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OIL BURNER CONSTRUCTION

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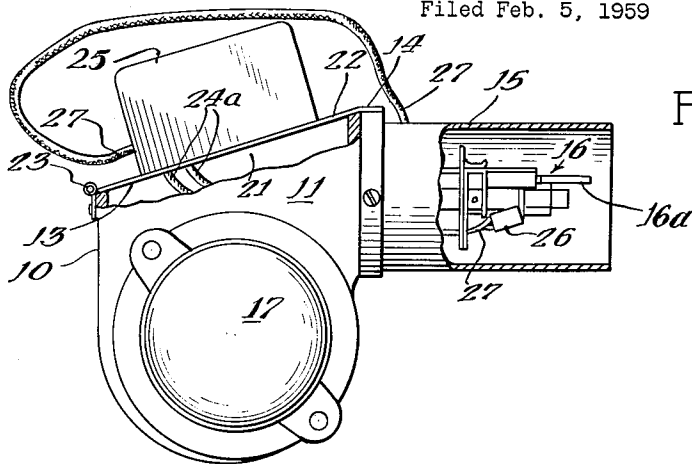


FIG. 1

FIG. 2

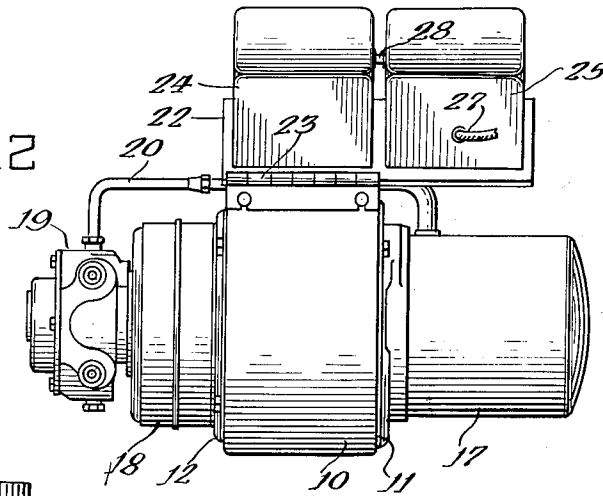


FIG. 3

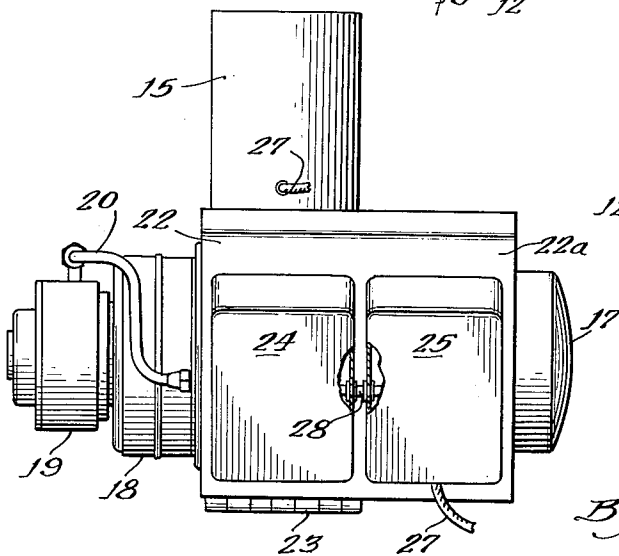
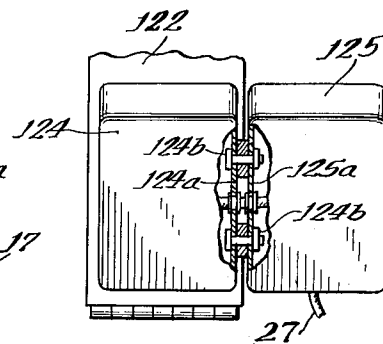


FIG. 4



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OIL BURNER CONSTRUCTION

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This invention relates to an oil burner construction, and in particular it relates to an oil burner structure in which the ignition transformer box and the safety relay box are both supported by a movable cover plate which serves as a closure for the interior of the burner housing.

The principal object of the present invention is to provide an improved oil burner construction.

Another object of the invention is to provide an oil burner construction in which the burner housing is provided with an access opening through which the firing assembly may be removed, and in which the cover plate for the access opening supports both the ignition transformer box and the safety relay box.

Yet another object of the invention is to provide an oil burner in which the ignition transformer assembly and the safety relay assembly are independent units, but always occupy the same positions with respect to each other so as to avoid any need for BX cable leads between the boxes.

The invention is illustrated in the accompanying drawing in which:

FIG. 1 is a side elevational view, partly in section, of an oil burner embodying the present invention;

FIG. 2 is a rear elevational view of the oil burner illustrated in FIG. 1;

FIG. 3 is a plan view, partly in section, of the oil burner illustrated in FIG. 1; and

FIG. 4 is a rear elevational view of an oil burner illustrating a modified construction.

Referring to the drawings in greater detail, and referring first to FIGS. 1 to 3, an oil burner includes a housing 10 having side walls 11 and 12 with an inclined top margin 13, and an annular forward flange 14 to which is secured a combustion tube 15. A firing assembly, indicated generally at 16, and including ignition spark electrodes 16a has its forward portion in the combustion tube 15, and its rear portion in the upper part of housing 10, as seen in FIG. 1. Mounted on side wall 11 of the housing is a motor 17, while mounted on the side wall 12 is an air inlet shutter 18 to which is secured a fuel pump 19 which communicates by a fuel conduit 20 with firing assembly 16.

As best seen in FIG. 1, housing 10 is entirely open at the top to afford an access opening 21 through which firing assembly 16 may be removed from the housing and the combustion tube. A cover plate 22 surmounts the top margin 13 of the housing to serve as a closure for access opening 21, and has one margin connected to the housing by a hinge 23. As best seen in FIGS. 2 and 3, cover plate 22 has a portion 22a which extends laterally beyond the plane of side wall 11 of the housing, so that it overhangs motor 17.

The electrical system of an oil burner requires an ignition transformer to provide the necessary high voltage current for ignition of the oil burner flame. The ignition transformer in the present oil burner is carried in a transformer box 24 which is supported on cover plate 22 directly above access opening 21 for the housing. Thus, as seen in FIG. 1, suitable ignition leads 24a may extend directly from the transformer through the cover plate and make suitable contact with the ignition spark electrode of firing assembly 16.

An oil burner must also have a safety combustion control system which stops operation of the oil burner either in the event of ignition failure or flame failure. The

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safety combustion control requires a group of relays and thermostatic switches, all of which are contained in a safety relay box 25 which is supported on laterally projecting portion 22a of the cover plate, alongside ignition transformer box 24. A heat sensitive flame detector 26 is mounted toward the front of firing assembly 16, and has an electrical connector lead 27 which extends into the interior of relay box 25. A suitable electric connection 28 extends from the interior of safety relay box 25 to the interior of ignition transformer box 24, so that the components of the safety combustion control system may control operation of the entire burner including the ignition, fuel pump and motor.

No detailed description of the safety combustion control components is provided, since these vary with different oil burners, and the specific components form no part of the present invention. Generally speaking, such safety combustion controls include a starting relay, and in the starting relay circuit a thermostatic switch with which there is associated an electric resistance element to heat the thermostat if the start circuit remains in operation for an excessive period of time. When there is proper ignition, the operation of the oil burner firing assembly heats flame detector 26, said detector being a thermocouple which acts through conventional switch means to transfer the electrical system from a start circuit to a run circuit. If ignition fails to take place within a predetermined time period, the electric resistance element associated with the thermostatic switch opens the start circuit to disable the entire burner electric system until the unit is serviced for proper operation.

In the alternative form of the device illustrated in FIG. 4, all the components are the same as those illustrated in FIGS. 1 to 3 except for the cover plate, and a modified mounting for the safety relay box. In the construction illustrated in FIG. 4, a cover plate 122 which is only the width of housing 10 is connected by a hinge 23 to the housing. In this case, a transformer box 124 has a side wall 124a which is suitably apertured to receive fasteners, such as bolts 124b which also impale a side wall 125a of a safety relay box 125. Spacer sleeves 125b preferably are provided between the adjacent side walls 124a and 125a of the ignition transformer box 124 and safety relay box 125 to avoid any possibility of overheating of the relay box directly from the transformer box.

In both forms of the invention, the ignition transformer box is mounted on the cover plate, and likewise in both forms of the invention the safety relay box is supported by the cover plate, although in the device of FIG. 4 it is not mounted directly upon it. In each form of the device the two boxes are separate, self-contained units which have no common wall between them; and preferably their adjacent side walls are spaced apart to minimize conduction of heat from the transformer box to the relay box.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations are to be understood therefrom, as some modifications will be obvious to those skilled in the art.

I claim:

1. In an oil burner, in combination: a housing the top of which is provided with an access opening; a combustion tube secured to the front of said housing; a firing assembly supported with its forward portion in said tube and its rear portion in the housing, said firing assembly being removable through the access opening; a movable cover plate surmounting the housing to serve as a closure for the access opening; an ignition transformer box fixedly mounted on said cover plate directly above said access opening; electrical connections from the interior of the transformer box through the

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cover plate and into electrical contact with the ignition spark electrodes of the firing assembly; a safety relay box fixedly supported by said cover plate immediately adjacent the transformer box, said transformer box and said relay box each being a separate, self-contained unit, and said boxes having no common wall between them, and said relay box and transformer box constantly maintaining a fixed spatial relationship to one another to permit short, rigid electrical connections between said boxes; a heat sensitive flame detector positioned in the combustion tube to detect operation of the burner; electrical connections between the flame detector and the interior of the relay box; and short electrical connections between the interior of the relay box and the interior of the ignition transformer box.

2. The combination of claim 1 in which the cover plate is sufficiently wide to serve as a base for the ignition transformer box and the safety relay box; and said boxes are independently mounted on the cover plate side by side.

3. The combination of claim 1 in which the cover plate serves as a base for the ignition transformer box, and the safety relay box is secured to a wall of the transformer box.

4. The combination of claim 3 in which the ignition transformer box and the safety relay box are side by side with their adjacent walls in spaced relationship.

5. The combination of claim 4 in which the relay box is secured to a side wall of the transformer box, and heat insulating spacers are provided between the adjacent walls of said boxes.

6. The combination of claim 1 in which the cover plate is sufficiently wide to serve as a base for the ignition transformer box and the safety relay box, and said boxes are independently mounted on the cover plate side by side with their adjacent walls in spaced relationship.

7. The combination of claim 1 in which the ignition transformer box is mounted on the cover plate directly above the access opening, and the safety relay box is positioned beside the transformer box.

8. In an oil burner, in combination: a housing the top of which is provided with an access opening; a combustion tube secured to the front of said housing; a firing assembly supported with its forward portion in said tube and its rear portion in the housing, said firing assembly

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being removable through the access opening; a cover plate surmounting the housing to serve as a closure for the access opening, said cover plate having a margin hingedly connected to the housing; an ignition transformer box fixedly mounted on said cover plate directly above said access opening; electrical connections from the interior of the transformer box through the cover plate and into electrical contact with the ignition spark electrodes of the firing assembly; a safety relay box fixedly supported by said cover plate immediately adjacent the transformer box, said transformer box and said relay box each being a separate, self-contained unit, and said boxes having no common wall between them, and said relay box and transformer box constantly maintaining a fixed spatial relationship to one another to permit short, rigid electrical connections between said boxes; a heat sensitive flame detector positioned in the combustion tube to detect operation of the burner; electrical connections between the flame detector and the interior of the relay box; and short electrical connections between the interior of the relay box and the interior of the ignition transformer box.

9. The combination of claim 8 in which the cover plate has a part projecting laterally beyond a wall of the housing, the ignition transformer box is mounted on the cover plate directly above the access opening, and the safety relay box is independently mounted beside the transformer box on the part of the cover plate which projects beyond the wall of the housing.

10. The combination of claim 8 in which the ignition transformer box is mounted on the cover plate directly above the access opening; and the safety relay box is mounted on a side wall of the transformer box.

11. The combination of claim 10 in which the relay box is secured to the wall of the transformer box by a plurality of fasteners, and heat insulating spacers are positioned between the adjacent walls of the boxes.

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