

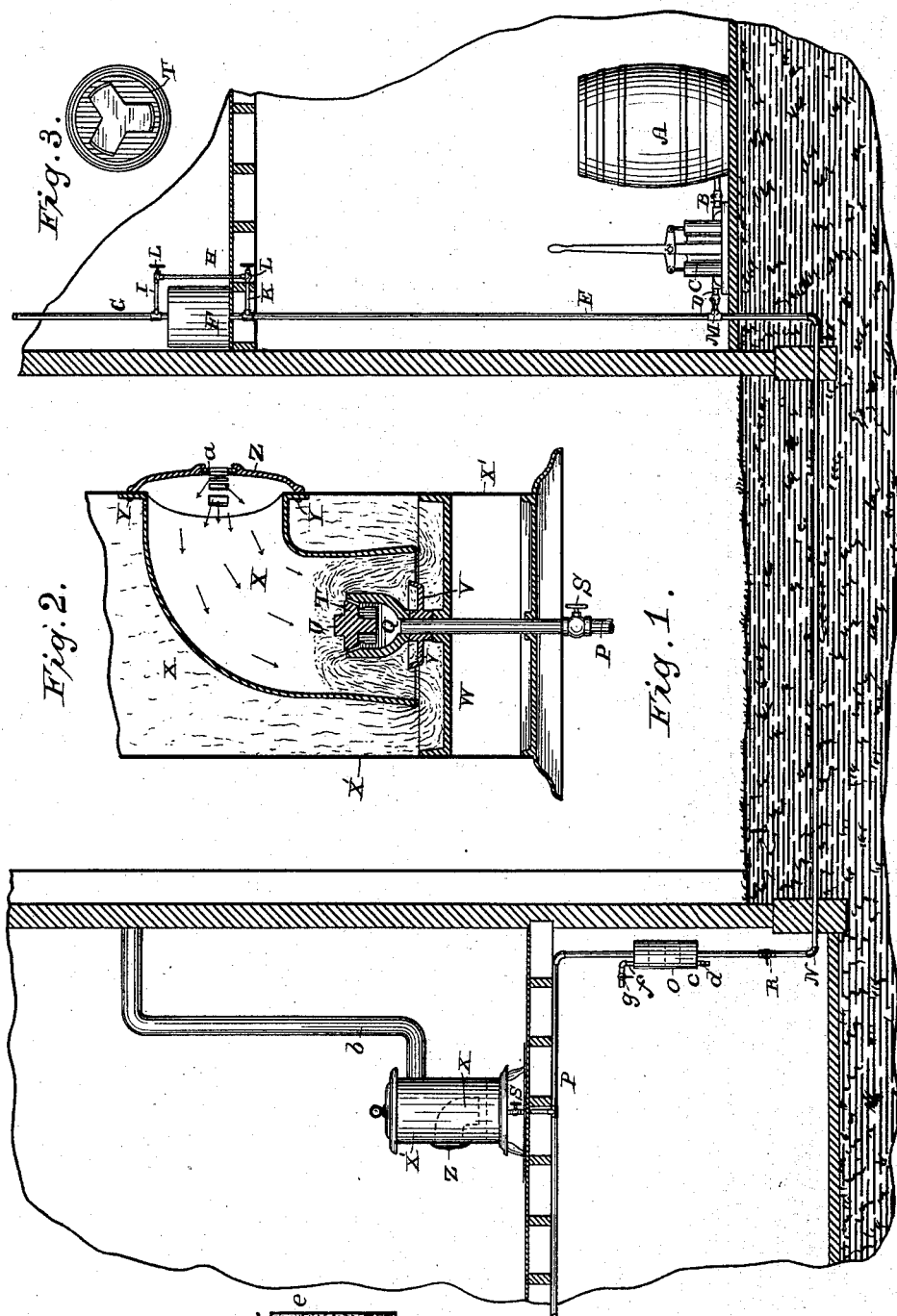
(No Model.)

R. W. SMITH.

APPARATUS FOR BURNING CRUDE PETROLEUM OIL.

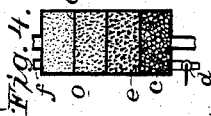
No. 384,873.

Patented June 19, 1888.



WITNESSES

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INVENTOR.

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UNITED STATES PATENT OFFICE.

ROBERT W. SMITH, OF TOLEDO, OHIO.

APPARATUS FOR BURNING CRUDE PETROLEUM-OIL.

SPECIFICATION forming part of Letters Patent No. 384,873, dated June 19, 1888.

Application filed May 19, 1887. Serial No. 238,764. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. SMITH, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Apparatus for Burning Petroleum, of which improvements the following is a specification.

The object of my invention is to provide a heating apparatus that will thoroughly consume crude petroleum.

To this end my invention consists in the peculiar organizations of parts hereinafter described, and succinctly summed up in the appended claims.

In the accompanying drawings, which represent so much of a petroleum-burning apparatus embodying all my improvements as is necessary to illustrate the subject-matter herein claimed, Figure 1 is a sectional elevation of my improved apparatus. Fig. 2 is a vertical central section, on a larger scale than Fig. 1, through so much of a stove or heater suitable for operating my invention as is necessary to illustrate its working. Fig. 3 is a detail view of the spider cap-nut detached. Fig. 4 is a vertical central section through an oil-filter which may be used in connection with my apparatus.

A cask or tank, A, containing crude petroleum-oil, is shown as connected by a pipe, B, with the force-pump C, the details of which are of usual character, and need not be described, as they constitute no part of my invention.

A pipe, D, connects the force-pump with another pipe, E, leading to an elevated tank, F, of ordinary construction, preferably closed at its top and provided with a vent-pipe, G. If desired, an ordinary glass tube, H, may be employed to serve as an indicator of the quantity of oil contained in the tank F. Tubes I and K connect the oil-pipe E and vent-pipe G with the glass tube H, and are provided with cocks L, as usual. The oil being forced into the tank F, by means of the force-pump, until the tank is sufficiently full, as will be indicated by the glass tube, the working of the pump is stopped and the oil will begin to descend by gravity through the pipe E, and will be prevented from passing back to the pump by its check-valve M, and consequently

will find its way through pipe N and oil-filter O, thence on through pipe P to the oil-cup Q.

The pipes N and P are furnished with cocks R and S, one of which should be closed when the oil is being pumped into the tank F. They should both be open when the fire is lighted. The cock R might be dispensed with, and is intended merely as a safety-cock. The cock S should always be closed except when it is desired to light a fire in the stove or heater. It is adapted to be opened more or less in the ordinary way, in order to regulate the supply of oil to the oil-cup Q. This oil-cup is internally screw-threaded at its upper end, as shown, so as to receive a spider cap-nut, T. The mouth of the oil-cup is tapering, as illustrated, and the cap of the nut is correspondingly tapered, so that as it is screwed down it tends to close the top of the cup more or less, and will close it entirely, if desired. In other words, it regulates the size of the opening for the overflow of the oil from the cup. An annular head, U, upon the nut receives a suitable wrench (not illustrated) for turning the nut to regulate the size of the opening for the escape of the oil from the oil-cup.

The burner-pipe P is shown as passing up through the bottom of the stove and of a diaphragm or pan, W, which extends across the stove and supports a drip-tray, V, through which the burner-pipe also passes. The oil-cup is secured on the burner-pipe so that the oil flows upward through it before being burned.

The drip-tray V under the oil-cup catches any oil that may run down over the outside of the cup before it is burned. Should this tray become full, its overflow will drop upon the diaphragm W, which will hold it in the path of the flame until burned.

A magazine-flue, X, fastened by rivets Y to the wall of the stove, is provided with an ordinary door, Z, provided, as usual, with a slide or damper, a, to admit air in greater or less quantity, as desired, for purposes of combustion. The flue X extends down around the oil-cup to near the diaphragm W, allowing merely sufficient space for the products of combustion to properly pass between the end of the flue and the diaphragm and escape around the outside of the flue into the stove body or

140
12
250
148
1650

95 3

144

100 2

31

barrel X' and pass off through the pipe *b* to the chimney or out-of-doors, in the usual manner.

The apparatus operates as follows: With the proper oil-supply in the tank F and the cocks R and S open, the oil cup will be filled with oil under pressure and will overflow from the cup in a thin circular sheet. This, being ignited in any ordinary way, will be supplied with air for combustion entering through the damper and magazine-flue in a downward direction, the draft from the chimney being sufficient for that purpose. The result will be that the flame, instead of being driven up, will be flared out around the oil-cup and driven downward. The oil-cup will thus be highly heated and much vapor will be generated therein, so that the supply of fuel will very soon consist of mingled vapor and air, all the lighter portions of the oil being converted into vapor. The heavier oil, which may overflow and not be consumed instantly, as it passes out at the top of the oil-cup will either be consumed while it is passing down the sides of the cup or else may, in small quantities, drop into the drip-tray V, where it will be in the path of the flame, and will aid in supplying material for combustion. In case the heavy oil should not all be consumed in the drip-tray, it will again overflow upon the diaphragm below, where it is still in the course of the draft or path of the flame, and will be entirely consumed. I am thus enabled with my apparatus, by a downward draft, to thoroughly consume crude petroleum. Further than that, I am enabled to get the advantage of converting the lighter oils it contains into vapor, which readily burns and aids materially in the consumption of the residuum or heavy oils, so that I get a perfect combustion of the entire crude product.

In order that the crude oil may be better prepared for thorough combustion, I provide an oil-filter between the tank F and the stove. This filter may be composed of an ordinary tank, *c*, adapted to contain proper oil-filtering material and be connected with the oil-pipe leading from the tank F to the stove, as shown in Figs. 1 and 4.

A cock, *d*, near the bottom of the filter may be employed to run off any water that may accumulate. A perforated diaphragm, *e*, supporting successive layers of fine gravel, coarse sand, and glass-sand, (indicated in Fig. 4,) or any other suitable oil-filtering material of ordinary character, may be employed. A pipe, *f*, connected with the top of the filter, is provided with a cock, *g*, so that, when desired, a hose or pipe may be connected with the pipe *f* and the filter flushed with water to cleanse it of any sediment or accumulations. Whenever the crude oil is sufficiently free from solid or incombustible matter, it will not be necessary to use the filtering apparatus; but

with it the poorest grade of crude oil may be used without difficulty.

In the drawings I have illustrated an ordinary form of cylindrical heater or stove; but my invention is applicable to stoves, furnaces, ranges, heaters, &c., of various forms.

I do not confine my invention to the particular form of embodiment illustrated in the drawings, as many variations of details may be made without departing from its substance, and some of the parts described may also be advantageously used together in an oil-burning apparatus without the others.

I claim as of my own invention—

1. The combination, in an oil-burning apparatus, of a stove, a downdraft-flue therein, an escape-pipe for the products of combustion, an oil-supply tank, a supply-pipe connected therewith, and an oil-cup mounted on the supply-pipe or oil-connection in the flue and provided with an adjustable cap for admitting oil to flow upwardly through and over the top of said cup, substantially as set forth.

2. The combination, in an oil-burning apparatus, of a stove, a downdraft-flue therein, an escape-pipe for the products of combustion, an oil-supply tank, a supply-pipe connected therewith, a filter interposed in the supply-pipe, and an oil-cup mounted on the oil-supply pipe or oil-connection and provided with an adjustable cap for admitting oil to flow upwardly through and over the top of said cup, substantially as set forth.

3. The combination, in an oil-burning apparatus, of a stove body or barrel, its downwardly-projecting draft-flue, a draft-opening at its upper end, and an oil-cup in the flue, having an oil-connection or supply-pipe in its bottom and an adjustable cap at its top, substantially as set forth.

4. The combination, in an oil-burning apparatus, of a stove body or barrel, its downwardly-projecting draft-flue, a draft-opening at its upper end, an oil-cup in the flue, having an oil-connection or supply-pipe in its bottom and an adjustable cap at its top, a drip-tray beneath the oil-cup, and a diaphragm beneath the drip-tray, substantially as set forth.

5. The combination, in an oil-burning apparatus, of a stove body or barrel, its downwardly-projecting draft-flue, and an oil-cup with an oil connection or opening in its bottom for admitting oil to flow upwardly over the top of said cup, and an adjustable cap to regulate said flow, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

ROBERT W. SMITH.

Witnesses:

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SCHUYLER DURYEE.