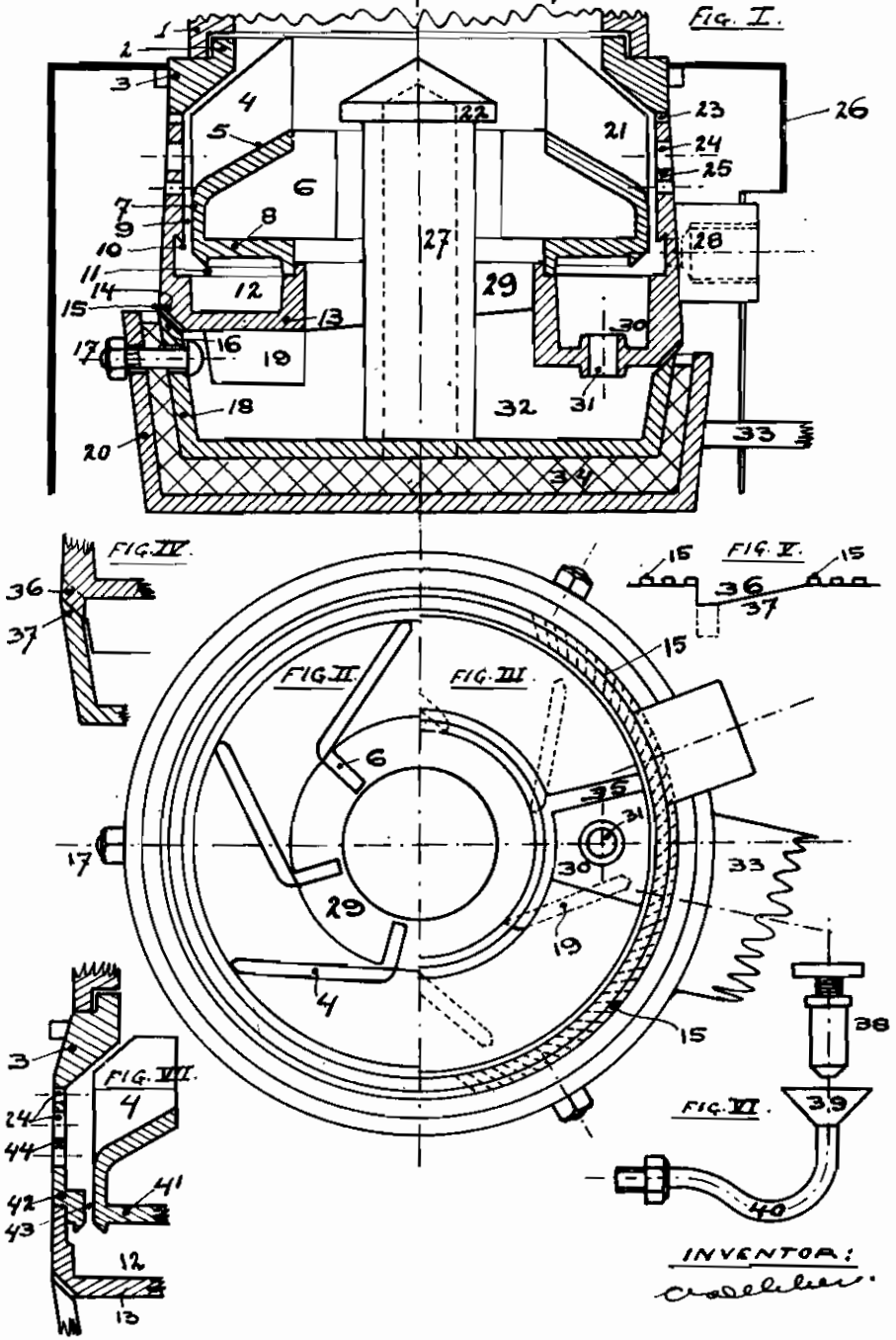


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CRUDE OIL BURNERS

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The invention relates to improvements in crude-oil burners with a covered sloping annular evaporation gutter of which the residue drops at the lower end of the gutter into a separate combustion chamber where it burns and heats the gutter and its cover; and the objects of the improvements are, first, quick lighting of the hot economical principal flame, no going out of that flame when burning low and the maintenance of the entire evaporation of the lighter parts of the crude-oil and the maintenance of the small residue discharge from the gutter when burning at full capacity (see claims 1, 2, 3, 6, 9, 11, 12, 14); second, a sootless and smokeless combustion, even with little chimney draught, and a higher efficiency by giving the oil-gas flame and the residue flame a rotating motion in the same or opposite directions (see claims 4, 5, 8); third, the prevention of roaring of the burner (see claim 6); fourth, a higher efficiency and a hotter flame by pre-heating the combustion air (see claim 9); fifth, a better combustion of the residue by a better air-supply to the residue combustion chamber (see claims 7 and 8); sixth, a quicker heating up of the bottom of the residue combustion chamber (see claim 11); seventh, an even evaporation of the crude-oil in the gutter and the prevention of coke-formation in the gutter (see claim 10); eighth, a higher temperature in the residue combustion chamber (see claim 12); ninth, an easy lighting of the burner, and a sufficient supply of combustion air to the residue combustion chamber during the starting of the burner (see claim 13); tenth, the prevention of choking-up of the gas-outlet slit (see claim 15); eleventh, the prevention of air passing into and coke-formation in the gutter (see claim 16). One form of the invention is illustrated in the accompanying drawing in which Figure I is a vertical section of the entire burner, Fig. II a plan view of the burner without cover 3, Fig. III a plan view without the covers 3 and 8, Fig. IV a section through the cams 36 and notches 37, Fig. V a view of the cams 36, notches 37 and slots 15, Fig. VI a view of the crude-oil supply and Fig. VII a section of a gutter with two covers.

The burner consists of a covered annular evaporation gutter 12 with sloping bottom 13, a vertical gas-outlet slit 9, a fuel-supply 28 at the top of the slope, an outlet 31 of the not evaporated fuel (residue) at the lower end of the slope, a crude-oil gas combustion chamber 21 and a residue combustion chamber 32 for the burning of the heavy parts of the crude-oil, the flame of which heats the gutter and its cover 8, while ris-

ing through the hole 29 in the middle of the burner, which hole is formed by the annular gutter 12.

The lower end of the gutter has a sink 30. The gutter is provided with a small dam 35 between its higher end and the sink.

The gutter is entirely closed by the cover 8 except for a vertical gas-outlet slit 9. The cover is hollow in order to get a high temperature more quickly and this hollow has ribs 8, which extend into the hole 29. The outside of the cover 8 has a vertical upward extension 7, which projects above the top of the gas-outlet slit 9 and joins the inclined ascending upper surface 5 of the cover, which surface has tangential ribs 4. The cover has on its underside a sharp edge 11. The wall of the gutter has a sharp edge 10 to prevent oil creeping up into the gasslit 9. The outer wall of the gutter has a vertical upward extension 25, which has holes 24 and slots 23 for the supply of combustion air to the combustion chamber 21. The upper edge of this extension 25 supports a cover 3 with a narrow aperture and a cylindrical flange 2. The gutter fits close and with a bevelled side 14 upon the bevelled edge 16 of the ashbox 19, which forms the residue combustion chamber 32. The bevelled side 14 is provided with tangential slots 15, which give the passing combustion air a rotating downward motion. The ashbox 16 has a centre-piece 27 with a brim 22 cast with the bottom of the ashbox. The gutter has tangential ribs 19 on its underside. It has slanting cams 36 fitting in slanting notches 37 in the wall of the ashbox 18, which is connected by means of screws 17 with a protection base 20 having a handle 33. The space between the ashbox 18 and the protection base 20 is filled up with isolation material 34. The burner has a jacket 26 for the pre-heating of the combustion air. The burner is pressed by means of a spring support against the flame inlet pipe 1 of the range or stove or geyser (etc.), which is connected with a chimney. The crude-oil is supplied from a tap 38 at a fuel tank, through an oil-pipe having a funnel 39 and an oil-lock 40.

Another form of transmitting heat from the oil-gas flame to the gutter 12 is illustrated by Fig. VII. In this case the gutter has two covers 41 and 42 having the gas-outlet slit 43 between them. The cover 42 is of one piece with the ring 44 having holes 24 and with the cover 3. The working of the burner is as follows:

The gutter 12 is raised from the ashbox 18 by holding the gutter in its place and turning the handle 33 away from it thereby obtaining sufficient space to throw a burning match into the

thin layer of crude-oil, which has dropped from the fuel-tap 38 in the funnel 39 and flown through the oil-lock 40, the hole 28, the gutter 12 and the residue-hole 31 upon the bottom of the ashbox 18. The flame rises through the hole 29 heating the bottom 13 of the gutter 12 and its cover 8 with ribs 6 and the brim 22 of the centre-piece 27 on its way to the appliance, which has to be heated. The centre-piece 27 transmits its heat to the bottom of the ashbox 18 causing such a faster yield of gas, so that flames pass outside and back into the combustion chamber 21 through the holes 24 and heat the ribs 4 and the surface 5 of the cover 8. Soon the evaporation of the crude-oil in the gutter becomes so great that oil-gas escapes through the gas-slit 9 and is ignited by the flame from the lower combustion chamber 32. In the meantime this flame has begun to heat the appliance.

The oil-gas flame, which is the hot and economical flame, the principal one, touches the ribs 4 and the upper surface 5 of the cover 8 obtaining its combustion air through the holes 24 and the slots 23. Soon the evaporation reaches its maximum and very little residue (depending on the quality of the fuel) passes through the hole 31 into the residue combustion chamber 32. Then flames no longer pass to the outside from the chamber 32, the handle 33 is turned back and the gutter 12 fits again close on the ashbox 18, combustion air passing only through the small slots 15, as only a small quantity of air is required for the small residue flame (a great quan-

tity would cool down the bottom of the gutter too much and decrease the evaporation of oil). The tangential ribs 4 and 19 give the oil-gas flame and the residue flame rotating motions causing a better combustion. Moreover the mixtures of gas and air collide with the hot ribs 4 and 19 thereby improving the combustion. The oil-gas flame heats the extended wall 25 of the gutter, which heat assists the evaporation of the crude-oil in the gutter. The contact of the oil-gas flame with the ribs 4 and the surface 5 and the extended wall 25, and of the residue flame with the ribs 19 assures a maintenance of the evaporation during small fuel supplies (preventing flame extinction) and assures firstly a full evaporation of the lighter parts of the crude-oil; secondly a small residue discharge through the hole 31 at full capacity; thirdly quick attaining of the full capacity of the burner. When burning at full capacity the burner has an inclination to roar, which is prevented by the vertical extension 7 of the outside of the cover 8 and its inclined ascending surface 5. While the crude oil evaporates on its way through the gutter its viscosity changes. Therefore the pitch of the slope is made to suit these viscosities at various parts of the bottom.

I am aware that prior to my invention crude oil burners have been made with a covered sloping annular evaporation gutter, a residue outlet at the lower end and a residue combustion chamber underneath.

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