

G. E. CLAPP.  
OIL BURNER.  
APPLICATION FILED JULY 14, 1910.

1,020,265.

Patented Mar. 12, 1912.  
2 SHEETS—SHEET 1.

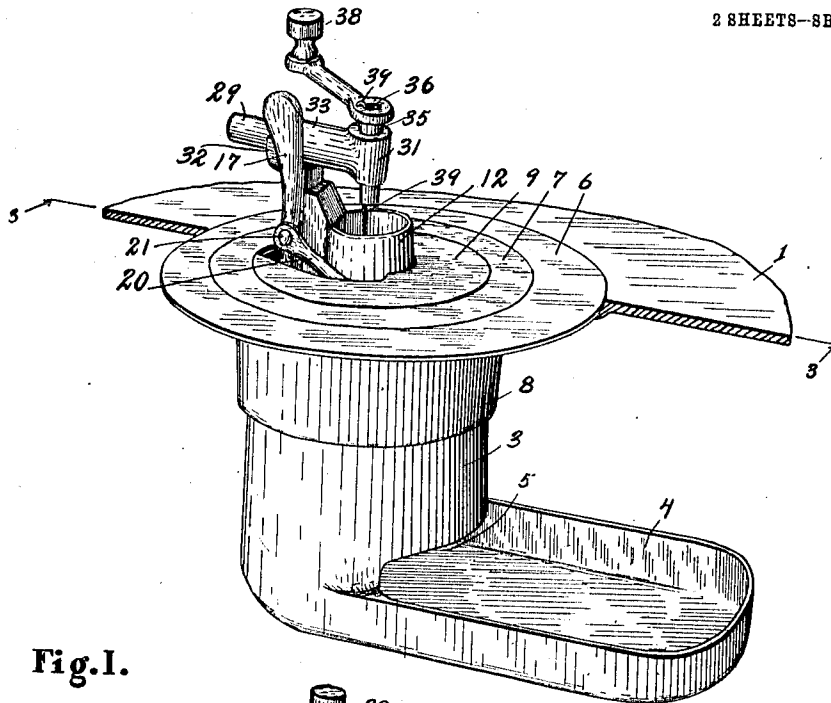


Fig. I.

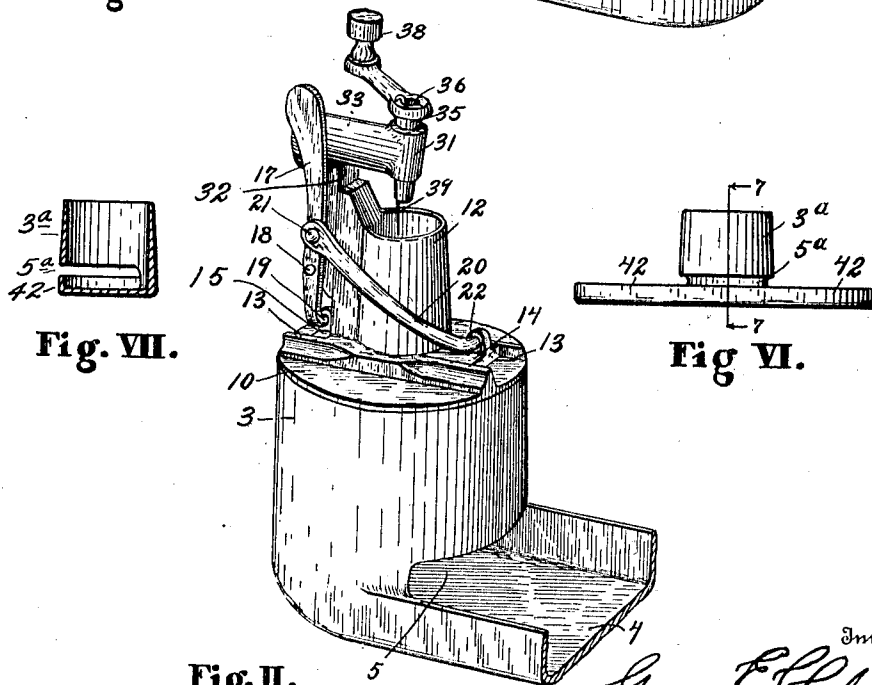


Fig. II.

Witnesses  
F. Gertrude Talleman  
Phineas Woodruff.

Inventor  
George E. Clapp  
By Chappell & Earl  
Attorneys

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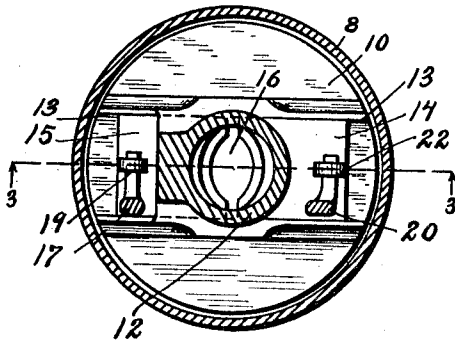


Fig. IV.

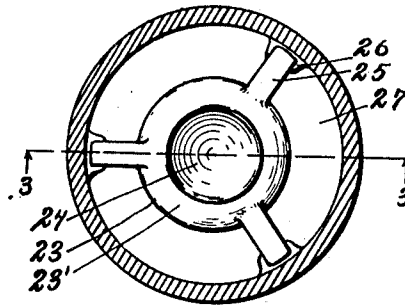


Fig. V.

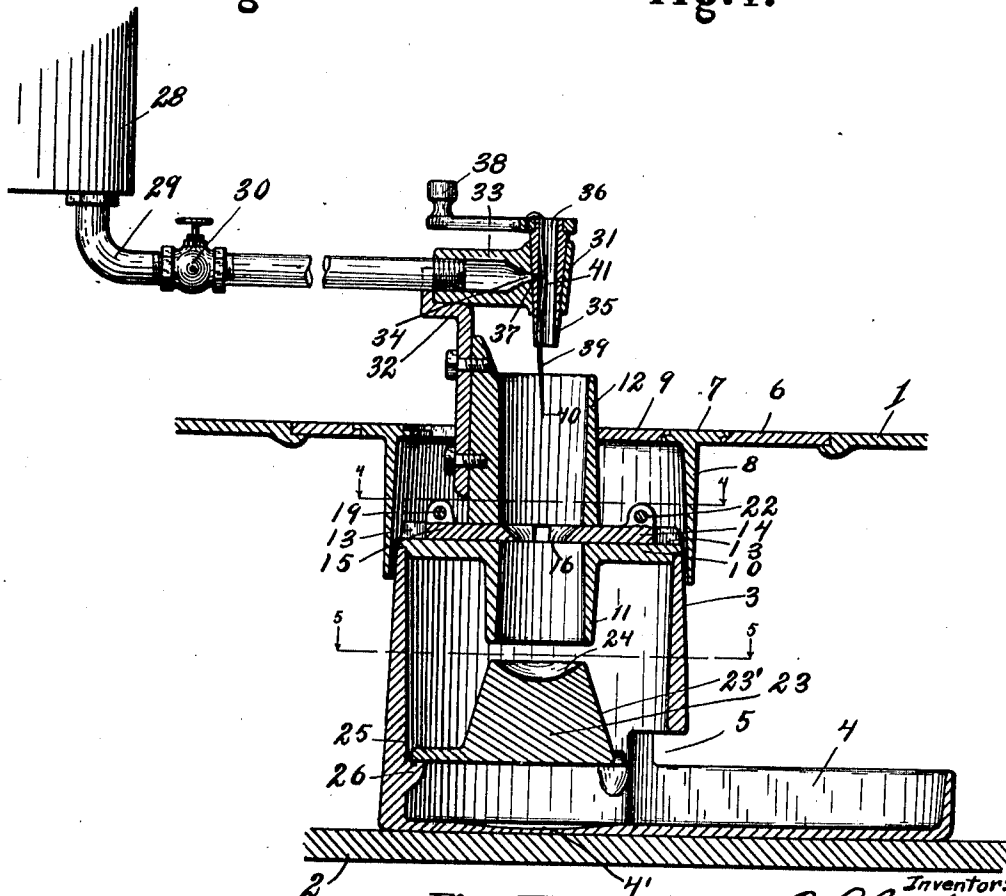


Fig. III.

Witnesses  
F. Bertie, Tallman  
Olivia Woodruff.

Inventor:  
George E. Clapp  
By Chappell & Earl  
Attorneys

# UNITED STATES PATENT OFFICE.

GEORGE E. CLAPP, OF KALAMAZOO, MICHIGAN.

OIL-BURNER.

1,020,265.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed July 14, 1910. Serial No. 571,880.

*To all whom it may concern:*

Be it known that I, GEORGE E. CLAPP, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

This invention relates to improvements in oil burners, and to a burner especially adapted and intended for burning crude oil, but which will burn any sort of liquid hydrocarbon which is at all capable of vaporization or gasification.

Certain features here illustrated and not claimed are illustrated in my co-pending application, Ser. No. 533,428, for oil burner, filed Dec. 16, 1909, and Patent No. 993,758, issued May 30, 1911, for faucets.

The objects of my invention are, first, to produce a simple and efficient structure which will not clog, and in which oil is readily gasified and burned without carbonization. Second, to provide, in conjunction with a device of this kind, an improved means of delivering and utilizing a minimum amount of oil. Third, to provide in structures of this class an improved structure comprising means of controlling the relative amount of oil and air delivered to the generating chamber of a burner of this class.

Further objects, and objects pertaining to details of construction, will readily appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:—

Figure 1 is a perspective view of my improvement in position in a stove, a portion of the top of the stove only being here diagrammatically illustrated. Fig. 2 is a detail perspective view showing the relation of the various parts in perspective with the telescopic connection of the stove omitted. Fig. 3 is a vertical sectional elevation view, taken on a line corresponding to line 3—3 of Figs. 1, 4 and 5. Fig. 4 is a detail sectional plan view taken on line 4—4 of Fig. 3, showing the dampers and method of adjusting the same to control the intake of air. Fig.

5 is a detail sectional plan view taken on a line corresponding to line 5—5 of Fig. 3, showing the details of the generator cup and its support, the pan being omitted. Fig. 6 is a reduced view of a modification of the generator and its pan. Fig. 7 is a vertical sectional view on line 7—7 of Fig. 6 of the generator shell and pan.

In the drawing, all sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar letters of reference refer to similar parts throughout the several views.

Considering the numbered parts of the drawing, I have shown the stove only partially, the same being a portion of an ordinary cooking stove, the top 1 and the bottom 2 being illustrated diagrammatically. Beneath one of the lids I arrange my generator chamber 3, which is provided with a pan-like base extension 4 communicating with the said generator chamber by the opening 5.

A ring 6 takes the place of the lid of the stove, and within this ring is supported a second ring 7 having a downwardly projecting flange 8 which telescopes over the top of the generator shell 3. A curved top plate 9 is provided therefor to completely close this top opening except for the tubular air intake 12. A plate 10 with a central opening is provided for the generator 3, having a downwardly-projecting, centrally-arranged, tubular flange 11, and an upwardly-projecting tubular air intake 12 for the air supply, corresponding to and amounting to an extension upwardly of the flange 11. On the top 10 are formed ways 13 in which are damper slides 14 and 15 notched at the centers to control an aperture 16. These are controlled by a single lever 17, which is fulcrumed at 18 and pivotally connected at 19 to the slide 15. A link 20 is pivoted to the lever at 21 and connects by pivot 22 to the opposite slide 14 of the damper, so that on manipulation of the lever 17 the dampers open and close to and from the center, as is very clear from an inspection of the Figs. 2, 3 and 4.

In the generator chamber 3 is a cup 23 of a comparatively large mass of cast iron, preferably having a shallow depression 24 formed in the top thereof and having sloping sides 23' so that the body of this cup is conical in form and of solid metal. This cup 23 is supported in place by radial or spider arms 25, which rest upon ledges

or lugs 26 projecting inwardly in the generator chamber 3. A slight depression 4' for receiving the oil for starting the fire is beneath the cup 23. Because the cup is supported by the spider arms 25 on the lugs 26, an annular air space 27 surrounds the same, down through which the air for supporting combustion is delivered. A fuel tank 28 supplies fuel to the burner through a pipe 29, which terminates in a feed device 31, which is supported on the bracket 32, secured to the air conduit or intake 12. A globe valve 30 is in the pipe 29 as extra precaution to comply with the requirements of fire underwriters. This feed device consists of a chamber 33 which is perforated at its end at 34, in which is arranged the vertical conical spigot 35, which is tubular in form, having a vertical aperture 36 therethrough open at top and bottom. A lateral aperture 37 leads through the side of this spigot to the central aperture 36, and is adapted to register with the aperture 34 of the chamber for controlling and regulating the delivery of fuel to the burner. A lead wire 39 is secured to the spigot and extends down through the hollow of the same, terminating in a sharp point, as 40. This wire is slightly offset or bent to one side at 41, opposite the aperture 37. A handle 38 is provided for controlling the feed device by adjusting the spigot 35 and thereby regulating the size of the feed aperture.

I have thus described in detail the various parts of my improved structure.

A pan 42 corresponding to pan 4 can extend in any direction from the under side of the generator chamber, and I have shown this pan 42 extending in opposite directions from the generator chamber in the modification illustrated in Fig. 6. This modification shows casing 3<sup>a</sup> like casing 3 and opening 5<sup>a</sup> similar to opening 5. The pan 42 corresponds to pan 4 and extends in both directions, as shown.

Where the stove is especially constructed, the telescopic feature which I have here illustrated will not need to be incorporated, as the structure can be provided without need of any such devices.

I will now indicate the operation of my device and describe the process by which I am able to effectively burn crude petroleum, or any liquid hydrocarbon which is at all volatile, or capable of gasification.

In the operation of my improved device, fuel is placed in the tank 28 and is delivered through the pipe 29 into the chamber 33, which is comparatively large and is delivered to the small aperture 34, which is controlled by the spigot 35, which is tubular, having a vertical opening 36 therethrough. A small transverse opening 37 in the spigot coöperates with the hole 34. Oil is delivered freely down through the tubular spigot along

the leading wire 39 and drizzles off in a fine stream or in a series of very small drops at the point 40. It drops down into the depression 24 in the generator cup 23 and drizzles over into the depression 4' in the pan 4, and, when the fire is lighted, it immediately heats up the mass of metal constituting the cup 23. As soon as this metal is heated, air is drawn down through the intake passage 12 and is delivered onto the oil contained in the cup and mixes with the vapor and gas and proceeds to burn. The heavy body of the cup 23 thus becomes quite highly heated so that the oil that drops onto the depression 24 in the top thereof assumes a spheroidal form and has the appearance of molten lead or metal in a ladle. It is evaporated and gasified by the heated body of the cup 23 and passes as vapor and gas from the cup without any overflow, when it is mixed with the air that is delivered downwardly into this mixing chamber.

The amount of air and the amount of fuel has to be very carefully regulated, and, when the supply of fuel is cut down, it is necessary also to cut down the supply of air by regulating the damper by means of the lever 17. When the volume of fuel is increased, it is necessary to open the damper. So nice is this adjustment necessary that, if the volume of oil is too large for the amount of air, the fuel will burn with a smoky flame and an unsatisfactory result will be obtained, and eventually the fire will go out. On the other hand, if the damper is opened too wide for the amount of fuel, the flame soon burns the fuel and becomes so low that the gas is not generated and the flame flashes out. Further, it is necessary that the fuel be delivered in a constant small stream. If, in the apparatus here illustrated, which is substantially drawn to scale, the wire 39 is removed and the oil allowed to drip from the larger aperture of the spigot, the size of the drops will be so large and the interval between the same will be so great that the fire will practically go out between times. It is necessary to insure success that a constant quantity of the oil be delivered, and, when this is done and the right amount of air for supporting combustion for this volume is delivered, the heavy body 23 of the cup will become heated and enough heat will be stored to immediately vaporize and gasify the oil that may be needed to properly maintain combustion.

I have described a small stream which is exactly what occurs with crude oil. The stream consists of very fine drops when lighter, less viscid oil, as kerosene, is used.

A depression in this cup should be rounded at the bottom and be of such depth as to retain the fuel in the spheroidal form, but should not be deeper than is required to hold the proper amount of fuel.

Having thus described my invention, I desire to claim the apparatus specifically and broadly, and also to claim generally the method of burning hydrocarbon or crude oil, as it is accomplished in my improved burner.

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

10 1. The combination with a stove, of a generator chamber; connections between said generator chamber and the lid opening in said stove; a pan extending laterally from the generator chamber, opening into the  
15 same; a cup of a considerable mass of metal sufficient to store heat, centrally supported in the said generator chamber by radial arms or fingers resting upon suitable ledges or projections, said cup being provided with a shallow depression; a downwardly-opening air intake conduit at the top of said  
20 generator chamber; a damper arranged and structurally connected to control said air intake, composed of opposite slide members closing toward the center; a lever and connections for operating the said slide members simultaneously to regulate a central  
25 opening; a fuel supply pipe; a tubular spigot for said supply pipe open at top and bottom; and a pointed wire leading from said spigot for delivering a regulated amount of fuel down through the damper into the generator cup, coacting substantially as described and for the purpose  
30 specified.

2. The combination with a stove, of a generator chamber; a pan extending laterally from the generator chamber, opening into the same; a cup of a considerable mass of metal, sufficient to store heat, centrally supported in the said generator chamber, said cup being provided with a shallow depression; a downwardly-opening air intake conduit at the top of said generator chamber; a damper arranged and structurally connected to control said air intake, composed of opposite slide members closing toward the center; a lever and connections for operating said slide members simultaneously to regulate a central opening; a fuel supply pipe; a tubular spigot for said supply pipe open at top and bottom; and a pointed wire leading from said spigot for delivering a regulated amount of the fuel down through the damper into the generator cup, coacting substantially as described and for the purpose specified.

3. The combination with a stove, of a generator chamber; a pan extending laterally from the generator chamber, opening into the same; a cup of a considerable mass of metal, sufficient to store heat, centrally supported in the said generator chamber, said cup being provided with a shallow depression; a downwardly-opening air intake

conduit at the top of said generator chamber; a damper arranged and structurally connected to control said air intake, composed of opposite slide members closing toward the center; a fuel supply pipe; a  
70 tubular spigot for said supply pipe, open at the top and bottom; and a pointed wire leading from said spigot for delivering a regulated amount of fuel down through the damper into the generator cup, coacting substantially as described and for the purpose specified.

4. The combination with a stove, of a generator chamber; a pan extending laterally from the generator chamber, opening into  
80 the same; a cup of a considerable mass of metal, sufficient to store heat, centrally supported in the said generator chamber by radial arms or fingers resting upon suitable ledges or projections, said cup being provided with a shallow depression; a downwardly-opening air intake conduit at the top of the said generator chamber; a damper arranged and structurally connected to control said air intake, composed of opposite slide  
85 members closing toward the center; a fuel supply pipe; a tubular spigot for said supply pipe, open at top and bottom; and a pointed wire leading from said spigot for delivering a regulated amount of fuel down through the damper into the generator cup, coacting substantially as described and for the purpose specified.

5. The combination with a stove, of a generator chamber; a pan extending laterally from the generator chamber, opening into the same; a cup of a considerable mass of metal, sufficient to store heat, centrally supported in the said generator chamber, said cup being provided with a shallow depression; a downwardly-opening air intake conduit at the top of said generator chamber; a damper arranged and structurally connected to control said air intake, composed of opposite slide members closing toward the center; a lever and connections for operating said slide members simultaneously to regulate a central opening; and a fuel supply pipe provided with means for delivering a regulated amount of fuel down through the damper into the generator cup, coacting substantially as described and for the purpose specified.

6. The combination with a stove, of a generator chamber; a pan extending laterally from the generator chamber, opening into the same; a cup of a considerable mass of metal, sufficient to store heat, centrally supported in the said generator chamber, said cup being provided with a shallow depression; a downwardly-opening air intake conduit at the top of said generator chamber; a damper arranged and structurally connected to control said air intake, composed of opposite slide members closing toward the

center; and a fuel supply pipe provided with means for delivering a regulated amount of fuel down through the damper into the generator cup, coacting substantially as described and for the purpose specified.

7. In a device of the class described, the combination of a generator; an air intake leading thereto; a fuel supply tank with pipe connection therefrom; a chamber at the end of said pipe connection of considerable size with a reduced delivery aperture; a conical tubular spigot open at top and bottom for controlling the said delivery aperture; a lead wire arranged within the said tubular spigot and extending downwardly therefrom; and means for adjusting the said spigot to regulate the delivery of fuel into the said device, as specified.

8. In a device of the class described, the combination of a generator; an air intake leading thereto; a fuel supply tank with pipe connection therefrom; a chamber at the end of said pipe connection of considerable size with a reduced delivery aperture; a tubular spigot open at top and bottom for controlling the said delivery aperture; a lead wire arranged within the said tubular spigot and extending downwardly therefrom; and means for adjusting the said spigot to regulate the delivery of fuel into the said device, as specified.

9. In a burner for crude petroleum, or similar fuel, the combination of a generator chamber, a cup comprising a shallow depression in a considerable mass of metal which is adapted to store heat centrally supported and disposed in said chamber, an air space around and beneath said cup, an air intake delivering downwardly and centrally over said cup, damper means for controlling said air intake, a fuel supply pipe adapted to deliver a thin stream of fuel into said cup and valve mechanism for regulating the same, said parts being so proportioned and

arranged that the liquid fuel contained in said cup is caused by the heat stored therein to assume a spheroidal form and is constantly replenished during vaporization without destroying said spheroidal form.

10. In a burner for crude petroleum or similar fuel, the combination of a generator chamber, a cup comprising a shallow depression in a considerable mass of metal which is adapted to store heat centrally supported and disposed in said chamber, an air space around and beneath said cup, an air intake delivering downwardly and centrally over said cup, damper means for controlling said air intake, means for delivering a thin stream of fuel into said cup, said parts being so proportioned and arranged that the liquid fuel contained in said cup is caused by the heat stored therein to assume a spheroidal form and is constantly replenished during vaporization without destroying said spheroidal form.

11. In a burner for crude petroleum or similar fuel, the combination of a generator chamber, a cup comprising a shallow depression in a considerable mass of metal which is adapted to store heat centrally supported and disposed in said chamber, an air space around and beneath said cup, an air intake delivering downwardly and centrally over said cup, means for delivering a thin stream of fuel into said cup, said parts being so proportioned and arranged that the liquid fuel contained in said cup is caused by the heat stored therein to assume a spheroidal form and is constantly replenished during vaporization without destroying said spheroidal form.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

GEORGE E. CLAPP. [L. s.]

Witnesses:

CLORA E. BRADEN,

F. GERTRUDE TOLLMAN.