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2,235,664

OIL BURNING APPARATUS

Filed April 20, 1938

3 Sheets-Sheet 1

Fig. 1.

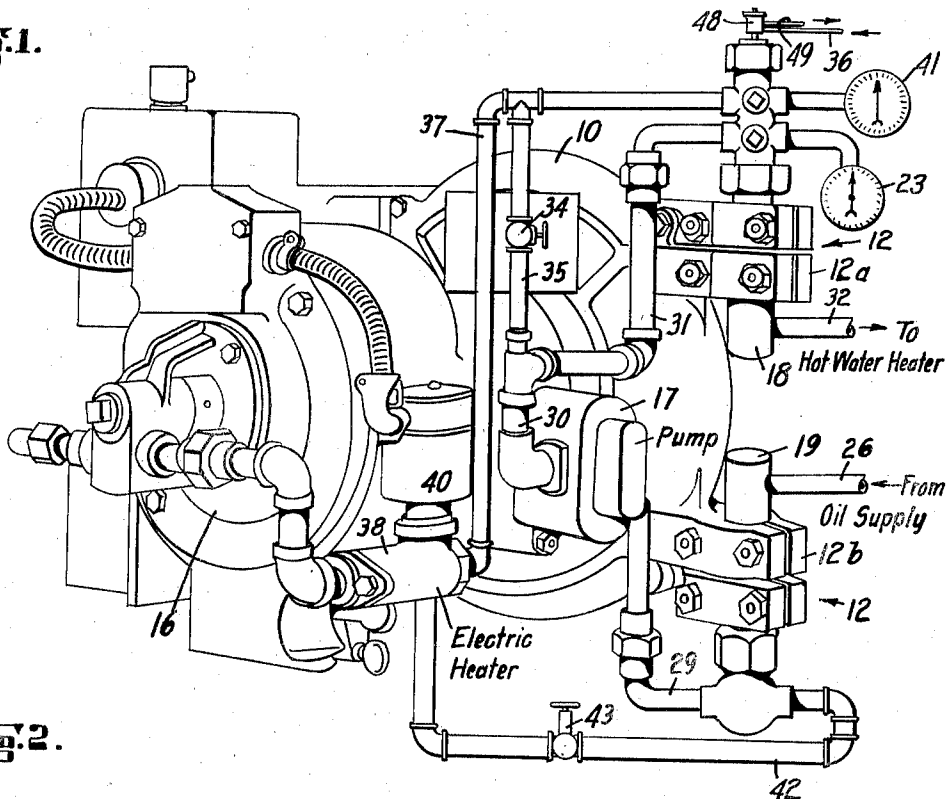
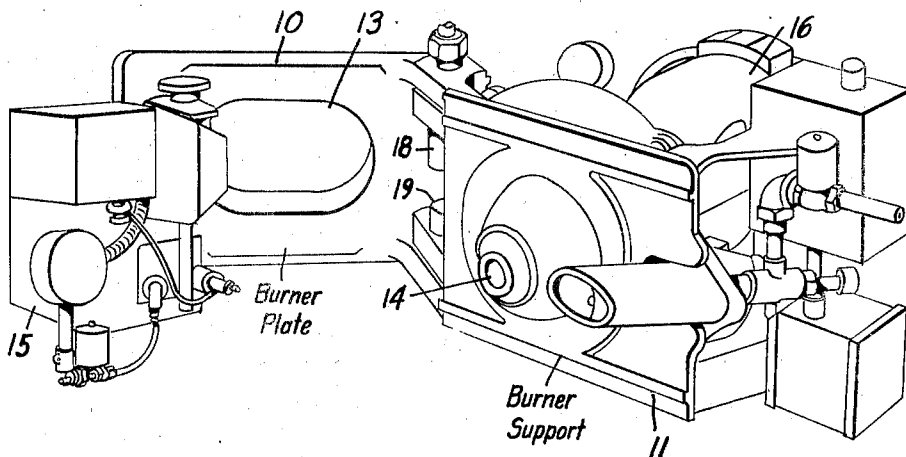


Fig. 2.



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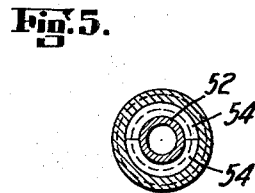
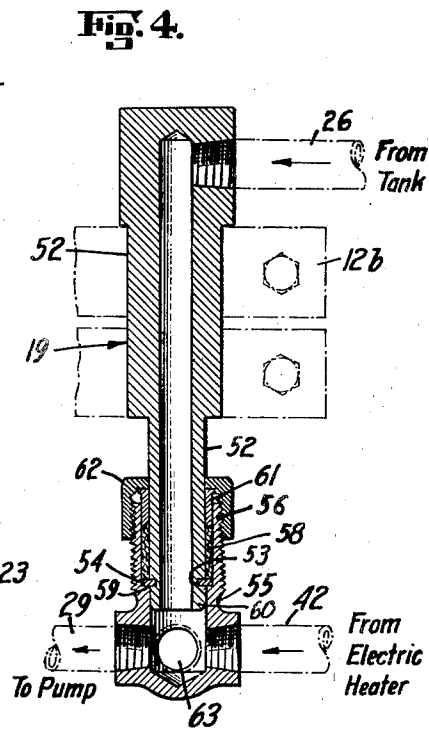
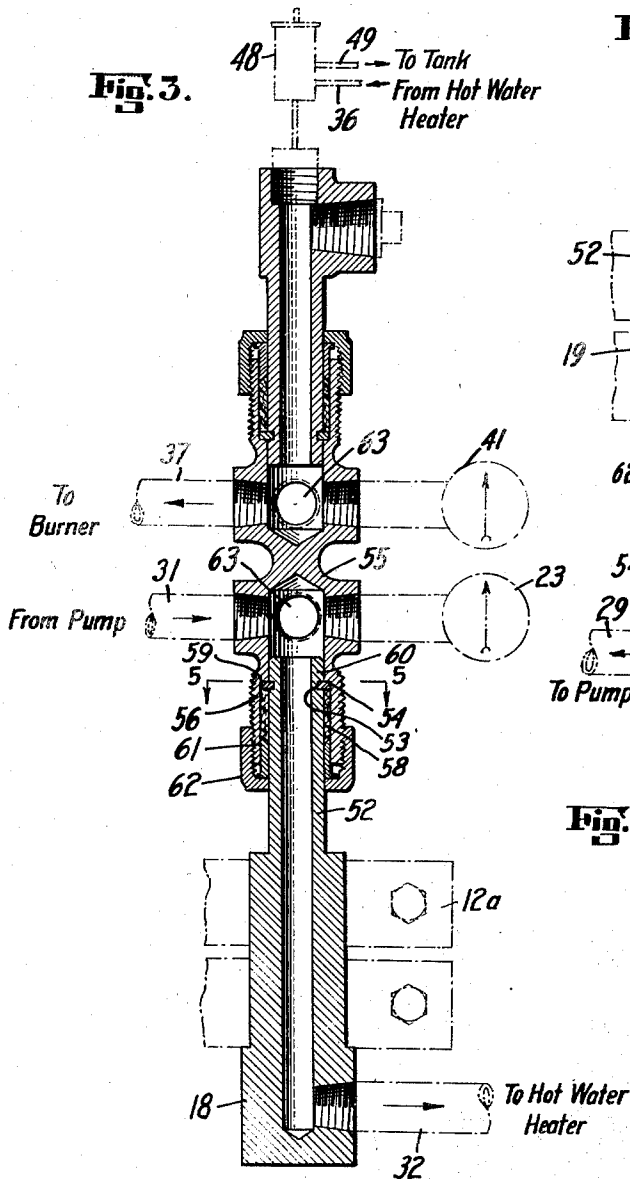
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3 Sheets-Sheet 2



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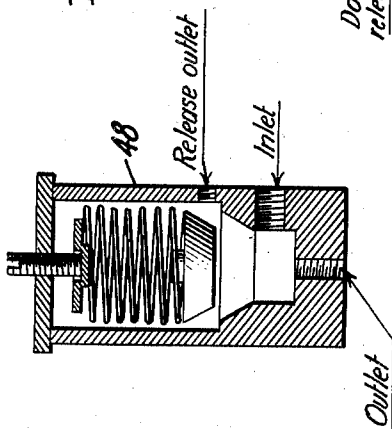
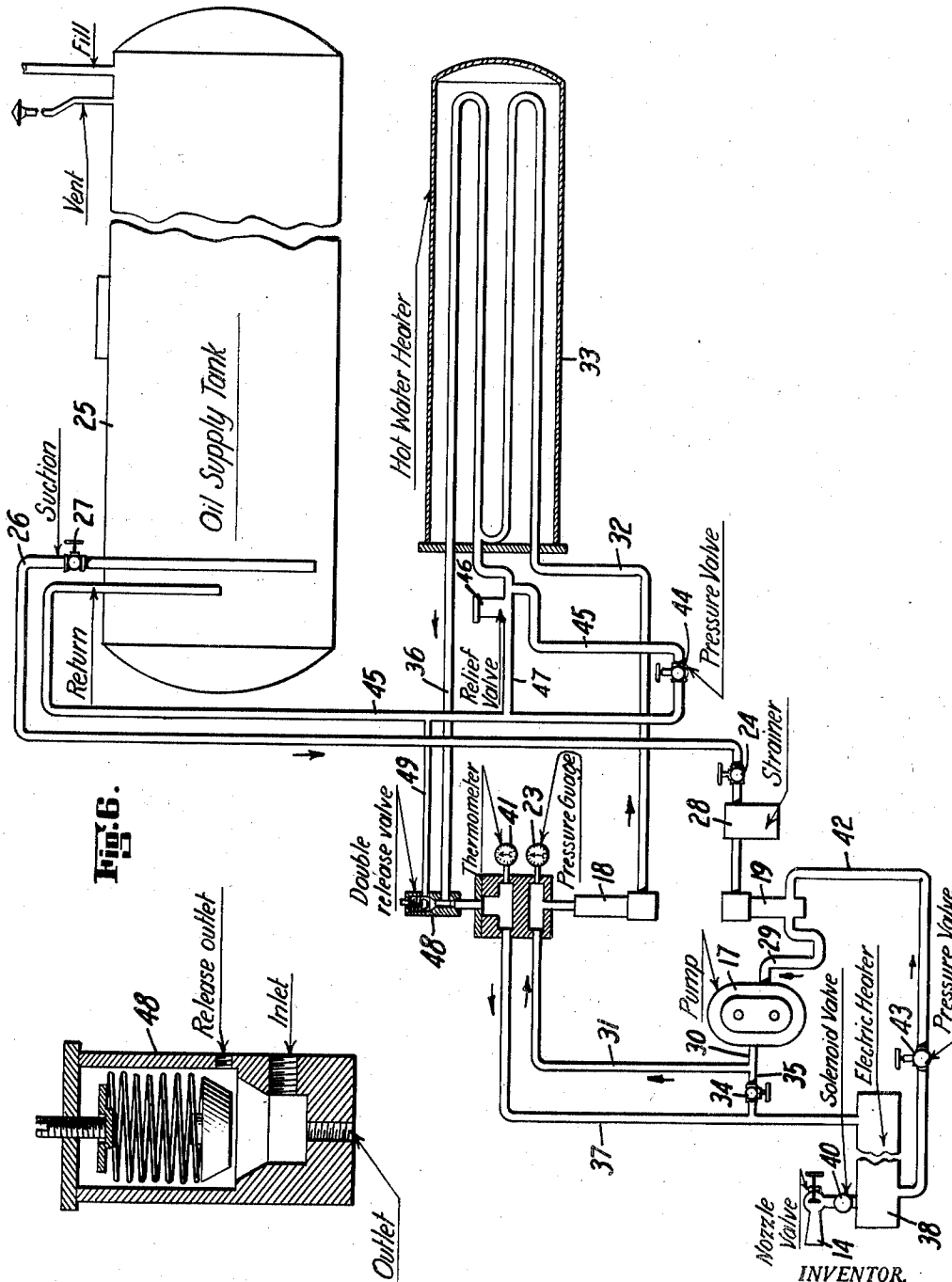
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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OIL BURNING APPARATUS

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Application April 20, 1938, Serial No. 203,044

6 Claims. (Cl. 158—36)

This invention relates to improvements in oil burning apparatus, particularly to apparatus for supplying oil to the burner and to fluid conducting hinge mountings adapted to support heavy duty oil burners or other devices.

Because of various desirable considerations, such as inspection, cleaning and repair, it has become the practice to mount heavy duty oil burners for large boilers on hinges so they can be swung in and out of normal burning positions. The oil pump of such burners is usually mounted to be swung with the burner and drive motor as a unit.

With a swingable burner unit, it becomes necessary to provide flexible connections for supplying oil to the burner, and the preferred way of meeting this requirement is to supply the oil through the hinge mountings of the burner unit. This creates the problem of providing a hinge mounting which is sturdy enough to properly support the burner unit and which will prevent oil leakage even after long periods of service. Often the oil is heated to assist easy vaporization, making it necessary perhaps to pass the oil through the hinge mountings several times, in some instances in heated condition. After being heated the oil is especially inclined to leak.

So far as is known, no hinge mountings provided up to the present time prevent oil leakage very long. The usual hinge joint now known involves tapered fittings. These require very accurate machining and must be so tightly adjusted to avoid leakage that the hinge works hard and wear is rapid.

According to the present invention an improved hinge mounting is provided which does not require high-precision machining, which is very sturdy in construction, which is easy in action, and which provides definite assurance against oil leakage even after long service. Moreover the hinge mounting provides for passing the oil therethrough several times. A feature of the specific construction disclosed is that it provides for hinging the burner unit to swing either to the right or to the left.

Another feature of the invention is the unique and advantageous means provided for heating and circulating the oil between the source of supply, the oil heaters, and the oil burner.

Another feature of the invention is the unique and advantageous means provided for assuring hot oil at the nozzle for starting.

Another feature of the invention is the provision of safety devices in the fluid circulatory system.

While the hinge joint is described in connection with swingable oil burner units, it is adapted for use wherever a leakproof oscillating pipe fitting is required. For example, it may be used for fire hose or hydraulic lines for other purposes, air compressor lines and many other purposes.

The objects, advantages and features of the invention will be noted in the detailed description of an illustrative embodiment of the invention shown in the accompanying drawings, in which:

Fig. 1 is a perspective view of a heavy duty oil burner unit mounted on fluid conducting hinges on the front of a boiler;

Fig. 2 is a perspective view of an oil burner unit in outwardly swung position accessible for inspection, cleaning or repair;

Fig. 3 is a vertical section through the upper part of the hinge mounting shown in Figs. 1 and 2;

Fig. 4 is a vertical section through the lower part of the hinge mounting shown in Figs. 1 and 2;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 3;

Fig. 6 is a diagrammatic view of an oil burner system embodying the present invention; and

Fig. 7 is a vertical section through a part of the upper hinge mounting shown in Figs. 1 and 2.

Referring to Figs. 1 and 2, 10 designates a burner plate which is secured to the front of a boiler. A burner support 11 is swingably anchored on the burner plate 10 by the hinge mounting 12, here shown to comprise the upper portion 12a and the lower portion 12b. The burner plate 10 is provided with an opening 13 for the burner nozzle 14. Certain electrical or other controls for the burner are shown at 15. The burner proper, including motor and vaporizer, is shown at 16. The motor may drive a pump 17 also mounted on the burner support 11. The burner unit may be swung inward as shown in Fig. 1 in operation and be swung outward as shown in Fig. 2 for inspection, cleaning or repair. The hinge pins 18 and 19, besides serving to support the burner unit, also serve for the circulation of oil.

Referring to diagrammatic Fig. 6, 25 designates an oil tank or source of supply. The oil may be withdrawn under suction through the pipe 26 provided with a hand valve 27. The oil passes through a strainer 28, through lower hinge pin 19, and pipe 29 to the intake side of pump 17. A

hand valve 24 may serve to cut off the oil when cleaning the strainer.

From the pump 17 the oil travels through the pump outlet pipe 30 to the pipe 31 leading to the upper hinge joint from whence it flows through a pipe 32 to a steam or hot water oil heater 33. A pressure gauge 23 may be provided at the hinge. The hand valve 34 in the by-pass pipe 35 will be assumed to be closed. The purpose of the valve 34 is to permit some cold oil to flow directly from the pump to mix with the heated oil going to the burner nozzle when the heated oil is too hot.

From the hot water heater the oil flows by pipe 36 to the upper chamber of the upper hinge joint and thence through a pipe 37 to the chamber of an electric heater 38. The electric heater may or may not be in operation when the burner is started up. That will depend upon whether there is hot water in the hot water heater 33 or not. If the heater 33 is connected with the boiler served by this burner and the water in the boiler is cold, it will be desirable to operate the electric oil heater 38. There may be other situations in which the electric heater is needed. It may be turned on or off by hand or in response to the temperature of the water in the heater 33 or automatically in response to other conditions. Of course, if desired, the electric heater may be continuously operated but normally is not necessary and is not used after the hot water oil heater becomes effective.

At the start of operation of the burner a solenoid controlled valve 40 between the electric heater 38 and the burner nozzle will be closed. This valve is set to automatically open after the lapse of a given time, say 60 to 120 seconds to allow oil to be circulated by the pump through the hot water oil heater and back to the burner nozzle, or it may be operated in accordance with the temperature of the oil. The oil may operate directly upon an element of the valve 40 or through a temperature responsive element at a distance from the valve 40, for example the thermometer 41 at the hinge between the pipes 36 and 37. Or, if desired, the valve 40 may be controlled conjointly by time and temperature responsive means. While the solenoid valve 40 is closed the oil will be recirculated to the pump through the by-pass pipe 42, the pressure generated being sufficient to open the pressure valve 43. The oil returns from the pipe 42 to the lower part of the hinge mounting and enters the pump through the intake pipe 29 through which the cold oil was initially drawn. When the given condition is reached the solenoid valve 40 opens, thus relieving pressure on the valve 43 to permit it to close. Thus, oil which has been raised in temperature is seldom if ever circulated through the pump. Normally the hot oil goes directly from the heater to the burner nozzle without passing through the pump.

Means are provided for relieving the pressure of the oil in the system if, while the solenoid valve is closed as for instance when it is working on a time limit, the water in the hot water oil heater should be so hot as to cause the oil to expand unduly, or if for any other reason the oil pressure should become too great. A pressure valve 44 in a relief pipe 45 will open when the oil pressure is too great and permit the oil to flow back to the tank 25. If, for any reason the valve 44 should fail to operate, a relief valve 46 will open and similarly permit excess oil to return to the tank through pipe 47 connecting with the relief pipe

46. In order to prevent an over-supply of oil reaching the burner there may be provided between the pipes 36 and 37, as at the hinge, a release valve 48. Excess fluid escaping from the valve 48 is returned to the tank 25 through the pipe 45 and a connecting pipe 49 between the pipe 45 and the valve.

An improved construction of an oil-tight joint at each of the hinge portions is shown in Figs. 3 and 4. For purposes of reference the hinge pins and their extensions and parts to allow flow of liquid therethrough will be noted herein in some instances as fittings. Three similar joints are shown, one in connection with the lower hinge pin member 19 (Fig. 4) and two in connection with the upper hinge pin member 18 (Fig. 3). It is herein desired to provide a non-leaking, non-binding joint that will allow relative movement of the parts. The structure herein illustrates such an improved joint. As specifically illustrated, the hinge pins have a reduced extension 52 provided with a groove 53 within which fits a split washer 54. A pipe fitting 55 has a threaded extension 56 provided with a packing receiving bore to receive packing 58 and the washer 54. A shoulder 59 in the extension 56 engages the outer edge of the split washer and the hinge pin extension 52 has a headed portion 60 fitting closely inside the pipe fitting above the packing bore to provide a sturdy mounting. No strain is therefore placed on the packing. The ends of the split washer 54 are machined to fit closely together and if desired they may be stepped or tongue-and-grooved. Also the flat portion of the washer covers the space between the portion 60 and the pipe fitting and is pressed tightly against the shoulder 59 so as effectively to prevent leakage. A gland 61 and a packing nut 62 hold the packing and the split washer in position.

In Fig. 3 the pipe fitting 55 for the two separate ducts preferably is made rigid, as for example being cast in one piece so it will not come apart in service. The fitting may be formed of several assembled parts if securely fastened together to resist separation or leakage when subjected to constant oscillation. However, unless assembly convenience is an important factor the one piece fitting is preferred.

The pipe fittings are so formed as to provide suitable connections either when the burner unit is mounted on the right hand side or on the left hand side. The extra pipe openings 63 are closed by plugs when not used.

It will thus be seen that the invention provides a fluid conducting system for oil burners or the like which serves to conduct the oil from a source to a pump, from the pump to an outside heater, and back to the burner nozzle without normally requiring the pump to handle hot oil. Also that the system provides for securing hot oil at the burner before the oil is allowed to flow to the burner nozzle, safety means being provided for recirculating the oil through the pump until it is hot and thereafter automatically supplying the hot oil to the burner. Also that various safety devices are provided for avoiding undue pressure in the system which might cause leakage of oil or injury to any of the parts.

Moreover, the invention provides an improved hinge mounting for a swingable oil burner unit or for other purposes which permits the fluid to flow through the hinge mounting a plurality of times; which will resist leakage even after long periods of severe service; and which is sturdy

and free from wearing action against the packing of the joint.

While one embodiment of the invention has been illustrated and described with particularity, it is to be understood that the invention may be variously embodied within the limits of the prior art and the scope of the subjoined claims.

I claim:

1. A hinge mounting for supporting a closure and burner mechanism of heavy duty oil burners or the like, comprising in combination, a lower tubular hinge pin, a pipe connected thereto, a pipe fitting turnably connected to said pin, a packed joint having cylindrical bearing engagement with said pin, an upper tubular hinge pin, a pipe connected thereto, a pipe fitting having a plurality of independent ducts turnably connected to said upper hinge pin, a packed joint having cylindrical bearing engagement with said upper hinge pin, and a third tubular member opposite said upper hinge pin and having a cylindrical packed turnable joint with said upper pipe fitting.

2. An oil burner system comprising in combination, a hinged oil burner unit including an oil pump; a hot fluid oil heater and an oil supply tank at fixed locations; a turnable hinge connection in the conduit from the tank to the pump, a turnable hinge connection in the conduit from the pump to the hot fluid oil heater, and a turnable hinge connection in the conduit from the hot fluid oil heater to the burner.

3. An oil burner system comprising in combination, a hinged oil burner unit including a nozzle, a pump and an electric oil heater; an outside oil supply tank, an outside oil heater, a conduit supply line from said tank to said pump passing through a hinge, a conduit line from said pump to said outside heater passing through a hinge, a conduit line from said outside heater passing through a hinge and through said electric heater and normally to said nozzle, a by-pass conduit line from said electric heater through a pressure valve and through a hinge common to said supply line and to said pump, and a valve at said nozzle for controlling the flow either to

the nozzle or back to the pump through the by-pass line.

4. In combination an oil burner including a pump, a hinge mounting for the oil burner comprising a rotatable hinge member which is rigidly connected to the oil burner, said hinge member being provided internally with a longitudinally extending oil passage, a rigid conduit from the discharge side of the oil burner pump communicating with said oil passage, an oil heater, a rigid conduit leading from said oil passage to said heater, conduit means for conducting oil from the heater to the interior of said hinge member, and to another oil passage therein, said last mentioned oil passage being out of communication with the first mentioned oil passage, and a conduit leading from the last mentioned oil passage to the oil burner.

5. An oil burner installation comprising in combination a hinged oil burner unit including a pump, a hinge mounting for said oil burner unit including supporting conduit elements and cooperative conduit elements, an oil heater on the stationary side of the hinge mounting, said supporting elements having relative turning movement to permit swinging movement of the burner unit, said hinge mounting being provided with a first longitudinal oil passage, a rigid conduit from the discharge side of the pump communicating with said first oil passage, a rigid conduit from said heater communicating with said first oil passage, said hinge mounting being provided also with a second longitudinal oil passage, a rigid conduit from the heater communicating with said second oil passage, and a rigid conduit from the oil burner communicating with said second oil passage.

6. An oil burner installation as set forth in claim 5 which further comprises a supply tank on the stationary side of said hinge mounting, a third longitudinal oil passage in said hinge mounting, a rigid conduit from said supply tank communicating with said third oil passage, and a rigid conduit from said pump communicating with said third oil passage.

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