

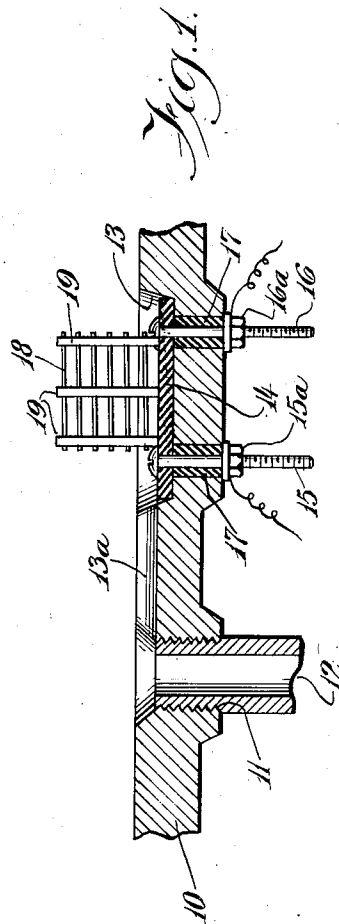
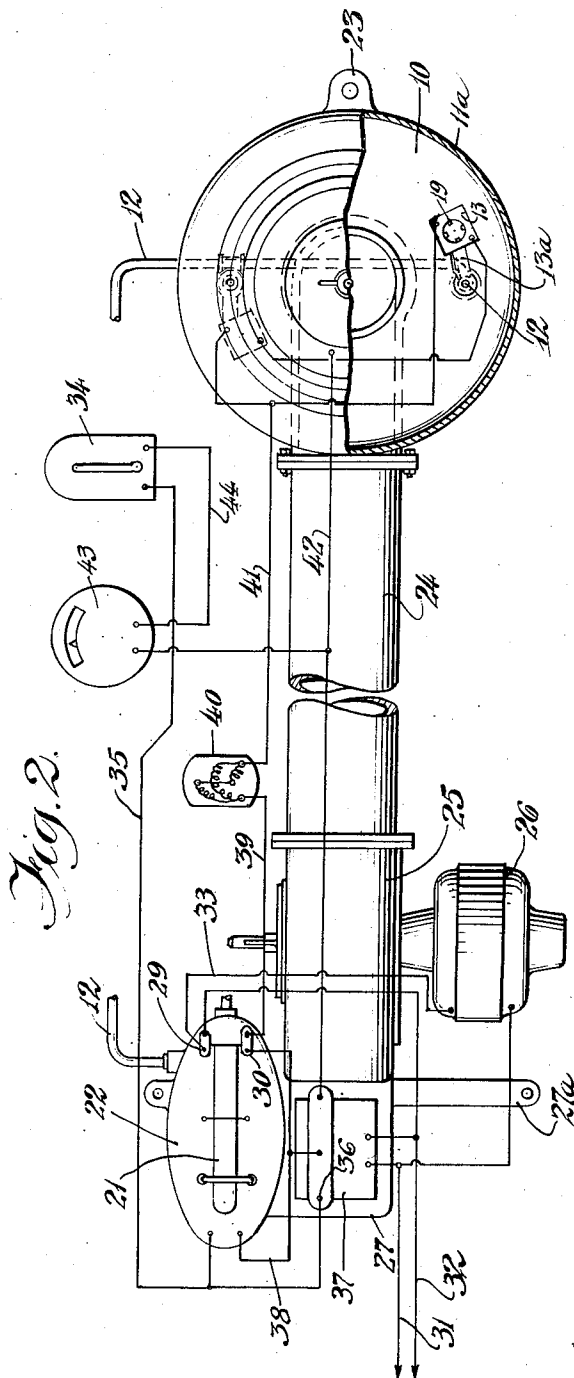
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IGNITION UNIT FOR OIL BURNERS AND THE LIKE

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IGNITION UNIT FOR OIL BURNERS AND
THE LIKE

James Carroll Reynolds, Mattoon, Ill.

Original application July 7, 1938, Serial No.
217,937. Divided and this application Septem-
ber 1, 1939, Serial No. 293,088

1 Claim. (Cl. 175—115)

This invention is directed to an electric igniter adapted for use in and of particular advantage in pot type oil burners.

This application is a division of my co-pending and previously filed application for patent Serial No. 217,937, filed on July 7, 1938.

It is an important object of my invention to provide a novel electric ignition unit adapted to be mounted wherever combustion thereof is to be produced, and which includes a base, an electrical coil; terminal elements for said coil and means for supporting the coil in substantially spiral position.

A further object of my invention is the provision of an inexpensive relatively small and novel ignition element adapted to be mounted within inclosures in which combustion oil is carried, which consists of a nichrome resistance element, means for connecting the terminals thereof to the power source, and means for mounting the same within the combustion chamber.

A further object of my invention is the provision of a novel construction of portions of a burner pot and other combustion chambers including a well in the bottom thereof communicated with the fuel oil inlet, and the provision of my novel ignition element mountable in the well and adapted to be connected to an electric power source and adapted to kindle a slow fire.

Other and further important objects of my invention will be apparent from the following description and claims. This invention (in a preferred illustration only) is described in the following specifications and illustrated in the drawing.

On the drawing:

Fig. 1 is a partially cross section and partially side elevation view of an ignition unit of my construction as preferably mounted in the bottom of a combustion chamber.

Fig. 2 is a partially top plan view, portions of the top of the combustion chamber broken away to show the interior thereof, and with the electrical wiring connections illustrated diagrammatically.

Referring to the drawing, reference numeral 10 designates a burner bowl, only a portion of the bottom thereof being shown. The combustion chamber or pot 10 is provided with threaded oil inlet ports 11, preferably two in number as illustrated in Fig. 2, which inlet ports are communicated with the fuel valve chamber of the oil apparatus hereinafter described by means of a connecting conduit 12.

A relatively shallow outwardly flared well or recess 13 is preferably though not necessarily formed in the bottom of the combustion chamber a short distance from each of the oil inlet ports 11, and a shallow recess or trough 13a is also preferably formed in the bottom of the pot

or combustion chamber so that the first oil which enters the inlet port will flow to fill up the well in which the ignition unit is mounted.

Numeral 14 designates a substantially flat base which is formed of an insulating and non-conductable material and which base is provided with a pair of spaced apart apertures. Said apertures receive a pair of terminal bolts 15 and 16 which extend through suitably spaced apertures which extend through the bottom of the combustion chamber and which bolts project therebelow. The bolts 15 and 16 are separated from the burner bowl 10 by suitable insulating sleeves 17, as clearly shown in Fig. 1, and said bolts also carry suitable washers and also threaded nuts 15a and 16a by means of which the electrical circuit wires are communicatively connected.

A spirally wound resistance coil 18, preferably of nichrome or other suitable resistance wire is mounted with respect to the insulated base 14 by means of a plurality of upwardly extending posts or standards 19 which serve to hold the convolutions of the coil in proper position. The opposite terminals of the resistance coil 18 are connected to the upper ends of terminal bolts 15 and 16 respectively.

When the electrical circuit which is connected to the ignition element is closed, the resistance coil 19 becomes red hot due to its resistance action, thereby creating a temperature of from 1200 to 1500 degrees F. in the area immediately about said coil. As the oil begins to flow through the feed supply lines or conduits 12 in the manner described in my aforesaid co-pending application, the initial oil will flow through the recesses 13a to the respective wells 13 and to thereby surround said resistance coils 19 and gradually submerge a major part of said resistance coil from the bottom. As the inflowing oil submerges the lower part of the coil 19, the gradually decreasing unsubmerged portion continues to be red hot and its incandescence is by the aforesaid partial submergence actually and substantially increased. This increased incandescence causes the oil within and about said red hot portions of the ignition elements to be raised to a temperature beyond its flash point to result in a burning thereof in a relatively slow flame. As the oil continues to flow in, the size of the areas of burning oil gradually increases until the flame spreads over the entire surface of the body of oil in the burner bowl.

I call attention to the fact that the ignition coils 19 are connected in circuit with power source by a relay switch 21 shown partially in the top plan view in Fig. 2, and that said circuit is closed by said relay switch a short interval of time prior to actual inflow of oil, such interval being sufficient to permit the resistance coils 19 to be-

come red hot and to create a temperature within and immediately about said coils of about 1200 to 1500 degrees F. as above stated.

My preferred construction comprises means for stopping the inflow of oil after the oil in the burner bowl has reached a depth of approximately three-eighths of an inch, and includes a suitable oil control valve cooperating with the metal oil valve housing 22, to the bottom of which one end of the fuel conduit 12 is connected, as shown at the upper left of Fig. 2.

Referring to Fig. 2, which is only one of numerous oil burner devices in which my present invention might be satisfactorily employed, reference numeral 10 designates the bottom of the burner bowl or combustion chamber having annular side wall 11a which may be suitably and adjustably supported by a plurality of supporting lugs 23, only one of which is shown at the right of Fig. 2 as being threaded in a suitable extending ear of the burner bowl 10. The burner bowl is connected to a blower housing 25 by a suitable connecting draft tube 24, the fan within the blower housing not being shown. Numeral 26 is an outline plan of the fan motor having its two electric wire terminals which supply the electric power to said motor. Numeral 27a designates an outwardly extending portion of the supporting frame 27 which supports respective parts at suitable height from the floor and also with respect to the plane of the bottom of the burner bowl. Numeral 37 designates a transformer; and numerals 29 and 30 designate mercury switches which are positioned in spaced apart relation above the top of the oil valve casing 22. Numerals 31 and 32 are electrical circuit wires which are connected to the source of electricity, 31 being connected to one terminal of the transformer 37, and also leading to one terminal of the electric motor. Circuit wire 32 leads to another terminal of the transformer 37 and to mercury switch 29. A circuit wire 33 leads from mercury switch 29 to the opposite terminal of the electric motor 26. It will be apparent that when mercury switch 29 is closed, the electric motor will be in a closed circuit with the power source and will begin operation of the blower.

Numeral 34 designates a thermostat, one terminal of which is connected by circuit wire 35 to the left hand terminal 36 of the transformer 37, and said circuit wire 35 is also connected to the left hand end of the oil valve casing 22 as indicated in Fig. 2. A connecting circuit wire 38 connects the second terminal shown at the left of the oil valve casing 22 and is also connected to mercury switch 30. A circuit wire 39 connects the other terminal of mercury switch 30 with one terminal of the automatic warp finger switch 40. The other terminal of the warp finger switch 40 is connected by circuit wire 41 to terminal bolts 15 of the ignition elements hereinbefore described.

The other terminal bolts 16 of the ignition elements herein described are connected by circuit wiring 42 to one of the outlet terminals of the transformer 37, said circuit wire 42 being also connected to a terminal boiler control device 43 as shown in the upper portion of Fig. 2. A circuit wire 44 connects one terminal of the

boiler control device 43 to one terminal of the thermostat 34.

The operation of one of my preferred forms of oil burning apparatus such as described in my co-pending application Serial No. 417,937, or as briefly described herein, is such that when the relay switch closes the circuit it connects the ignition elements into circuit with the source of electricity, through the transformer.

As the oil flows by gravity into the burner bowl 10 from the oil valve housing, an increasing portion of each of said coils is surrounded by it, until the greater part of the coils are submerged. Such flow continues until a depth of approximately three-eighths of an inch has been reached in the bowl, as this will be a common level with the oil in the oil valve casing 22.

Simultaneous with closing of circuit to the ignition elements, the operation of the mercury switch 29 connects the electric motor 26 in circuit to drive the blower or fan in housing 25. As the flames about the ignition elements continue to increase, an increasing quantity of oil is ignited until the entire surface of the oil body is burning.

In burners of my described preferred construction a small portion of forced air introduced into the burner bowl travels over the surface of the oil, and resulting oil vapor rises and contacts and is mixed with the air expelled at the top of the bowl, the consequent mixture igniting to cause a continuing flame at the rim of the bowl. This action continues until the respective circuits are opened to stop the motor and to close the fuel feed valve.

It will be apparent that the ignition element of my described novel construction provides a resistance element for positive ignition which I have found eliminates the explosive tendency incident to use of other types of ignition, kindles a slow fire and maintains a state of decarbonization in the burner bowl.

I am aware that various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof.

I claim as my invention:

In combination with a fuel oil burner including a fuel combustion bowl having one or more bottom fuel inlets, fuel conduits for connecting a fuel source and said fuel inlet, the bottom of said burner bowl having a well therein adjacent said fuel inlet; a helical electric resistance ignition element mounted in said well; a base of insulating material in said well; spaced standards of insulating material mounted on said base for supporting said ignition element; and terminal bolts extending through said base and through said bowl and adapted to electrically connect said ignition element to an electric circuit, the inflow of fuel oil being adapted to submerge the lower part of said ignition element and to thereby effect increased incandescence and fuel igniting functions of the upper part of said ignition element.

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