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C. H. OAKES

1,957,902

FORCED DRAFT FURNACE

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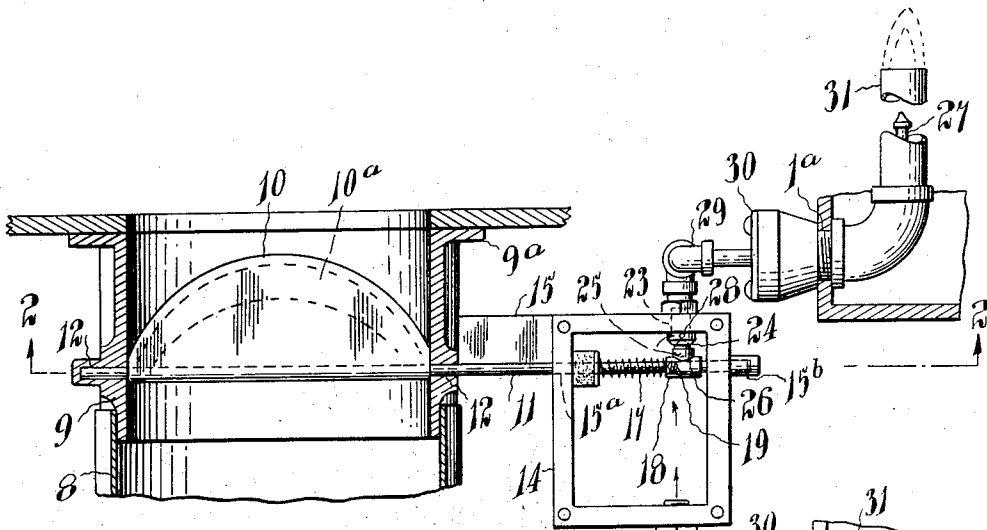


Fig. 1.

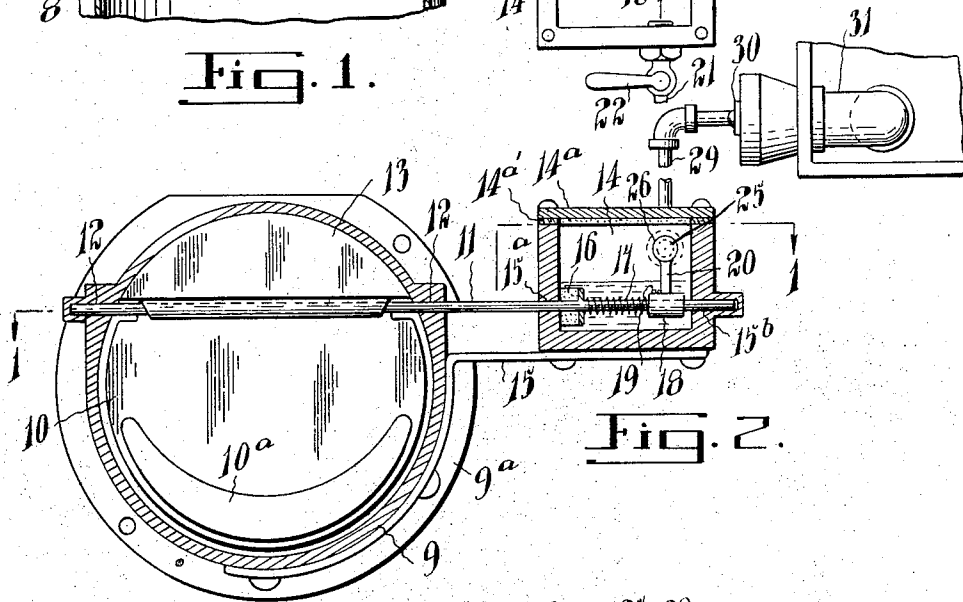


Fig. 2.

Fig. 3.

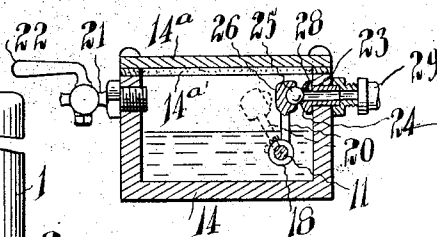
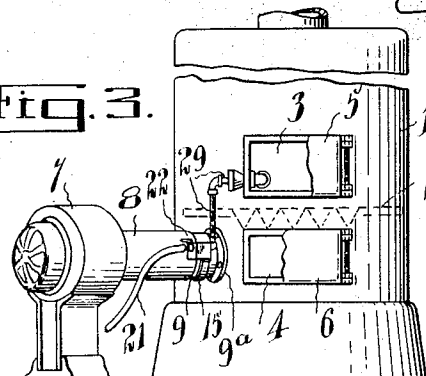


Fig. 4.

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FORCED DRAFT FURNACE

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In Canada October 15, 1932

8 Claims. (Cl. 110—22)

This invention relates to forced draft furnaces, and the object of my invention is to prevent explosions of unburned gases in the furnace, and to burn, and thus utilize for heating purposes, gases which form in the fire box owing to the incomplete combustion of the fuel and which ordinarily escape up the chimney.

I attain my objects by providing a gas burner in the fire box above the fuel and by providing means regulable by the forced draft for increasing the supply of gas to the burner.

My invention is hereinafter more particularly described and is illustrated in the accompanying drawing in which

Fig. 1 is a diagrammatic plan view showing the casting in section and the top of the gas chamber removed;

Fig. 2 a vertical section on the line 2—2 in Fig. 1;

Fig. 3 a side elevation of a furnace, partly broken away showing my device attached thereto; and

Fig. 4 a vertical longitudinal section of the gas chamber.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

1 illustrates a coal furnace of ordinary construction provided with a grate 2 which is illustrated in dotted lines in Fig. 3, and a fire box 3 above the grate and an ashpit 4 beneath it. The furnace is provided with the usual coal door 5, and ashpit door 6.

The furnace 1 is provided with a forced draft installation or blower. The blower proper 7 is located on the floor adjacent the furnace and is provided with a pipe 8 for directing the forced draft into the ashpit of the furnace. This pipe 8 slips over the mouth of, and is connected to, a cylindrical casting 9 provided with a flange 9^a which is bolted to the outside of the fire box 3 of the furnace 1. An aperture cut in the side of the furnace provides a communication between the cylindrical casting 9 and the ashpit.

A swinging damper 10 is hung from a rotatable shaft 11 which is mounted in bearings 12 in the said casting 9. The segment above the shaft 11 in the interior of the casting is closed by a partition 13. The damper 10 closes the segment of the casting 9 beneath the shaft 11 with the exception of a slight space between the edge of the damper and the interior of the casting. The damper 10 is provided with a vane 10^a extending out adjacent the bottom thereof. This vane tends to catch draft from the blower and assists in swing-

ing the damper 10 up and maintaining it in the raised position by means of the draft from the blower.

A gas receiving chamber 14 is supported by means of a bracket 15 secured to the casting 9. The shaft 11 extends through the wall of the casting 9 and through the chamber 14, being rotatable in bearings 15^a and 15^b in opposite walls of the chamber 14. The bearing 15^b includes a cap which extends around the end of the shaft 11 forming a gas-tight closure. A packing ring 16 is mounted on the shaft 11 adjacent the bearing 15^a and a spring 17 is mounted on the said shaft 11 and engages the packing ring 16 forcing it into contact with the bearing 15^a to form a leak-proof packing. The other end of the spring 17 engages a collar 18 on the shaft 11. This collar 18 is maintained in position on the shaft 11 by means of a set screw 19, and is provided with an arm 20 which normally extends substantially vertically from the shaft 11.

A cover 14^a is adapted to be bolted to the top of the chamber 14 and is provided with a gasket 14^{a'}. To prevent the leakage of gas through the wall of the chamber 14 at the point of entrance of the shaft 11, the chamber is filled with oil to a point above the bearings 15^a of the shaft 11.

Gas is led to the chamber 14 through a pipe 21 in which is a manual control valve 22. This pipe 21 extends through one wall of the chamber 14. Gas is led out of the chamber 14 through a pipe 23 which extends through the opposite wall of said chamber 14. The inner end of the pipe 23 extends into the chamber and is narrowed to form a valve seat 24 for the ball valve 25, which is mounted in a socket 26 on the rocker arm 20.

When the rocker arm 20 is in its normal substantially vertical position the valve is closed. To supply gas to the burner 27 a pin hole by-pass 28 is bored in the pipe 23 between the valve seat 24 and the wall of the chamber. This permits a small continuous flow of gas to the burner 27 to provide a continuously burning pilot light. When the blower starts to operate, the draft swings the swinging damper 10 inwardly and upwardly, causing the shaft 11 to rotate and the valve 25 to be withdrawn as illustrated in Fig. 4 in dotted lines. This permits a large supply of gas to flow through the gas line forming a large flame in the burner 27.

The gas is carried from the pipe 23 to the burner through a series of pipes 29. The burner extends into the fire box through an aperture 1^a in the furnace 1 adjacent the coal door 5, and the burner is directed inwardly over the coal.

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The burner 27 is provided with a guard 31 surrounding the burner and the gas line from a point beyond the end of the burner tip to a point outside the fire box. This guard is in the form of a pipe which is open at each end and permits the circulation of air from outside the fire box to the burner. The guard is supported on the burner and gas line, and spaced therefrom, by suitable supporting brackets 30. Thus the burner is constantly supplied with fresh air, and is shielded from draft or currents of air which would be likely to extinguish it.

What I claim as my invention is:

1. In a solid fuel furnace including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a burner in the fire box above the grate; and means operable by the draft for regulating the burner flame.

2. In a solid fuel furnace, including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a gas burner in the fire box above the grate; and means operable by the draft for regulating the flow of gas to the burner.

3. In a solid fuel furnace, including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a gas burner in the fire box above the grate; a gas line leading to the burner; a swinging damper adapted to be swung by the draft when the forced draft inducing means are in operation; and a valve in the gas line operable by the damper to regulate the flow of gas to the burner.

4. In a solid fuel furnace, including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a gas burner in the fire box above the grate; a gas line leading to the burner; and a rocker arm valve in the gas line; and means operable by the draft to actuate the valve for regulating the flow of gas to the burner.

5. In a solid fuel furnace, including a fire box and a grate, the combination of means for in-

ducing a forced draft through the grate; a gas burner in the fire box above the grate; a gas line leading to the burner; a rotatable shaft; a damper hung from the shaft and adapted to be swung by the draft when the forced draft inducing means are in operation; and a rocker arm valve in the gas line mounted on said rotatable shaft.

6. In a solid fuel furnace, including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a swinging damper adapted to be swung by the forced draft; a gas burner in the fire box; a gas line leading to the burner; a valve in the gas line operable by the damper; and a by-pass permitting a continuous flow of gas past the valve to the burner.

7. In a furnace, including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a gas burner in the fire box above the grate; a gas line leading to the burner; a gas chamber in the gas line; a shaft extending into said chamber and rotatable in bearings in the sides of said chamber; means operable by the forced draft to rotate said shaft; a rocker arm valve in said gas line mounted on said rotatable shaft in said chamber; and a liquid in said chamber extending above the said bearings of the shaft to prevent the escape of gas from the chamber.

8. In a furnace, including a fire box and a grate, the combination of means for inducing a forced draft through the grate; a gas burner in the fire box above the grate; a gas line leading to the burner from outside the fire box; a guard for said burner comprising a pipe surrounding the burner and the gas line from a point beyond the end of the burner tip to a point outside the fire box, said pipe being open at each end to permit circulation of air from outside the fire box to the burner; and means operable by the draft for regulating the flow of gas to the burner.

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