Nov. 10, 1925. 1,560,550

W. H. DUNKERLEY

HYDROCARBON BURNER

Filed Nov. 16, 1923 2 Sheets-Sheet 1

Fig. 1.

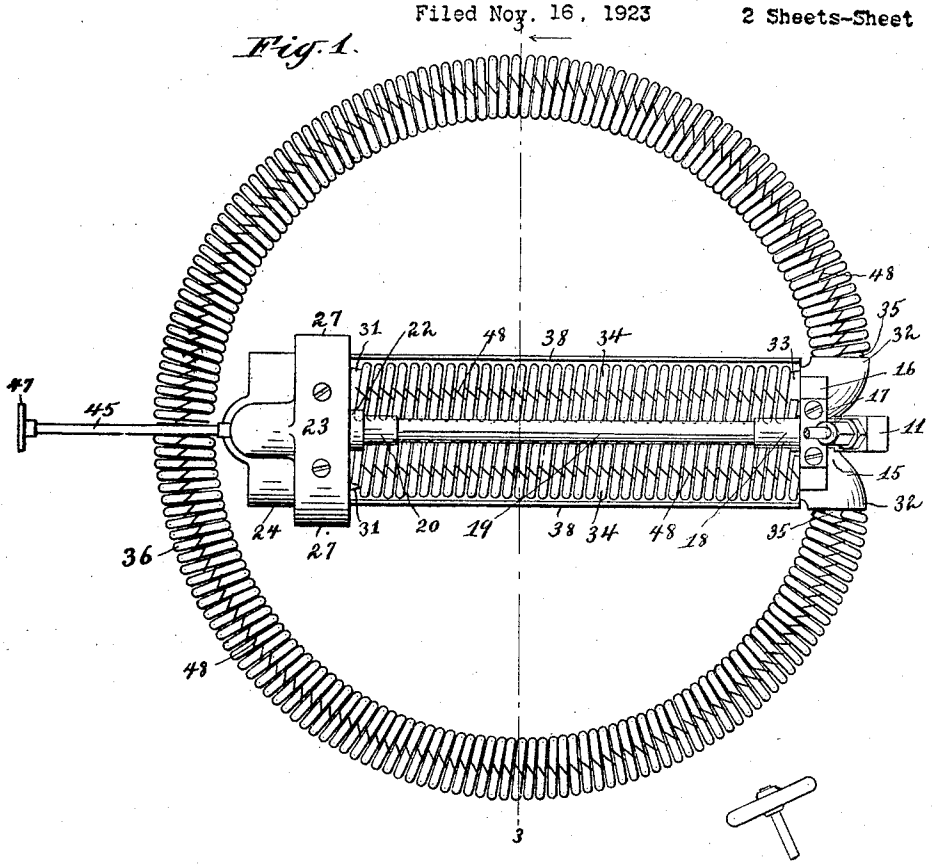
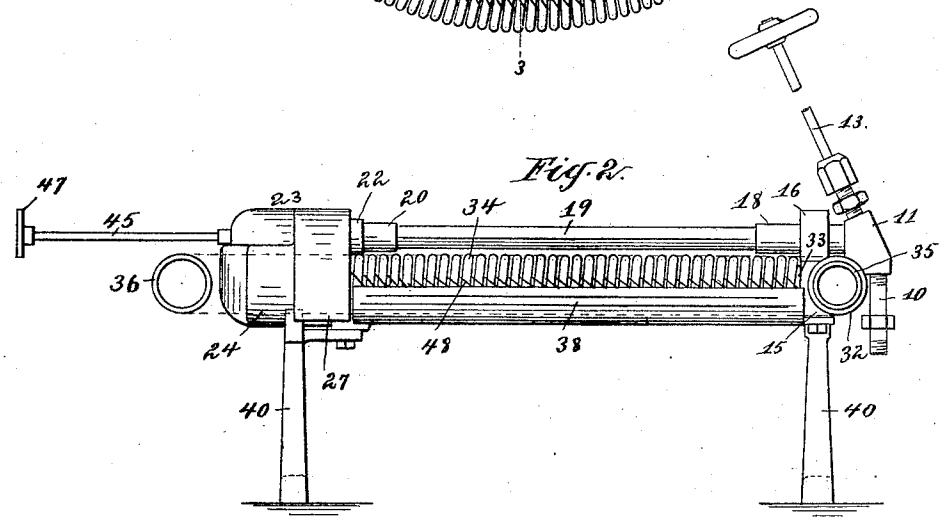


Fig. 2.



Inventor
William H. Dunkerley.
by his attorney.
Charles R. Searle

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W. H. DUNKERLEY

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Filed Nov. 16, 1923 2 Sheets-Sheet 2

Fig. 3.

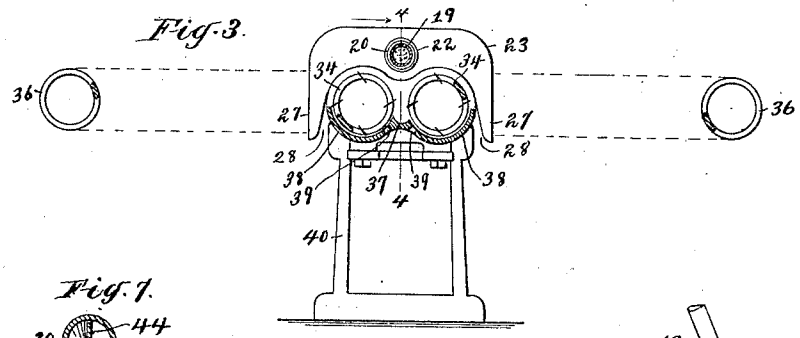
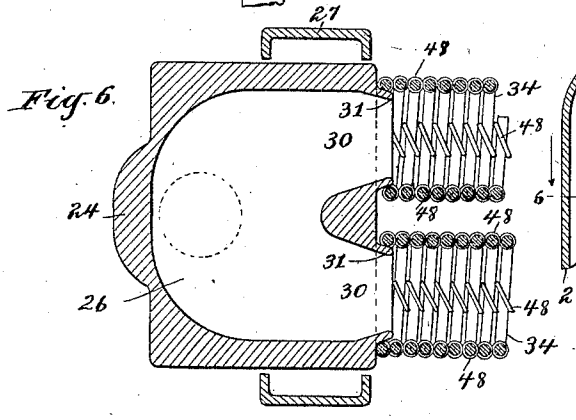


Fig. 7.



Fig. 4.

Fig. 6.



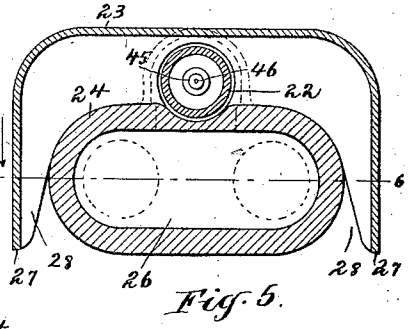


Fig. 5.

Fig. 8.

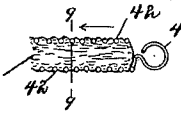
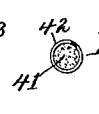


Fig. 9.



Inventor:
William H. Dunkerley.
by his attorney.
Charles R. Seale.

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UNITED STATES PATENT OFFICE.

WILLIAM H. DUNKERLEY, OF PATERSON, NEW JERSEY.

HYDROCARBON BURNER.

Application filed November 16, 1923. Serial No. 675,038.

To all whom it may concern:

Be it known that I, WILLIAM H. DUNKERLEY, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented a certain new and useful Improvement in Hydrocarbon Burners, of which the following is a specification.

The invention relates to heat producing burners for domestic and other purposes, and the object of the invention, among others, is to provide a simple and efficient device, economically constructed and operated, in which the oil is thoroughly vaporized and properly mixed with air to produce the desired heating flame.

Other important objects are, to provide burner tubes of inexpensive construction adapted to receive and burn the mixed air and vapor; to arrange the burner tubes and generator in such manner as to insure rapid and complete vaporization; to provide means for supplying warmed air to the mixing chambers, and means for delivering the oil-vapor and air to the mixing chambers in such manner as to insure intimate mingling; and means for easily removing obstructions from the vapor nozzle.

Another important object is to provide an arrangement by which all parts of the device are easily accessible for inspection, cleaning, and replacement.

The invention consists in certain novel features and details of construction and arrangement by which the above objects are attained, to be hereinafter described and claimed.

The accompanying drawings form a part of this specification and show an approved form of the invention.

Figure 1 is a plan view of the improved burner.

Figure 2 is a corresponding side elevation, with a portion omitted.

Figure 3 is a vertical transverse section taken on the line 3—3 in Figure 1.

The remaining figures are on a larger scale.

Figure 4 is a vertical longitudinal section showing certain parts, taken on the line 4—4 in Figure 3.

Figure 5 is a vertical transverse section, taken on the line 5—5 in Figure 4.

Figure 6 is a horizontal section, taken on the lines 6—6 in Figures 4 and 5.

Figure 7 is a transverse section showing a detail, taken on the line 7—7 in Figure 4.

Figure 8 is a longitudinal section showing a detail.

Figure 9 is a corresponding cross-section taken on the line 9—9 in the preceding figure.

Similar reference numerals indicate the same parts in all the figures.

Referring to the drawings, 10 is an oil-supply pipe bringing oil under pressure from a pump or other source, not shown, to a valve casing 11 having a contracted passage 12, controlled by a needle valve 13, leading to the valve chamber 14 in such casing. The latter is mounted upon a Y-shaped portion 15 of the burner, to be described, forming part of the burner tube system.

Slidably mounted in a yoke 16 secured by screws 17 upon the portion 15, is a sleeve 18 extending into the valve chamber 14, which receives telescopically one end of the generator or vaporizing tube 19 of which it forms a continuation. The tube 19 extends horizontally on the centre line of the burner and its opposite end carries a cap 20 having a small orifice 21 in its closed end, which is slidably received in a nozzle 22. The latter forms part of a removable case 23 secured by screws to a casting or manifold 24 located opposite to the portion 15.

Within the case 23 is the primary mixing chamber 25 to which the nozzle 22 leads, and which is shown in communication through the hole 29 with a secondary mixing chamber 26 in the manifold 24. The wings 27 of the case 23 overhang the manifold on its sides, see Figure 5, and are open at the lower ends to provide passages 28 for the entrance of air to the primary mixing chamber 25.

The secondary mixing chamber 26 divides horizontally into two channels 30 each terminating in a nozzle 31.

The Y-shaped portion above mentioned comprises a hollow casting having two horizontally disposed outwardly curved branches

32, each provided with a nozzle 33 corresponding with and oppositely located to the nozzles 31. The two primary burner tubes 34 extend parallel with each other and with the vaporizing tube 19, below the latter, from the nozzles 31 to the nozzles 33 and are supported thereby at their ends.

On the outer terminal of each branch 32 is a nozzle 35 each of which receives one end of a secondary burner tube 36 of annular form, shown as lying in the same horizontal plane with the primary burner tubes 34. This secondary tube 36 encircles the tubes 34 and manifold 24, as seen in Figure 1.

Beneath the primary burner tubes 34 and extending from the manifold 24 to the casting 15, is a trough 37 having curved extensions or wings 38 at its sides, matching the contour of the under faces of the tubes 34 and provided each with a series of orifices 39. The trough 37 provides a long receptacle below the vaporizing tube or generator 19 and between the burner tubes 34, adapted to receive a priming charge of hydrocarbon for heating the generator, and the wings 38 serve as shields for the under faces of the primary burner tubes, causing the flames therefrom to issue on the upper faces thereof.

The burner may be supported in any manner suitable to the requirements of location or other conditions in the fire-box of a furnace or other heating apparatus, as will be understood. It is shown as carried on legs 40 secured to the manifold 24 and casting 15.

Within the vaporizing tube 19 is inserted a packing 41 of steel wool or other heat-conducting fibrous material, preferably contained in a helical cage 42 of wire having a loop 43 at one end by which it and its inclosed packing may be withdrawn from the tube. The packing serves its usual function of retarding the flow of oil and presenting it favorably for vaporization.

In the cap 20, see Figures 4 and 7, is a thin plate 44 twisted to spiral form, serving to impart a whirling movement to the vapor issuing through the orifice 21 into the mixing chamber 25, as an aid to the desired intimate mingling of the vapor and air.

A rod 45 extends slidably through the wall of the case 23 in axial alinement with the vaporizing tube 19 and carries at its inner end a pin 46 adapted to be thrust into and withdrawn from the orifice 21 to clear the latter and remove minute obstructions therefrom. The rod has a head or button 47 to facilitate such reciprocations.

The burner tubes 34 and 36 are close helixes of heavy wire having their convolutions held apart by small wires 48 to provide the desired openings for the flow of mixed air and vapor from the interior to the exterior where combustion takes place. This form has the advantages of economy of construction, uniform spacing, lightness, and easy replacement.

The operation briefly stated is as follows: Oil or other hydrocarbon admitted to the valve casing past the needle valve 13 enters the vaporizing tube or generator 19, which has been previously heated by burning a priming charge in the trough 37, and is vaporized therein being broken up and retarded in its flow by the packing 41. The vapor thus produced is agitated in the cap 20 by the action against the twisted plate 44 and escapes through the orifice 21 to the primary mixing chamber 25 in the case 23 where it receives and mingles with air entering at the wings 27. The mixture then passes downwardly through the hole 29 into the secondary mixing chamber 26 in the manifold 24 and thence to the primary burner tubes 34 and escapes through the spaces between the wires thereof and is burned. The heat thus produced warms the entire device and automatically continues the vaporization in the tube 19 and also supplies heat to the mixing chambers and air entering at the wings 27 of the case 23. Thus combustion once properly initiated and the supply of oil adjustably established by the needle valve 13, is continuous until the supply of hydrocarbon is cut off.

A supply of the mixture also traverses unconsumed through the primary burner tubes 34 to the casting 15 and is deflected in opposite direction to the annular secondary burner tube 36 whence it escapes and is burned.

By disconnecting the pipe 10 from its supply pipe, not shown, and removing the yoke 16 and case 23, all the parts carried thereby are readily separable and accessible for cleaning.

I claim:—

1. In a device of the character set forth, an annular burner tube consisting of a helix, and primary burner tubes arranged side by side each consisting of a helix, a primary mixing chamber, a secondary mixing chamber, the said tubes being in communication with each other at one end through said secondary mixing chamber, the primary burner tubes being out of communication with the annular tube at the other end but in communication with each other.

2. In a device of the character set forth, primary burner tubes arranged side by side and each consisting of a helix, a secondary mixing chamber with which said tubes communicate at one end, and an annular secondary burner tube consisting of a helix, and couplings uniting the adjacent ends of said annular tube with adjacent ends of

the primary burner tubes at the end opposite the communication of said primary tubes with the said mixing chamber.

3. A device of the character described comprising primary burner tubes side by side and each consisting of a helix, a secondary mixing chamber with which one end of said tubes communicate, a primary mixing chamber above said secondary mixing chamber, a Y shaped member connecting the other ends of said tubes, a vaporizing tube communicating with said primary mixing chamber and extended above said tubes, and a valve controlled oil supply for said vaporizing tube.

In testimony that I claim the invention above set forth I affix my signature hereto.

WILLIAM H. DUNKERLEY.