J. GEYER.

FLUID FUEL BURNER.

APPLICATION FILED JUNE 13, 1919.

1,334,747. Patented Mar. 23, 1920.

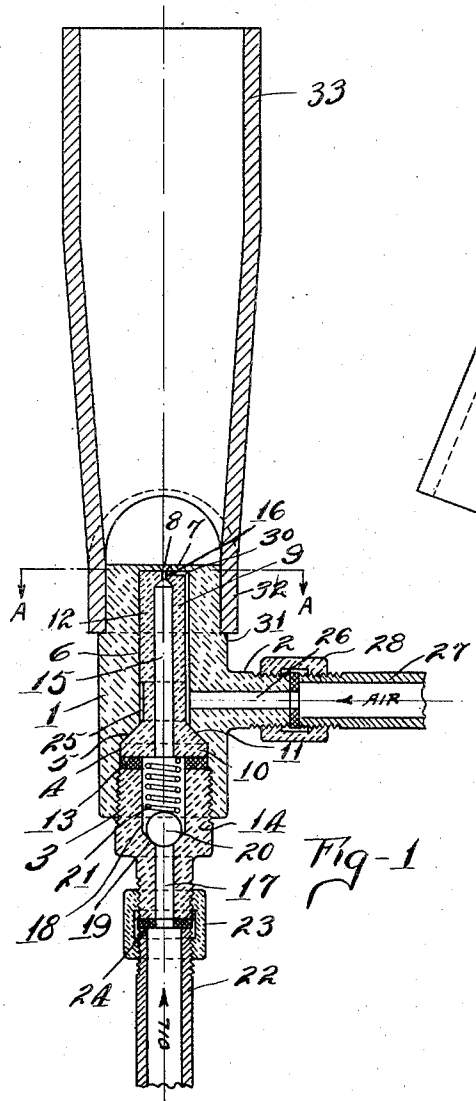


Fig-1

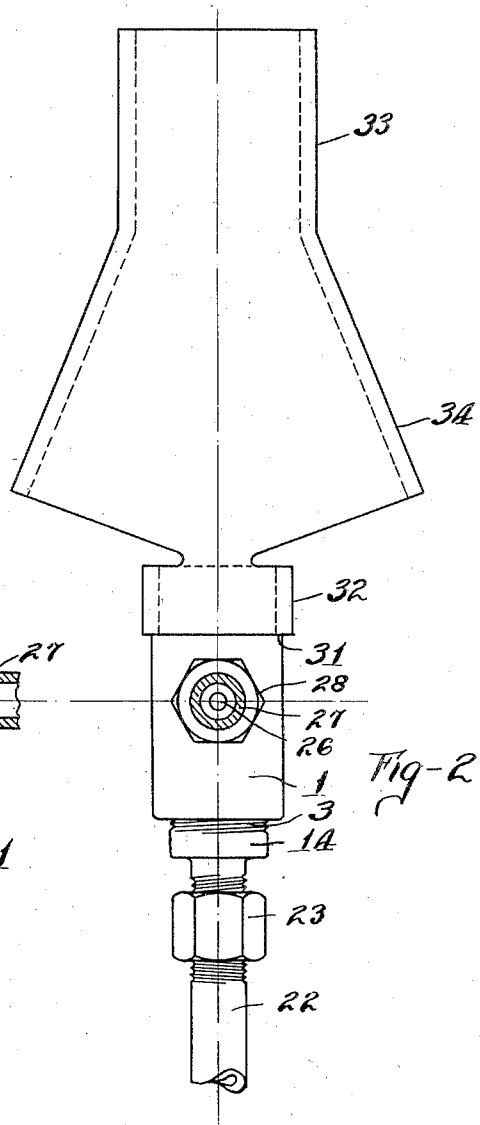
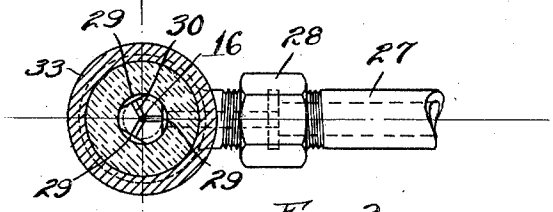


Fig-2



SECTION A-A. Fig-3

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FLUID-FUEL BURNER.

1,334,747. Specification of Letters Patent. Patented Mar. 23, 1920.

Application filed June 13, 1919. Serial No. 303,939.

To all whom it may concern:

Be it known that I, JAKOB GEYER, a subject of Hungary, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Fluid-Fuel Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to fluid fuel burners, and more particularly to burners of the type wherein liquid fuel is supplied to or injected into a mixing chamber in conjunction with air or other combustible fluid.

The general objects of the invention are to provide a burner of this character which is simple in construction, economical of production, and efficient in operation.

I accomplish the foregoing objects, and others which will appear hereinafter, in and through the embodiment of my invention illustrated in the drawings forming part hereof wherein: Figure 1 represents a central vertical sectional view through a burner constructed in accordance with my invention; Fig. 2 a side elevation of the burner shown in Fig. 1; and Fig. 3 a sectional view corresponding to the line A—A of Fig. 1.

Describing by reference characters the various parts illustrated herein, 1 denotes a burner sleeve, preferably of metal, having a bore extending longitudinally therethrough and provided with a supply connection 2. The bore comprises an enlarged internally threaded portion 3, a plain or unthreaded portion 4 above and forming a continuation of the portion 3, a frusto-conical portion 4 the upper end of which communicates with a reduced cylindrical portion 6, terminating within the upper end of the sleeve 1, below an annular wall 7, said wall having a central outwardly and upwardly flaring discharge or outlet opening 8.

Within the portions 4, 5 and 6 of said bore is a nipple 9, preferably of metal, having walls 10, 11 and 12 conforming in contour to the bore sections 4, 5 and 6, respectively, the wall 10' being shorter than the bore section 4 to provide a space for the reception of a packing ring 13 between the lower end of said nipple and the upper end of a connection 14 which is threaded into the portion 3 of said bore. The nipple 6 is provided with a central bore 15 having a central contracted discharge outlet 16 at its upper end registering with the flared outlet 8, the bottom of the flared outlet being preferably of the same cross-sectional area as the outlet 16.

The connection 14 is provided with a central bore 17 extending upwardly from the lower end thereof and preferably of the same cross-sectional area as the bore 15. The bore 17 merges at its upper end with an enlarged bore section 18, there being a valve seat 19 provided between the lower sections 17 and 18 which is adapted to receive a check valve 20, preferably of the ball type, there being a helical spring 21 interposed between the upper surface of said ball and the bottom of the nipple thereabove. A supply pipe 22 for liquid fuel is shown as connected to the bottom of the connection 17, as by means of a nut 23 engaging reversely arranged threads on the exterior of said pipe and said nipple, a packing ring 24 being interposed between the upper end of said pipe and the lower end of said nipple.

Immediately above the wall 5, the nipple is provided with an annular groove providing an annular channel 25 extending thereabout, this channel communicating with a passageway 26 provided in the connection 2, said passageway registering with the bore of a pipe 27 which may be secured to the connection 2 by a nut 28 in the same manner as the pipe 22 is secured to the nipple 14.

The outer cylindrical wall 6 of the nipple is ground away, or otherwise suitably removed, to provide a plurality of vertical channels 29 extending upwardly from the annular channel 25 nearly to the top of the nipple. Three such vertical channels are shown, the said channels being spaced equidistantly about the circumference of said nipple, the upper end of each channel being connected with the outlet 16 by means of a radial port 30 formed in the upper end of said nipple.

The upper end of the shell or sleeve 1 is provided with an annular seat 31 on which there is fitted the lower end of a mixer. This combined mixer is provided with a collar 32 at its lower end adapted to rest upon the shoulder 31. The upper end of the combined mixer is preferably cylindrical, as indicated at 33. The lower end is flared outwardly and downwardly from the cylindrical portion 33, as indicated at 34. In a plane at right angles to that passing through the flared or skirt portions 34, the said

mixer is interiorly enlarged or widened upwardly from the top of the sleeve 1 to the cylindrical portion 33.

With the parts arranged and constructed as described, oil under suitable pressure will be supplied through the pipe 22, past valve 19 and to the orifices 16 and 8. Air under pressure will be supplied through the pipe 27, annular channel 25, passageways 29 and ports 30, being delivered at right angles to and into the outlet port or orifice 16. The jets of air supplied through the ports 30 will not only be capable of exercising an aspirating effect upon the liquid fuel, but will effectively atomize the same, the mixture of air and atomized fuel being discharged through the expanding orifice 8 into the combined mixer thereabove, sufficient air to insure complete combustion of this mixture being admitted into the lower portion of the mixer between the top of the sleeve 1 and the lower portion of the said mixer. Should an explosive mixture in the air and fuel be produced within the outlet 16 and the bore 15, the valve 20 will be seated, and the propagation of the flame beyond such valve and into the fuel pipe will be prevented.

The arrangement of the vertical passageways 29 enables the oil supplied through the nipple and the air discharged through the ports 30 to be effectively heated before impingement in the port 16, through the heat conducted to the sleeve 1 and the nipple from the burner.

Having thus described my invention, what I claim is:—

In a burner of the character described, the combination of a mixing chamber, a sleeve member provided at the top thereof with a relatively small flaring port adapted to discharge into said mixing chamber, and a longitudinal bore in alinement with said port, said bore having an increased diameter at the bottom thereof, a fluid fuel member mounted in said bore and having an outlet port registering with said flaring port, a plurality of longitudinal passageways formed on the exterior of said fluid fuel member and communicating individually and at right angles with said outlet port, means for supplying liquid fuel to said fluid fuel member and means for supplying pressure fluid to said passageways.

In testimony whereof, I hereunto affix my signature.

JAKOB GEYER.