June 10, 1969 R. E. SHENBERGER 3,448,736

OIL FIRED CONVERSION ASSEMBLY

Filed Jan. 10, 1968

Fig. 1

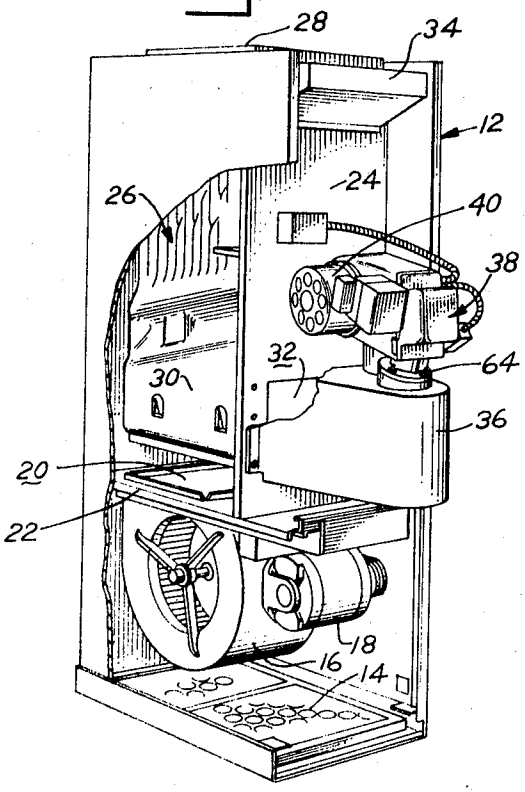


Fig. 2

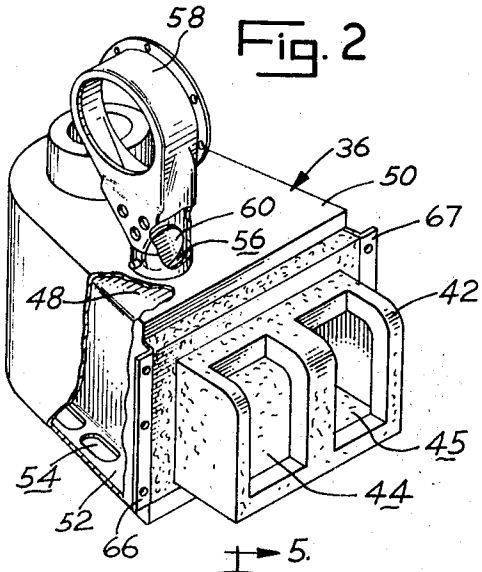


Fig. 3

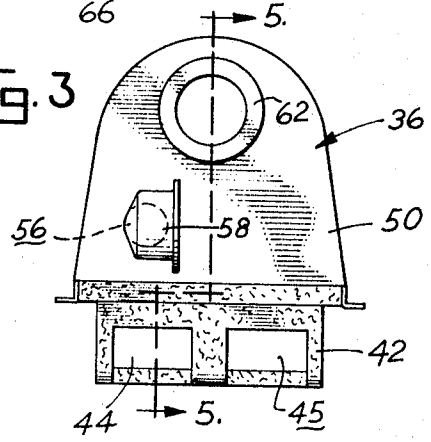


Fig. 5

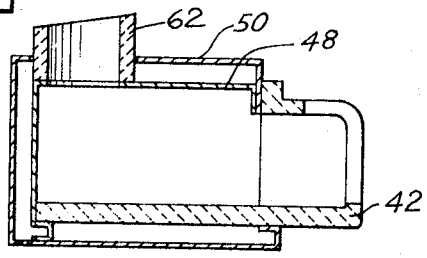


Fig. 6

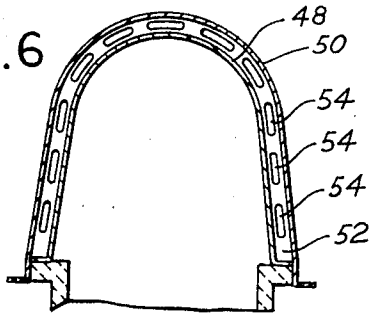
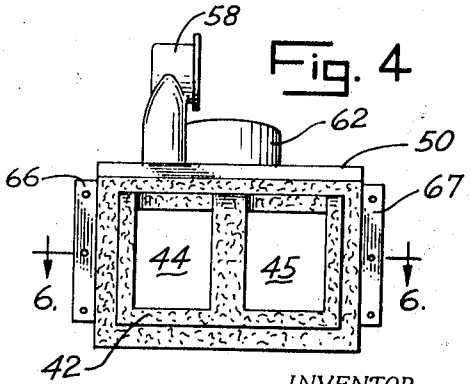


Fig. 4



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OIL FIRED CONVERSION ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

A furnace conversion assembly for converting a gas fueled furnace into an oil fueled furnace. A hollow walled, combustion chamber box includes a header on one side adapted to fit onto the gas burner header opening of a gas furnace heat exchanger. Air inlet holes in the box permit passage of air through the hollow walls of the box. An air outlet for the hollow walls is provided adjacent a flue leading into the interior or combustion chamber of the box. Air drawn through the hollow walls of the box is combined with fuel oil in an oil burner for combustion of the oil and air mixture within the interior of the chamber box, the oil burner being mounted to the combustion chamber box. Combustion products are directed through the header and into the gas furnace heat exchanger to exhaust in the normal manner through the heat exchanger.

Background of the invention

This invention relates to a furnace conversion assembly for converting a gas fueled furnace into an oil fueled furnace and, more particularly, to a conversion assembly which may be readily attached to various existing gas furnaces with a minimum of modification.

It is well known that gas furnaces are very desirable, and thus currently are especially popular as a means for heating residences. However, it often happens that public utilities are unable to provide natural gas service for many homes in many areas. For this reason, it is sometimes necessary to use alternate fuels such as coal, which is understandably not a desirable fuel for residential heating, or oil, which is a desirable fuel for residential heating.

Rather than being required to build a separate furnace model for each type of fuel, it has been found advantageous to utilize a basic design furnace for use with either oil or gas. Thus, an installation may be changed after it is in service, or an installation may be originally set up for either gas or oil depending upon the desires of the customer.

Summary of the invention

In a principal aspect the present invention is a furnace conversion assembly for converting a gas fueled furnace into an oil fueled furnace. The original gas fueled furnace is of the type which includes a heat exchanger with a gas burner header for receiving gas burners leading into the heat exchanger. The conversion assembly comprises an enclosed combustion chamber which is surrounded by a shroud so that an air space is defined between the chamber and the shroud. Air is made to flow in this air space and is drawn off to be combined with fuel oil in the oil burner. The oil and air mixture subsequently combusts in the chamber with the combustion products passing from the combustion chamber, through the header opening in the furnace and into the heat exchanger of the furnace. The air passing through the hollow space betwen the chamber and the shroud serves to insulate the combustion chamber while simultaneously being heated to more efficiently combust with the fuel oil.

It is thus an object of the present invention to provide an improved furnace conversion assembly.

It is a further object of the present invention to provide a furnace conversion assembly for converting a gas fueled furnace into an oil fueled furnace.

One other object of the present invention is to provide an economically manufactured conversion assembly which can be incorporated with existing gas furnaces with a minimum of expense, time and effort.

Still another object of the present invention is to provide a conversion assembly which insures more efficient operation of the furnace and more complete combustion of the fuel.

These and other objects, advantages and features of the present invention will be more fully set forth in the detailed description which follows:

Brief description of the drawings

In the detailed description which follows, reference will be made to the drawing comprised of the following figures:

FIG. 1 is a cut-away perspective view of a typical residential gas furnace including the oil conversion assembly of the present invention with a fuel oil burner mounted thereon;

FIG. 2 is a perspective view of the convention assembly of the invention;

FIG. 3 is a top plan view of the assembly illustrated in FIG. 2;

FIG. 4 is a front end view of the assembly shown in FIG. 2;

FIG. 5 is a cross-sectional view taken substantially along the line 5—5 of FIG. 3; and

FIG. 6 is a cross-sectional view of the assembly taken substantially along the line 6—6 of FIG. 4.

Description of the preferred embodiment

FIG. 1 illustrates a typical gas furnace unit which includes the oil conversion assembly of the present invention. The gas furnace is enclosed in a cabinet **12**. Air enters at the bottom of cabinet **12** and passes through the air filter **14** being drawn therethrough by a squirrel cage fan **16** which is driven by an electric motor **18**.

The cool, inlet air is forced up through an opening **20** in a wall **22** which defines the lower boundry of a heat exchanger cavity within the cabinet **12**. The heat exchanger cavity is defined by the outside walls of the cabinet **12**, the bottom cavity wall **22** and a back cavity wall **24**. A heat exchanger **26** is fastened within the heat exchanger cavity so that the air passing up through the opening **20** may circulate about the heat exchanger **26**, be heated and pass through the plenum **28** to duct work in the residence. The walls of the heat exchanger cavity are preferably insulated to insure that the air remains heated as it passes into the residence duct work.

The heat exchanger **26**, as utilized in the gas furnace, includes a lower burner portion **30** with header opening **32** passing through the back cavity wall **24**. In a gas furnace, gas burners are inserted through the header opening **32** into the burner portion **30**. The gas is ignited and combusted with air within the burner portion **30**. The combustion products then rise through the remainder of the heat exchanger **26** and pass out through an exhaust vent **34**.

To convert the gas fuel furnace to an oil fueled furnace, a conversion assembly **36** of the present invention is positioned in the header opening **32** in place of the gas burners which are removed. An oil burner **38** with appropriate controls is mounted on the assembly **36**. The oil burner **38** includes a motor and fan assembly **40** which draws air into the burner **38** for mixture with fuel oil. The air and fuel oil mixture is then forced through the oil burner gun which projects into the interior of the assembly **36**. There the vaporized mixture is ignited. The combustion prod-

ucts then pass from the assembly **36** through the header opening **32** and into the burner portion **30** of heat exchanger **26** to heat air flowing through the heat exchanger cavity in the same manner air is heated by the gas furnace.

Referring now to FIGS. 2–6, there is shown in greater detail the conversion assembly **36** of the invention. The conversion assembly **36** generally has the shape of a rectangular parallelepiped. It includes a header **42** adapted to fit into the header opening **32**. The header **42** includes two openings **44** and **45** leading from the interior of the assembly **36**. The number of openings in the header **42** is equal to the number of cells in the furnace. Thus one or more openings may be defined in the header, depending upon the configuration and construction of the heat exchanger.

Combustion products are expelled through these header openings **44** and **45** into the burner portion **30** of the head exchanger **26**. Preferably the header **42** is fabricated from a fire resistant asbestos composition and projects partially into the header opening **32** to insure that the combustion products are directed into the heat exchanger **26**.

The assembly also includes an inner chamber **48** and a shroud **50** which surrounds the chamber **48**. The shroud **50** is spaced from the chamber **48** to provide a hollow air space between the shroud **50** and the chamber **48**. A brace and separator member **52** maintains the shroud **50** in a fixed position in relation to the chamber **48**. A plurality of air openings **54** are defined in the brace **52**. A single air outlet **56** is defined in the top of the shroud **50**. A fan housing assembly **58** is attached to the shroud **50** and extends upward from the air outlet **56**. Included within the fan housing assembly **58** is a conventional air flow damper or shutter **60** which is manually controlled.

A burner inlet mounting tube **62** passes through the shroud **50** and chamber **48**, and provides a passage to the interior of chamber **48**. As may be seen by examining FIG. 1, the gun of the oil burner **38** passes through the tube **62** into the interior of the assembly **36**. The burner **38** is mounted on the tube **62** and held in position by suitable means such as bolts **64** shown in FIG. 1.

The throud **50** includes flanges **66** and **67** adjacent the header **42**. The flanges attach to the back cavity wall **24** and serve to hold the assembly **36** in contact with the furnace by fastening bolts passing through the flanges **66** and **67**.

In operation, the fan and burner assembly **38** of the oil burner cause air to be drawn through the air openings **54**. This air passes around the hollow walls of the assembly **36** and through the outlet **56**. The heated air is then combined with fuel oil in the burner **38** and ignited as previously described. Since the chamber **48** is fabricated from sheet metal and conducts heat readily, air passing between the chamber **48** and the shroud **50** becomes heated prior to combustion with oil. Moreover, since the air passes around the chamber **48**, it acts as insulation for the furnace. In addition, since the air is heated before it is combined with the fuel oil, the air and fuel mixture provides a more efficient and complete combustion. Thus, there are two effects achieved by the present construction; first, the air insulates the combustion chamber, and second, the air is preheated to provide a more efficient combustion with the oil.

There are numerous other advantages to a construction of this type. For example, it is no longer necessary to manufacture two distinct types of heat exchanger to burn both oil and gas. In addition, blower and motor sizes can be reduced by utilizing a combination as presently claimed. As will be noted, the gas-fired heat exchanger is a multicell clam-shell type compared to a drum and wrap-around radiator type heat exchanger which is quite common on oil-fired furnaces. The multicell clam-shell type of heat exchanger offers less resistence to air flow than the drum and radiator type. Thus a smaller motor is required to drive the oil burner since there is less air flow resistance. Consequently, the operating efficiency of the conversion assembly of the invention is improved in relation to many standard oil-fired furnaces. This increase in efficiency is due to the insulating and preheating effects previously described and has resulted, in tests run by the inventor, in increased efficiencies as high as 9%.

While there has been set forth a preferred embodiment of the present invention, it is to be understood that all those embodiments obvious to persons skilled in the art and all those embodiments equivalent to the claimed subject matter are to be included within the scope of the appended claims.

What is claimed is:

1. A furnace conversion assembly for converting a gas fueled furnace into an oil fueled furnace, said furnace including a heat exchanger with a gas burner header opening in one side thereof, said furnace also including an oil burner, said assembly comprising in combination:

an enclosed combustion chamber, said chamber including a header serving as an exit for combustion products passing from said chamber to said heat exchanger, said header being attached to said header opening, said chamber also including a burner inlet mounting tube, said tube including mounting means for mounting said oil burner to combust an oil and air mixture within said chamber, and

a shroud surrounding said chamber and providing an enclosed air space about said chamber, said shroud including a plurality of openings to admit air in said air space, said shroud also including a single air exit duct, said duct being positioned adjacent said inlet tube so that air drawn through said air space and directed from said duct passes into said oil burner to mix and combust with said oil.

2. The assembly of claim **1** including air flow control means within said air exit duct.

3. The assembly of claim **1** wherein said shroud and chamber comprise substantially rectangular sided parallelepipeds, with one of said sides defining said header, said air space openings being defined about the outer periphery of the bottom of said assembly, and said air exit duct and said inlet tube being positioned on top of said assembly with air passing around said assembly to insulate said chamber and provide more complete combustion.

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