Dec. 11, 1934. E. SCHMIDT 1,983,709

FUEL BURNER

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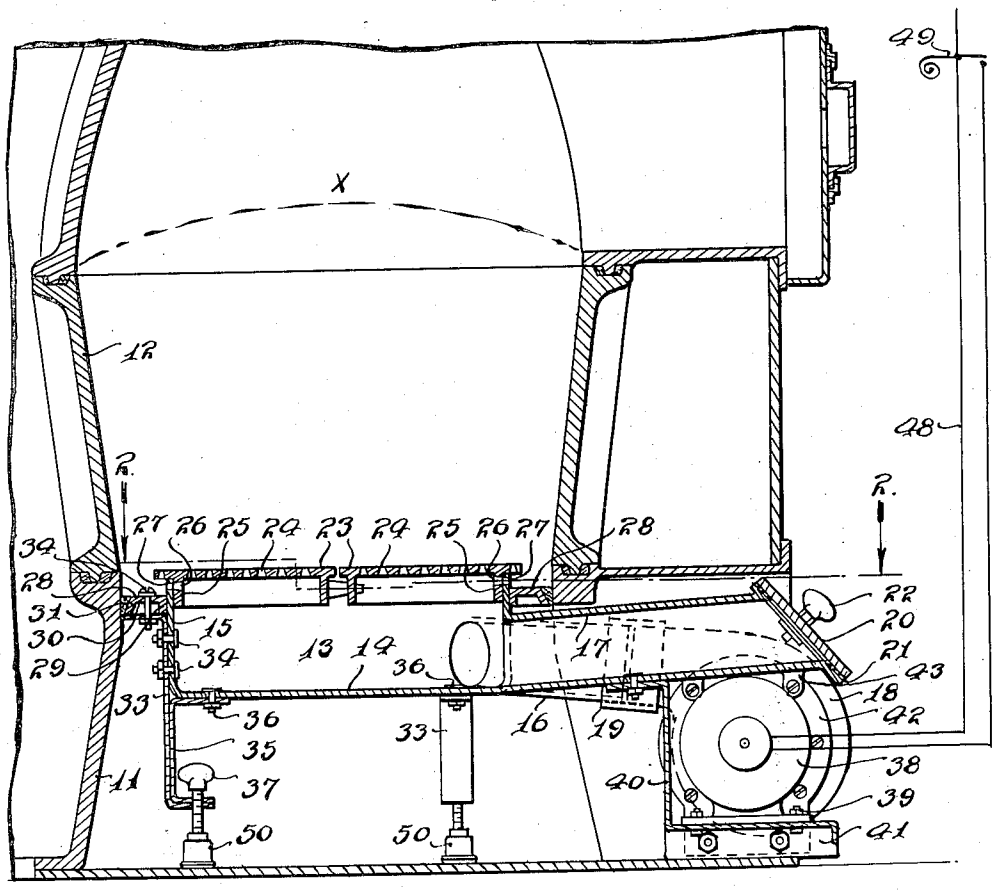


Fig. 1.

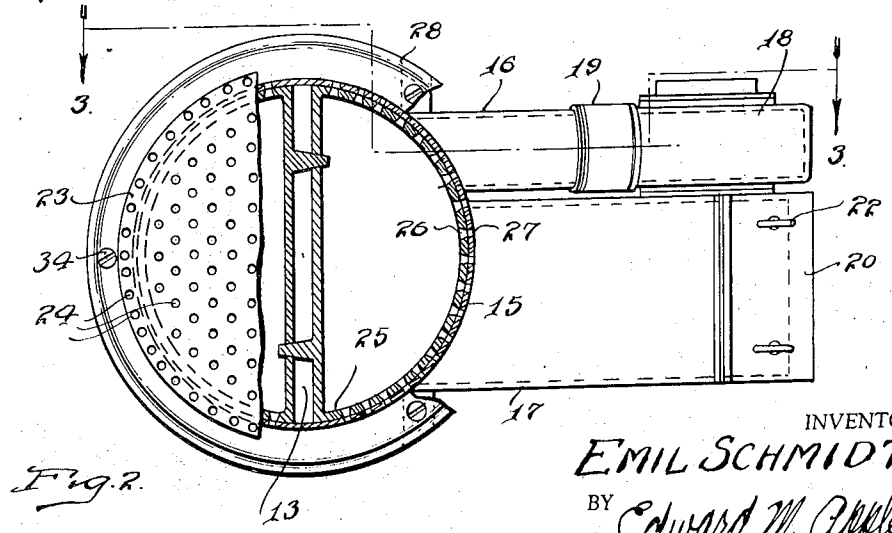


Fig. 2.

INVENTOR.
EMIL SCHMIDT.
BY Edward M. Apple
ATTORNEY.

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Fig. 3.

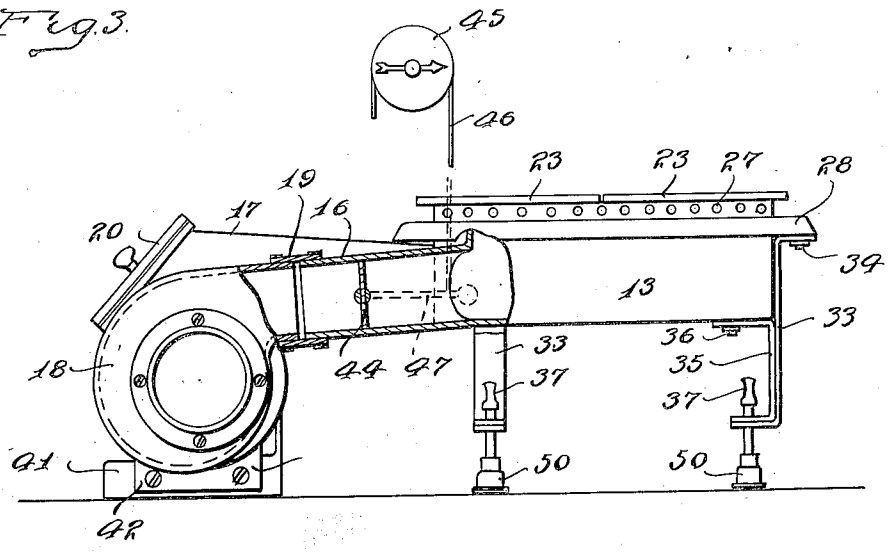


Fig. 4.

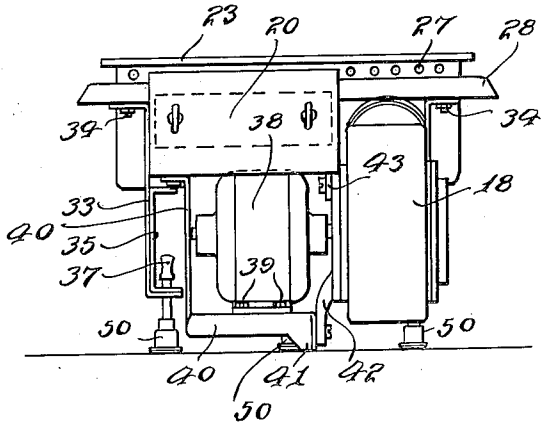
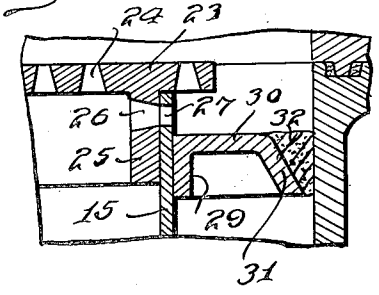


Fig. 5.



INVENTOR.
EMIL SCHMIDT.
BY Edward M. Apple
ATTORNEY.

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UNITED STATES PATENT OFFICE

1,983,709

FUEL BURNER

Emil Schmidt, Detroit, Mich., assignor to Air-O-Mat Burner Company, Detroit, Mich., a firm consisting of William H. Kirby, Ambrose Dolney, Rodney M. Beach, and Herman P. Ward

Application September 28, 1932, Serial No. 635,208

7 Claims. (Cl. 110—69)

This invention relates to heating equipment and has for its principal object the provision of a fuel burner which is simple to manufacture, easy to install, and economical to operate.

Another object of the invention is to provide a burner which is compact and readily adaptable to an old or a new heating plant.

Another object of the invention is to provide a device which will efficiently burn the cheaper grades of coal and leave a minimum of residue.

Another object of the invention is to provide a coal burning device which automatically controls the elements of combustion to produce the maximum of efficiency.

Another object of the invention is to provide a device which will automatically produce a constant, regular and even flow of heat.

Another object of the invention is to provide an automatic coal burning device which can be operated in congested areas without polluting the air with unburned gases, smoke and soot.

The foregoing and other objects of the invention will be understood more readily by a careful examination of the following specification, reference being made to the accompanying drawings in which:

Fig. 1 is a vertical central sectional view of a warm air furnace showing the improved burner installed.

Fig. 2 is a top plan view of the burner, partly in section, taken on line 2—2 of Figure 1.

Fig. 3 is a side elevational view of the burner, partly in section, taken on line 3—3 of Figure 2.

Fig. 4 is a front elevational view of the burner.

Fig. 5 is an enlarged sectional view of a portion of the grate and sealing ring.

The use of coal in the production of heat, particularly the use of low grade bituminous coal, has many disadvantages, one of them being the difficulty of obtaining a comparatively even temperature. Another is the difficulty of eliminating the nuisance of smoke, and still a third is the inconvenience of making disposition of the ashes.

It is my claim that by using my improved burner the above mentioned disadvantages are overcome and other new and useful results are obtained, as hereinafter set forth.

Referring now to the drawings, Fig. 1 illustrates the invention as applied to a conventional warm air furnace having the usual ash pit 11 and fire pot 12. To carry out my invention, I provide a chamber 13 comprising a base 14 and side walls 15, which may be formed of cast iron or other fire proof material. Integral with the side walls 15 of the chamber 13 is formed an air in-take 16, preferably of annular cross section, and a clean-out tunnel 17, preferably of rectangular cross section, both of which communicate with the interior of the chamber 13. The air in-take 16 is connected to an air impeller such as a centrifugal fan 18 by means of a collar 19, preferably made of rubber or other shock absorbing material. Pivoted within the air intake 16 is a damper 44, which is manually operable by means of the pulley 45, the chain 46 and the lever 47. The clean-out tunnel 17 is closed at its outer end by a door 20 made air tight by means of a gasket 21 and secured by any suitable locking means 22.

Supported by and overhanging the side walls 15 of the chamber 13 is a set of grates, which consist substantially of a pair of plates 23 having a multiplicity of inverse counter-sunk holes 24 therethrough, and depending circumferential flanges 25, said flanges 25 being adapted to secure said plates 23 against lateral displacement. Extending through the arcuate sections of the depending flanges 25 is a multiplicity of transverse passage-ways 26 which are adapted to communicate with a multiplicity of holes 27 positioned in, and near the upper edge of, the side walls 15.

Circumferentially positioned about the exterior of the side walls 15 and immediately below the holes 27 and adapted to fill the intervening space between the walls 15 and the inside walls of the ash pit 11, is a sealing ring 28, consisting substantially of an inverted metal channel, having a straight inside wall 29, a flat top 30 and an angular outside wall 31. The straight wall 29 of the sealing ring 28 is machined to fit tightly against the exterior of the walls 15. The space between the angular side wall 31 of the ring 28 and the inside wall of the ash pit 11, is adapted to receive cement 32 or other substance that will prevent the leakage of air and gas past the sealing ring 28.

The sealing ring 28 is supported by brackets 33 positioned equally distant about the chamber 13, said brackets 33 being secured to the sealing ring 28 and the side walls 15 of the chamber 13 by means of bolts 34. Auxiliary brackets 35 are secured to the base 14 of the chamber 13 by means of bolts 36 and are adapted to cooperate with the brackets 33 to support the chamber 13. Wing headed bolts 37 extend through threaded holes in the feet of brackets 33 and 35 and are

adapted to change the elevation of the assembly. The lower ends of the wing headed bolts 37 are mounted in rubber cups 50 as a precaution against transmission of sound.

The centrifugal fan 18 is driven by an electric motor 38 which is secured by bolts 39 to, and supported by, the bracket 40, the upper end of which is bolted to the underside of the clean-out tunnel 17, and the lower end of which terminates in the angular foot 41. The fan 18 is mounted on the plate 42, the latter being bolted near its top to lugs 43 depending from the underside of the clean-out tunnel 17 and bolted at its bottom to the angular foot 41 of the bracket 40. The motor 38 is automatically operated through a circuit 48, in which is imposed a thermostatic switch 49 of any desired type.

My improved burner can be adapted to any round heating plant, whether new or old, by using the proper size sealing ring 28. Preparatory to use, I remove the original grates from the furnace and insert the assembled burner into the ash pit 11, after removing the ash pit door. After the burner is placed within the ash pit, it is elevated to the desired position by the wing headed bolts 37 and the sealing ring 28 is cemented to the walls of the ash pit 11. The motor 38 is then connected to the circuit 48 and the device is ready for operation.

In using this improved burner, I have found in practice that the best results are obtained by using finely pulverized coal or slack. It has also been found that better results are obtained by keeping the fire pot 12 filled to the level, indicated by the broken line X. It has been found that an air pressure of from one-quarter of a pound to three-quarters of a pound per square inch produces the best results, as such pressure will not drive the heat units and the unburned particles out through the flue. Inasmuch as the chamber 13 is sealed, except at its top, the incoming air is forced through the holes 24, 26 and 27, assuring an even distribution of air through every portion of the coal, resulting in a slow, but perfect, combustion. The temperatures thus created are of such intensity that practically all of the fuel is consumed, without smoke, within the fire pot, leaving a minimum residue of fly ash which sifts through the grates into the chamber 13 and may be removed, from time to time, through the door 20 of the clean-out tunnel 17.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. A fuel burner for use within a furnace having a fire pot and ash pit, said burner comprising in combination, a hollow body portion having an outside periphery similar in contour to the inside periphery of said fire pot, grates supported by the walls of said body, a port in said body communicating with an air impeller, a second port in said body communicating with a horizontally disposed tunnel member, means carried on the outside of said body for effecting an air-seal between said body and the walls of said furnace, and adjustable legs for supporting the whole assembly.

2. A fuel burner, for use within a conventional furnace, comprising a hollow body portion having an outside periphery similar in contour to the inside periphery of said furnace, grates supported by said body portion, said grates having integral flanges depending adjacent the inner periphery of said body portion to secure said grates against lateral displacement, a peripheral sealing member carried on the outside of said body and adjustable means for supporting said body portion.

3. A fuel burner, for use within a conventional furnace, comprising a hollow body portion having an outside periphery similar in contour to the inside periphery of said furnace, a sealing member disposed about the outside periphery of said body portion near its top, a multiplicity of transverse openings extending through the walls of said body portion above said sealing member, a cover for said body comprising one or more plates having a multiplicity of vertically disposed inverted countersunk passage-ways there through, and adjustable means for supporting said body.

4. A fuel burner, for use within a conventional furnace, comprising a hollow body portion having an outside periphery similar in contour to the inside periphery of said furnace, an opening in said body portion communicating with a horizontally disposed tunnel member, means on said tunnel member for supporting said air impeller, and adjustable means for supporting said body.

5. In a fuel burner of the character described, for use within the ash pit of a conventional furnace, in combination, a body portion having a contour similar to the inside contour of said furnace, depending adjustable legs on said body, a peripheral sealing member carried by said body portion, said sealing member comprising an inverted channel having a straight side, a flat top and an angular side, said angular side cooperating with the inside wall of said furnace to form a gutter for the introduction of cement or like material.

6. In a fuel burner of the character described, for use within the ash pit of a conventional furnace, in combination, a hollow body member having depending adjustable feet, a sealing member positioned about the outside of said body portion near its top, a multiplicity of transverse passage-ways extending through said body portion above said sealing member, cover plates for said body portion, said cover plates having a multiplicity of vertically disposed inverted countersunk passage-ways there through, an air intake in said body portion and a horizontally disposed tunnel member extending from said body portion to the exterior of said furnace.

7. In a fuel burner of the character described, for use within the ash pit of a conventional furnace, in combination, a body member having vertically adjustable depending supporting means thereon, a circumferentially disposed sealing member carried by said body near the top, a multiplicity of transverse pasage-ways extending through the walls of said body above said sealing member, an air intake for said body member, a horizontally disposed tunnel extending from said body member to the exterior of said furnace, and cover plates for said body member, said cover plates serving both as grates and as baffles to direct air through said horizontally disposed passage-ways and over said sealing member.

EMIL SCHMIDT.