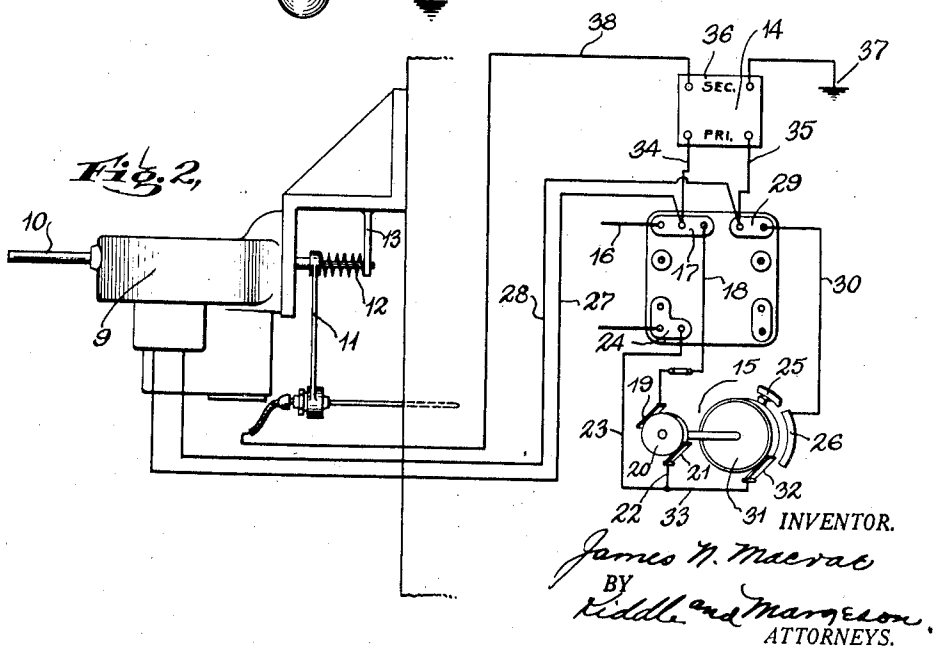
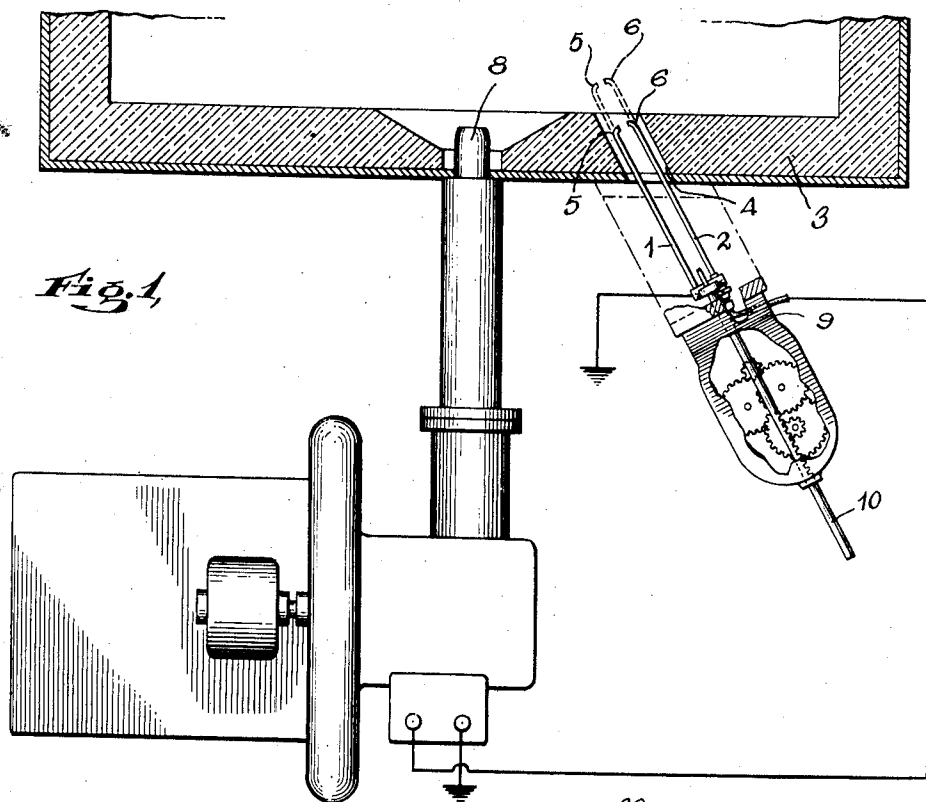


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J. N. MACRAE
IGNITION MECHANISM
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UNITED STATES PATENT OFFICE

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IGNITION MECHANISM

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The present invention relates to an improvement in ignition apparatus which is adapted for various uses but which is particularly designed for use in connection with oil burning apparatus.

One of the objects of my invention is the provision of an ignition apparatus comprising electrodes with means for reciprocating the electrodes into and out of operative position with respect to the burner or burner nozzle.

A still further object of my invention is the provision of an ignition apparatus for oil burners and comprising a pair of electrodes in which an electric motor hereinafter called a torque motor is provided for bodily moving the electrodes into firing position with respect to the burner or burner nozzle and a spring for returning the electrodes to initial position.

A still further object of my invention is the provision of an ignition apparatus particularly well adapted for use in connection with oil burning apparatus and comprising a pair of electrodes adapted bodily to be driven by a torque motor into firing position with respect to the burner nozzle, a spring or other means being provided for returning the electrodes to their initial position, the circuit of the torque motor being controlled automatically by a control or program motor constructed and arranged so that the ignition apparatus is allowed to retire out of firing position after ignition has been brought about, the electrodes at that time being maintained out of contact with the fuel issuing from the burner nozzle. Obviously such an arrangement is of advantage in that the electrodes are protected against the detrimental effect of the heat of the burning fuel and effectually prevented from becoming carbonized.

In the drawings accompanying this application, Fig. 1 shows an embodiment of my invention in plan and more or less diagrammatically; and

Fig. 2 is a wiring diagram which may be used with my apparatus.

Referring to the drawings in detail, the invention comprises a pair of electrodes 1 and

2 mounted in an oil burning installation at the front wall 3 of a furnace, the electrodes passing through an orifice 4 provided in the furnace wall for this purpose, the electrodes when not in use being retracted into this orifice sufficiently to be protected from the deteriorating effect of combustion in the furnace.

As above mentioned it is one of the objects of my invention to provide an ignition apparatus adapted to be moved bodily into and out of firing position. In this connection I provide a torque motor 9, the construction of which constitutes no part of this invention but which motor, however, is adapted to drive a rack 10 forwardly, i. e. toward the furnace, this rack 10 carrying an arm 11 which supports the electrodes 1 and 2. Upon operation of the torque motor, therefore, it will be apparent that the electrodes of the igniter or ignition apparatus will be moved lengthwise to the dotted line position indicated in Fig. 1 which is the operative position of the electrodes, the electrodes at that time being moved through the orifice 4 beyond the inner surface of the furnace wall 3 and into position whereby fuel issuing from the burner nozzle 8 may come into operative relation with a spark across the gap between the ends of the terminals 5 and 6.

The torque motor 9 always runs in the same direction and consequently to return the electrodes to their initial or inoperative position I provide a spring 12 between a fixed member 13 and the lever 11 carried by the rack 10, this spring as will be obvious being placed under compression when the electrodes are moved into the furnace, that is into firing position and returning the electrodes to their initial or inoperative position when the circuit to the torque motor 9 is opened.

The necessary current for the electrodes is supplied from a transformer 14 and the circuit for this transformer as well as for the torque motor 9 is controlled by a control or program motor 15.

Current for the control motor 15 may be supplied from any suitable source such as a power line for example.

Upon the closing of a switch as for example

operation of a push button current is supplied to the motor 15 by way of conductor 16, terminal 17, conductor 18, brush 19, motor armature 20, brush 21, conductors 22, 23, terminal 24 to the other side of the line.

The motor 15 is provided with a movable contact 25 adapted to engage a fixed contact 26 and when the motor 15 has rotated sufficiently to bring the movable contact 25 into engagement with the contact 26 a circuit will be closed to the torque motor 9. This circuit may be traced by way of conductor 16, terminal 17, conductor 27 through the torque motor, conductor 28, terminal 29, conductor 30, brush 26, contacts 25, 31, brush 32, conductors 33, 23, terminal 24 to the other side of the line.

The closing of the circuit of the torque motor 9 will effect bodily movement of the electrodes 1 and 2 through the rack 10 and arm or lever 11 toward the furnace wall into the dotted line position of Fig. 1. As above explained this dotted line position of the electrodes is the operative position thereof, the electrodes now being in position to fire the fuel issuing from the burner nozzle 8. A circuit is now established also to the primary of the transformer 14 by way of conductor 16, terminal 17, conductor 34, primary of the transformer, conductor 35, terminal 29, conductor 30, contacts 26, 25, 31, 32, conductors 33, 23, terminal 24 to the other side of the line.

One terminal of the secondary 36 of the transformer 14 is grounded as indicated at 37 and the parts are so designed that when the torque motor is excited and the electrodes 5 and 6 are moved to operative or firing position the primary circuit of the transformer 14 will have been closed and the current induced in the secondary of the transformer will pass through high tension lead 38 and ground 37 and jump the gap between the points of the electrodes and ignite the combustible mixture discharged from nozzle 8.

It will be understood of course that the program or control motor 15 is only intermittently operated as distinguished from being continuously rotated and consequently after the electrodes of the igniter have been moved to firing position the motor 15 is brought to rest with the contacts 25 and 26 out of engagement with each other which opens the circuit of the torque motor 9 and permits the spring 12 to return the electrodes to their initial position in the furnace wall 3.

From the foregoing, therefore, it will be seen that I have provided an ignition apparatus in which a pair of electrodes are provided and in which these electrodes are moved into and out of firing position, the electrodes when out of firing position being maintained within an orifice in the furnace wall which will effectually prevent any deleterious action thereon due to the heat of the burning

fuel and also the collection of oil on the electrodes with a consequent carbonizing thereof.

It is to be understood of course that means other than that described specifically can be employed for effecting reciprocation into and out of firing position, the torque motor 9, etc. having been shown and described by way of illustration only, any means for effecting the automatic movement into and out of firing position of the electrodes coming within the spirit and scope of my invention.

What I claim is—

Ignition mechanism comprising in combination a pair of cooperating electrodes, a transformer for supplying current thereto, an electric motor for moving the electrodes longitudinally into operative position, means for moving the electrodes longitudinally out of operative position, an intermittently operated control motor, and switch mechanism for the first mentioned electric motor and for said transformer controlled by said intermittently operated motor, whereby when the electrodes have been moved to operative position the circuit of said first mentioned motor will be opened and the circuit of said transformer closed.

This specification signed this 14th day of June, 1928.

JAMES N. MACRAE.