(No Model.) 3 Sheets—Sheet 1.

S. T. & C. H. WELLMAN.

MELTING FURNACE.

No. 541,402. Patented June 18, 1895.

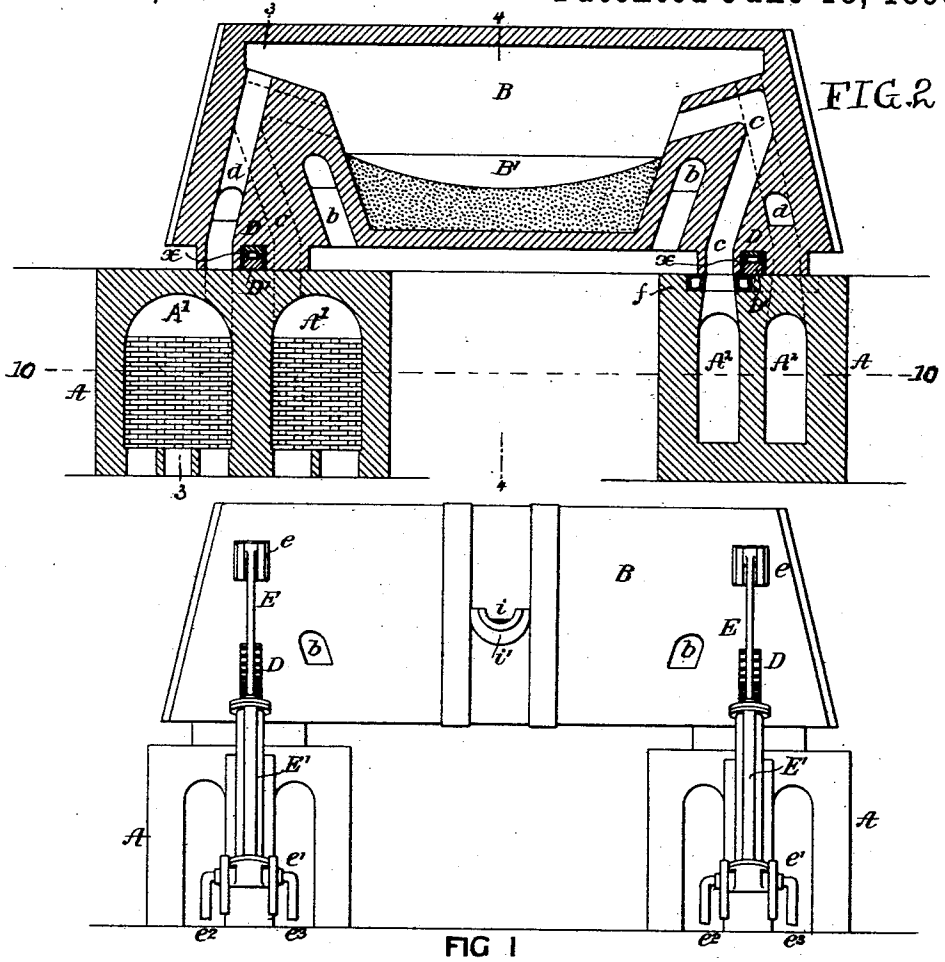

FIG. 2.

FIG 1

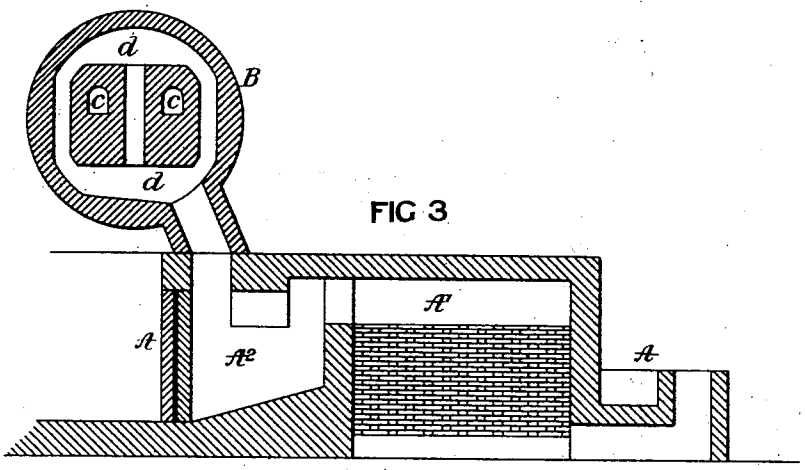

FIG 3

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FIG 5

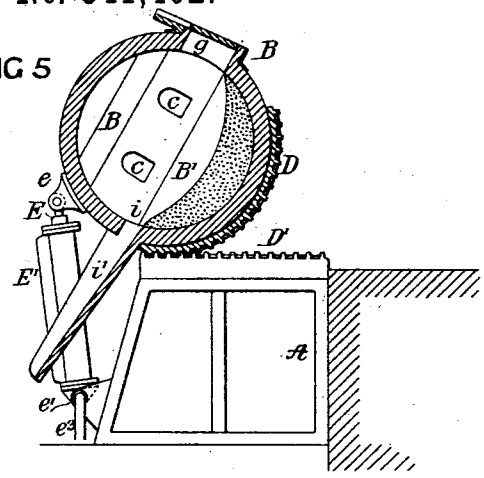

FIG 4

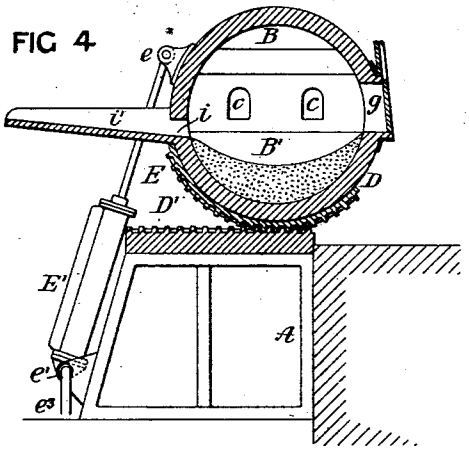

FIG 6

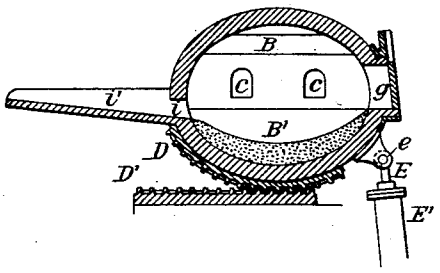

FIG 7

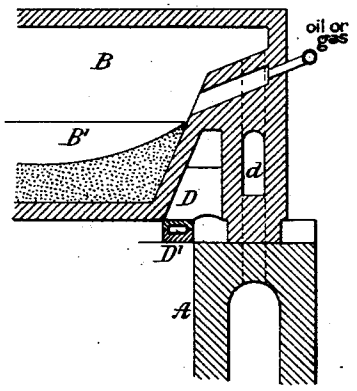

FIG 8

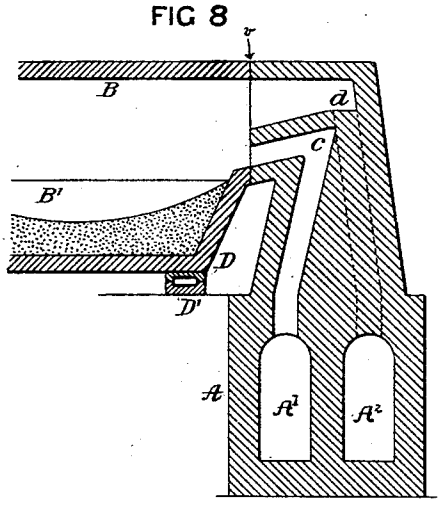

FIG 9

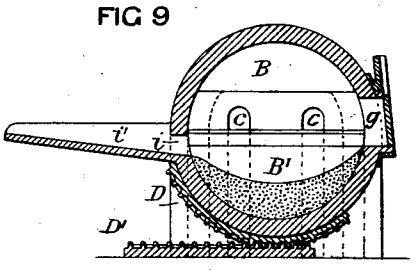

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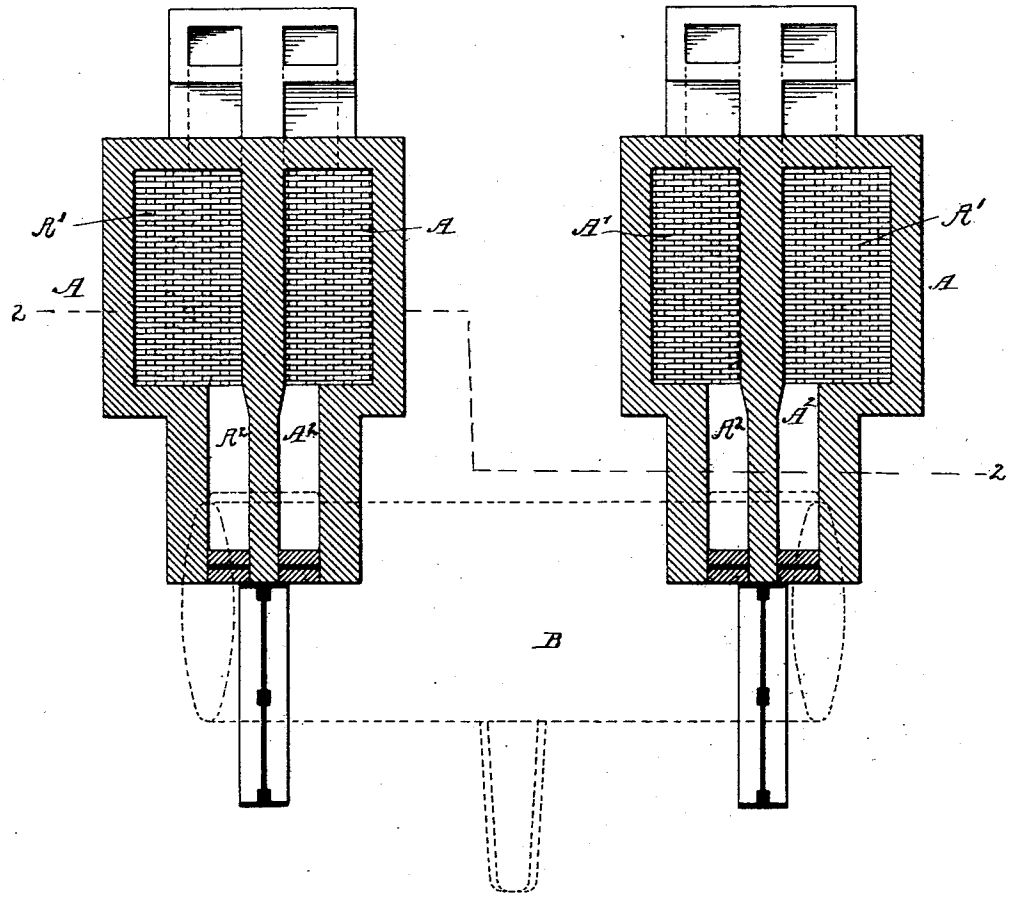
FIG. 10.



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UNITED STATES PATENT OFFICE.

SAMUEL T. WELLMAN AND CHARLES H. WELLMAN, OF UPLAND, PENNSYLVANIA.

MELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 541,402, dated June 18, 1895.

Application filed July 3, 1894. Serial No. 516,495. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL T. WELLMAN and CHARLES H. WELLMAN, citizens of the United States, and residents of Upland, Pennsylvania, have invented certain Improvements in Melting-Furnaces, of which the following is a specification.

The object of our invention is to construct a cylindrical melting furnace with the hearth of the furnace at the center and the gas and air openings at the ends.

A further object of our invention is to so arrange a furnace of this character that it can be rolled forward so as to discharge its contents.

In the accompanying drawings, Figure 1 is a side view of our improved melting-furnace. Fig. 2 is a longitudinal sectional view on line 2 2, Fig. 10. Fig. 3 is a transverse sectional view on the line 3 3, Fig. 2. Fig. 4 is a transverse sectional view on the line 4 4, Fig. 2. Fig. 5 is a similar view to Fig. 4, showing the furnace in the act of discharging. Fig. 6 is a view of a slight modification, showing the furnace oval in cross-section. Fig. 7 is a view illustrating the furnace adapted to burn natural gas or oil. Figs. 8 and 9 are views illustrating a cylindrical furnace in which the passages for the air and gas are in the stationary structure, the joint being made at the hearth; and Fig. 10 is a sectional plan view on the line 10 10, Fig. 1.

In the construction of the ordinary melting furnace the walls must necessarily be built very heavy and braces and tie rods have to be used in order to hold the walls together, but in the construction of the furnace which we will now proceed to describe the shape of the body of the furnace being cylindrical or nearly cylindrical common bands or hoops may be used, as the walls are to a certain extent self-sustaining.

A A are the foundations adjoining which are the regenerating chambers A′ and slag pockets A^2.

B is the melting furnace preferably cylindrical in cross section, as shown in Fig. 3, and supported at each end on the foundations A A.

B′ is the hearth on which the metal is melted. This hearth is of the ordinary construction and on each side of the hearth within the brick work of the furnace are air ducts *b* which act to cool the bricks to a certain extent.

In each end of the furnace are gas ports *c* and air ports *d*, clearly shown in Figs. 2 and 3. These gas and air ports communicate with the combustion chamber of the furnace, as clearly shown in Fig. 2. We preferably separate the gas and air ports at the base of the furnace where they join the foundation by a space *x* formed in the furnace and open to the atmosphere so that the gas or air under pressure that should escape at the joint will not mix in the passages but will simply escape to the atmosphere. The air space may be formed in the foundation in some instances, and we preferably build in the furnace water jacketed seats *f* at the joints of both the gas and air passages so as to keep the parts cool. The seats may be carried either by the foundation, as shown in Fig. 2, or by the movable part of the furnace.

The furnace is provided with toothed segments D D at each side adapted to racks D′ on the foundation or on the frame extending from the foundation, and can be mounted in the space *x* between the air and gas ports, as clearly shown in Fig. 2, or they can be located inside the ports nearer the furnace center, as shown in Figs. 7 and 8.

Connected at each end of the furnace at *e* *e* are piston rods E having pistons adapted to the hydraulic cylinders E′ pivoted at *e*′ to the foundation. The cylinders are provided with fluid pipes e^2, e^3 communicating with the upper and lower end of the cylinder and these pipes extend to a suitable valve or regulator for regulating the flow of liquid into the cylinders to tip or raise them as desired.

g is the charging door and *i* is the pouring opening and extending from the furnace in line with this opening is the spout *i*′. In operation the furnace is charged through the door *g* from the charging floor and gas and air are supplied through the ports at one side of the furnace and the products of combustion escape through the ports at the opposite sides and when the metal is in a condition to be poured fluid under pressure is admitted to the upper portion of the cylinder E′ which

will draw down the piston and cause the furnace to roll forward at the same time tipping it and discharging the contents into a suitable receptacle as clearly shown in Fig. 5. As soon as the molten metal has been discharged, the fluid under pressure is admitted to the cylinder and the furnace returned to its normal position, Fig. 4.

In some instances the furnace may be made oval in cross section, as shown in Fig. 6, and where natural gas or oil is used the furnace may be constructed as shown in Fig. 7, an air passage being provided at the base and a gas inlet being provided at the side of the furnace.

In Figs. 8 and 9, we have shown a furnace construction in which the gas and air ports are built with the foundation and the joint made on the line *v* so that only the central or hearth portion of the furnace will roll forward and away from the joint to discharge.

We claim as our invention—

1. The combination in a melting furnace, of the foundation, air and gas passages therein, a hearth section having passages communicating with the said air and gas passages of the foundation when the blast is on, and means for rolling the hearth section forward and away from the said air and gas passages to discharge the contents, substantially as described.

2. The combination in a melting furnace, of the foundation, air inlet passages therein, a rack on the foundation, a cylindrical furnace section having a hearth and passages adapted to align with the passages of the foundation when the blast is on, a segmental gear on the cylindrical section meshing with the teeth of the rack, and means for rolling the said section so that it will move forward to discharge, substantially as described.

3. The combination in a melting furnace, of the foundation having air and gas ports at each side, a cylindrical hearth section also having air and gas ports at each side, aligning with the ports of the foundation when the furnace is in action, a rack on the foundation and a gear on the hearth section meshing with said rack, with a cylinder and piston, one connected to the foundation and the other to the hearth section so that when pressure is applied to one end of the piston the furnace will be rolled forward, substantially as described.

4. The combination of the foundation, air and gas passages and a rack at each end of the foundation, a cylindrical hearth section, gears thereon meshing with the racks, air and gas passages one on each side of each rack and aligning with the passages of the foundation when the furnace is in action, a pouring opening in the hearth section, and means for turning said section so that it will roll forward and discharge, substantially as described.

5. The combination of the foundation, air and gas passages therein, a hearth section having air and gas passages at each end adapted to rest over the passages of the foundation when the furnace is in action, means for rolling said hearth section forward, and an air channel between each air and gas joint so that the air and gas ports will not communicate with each other at the joints, substantially as described.

6. The combination in a melting furnace, of the foundation, air and gas passages therein, a hearth section having passages communicating with the said air and gas passages of the foundation when the blast is on, a fixed track and means for rolling the hearth section forward on said track without elevating it, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

SAMUEL T. WELLMAN.
CHARLES H. WELLMAN.

Witnesses:
WILL. A. BARR,
JOSEPH H. KLINE.