May 29, 1928. 1,671,494

C. R. STEWART

FUEL BURNER

Filed March 14, 1925 2 Sheets-Sheet 1

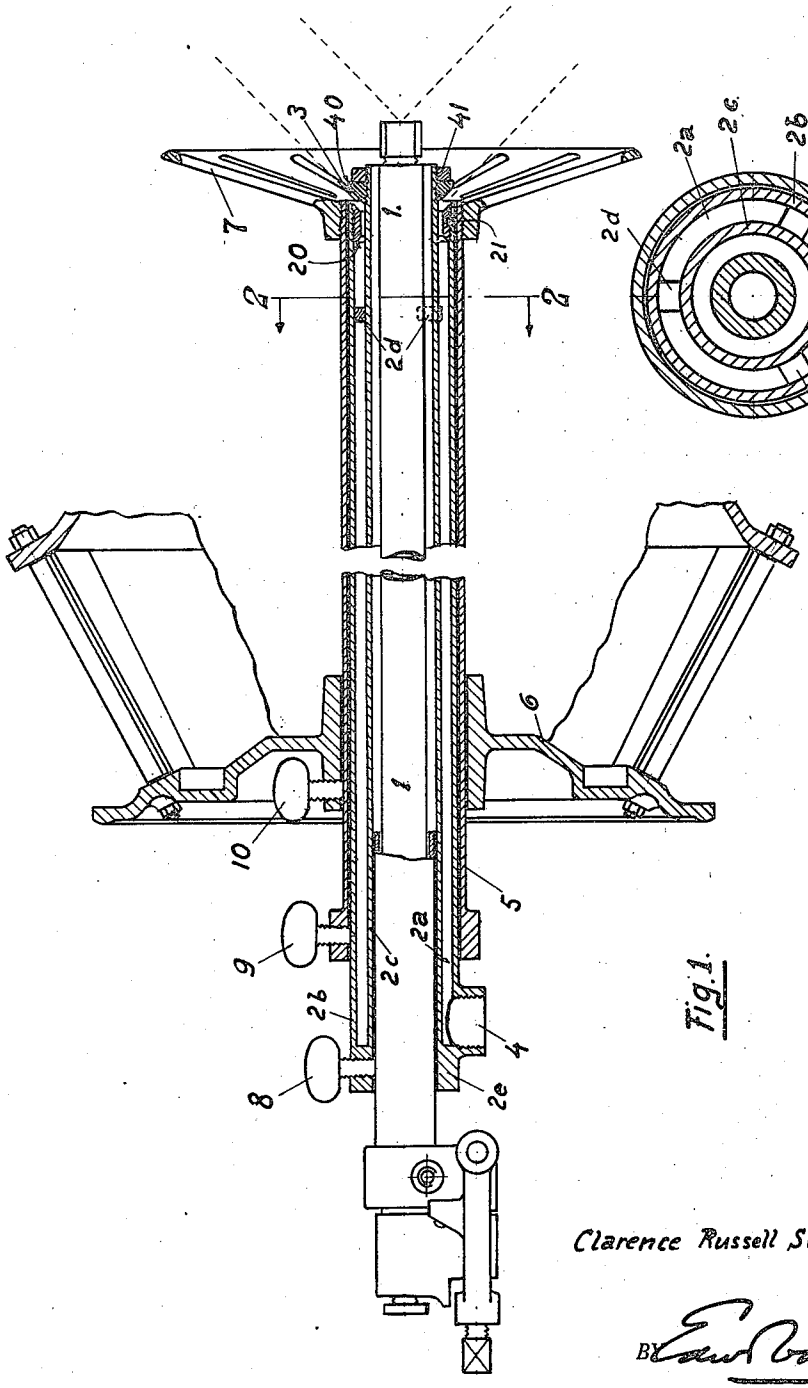


Fig. 1.

Fig. 2.

Clarence Russell Stewart.

INVENTOR.

BY Edwin Bradbury

ATTORNEY.

May 29, 1928. 1,671,494

C. R. STEWART

FUEL BURNER

Filed March 14, 1925 2 Sheets-Sheet 2

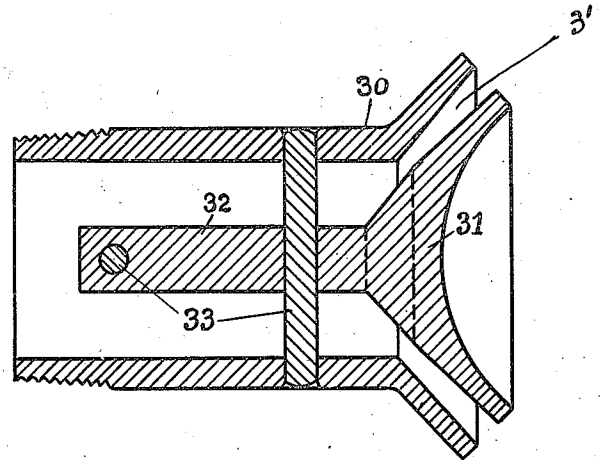


Fig. 3.

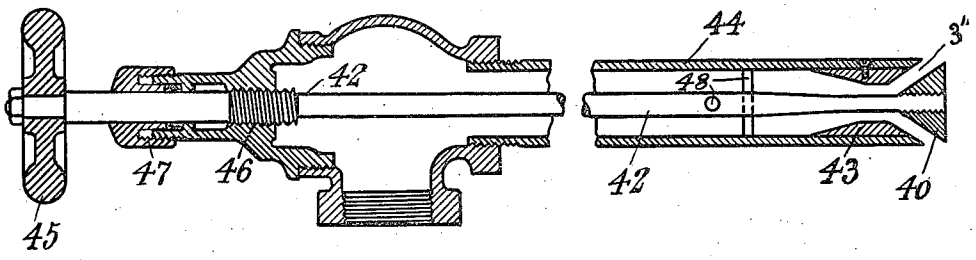


Fig. 4

Clarence Russell Stewart.

INVENTOR

BY Edw. Dauchinsky

ATTORNEY

Patented May 29, 1928. 1,671,494

UNITED STATES PATENT OFFICE.

CLARENCE RUSSELL STEWART, OF MONTEREY PARK, CALIFORNIA, ASSIGNOR TO PEABODY ENGINEERING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

FUEL BURNER.

Application filed March 14, 1925. Serial No. 15,568.

This invention relates to a device for burning fuels in the form of elastic fluids, mixtures of fluids, or mixtures of fluids and solids in which the fluid or mixture to be burned is projected in the form of a hollow divergent cone into a stream of air or oxygen with which it is mixed and carried into a combustion space, and has for its object the production of a burner that will burn either or both nonelastic fluid fuel and fuels in the form of liquid, including mixtures of solids and fluids, in the same furnace, using the same furnace wall opening and combustion air system, also providing a means of changing from one to the other fuel with the least possible delay.

It will be noted that air or other gases may be charged with large quantities of finely divided solid fuels such as pulverized coal and while in motion is capable of carrying these small particles of solids in suspension, so that this mixture of gaseous and solid materials acts like an elastic fluid, flowing for long distances through pipe lines and tortuous passages and emerging as a homogeneous body through small orifices. This elastic fluid mixture is for combustion purposes similar to a gas and can be burned like a gas in suitable apparatus. My invention is therefore capable of burning liquid fuel and any other combustible in an elastic fluid form.

A further object is the combination of liquid and gas burners so arranged as to provide two divergent concentric cones of fuel when both are in use, and to permit the withdrawal of either to inoperative position as desired.

The foregoing and other features of my invention will now be described in connection with the accompanying drawing forming part of this specification, in which I have represented my fuel burner in its preferred form, after which I shall point out more particularly in the claims those features which I believe to be new and of my own invention.

Figure 1 is a longitudinal section of my burner supported in a frame of an air register which may be mounted in a furnace wall.

Figure 2 is a cross section along the lines 2—2, Figure 1.

Figures 3 and 4 are modified forms of burners which I may employ.

In the carrying out of my invention I employ an atomizer for liquids 1 which may be of any type such as the so-called mechanical atomizer with or without an oil return line, or steam or air atomizer. Surrounding this atomizer is a gas or fluid supply duct 2^a of annular section formed by two concentric pipes 2^b and 2^c closed by a suitable wall at one end 2^e and having an annular discharge orifice 3 at the other and an inlet 4. The lugs 2^d serve to keep the two pipes concentric inasmuch as they are not connected together in any way at the discharge end. At the same time the lugs 2^d are small in area and do not seriously interfere with the flow of the fluid. The orifice 3 may be fixed as shown at 3′ in Figure 3 or may have a variable annular orifice as shown at 3″ in Figure 4 so arranged that the orifice opening may be changed while the burner is in service. With this latter arrangement a nearly constant fluid pressure and fluid exit velocity may be maintained at the burner tip throughout a wide range of volume burned.

Surrounding this tubular gas supply pipe 2^b, I provide a tubular sleeve 5 which slides in the air register frame 6 and carries on its furnace end a flame plate or diffuser 7. Inasmuch as any form of air register or diffuser may be used they are not further described herein.

The oil burner or atomizer 1 slides inside the tubular gas burner and may be held in adjusted position therein by any well known means as for example set screw 8. Likewise the tubular sleeve 5 carrying the diffuser 7 is held in normal position of operation by means 9 and the whole burner within the air register may be held by the set screw 10.

It will be readily understood that with this arrangement either burner which is not in use can be drawn back so that the tip will be away from the heat. Also both burners and flame plate are adjustable with reference to the air register frame.

Referring to Figure 3 which is a simple modification of my device, the pipe 30 is belled out on one end and threaded at the other. A cone 31 supported on rod 32 is rigidly held coaxial with pipe 30 by pins 33.

The annular discharge orifice 3 as illustrated in Figure 1 may be varied by adjusting the cone piece 40 and securing it in adjusted position by a lock nut 41. If however it is advisable to provide a means for

adjusting the annular discharge orifice while in operation a device such as detailed in Figure 4 is employed, where the cone 40 is supported on end of a valve stem 42 coaxial with a throat piece 43 mounted in the end of pipe 44.

The position of the cone is changed by hand wheel 45 the threaded portion of stem 42 engaging the threaded nut 46 just inside of the packing gland 47. In this construction the pins 48 do not project into the pipe as in the construction shown in Figure 3 but act as a guiding means in contact with the inner wall of the pipe to keep the cone 40 coaxial with the throat piece 43.

I wish it distinctly understood that my fuel burner described and illustrated is in the form in which I desire to construct it and that changes or variations may be made as may be convenient or desirable without departing from the salient features of my invention and I therefore intend the following claims to cover such modifications as naturally fall within the lines of invention.

I claim:—

1. A burner comprising a frame, a tubular sleeve slidable in said frame and carrying at one end a flame plate, a tubular gas supply pipe slidable in said sleeve and having an annular discharge orifice, and an oil burner pipe slidable in said gas supply pipe and having its discharge orifice adjacent the annular discharge orifice when in operative position.

2. A burner comprising a frame, a tubular sleeve slidable in said frame and carrying at one end a flame plate, a tubular gas supply pipe slidable in said sleeve and having an annular discharge orifice, an oil burner pipe slidable in said gas supply pipe and having its discharge orifice adjacent the annular discharge orifice when in operative position, and means for holding the gas supply pipe in either operative or inoperative position.

3. A burner comprising a frame, a tubular sleeve slidable in said frame and carrying at one end a flame plate, a tubular gas supply pipe slidable in said sleeve and having an annular discharge orifice, an oil burner pipe slidable in said gas supply pipe and having its discharge orifice adjacent the annular discharge orifice when in operative position, and means for holding the oil burner pipe in either operative or inoperative position.

4. A burner comprising a frame, a tubular sleeve slidable in said frame and carrying at one end a flame plate, a tubular gas supply pipe slidable in said sleeve and having an annular discharge orifice, an oil burner pipe slidable in said gas supply pipe and having its discharge orifice adjacent the annular discharge orifice when in operative position and means for holding either or both of said pipes in operative or inoperative position.

5. A burner comprising a frame, a tubular sleeve slidable in said frame and carrying at one end a flame plate, a tubular gas supply pipe slidable in said sleeve and having an annular discharge orifice, an oil burner pipe slidable in said gas supply pipe and having its discharge orifice adjacent the annular discharge orifice when in operative position, and means for holding said flame plate in adjusted position.

6. A burner unit comprising a plurality of coaxial fuel supply pipes, a sleeve surrounding the outer end of said pipes, all of said parts being mounted in a support, means to effect the longitudinal adjustment of the unit as a whole or of the parts thereof independently of each other, and a diffuser or flame plate mounted on the forward end of said sleeve.

7. A burner unit comprising a frame, a sleeve adjustably supported therein, a plurality of fuel supply pipes supported within said sleeve and coaxial therewith, a conical diffuser or flame plate secured to the forward end of said sleeve, and means to effect the adjustment of said sleeve and pipes independently of each other.

In testimony whereof I affix my signature.

CLARENCE RUSSELL STEWART.