

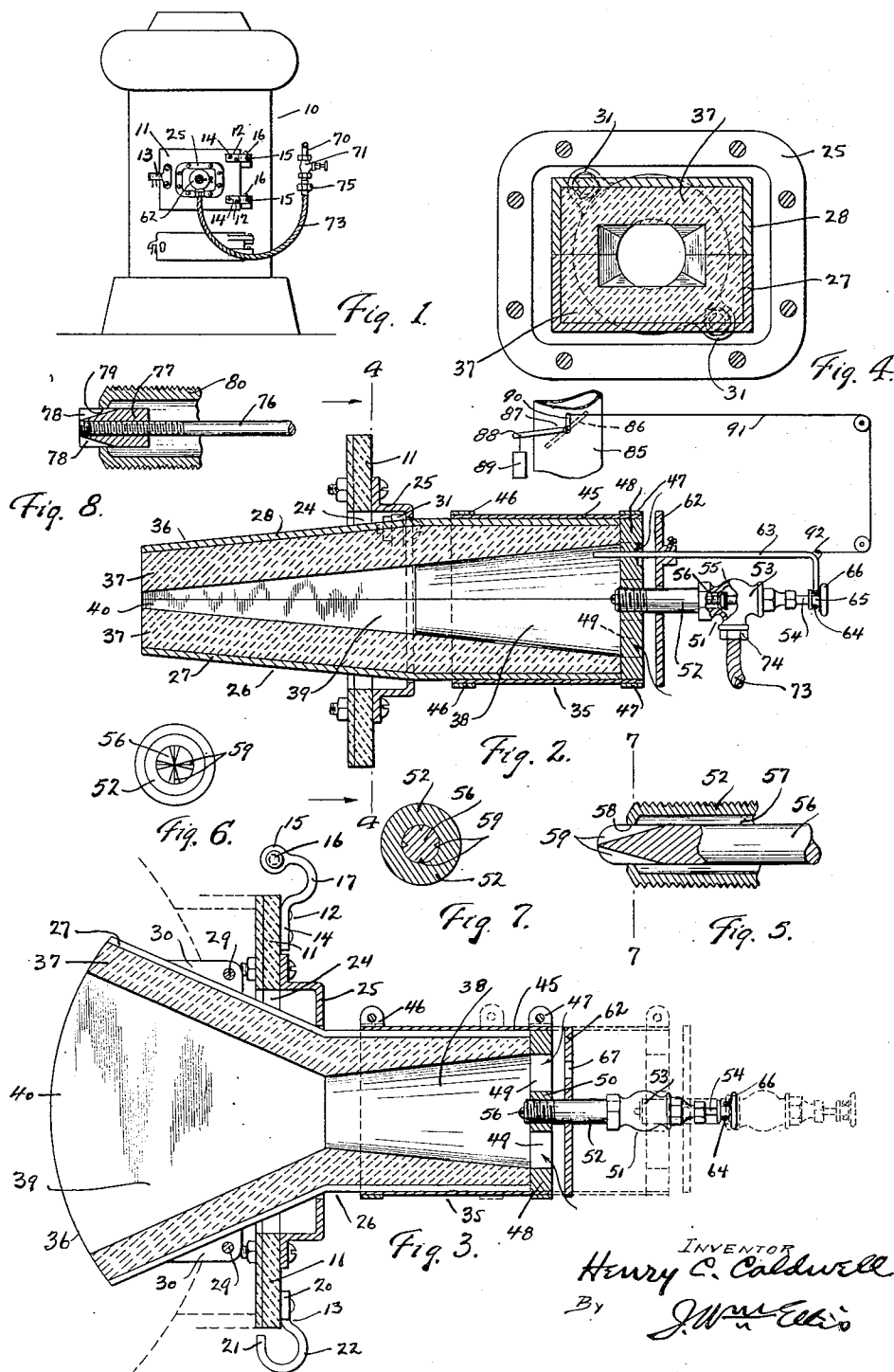
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HEATER

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HEATER

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My invention relates in general to gas heaters which may be used in many different ways, but for convenience in the drawing and following description, I have shown and described it as applied to the fuel door of a furnace, boiler, or other heating unit.

It is well known to those skilled in the art that on the chilly days of the spring and fall, or when the temperature does not warrant the building of a coal fire in the boiler or furnace, it is often necessary to have heat. Under these conditions, it is very desirable to have means which may be used to quickly and economically supply enough heat to take the chill out of the air.

The principal object of my invention has been to provide a gas heater which may be quickly attached to or detached from a furnace or boiler.

Another object has been to provide a heater which is carried by a door in such a manner that when the door is swung into position and closed, the burner will be in its operative position.

Another object has been to provide a heater which is designed with an adjustable combustion chamber, whereby the combustion chamber may be regulated in accordance with the desired burning capacity of the burner.

Another object has been to provide a heater having a control valve so designed that it breaks up the gas into a plurality of jets and controls the size of the jets at the orifices thereof.

Another object has been to so construct the device that the stack damper of the heating means may be regulated in accordance with the amount of gas being consumed.

Moreover, my device is provided with air regulating means which are operated by and in accordance with the gas regulating means.

Furthermore, my device is provided with a specially constructed combustion chamber having linings of sufficient thickness to prevent excessive radiation and to build up temperature within the chamber so that substantially complete combustion occurs within the chamber.

Moreover, my device is provided with an air control damper which closes the outer end of the combustion chamber when the heater is lighted, whereby the operator is shielded against possible backfiring and resulting injury.

The above objects and advantages have been accomplished by the device shown in the accompanying drawing, of which:

Fig. 1 is a front elevation of a boiler to which my device has been attached.

Fig. 2 is an enlarged, vertical, sectional view of my device.

Fig. 3 is a sectional plan view thereof.

Fig. 4 is a transverse, sectional elevation taken on line 4—4 of Fig. 2.

Fig. 5 is an enlarged fragmentary sectional view of the end of the control valve.

Fig. 6 is a front view thereof.

Fig. 7 is a sectional view of the end of the control valve taken on line 7—7 of Fig. 5.

Fig. 8 is a fragmentary, sectional view of a modified form of control valve.

As shown in Fig. 1 of the accompanying drawing, my invention is applied to a steam boiler, but obviously it may be used on a hot water boiler, a furnace, or any other heating device.

When my heater is to be attached to a heating device, the fire door of the heating device is preferably removed and the door 11 of my heater is fitted in place thereof. The door 11 is made preferably of some suitable asbestos board which is not only heat resisting, but strong enough to carry the heater. Such a rod is cut to the proper size, and hinges 12 and a door latch 13 are secured in proper places. Each of the hinges 12 is provided with a body portion 14 for securement to the door 11 and with an eye 15 for carrying suitable hinge pins 16. The body portion 14 and eye 15 of each of the hinges is connected by a curved portion 17. These curved portions are substantially semi-circular and provide means of adjustment so that the inner face of the door may be brought flush and in suitable contact with the face of the heating unit. Furthermore, if any inaccuracy occurs in the positioning of the hinges or latch on the door, they may be easily adjusted by bending. These hinges are made of any suitable malleable material so that, not only can the above adjustments be made, but one set of hinges is all that is required for various types of heating devices.

The latch 13 is provided with a body part 20 by which it is secured to the door 11. An operating end 21 is provided on the latch and this operating end is connected to the body part 20 by means of the curved portion 22. This curved portion is circular in shape, as shown, and permits adjustment of the latch in a manner similar to the adjustment above described in connection with the hinges.

The door 11 is provided with a central opening 24 over which is arranged a combustion unit holder 25. The combustor unit holder is preferably secured to the door by means of suitable bolts, as shown.

The combustion unit 26 of my device is preferably formed in halves 27 and 28 which may be secured together by means of bolts 29 which pass through lugs 30 formed on each half of the combustion unit. Each half of the combustion unit is provided with a lug 31 which bears against the inner face of the combustion unit holder 25 and through which a suitable bolt is passed whereby the assembled combustion unit is securely held in place by the holder. The outer end 35 of the combustion unit, or that portion which projects outwardly from the door, is preferably circular in form, while the inner end 36, or that end which is disposed within the heating device, is flared or fan-shaped, whereby the heat which is generated within the combustion unit is spread across the furnace. As shown in the drawing, each half of the combustion unit is provided with a refractory lining 37, thus forming the combustion chamber of my device. This lining is preferably so proportioned that the outer end 35 of the combustion unit is formed with a tapered chamber 38, the larger end of which is toward the outer end of the combustion unit. The lining at the inner end of the unit forms a chamber 39 which is fan-shaped, the outer end of which meets the inner and smaller end of the chamber 38. The chamber 39 is tapered down to a relatively narrow mouth 40 so as to insure complete combustion and to distribute the flame to the heating device.

Carried by the outer end 35 of the combustion unit is an extension tube 45 which is preferably of sheet metal, and is held in position by a clamp 46 at the inner end and a clamp 47 at the outer end. The outer end of this tube carries a valve holder 48 which is held in position by means of the clamp 47. This valve holder is disc-shaped and is provided with suitable apertures 49 for the passage of air, and with a centrally arranged screw-threaded boss 50. Carried by this screw-threaded boss is the valve 51 of my device. This valve comprises a control nipple 52 which is screw-threaded to the boss 50 at one end and which carries the valve body 53 at its other end. The valve body 53 is provided with the usual valve stem 54 and a shut-off valve 55 which is controlled thereby. Carried by the valve 55 is a control stem 56 which passes through and projects from the inner end of the nipple 52. The nipple is provided with an enlarged bore 57, and with a reduced outlet opening 58 at its extreme inner end. The outlet opening 58 is preferably of the same size as the control stem 56, so that the stem will be guided in its movement by the opening. The outer end of the stem is formed with a plurality of tapered flutes 59 which are tapered starting from the extreme end of the stem and terminating at the periphery thereof. It will be seen that because of these flutes, a plurality of orifices will be provided between the control stem and the outlet opening 58 of the nipple, which orifices will be regulated in size, due to the tapered formation of the flutes, by the relative movement of the stem in the opening.

An air shutter 62 is slidably mounted upon the control nipple 52 and controls the air openings 49 in the valve holder. A control rod 63 is carried by the shutter and has its inner end slidably supported by the valve holder 48. The outer end of the rod is bent at right angles and is provided at its extreme end with a ring 64. This ring is designed to engage a groove 65 formed on the control valve wheel 66, so that when the stem 54 of the valve is operated, its longitudinal movement will also produce longi-

tudinal movement of the control rod 63, and thus operate the air shutter. The air shutter is provided with a lighting hole 67. This hole is made relatively small, so that the operator is not exposed to any danger of possible explosion in the burner because of retarded lighting. The opening also provides a peep-hole through which the action of the burner may be seen.

In Fig. 1, I show a gas supply pipe 70 with a shut-off valve 71. A flexible metal hose 73 is used to conduct gas from the supply pipe 70 to the valve 53 of my heater, whereby the door 11 may be swung upon its hinges without the necessity of disturbing any of the connections. One end of the flexible hose 73 is connected to the valve body by means of a coupling 74, and the other end is connected to the shut-off valve 71, preferably by means of a union connection 75. By means of these connections, should it be desired to remove the heater, the flexible hose 73 may be easily and quickly detached from the gas supply pipe 70 at the union connection 75.

In the form of control valve shown in Fig. 8, the control stem 76 is screw-threaded at its outer end, and a control pilot 77 is carried by this end. This provides means for adjusting the relation of the flutes 78 formed in the pilot with the outlet opening 79 of the nipple 80. After such adjustment, the pilot may be secured to the stem 76 by any suitable means.

In Fig. 2, I have shown, in a diagrammatic manner and on a reduced scale, a fragmentary portion of the stack 85 of the heating means with its damper 86. To the shaft of the damper I attach a bellcrank lever 87 to the arm 88 of which I fasten a weight 89 whereby the damper will be urged toward its open position. To the other arm 90 of the lever I attach a control cord 91, the other end of which is fastened to some suitable part of the control rod 63, as, for instance, a tab 92, made a part thereof. When the valve 51 is operated to increase the gas consumption, the damper 86 will be opened accordingly, and when the control rod 63 is moved inwardly when reducing the flow of gas, the damper will be moved toward its closed position, whereby substantially the proper amount of draft will be maintained in my heater irrespective of the amount of gas being used.

While my invention is suitable for use as an auxiliary device used simultaneously with solid fuels in the firebox of the heating device, yet in many cases it may be used to provide all of the heat desired from the heating device. When the gas consuming capacity of my device is to be increased, it is necessary to increase the size of the mixing and combustion chambers of the combustion unit, since the major portion of combustion must occur within the combustion unit before the flame passes out of the mouth 40 thereof to the fire box of the heating unit. Such adjustment is brought about by moving the extension tube 45, carrying the valve 51, backward, and is made by loosening the clamp on the extension tube, whereupon the tube may be withdrawn the desired amount, after which the clamp is again tightly fastened in place.

From the foregoing description it will be obvious that the gas being supplied to the heater is projected into the combustion chamber at the velocity which is produced by the gas pressure, since the control of the size of such jets is at the extreme outer end of the control valve. Furthermore, it is obvious that as the control valve is operated to increase the gas supplied to the

combustion chamber, the air shutter will be correspondingly opened, thus supplying the correct amount of additional air for the added amount of gas used.

5 Obviously, some modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims, and I do not, therefore, wish to be limited to the exact
10 embodiment herein shown and described, the form shown being merely a preferred embodiment thereof.

Having thus described my invention, what I claim is:

15 1. The combination with one of the openings of a heating device, of a supporting plate, adjustable hinges and latching means carried by the plate for securing the same in front of the opening for closing the same against the entrance of
20 air, and a gas heater carried by the supporting plate.

2. A heater comprising a plate adapted to be fitted to a heating device, a refractory combustion unit carried by and projecting through the plate,
25 an extension tube carried by the unit, a valve holder carried by the tube, a source of fuel supply, and a fuel control valve carried by and arranged in front of the holder.

3. A heater comprising a plate adapted to be fitted to a heating device, a refractory combustion unit carried by and projecting through the plate, a valve holder carried at the outer end
30 of the unit, a control valve carried by the holder, the control valve comprising a body, a control nipple carried by the body, a source of fuel supply and a fuel control stem mounted in the nipple and supported thereby.

4. A heater comprising a plate adapted to be fitted to a heating device, a refractory combustion chamber carried by and projecting through the plate and formed with a tapered portion
40 having its base at the outer end of the heater and with a flat flaring portion at its inner end, an extension tube carried by the chamber, a valve holder carried by and arranged in front of the tube, a source of fuel supply, a fuel control valve carried by the holder, and an air shutter slidably carried by the valve.

5. A heater comprising a refractory combustion chamber formed with a tapered portion at its inlet end and a flat, flaring portion at its inner end, a source of fuel supply, and a fuel control valve carried by and at the outer end
50 of the chamber.

55 6. A heater comprising a refractory combustion chamber formed with a tapered portion having its base at the outer end of the heater and a flat, flaring portion at its inner end, a source of fuel supply, and a fuel control valve carried by and at the outer end of the chamber.

tion chamber formed with a tapered portion having its base at the outer end of the heater and a flat, flaring portion at its inner end, a source of fuel supply, and a fuel control valve carried by and at the outer end of the chamber.

7. A heater comprising a plate adapted to be fitted to a heating device, a refractory combustion unit carried by and projecting through the plate and formed with a tapered portion having its base at the outer end of the heater and with a flat, flaring portion at its inner end, a source of fuel supply, and a fuel control valve carried at and by the outer end of the unit.

8. A heater comprising a plate adapted to be fitted to a heating device, a refractory combustion unit carried by and projecting through the plate, a valve holder carried at the outer end of the unit, a source of fuel supply, and a fuel control valve carried by and arranged in front of the holder, comprising a control stem formed with a plurality of tapered flutes at its outer end.

9. A heater comprising a refractory combustion chamber having a throat and a fan-shaped inner end beyond the throat, means for directing a combustible mixture into the chamber to produce a flame therein, the throat being so proportioned that the flame will substantially fill the same, whereby induction of air is produced in the chamber, and the velocity of the flame is first increased and then decreased in its passage through the heater.

10. A heater comprising a plate adapted to be fitted to a heating device, a refractory combustion unit carried by and projecting through the plate, a valve holder carried at the outer end of the unit, a shut-off valve carried by and arranged in front of the holder, a source of fuel supply, a fuel control valve operated by the shut-off valve, the control valve comprising a body, a control nipple carried by the body and connecting it to the holder, and a control stem mounted in the nipple and supported thereby.

11. A heater comprising a refractory combustion chamber formed with a frusto-conically shaped portion and a flaring portion extending therefrom, the frusto-conically shaped portion having its smaller diameter at the point of union with the flaring portion, the flaring portion having its sides tapering outwardly from the point of union and its top and bottom tapered inwardly from the same point, a source of fuel supply and a fuel control valve carried by and at the outer end of the unit.

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