J. F. MacKAY.

OIL OR VAPOR BURNER.

APPLICATION FILED NOV. 10, 1919.

1,365,005. Patented Jan. 11, 1921.

FIG. I.

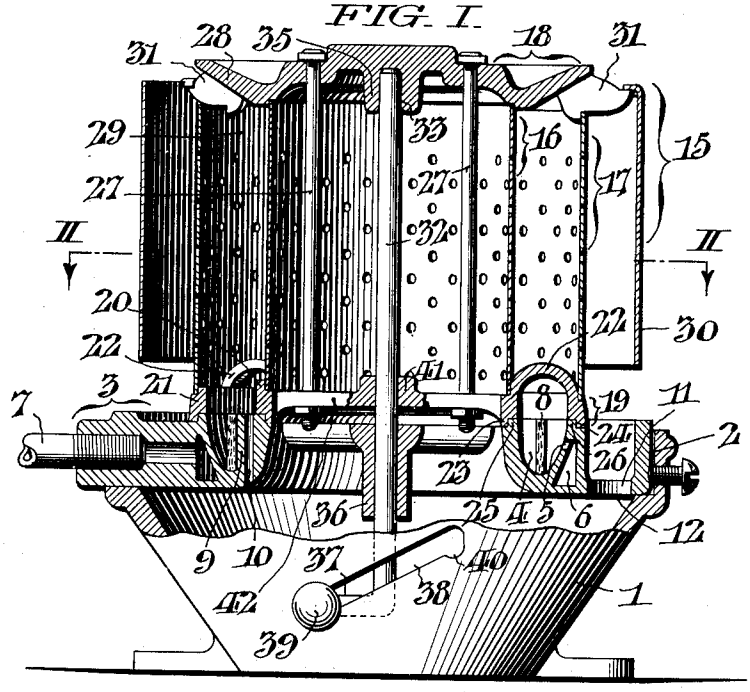
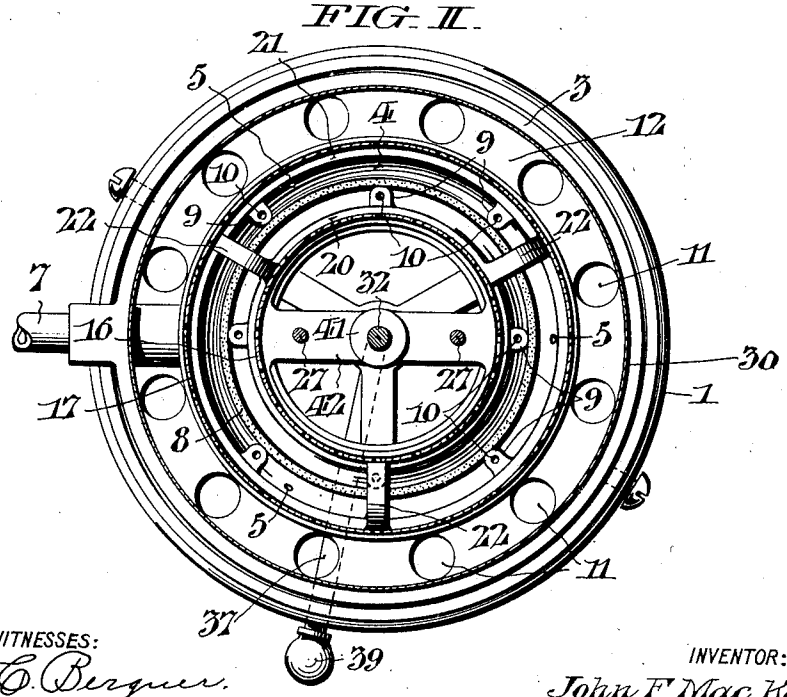


FIG. II.



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OIL OR VAPOR BURNER.

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To all whom it may concern:

Be it known that I, JOHN F. MacKAY, a citizen of the United States, residing in Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Oil or Vapor Burners, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to oil or vapor burners, and more especially to that class of such burners particularly adapted for use in connection with poultry brooders or the like.

In order to meet the requirements of practice, burners of this class must be efficient in operation; capable of effecting perfect combustion of the fuel to the exclusion of any tendency whatever of smoking; and moreover of such simple construction as to be absolutely proof against derangement in operation.

The organization herein set forth embodying the above characteristics, comprises an annular trough to which liquid fuel is directed through a series of inlets so located and arranged as to effect an even supply and distribution of the fuel, thereby insuring a constant, non-wavering flame when the burner is in operation.

The invention is further directed to a simple, novel, composite flue structure, adapted for superimposition upon the fuel trough, and having provisions for admitting the proper quantity of air to effect perfect combustion of the fuel.

Referring now to the drawings, Figure I, is, for the greater part, an axial sectional elevation through an oil or vapor burner conveniently embodying my invention, a portion of the base member having been shown in elevation so as to illustrate certain exterior details to advantage.

Fig. II, is a plan section as viewed in the direction of the arrows II—II in Fig. I.

The organization represented in these illustrations comprises a hollow, inverted, frusto-conical base member 1, having formed at its top a seat 2, adapted to receive an annular trough member or structure 3. The fuel trough proper, indicated at 4, is preferably of a semi-oval cross section as best seen in Fig. I, and fuel is directed thereto through a series of ports 5, substantially above its bottom, which communicate with a circumjacent supply duct 6, formed in the member 3 and supplied through a pipe 7. As will be noted from Fig. II, I have, in the present instance, shown three of such ports, but it is to be understood that this number may be varied in accordance with the size of the burner, due consideration also being given to the kind of fuel employed. Furthermore, it is also to be noted that these ports are spaced at even intervals about the periphery of the trough so that the fuel is evenly supplied and distributed thereto. It has been found by experimentation that in the absence of such distribution, an even flame could not be obtained since the greater flaring invariably took place at the point of entrance of the supply.

Located within the fuel trough is an annular wick 8, which is held central therein by means of a series of inwardly projecting lugs 9, disposed in alternation about the sides of the trough as best seen in Fig. II. Each of these lugs is pierced by an air supply aperture 10, which opens immediately adjacent the top of the wick and communicates with the interior of the hollow base 1, the latter in turn communicating with the exterior through a series of air supply openings 11, in a horizontal web portion 12, of the member 3.

Superimposed upon the trough member 3, is a composite flue structure comprehensively indicated at 15. This structure comprises a pair of spaced, concentric, perforated sheet metal cylinders 16 and 17, which are clamped between a cap member 18, and a bottom member 19, the latter consisting of the concentric rings 20 and 21, which are united by integral bridging straps 22, and suitably shouldered at 23 and 24 so as to be held from lateral displacement by engagement with corresponding ridges 25 and 26 respectively formed upon the top of the trough member 3. Likewise, the inner and outer cylinders 16 and 17, are held in the proper axial relation by appropriate engagement means in the form of recesses or shoulders formed in both members 18 and 19, as clearly shown in Fig. I. The straps 22, are adapted to span the fuel trough, and, as will be best seen from Fig. II, are comparatively narrow so that their obstruction to the continuity of the flame from the trough is negligible for all practical purposes. The sev-

eral constituent elements of the flue structure are held assembled as a unit, by a series of tie bolts 27. The cap member 18, completely occludes or closes the top of the inner cylinder 16, and is formed with a peripheral flare 28, which over-hangs the flue proper, *i. e.*, the space 29, between the concentric cylinders 16 and 17. The overhanging flare 28, is functional in directing the heated gases from the combustion flue formed by the walls 16 and 17 radially away from the burner. The flue structure is further supplemented by a guard apron 30, which surrounds the same, and is suspended from a series of radial arms 31, projecting from the cap member 18. The guard apron 30 cooperates with the outer cylinder 17 to form an annular air flue surrounding the annular combustion flue and open at both top and bottom. The peripheral flare 28 of the cover 18, it will be seen, directs the hot gases from the combustion flue over or across the outer open end of the air flue.

In order that the flue structure may be bodily raised above the burner to permit access to the fuel trough for ignition purposes, I have provided a lifting device, which comprises a rod 32, extending axially through the burner, and engaged at its upper end in a socket 33, formed in the central lug 35, on the cap member. The rod is axially shiftable in a supporting bearing 36, integral with the trough member 3, and its lower end is bent outwardly at right angles as shown at 37, and extends through an inclined slot 38, in the wall of the base member 1. To the outer end of the lateral extension of the rod 33, is secured a finger knob 39. It will be seen that by moving the knob to the right as viewed in Fig. I, the engagement of the extension 37, with the lower edge of the cam slot 38, will cause the rod to be shifted vertically until the limit of the slot is reached. At this point, I have provided a depression 40, in which the rod extension 37, may be temporarily locked, so that the flue structure shall be maintained in its raised position. In order that the flue structure may be maintained in proper axial alinement and position with reference to the other parts when raised and lowered, the bottom member 19 of said flue structure is provided with a boss or hub 41 supported by a cross piece or web 42 through which the rod 32 extends.

In beginning the operation of the burner, the flue structure 15, is raised in the manner described and only a sufficient supply of fuel (under control of a suitable valve (not shown) in pipe 7) is fed to the trough to properly saturate the wick. The latter is then ignited, and the flue structure replaced in proper operative relation to the trough. After the parts of the burner have become sufficiently heated to insure the vaporization of the fuel, the supply through the pipe 7 is increased until the wick is substantially flooded, whereupon combustion proceeds without the aid of the wick. The admission of liquid fuel to the trough from the adjacent supply duct 6 completely separate therefrom and communicating therewith only at a substantial distance above its bottom, as through the ports 5, makes possible a much more uniform distribution of fuel to different parts of the trough than can be obtained with said duct 6 also in more or less free communication with the bottom of the trough, since with the latter arrangement a condition of moderate oil supply tends to result in its entering the trough only at a very limited portion of its circumference,—thus defeating the very object of the duct as a means of even supply and distribution of oil. During combustion, air is supplied to the flue space through the perforations in the cylinders. The portion entering through the outer cylinder is obtained directly from the exterior, while the complementary quantity which diffuses through the inner cylinder enters the base member 1 through the central opening of the bottom element 19 of the flue structure. In addition to such air supply, a proportionate quantity is furnished through the ducts 10, in the lugs 9, of the trough member; this air supply is especially serviceable during the priming operation and the starting of the burner.

By this arrangement, it will be seen that a sufficient quantity of air is at all times available to effect perfect combustion of the vaporized fuel in the flue, and that by aid of the flared periphery of the cap member 18, the heated gases are directed outwardly so that when the device is used, for example, beneath a brooder hood, the warmth is effectively dissipated in all directions.

While I have specifically shown and described a burner more especially adapted for the stated use, it is to be understood that the organization may be employed for other analogous purposes without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. A burner of the character described comprising a fuel trough and a co-extensive duct for fuel supply, said trough and duct communicating only through a series of ports opening through the side of the trough and equally spaced substantially above the bottom of the trough, so as to effect an even supply and distribution of the fuel to the trough.

2. A burner of the character described comprising an annular fuel trough and an adjacent annular fuel supply duct, said trough and duct communicating only laterally through a series of ports equally spaced

substantially above the bottom of the trough, so as to effect an even supply and distribution of the fuel to the trough.

3. A burner of the character described comprising, as an integral structure, an annular fuel trough and a circumjacent fuel supply duct, said trough and duct communicating only through a series of ports through the side of the trough, equally spaced substantially above the bottom of the trough and adapted to effect an even supply and distribution to the trough.

4. In a burner of the character described, the combination of an annular fuel trough; a wick of like configuration located in said trough; and a series of lugs extending inward from opposite sides of the trough alternately and adapted to engage the wick to maintain the same centralized therein.

5. A burner of the character described comprising a combustion flue, and a fuel trough subjacent thereto with the fuel walls extending upward from its sides, said trough having therein a wick and air supply ducts opening upward between its sides immediately adjacent the top of the wick.

6. A burner of the character described comprising an annular combustion flue, a fuel trough, with a wick therein, subjacent thereto with the flue walls extending upward from its sides, an annular fuel supply duct adjacent said trough communicating therewith only through a series of equally spaced ports substantially above the trough bottom, and a series of equally spaced air supply ducts in said trough opening immediately adjacent the wick between the same and the trough and flue walls.

7. In a burner of the character described, the combination of an annular fuel trough; cylinders superimposed on said trough forming an annular open top combustion flue communicating therewith; and a flange extending outward from the inner cylinder over the top of said combustion flue and acting to deflect the heated gases therefrom radially outward.

8. In a burner of the character described, the combination of an annular fuel trough; cylinders superimposed on said trough communicating therewith; a surrounding guard apron coöperating with the outer of said cylinders to form an annular open-top air flue about said annular combustion flue; and a flange extending outward from the inner cylinder over the top of said combustion flue and acting to deflect the heated gases therefrom radially outward over the top of said air flue.

9. In a burner of the character described, the combination of a hollow base; an annular trough structure thereon having therein an annular fuel trough and circumjacent openings for admitting air to the interior of said base; and a flue structure superimposed on said trough structure comprising cylinders forming an annular open top combustion flue communicating with the trough, and means occluding the inner cylinder.

10. In a burner of the character described, the combination of a hollow base; an annular trough structure thereon having therein an annular fuel trough and circumjacent openings for admitting air to the interior of said base; and a flue structure superimposed on said trough structure comprising perforated cylinders forming an annular open top combustion flue communicating with the trough, means closing the inner cylinder at its upper end, a surrounding guard apron coöperating with the outer cylinder to form about said combustion flue an annular air flue open at top and bottom, and a flange extending outward from the inner cylinder over the top of said combustion flue and acting to deflect the heated gases therefrom radially outward over the top of said air flue.

11. In a burner of the character described, the combination of a flue structure comprising cylinders forming an annular open top flue; and a cap member at the upper end of said cylinders occluding the inner one, and having a flaring peripheral flange extending outward from the inner cylinder over the top of said combustion flue and serving to deflect the heated gases therefrom radially outward; said cap member having engagement means for maintaining said cylinders in proper axial relation.

12. In a burner of the character described, the combination of a flue structure comprising cylinders forming an annular open top combustion flue, and arms projecting radially outward from the upper end of said structure; and a surrounding guard apron suspended from said radial arms and cooperating with the outer cylinder to form an annular open top air flue about said combustion flue.

13. A burner of the character described comprising an annular fuel trough; and a superimposed flue structure consisting of a pair of spaced, concentric, perforated sheet metal cylinders, the inter-space between said cylinders forming the flue proper and communicating directly with the fuel trough; a circular cap member and a base member of like configuration, both recessed to engage with the corresponding peripheral edges of the said cylinders; and means for securing together the constituent elements of the flue structure into a unitary organization.

14. A burner of the character described comprising an annular fuel trough; in combination with a superimposed flue structure consisting of a pair of spaced, concentric, perforated sheet metal cylinders, the interspace between said cylinders forming the

flue proper, and communicating directly with the flue trough; a circular cap member and a bottom member of like configuration, both recessed to engage with the corresponding peripheral edges of the said cylinders; and a series of tie-bolts for clamping the said cylinders between the said cap and bottom members.

15. A burner of the character described comprising an annular fuel trough; in combination with a superimposed flue structure consisting of a pair of spaced, concentric, perforated sheet metal cylinders held between a circular cap member and a bottom member of similar configuration; and a guard apron surrounding the flue structure and suspended from radial supporting arms projecting from said cap member.

16. A burner of the character described comprising an annular fuel trough; in combination with a superimposed flue structure including a pair of spaced, concentric, perforated sheet metal cylinders, the interspace between the said cylinders forming the flue proper and communicating directly with the fuel trough; a cap member closing the upper end of the inner cylinder and provided with a peripheral flare adapted to overhang the open top of the flue proper; a bottom member consisting of two spaced concentric rings integrally united by bridging straps adapted to span the fuel trough; and means for securing together the several constituent elements of the flue structure into a unitary organization.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this fourth day of November, 1919.

JOHN F. MacKAY.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.