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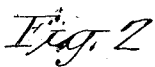
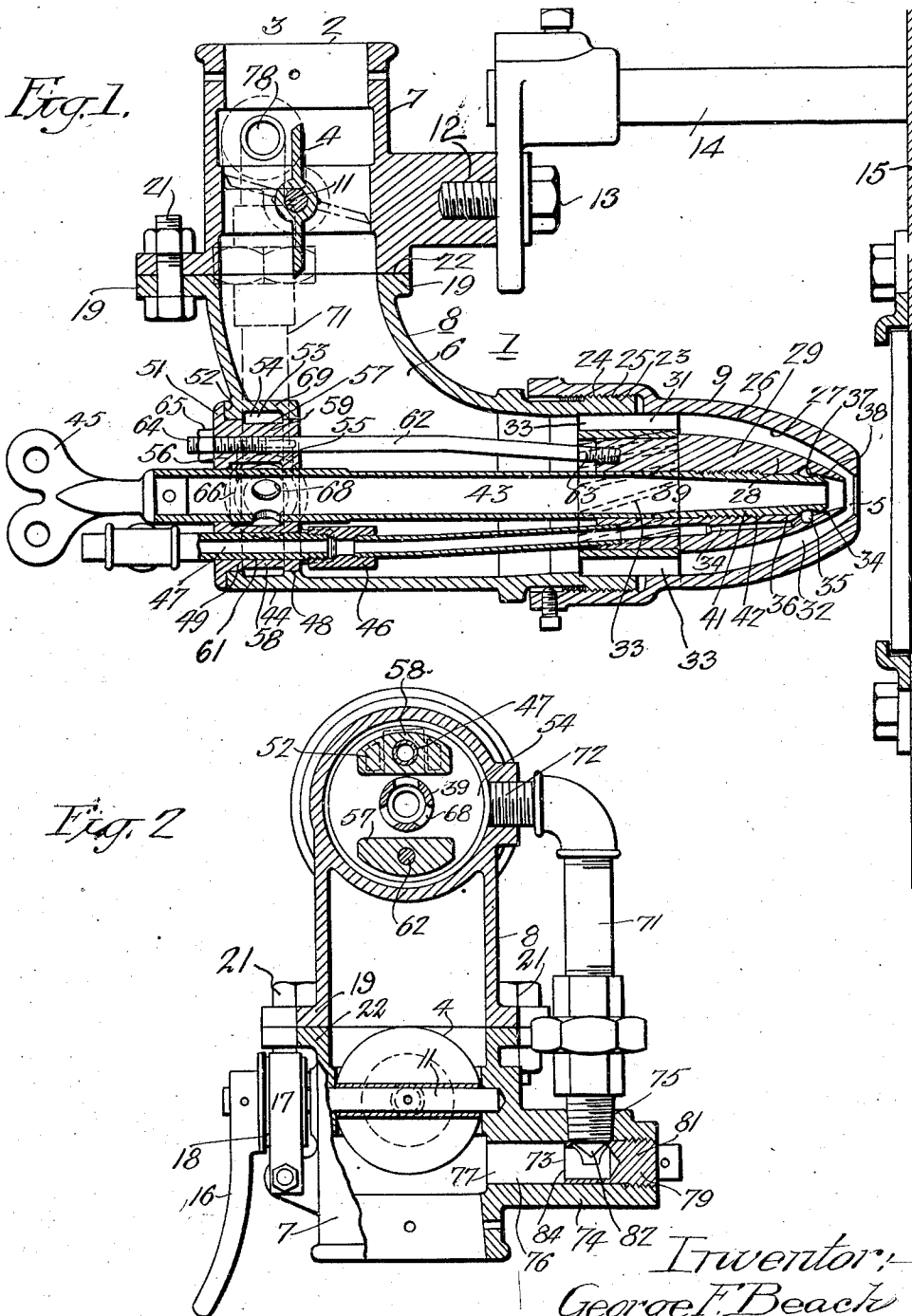
G. F. BEACH

1,763,387

OIL BURNER

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2 Sheets-Sheet 1



74'82 Inventor:
George F. Beach
by his Attorneys.
Houson & Houson

1,763,387

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Fig. 4.

Inventor:
George F. Beach

*Inventor:-
George F. Beach
by his Attorneys,
Horton & Horton*

UNITED STATES PATENT OFFICE

GEORGE F. BEACH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO RYAN, SCULLY & COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF DELAWARE

OIL BURNER

Application filed April 6, 1926. Serial No. 100,165.

My invention relates to burners, having particular relation to those adapted to burn oil.

One object of my invention is to provide a burner of simple, compact and rugged design that shall have a wide range in capacity and that shall be particularly characterized by its efficient operation at low oil consump-

10 In a Patent No. 1,161,183 granted to Mircs Fuel-Oil Equipment Company, upon an application filed by the present applicant, is shown a valve construction, wherein a damper controls the supply of air to a spray tube as well as to a main annular air passage.

Such type of burner has a rated oil burning range of approximately 50%, that is, the oil flow may be so reduced that the minimum oil consumption is about 50% of the maximum burner capacity. This relatively narrow range is caused by the fact that for oil consumptions, below the above-noted minimum, there is not sufficient air to fill both the spray tube and the main annular passage. 20 As a result of the low air pressure in the spray tube, the oil is not carried beyond the end of the burner and into the furnace, but is permitted to drip in the space therebetween.

In accordance with the present invention, I provide means whereby a predetermined volume of air may be supplied to the spray tube regardless of the fuel consumption of the burner, so that the above difficulties may be overcome.

35 Other objects and applications of my invention, as well as details of construction and operation, whereby my invention may be practiced, will appear more fully hereinafter when taken in connection with the accompanying drawings, wherein

Fig. 1 is a longitudinal sectional view of a burner embodying my invention;

Fig. 2 is a transverse sectional view taken on the line II—II of Fig. 3; and

45 Figs. 3 and 4 are side elevational and top plan views, respectively, of the structure of Fig. 1.

Referring particularly to Figs. 1 and 2, a burner comprises a casing 1, an air inlet passage 2 of which extends from an opening 3

and is controlled by a damper 4. The casing 1 is also provided with an air discharge outlet 5 and a main air passage 6 which connects said inlet passage 2 and said outlet 5.

The casing may comprise lower, intermediate and upper parts 7, 8 and 9, respectively, part 7 comprising a casting providing a mounting for a damper supporting shaft 11, and also having a threaded boss 12 adapted to receive a bolt 13 for securing the casing part 7 to a supporting bracket arm 14 extending from a furnace wall 15. The shaft 11 is provided with an operating handle 16, and it may be retained in any desired position by means of a friction band 17 which co-operates with a drum 18 mounted on said shaft 11.

The intermediate or rear casing part 8 has a lower end 19 (Fig. 2) thereof secured by bolts 21 to an upper end 22 of the lower casing part 7. A front end 23 of the casing part 8 is provided with an externally threaded portion 24 which is adapted to engage a correspondingly threaded internal portion 25 of a tubular nose 26 constituting the upper or front casing part 9 (Figs. 1 and 3). The latter is provided with an inner surface 27 of parabolic form that converges toward the air discharge outlet 5. An atomizer 28 is positioned within the casing 1 and it comprises an oil nozzle 29, preferably of parabolic form, which is so mounted within the front casing part 9 by an annular channel member 31 as to form in the part 9 an annular section 32 that communicates at its one end with the main air passage 6 and terminates at its opposite end in the discharge outlet 5. The channel 31 is preferably provided with a plurality of angle blades 33, whereby the air may be given a desired spiral movement.

The nozzle 29 is provided with an oil passage 34 that extends to an annular groove 35 formed in an inner wall 36 of said nozzle. A portion 37 of the inner wall 36 between the annular groove 35 and the outer end of the nozzle 29 is of conical form and it co-operates with a beveled end portion 38 of a spray tube 39 that is movably mounted within the nozzle 29, the latter having a threaded portion 41

in engagement with a correspondingly threaded portion 42 of said spray tube 39.

The spray tube 39, which defines a central air passage 43, extends rearwardly from the nozzle 29 through a tubular extension 44 of the rear casing part 8 and terminates in an adjusting handle 45. The oil passage 34 is similarly extended rearwardly and it is associated by means of a connecting nut 46, with an external supply pipe 47 which also extends through the tubular extension 44.

The tubular extension 44 is provided with an inner wall 48 adapted to receive a removable plug 49, a head portion 51 of which may be clamped against an outer edge 52 of the casing part 8 to lock said plug 49 securely in position. The plug 49 is preferably provided with a central recess 53, defining a chamber 54 between itself and the casing wall 48,—the recess being so formed that the plug 44 may be considered as comprising inner and outer plate sections 55 and 56 and spacing arms 57 and 58. The arms 57 and 58 are provided with perforations 59 and 61 through which pass a tie bolt 62 and the oil pipe 47, respectively. An inner end 63 of the tie bolt 62 is secured to the nozzle 29, while an outer end 64 is threaded to receive a locking nut 65. The plate sections 55 and 56 are also provided with aligned apertures 66 and 67 through which extends the spray tube 39. Thus, the plug 44 constitutes a support for the oil pipe 46, the spray tube 39 and the tie bolt 62.

Communication may be established between the spray tube 39 and the chamber 54 by means of a plurality of perforations 68 positioned in the former. The chamber 54 may be somewhat enlarged between the plate sections 55 and 56 by recessing a portion 69 of the tubular extension 44, as illustrated in the drawing.

In accordance with my invention, air is supplied to the spray tube 39 through a pipe 71 that extends from an aperture 72 in the wall of the chamber 54 to a passage 73 in a boss 74 projecting from the lower casing part 7. The passage 73 comprises vertically and horizontally extending portions 75 and 76, respectively. One end 77 of the horizontal portion 76 opens into the lower casing part 7 at a point 78 which is positioned below the damper 5, whereby the volume of air supplied to the spray tube 39 may be independent of the position of said damper 5. An outer end 79 of the horizontal passage section 76 is closed by means of a plug valve 81 having an aperture 82 in a tubular section 83 thereof,—the aperture 82 being movable into and out of alignment with the vertical section 75 of the passage 73, while an open end 84 of said tubular section 83 is at all times in communication with the horizontal passage section 76. Hence, the amount of air supplied to the chamber 54 and spray tube 39

may be adjusted independently of the damper 5.

In operation, assuming the damper 4 in the position shown in Fig. 1, the burner may be considered as operating at its maximum capacity. The air divides into two streams, a portion passing through the pipe 71 to the spray tube 39 and the remainder being given a spiral motion by the blades 33 and delivered through the annular passage 32 to the burner discharge outlet 6. The air passing through the spray tube 39 strikes the oil passing from the annular groove 35 and projects the same into the air discharging from the annular passage 32. As a result of the two air streams, the oil is thoroughly atomized and proper combustion conditions obtained.

When the burner is to be operated at low temperatures such, for example, as are required in the heat treatment of non-ferrous metals, the damper 4 is actuated to reduce the volume of air supplied to the main air passage 6 to a value necessary for proper combustion conditions, the limiting position being that shown in dot-and-dash lines in Fig. 1, wherein the air supply is cut off from said main passage, 6. The supply of air to the spray tube 39, however, remains unaltered, so that the fuel is discharged from the burner into the furnace rather than permitted to drip in the space therebetween, as occurred when the burner in my prior patent was operated at such low capacity.

When it is desired to clean the burner, it is only necessary to loosen the bolts 21 and remove the upper casing parts 8 and 9, since these parts contain the sections of the burner that usually requires cleaning. Thus, it is not necessary in the cleaning of the burner to shut down the source of air supply or disturb the piping connected to the burner.

While I have shown only one embodiment of my invention, for the purpose of describing the same and illustrating its principles of construction and operation, it is apparent that various changes and modifications may be made therein without departing from the spirit of my invention and I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims or as are demanded by the prior art.

I claim:

1. A burner comprising a casing having a tubular extension, a closure plug positioned in said extension comprising a pair of spaced plate sections interconnected by arms, of which one is apertured to receive a fuel pipe, said plug being apertured to permit the passage therethrough of a spray tube, and a pipe extending from the chamber formed between the plate sections of said plug to a predetermined point on said casing.

2. A burner comprising a two-part casing, of which one part is provided with an air inlet opening and a control valve, the other

part being provided with an opening having a closure plug comprising inner and outer plate sections interconnected by apertured arms, said plate sections being also apertured, and a fuel supply pipe, a spray tube and a tie rod respectively extending through said apertures.

3. A burner comprising a two-part casing, of which one part is provided with an air inlet opening and a control valve, the other part being provided with an opening having a closure plug comprising inner and outer plate sections interconnected by apertured arms, said plate sections being also apertured, a fuel supply pipe, a spray tube and a tie rod respectively extending through said apertures, an outer portion of said plug being adapted to abut against the casing, the plate sections of said plug forming a chamber in communication with said spray tube, and a pipe extending between said chamber and such point on said casing as to receive a constant supply of air independently of the position of the control valve.

4. A burner comprising a two-part casing, of which one part is provided with an air inlet opening and a control valve, the other part being provided with an opening having a closure plug comprising inner and outer plate sections interconnected by apertured arms, said plate sections being also apertured, a fuel supply pipe, a spray tube and a tie rod respectively extending through said apertures, the plate sections of said plug forming a chamber in communication with said spray tube, and a pipe extending between said chamber and such point on said casing as to receive a constant supply of air independently of the position of the control valve, said last-mentioned pipe having a control valve.

GEORGE F. BEACH.