R. C. CASAD.

OIL BURNER.

APPLICATION FILED JULY 5, 1913. RENEWED APR. 8, 1916.

**1,205,083.** Patented Nov. 14, 1916.

Fig. 1

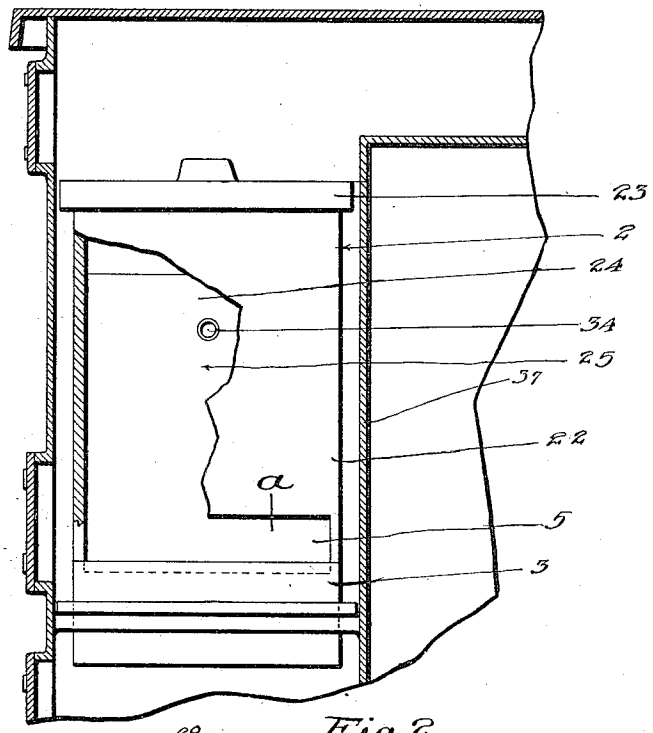



Fig. 2.

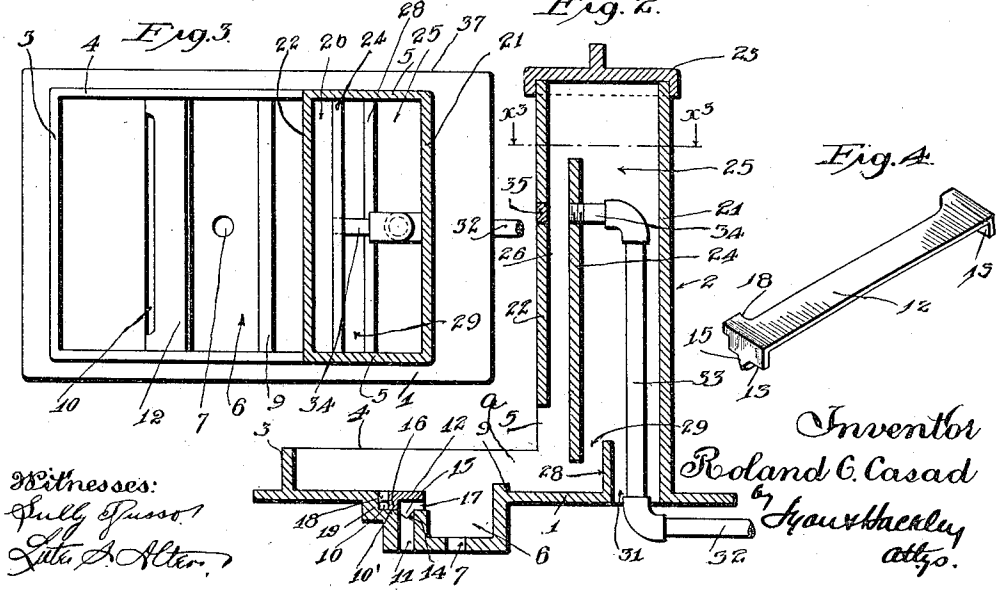



Fig. 3.

Fig. 4.




Witnesses:
Fully Pusso
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attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

ROLAND C. CASAD, OF SAWTELLE, CALIFORNIA.

## OIL-BURNER.

1,205,083. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed July 5, 1913, Serial No. 777,377. Renewed April 8, 1916. Serial No. 89,998.

*To all whom it may concern:*

Be it known that I, ROLAND C. CASAD, a citizen of the United States, residing at Sawtelle, in the county of Los Angeles and State of California, have invented a new and useful Oil-Burner, of which the following is a specification.

This invention relates to an oil burner for use in stoves, furnaces, etc., and the main object of the invention is to provide an oil burner which is capable of operating effectively under different conditions of temperature and oil supply. In the operation of oil burners the difficulty has arisen that the burner may produce an efficient and substantial smokeless flame under certain conditions of oil supply, air supply and temperature, but under other conditions it is liable to smoke and to burn inefficiently, this being particularly the case when the burner becomes overheated. Such defective operation of the burner, I have found to be largely due to difference in temperature between the oil vapor produced by the burner and incoming air, and an important object of the present invention is to provide an oil burner in which the oil vapor and the incoming air are heated to approximately the same temperature before they are mixed. Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate an embodiment of my invention, and referring thereto:

Figure 1 is a vertical section of a fire box of a stove or furnace, showing the burner in position therein, said burner being partly broken away. Fig. 2 is a vertical section of the burner. Fig. 3 is a section on line $x^3$—$x^3$, Fig. 2. Fig. 4 is a perspective of the deflector plate for the air supply required for combustion of the mixture.

The burner comprises a body consisting, for example, of cast iron, and provided with horizontal or base portion 1, and a vertical portion 2 extending upwardly from said base portion. Said base portion 1 is provided with an upwardly extending flange 3 on one end, and with side flanges 4 extending from said end flange 3 to the side walls 5 of the upwardly extending portion 2 of the burner. The base portion 1 is provided with a trough 6 extending transversely thereof, a drainage opening 7 being provided in the bottom of said trough for receiving a suitable drain pipe. At the side of said trough which is toward the upwardly extending portion 2, the base portion is provided with a flange 9 rising a short distance above the floor of the base 1. On the opposite side of the trough, base 1 is formed with a rabbet 10 with a slot 11 extending downwardly from the horizontal face 10′ of said rabbet, said slot 11 being open at its lower end to receive air. A deflector member 12 is provided with downturned flanges 13 at its end resting on the horizontal face of rabbet 10, which is provided with a V-shaped groove 14 fitting a V-shaped projection 15 on flanges 13. Member 12 is formed with a downturned flange 16 resting on the horizontal face 10′ of the rabbet 10 and above the face 10′, so as to form an outlet passage or slot 17 for the air coming into the slot 11, said outlet passage opening horizontally into the trough 6 on the side opposite the lip 9 aforesaid. Lugs 18 on the back of the deflector member 12 engage with the vertical wall 19 of the rabbet 10 to retain the deflector member in position. The vertically extending portion 2 of the burner is provided with rear wall 21 and front wall 22 connecting the side walls 5 so as to form a hollow vertical casing which is closed at the top by a movable cover plate 23. A vertical partition 24 extends across this casing between the side walls 5 so as to divide the space within the casing into a rear chamber 25 acting as an aid heating and a front chamber 26 acting as a vaporizing or generating chamber. The partition 24 extends beneath the lower end of front wall 22, and the base 1 is provided with an upwardly extending flange 28 at the rear of said partition 24 and separated therefrom to form an air inlet passage 29 communicating with the air heating chamber 25 and opening directly below the outlet of the vaporizing chamber 26. Air is supplied to the air heating chamber through an air inlet 31 in the base member 1 between the flange 28 and the rear wall 21. An oil supply pipe 32 is connected to a riser 33 extending upwardly through the air inlet 31 into the air chamber 25 and is connected at its upper end to a nipple 34 extending through the partition 24. The forward end of said nipple 34 terminates flush with the front of the partition 24 so that the oil issuing from said nipple passes on to the front surface of the partition 24 and runs down over the same, adhering to this surface and

spreading out as it descends so as to expose a large surface for evaporation.

35 designates a plug which is used to fill an opening in the front plate 22 required for putting the nipple 34 in place.

A mixture outlet orifice *a* is formed between the lower edge of the front wall 22 of the casing and the upper edge of flange 9. This outlet must be at least as large as the cross sectional area of the mixing chamber 26, and preferably much larger, as shown, to prevent choking the mixture at the outlet orifice.

The burner is placed in any suitable stove or range, for example, as shown in Fig. 1, it is placed within the fire box 37 in such manner that the base 1 extends completely across the fire box so that all the air entering the lower portion of the fire box is forced to pass through the air inlets 31 and 11, the current of air through these inlets being maintained by the natural draft produced by the combustion of the burner.

The operation is as follows: In starting the burner, the oil supplied through pipe 32 runs down on the partition 24 onto the base 1 back of the lip 9 and is ignited by suitable means, this portion of the base 1 constituting a firing pan and enabling the burner to be brought to the required temperature, the walls of the air chamber 25 and the generator chamber 26 being then sufficiently hot to maintain the production of vapor and combustible mixture in the following manner: Oil being supplied through the pipe 32 issues through the outlet member 34 and spreads over the front of the partition 24 as stated, and is vaporized by the heat imparted to it by the partition, and at the same time air enters through the air inlet 31, part of the air passing upwardly in the air chamber 25 and then downwardly in the vaporizing space 26 between the partition 24 and the front wall 22 and mixes with the vapor in said space. Another portion of the air coming in through the air inlet 31 passes over the flange 28 and through the air passage 29 and under the partition 24, this current of air meeting the current of mixed air and vapor issuing through the mixture outlet orifice *a* at the bottom of the vaporizing chamber 26 and furnishing additional air for combustion of this mixture, the mixture being ignited as it issues from the vaporizing chamber forming a flame passing over the trough 6 and meeting an auxiliary current of air entering through the air inlet slot 11 and directed upwardly and rearwardly against the flame, so as to provide air for completing the combustion. The main portion of the air which enters the air inlet 31 passes upwardly through the chamber 25 and is therein subjected to heating action by contact with the hot walls of said chamber and at the same time the oil is subjected to a heating action by contact with the partition plate 24, so that the temperature of the oil vapor generated in the chamber 26 is substantially the same as that of the air passing downwardly in said chamber from the air chamber 25, and the mixture of vapor and air is for this reason accomplished in the most effective manner and with minimum liability of production of soot or smoke. In case the amount of oil supplied is in excess of what can be taken up by the air, this excess oil runs over the lip 9 into the trough 6 and then runs out through the drainage opening 7 into any suitable drainage pipe.

What I claim is:

1. An oil burner comprising a casing formed with an air heating chamber and a vaporizing and mixing chamber extending side by side, so as to cause the oil, vapor and air to be heated to substantially the same temperature on contact with the walls of said air chamber and oil vaporizing chamber, said casing having a mixture outlet orifice at its lower end, the cross sectional area of said orifice being at least as large as the cross sectional area of said vaporizing and mixing chamber.

2. An oil burner comprising a base, a casing extending upwardly from said base, a vertically extending partition in said casing and dividing said casing into an air heating chamber and a vaporizing and mixing chamber, an oil supply pipe having an outlet for delivering oil to one face of said partition, said casing being provided with an air inlet communicating with said air heating chamber and with an outlet orifice for mixture communicating with said vaporizing and mixing chamber, said mixture outlet orifice being at least as large in cross sectional area as the mixing chamber.

3. An oil burner comprising a base, a casing extending upwardly from said base, a partition dividing said casing into an air heating chamber and a vaporizing and mixing chamber, said chambers communicating with each other at their upper ends and said vaporizing and mixing chamber having an outlet orifice at its lower end opening into the space above the base, said casing having an air inlet at the bottom of said air heating chamber, said mixture outlet orifice being at least as large in cross sectional area as the mixing chamber.

4. An oil burner comprising a base, a casing extending upwardly from said base, a partition dividing said casing into an air heating chamber and a vaporizing and mixing chamber, said chambers communicating with each other at their upper ends and said vaporizing and mixing chamber having an outlet at its lower end opening into the space above the base, said base having

an air inlet at the bottom of said air heating chamber, and said base being provided with a flange extending upwardly between said air inlet and said partition forming an air passage between the air heating chamber and the aforesaid outlet for the oil vaporizing and mixing chamber.

5. An oil burner comprising a base, a casing extending upwardly from said base, a partition dividing said casing into an air heating chamber and a vaporizing and mixing chamber, said partition terminating at a point below the upper wall of the casing to provide communication between said chambers at their upper ends and said vaporizing and mixing chamber having an outlet at its lower end opening into the space above the base, said base having an air inlet at the bottom of said air heating chamber, said base being provided with a flange extending upwardly between said air inlet and said partition forming an air passage between the air heating chamber and the aforesaid outlet for the oil vaporizing and mixing chamber, said base being provided with an air inlet opening located in front of said outlet, and a deflector extending rearwardly above said last named inlet to deflect the air therefrom rearwardly against the flame from said outlet.

6. An oil burner comprising a base, a casing extending upwardly from said base, a partition dividing said casing into an air heating chamber and a vaporizing and mixing chamber, said chambers communicating with each other at their upper ends and said vaporizing and mixing chamber having an outlet at its lower end opening into the space above the base, said base having an air inlet at the bottom of said air heating chamber, and said base having a trough in front of said casing and provided with a raised lip at the side of said trough toward the casing.

In testimony whereof, I have hereunto set my hand at Los Angeles, California this 26th day of June, 1913.

ROLAND C. CASAD.

In presence of—
ARTHUR P. KNIGHT,
MARTHA M. LANGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."