Feb. 9, 1926. 1,571,962

W. H. OVERTON

LIQUID FUEL BURNER

Filed Oct. 20, 1924 2 Sheets-Sheet 1

Fig. 1

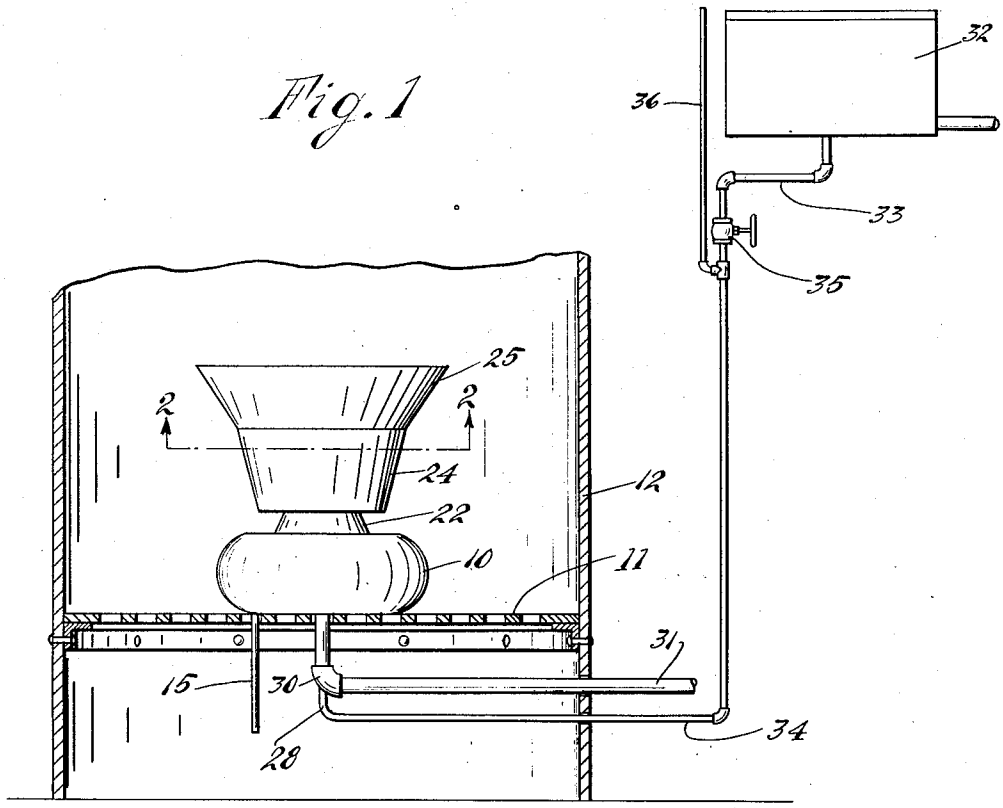
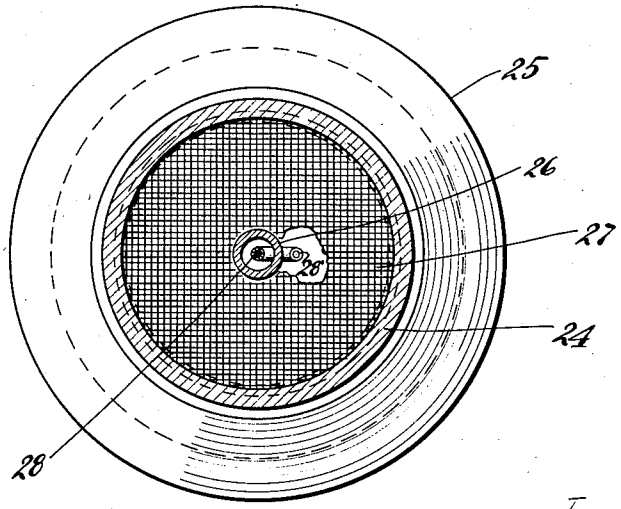


Fig. 2



Witnesses:
W. Schmidthardt
J. D. Stuwe

Inventor:
William H. Overton
By Joshua R. H. Potts
His Attorney.

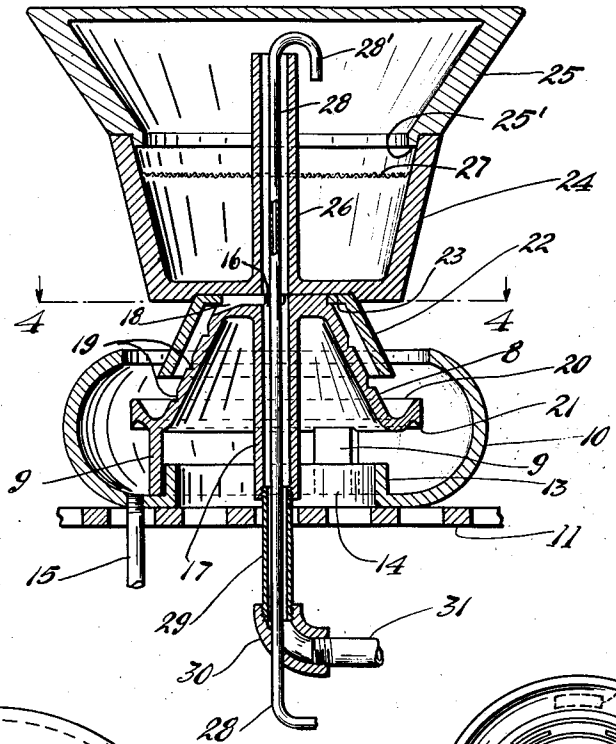
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Fig. 3



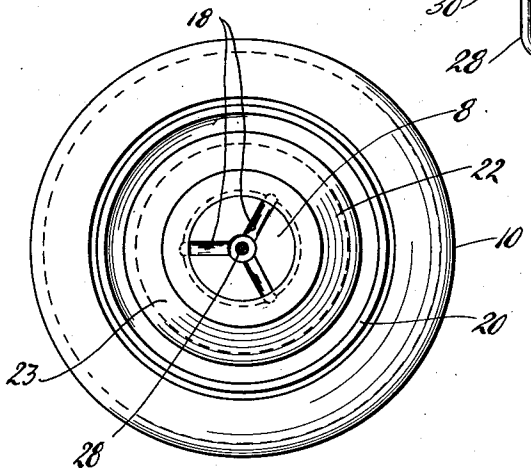


Fig. 4

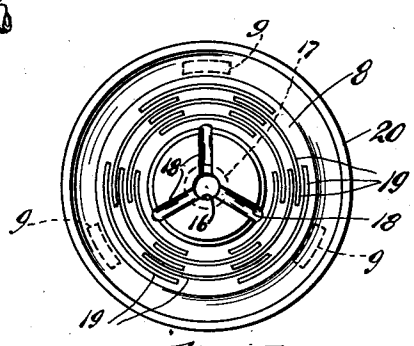


Fig. 5

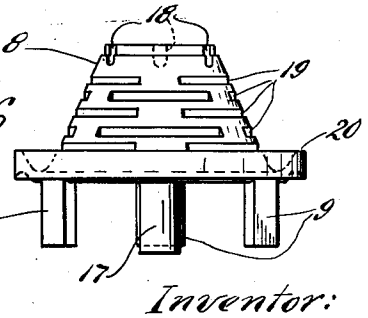


Fig. 6

Witnesses:
W. Schmidthandt
J. D. Stowe

Inventor:
William H. Overton
By Joshua R. H. Potts
his Attorney.

Patented Feb. 9, 1926. 1,571,962

UNITED STATES PATENT OFFICE.

WILLIAM H. OVERTON, OF CHICAGO, ILLINOIS.

LIQUID-FUEL BURNER.

Application filed October 20, 1924. Serial No. 744,530.

To all whom it may concern:

Be it known that I, WILLIAM H. OVERTON, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Liquid-Fuel Burners, of which the following is a specification.

My invention relates to a liquid fuel burner, and has for its main object to supply a burner of this kind which is mountable in a furnace or steam boiler, and is provided with an appliance which will generate liquid fuel gas or oil gas and steam and commingle them with air so thoroughly and uniformly as to produce substantially complete combustion, thereby avoiding practically all accumulation and deposition of carbon, and as a result eliminating substantially all noise generally produced with the usual type of oil burner in a furnace. Another object is to provide means for regulating the flow of water and to feed it in drops to the burner within the furnace; and furthermore to provide means to generate said regulated drops into steam within the furnace and there conduct and cause said steam to thoroughly commingle with the fuel gas generated from the heated oil flowing over the burner. And another object is to provide steam generating means with safety appliance which preferably includes separable container members arranged to move apart and permit the steam to escape when its pressure becomes excessive.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification and in which,

Fig. 1 is an elevational view showing one form of my invention mounted in position in a furnace;

Fig. 2 is an enlarged inverted sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view of the burner and steam generating apparatus;

Fig. 4 is a plan view taken on line 4—4 of Fig. 3 and above member 22; and

Figs. 5 and 6 are respectively, a plan and an elevational view of the burner cone.

The particular form of my invention illustrated in the drawings comprises a conical type of liquid fuel burner or oil burner 8 resting with legs 9 in a burner support and safety dish 10 which is seated and supported on the grate 11 of a furnace 12, or this burner support may be mounted in any suitable way in the furnace. Said safety dish 10 is provided with an inner collar 13 forming a central air inlet 14 therein, and a drain pipe 15 leads from the bottom of the burner to a suitable receptacle, to drain excess oil and act as a safety appliance. The burner is provided with an outlet 16 at its top to which the liquid fuel is supplied through an inlet conduit 17, which is preferably formed integral with the top of the burner cone, and from this top outlet the fuel flows through upper radial grooves 18 emptying into channels or grooves 19 which extend circumferentially of said cone and overlap to spread the fuel thereon. A trough 20, for holding the usual asbestos wicking (not shown), is formed integral with the bottom of the cone, and a downwardly pointed flange 21 is formed at its bottom to lead the oil drops outwardly and prevent oil from flowing underneath the cone. A cap 22 is mounted with an inner annular flange 23 over the upper, slightly contracted part of said cone, and is spaced from its circumference, thus permitting the generating of fuel gas from the descending liquid fuel flowing over the heated burner beneath the heated cap, and permitting the commingling with the fuel gas and with the air surrounding said burner at the lower part of said cap.

This burner construction I provide with a steam generating apparatus which forms the essential part of my invention, and which will be arranged and modified to suit the various types of burners already on the market. This apparatus comprises a container including two parts, the lower pan-shaped part 24 forming the main generating chamber which is mounted and firmly seated on cap 22 by means of a cut-out portion, and an upper or cover part 25 is mounted for upward movement on said lower part with an annular flange 25′ engaging in part 24, adapting said parts to separate and to permit the escape of steam when the pressure thereof within said separable parts becomes excessive. A tube 26 rises from the bottom of part 24 and forms means for conveying steam from the container to the burner, and also acts to fully vaporize all particles of water into gas or steam to pre-

vent water particles reaching the liquid fuel; while a screen or diaphragm 27 is mounted in the upper portion of part 24, and serves the purpose of breaking up the drops of water and of inhibiting water which may reach the bottom of the highly heated part 24 from splashing upwards and from getting into tube 26.

The means provided for feeding water into this container includes a fed pipe 28, preferably of copper and being bendable, which extends through inlet conduit 17 and through a fuel supply pipe 29 attached to said conduit, also through the wall of an elbow 30 attached to pipe 29, being brazed air-tight into said wall, said pipe 28 being then bent and leading transversely out of the furnace. The top of pipe 28 extends through tube or well 26 and is bent over as shown at 28′ to discharge the water in drops into the steam generating container. A fuel supply pipe 31 connects elbow 30 with a suitable source of fuel supply.

Means are provided for exactly regulating and feeding water in drop proportions to pipe 28 and into the container. This means comprises a suitable supply tank 32, mounted higher than the outlet of the bent portion 28′ of pipe 28, and a conduit 33 leads from said tank to pipe 28, forming therewith a lower water retaining portion 34 which provides a water column or trap in the portion of said conduit extending below the outlet of pipe portion 28′. A control valve or regulating valve 35, preferably in the form of a sight-feed valve, is interposed in pipe 33 for accurately regulating the supply of water and to feed it in drop proportions into the supply conduit through said pipe 28 and through portion 28′ into the container, for generating steam therein during the operation of the burner. A vent pipe 36 is connected into the supply pipe 33, immediately beneath valve 35, being positioned above the head of the standing water in said pipe which forms the head of the water column in portion 34 and is level with the outlet of bent portion 28′ of said pipe.

The upper portion of safety dish 10 is formed and placed so as to provide a mechanical mixing chamber in conjunction with the burner cone and the cap, for thoroughly and completely mixing the fuel gas, steam and heated air at the principal place of ignition.

With the use of this apparatus the oil is turned on and burned for several minutes, until the burner cone 8 and cap 22 are heated, whereupon the water is turned on by control valve 35, and is then fed in drop proportions, normally at the rate of from 40 to 80 drops a minute, these drops being formed into steam during the descent, and if any particles of water reach the heated bottom of lower part 24, the screen inhibits such particles from splashing up and getting into tube or well 26, or through said well onto the oil; this steam being chiefly generated in the lower part or chamber 24 and passing down through tube or well 26 to spread over and commingle with the fuel and fuel gas passing between cone 8 and cap 22. Hereby steam is generated and oil gas or liquid fuel gas is also generated within the furnace, and these gases are commingled and combined into a contact action and combination with the heated air thereby producing nearly a white or incandescent flame which yields the very highest, constant and intense heat, and eliminates the accumulation and deposition of practically all carbon. The mixture of these gases is so uniformly constant and the combination is so complete and highly efficient that nearly all noise is done away with in the burning of oil or liquid fuel by the use of my method and apparatus.

By extending the water feeding pipe 28 through the wall of elbow 30 and brazing it therein, a firm and air-tight connection is formed therewith, and by extending said pipe 28 through the fuel supplying conduit, the fuel flowing through said conduit is automatically cooled and is prevented from decomposing or forming fuel gas in said conduit, and this arrangement furthermore warms the water flowing in the upper part of pipe 28, thereby delivering warm water to the steam generating means of the apparatus.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a liquid fuel burner; an apparatus attached to said burner for generating steam and comprising a container formed of parts movable apart for escape of steam under excess pressure, a tube in one part for conveying steam to the burner, and a water supply conduit extending through said tube for delivering water in drops into said container.

2. In combination with a liquid fuel burner; an apparatus attached to said burner and comprising a container arranged to permit the escape of excess steam, a conduit for conveying steam from said container to said burner, a conduit extending through said first conduit for supplying water in

drops into said container, and reticulated means extending across an intermediate part of said container to break up particles of water and inhibit splashing thereof or passing thereof into the steam conveying conduit.

3. An apparatus comprising a liquid fuel burner; an appliance mounted on said burner and comprising a container of parts movable apart by excess steam pressure, a fuel supply tube on said burner, a tube extending upward from the lower part of said container for conveying steam to the burner, and a water supply conduit entering said container through both of said tubes and extending into the upper container part for feeding water in drops into said container.

4. In combination with a liquid fuel burner; an apparatus attached to said burner for generating steam and comprising a container formed of parts which are movable apart to permit escape of excess steam under pressure, a conduit for conveying fuel to the top of said burner, a tube in one of said parts for conveying steam from the container to the top of said burner to mingle with said fuel, and a water supply conduit extending through said tube for delivering water in drops into said container.

5. A liquid fuel burner comprising a conical burner provided with upper radial grooves and overlapping circumferential grooves for spreading liquid fuel over the cone surface, and a trough at the lower part of said cone having an outwardly pointed flange at its lower end to prevent fuel getting on the underside of said cone.

6. An apparatus comprising a conical burner provided with overlapping grooves around its circumference for spreading liquid fuel, a trough at the lower end of said burner with a pointed lower flange, a container mounted on said burner and arranged to permit escape of excess steam, and means for conveying water into said container and for generating it into steam.

7. An apparatus comprising a fluid fuel burner with a fuel supplying conduit including an inlet conduit in the burner, a water vaporizing appliance mounted on said burner, and a pipe entering through and fastened in the wall of said supply conduit, outside of said burner, and extending through the fuel flowing through said conduit for carrying cool water therethrough, to cool said fuel and prevent gasifying thereof in said conduit, and to deliver water warm into said appliance.

8. An apparatus comprising a liquid fuel burner; an appliance mounted on said burner and comprising a container including a lower body part and an upper cover part seated thereon to be moved upwards therefrom, a fuel supply tube on said burner, a tube formed integral with said lower part and extending upwardly in said container, and a water supplying tube extending through the tube on said burner and through the tube on said lower part for supplying water into said container to be converted into steam therein, said tube on said lower part providing a conduit for feeding steam from said container to said burner.

In testimony whereof I have signed my name to this specification.

WILLIAM H. OVERTON.