June 12, 1928.

1,673,119

W. C. McKESSON

OIL BURNER

Filed May 11, 1927

Fig. 1.

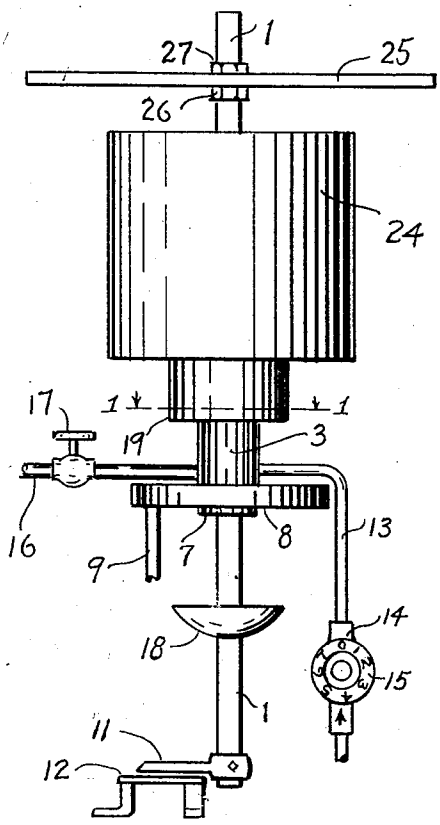
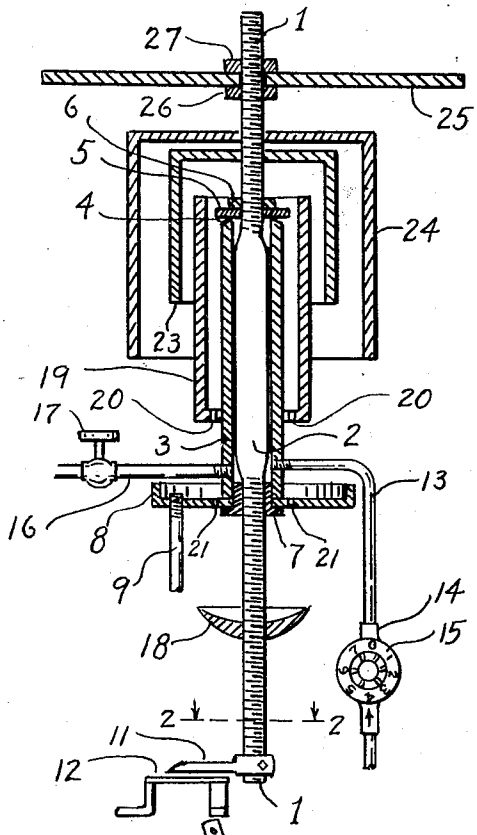


Fig. 2.



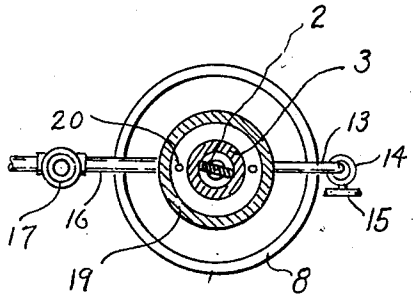


Fig. 3.

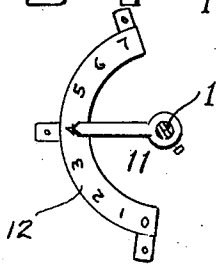


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM C. McKESSON, OF CHICAGO, ILLINOIS.

OIL BURNER.

Application filed May 11, 1927. Serial No. 190,537.

My invention relates to the construction of a burner which will produce efficient combustion using kerosene, stove oil or the heavier grades of a fuel oil. The burner is adapted to produce combustible vapors from such fuel without the aid of a forced air draft. The burner is devised to permit of accurate regulation and adjustment. The means by which these and other beneficial results are secured are shown in the accompanying drawings in which

Fig. 1 is a side view of the burner. Fig. 2 is a vertical sectional view. Fig. 3 is a transverse section taken on the dotted line 1—1 in Fig. 1, and Fig. 4 is a similar view taken on the line 2—2 in Fig. 2.

Throughout the several views like parts are indicated by the same characters. Referring to the details of construction, 1 is a valve stem which passes entirely through the burner. This valve stem is preferably threaded from end to end except for a flattened portion 2 which in the assembly comes within the generating chamber 3 and which serves as a scraper for removing accumulations of residue from the walls of said generating chamber 3. The chamber 3 is cylindrical in shape, of a diameter just sufficient to provide a working fit for the scraper 2. The chamber has a finished valve seat 4 on the upper end. This valve seat 4 is preferably beveled as shown to insure proper seating of the valve 5 which is carried by the valve stem 1. The beveled valve seat is self-cleaning in that particles of carbon or residue are readily dislodged by the discharge of vapor which escapes between the valve 5 and the beveled valve seat 4. In practice the valve 5 is threaded to fit the valve stem 1 and is fixed at the proper position by a lock nut 6.

The chamber 3 is reduced at the end opposite the valve seat 4 to fit the valve stem 1 below the scraper section. This may be conveniently accomplished by the use of a flanged bushing 7 threaded into the end of the chamber 3, this bushing in turn being threaded to fit the valve stem 1. Any dirt, residue or carbon which forms in the generating chamber and which is removed from the walls by scraper 2 is readily removed by unscrewing the bushing 7. 8 is an oil pan which is utilized in the heating of the burner and which also serves to collect surplus oil, if the burner is improperly adjusted. Surplus oil is discharged from this pan into an overflow pipe 9. The oil pan 8 is attached to the generating chamber 1 preferably by means of the flanged bushing 7 which passes first through the pan 8 and then into the threaded lower end of the chamber 3. The pan 8 and chamber 3 are supported within the combustion chamber of a stove or furnace, not shown, in such manner that they remain in fixed position when the valve stem 1 is rotated. The valve 5 is raised from the valve seat 4 by turning the valve stem 1.

11 is an indicator handle adjustably attached to the valve stem 1. 12 is an indicator scale attached to the stove or furnace. The indicator handle 11 is adjusted to point to zero on the scale 12 when the valve 5 is tightly closed and the last graduation on the scale 12 corresponds with the full open position of the valve 5. Intermediate points indicate the relative position of valve 5 when the burner is in operation. 13 is a fuel feed pipe leading to the generating chamber 3. 14 is a fuel feed regulating valve carrying an indicator wheel 15 having reference points corresponding to those on the scale 12. The position of these points with reference to a fixed mark on the body of the valve serves to show relative amount of feed during operation. Preferably the graduations on the wheel 15 are so related to those on the scale 12, that the amount of fuel supplied will correspond to the proper position of the valve 5 for most efficient consumption of this same amount of fuel. 16 is a discharge pipe connected with the generating chamber 3 and having the control valve 17 for regulating outflow of residue from the burner. 18 is a lighting cup adjustably mounted on the valve stem 1. 19 is a heating chamber partially surrounding the generating chamber 3. It is supported by the walls of the chamber 3. The height of the top of this chamber is adjustable. In small burners this adjustment may be most readily accomplished by threading opening in the center of the bottom of the chamber 19 to engage similar threads on the exterior surface of the generating chamber 3. 20 refers to small perforations in the bottom of the chamber 19. 21 indicates similar but smaller perforations in the bottom of the oil pan 8. 23 is a cylindrical baffle concentrically supported above and adjacent to the chamber 19. 24 is an outer baffle similar in shape to

23 and also concentric with the chamber 19. The baffles 23 and 24 are usually supported by attaching them to the valve stem 1.

25 is a spreader preferably composed of fire clay or metal and of size and shape best adapted to carry the flame and heat outward from the burner to the inner surfaces of the combustion chamber. 26 and 27 are nuts between which the spreader 25 is clamped.

In operation, the valve 14 is first opened and fuel is admitted to the generating chamber 3. The valve 5 is raised and fuel is permitted to overflow into the heating chamber 19 from which it escapes through the perforations 20 to the pan 8.

The overflow pipe 9 projects slightly above the bottom of the pan 8 and fuel oil is, therefore, spread over the bottom before overflow begins. A portion of the fuel oil is discharged through the small perforations to the lighting cup 18 where it is ignited by the operator. The burning oil in the cup 18 heats the oil pan 8 and vaporizes the oil which has spread over the pan. This oil then ignites and presently heats the remainder of the burner. The oil remaining within the chamber 19 and in the generating chamber 3 is vaporized by the heat so produced and escapes between the baffle 23 and the exterior of the chamber 19 where it is ignited by the burning oil in the pan 8. When the burner thus becomes sufficiently hot to vaporize the fuel in the generating chamber 3 the overflow of oil ceases. The controls 15 and 11 are then adjusted to properly regulate the flow of fuel oil and of heated vapor. During the operation of the burner the vapor and air mix between the lower edge of the baffle 24 and the exterior of the chamber 19. Combustion occurs at this point and the flame and heat pass outward and upward until deflected as desired by the spreader 25.

The valve 5 is adjusted to a height which produces pressure within the generating chamber 3. This is necessary for most efficient operation. The maximum amount of pressure is obviously limited by the pressure in the feed line but it should be sufficient to impart considerable force to the vapor escaping through the port between valve seat 4 and valve 5. The relative regulation of vapor pressure, with the valve 5 in any operating position, is automatically regulated by the feed pressure. When the vapor back pressure approaches the feed pressure, flow of fuel to the burner is reduced. A reduction in the amount of fuel available reduces vapor pressure. The flow of fuel then increases with the reduction of pressure back within the chamber 3 and the relative pressures become stabilized due to the limits of fuel available for production of vapor, as regulated by the fuel control valve 14.

The opening between the valve 5 and valve seat 4 should be so adjusted that, with the generation of the full amount of fuel admitted through the valve 14, the vapor pressure will be considerably less than the fuel pressure.

Proper relative adjustment is important to efficient operation and the indicator controls provided are therefore very desirable and necessary.

If a heavy fuel oil is used containing residue which will not vaporize in the generating chamber 3 the residue may be continuously or intermittently removed through the pipe 16 regulated by the valve 17.

The carbon or residue forming on the inside walls of the chamber 3 is loosened by rotating the valve stem 1 and the scraper 2. The residue so removed falls to the bottom of the chamber and may be removed by flushing through the pipe 16 or by removing the bushing.

The generating chamber 3 can be flushed and cleaned when cold by opening the valve 5 and the fuel supply valve 14 and by running oil through or by closing the valve 5 and by opening the valve 17 and by forcing fuel through the chamber 3 and into the discharge pipe 16.

The extensive surface areas of the baffles 23 and 24 absorb heat, during operation, which is transmitted through the valve stem to the generating chamber 3. They also serve to facilitate mixing of air and vapor.

Although principally intended for use with stove oil and other high gravity fuels, the burner can be used with heavy fuels containing nominal amounts of lighter oils by continually discharging the residue. For use with such heavy fuels, the chamber 3 is made relatively long and large in order to give adequate capacity, only a portion of the fuel being consumed. With light volatile fuels a small generating chamber is found adequate.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an oil burner, a generating chamber; a valve stem passing through said chamber; a scraper formed on said valve stem; an adjustable valve operated by said valve stem and adapted to regulate the flow of vapor from the said generating chamber; means for supplying fuel to the said generating chamber; a heating chamber partially enclosing the said generating chamber adapted to receive the vapor therefrom and having perforations in the bottom adapted to permit the escape of fuel; and concentric mixing baffles adapted for mixing heated vapor and air adjacent to the outer surface of the heating chamber.

2. In a oil burner, a cylindrical generating chamber; a beveled valve seat formed on the upper edge of the generating chamber; a

valve stem extending longitudinally through the generating chamber; a valve attached to the valve stem and adapted to be brought into contact with the valve seat by the longitudinal movement of the valve stem; a scraper formed on said valve stem within said combustion chamber; a lever and indicator scale by which the position of the valve may be accurately adjusted; a fuel supply pipe connected with the generating chamber; an adjustable indicator valve in the supply pipe adapted to provide accurate regulation of the fuel supply; an outlet pipe for discharging residue from the combustion chamber; a vapor heating chamber partially inclosing the generating chamber and adapted to receive fuel and vapor therefrom; mixing baffles supported above and adjacent to the heating chamber; an oil pan adapted to receive oil discharged from the heating chamber; a lighting cup supported beneath said generating chamber and a spreader adapted to deflecting flame and heat.

WILLIAM C. McKESSON.