

G. R. SHANKLIN.
HYDROCARBON OIL BURNER.
APPLICATION FILED JAN. 8, 1912.

1,065,277.

Patented June 17, 1913.

2 SHEETS—SHEET 2.

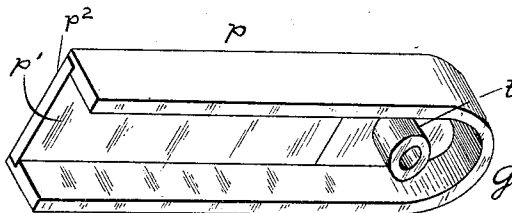
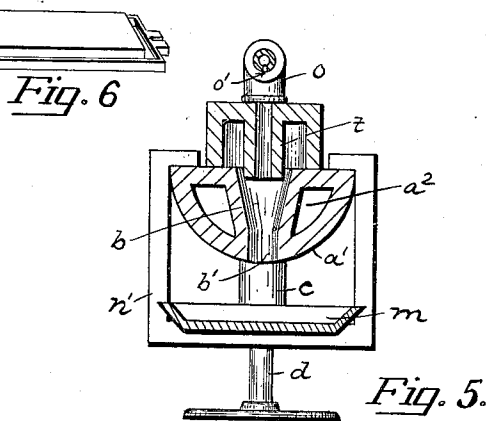
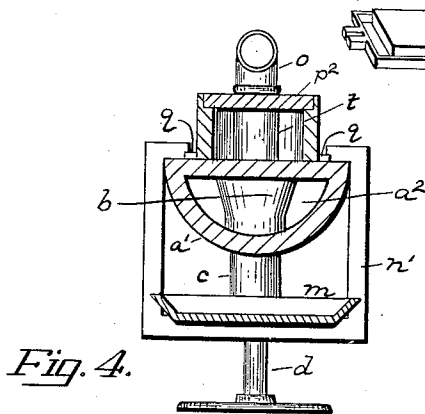
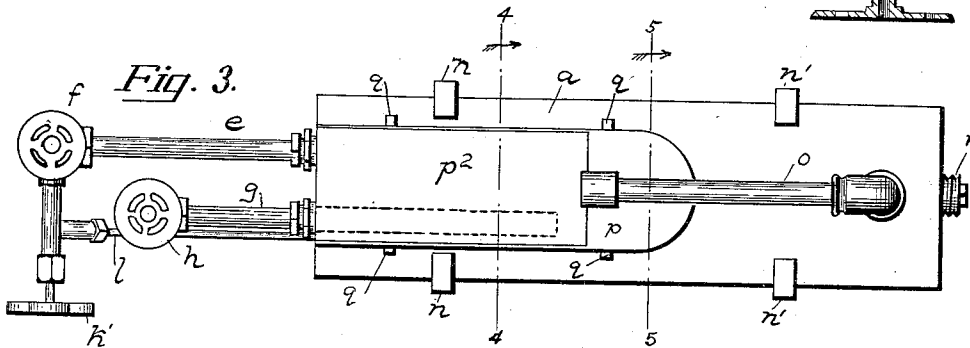
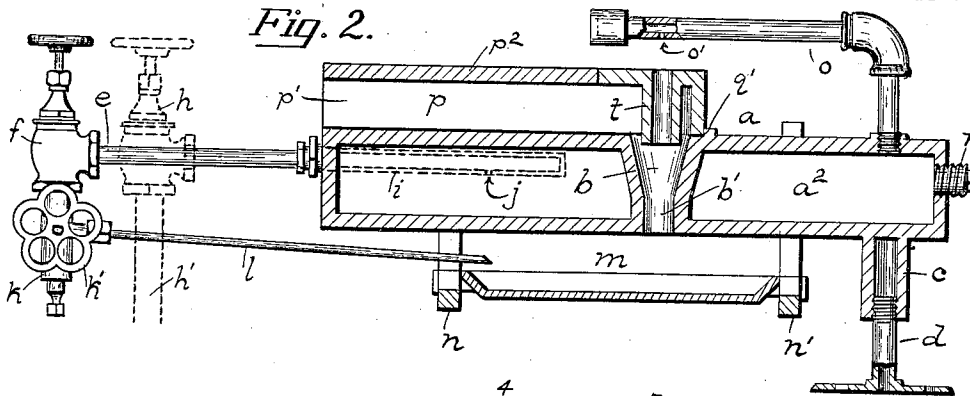


Fig. 7.

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HYDROCARBON-OIL BURNER.

1,065,277.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed January 8, 1912. Serial No. 670,096.

To all whom it may concern:

Be it known that I, GEORGE R. SHANKLIN, a citizen of the United States, and a resident of Portland, county of Multnomah, and State of Oregon, have invented a new and useful Improvement in Hydrocarbon-Oil Burners, of which the following is a specification.

My invention relates to the improving of oil burners of the type generally used in stoves, furnaces and other types of heating apparatus.

My invention has for its object to produce a simple and inexpensive burner, easy to operate, and giving efficient results.

My burner is further particularly designed to burn with an intensely blue flame and to prevent the excessive deposit of soot on the retort.

My further object is to so adapt my burner that by a slight modification of construction water may be vaporized in the burner for producing steam to assist in the gasification of the fuel oil and to produce therewith a highly combustible mixture. The use of steam, however, is optional.

My burner is furthermore so adapted that it will supply a constant stream of air for intermixing with the jet of gas produced by the vaporized oil, and that it will draw such supply of air from a point sufficiently distant from the flame and its products of combustion so as to reach the point of intermixture free from contaminating gases—the products of combustion—and thus increase the efficiency of my burner.

I attain the objects of my invention by the devices and combination of parts hereinafter fully described and illustrated in the accompanying drawings constituting a part of this specification.

In said drawings: Figure 1 is a side elevation of my burner including the provision of an auxiliary pipe introducing a spray of water to be converted into steam, the use of such pipe being optional, however, as mentioned; said auxiliary pipe may also be connected with a boiler for injecting steam into the retort; Fig. 2 is a longitudinal central section of my burner; Fig. 3 is a plan or top view of my burner arranged as shown in Figs. 1 and 2; Fig. 4 is a cross section on a line 4—4 of Fig. 3; Fig. 5 is a cross section on a line 5—5 of Fig. 3; Fig. 6 is a detail, in smaller scale, of a modified form of spreader plate, more fully described in the

body of my specification; Fig. 7 is a perspective view of the underside of the removable dome constituting the air-inlet of my burner and having extending through such portion the nipple, through which the jet of gas is injected into the mixing chamber, as will hereinafter be more fully explained.

a represents an elongated or longitudinally extending gas generator or retort having a bottom formed convex, in cross section, on the exterior, as at *a'*, and providing a generating chamber *a*², in which is cast a funnel-shaped mixing chamber *b*. *c* is a hollow standard adapted to be affixed on the threaded end of a leg *d*. At the front end of the retort, *a*, is introduced an oil pipe *e*, controlled by a valve *f*; and if my burner is to be adapted to generate steam within the retort, I further provide a water (or steam) pipe *g*, controlled by a valve *h* and connected to a tube *i*, closed at one end, extending into the retort, and provided with an orifice, or steam outlet *j*. From the oil supply pipe *e* extends a pilot pipe *l* to a spreader-pan *m* supported by adjustable hangers *n*, *n'*. Over the top of the retort, *a*, extends a pipe *o*, closed at its extremity and provided with an orifice at *o'* through which gas is ejected through the nipple *t*, preferably formed integrally with the dome *p*. The latter is preferably merely set on the top of the retort, held properly positioned by lugs *q*, *q'*, so that it may be removed. The jet of primary intermixture of gas and air passes through the nipple *t* into the funnel-shaped mixing chamber *b*, in which a second intermixture takes place, which final intermixture ignites at the outlet end *b'* of the mixing chamber. The air drawn into the mixing chamber, *b*, is taken in at the mouth *p'* of the dome *p*; and, by reason of the construction described, the air so drawn in is not deteriorated by coming into contact and being intermixed with the products of combustion of the flame, but reaches the top or inlet of the mixing chamber in an uncontaminated state. The flame of the burning gases begins at the outlet *b'* and thence is spread by the spreader-pan *m* over the whole of the bottom of the generator. The dome *p* may be cast in one piece or with a removable top-plate *p*², as deemed convenient.

When my burner is to be adapted to generate or introduce steam in the retort, *a*, the pipe *h'* is connected either with a head

of water, so as to run in a very small stream of water into the steam generator *i*, or else it may be connected directly with the steam boiler, and the steam permitted to escape through the orifice *j*.

My burner is started as usual by opening the valve *k'* so as to permit a small portion of the oil to run through the pilot pipe *i* into the spreader pan *m*. The oil in the latter is then ignited so as to heat the generator, *a*, to the degree required for the vaporizing of the oil, and when that result has been obtained, the valve *f* is opened to feed the oil into the generating chamber *a'* of the retort *a*.

The making of the dome *p* removable is of special advantage, in this, that this piece may be kept thoroughly clean; and, furthermore, when the dome is removed access is freely had to the funnel-shaped mixing chamber *b*, facilitating the cleaning of the latter.

r merely represents a plug closing the hole left in the casting of the generator *a*.

The convexed bottom of the retort, *a*, has several objects. Among others it prevents the accumulation of soot or carbon from the burning oil, as generally occurs when the retort bottom is made flat. It further allows the flames to be spread over the convexed surface of the retort, which is essential in range heating; and it presents a greater surface to the flames deflected against it by the spreader-pan, and hence heats up and gasifies the oil more quickly.

The type of spreader-pan shown in Fig. 6 is preferably used in all types of fire boxes, except ranges. This type of spreader-pan causes the flames impinged against its top flat surface to flatten and spread laterally in all directions against the walls of the fire box.

In ranges, the type of spreader-pan shown in Figs. 1 and 2, for example, is preferable. The construction of the gas and air mixing devices of my burner is designed to accomplish an efficient intermixture of gas and air, so as to produce an intensely hot blue burning flame. By reason of the nipple *t* extending only slightly into the upper part of the mixing chamber *b*, the gas and air projected through the latter draw in a much greater volume of air than if the nipple *t* projected farther down into said intermixing chamber *b*. The discharge end of the nipple *t* and the outlet *b'* of the mixing chamber *b* are purposely spaced considerable distance apart, so as to afford an ample opportunity for the thorough intermixing of the gas and air. The rush of gases downward toward the outlet *b'* of the mixing chamber *b* restrains the ignition of the gases inside of the mixing chamber and in so doing prevents the intense and destructive heating of the casing of the mixing chamber. The funnel-shape construction of the

mixing chamber, namely the making of approximately the upper half thereof conical, so as to insure the thorough intermixtures of the hydrocarbon gases with air, and the making of the lower half contracted to a cylindrical orifice extending from the discharge end of the lower part *b'* to such upper conical portion, prevents the flame from being drawn back into the mixing chamber. It also reduces the roar of the burning gases, since much of this noise is due to the vibrations caused by the frequent drawing in of the flame into the discharge end of the mixing chamber.

I claim:

1. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a longitudinally extending retort, a funnel-shaped mixing chamber provided in said retort; a dome mounted on the retort constituting an air intake; a gas and air mixing nipple extending from the exterior through said dome, and entering centrally the upper portion of said mixing chamber; said dome adapted to take in air at a point distant from said gas and air mixing nipple, and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

2. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a longitudinally extending retort having a bottom made convex in cross section on the exterior; a funnel-shaped mixing chamber provided in said retort; a dome mounted on the retort constituting an air intake; a gas and air mixing nipple extending from the exterior through said dome, and entering centrally the upper portion of said mixing chamber; said dome adapted to take in air at a point distant from said gas and air mixing nipple, and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

3. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a longitudinally extending retort having a bottom made convex in cross section on the exterior; a funnel-shaped mixing chamber provided in said retort; a dome removably mounted on the retort constituting an air intake; a gas and air mixing nipple extending from the exterior through said dome, and entering centrally the upper portion of said mixing chamber; said dome adapted to take in air at a point distant from said gas and air mixing nipple, and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

4. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a longitudinally extending

retort; a funnel-shaped mixing chamber provided in said retort; a dome mounted on the retort constituting an air intake; said dome extending longitudinally to one end of the retort and formed with a gas and air mixing nipple entering centrally from the exterior into the upper portion of said mixing chamber; and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

5. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a longitudinally extending retort having a bottom made convex in cross section on the exterior; a funnel-shaped mixing chamber provided in said retort; a dome removably mounted on the retort constituting an air intake; said dome extending longitudinally to one end of the retort and formed with a gas and air mixing nipple entering centrally from the exterior into the upper portion of said mixing chamber, and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

6. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a retort, a funnel-shaped mixing chamber provided in said retort, a dome mounted on the retort constituting an

air intake, and a gas and air mixing nipple extending from the exterior through said dome, and entering centrally the upper portion of said mixing chamber, and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

7. In a hydro-carbon burner of the type described, including a spreader-pan, the combination of a retort, a mixing chamber provided in said retort, said mixing chamber formed conical in its inlet or upper portion, such conical portion terminating in an outlet of small bore, said outlet extending from the discharge end of the mixing chamber approximately into the middle thereof, whereby the liability of the flame striking back into the mixing chamber is lessened; a dome mounted on the retort constituting an air intake; a gas and air mixing nipple extending from the exterior through said dome, and entering centrally the upper portion of said mixing chamber, and a pipe extending from said retort over said nipple, said pipe provided with an orifice adapted to eject the gas through said nipple.

GEORGE R. SHANKLIN.

Witnesses:

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