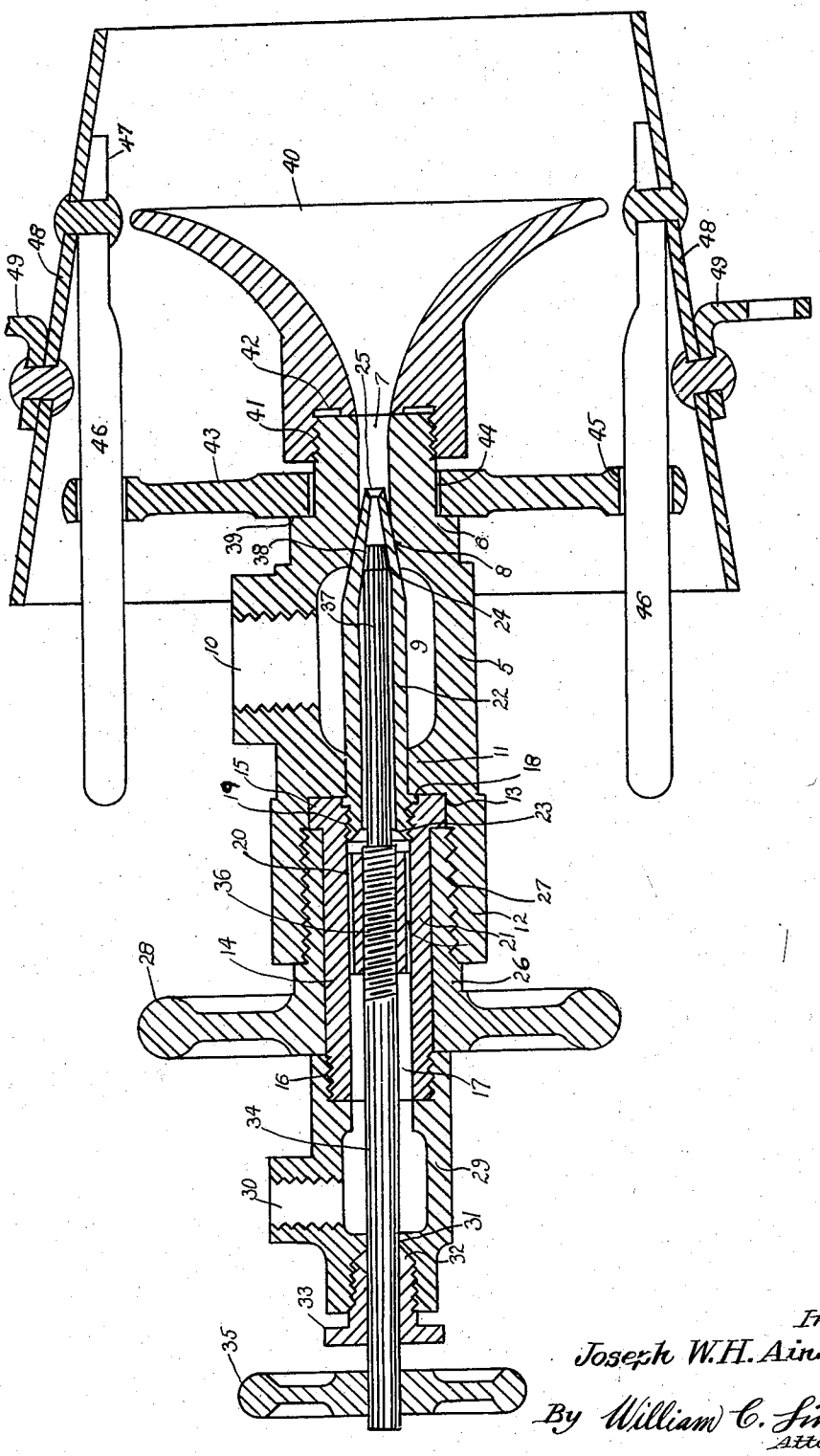
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LIQUID FUEL BURNER

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Inventor
Joseph W.H. Ainscow.
By William C. Linton.
Attorney.

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JOSEPH WILLIAM HORACE AINSCOW, OF LINDFIELD, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA

LIQUID-FUEL BURNER

Application filed October 5, 1926, Serial No. 139,658, and in Australia November 5, 1925.

This invention relates to burners used for atomizing and projecting liquid fuel into furnaces and the like and has been specially devised in order to provide an improved liquid fuel burner of simple, efficient and durable construction whereby the parts are readily removable for cleaning without disconnecting the supply pipes and in which the regulation of the relative volumes or quantities of liquid fuel and commingling air, steam or gas, may be readily and independently effected, and which reduces the consumption of fuel, is practically noiseless in operation and though primarily intended for the burning of cold fuel at low pressure in comparatively small volume thus rendering preheating of the liquid fuel unnecessary, may be used with equal efficiency with the fuel under pressure and when preheated, and by which may be used any liquid fuel, such as crude oil, residual oil, tar and tar oil with either air, steam or gas, such as furnace or waste gases.

In order that the invention and a practical application of the same will be readily understood the same will be described with reference to the accompanying drawings in which is shown a longitudinal sectional elevation of the burner with the valve closed, and carrying a flame concentrator and arranged in a free air furnace mouth cone.

The improved liquid fuel burner comprises; a main hollow case 5 which is open at both ends and has, the forward end 6 contracted to form an exit passage 7 having its rear end valve seated as at 8, an enlarged cavity forming an air or steam chamber 9 from which is a lateral passage 10 adapted for connection to a source of air, steam or gas supply, a rearward divisional bored wall 11, and the rear end enlarged to form an internally threaded socket 12 which has an internal plain shoulder 13 at the forward or inner end; in said socket 12 hollow stem 14 which has at its forward end a flange 15, its other end 16 externally threaded, and in its bore 17 which is recessed and threaded at its forward end as at 18 and 19 an annular contraction 20 internally threaded and having through its wall a plurality of longitudinally and circumferentially disposed fuel passages 21; a hollow nozzle 22 which has its rear end countersunk as at 23 and threadedly connected in the forward end of said stem 14, projecting through the bored wall 11 and the chamber 9 so that its forward end 24 which is contracted and has its mouth countersunk as at 25 will seat in the valve seat 8 at the rear end of the passage 7; a nozzle adjuster 26 which consists of a gland like externally threaded sleeve 27 and an operable wheel 28 and is revolvable upon said stem 14 with its sleeve in the socket 12, a hollow connection and closure 29 with its forward end internally threaded and connected upon said stem 14 and having a lateral passage 30 adapted for connection to a fuel supply, and a rear bore wall 31, and in its rear end a partially threaded stuffing box 32 to receive packing and in which is engaged a gland 33; and a needle valve stem 34 which has an operable wheel 35 on its rear end and extends through the gland 33 the connection 29 and the stem 14 and has a threaded portion 36 in engagement with the internally threaded contraction 20 of said stem 14, and a reduced forward portion 37 extending into the hollow nozzle 22 and terminating in a coned end 38.

The forward end of the casing 6 is externally reduced to provide a shoulder 39 and outwardly thereof is externally threaded for engagement thereon of the socketed and internal threaded shank 41 of a bell mouth or deflector 40, preferably with a copper washer 42 interposed, of requisite diametrical size to freely move within a free air cone, or to pass through an apertured closure affixed in or across the furnace mouth.

The burner is secured to a spider 43 by passing the reduced end through an aperture 44 in said spider and connecting the deflector 40 as shown. The spider 43 has transverse bores 45 near its radial extremities and is slidably mounted upon a plurality of spaced arms 46 (preferably three) secured at their inner ends 47 to and projecting from a free air cone 48 affixed in the furnace mouth such as by bolts through apertured lugs 49 all of which is fully described and claimed in my copending application filed November 10, 1927, Serial No. 232,438.

In use, the burner being connected at 30

to a fuel supply and to an air or steam supply at 10, fuel will flow through the connection 29 to the hollow stem 14 about the valve stem 34, thence through the passages 21 into the hollow nozzle 22. By revolving the valve stem 34 its forward valved end 38 may be advanced into or retired from the contracted end of said nozzle 22 and so regulate the discharge of fuel, and by revolving the adjuster 26, which is in threaded engagement in the socket 12 of the casing and free to revolve on the hollow stem 14 but is longitudinally held thereto between its flange 15 and the closure connector 29 upon its rear end, said stem 14 may be advanced or retired longitudinally and as it carries the hollow nozzle 22 and also the valve stem 34 the nozzle may be advanced or retired in relation to the exit 7 and so regulate the discharge of air, steam or gas to commingle with the oil issuing from said nozzle, without disturbing adjustment of the valve end 38 in the nozzle 22.

As the nozzle and the valve stem within the casing 5 are carried by the hollow stem 14 which has thereon the nozzle adjuster 26 which screws into the socket 12 of said casing 5, by unscrewing the adjuster from the socket 12 the whole of the parts may be removed for cleaning without having to break joint, the fuel connection to the connector 29 being flexible or permitting sufficient movement to allow the parts to be withdrawn, and it will be seen that the valve stem may be readily removed for cleaning or dislodging any obstruction in the nozzle without disturbing the adjustment of said nozzle in relation to the exit 7.

Air under low pressure through passage 10 to the chamber 9 is used for atomizing, and free air which is drawn in around the deflector 40 is used for combustion.

When a flame to fill a large area is required a nozzle with a larger exit 7 and or a wider countersink 25 may be used without alteration to the other parts of the burner or a plurality of the burners may be used.

The fuel which is fed by gravity or low pressure to the nozzle 22 and has its discharge therefrom regulated by the valved end 38 of the stem 34 is atomized as it spreads from the countersunk mouth of the nozzle into the exit 7 and the pressure of air, steam or gas from the chamber 9 mingles with it, the atomized fuel discharges into and spreads in the deflector 40, and as it reaches the mouth thereof is carried forward by the indraught of free air through a free air cone 48 affixed over the furnace mouth.

To obtain a wide volume of flame the pressure of air, steam or gas entering the chamber 9 is reduced and the nozzle 22 is retired from the valve seat 8 of the exit 7 so that just sufficient air, steam or gas will enter said exit to atomize the full discharging from said nozzle 22, combustion may be regulated by retiring the deflector 40 in the cone 48. To obtain a long intense flame the air, steam or gas pressure is increased, and the deflector 40 advanced in the cone 48 as required.

What I claim is:—

A liquid fuel burner comprising a casing having an atomizing chamber therein and a contracted exit within its forward end communicating with the chamber, an internally threaded socket formed with the rear end of said casing, said casing having a lateral fluid supply passage communicating with the atomizing chamber thereof, a hollow stem projecting in said socket, an internal contraction formed with said stem and having longitudinal passage ways therethrough, a gland like adjuster revolvable upon said steam and in threaded engagement with said socket, a hollow connector secured to one end of said stem and having a fuel supply passage therein communicating with the longitudinal passage ways of said internal contraction, a hollow nozzle connected to the opposite end of said stem and extending through the atomizing chamber of the casing, a contracted end formed with said nozzle seatable and longitudinally movable within the exit of said casing, a needle valve seatable within said nozzle, a valve stem connected at one end to said needle valve and extending through said connector, a hand wheel secured to the opposite end of said valve stem and a threaded connection between said valve stem and said internal contraction of said hollow stem.

JOSEPH WILLIAM HORACE AINSCOW.