No. 883,373. PATENTED MAR. 31, 1908.

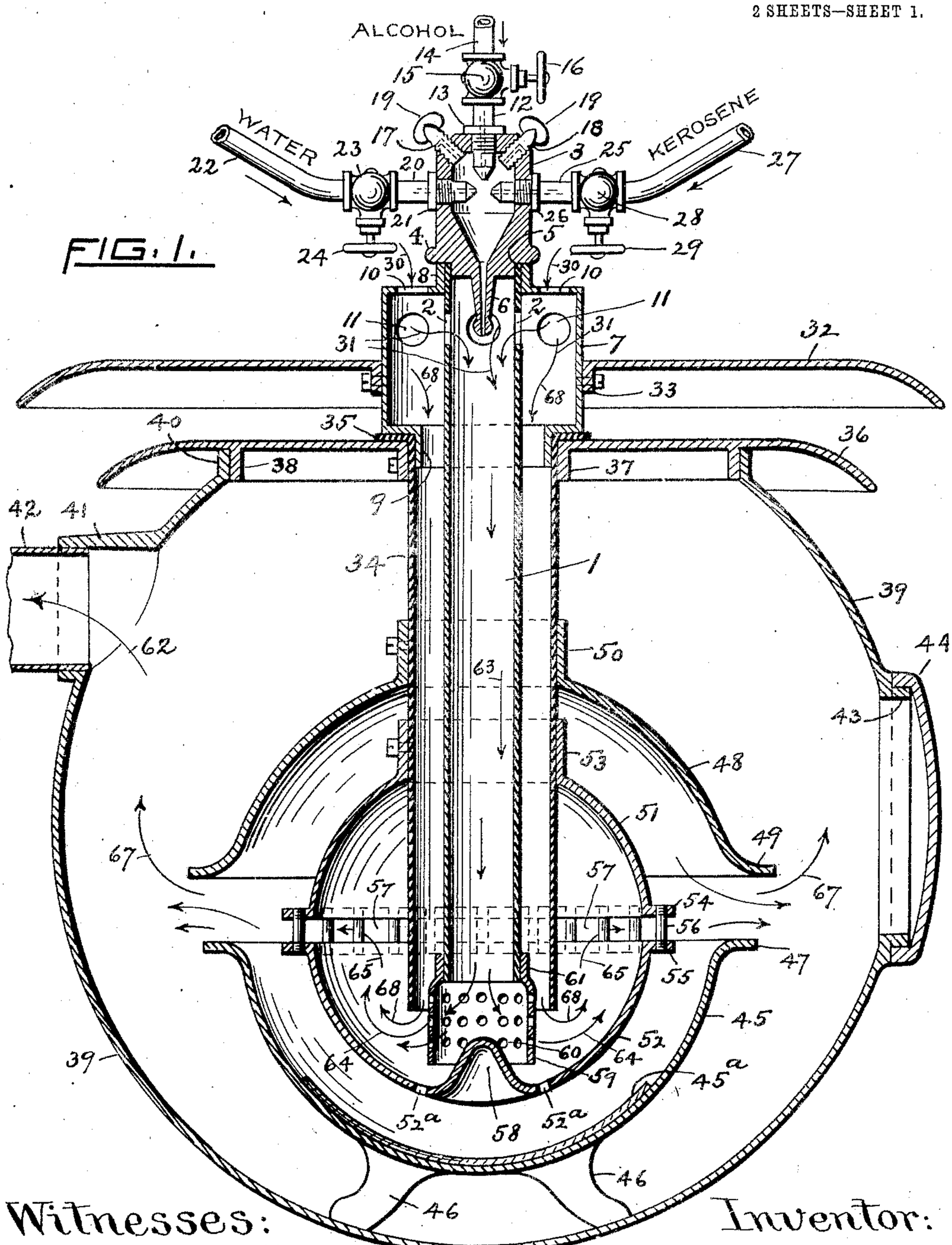
A. AKESON.

HYDROCARBON BURNER.

APPLICATION FILED JUNE 11, 1907.

2 SHEETS—SHEET 1.

FIG. 1.



Witnesses:

Edward C. Baker

George W. Bennett Jr.

Inventor:

Anders Akeson

By Charles T. Hannigan

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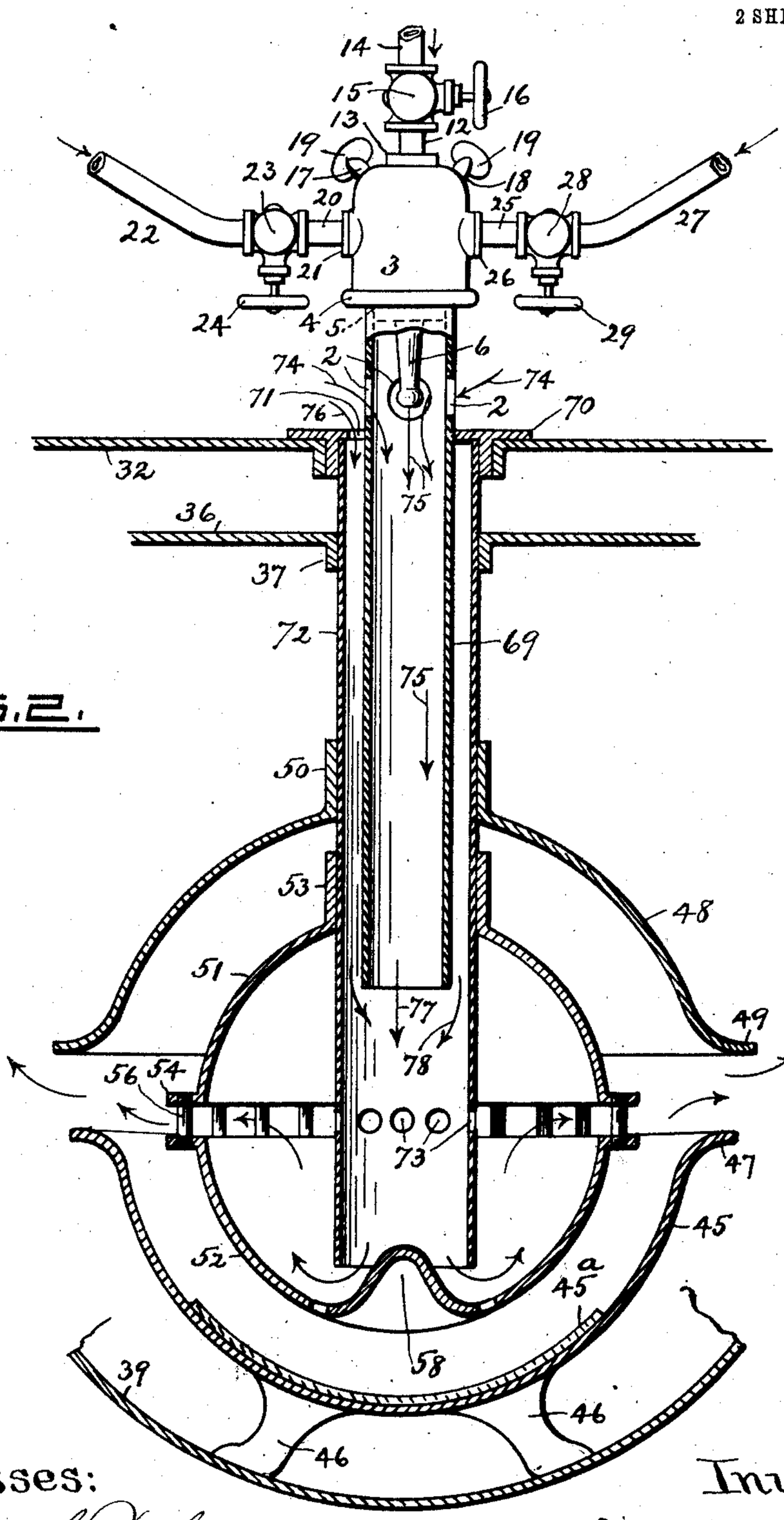

FIG. 2.

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UNITED STATES PATENT OFFICE.

ANDERS AKESON, OF WORCESTER, MASSACHUSETTS.

HYDROCARBON-BURNER.

No. 883,373. Specification of Letters Patent. Patented March 31, 1908.

Application filed June 11, 1907. Serial No. 378,460.

To all whom it may concern:

Be it known that I, ANDERS AKESON, a citizen of the United States, residing at the city of Worcester, county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

My invention relates to the class of hydrocarbon burners for heating purposes, and it consists of the novel construction, combination and arrangement of parts, as hereinafter specified and claimed.

The purpose of my invention is to feed several liquids, drop by drop, from suitable tanks or reservoirs, by means of gravity alone, into the vaporizing tube or chamber, where they are minutely subdivided and thoroughly mingled, and also to provide means for the combustion of the vapors and gases so produced.

In the accompanying drawings, like reference characters indicate like parts.

Figure 1 is a central vertical section of my improved hydrocarbon burner, and, Fig. 2 is a central vertical section of a modified form of my invention.

The vaporizing chamber 1 is a tube having air inlets or openings 2 near its top. The tube or chamber 1 has at its upper end a feed chamber 3, whose exterior surface is substantially cylindrical with an annular flange 4 extending therefrom. The chamber 3 has an annular shoulder 5 to enable it to fit upon the upper edge of the tube 1 and to enter and close the upper end of said tube. A nozzle 6, integral with the cylindrical feed chamber, projects centrally downward into the tube or chamber 1 and has a tapering bore, as seen in Fig. 1. The interior of the chamber 3 is tubular at and near its center, and funnel-shaped at its bottom, and opens into said bore of the nozzle 6. The upper end of the chamber 3 is beveled internally.

An air drum 7 is tubular in shape and has two concentric sleeves or extensions 8 and 9 at its ends, respectively. This drum is provided with a series of air inlets 10, 11. The sleeve 9 is of larger diameter than the sleeve 8. The upper end of the vaporizing tube 1 fits into the sleeve 8 and said end is flush with the upper edge of the sleeve 8. The air inlets 2 of the tube 1 are in close proximity to the air inlets 10 11 of the drum or cylinder 7. The wall of the feed chamber 3 is tapped for the reception of three nozzles and two vent plugs. At the top is the nozzle 12 having a flange 13 which rests upon the top of the chamber 3 on the outside of the same. 14 designates the feed pipe, and a valve 15 is placed between said pipe and the nozzle 12 and is operated by the handle or wheel 16. Alcohol is fed to the chamber 3 through the pipe 14, valve 15 and nozzle 12 from a suitable tank or reservoir, not shown. Adjacent to the alcohol feed nozzle 21, are two vent plugs 17 and 18. The vent plug 17 is shown in Fig 1 as open, and the vent plug 18 as closed. Each of said plugs has a knurled head 19, by which it is seized and turned. As indicated in each plug in dotted lines, there is a central longitudinal passage, whose upper portion bends at a right angle and opens through one side.

The vent plug 17 is shown open or unscrewed until the outer end of said bent passages is out beyond the exterior surface of the chamber 3. The vent plug 18 is shown as closed, that is, said outer end of the passage is between the inner and outer surfaces of the chamber 3, in the top wherein said plug is mounted. The opening of either or both said plugs allows the entrance of air into the chamber 3, to enable the flow of the liquids from the nozzles 12, 20 and 25 to pass from the nozzle 6, of said chamber, into the vaporizing chamber 1. Near the vent plug 17 is the nozzle 20, having the flange 21 which fits closely upon the exterior of the chamber 3. A feed pipe 22 conducts water from a suitable tank or reservoir, not shown. A valve 23 connects the feed pipe 22 and nozzle 20 and is operated by the handle or wheel 24. Near the vent plug 18 is the nozzle 25, having the flange 26 which fits closely upon the exterior surface of the chamber 3. A feed pipe 27 conducts kerosene from a suitable tank or reservoir, not shown. A valve 28 connects the feed pipe 27 and nozzle 25 and is operated by the handle or wheel 29.

As represented in Fig. 1, the end of the nozzle 6 has an enlargement or head, which is located opposite to the air inlets 2 and 11. The direction of the several air currents is indicated by the arrows 30 and 31, respectively. A dished inverted plate or disk 32 has a tubular sleeve 33, which fits upon the air drum 7, and is secured thereto by screws or otherwise. A large tube 34 has at its upper end a bent flange 35, which fits upon the sleeve 9 of the air drum 7 and abuts the lower

end or shoulder of said drum. The tube 34 is an air tube and surrounds the vaporizing tube or chamber 1 concentrically. The tube 34 is open at the bottom and extends downward slightly below the lower end of the vaporizing tube or chamber 1. An inverted dished-shaped plate or disk 36 has two sleeves 37 and 38, of which the former fits upon the outer surface of the air pipe 34 and is secured in place by screws or otherwise. A globe-shaped heater 39 has a sleeve 40 which fits upon the sleeve 38 of the plate or disk 36, and is supported in position by screws or otherwise. Said heater has a funnel 41 in which a chimney pipe 42 fits, and it also has a sleeve 43, which is closed by a door or cover 44. The fire pot 45 is hollow and hemispherical in shape, and is supported by legs 46, which rest upon the bottom of the heater 39. It has a flaring mouth or rim 47 on its upper edge. The fire pot 45 has an asbestos lining 45[a] on the bottom thereof. A dome 48 is symmetrical in shape with the fire pot 45 and has the flaring mouth or rim 49, but inverted, and a concentric sleeve 50, which fits upon the air pipe 34 and supports the dome, being fastened by screws or otherwise. The rims 47 and 49 of the fire pot and dome, respectively, are parallel with each other and separated by a considerable space, as shown in Fig. 1.

The combustion chamber is made of two hemispherical shells 51, 52. The upper half 51 of the combustion chamber has a sleeve 53, by which it is supported on the air pipe 34 and secured by screws or otherwise. It also has a flange 54. The lower half has a flange 55. Studs or bolts 56, secured into threaded holes at equi-spaced intervals, secure the upper and lower halves of the combustion chamber at the flanges 54 and 55, leaving there a central space 57. The lower half 52 of the combustion chamber has a central directed bulge 58, which serves as a deflector. A discharging tube 59 has a number of apertures or outlets 60 on its sides and is provided with a sleeve or collar 61, which fits upon the lower end of the chamber 1. The tube 59 is open at its bottom and extends partially over and around the deflector 58, nearly half-way down the latter. The tube 59 is concentric with the tubes 1 and 34, but is less in diameter than the tube 34. Near the deflector 58, the lower part 52 of the combustion chamber is provided with a series of openings or apertures 52[a], as shown in Fig. 1.

The following is a description of the operation of my improved hydrocarbon burner. The asbestos lining 45[a] of the fire pot 45 is saturated with kerosene. The door 44 is opened and a lighted match is applied at some point between the rims 47 and 49 of the fire pot 45 and the dome 48. The door 44 is then instantly closed. The liquid fuel, with which the asbestos lining has been saturated, is thus ignited and burns rapidly, so that the combustion chamber 51, 52, is almost immediately heated to a sufficient degree to vaporize the liquids about to be fed thereto. The alcohol is first fed to the burner by opening the valve 15, and flows by gravity down through the nozzle 12, drop by drop, into the feeding chamber 3 and thence through the nozzle 6 into the vaporizing chamber or tube 1. Next, the kerosene is fed to the burner by opening the valve 28 and flows by gravity down through the nozzle 25, drop by drop, into the feeding chamber 3, and thence through the nozzle 6 into the vaporizing tube or chamber 1. Next, the water is fed to the burner by opening the valve 23 and flows by gravity down through the nozzle 20, drop by drop, into the feeding chamber 3, and thence through the nozzle 6 into the vaporizing tube or chamber 1.

The air currents, indicated by the arrows 30 and 31, through the air inlets 10, 11, 2, together with the outward draft through the chimney pipe 42, as indicated by the arrow 62, rush strongly down through the vaporizing tube or chamber 1, as indicated by the arrows 63 and serve to dissipate the drops of the several liquids into spray or fine particles. This result is facilitated by the drops of water, which, being of the greatest density, break up the drops of alcohol and kerosene, but are themselves separated and subdivided into smaller and smaller globules by the contact as also by the strong air draft already described, and thus these fluids are thoroughly mixed and mingled. The lower part, however, of the vaporizing chamber or tube 1, is heated from the flames in the fire pot 45, and this heat changes the liquid contents of the tube or chamber 1 into hydrocarbon vapor, which, as it rushes out through the apertures 60 of the discharging tube 59 into the combustion chamber 51, 52 (as indicated by the arrows 64) is ignited in the combustion chamber and between the stud bolts 56, through the space between the upper and lower halves 51, 52, of the combustion chamber, as indicated by the arrows 65, and thence into and out of the dome 48 or out of the aperture between the dome 48 and fire pot 45, as indicated by the arrows 67, being thoroughly decomposed in the fire pot 45 and under the dome 48.

The deflector 58 serves to direct the currents of vapor through the apertures 60 of the discharging tube 59, and as these vapors are there discharged they meet the downrushing currents of cold air, which are coming through the air pipe 34, as indicated by the arrows 68.

The plates or disks 32, 36 and the air space between them prevent excessive radiation upward from the heater, and so protect the feeding device and the contents thereof.

In Fig. 2 is represented a modification of my improved hydrocarbon burner. In this the vaporizing chamber or tube 69 is much shorter than shown in Fig. 1, and its upper part is not inclosed in the air pipe, as in Fig. 1, and its lower part is not provided with a discharging tube with apertures, as hereinbefore described. A flanged collar 70, having air holes 71, rests on the plate 32 and supports the air tube 72. The air tube 72 supports, as already described, the dome 48 by means of the collar 50 and the upper half 51 of the combustion chamber by means of the collar 53, and the upper half 51 of the combustion chamber, by means of its flange 54. The bolts 56 support the lower half 52 of the combustion chamber, and provide a space between said upper and lower halves. The air tube 72 extends below the lower end of the vaporizing tube 69, and near its bottom has a row of holes 73, which are in line with said space between the upper and lower halves 51, 52, of the combustion chamber. The air enters the vaporizing tube or chamber 69 through the air holes 2 directly from the external atmosphere, as indicated by the arrows 74. The drops of alcohol, kerosene and water pass from the nozzle 6 down through the tube or chamber 69, as indicated by the arrows 75. The air enters the tube 72 from the external atmosphere through the air holes 71, as indicated by the arrow 76. At the bottom of the tube 69 the vapor descends therefrom, as indicated by the arrow 77, into the lower portion of the tube 72 (which is the equivalent of the discharging tube 59 of Fig. 1) and there mingles with said vapors, as indicated by the arrows 78, with the same result as hereinbefore described.

The deflecting plates 32 and 36 serve to protect the hydrocarbon feeding device from the heat caused by the burner or combustion chamber in the heater 39 and radiating from the latter. One of such deflectors is useful, but by having two, arranged parallel to each other, with an intervening space, they are more efficient to intercept the heat and prevent danger to the feeding means.

I claim as a novel and useful invention and desire to secure by Letters-Patent:—

1. The improved feeding device for hydrocarbon burners herein described, consisting of the combination of a chambered receptacle, a plurality of nozzles discharging into the chamber of said receptacle different liquids from separate sources; means for controlling at will the discharge of each of said nozzles; air vent plugs opening into said chamber and adjustable to control the air currents passing through them, respectively; and a nozzle extending from said receptacle and adapted to discharge from said chamber the mingled contents of said chamber.

2. In a hydrocarbon burner, the combination of an air pipe having an air inlet at the top and an open bottom; a vaporizing tube within the air pipe and concentric therewith; air inlets in said tube admitting air therein from said pipe; a perforated discharge tube at the bottom of the vaporizing tube located and adapted to discharge hydrocarbon vapor into the air currents which flow from the bottom of the air pipe; means for feeding hydrocarbon fluids to the vaporizing tube at the upper end thereof; and means for the combustion of said vapors at and near the lower end of said pipe and tube.

3. In a hydrocarbon burner, the combination of a combustion chamber having discharge openings; a concavo-convex deflector directed upwardly from the bottom of said chamber; a vaporizing tube whose open bottom surrounds concentrically and partially extends downward over said deflector; a feed device near the top of said tube for feeding liquid fuel thereto; and an air pipe surrounding concentrically said tube and discharging at its lower end near to the lower end of said tube.

4. In a hydrocarbon burner, the combination of a vaporizing tube having an air inlet near its upper end; a combustion chamber into which the lower end of said tube extends and which consists of two hemispherical shells or parts circumferentially connected with an intervening circumferential space or opening; a deflector on the bottom of the combustion chamber extending upwardly into the vaporizing tube; an air pipe having air inlets at its upper end and surrounding the vaporizing tube concentrically and having an open bottom adjacent to the lower end of the vaporizing tube; and means for feeding liquid fuel to said vaporizing tube.

5. In a hydrocarbon burner, the combination of a hemispherical shell having an annular flange; a second hemispherical shell having an annular flange; stud bolts passing through both of said flanges at equi-spaced intervals and keeping said flanges parallel with each other with an intervening space, said hemispherical shells constituting a combustion chamber; an air pipe entering at the top of the combustion chamber and extending below said intervening space; a vaporizing tube within said pipe; means for feeding a liquid fuel to said tube at the top thereof; a perforated tube secured upon the bottom end portion of said vaporizing tube; and a deflector on the lower hemispherical shell and extending upwardly into said perforated tube.

6. In a hydrocarbon burner, the combination of a spherical combustion chamber provided with equatorially arranged openings; an air pipe on which the combustion chamber is supported; a vaporizing tube extending into said chamber; and means for feeding liquid fuel to said tube.

7. In a hydrocarbon burner, the combination of an air pipe having means of supplying

air thereto; a dome with a flaring rim; a collar on said dome by which the dome is supported on the air pipe; a globular shaped heater; a fire pot having a flaring rim beneath said first mentioned rim and concentric therewith and which is supported upon the bottom of the heater within the same upon legs; a combustion chamber concentrically supported by said air pipe within said dome and fire pot; a vaporizing tube extending into the combustion chamber; means for supplying air to said tube; and means for feeding liquid fuel to the vaporizing tube at the upper end thereof.

8. In a hydrocarbon burner, the combination of a globe-shaped heater having a door and a funnel and pipe to carry away the products of combustion; a fire pot in said heater; an air pipe extending into said heater; a dome supported by the air pipe and extending above the fire pot; a combustion chamber supported by said air pipe within the fire pot and dome; and means for conducting hydrocarbon vapors into the combustion chamber.

In testimony whereof I affix my signature in presence of two witnesses.

ANDERS AKESON.

Witnesses:
EDWARD C. BAKER,
GEORGE W. BENNETT, Jr.