

[54] **FUEL OIL BURNER LEAD CONTROL MECHANISM**

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[58] **Field of Search**..... **431/186, 189**

[56] **References Cited**

UNITED STATES PATENTS

2,831,535	4/1958	Lange	431/186
2,119,952	6/1938	Engels.....	431/189 X
2,382,483	8/1945	Holden	431/186 X

2,669,296 2/1954 Stillman et al. 431/186 X

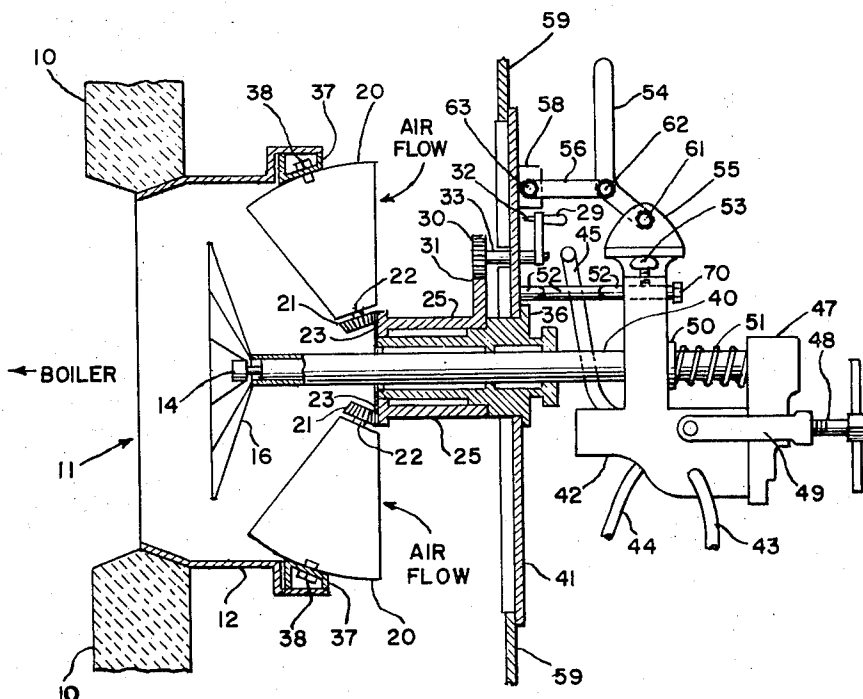
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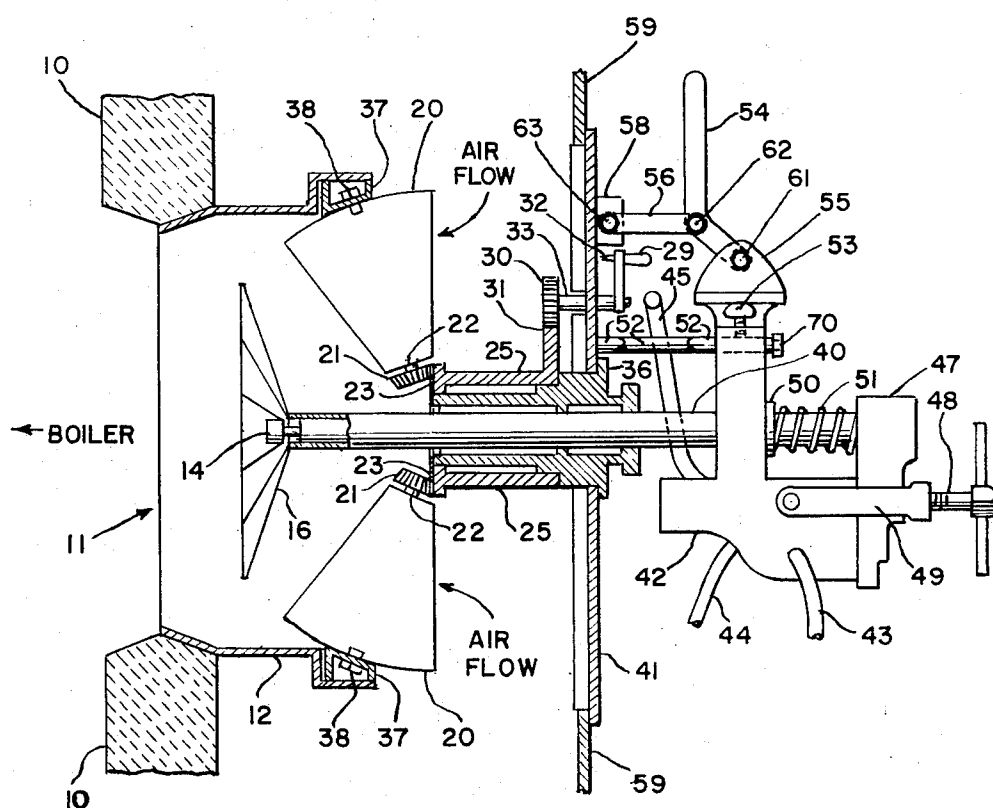
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[57] **ABSTRACT**

Positioning apparatus comprising a bell crank lever for providing a mechanical advantage to move an igniter tip on an oil burner inwardly and outwardly with respect to the location of a boiler. Slotted positioning and supporting guide rods having a wing-nut locking mechanism for locking the igniter tip in place when positioned. Support brackets connect the crank lever to an oil feed system that is rigidly connected to the guide rods and igniter tip for simultaneous movement of the brackets, lever feed system and igniter tip, with the guide rods indicating the position of the igniter tip.

8 Claims, 1 Drawing Figure





FUEL OIL BURNER LEAD CONTROL MECHANISM

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of royalties thereon or therefor.

BACKGROUND OF THE INVENTION

This invention generally relates to a protective system for igniter tips in a fuel oil burner system and more particularly to a system for the withdrawal and insertion of an igniter tip that can be operated depending on the operational status of the oil burner system at that time.

In prior art systems, plurality of igniter tips placed in a boiler system supply heat to the boiler and are prevented from burning out by a ventilation system that supplies air individually to remove heat from each igniter tip. When an igniter tip is not in use, its respective ventilation system is shut down and air doors are closed to prevent loss of heat from other burners so that the end of the igniter tip not in use is in an area of very high ambient temperature. Over extended periods of time, this often causes extended damage to the igniter tip, necessitating its replacement with the accompanying drawback of not only the cost of replacing the individual igniter tip but the entire boiler being out of use for a period of time. In maritime use, when a ship is at sea, this can mean running the boiler over an extended period of time at less than optimum conditions until the ship is brought in for repairs.

SUMMARY OF THE INVENTION

It is therefore a general object of the present invention to provide a system for preventing damage to igniter tips. It is a further object to provide a system for removal of igniter tips from high ambient temperature areas. Another object is in providing optimum positioning of igniter tips both when in use and when out of use.

This is accomplished in accordance with the present invention by providing a positioning system with a plurality of interconnecting components having a mechanical advantage for locating an igniter tip at a first optimum position for providing heat to a boiler when the tip is in use, and at a second optimum position when the system is not in use. This permits optimum use of the boiler by using only the igniter tips required at any particular time and not being forced to use an igniter tip merely to prevent its damage.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE is a partial sectional side elevation view of a burner assembly in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the FIGURE, there is shown a furnace wall 10 that may be made of brick with an opening 11. A tubular shaped housing 12 abuts wall 10. An igniter tip 14 is located inside vanes 16 that are arranged in a conical shaping with the igniter tip axially displaced from the apex of the cone.

Air doors 20 control the flow of air from a source (not shown). The air doors 20 along with vanes 16 control the supply of air to the igniter tip 14. In addition, the air provides temperature control throughout the area of its circulation. Additional vanes (not shown) can be placed in the opening 11 for further control of air flow if required.

The air doors 20 are operated by gears 21 connected to a pin 22 at the end of each door 20. A gear 23 connected to cylindrical sleeve 25 drives the gears 21 to position air doors 20 for control of air flow. A gear 31 on sleeve 25 meshes with a gear 30 on rod 33 that enables the air doors 21 to be positioned by a handle 29 with a position indicator 32. The air doors are manipulated by handle 29, through rod 33, gears 30 and 31, sleeve 25, gears 23 and 21 and pin 22. In addition, sleeve 25 provides contact with tubular piece 36 on bearing surfaces between the respective pieces.

The air doors 20 are positioned in relationship to housing 12 by means of register rings 37 secured to air doors 20 by means of hex headed bolts 38.

The tubular piece 36 having both inner and outer bearing surfaces is mounted on door 41 by means of bolts or welding. A barrel piece 40 that permits flow of oil through its center in an axial direction is supported by piece 36 on bearing surfaces and is capable of longitudinal movement in relationship to piece 36.

A valve body 42 receives oil through flexible tubing 43 with flexible tubing 44 the return line in a return flow system. A lever 45 controls the flow of oil through valve body 42. An atomizer body 47 is secured to valve body 42 by means of screw assembly 48 and coupling yoke 49. A collar 50 is held abutting a section of valve body 42 by spring 51. Guide rods 52 secured to valve body 42 and door 41 have position indicators to show the position of the igniter tip 14 on movement of barrel piece 42. Wing nuts 53 are used to lock the tips 14 in a fixed position. Stops 70 are used to limit travel. A bell crank lever 54 is used to move barrel piece 40 for the positioning of igniter tip 14. A support bracket 55 is secured to crank lever 54 by means of bolt and hex head nut 61 and is welded to an upper portion of valve body 42. A bar 56 connects the fulcrum of lever 54 by means of bolt and nut 62. A support 58 welded to door 41 is secured to bar 56 by means of bolt 63. Wall 59 abuts door 41 when door 41 is in the closed position. Lever 54 is capable of rotational movement at its fulcrum connecting with bar 56 and at its connection with support bracket 55. Bar 56 is capable of rotational movement at its connection with support 58. In this manner, when lever 54 is moved from one position to another, the barrel piece 40 may slide easily in its axial direction.

In operation, there are normally a plurality of burner units associated with each boiler. This often leads to less than all burner units being in operation at the same time. The optimum position of igniter tip 14 differs depending on whether or not it is in use. When in use, it is supplied with air through air doors 20 and vanes 16 and is forwardly positioned with relationship to the boiler. When not in use, the air supply is terminated for optimum operation of the burners in use and it becomes essential to retract the igniter tip 14 to prevent damage from burn-out, coking, etc. In this particular burner, the retraction is normally about 3 inches.

The igniter tip 14 when operating is positioned a predetermined distance from wall 10 and the boiler for op-

timum operation. When the igniter tip 14 is taken out of service, it may be retracted by pushing forward on bell crank lever 54 which permits retraction of igniter tip 14 and associated components. The igniter tips may again be moved forward by pulling back on lever 11. The wing nuts 53 on guide rods 52 can provide positional locking as explained previously.

There has therefore been described a means of positioning the igniter tip 14 on a burner from outside the wall 59 of a burner to permit ease of movement of the tip 14 while the door 41 is closed. This necessitates movement of oil lines 43 and 44, valve body 42, atomizer body 47, screw assembly 48, coupling yoke 49, collar 50, spring 51, guide sleeve 71, wing nuts 53, lever 45, barrel piece 40 and vanes 16, as well as igniter tip 14. All such components are mounted on door 41 for easy accessibility when not in use.

It will be understood that various changes in the details, materials, steps and arrangement of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

What is claimed is:

1. An oil burner positioning apparatus comprising: an igniter tip;
a barrel piece connected to said igniter tip;
an oil feed system connected to said barrel piece;
a bell crank lever linkage mechanism connected to said oil feed system for moving said igniter tip, said barrel piece and said oil feed system along the axial direction of said barrel piece;
a tubular piece having said barrel piece slidably mounted within; and
a fireproof door having an opening with said tubular piece mounted within said opening;
wherein said bell crank lever mechanism further includes a bell crank lever having an end connected to said oil feed system;
a bar having a first and second end with said first end

connected to the fulcrum of said bell crank lever; and

a support connected to the second end of said bar and said fireproof door.

2. An oil burner positioning apparatus according to claim 1 wherein said bar is rotatably connected to both the fulcrum of said bell crank lever and said support.

3. An oil burner positioning apparatus according to claim 2 wherein said end of said bell crank lever is rotatably attached to said oil feed system.

4. An oil burner positioning apparatus according to claim 3 wherein said support is rigidly connected to said fireproof door.

5. An oil burner positioning system according to claim 4 further comprising:

a pair of guide rods having their axial directions parallel to said barrel piece slidably connected to a pair of sleeves on said oil feed system and rigidly connected to said door, said guide rods having indicating marks to show the location of said igniter tip.

6. An oil burner positioning system according to claim 5 further comprising:

a pair of wing nuts connected to said sleeves for locking the sleeves in position on said guide rods.

7. An oil burner positioning system according to claim 6 further comprising:

flexible tubing connected to said oil feed system; and vanes arranged in a cone shape and connected to said barrel piece with said igniter tip axially displaced from the apex of said cone.

8. An oil burner positioning system according to claim 7 wherein said vanes are connected to said barrel piece and said flexible tubing is connected to said oil feed system so that operation of said bell crank lever linkage moves said tubing and said vanes, with said vanes moving along the axial direction of said barrel piece.

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