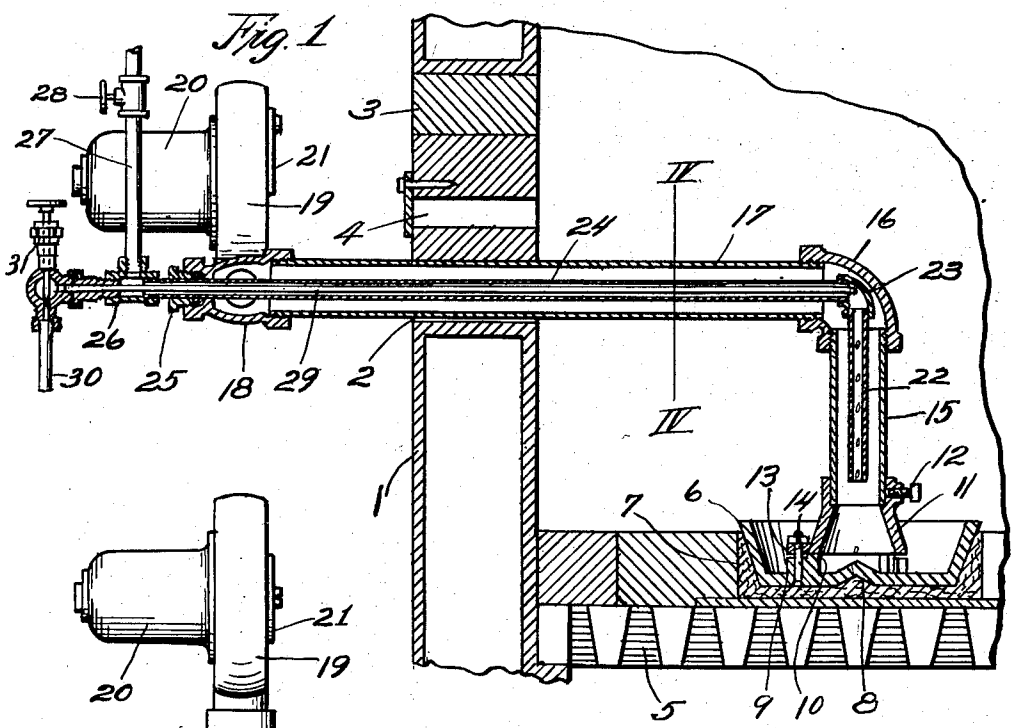
May 20, 1924. 1,494,651

N. E. TYRRELL

OIL BURNER

Filed March 20, 1922

Fig. 1



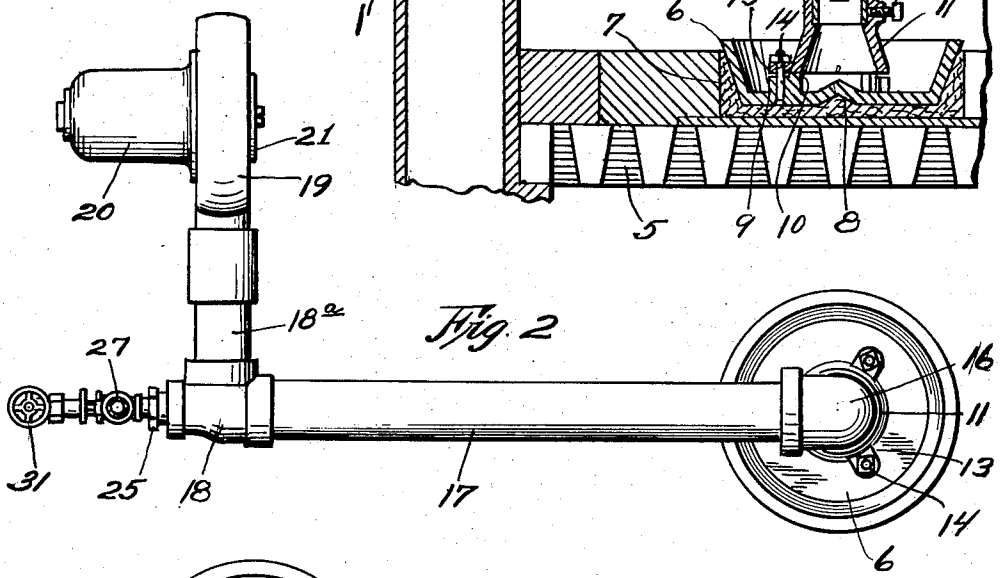


Fig. 2

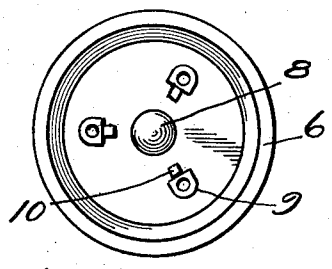


Fig. 3

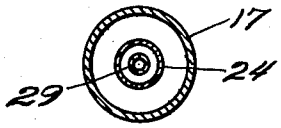


Fig. 4

Witness:

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By Thompson & Howard

Attys.

Patented May 20, 1924. 1,494,651

UNITED STATES PATENT OFFICE.

NATHAN E. TYRRELL, OF KANSAS CITY, MISSOURI.

OIL BURNER.

Application filed March 20, 1922. Serial No. 545,104.

To all whom it may concern:

Be it known that I, NATHAN E. TYRRELL, a citizen of the United States, and resident of Kansas City, county of Jackson, State of Missouri, have invented a certain new and useful Improvement in Oil Burners, of which the following is a complete specification.

This invention relates to power oil burners, and has for its object to produce an efficient burner whereby perfect combustion can be had without the noise invariably attendant upon the operation of a power burner in which gasification occurs in a confined space prior to ignition as in a pipe or retort, or where the fuel is atomized under the force of a blast.

It is well known that liquid burns without noise in an open pan or where otherwise unconfined, and I have discovered that efficient combustion can be obtained with but little attendant noise, by discharging fuel in liquid form and air under pressure into an open pan located in a combustion chamber.

Another object is to produce an oil burner in which the oil is fed by gravity to a pan located in a fire chamber and air is employed to guard against premature gasification of the fuel and to effect vaporization thereof in an unconfined space in the pan.

A further object is to produce a simple, durable and economical construction, by which the above objects are accomplished, and by which the combustible mixture thus produce is uniformly distributed radially within and radially discharged upwardly from the pan into the combustion chamber.

With the objects named in view the invention consists in certain novel and useful features of construction and organization of parts, as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawing, in which:—

Figure 1 is a vertical section taken through the burner in operative relation with a furnace;

Figure 2 is a top plan view of the burner;

Figure 3 is a top plan view of the fire pan; and

Figure 4 is a section on the line IV—IV of Figure 1.

In the said drawing, where like reference characters identify corresponding parts in all of the figures, 1 illustrates a furnace of any of the common and well known types, and 2 the fuel door opening thereof, which, as illustrated, is closed by fire brick or the like, and provided with a lighting port 4. The draft up through the grate of the furnace is cut off as indicated at 5, and resting on the grate bars is a fire pan 6, the wall of which slopes upwardly and outwardly in order to direct the flame radially upward against the walls of the combustion chamber, said pan being suitably insulated as at 7 from the grate bars, to provide a staple support for and prevent air leaks around the pan.

The fire pan is formed centrally of its bottom with a conical projection 8 on the axis of which the liquid fuel is adapted to impinge, as will be pointed out hereinbelow, and be thereby evenly distributed in all directions over the bottom of the fire pan. A series of upstanding lugs 9 provided with suitable bolt openings, are formed on the floor of the fire pan, and each of said lugs is equipped with an extension 10 of less width than the lug, as shown in the drawing to avoid unnecessary restriction of the space between the bottom of the fire pan and the periphery of the flaring-mouthed discharge nozzle 11, said nozzle being secured in position on an air-supply pipe, hereinafter described, by means of a set screw 12. The outer periphery of the nozzle is formed with a series of perforated ears 13 for engagement by bolts 14 extending from the pan, to securely clamp and hold the nozzle upon the extensions 10. In this connection it is desirable to point out that the distance between the periphery of the nozzle mouth and the bottom of the fire pan, is such that the area of the discharge opening is substantially equal to the cross sectional area of the air-supply pipe, so that the pressure of air forced through the pipe is not decreased or increased as it would be if the flow was impeded by passage through the discharge opening formed between the nozzle and the bottom of the fire pan if the space between the same was greater or less than the cross sectional area of the air pipe.

Connected to the upper end of the nozzle

and held in position by means of the set screw 12, is a vertical pipe 15 communicating at its upper end with an elbow 16 in communication with a pipe 17 extending exteriorly of the furnace through the fuel door closure, and terminating in a T-coupling 18, one of the branches of said coupling being connected to a pipe 18a leading to a blower 19, which is preferably rotated by means of a variable speed electric motor 20, or the supply of air may be varied to suit conditions by means of a damper-controlled air intake 21.

Within the pipe 15 and terminating a short distance above the lower end thereof, is a gas-feed pipe 22, connected at its upper end to an elbow 23, which in turn is connected to a gas-feed pipe 24 located centrally of the air-feed pipe 17, and thereby insulated from the heat of the combustion chamber by the air in said pipe 17. The outer end of the pipe 24 passes through a bushing 25 in the third arm of the T-coupling 18, and is connected to a T-coupling 26, having one of its arms in communication with a gas-supply pipe 27 controlled by a hand valve 28.

Located centrally of the gas-supply pipe 24 and spaced therefrom in any suitable manner is a liquid fuel or oil-supply pipe 29 which has its discharge end, preferably within the elbow 23, at a point directly above the point of the cone 8 of the fire pan so that oil flowing from said pipe shall fall directly on the cone and be evenly distributed in all directions over the bottom of the fire pan, and it will be apparent, in this connection, that the oil-supply pipe will be insulated from heat of the combustion chamber to prevent premature gasification of such fuel, by the gas-feed pipe 24 and also by the air-feed pipe 17. The pipe 29 passes exteriorly of the third arm of the T-coupling 26 and communicates with a gravity feed pipe 30 leading from a suitable source of oil supply, a needle valve 31 being employed to control pipe 30.

The operation of the device is substantially, as follows: The gas is turned on and ignited in any suitable manner, through lighting port 4, and as soon as the fire pan becomes hot, the oil valve is slightly opened to permit of a slow flow of oil through the pipe 29 from which it will drop through pipe 22, upon the hot cone 8 and be evenly distributed in all directions. This oil will be gasified upon coming into contact with the fire pan and will burn in combination with the gas flowing through the pipe 22. When the oil has gasified and is burning, the blower is started at slow speed, if equipped with a variable speed motor, or if not, the damper is so regulated as to limit the air supply, and the heat of the flame upon the addition of the supply of air under pressure is greatly increased. The gas supply may now be cut off and the oil and air supply gradually increased until the desired flame is secured within the combustion chamber, and it will be apparent in this connection that as the oil is gasified in a practically unconfined space, the open fire pan, there will be no appreciable amount of noise.

It will be apparent that as the oil burner embodying the invention has no jets or orifices of small size and in close proximity to the flame, the possibility of inefficiency of operation due to incrustation of and clogging with carbon is eliminated.

From the above description it will be apparent that I have produced a device of the character described, which possesses all of the features of advantage set forth as desirable, and while I have described and claimed the preferred embodiment of the same, I reserve the right to make all changes properly falling within the spirit and scope of the appended claims.

I claim:

1. In an oil burner, a fire pan having a central conical projection rising from the bottom, an upright air-supply pipe terminating at its lower end in a nozzle disposed concentrically of and above the bottom of the pan and spaced therefrom to provide a discharge opening of substantially the same capacity as the cross-sectional area of the air-supply pipe, means to supply air under pressure, to the upper end of the air-supply pipe, an upright insulating pipe within and spaced from the air-supply pipe, and terminating short of the lower end of the latter, and means to drop oil down through the insulating pipe and upon the apex of the conical projection without contact with the said insulating pipe.

2. The combination with a furnace having a controlled ignition port, a fire pan within the combustion chamber of the furnace, having a central conical projection rising from the bottom, an air-supply pipe extending into the furnace and terminating in a downturned discharge end disposed centrally of and above the fire pan and provided at its lower end, withing the pin, with a flaring nozzle, concentric of the conical projection, means to supply air under pressure, to said supply pipe, exteriorly of the furnace, a gas-supply pipe extending into and spaced from the air-supply pipe except at the entrance point of the former into the latter, and terminating in a depending part communicating with the air-supply pipe near the nozzle thereof and vertically above the said conical projection, and an oil-supply pipe extending into and spaced from the gas-supply pipe except at the point of entrance of the former into the latter, the discharge end of the oil-supply pipe being in vertical alinement with the bore of the

depending part of the gas-supply pipe so that oil can be dropped directly onto the conical projection.

3. In an oil burner, an upright air-supply pipe terminating at its lower end in a nozzle, means to supply air under pressure to the upper end of the air-supply pipe, an upright insulating pipe within and spaced from the air-supply pipe, and terminating short of the lower end of the latter, and means to drop oil down through the insulating pipe without contact with the said insulating pipe.

In witness whereof I hereunto affix my signature.

NATHAN E. TYRRELL.