

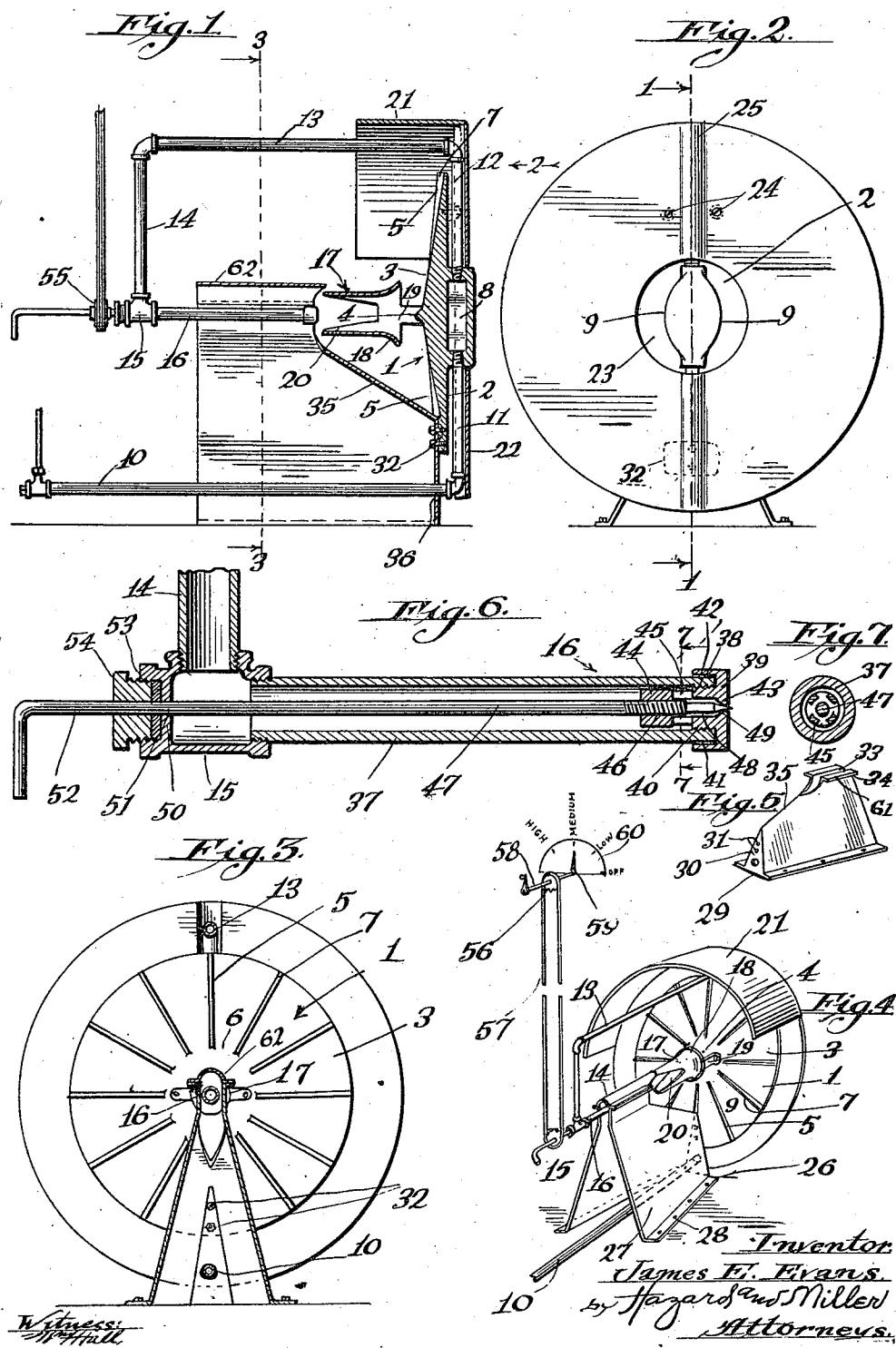
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OIL BURNER

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UNITED STATES PATENT OFFICE.

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OIL BURNER.

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My invention is an oil burner for installation in a furnace adapted to vaporize and gasify oil and burn the gas.

5 An object of my invention is to develop an oil burner which will properly vaporize and gasify the oil before its injection into the burner proper, and to utilize a spreading device for the flame to force the flame substantially in a circular sheet radially outwardly from a central point, said
10 central point being substantially where the jet of gas impinges on the spreading device.

Another object of my invention is to form a base through which extends a needle valve, the base being designed to have the bulk of the air for combustion drawn therethrough, the action being of the injector type, the jet of gas drawing in the air.

20 Another feature of my invention is to encircle the jet of gas with what may be termed a suction tube having openings at the side to draw the air in by suction due to the rapid flow of the jet of gas there-through.

25 Another object of my invention is the construction of a needle valve with the adjusting elements of the valve and the valve seat positioned closely adjacent one to the other, whereby changes of temperature of the needle valve in heating and cooling will have very little effect on the adjustment of the valve.

My oil burner structurally comprises a disc-shaped spreading plate positioned at right angles to a needle valve for discharging the gasified oil, the jet impinging on the center of the plate, the plate having the form of a flat cone with a central small projection, this projection dividing the gas and the flame and with the spreading plate spreading the flame in a circular sheet, the flame traveling radially outwardly.

35 A retort is formed in the back of the spreading plate and forms a means for heating the oil which is fed thereto by pipes and conveyed therefrom by other pipes to the needle valve. These pipes are in the direct path of the spreading flame and thereby the incoming oil and the vapors and gas developed from the oil are heated. A hood is provided over the top of the spreading plate and a backing disc surrounds the pipes at the back of the spreading plate,

thereby subjecting such pipes and the retort to a greater temperature.

55 The spreading plate is preferably mounted on an inverted V-shaped base, this base forming an air inlet for the needle valve jet and functioning to spread the flame laterally at the base of the furnace.

60 The whole burner is adapted to be mounted in a furnace of suitable character and may be utilized in domestic furnaces without disturbing much of the general construction of the present furnaces.

65 My invention will be more readily understood from the following description and drawings, in which:—

Figure 1 is a vertical longitudinal section through my burner on the line 1—1 of Fig. 2 in the direction of the arrows.

Fig. 2 is a back view of the burner in the direction of the arrow 2 of Fig. 1.

Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 1, in the direction of the arrows.

Fig. 4 is a perspective front view of the burner, indicating a distant manipulation for the needle valve.

Fig. 5 is a perspective detail of a base for supporting the main portions of the burner.

Fig. 6 is a longitudinal section of the needle valve.

Fig. 7 is a cross section of the needle valve on the line 7—7 of Fig. 6.

The construction of the spreading plate or disc is substantially as follows, being illustrated particularly in Figs. 1, 3 and 4:

This disc is designated by the numeral 1 and has a flat back surface 2, a coned front surface 3 with a slight projection 4 at the apex of the cone, the cone being very flat as indicated in Fig. 1. A series of radial ribs 5 extend outwardly from a position designated by the numeral 6, slightly spaced radially from the projection 4. The ribs extend forwardly at their outer ends 7 from the main surface of the cone 3. A retort 8 is formed in the back of the disc, this retort being bulged sideways as indicated by the numeral 9. The oil infeeding pipe 10 extends along the base of the furnace and has a vertical connecting pipe 11 threaded into the lower part of the retort. A vertical discharge pipe 12 leads from the upper

part of the retort to a horizontal pipe 13, a downflow pipe 14, to a T 15, to which is connected my needle valve 16. This latter will be described in detail hereunder.

5 The suction tube 17 shown particularly in Figs. 1 and 4 is substantially tubular with a belled end 18 spaced from the spreading plate 1 by arms 19 and has opposite lateral openings 20 from the forward end and extending backwardly from the needle valve. This suction tube has its forward end positioned very close to the end of the needle valve.

15 A hood 21 forming nearly a semi-circle, extends over the upper portion of the spreading plate and forwardly over the pipe 13. This hood preferably is either formed integral with or attached to a backing disc 22, which is of larger diameter than the spreading disc. This backing disc has a central opening 23 surrounding the retort 9 as shown in Fig. 2, and is clamped to the back of the spreading plate and to the pipes 11 and 12 by screws 24. It will be noted 25 that this backing disc has a bulged section 25 to accommodate the pipes 11 and 12 so that the main portion of the disc is positioned closely behind the spreading disc.

30 The base for supporting the burner proper is indicated particularly in Figs. 1, 3, 4 and 5. The base is designated generally by the numeral 26 and is constructed with side walls 27 having flanges 28 at their lower edge, these walls being spaced apart 35 a considerable distance at the front lower edge of the flanges and are close together at the inner end as indicated by the numeral 29. Thus the base forms a tapering structure, being widest at the front end of the furnace and tapering to a back wall 30 40 which is substantially vertical and triangular in shape. This wall is provided with a pair of apertures 31 through which bolts may extend engaging in a tri-angular lug 32 45 projecting outwardly from the coned face of the spreading disc.

50 The walls of the base are separated at the top as indicated by the numeral 33 and have outwardly curved flanges 34. The space 33 is sufficient for the needle valve to extend through and to be slightly below the flanges as indicated clearly in Fig. 1. The inner portion of the base has a sharp upper edge 35 which is closed, this forming in effect a knife edge and spreading the flame shot 55 downwardly to the lower periphery of the spreading disc.

60 It will be noted that the flanges 34 at the upper edge of the base are substantially on the same longitudinal alinement as the upper portion of the suction tube 17.

The infeeding pipe 10 extends through an aperture 36 through the front wall 30 and may be supported therein.

65 My needle valve is constructed substan-

tially as follows, being illustrated particularly in Figs. 1, 6 and 7.

70 As above mentioned the T 15 is connected to the downflow pipe 14, the needle valve 16 extending in the furnace from the T. The needle valve comprises a tube 37 shown as screw threaded to the inner end of the T and having an internal screw thread 38 adjacent its outer end. A valve seat in the form of a cap 39, having an inner hub 40 screw 75 threaded on the outside is threaded on the internal threads 38. The cap has a backwardly extending flange 41 slightly spaced as indicated by the numeral 42 from the exterior of the pipe 37. This cap has a coned 80 seat 43 for the needle of the needle valve. The hub 40 has an inwardly extending block 44 with a plurality of radial slots 45 there-through, the block being threaded as indicated at 46 at the inner section. 85

90 The needle stem 47 is threaded in the threads 46 and has a reduced end 48 having the pointed needle 49 on the end thereof to seat against the cone seat 43. A T is provided with a diaphragm 50 having an aperture 51 therethrough for the rearward end 52 of the stem and a packing 53 is held in place by a packing nut 54, thereby making a gas-tight closure for the end of the needle valve stem. 95

100 The distant control of the needle valve is indicated in Figs. 1 and 4, utilizing a sprocket 55 on the needle valve stem, a sprocket wheel 56 positioned where it may be readily accessible and a sprocket chain 57 between the said wheels. The sprocket wheel 56 is mounted on a shaft 58, such shaft having a pointer 59 rotatable over an indicator dial 60.

105 The manner of operation of my burner is substantially as follows:

110 It will be understood that the burner may be placed in any suitable type of furnace but the type of mounting above described is particularly adapted for utilization in a domestic furnace or cooking or heating stove, depending on the size of the burner utilized. In accordance with the ordinary practice, the fuel being fed to the burner through the pipe 10 may be controlled by a valve. After 115 the burner is in operation the oil in the pipe 11 and in the retort 8 becomes heated and as the retort itself is very hot the oil becomes vaporized and then gasified, this being partially accomplished in the pipe 12 120 and the pipe 13. The needle valve may be adjusted as above described and controls the flow of oil vapor which after the furnace is in operation is practically in the form of gas.

125 This gas is injected therefore under a considerable pressure directly towards the projection 4 on the spreading disc and through the suction tube 17, and has an injector action drawing air through the front end of the base 26 and drawing air radially through 130

the side openings of the suction tube 17. As the jet, which by the time it strikes the spreading plate is substantially burning, is forced radially in all directions in a thin sheet of flame, this flame is so thin that there is sufficient air to form practically perfect combustion. The flames curl backwardly on account of the hood 21 and are spread sideways at the bottom between the inner end of the base. Some of the flames curl around the back of the spreading disc and of the backing disc. Thus the pipes containing the oil and the oil vapor are subjected to a very high temperature.

The particular feature of my needle valve is positioning the screw threads by which the stem of the valve is threaded in and out so as to open and close the needle in the cone seat close to the said seat as clearly shown in Fig. 6. By such construction the stem of the valve between the threaded portion and the needle is so short that any expansion or contraction due to changes of temperature are immaterial and therefore the adjustment of the valve does not materially change from that in which it is set; nor when the valve is shut off is there any danger of changes of temperature, injuring the valve seat or opening up the valve.

It will be obvious that my burner may be considerably changed in general construction and specific details to adapt it for different types of furnaces and possibly for injecting the gas in a different direction from that shown, which is horizontal. These changes will be within the scope of my invention as set forth in the description, drawings and claims.

A cap 62 is secured to flanges 34 on the upper edges of the side walls of the base and has an inner end extending towards the suction tube 17. This cap is adapted to be adjusted longitudinally of the flanges 34 to position the inner edge variable distances from the suction tube 17.

Having described my invention, what I claim is:—

1. An oil burner comprising in combination a spreading disc having a conical front surface, a hollow retort formed in the back of the said disc, a back disc secured on the back of the spreading disc, adjacent the rear face of the retort, an oil infeeding pipe leading into the bottom of the retort from below the bottom of the spreading disc, an outfeeding pipe connected to the upper part of the retort, extending upwardly, then horizontally and then downwardly and being connected to a valve having a nozzle, the nozzle being in axial alinement with the axial center of the spreading disc.

2. An oil burner as claimed in claim 1, having in addition a curved hood extending

forwardly from the backing disc over part of the horizontal section of the outfeeding pipe.

3. An oil burner comprising in combination a base having side walls upwardly inclined towards each other, having an open space at the front end being tapered towards the back, a spreading disc secured to the back of the base and extending upwardly therefrom, a valve having a nozzle extending through the upper portion of the base, the nozzle being in axial alinement with the axial center of the spreading disc.

4. An oil burner as claimed in claim 3, in which the base is formed with a sharp upper closed edge adjacent the spreading disc.

5. An oil burner as claimed in claim 3, in which the base is formed with an upper closed cap between the sides adjacent the valve and with a closed sharp upper edge adjacent the spreading disc.

6. An oil burner comprising in combination a base having upwardly converging side walls, the walls being spaced apart at the front of the burner and tapering towards the rear of the burner, a spreading disc having a conical front surface secured to the back of the base and extending upwardly therefrom, the spreading disc having a retort formed in the back thereof, an infeeding pipe extending through the base and upwardly behind the spreading disc, being connected to the retort, an outfeeding pipe connected to the retort extending upwardly behind the spreading plate horizontally and then downwardly, a needle valve extending inwardly towards the spreading plate, through the upper portion of the base, the valve having a nozzle in axial alinement with the center of the spreading disc.

7. An oil burner as claimed in claim 6, in which the side walls have a cap at their upper ends adjacent the needle valve and joined at their inner ends adjacent the spreading plate with a sharp closed upper edge.

8. An oil burner as claimed in claim 6, in which the base is provided with spaced side walls adjacent the needle valve, with a cap forming a top closure and a suction tube extends forwardly from the spreading plate towards the needle valve, said tube having lateral openings.

9. An oil burner as claimed in claim 6, having in addition a backing disc secured to the back of the spreading disc, said disc having bulged sections to fit snugly around the oil pipes and a curved hood extending forwardly from the backing disc over the spreading disc.

In testimony whereof I have signed my name to this specification.

JAMES E. EVANS.