May 24, 1932. D. ERICKSON 1,860,086

FUEL BURNER

Filed June 28, 1930 2 Sheets-Sheet 1

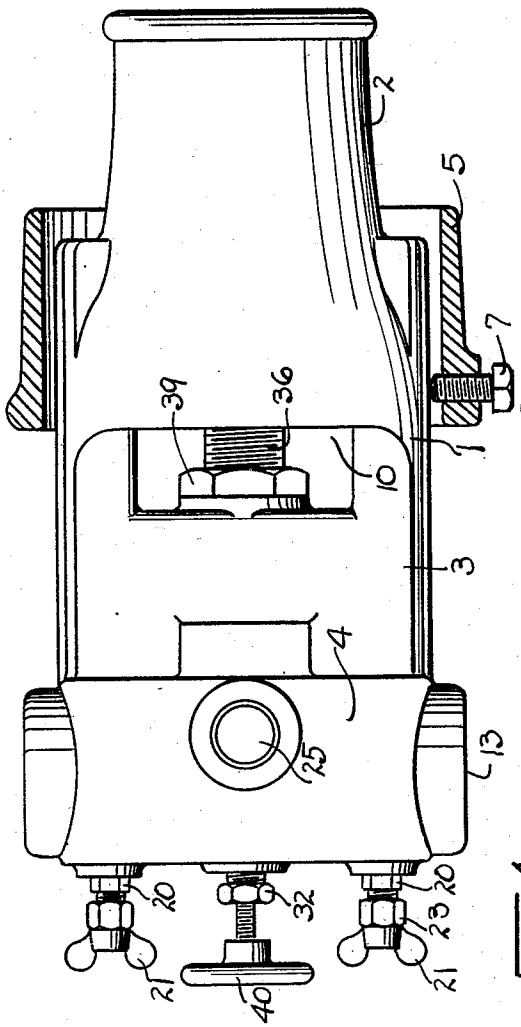


Fig. 1.

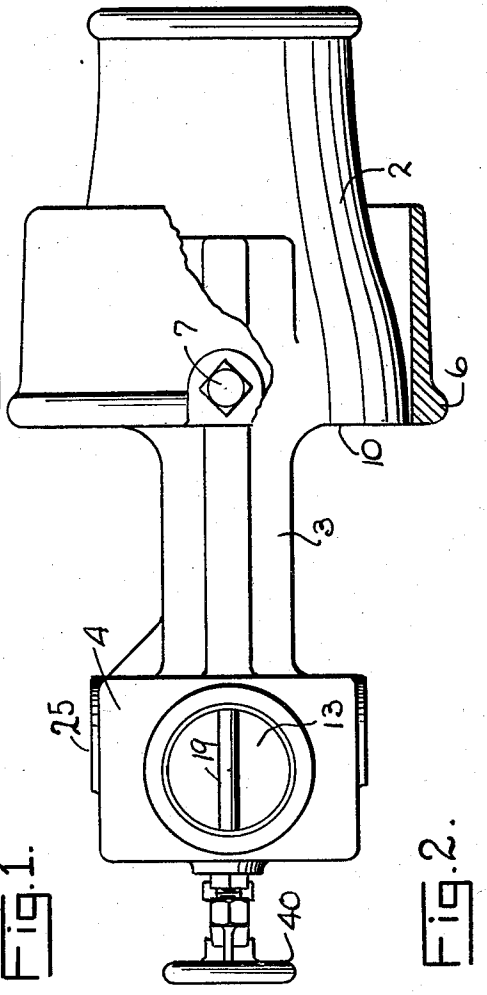


Fig. 2.

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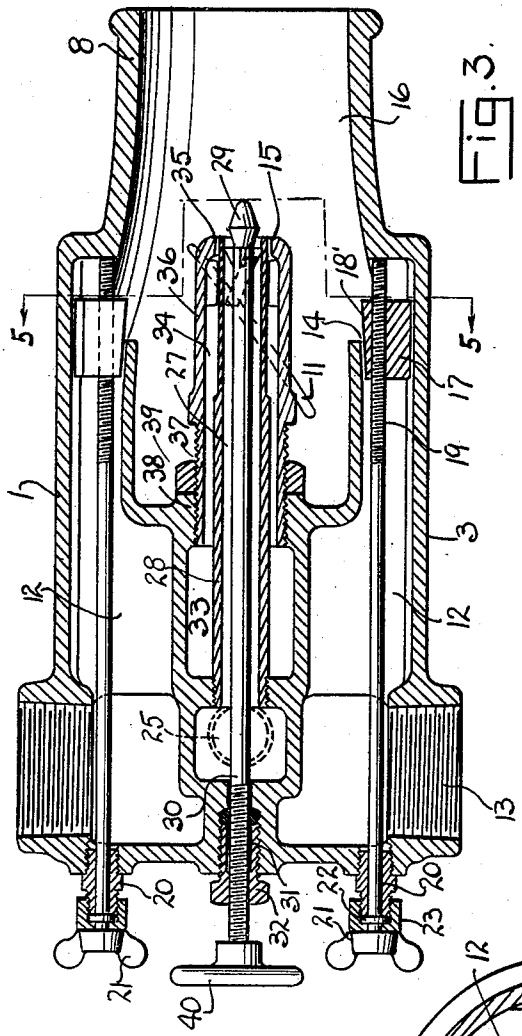


Fig. 3.

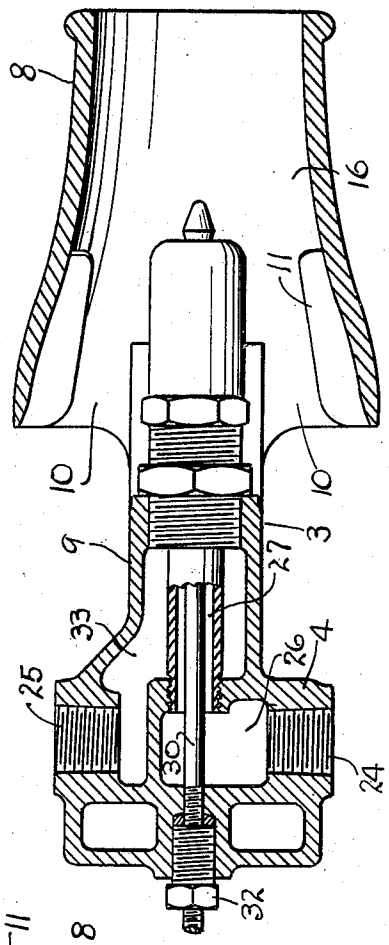


Fig. 4.

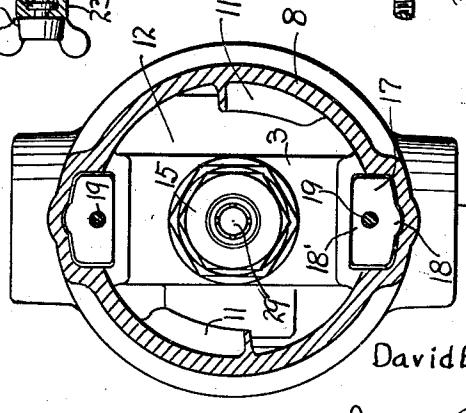


Fig. 5.

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Patented May 24, 1932 1,860,086

UNITED STATES PATENT OFFICE

DAVID ERICKSON, OF WICHITA FALLS, TEXAS, ASSIGNOR TO E. & L. COMPANY, OF WICHITA FALLS, TEXAS, A PARTNERSHIP COMPOSED OF DAVID ERICKSON AND BERT L. LIGON

FUEL BURNER

Application filed June 28, 1930. Serial No. 464,440.

My invention relates to burners for use in the handling of liquid and gaseous fuel. It pertains particularly to burners of the type employed in furnaces under boilers in the generation of steam.

It is an object of the invention to provide a burner structure through which the proper mixture of the fuel with the air and steam may be made so as to accomplish the most efficient combustion of the fuel and obtain the desired heat under the boiler.

The invention resides in the construction of the burner whereby the amount of air, steam or fuel may be varied to accomplish the most effective results.

It is also my desire to provide a particularly simple form of structure which may be manufactured at a price within the reach of the ordinary user of burners of this character.

I also aim to provide a burner in which different kinds of fuel may be used effectively through the adjusting means which I have provided.

Referring to the drawings herewith, Fig. 1 is a top plan view of a burner constructed in accordance with my invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a central horizontal section through the burner shown in Fig. 1.

Fig. 4 is a central longitudinal section taken at right angles to the view shown in Fig. 3; and

Fig. 5 is a transverse section on the plane 5—5 of Fig. 3.

My burner comprises an outer casing 1, which is circular at the forward end 2 and is flattened intermediate the ends at 3, the rearward or outer end of the burner being formed into a rectangular shaped chamber 4.

To provide means for securing the burner in position in the wall of the furnace I provide an outer ring 5, which is slightly tapered toward the nozzle of the burner. The rearward side is provided with a bead 6, and one or more set screws 7 are extended through the rearward rim of the ring or sleeve to bear against the side wall of the casing 1 and hold said casing firmly in position. Said ring may be clamped in any adjusted position longitudinally of the burner body to regulate the intake of air to the burner. With particular reference to Figs. 1 and 3, it will be noted that the side walls of the casing are approximately parallel between their ends but the forward end is tapered toward the discharge opening 8, which projects into the fire box. On opposite sides of the intermediate portion 3 of the body the side walls are constricted in one plane to provide two opposite flat walls 9 and forwardly from the flattened portion the circular nozzle end is open, as shown at 10, in the drawings. This opening 10 on each side of the circular portion of the burner provides ample space for the entrance of air about the fuel discharge nozzle. The ring 5 acts to control the air entering at 10. The inner walls adjacent these openings are formed with inclined or spirally arranged vanes 11, these vanes tending to give the air a whirling motion about the nozzle so that a better mixture of the air with the fuel may be obtained.

In the intermediate portion of the burner I provide an interior chamber 12, which serves to connect with inlet ports for fuel. With reference particularly to Fig. 3 there is a passage indicated in the chamber 12 leading from an inlet port 13 by way of the chamber 12 to a discharge port 14, through which the fuel, such as low pressure gas, may find entrance about the discharge nozzle 15.

The ports 14 leading from the gas passage to the chamber 16 within the discharge end 8 of the burner are regulated as to the size thereof by the valve members 17. Said valves comprise blocks of metal which are shaped to fit within the fuel passage and, as will be seen from Fig. 5, these blocks have a rounded lug 18 on the outer side to fit within a groove

in the passage and thus tend to hold the said valves in position. The inner faces 18′ of the valve members are tapered outwardly and it will be obvious that as the valve is moved toward the discharge nozzle the passage will be opened to allow the discharge of fuel, but when the valve is moved in the opposite direction the wedge-shaped block will move into position to close the passage. The size of the discharge opening from the fuel passage may thus be varied. The movement of the valve is accomplished through a threaded rod 19 which extends longitudinally through the valve block, and tends to move the valve through the threaded connection therewith on the rotation of the rod. It will be seen from the drawings that the rod extends through a bushing 20 in the outer end of the burner and has a thumb nut thereon, through which the rod may be rotated in the movement of the valve. The rod is held against longitudinal movement by means of a radial flange 22 thereon fitting within a recess in the inner portion of a nut 23.

There are two passages or chambers 12 for the inlet of the gas. On the sides at right angles to the inlet ports 13 for the fuel are openings 24 and 25. The opening 24 provides an inlet for fuel which may be either oil or similar liquid fuel or gas under high pressure. This port leads to a chamber 26 connecting with a passage 27 through a pipe 28 leading to the forward end of the nozzle 15 previously referred to. This structure will be understood from Fig. 3. It allows the discharge of fuel directly at the forward end of the nozzle.

The passage of fuel, either oil or high pressure gas, through this passage is regulated to some extent by a valve 29, said valve being secured upon a rod 30, which extends through a stuffing box 31 on the rearward end of the burner and through a gland 32 with which it has a threaded connection so that the rotation of the said rod will move the valve head 29 longitudinally of the nozzle.

The opposite inlet port 25 is for the steam from the boiler. This steam enters a chamber 33, which connects with a passage 34 shown in Fig. 3, leading to an outlet port 35, which is an annular orifice around the forward end of the pipe 27.

The passage 34 is formed by the outer nozzle member 36 which is spaced slightly from the forward end of the pipe 27 at one end, and, at the opposite end, is threaded at 37 to screw within the body of the nozzle at 38. A lock nut 39 tends to hold the same rigidly in position. This member 36 is adjustable longitudinally at 38 so as to vary the position of the annular port 35.

In the operation of my burner it will be noted that it may be used with low pressure gas and by low pressure gas I contemplate gas under pressure of from five to fifteen pounds per square inch. When fuel of this kind is employed the gas finds entrance through both of the ports 13, it being necessary to provide a large passage for gas under low pressures. This gas enters into the chamber about the nozzle through the ports 14 under control of the valves 17 and said valves may be regulated to obtain the discharge of the proper amount of fuel. At the same time steam is allowed to enter through the port 25, the passage 33 and to the discharge orifice 35. In case of gaseous fuel of this character, the amount of steam may be regulated to form a proper mixture with the gas so that the greatest efficiency may be obtained and this may be done by careful adjustment, depending upon the amount of gas employed.

When high pressure gas is employed or when oil is desired for fuel the ports 13 will, of course, be closed and the fuel will find entrance through the passage 24 and the discharge of the fuel will be regulated by means of the valve 29, as previously noted, said valve being manipulated through a handle member 40. Steam will be employed as in the use of low pressure gas and the amount of steam may be regulated to produce the desired mixture. During the operation of the burner air will enter in sufficient volume through the openings 10 at each side of the discharge portion 8 of the burner. This air will have a slight rotation tending to more thoroughly mix the air with the fuel and steam so as to produce thorough and complete combustion with the fuel.

It will be noted that my structure is simple and capable of ready adjustment and it is found that most efficient results are obtained in the operation of a burner so constructed.

What I claim as new is:

1. A fuel burner comprising a casing, a nozzle projecting forwardly therefrom, said nozzle including an inner pipe, an outer steam conducting pipe, opposed gaseous fuel passages, a discharge member into which said nozzle projects, said member having large air inlets, and adjustable valves in said fuel passages.

2. A fuel burner comprising a casing, a nozzle projecting forwardly therefrom, said nozzle including an inner pipe, an outer steam conducting pipe, opposed gaseous fuel passages, a discharge member into which said nozzle projects, said member having large air inlets, and adjustable valves in said fuel passages at opposite sides of said nozzle, said valves controlling the discharge of gas to said member between said air inlets.

3. A fuel burner comprising a tubular discharge member tapering forwardly, a nozzle projecting into said member, means to conduct steam to said nozzle, means to discharge low pressure gas at each side of said member and to the rear of said nozzle, and manually

adjustable means to regulate the amount of gas passing from said discharge means.

4. A combination low and high pressure fuel burner including a casing, a nozzle at the forward end thereof, means to conduct high pressure fuel and steam to said nozzle, a forwardly tapered funnel into which said nozzle discharges, low pressure gas passages at opposite sides of said nozzle, and valves in said passages.

In testimony whereof I hereunto affix my signature this 18 day of June, A. D. 1930.

DAVID ERICKSON.