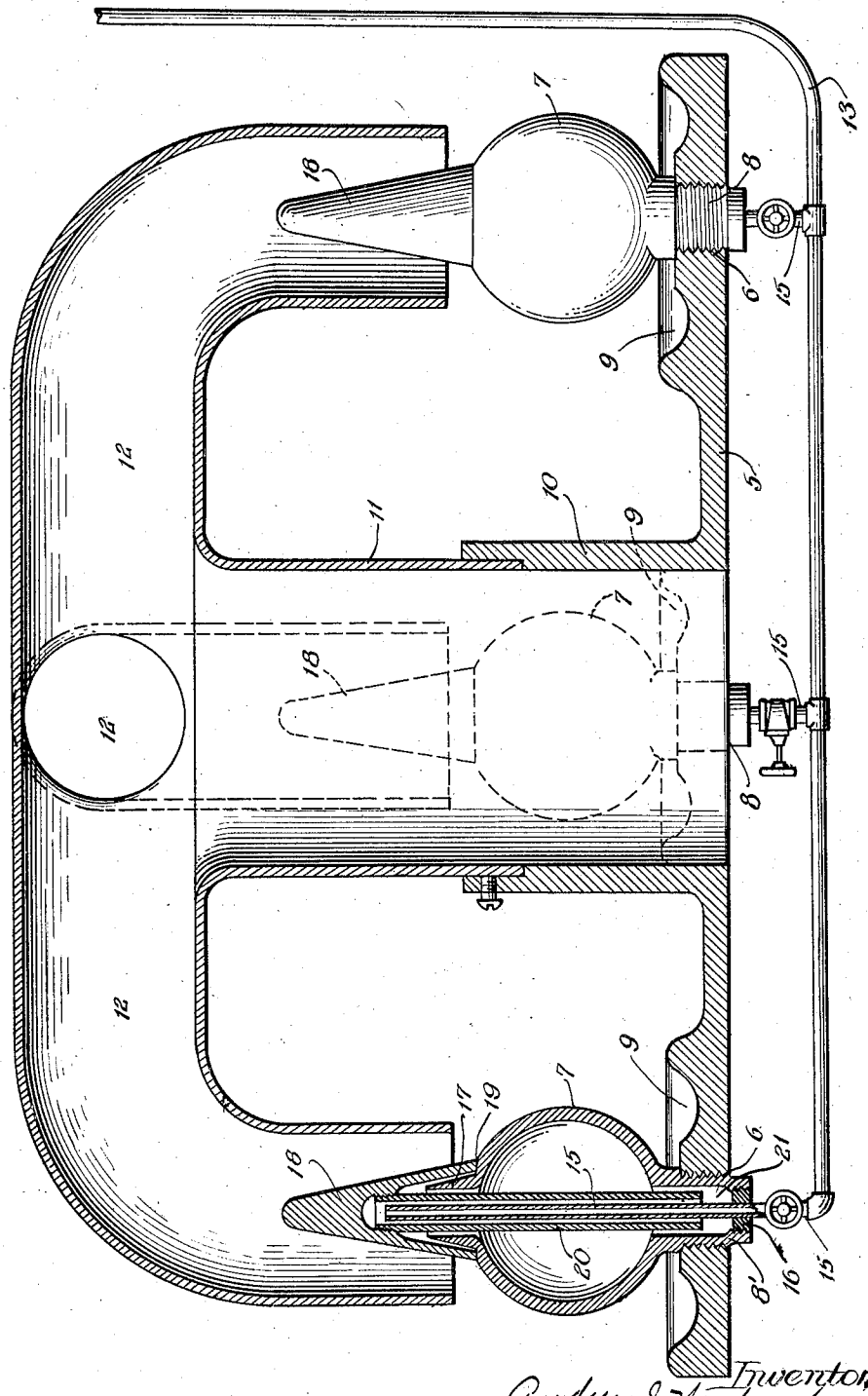
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FUEL OIL BURNER

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FUEL-OIL BURNER.

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The object of this invention is to provide a burner of comparatively simple and inexpensive construction which can be easily applied to the ordinary furnace for burning what is now sold as heating oil and other forms of oil fuel.

A further object of the invention is to provide a burner in which the oil is reduced to a gaseous state and permitted to feed from the burner for combustion exteriorly thereof and within the combustion chamber of a furnace.

And a further object of the invention is to produce the gas in the burner and hold it therein under pressure automatically controlled to permit the gas to feed to the outside of the burner in desired volume for combustion.

And a further and important object of the invention is to provide a burner which will promote perfect combustion of the oil fuel without the objectionable deposition of carbon or soot on the burner, which would be liable to interfere with its operation and reduce its efficiency.

Further objects of the invention will appear hereinafter in the detail description of the selected embodiment of the invention which is illustrated in the accompanying drawing, wherein the view shows a section of a four-unit burner with one of the units in section.

Referring to the drawing, 5 is a base plate which is provided with threaded openings 6 to receive the generators 7 which have a contracted neck 8 screw-threaded into the openings 6. The base plate is provided with a trough 9 at the bottom of each generator adapted to receive a priming charge of oil for lighting the burner and to collect any unconsumed oil which may flow down the side of the burner when it is first lighted. In the four-unit type of burner illustrated, the plate is also provided with a centrally disposed tubular collar 10, to which is secured a tubular dome 11 having four tubular branches 12 extending laterally therefrom and turned down to supply air to the burners.

A pipe 13 is connected with an oil supply tank (not shown) and is adapted to deliver the oil through valved branches 15 to each of the burners. Each branch 15 is secured in a plug 16 which is screw-threaded in the bottom of the neck 8 of the generator 7. The generator has a tapered outlet 17 which extends above the body of the generator and the branch oil pipe 15 projects upward through and above this outlet. A cap 18 is shaped to fit upon the tapered outlet of the generator and the lower edge of the cap is ground to seat snugly on a ground seat 19 on the generator body at or about the bottom of the tapered outlet 17. A tube 20 of greater interior diameter than the exterior diameter of the branch oil pipe 15 is secured at its upper end in the cap and surrounds the branch oil tube and extends down thereon within the neck 8 of the generator, terminating above the plug 16.

In practice the oil flows by gravity from the supply tank through the pipe 13 to the branch pipes 15 and from the top of these pipes the oil flows slowly down between the branch oil pipes and the tubes 20 to the wells 21 within the necks 8 of the generators, and up into the generators. The supply pipe is provided with a shut-off valve (not shown) to prevent the flow of oil from the supply tank if the burner is not to be maintained in operative condition. To light the burner a priming supply of oil will be delivered into the troughs 9 and ignited, or a torch will be applied to the burner to provide sufficient heat for starting the generation of gas and for causing the oil in the generator to flow out from under the cap and down the sides of the body of the generator. This oil will be immediately ignited to produce heat for continuing the operation started by the priming charge or torch of converting the oil within the generator into gas and for forcing the oil and gas out of the generator. It will be understood of course that at first oil will flow out of the generator but, as this oil becomes ignited and produces heat, gas will be formed in the generator and in a short time the generator will be full of gas, the oil being forced out from beneath the cap or forced back into the tube 20. I am unable to estimate just when this will take place because conditions vary so greatly, but as I now understand the theory of operation of the burner, from many tests extending over many months, I believe the generator becomes charged with gas within a very few minutes after the burner is lighted. I reach this conclusion because I have observed repeatedly that at first the oil runs down the sides of the gen-

erator body and burns freely thereon, but gradually, and I mean within a very few minutes, the oil ceases to run and the gas flows instead thereof, producing a flame around the body below the seat. I have operated a single-unit and a four-unit burner for many hours continuously and for many days and I have never discovered any indication that the gas pressure backs up the oil sufficiently to prevent the generation of gas. These extensive tests have seemed to indicate that there is always some oil in the well 21 and this oil is being constantly replenished by the flow, in more or less limited quantity, from the top of the branch oil pipe. The down-turned branch of the dome encloses a part of the cap and preferably terminates just above the seat so that it will supply sufficient air where the gas escapes from the interior of the burner to provide for combustion as perfect as can be obtained. When the burner is in complete operation it will continue operating indefinitely, and my extensive tests of long duration have indicated that so long as the burner is operating the gas will be generated with sufficient pressure to lift the cap and permit a sufficient quantity of gas to escape for continuing combustion; and at the same time the gas pressure produced will not be sufficient to prevent the flow of oil supply by gravity. In other words, there seems to be a sufficient factor of safety in this respect in the construction whereby the oil flows up through the branch pipe to the top thereof and over the top and down between the branch pipe and the tube to the bottom of the tube before it enters the generator, so that the gas pressure will never be sufficient to prevent the flow of oil. The gas is delivered from the generator by its own pressure when sufficient to lift the cap 18 off the ground seat upon which it normally rests. The cap is unseated automatically more or less as the pressure increases or diminishes to allow the gas to escape from the generator, and the cap is unseated only to the extent required to allow the gas to escape. By this means I prevent the formation and accumulation of carbon where the gas escapes, because the escape opening is not like a fixed opening, but varies in extent with the variation in the gas pressure; and furthermore, the escaping gas has the effect of cleaning the seat for the cap. Since the escape opening will increase in size with the increase in gas pressure, there will be no liability of gas exploding in the generator. The oil well 21 and the space between the tubes 15 and 20 provide for a constant supply of oil for the generator and prevent back pressure of the gas, which would have a tendency to produce an intermittent or fluctuating flame.

My invention is simple in construction, it can be manufactured at comparatively low cost, it can be easily installed in any furnace, it is easily ignited, and once ignited will operate automatically. I have found in practice that practically perfect combustion is obtained with this burner. The burner operates without odor and without any more noise than is furnished by the flame, and this noise, of course, will depend upon the number of units, the size thereof and other conditions well known to those skilled in the art. I have indicated a burner comprising four units, which I have found suitable for an ordinary dwelling hot water, steam, vapor or hot air heating furnace, and I believe a four-unit burner will be sufficient for the average size dwelling; but I do not limit my invention to this adaptation and reserve the right to embody it in a single unit or in any multiples thereof as may be found desirable. And while I have designed and tested my improved burner primarily for domestic use in dwellings and small offices, I contemplate constructing it for larger capacities, with such changes as may be necessary, for apartment buildings and other uses.

I have shown the generator having the form of a spherical body because this is a form which I have found satisfactory in tests, but it may be varied in form and produce satisfactory results; and while it has many desirable advantages, I do not limit myself to a generator having a spherical body. I also reserve the right to make any changes in the form, construction and arrangement of parts of my improved burner as fall within the scope of the following claims.

I claim:

1. An oil burner comprising a hollow gas generator having an outlet and a seat at the top thereof, said generator being adapted for the generation of gas therein, an oil pipe projecting up through the generator, and a cap over the upper discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator and adapted to be unseated by the gas generated in the generator.

2. An oil burner comprising a hollow gas generator having a tapered outlet nipple at the top thereof and a seat around said outlet, an oil pipe projecting up through the generator and above said outlet, and a cap arranged over the upper discharge end of the oil pipe and over said generator outlet and engaging said seat to close the gas outlet from the generator and adapted to be unseated by the gas pressure generated in the generator.

3. An oil burner comprising a hollow gas generator having an outlet at the top thereof and a seat around said outlet, an oil pipe projecting up through the generator, a cap

over the discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator, and a tube surrounding the oil pipe and engaged with and suspended from said cap.

4. An oil burner comprising a hollow gas generator having a tapered outlet nipple at the top thereof and a seat around said outlet, an oil pipe projecting up through the generator and above said outlet, a cap over the upper discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator, and a tube surrounding said oil pipe and suspended within the generator from said cap.

5. An oil burner comprising a hollow gas generator having a spherical body, an outlet at the top of the body and a seat around said outlet, an oil pipe projecting up through the generator, and a cap over the upper discharge end of the oil pipe and engaging said seat to close the gas outlet from the generator.

6. An oil burner comprising a hollow gas generator having a neck at the bottom and an outlet at the top thereof, a plug closing the neck, an oil pipe extending up through said plug and generator, a seat on the generator around said outlet, and a cap over the upper discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator.

7. An oil burner comprising a hollow gas generator having a body with a neck at the bottom and an outlet at the top, a plug closing the neck, an oil pipe extending up through said plug and body, a seat on the generator around said outlet, and a cap over the discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator, and a tube surrounding the oil pipe and suspended from the cap with its lower end located in the neck of the generator.

8. An oil burner comprising a gas generator having a hollow spherical body, a hollow neck at the bottom of the body and an outlet nipple at the top of the body, a plug in the lower end of the neck, an oil pipe extending up through said plug and projecting above the outlet, a seat around said nipple, a cap over the discharge end of the oil pipe and over the generator outlet and engaging said seat, and a tube surrounding and spaced from the oil pipe and suspended from said cap with its lower end located within a space from the neck between the body of the generator and said plug.

9. An oil burner comprising a plate having a threaded opening therein and a trough on its upper side surrounding said opening, a hollow gas generator having a neck threaded in said opening and an oppositely disposed outlet, a seat on the generator surrounding said outlet, a plug in the lower end of the neck, an oil pipe extending up through the neck, and a cap over the upper discharge end of said pipe and engaging said seat.

10. An oil burner comprising a plate having a threaded opening therein and a trough on its upper side surrounding said opening, a hollow gas generator having a neck threaded in said opening and an oppositely disposed outlet, a seat on the generator surrounding said outlet, a plug in the lower end of the neck, an oil pipe extending up through the neck, a cap over the upper discharge end of said pipe and engaging said seat, and a tube surrounding and spaced from the oil pipe and suspended from said cap with its lower end located in said neck and spaced therefrom.

11. An oil burner comprising a hollow gas generator having an outlet at the top thereof and a seat around said outlet, an oil pipe projecting up through the generator, a cap over the upper discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator, and an air supply tube surrounding the cap and spaced therefrom.

12. An oil burner comprising a hollow gas generator having an outlet at the top thereof and a seat around said outlet, an oil pipe projecting up through the generator, a cap over the upper discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator, and an air supply tube surrounding the cap and spaced therefrom and terminating above said seat.

13. An oil burner comprising a base plate having a tubular collar, a hollow gas generator mounted on the plate and having an outlet at the top thereof and a seat around said outlet, an oil pipe projecting up through the generator, a cap over the upper discharge end of the oil pipe and over the generator outlet and engaging said seat to close the gas outlet from the generator, and an air tube mounted on said collar and depending over and surrounding said cap and spaced therefrom.

14. An oil burner comprising a base plate having a centrally disposed tubular collar, a plurality of hollow gas generators mounted on said plate and each having an outlet at the top thereof and a seat around said outlet, an oil pipe projecting up through each generator, a cap over the upper discharge end of the oil pipe and engaging the seat to close the outlet from the generator, and a dome mounted on said collar and having tubular branches projecting over and surrounding said caps.

15. An oil burner comprising a hollow generator having a body with an opening at

the top thereof and a bearing surface around said opening, a weighted cap for closing said opening and having a bearing surface to engage the bearing surface on the body, said bearing surface being ground to form a seat, means for supplying oil to said generator, whereby under the application of heat the oil in the generator is gasified until the pressure is sufficient to lift the cap and permit the escape of the gas to be ignited and burned on the exterior of the generator, said burning of the gas heating the generator to cause continued generation of gas therein.

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