Nov. 18, 1924. 1,515,804

T. D. BRENNAN

OIL BURNER

Filed April 23, 1924 2 Sheets-Sheet 1

Fig. 2.

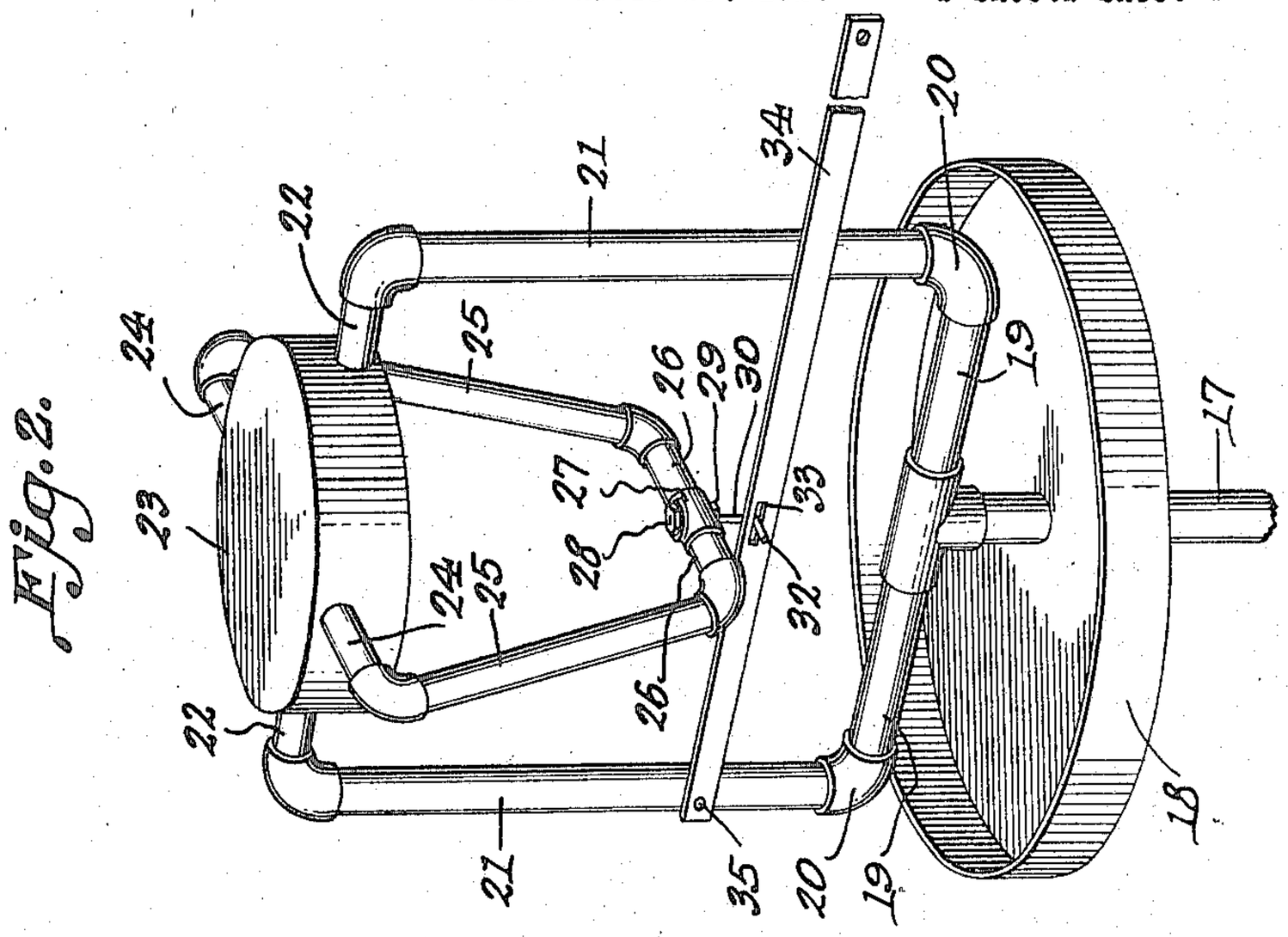
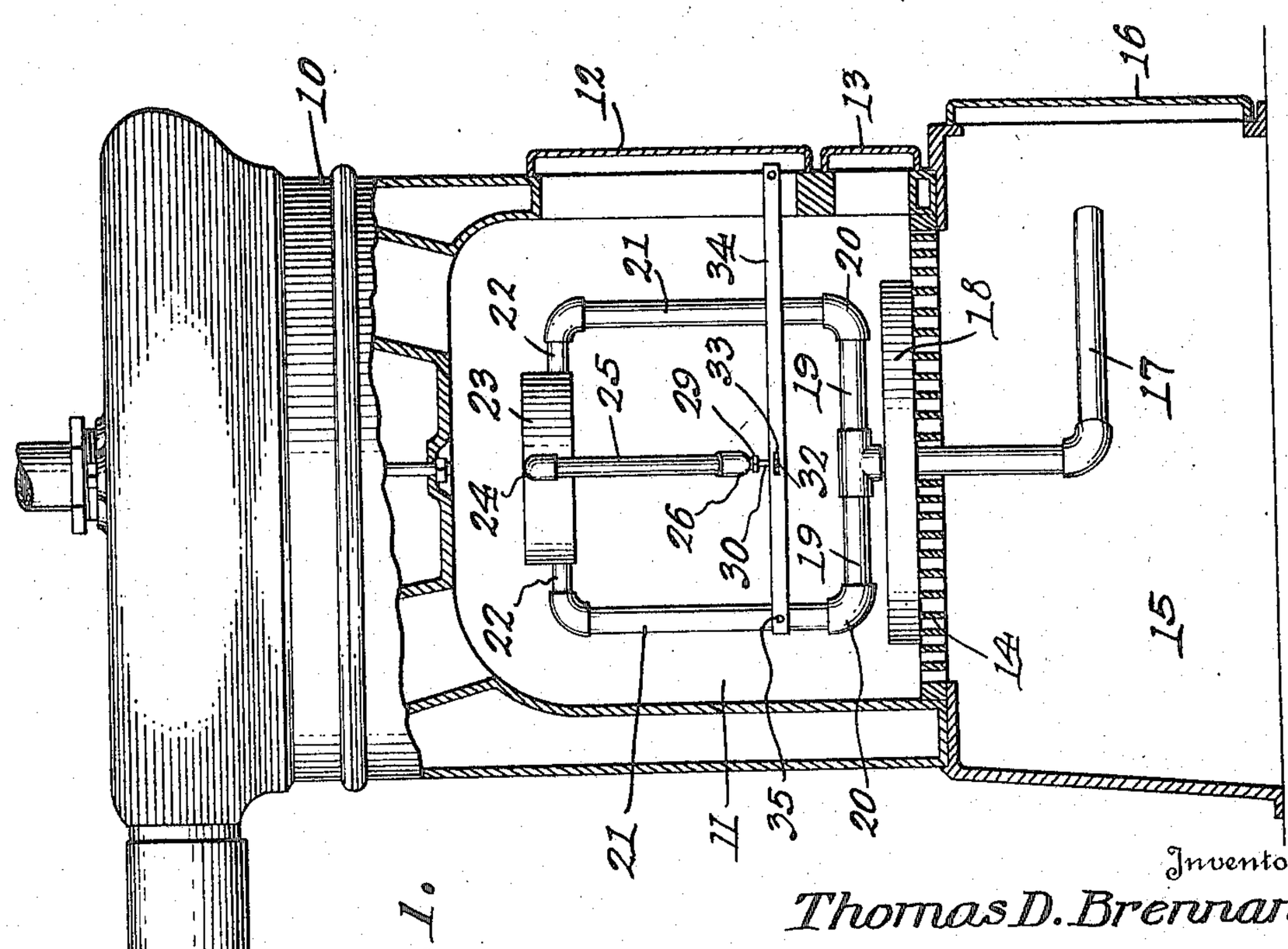


Fig. 1.



Inventor

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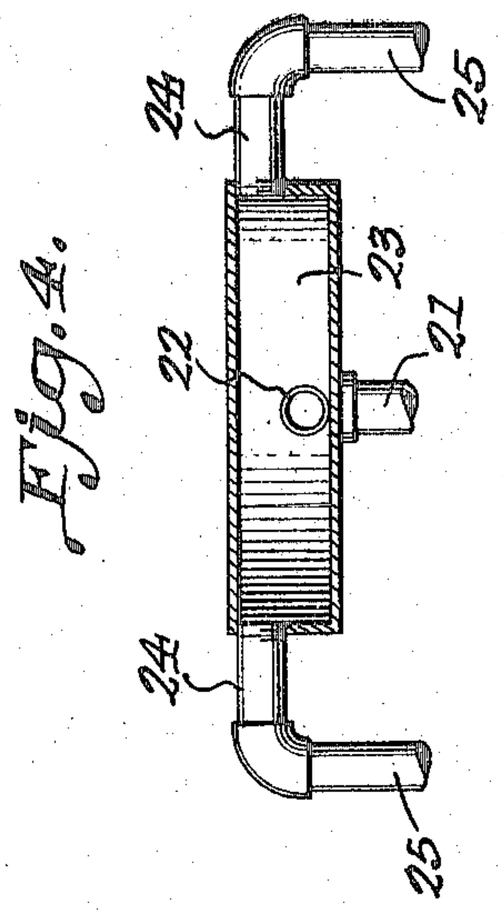

Fig. 4.

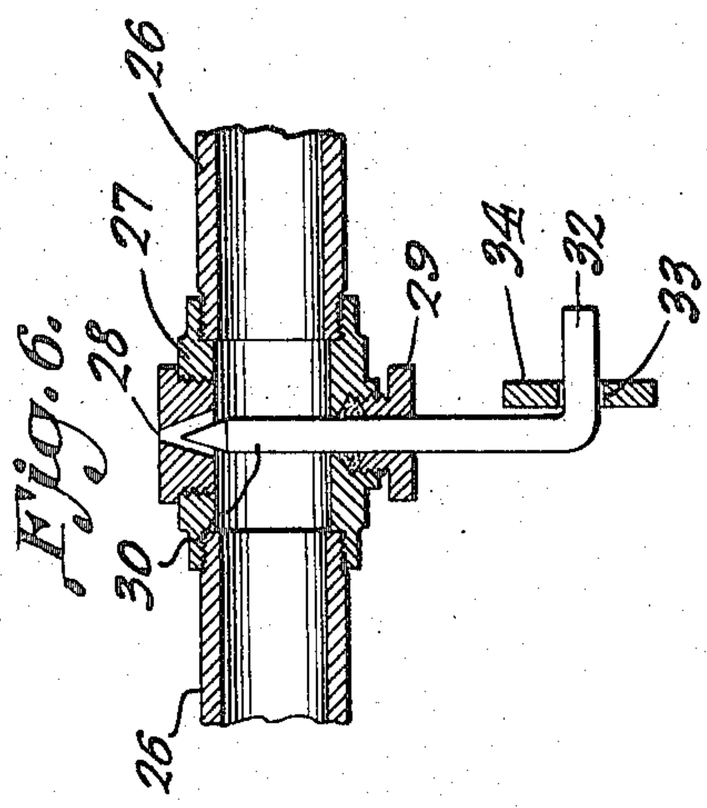

Fig. 6.

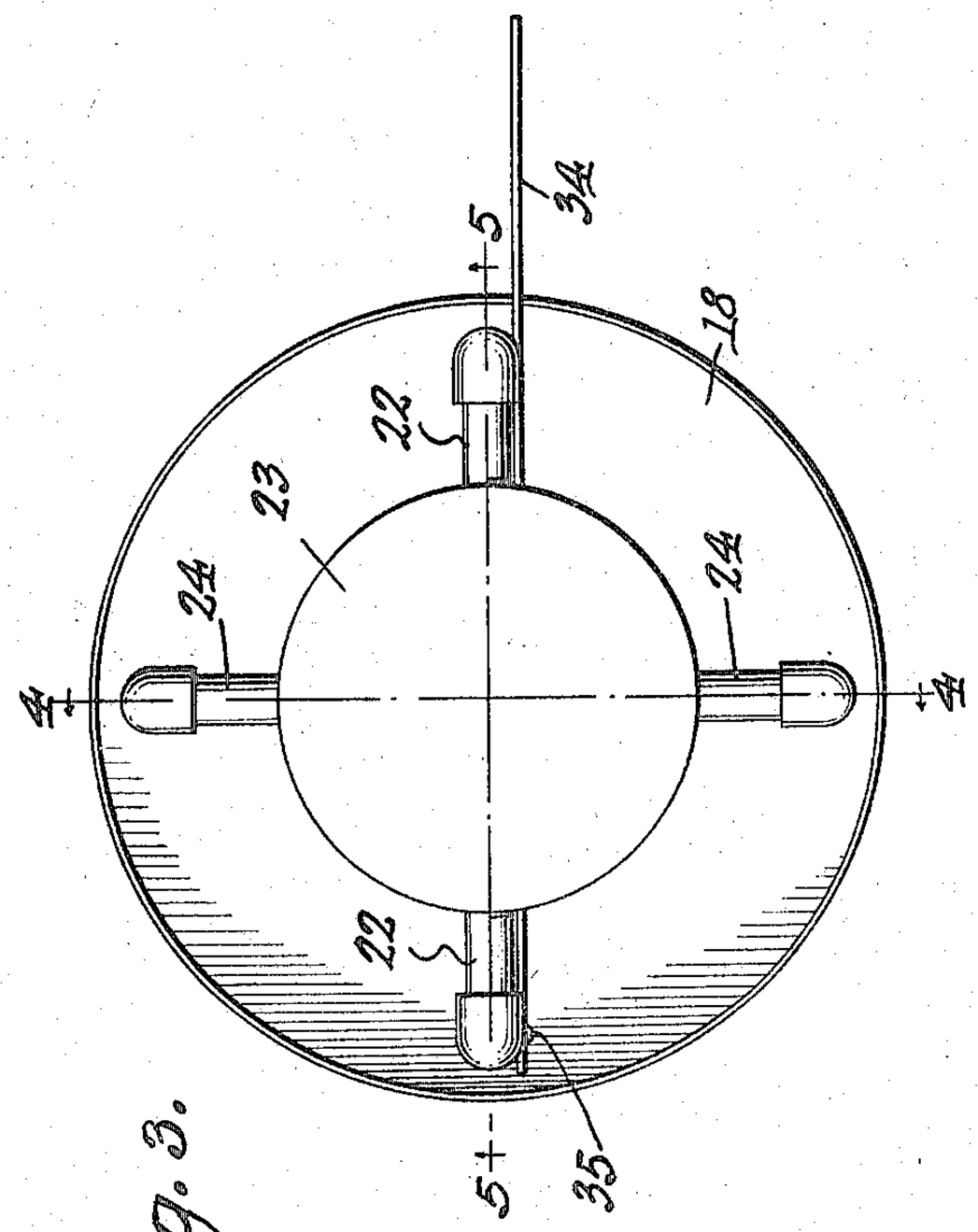

Fig. 3.

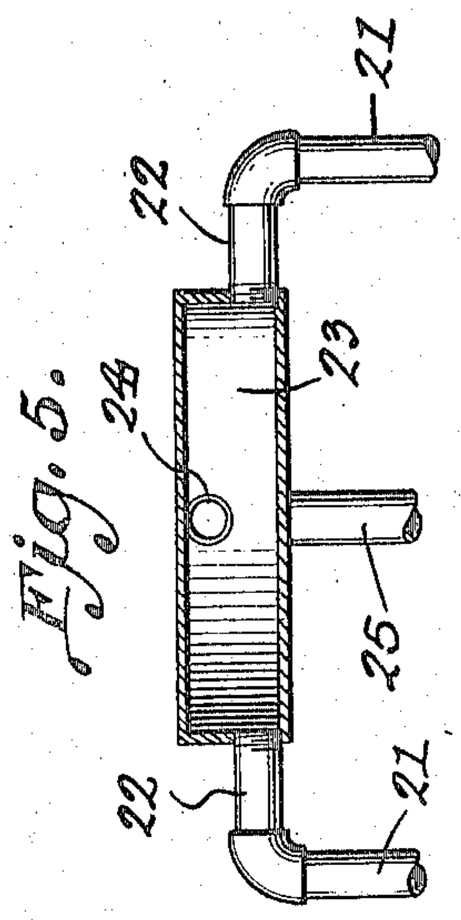

Fig. 5.

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Patented Nov. 18, 1924. 1,515,804

UNITED STATES PATENT OFFICE.

THOMAS D. BRENNAN, OF TULSA, OKLAHOMA.

OIL BURNER.

Application filed April 23, 1924. Serial No. 708,365.

To all whom it may concern:

Be it known that I, THOMAS D. BRENNAN, a citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

My invention relates to improvements in oil burners.

An important object of the invention is to provide a burner of the above mentioned character, which is adapted to successfully employ as fuel, any kind of low grade distillate, or light gas oil, as well as a high grade fuel, such as kerosene or coal oil.

A further object of the invention is to provide a burner of the above mentioned character, which is particularly adapted for use in the furnace of a heating plant, such as within a steam or hot water furnace, hot air furnace, or the like.

A further object of the invention is to provide a device of the above mentioned character, which is of simplified construction, and may be mounted within the ordinary furnace, without altering the construction of the same.

A further object of the invention is to provide a burner of the above mentioned character, having a vaporizing chamber arranged for and serving as a deflector for the flame, causing the same to travel radially in proper proximity to the wall of the furnace.

A further object of the invention is to provide a burner of the above mentioned character, having means whereby the liquid fuel is thoroughly vaporized, and maintained in the vaporized condition, until it is supplied to the burner tip, or orifice.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a burner device embodying my invention, showing the same installed in an ordinary hot water furnace, parts of the same being shown in section,

Figure 2 is a perspective view of the burner device removed,

Figure 3 is a plan view of the device,

Figure 4 is a transverse section taken on line 4—4 of Figure 3,

Figure 5 is a similar view taken on line 5—5 of Figure 3, and,

Figure 6 is a detail section through the valve.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a hot water furnace or boiler, of the usual construction, having a fire box 11, fuel door 12, slicer door 13, grate 14, ash pit 15, and ash pit door 16. This is of course the usual construction.

My burner device embodies a single common liquid fuel supply pipe 17, which may be led in through the opening of the ash pit and passed upwardly between the grate bars 14, or through the spaces occupied by them, if they are removed. The pipe 17 connects with a tank (not shown) holding the liquid fuel, which may be supplied through the pipe by gravity or by pressure, if desired. The pipe 17 extends centrally through a priming pan 18, which is horizontally arranged, and may be located upon the grate bars 14. Above this priming pan, the pipe 17 is connected with radial branches 19, preferably arranged in the same vertical plane as the diameter of the pan. The radial branches 19 are bent at their outer ends, as shown at 20, providing upstanding or vertical risers 21, which carry at their upper ends inwardly extending upper radial branches 22, preferably arranged in the same vertical plane as the diameter of the pan 18, and in the same vertical plane as the branches 19. The upper radial branches 22 lead into the bottom of a combined deflector and vaporizing chamber 23. This chamber is closed at its top and bottom, and at its sides, excepting for its connections with the several branches of the pipes. The combined deflector and vaporizing chamber 23 is of smaller diameter than the priming pan 18, is arranged above it, and is coaxial with relation thereto. The vaporizing chamber 23 is of smaller diameter than the priming pan 18, and it is preferred that the priming pan have a slightly larger diameter than the length of the lower branches 19, whereby the burning of the liquid fuel within this priming pan may thoroughly heat the branches 19, risers 21, and associated elements.

Leading into the top of the vaporizing

chamber 20 are radial upper branches 24, arranged at 90° from the branches 22, and preferably disposed in alignment with a diameter of the vaporizing chamber 23. The branches 24 are connected with depending pipes 25, which preferably converge downwardly, and these pipes are connected with lower branch pipes 26, extending across the branch pipes 19, at a right angle thereto. The several branch pipes are horizontally arranged, as shown. It will be seen that the branch pipes radiate with respect to the vaporizing chamber, and are spaced from each other at an angle of 90°.

The radial branches 26 are connected at their inner ends with a valve housing 27, provided in its top with an outlet opening 28, and at its bottom with a stuffing box 29. A vertically movable needle valve 30 controls the escape of vapor or gas, from the opening 28. At its lower end, the needle valve 31 has a lateral extension 32, operating within a slot 33, formed in a vertically swinging lever 34. This lever is pivoted at 35, and may extend to the exterior of the furnace, for convenient manipulation.

From the foregoing description it is thus seen that the branches 19, and risers 21, constitute in effect an upstanding U-shaped pipe, with the extensions 22 connected with the chamber 23. In a similar manner, the branches 26 and pipes 25 constitute a substantially U-shaped pipe, leading into the top of the chamber 23, through the medium of the extensions 24.

The operation of the burner device is as follows:

The burner is mounted within the furnace or boiler, as clearly shown in Figure 1, and no housing is employed for the burner. The liquid fuel, passes upwardly through the vertical pipe 17, and travels through the branches 19 and passes upwardly through the risers 21. In starting the burner device, a suitable amount of the liquid fuel is introduced into the priming pan 18, and this liquid fuel is ignited. The flame therefore passes upwardly, in contact with, or in close proximity to, the risers 21, and all other parts of the burner, whereby the liquid fuel is vaporized, and the vapor discharges from the opening 28, at which point it will be ignited. No means is provided to mix air with the vaporized liquid fuel, prior to the discharge of the vapor from the opening 28, as this mixing is effected upon such discharge, between the opening 28 and the bottom of the vaporizing chamber 23, since the air passes freely to the flame, through the grate. The volume of gas is of course regulated by the movement of the valve 33, in turn shifted by moving the lever 34. The flame passes upwardly from the opening 28, and impinges upon the bottom of the vaporizing chamber 23, and is deflected horizontally radially, and outwardly, toward the inner wall of the furnace. This flame and heated gas, of course impinge upon, or pass in proximity to, the risers 21 and pipes 25, and the branches carried thereby. As a result of this, the liquid fuel passing upwardly through the risers 21 and through the branches 22, is more or less vaporized, prior to its entrance into the vaporizing chamber 23, wherein it is further heated, and completely vaporized, or superheated. This vaporized fuel, discharges through the pipes 24, and downwardly through the pipes 25 and through the branches 26, and these various pipes are retained heated by contact with the flame or gases, and the vaporized fuel is maintained in the proper vaporized form and is prevented from condensing, prior to its discharge to the outlet opening 28. It is thus seen that substantially all parts of the device are subjected to the direct action of the flame or heated gas, and these parts will not be injured by the heat, since the interior thereof is constantly filled with either the liquid fuel, or the vaporized liquid fuel. The arrangement of the pipes or branches, radially about the combined deflector and vaporizing chamber, increases the efficiency of the device, as the maximum heat is imparted to these parts, for a thorough vaporization of the liquid fuel. By applying the full heat from the burner or opening 28, to the bottom of the vaporizing chamber 23, entirely satisfactory vaporization of the liquid or oil is obtainable, regardless of whether or not the burner is operating at its full capacity, or turned down to its lowest point. This is the object that everyone is seeking, who is interested in the development of an oil burner, of this general type, as it will enable the burner to be adjustable, for producing a heat of any desired degree, within its range of adjustment.

It is to be understood that the form of my invention herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts, may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. A liquid fuel burner comprising, a preheating pan, a single oil supply pipe extending upwardly through the central portion of the preheating pan and projecting above the same, a substantially U-shaped pipe connected at its base with the upper end of the supply pipe and arranged in the same vertical plane as a diameter of said pan of the pan above the same, said substantially U-shaped pipe being narrower than the diameter of said pan, a combined de-

flector and vaporizing chamber mounted within and near the upper ends of the substantially U-shaped pipe, radial branch pipes connected with the lower portion of the vaporizing chamber and the upper ends of the substantially U-shaped pipe, said vaporizing chamber having a smaller radius than said pan and disposed coaxially thereabove, a substantially U-shaped pipe which leads at its upper ends into the top of the vaporizing chamber, the second U-shaped pipe being positioned within the first named U-shaped pipe and disposed substantially at an angle of 90° with relation thereto, a valve device connected in the base of the second named U-shaped pipe, and means to operate the valve device.

2. A liquid fuel burner comprising, a preheating pan, a single oil supply pipe extending upwardly through the central portion of the preheating pan and projecting above the same, a substantially U-shaped pipe connected at its base with the upper end of the supply pipe, a combined deflector and vaporizing chamber disposed near the upper ends of the substantially U-shaped pipe, with the upper ends of the U-shaped pipe leading into said chamber near its bottom, said vaporizing chamber being arranged coaxially above the preheating pan, a second substantially U-shaped pipe having its upper ends leading into said chamber near its top, the second substantially U-shaped pipe being positioned within the first named substantially U-shaped pipe and arranged at an angle with relation thereto, a valve device connected in the base of the second named U-shaped pipe, and means to operate the valve device.

In testimony whereof I affix my signature.

THOMAS D. BRENNAN.