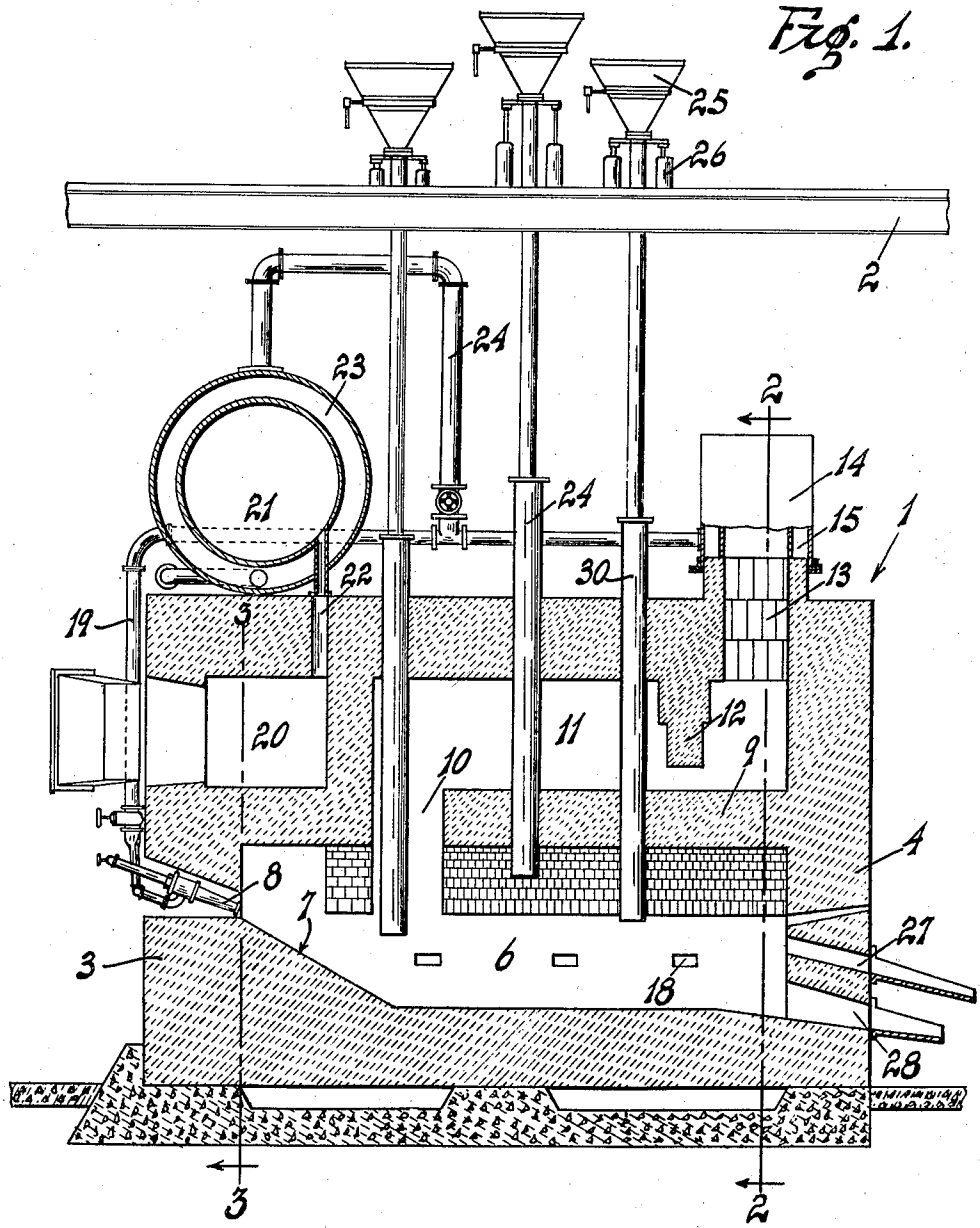
Oct. 6, 1936. J. ANSON 2,056,499

ORE SMELTING AND CONVERTING FURNACE

Filed June 22, 1936 3 Sheets-Sheet 1

Fig. 1.



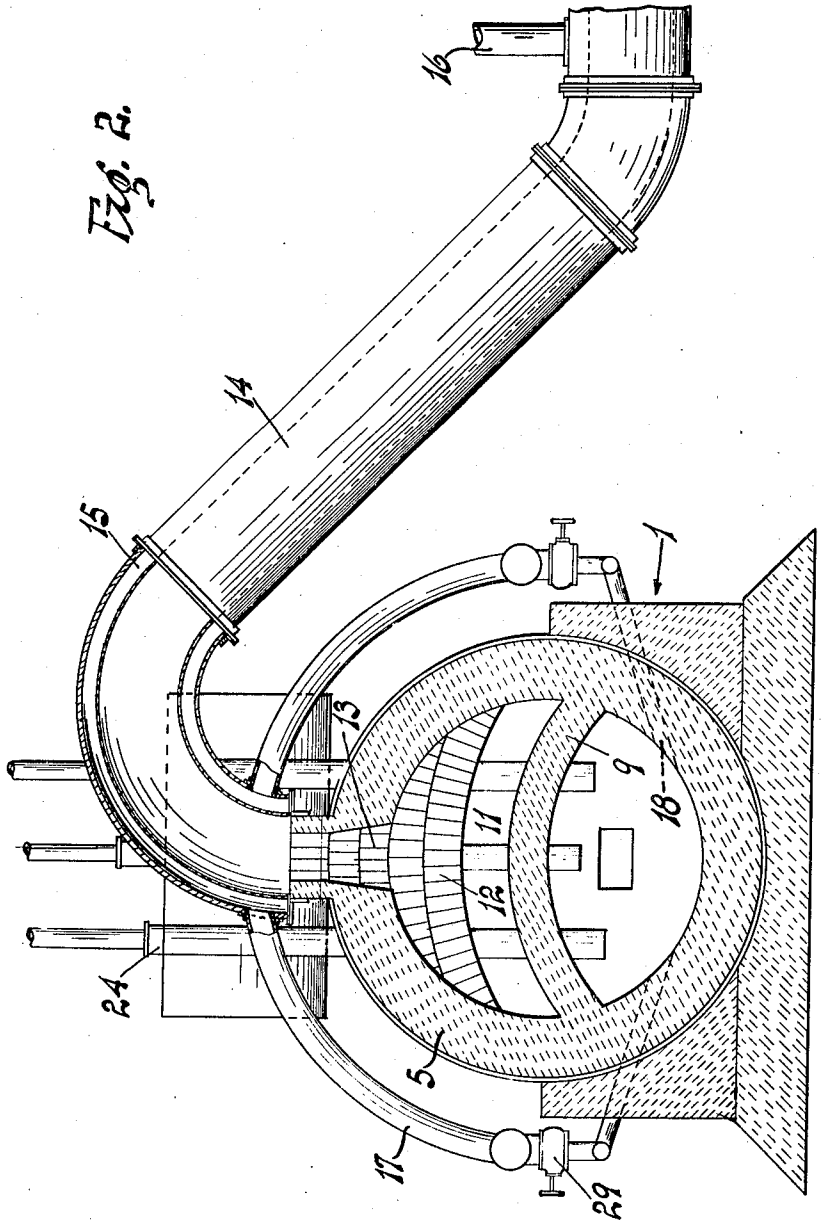
INVENTOR.
JOHN ANSON.
BY
K. A. Duckman
ATTORNEY.

Oct. 6, 1936. J. ANSON 2,056,499

ORE SMELTING AND CONVERTING FURNACE

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Fig. 2.



INVENTOR.
JOHN ANSON.
BY.
L. A. Duckman
ATTORNEY.

Oct. 6, 1936. J. ANSON 2,056,499

ORE SMELTING AND CONVERTING FURNACE

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Fig. 5.

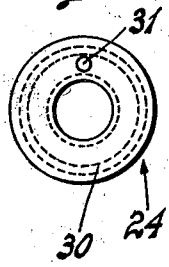


Fig. 4.

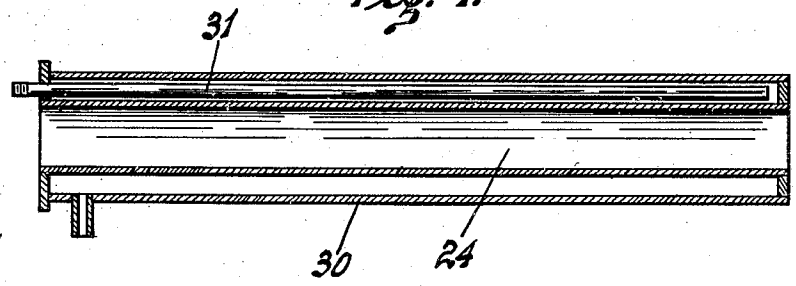
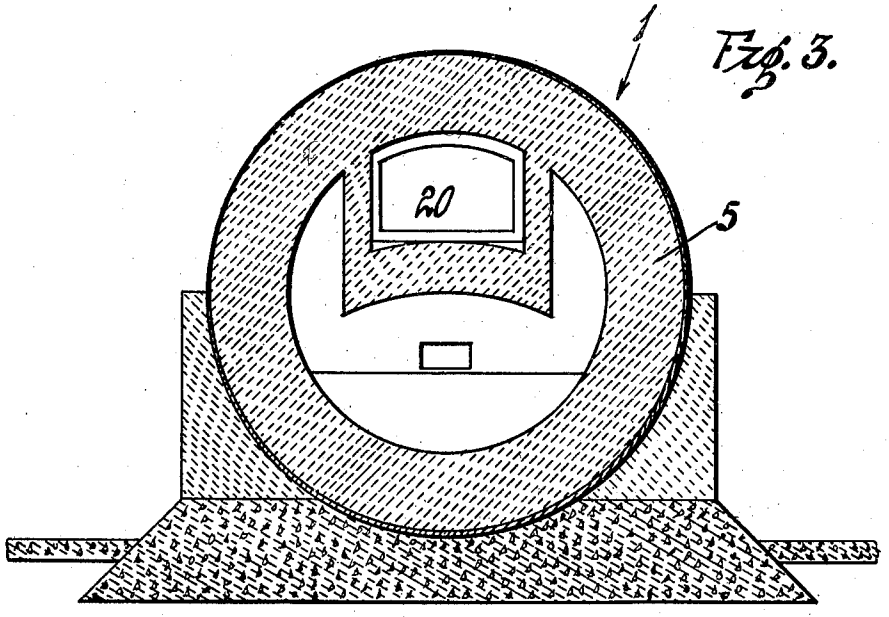


Fig. 3.



INVENTOR.
JOHN ANSON.
BY
H. A. Duckman
ATTORNEY.

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UNITED STATES PATENT OFFICE

2,056,499

ORE SMELTING AND CONVERTING FURNACE

John Anson, San Pedro, Calif.

Application June 22, 1936, Serial No. 86,633

12 Claims. (Cl. 266—33)

This invention relates to a novel ore smelting and converting furnace, including a novel arch construction within the furnace whereby high temperatures are obtained for the purpose of smelting ores.

Another object is to provide a furnace of the character stated which is efficient and effective in operation.

Still another object is to provide a furnace including a novel means of feeding the ore onto the bed in the furnace.

A further object is to provide a novel means of preheating air and introducing the heated air into the furnace, thereby increasing the heat efficiency of the furnace.

A feature of my invention resides in the novel means of adjusting the height of the ore bed to satisfy varying conditions.

Another feature of my invention is to provide a dust muffle in combination with the furnace, said muffle being heated by the gases in the furnace.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description, and the appended claims.

In the drawings:

Figure 1 is a longitudinal sectional view of my furnace.

Figure 2 is a transverse sectional view taken on line 2—2 of Fig. 1.

Figure 3 is a transverse sectional view taken on line 3—3 of Fig. 1.

Figure 4 is a longitudinal sectional view of one of the water cooled or feed pipes.

Figure 5 is an end view of the same.

Referring more particularly to the drawings, my furnace 1 is positioned substantially at the ground level, and a suitable housing (not shown) is erected around the furnace. The housing includes a charging floor 2 above the furnace, from which the ore is charged into the furnace, as will be further described.

The walls of the furnace are constructed of suitable material such as a refractory brick and I have found that magnesite fire brick is very effective to line the inside of the furnace and the outlet duct therefrom.

The furnace includes a front wall 3, a rear wall 4 and side walls 5. The ore chamber 6 in the furnace is formed with an inclined wall 7 adjacent the front end thereof. This wall is inclined downwardly and rearwardly for the purpose of deflecting the flame from the oil burner 8 in a downward and rearward direction. It will be noted from Fig. 1 that the burner 8 is also inclined downwardly and rearwardly thru the front wall 3 of the furnace. The oil is atomized in the burner either by steam or compressed air, the compressed air means of atomizing being shown, and subsequently described.

An arch 9 extends forwardly from the rear wall of the furnace, leaving a gas outlet space 10 from the ore chamber 6 into the exhaust chamber 11. A baffle wall 12 is provided adjacent the rear end of the exhaust chamber 11. This baffle wall constricts the outflow of hot gases and causes these gases to impinge upon the top wall of the arch 9 and by conduction the heat is transmitted thru the arch and then radiated onto the top of the ore pile. This materially increases the heat within the ore chamber 6. The outlet duct 13 of the furnace extends into the flue 14.

The flue 14 is surrounded with the hot air jacket 15 and this jacket is supplied with air under pressure thru the pipe 16 from a blower or pump (not shown). The manifold pipes 17 carry the air from the jacket 15 to the tuyères 18. Thus, hot air is drawn from around the stack 14 and fed back into the ore chamber of the furnace thereby saving additional heat units.

A pipe 19 extends from the jacket 15 to the burner 8, thus carrying hot air into the burner for atomization purposes. A muffle 20 is built into the furnace at the front end thereof and above the ore chamber 6. The hot gases pass over the bottom, sides and back of the muffle, as will be evident from Figs. 1 and 3. A dust chamber 21 is mounted on top of the furnace and the duct 22 admits the gases and ore particles from the muffle to the dust chamber. The purpose of the muffle is to separate certain more volatile metals from the agglomerate mass which might be drawn from the furnace. Zinc and lead, for example, would pass into the dust chamber 21 and would thus be separated from the remainder of the metal. The dust chamber is also surrounded with an air jacket 23 which jacket is connected to the pipe 19 thru the pipe 24.

Ore is charged into the chamber 6 thru a plurality of pipes 24. These pipes extend upwardly thru the charging floor 2, and hoppers 25 enable ore to be spilled into these pipes 24 and thence into the furnace. The height of the ore body in the chamber 6 is controlled by the height of the pipes 24 above the floor of the ore chamber. These pipes can be moved vertically in the furnace by means of jacks, or the like, 26 on the charging floor 2. Thus, by raising or lowering the pipes 24, the depth of the ore body in the fur-

nace can be varied. If the ore body extends above the tuyères 18 and if air is being forced thru these tuyères, the upper part of the ore body being heated, will be agitated and oxidized. Thus, rock wool can be formed and collected from the slag hole 27. Metal is collected out of the hole 28 in the rear wall of the furnace.

The manifold 17 is provided with suitable valves 29 so that hot air can be admitted at will into the furnace. The portion of the ore charging pipes 24 within the furnace is preferably provided with a water jacket 30. Water extends into the jacket and adjacent the bottom thereof thru the water pipe 31. Ore is continuously fed into the furnace, the slag being drawn off at 27 while the ore is collected at 28.

Having described my invention, I claim:

1. An ore smelting and converting furnace having an ore chamber and an exhaust chamber, an arch separating the ore chamber from the exhaust chamber, an oil burner extending into the front end of the ore chamber, a slag outlet and an ore outlet extending from the ore chamber, a plurality of ore charging pipes extending vertically into the furnace and into the ore chamber, and means to vertically adjust said ore charging pipes.

2. An ore smelting and converting furnace having an ore chamber and an exhaust chamber, an arch separating the ore chamber from the exhaust chamber, an oil burner extending into the front end of the ore chamber, a slag outlet and an ore outlet extending from the ore chamber, a plurality of ore charging pipes extending vertically into the furnace and into the ore chamber, a stack extending from the furnace, a hot air jacket surrounding the stack, said ore chamber having tuyères extending into it, and manifolds extending from the hot air jacket to the tuyères.

3. An ore smelting and converting furnace having an ore chamber and an exhaust chamber, an arch separating the ore chamber from the exhaust chamber, an oil burner extending into the front end of the ore chamber, a slag outlet and an ore outlet extending from the ore chamber, a plurality of ore charging pipes extending vertically into the furnace and into the ore chamber, means to vertically adjust said ore charging pipes, a stack extending from the furnace, a hot air jacket surrounding the stack, said ore chamber having tuyères extending into it, and manifolds extending from the hot air jacket to the tuyères.

4. An ore smelting and converting furnace having an ore chamber and an exhaust chamber, an arch separating the ore chamber from the exhaust chamber, an oil burner extending into the front end of the ore chamber, a slag outlet and an ore outlet extending from the ore chamber, a plurality of ore charging pipes extending vertically into the furnace and into the ore chamber, a stack extending from the furnace, a hot air jacket surrounding the stack, said ore chamber having tuyères extending into it, manifolds extending from the hot air jacket to the tuyères, a muffle in the furnace above the ore chamber, a dust chamber above the muffle and connected thereto, said muffle being heated by the hot gases in the furnace.

5. An ore smelting and converting furnace having an ore chamber and an exhaust chamber, an arch separating the ore chamber from the exhaust chamber, an oil burner extending into the front end of the ore chamber, a slag outlet and an ore outlet extending from the ore chamber, a plurality of ore charging pipes extending vertically into the furnace and into the ore chamber, means to vertically adjust said ore charging pipes, a stack extending from the furnace, a hot air jacket surrounding the stack, said ore chamber having tuyères extending into it, manifolds extending from the hot air jacket to the tuyères, and a muffle in the furnace above the ore chamber, a dust chamber above the muffle and connected thereto, said muffle being heated by the hot gases in the furnace.

6. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, and means to vertically adjust the ore charging pipes.

7. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, means to vertically adjust the ore charging pipes, a water jacket surrounding the ore charging pipes and means to circulate water in the water jacket.

8. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, means to vertically adjust the ore charging pipes, a hot air jacket around the stack, said ore chamber having a plurality of tuyères therein, and manifolds extending from the hot air jacket to the tuyères.

9. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, means to vertically adjust the ore charging pipes, a water jacket surrounding the ore charging pipes, means to circulate water in the water jacket, a hot air jacket around the stack, said ore chamber having a plurality of tuyères therein, and manifolds extending from the hot air jacket to the tuyères.

10. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the

rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, means to vertically adjust the ore charging pipes, a muffle in the front end of the furnace above the ore chamber, and a dust chamber connected to the muffle, said dust chamber being mounted on the furnace.

11. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, means to vertically adjust the ore charging pipes, a water jacket surrounding the ore charging pipes and means to circulate water in the water jacket, a muffle in the front end of the furnace above the ore chamber, a dust chamber connected to the muffle, said dust chamber being mounted on the furnace.

12. An ore smelting and converting furnace having an ore chamber adjacent the bottom thereof, an exhaust chamber adjacent the top thereof, an arch separating the ore chamber and the exhaust chamber, a baffle wall adjacent the rear end of the exhaust chamber, a stack extending from the rear of the exhaust chamber, said ore chamber having a slag outlet and a metal outlet, a plurality of ore charging pipes extending vertically into the ore chamber, an oil burner extending into the ore chamber, means to vertically adjust the ore charging pipes, a water jacket surrounding the ore charging pipes, means to circulate water in the water jacket, a hot air jacket around the stack, said ore chamber having a plurality of tuyères therein, manifolds extending from the hot air jacket to the tuyères, a muffle in the front end of the furnace above the ore chamber and a dust chamber connected to the muffle, said dust chamber being mounted on the furnace.

JOHN ANSON.