No. 894,393. PATENTED JULY 28, 1908.

E. RANKIN.

CRUCIBLE FURNACE.

APPLICATION FILED SEPT. 24, 1907.

Fig. 1.

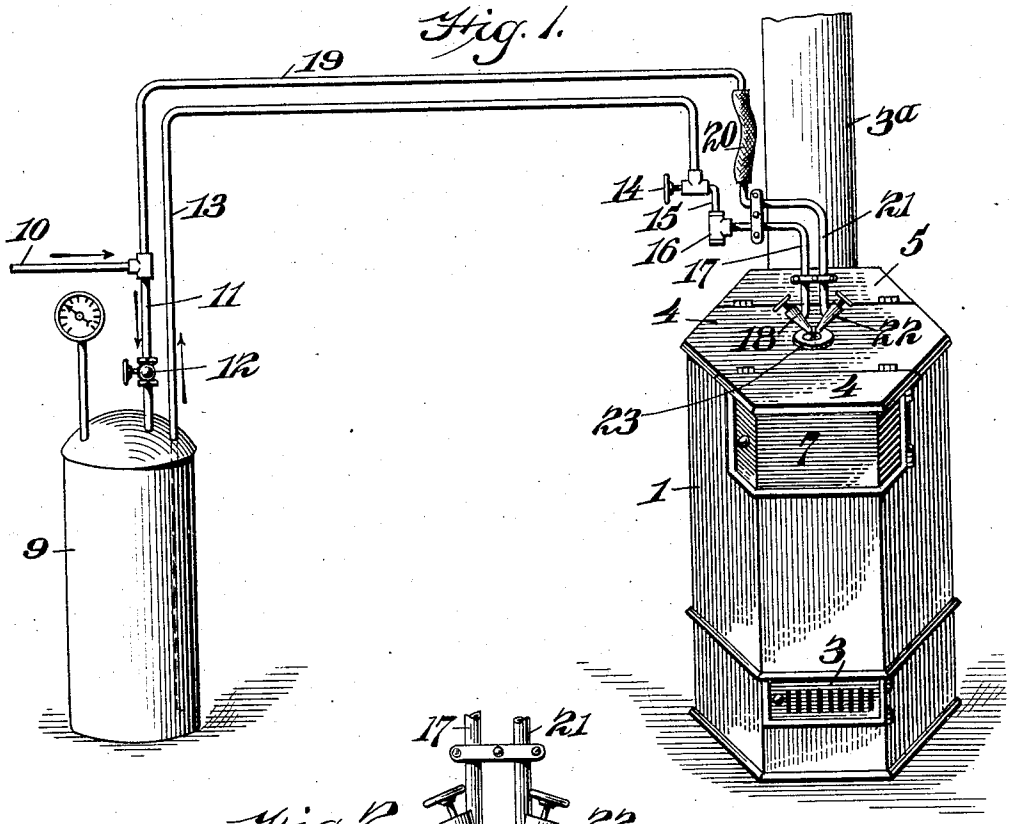
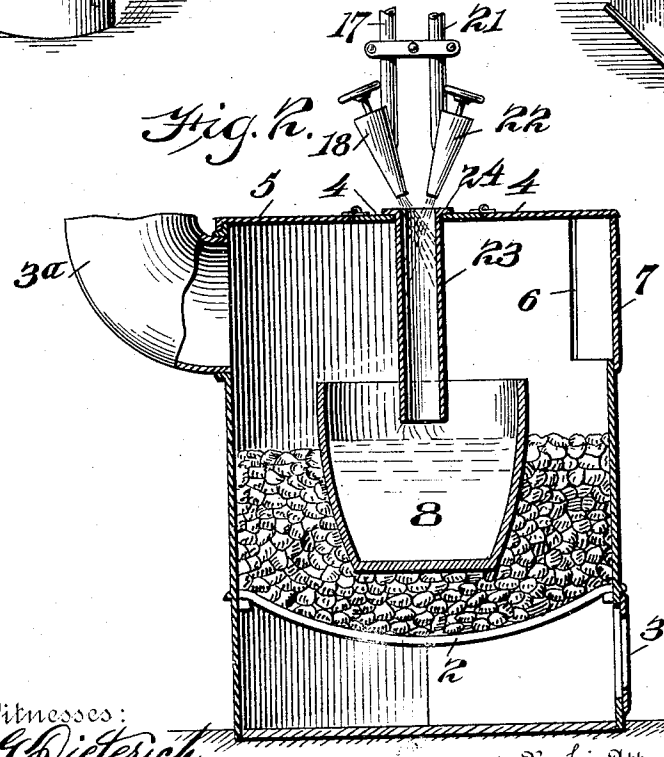


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE

EDMUND RANKIN, OF LINCOLN, ILLINOIS.

CRUCIBLE-FURNACE.

No. 894,393. Specification of Letters Patent. Patented July 28, 1908.

Application filed September 24, 1907. Serial No. 394,352.

To all whom it may concern:

Be it known that I, EDMUND RANKIN, a citizen of the United States, residing at Lincoln, county of Logan, State of Illinois, have invented certain new and useful Improvements in Crucible-Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a perspective view of the furnace and the means for supplying to the furnace compressed air and gasolene; and Fig. 2 a vertical sectional view thereof.

In crucible furnaces as now manufactured and used the melting pot is partly embedded in a coke fire in a closed furnace. In this construction of furnace the heat is entirely outside of the melting pot and works gradually inward through the melting pot and its contents. This renders the operation of these furnaces very slow and the melting pots are soon destroyed; and necessarily a good deal of fuel is consumed.

It is the object of my present invention to avoid these difficulties in this form of crucible furnaces and to provide a furnace which will require less fuel and in which the metal may be quickly reduced to a molten state.

Referring to the various parts by numerals, 1 designates a furnace which is preferably hexagonal in horizontal section and which is provided with a grate 2 and an ash and draft door 3. This furnace is provided with a two-part cover 4, the parts of which are hinged together and to the rear rigid part 5 of the furnace top. The furnace is provided at its forward upper edge with an opening 6, which is closed by a door 7. The purpose of this door and opening is to permit the melting pot to be readily placed in the furnace and removed therefrom. The grate 2 supports the coke fire and the melting pot 8 is partly embedded in said fire, as shown clearly in Fig. 2 of the drawing. The products of combustion pass out of the furnace through the flue 3^a.

To secure a rapid melting of the metal in the melting pot I provide a gasolene vapor flame. To this end I employ a pressure tank 9 into which air is pumped through pipes 10 and 11, pipe 11 being provided with a valve 12 to control the air within the tank. In this pressure tank is also placed gasolene and the air pressure is maintained on said gasolene. Connected to the pressure tank and extending near to the bottom thereof is a gasolene outlet pipe 13 which is extended to a point above the furnace and is provided with a controlling valve 14. Leading from this controlling valve is a short pipe 15 to the lower end of which is connected a swinging joint 16 carrying a short elbow pipe 17 which terminates at a point directly over the center of the furnace. To the end of this pipe is secured a needle valve 18.

Connected to the pipe 10 is an air inlet pipe 19 which extends to a point above the furnace and near to the gasolene outlet pipe. Connected to this air pipe is a flexible pipe 20 whose lower end is connected to the rigid elbow section 21. To the lower end of the pipe 21 is connected a needle valve 22 which is arranged obliquely to the pipe. The needle valves 18 and 22 converge, whereby the spray of gasolene from one valve and the air from the other will cross each other and commingle a short distance below the cover of the furnace and directly over the melting pot. By providing the swinging joint 16 and the flexible connection 20 in the air supply pipe, the needle valves may be swung horizontally to one side of the furnace to permit the cover to be lifted and the melting pot removed.

In the middle of the cover of the furnace is formed an opening through which is extended a burner tube 23 provided at its upper end with a flange 24. This flange rests on the upper surface of the furnace top and supports the tube in position. This burner tube is of such length that its lower end extends a suitable distance down in the melting pot so that the mixed air and gasolene may be burned within said pot and close to or in contact with the metal therein.

The air may be forced directly from the air supply through pipes 10, 19, 20 and 21 to the needle valve 22, and the valve 12 maintained closed; or if desired, the air from the tank 9 may be permitted to pass back through pipe 19. I prefer, however, to supply the air to the burner independently of the gasolene tank as by so doing the gasolene is maintained under a substantially uniform pressure.

By projecting the burner into the melting pot the greatest heat is secured at the point where it is most necessary. The heat from the coke fire will maintain the fluid in a molten state, but it is not so intense as the gasolene vapor flame and requires considerably more time to reduce the metal to its

molten state. It will be readily appreciated that the supply of gasolene and air to the burner tube may be cut off the instant the metal is melted.

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

1. A crucible furnace comprising a furnace proper, a crucible therein and means surrounding the crucible for heating it exteriorly, a burner tube depending into said crucible whereby the flame will be directed directly against the material in the crucible, and means for supplying gaseous fuel under pressure to said burner tube.

2. A crucible furnace comprising a furnace proper, means therein to support a coke fire, a melting pot adapted to be partly embedded in said coke fire, a burner tube extending down into said melting pot, a pair of needle valves discharging into said burner tube, and means for delivering air under pressure to one of said needle valves and gasolene under pressure to the other of said valves.

3. A crucible furnace comprising a furnace proper having a grate, a draft door, and a flue, a melting pot adapted to be supported therein, a removable burner tube extending through the top of said furnace, and means for delivering air and gasolene under pressure into the top of said burner tube, and the inner end of said tube extending down in the furnace and adapted to enter the melting pot.

4. A crucible furnace comprising a furnace proper having a grate, a draft door, and a flue, a melting pot adapted to be supported therein, a removable burner tube extending through the top of said furnace, a pair of needle valves above said burner tube and arranged in converging relation and adapted to discharge into said burner tube whereby the air and gasolene will commingle within said tube and will be discharged from the bottom thereof, and means for delivering gasolene and air under pressure to said needle valves.

5. A crucible furnace comprising a furnace proper having a grate, a draft door, and a flue, a hinged sectional top, a flanged burner tube supported by the top and extending vertically down into the furnace, a pair of oppositely inclined needle valves discharging into said tube, a gasolene supply pipe carrying one of said valves, an air supply pipe carrying the other valve, means for supplying air and gasolene under pressure to said pipes, and a swivel device for supporting said pipes, whereby the valves may be swung to one side of the furnace to permit the top to be opened.

6. In combination with a furnace proper having a hinged top, a melting pot and means for heating it exteriorly, a burner tube suspended on the top and depending into the melting pot, a pair of valves for injecting gaseous fuel into the upper open end of said tube, pipes connected to said valves for supplying the combustibles, these pipes being jointed to permit them to be swung out of the way of the hinged top when the same is opened.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 14th day of September 1907.

EDMUND RANKIN.

Witnesses:
ROBERT HUMPHREY,
A. L. ANDERSON.