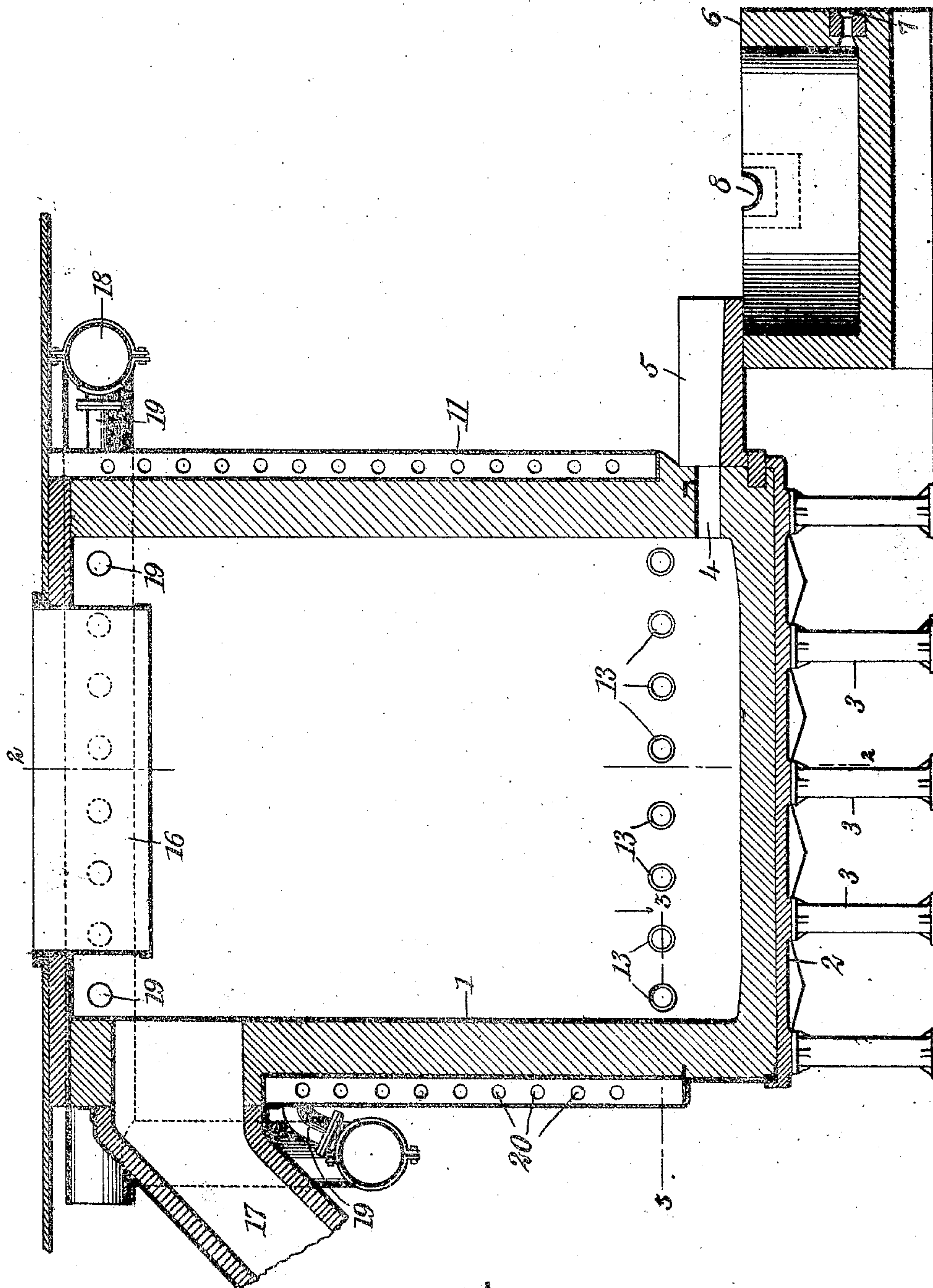


No. 842,663.

PATENTED JAN. 29, 1907.

H. W. HIXON,
BLAST FURNACE.
APPLICATION FILED AUG. 1, 1906.

2 SHEETS—SHEET 1.



WITNESSES

Geo. W. Mayhew
C. M. Fairbank

FIG. 1.

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ATTORNEYS

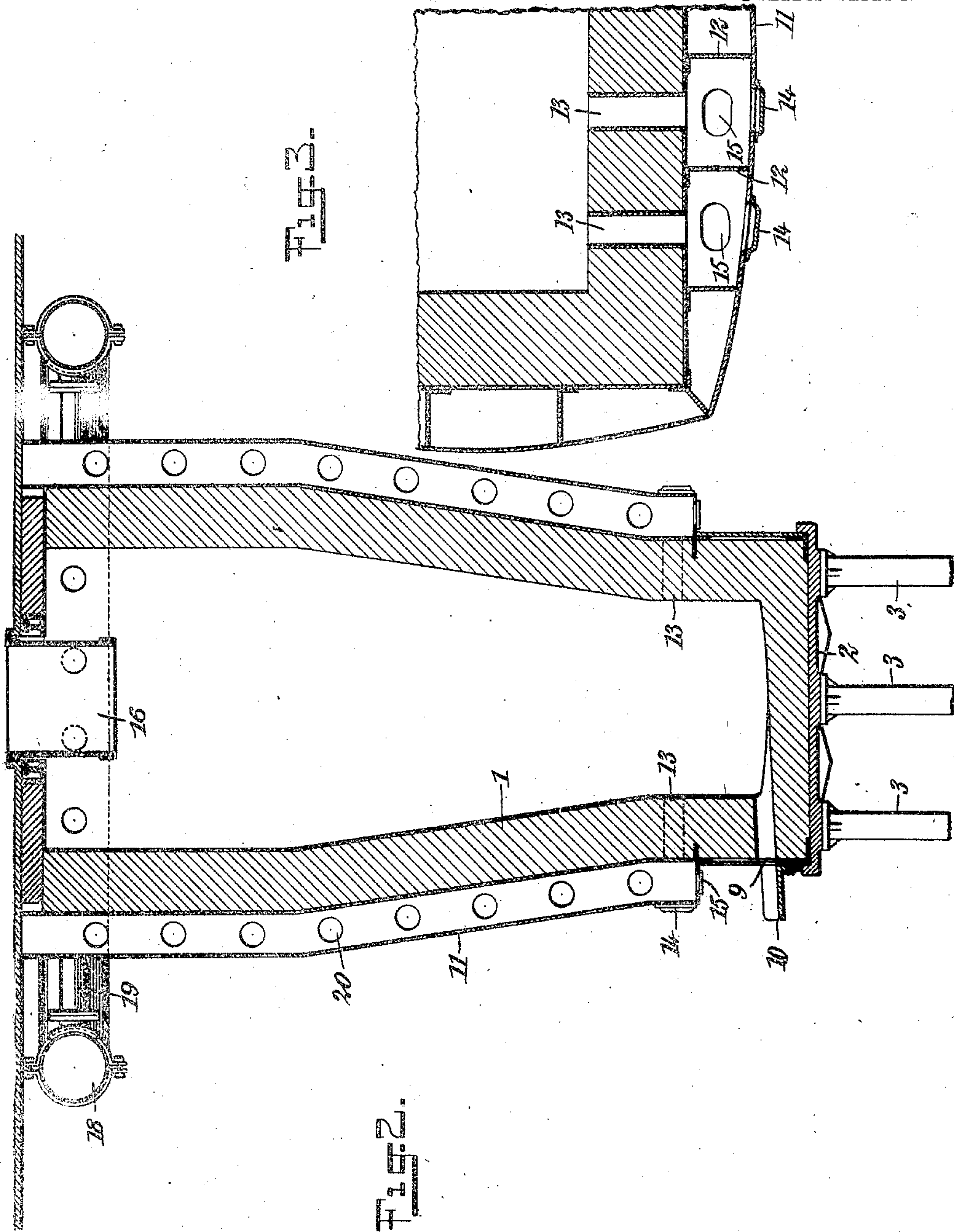
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HIRAM WEASE HIXON, OF VICTORIA MINES, ONTARIO, CANADA.

BLAST-FURNACE.

No. 842,663.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed August 1, 1906. Serial No. 328,741.

To all whom it may concern:

Be it known that I, HIRAM W. HIXON, a citizen of the United States, and a resident of Victoria Mines, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Blast-Furnace, of which the following is a full, clear, and exact description.

This invention relates to certain new and improved structural features in blast-furnaces for smelting copper ores, copper-nickel ores, or any other which is to be smelted to a matte.

The main features of my improved blast-furnace comprise a lining of refractory material, preferably of magnesite, and an air-jacket constituting a substitute for the water-jacket formerly used and through which the air passes on its way to the twyers.

In my improved form of construction I obtain greater economy in fuel to smelt the charge, as all of the heat transmitted through the lining is employed to heat the air in the air-jacket, and this heat is again returned to the furnace proper as the air enters the twyers. When a water-jacket is employed, all of the heat transmitted through the lining is carried away by the water and is lost, all of this heat being saved by my improved furnace in the manner above pointed out.

The magnesite employed as a lining material is highly refractory and is a very good non-conductor of heat, so that by the combined magnesite lining and the air-jacket it is possible to maintain the room in which the blast-furnace is located at a comparatively low temperature, as there is very little heat lost by radiation.

It is evident that other materials than magnesite—as, for instance, chrome brick or silica brick—may be employed in place of the magnesite.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which—

Figure 1 is a vertical section illustrating one form of my improved blast-furnace. Fig. 2 is a vertical section on a plane at right angles to Fig. 1 and on the line 2 2 of said figure, and Fig. 3 is a horizontal section on the line 3 3 of Fig. 1.

In the form of the invention illustrated I employ a magnesite lining 1, preferably rec-

tangular in cross-section and suitably supported on a base-plate 2 and supporting-legs 3 of any suitable construction.

The blast-furnace is provided with a slag-discharge port 4 adjacent its lower end and communicating with a spout 5, preferably formed of magnesite and leading to any suitable form of settler 6, which may also be formed of magnesite and provided with suitable opening 7 for drawing off the matte and an overflow-opening 8 for the escape of the slag.

The furnace may also be provided with a side tap 9 and spout 10, by which the metal may be drawn off and the furnace completely drained.

Surrounding the main body of the furnace is provided an air-jacket formed of tank-steel with double walls, and in order to strengthen the walls of the furnace the outer wall 11 of the air-jacket is preferably curved outward, and a plurality of supporting-braces 12 are inserted between the two walls of the jacket. This prevents side swelling of the magnesite lining and serves to hold the parts in their proper position, as the air-jacket and its supporting-braces constitute a truss. Each of these supporting-braces 12 extends vertically from the top of the furnace to the lower end of the air-jacket, thereby forming a plurality of vertical passage-ways, each of which along two opposite sides of the furnace communicates with a twyer 13, entering the furnace adjacent its lower end and through which the air from the vertical passage-ways is admitted to the furnace. To permit of the cleaning out of the twyers should they become obstructed, I provide a plurality of ports in the air-jacket, one opposite each twyer, and suitable closures 14, whereby they may be normally sealed air-tight. The lower end of each passage-way is also preferably provided with a small port and suitable closure 15, whereby any foreign matter collecting in said passage-ways may be removed.

The upper end of the blast-furnace is provided with the customary charge-opening 16 and a downtake 17 to the flue or chimney. Surrounding the upper end of the furnace is located an air-supply pipe 18, having a plurality of branches 19 extending therefrom and communicating with the passage-ways in the air-jacket. To maintain an even distribution of air in the jacket, I provide the vertical braces 12, constituting the partitions

between said passages, with a large number of openings 20, by which the air may freely pass from one passage-way to another.

In the operation of my improved blast-furnace above described the fuel and ore are inserted through the charge-opening in the usual manner, and air is supplied through the main supply-pipe 18 and branch pipes 19 to the vertical passage-ways in the air-jacket. The air in passing downward through these passage-ways serves to keep the walls of the furnace comparatively cool and at the same time serves to heat up the air which at the lower end of the passage-ways enters the furnace through the twyers 13. In this way the necessity for any auxiliary heating means for the air supplied to the furnace is eliminated, and all of the heat formerly carried away by water in the water-jacket is returned to the furnace.

Many of the details of the structure disclosed in the drawings are not essential to my invention, as it is evident that various changes may be made during the practical use of the same without departing from the spirit of my invention—as, for instance, windows may be inserted whereby the operator may see if the lining is getting red-hot and may control the supply of fuel to that portion of the furnace.

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

1. A blast-furnace, comprising a lining of a refractory material, an air-jacket surrounding the same, the outer wall of said jacket being curved outwardly and provided with vertical partitions between said lining and said jacket thereby forming a plurality of parallel passages, means for delivering air to the top of said passages, and twyers in the lining communicating with the lower ends of said passages.

2. A blast-furnace, comprising a rectangular lining of refractory material, an air-jacket surrounding the same and constituting a strengthening-brace for said lining, the outer wall of said jacket being curved outwardly and provided with a plurality of perforated, vertical partitions between said lining and said jacket, means for delivering air to said air-jacket at the upper end thereof,

and means for admitting air from said jacket through said lining at the lower end thereof.

3. A blast-furnace, comprising a rectangular lining of magnesite, an air-jacket surrounding the same, the outer wall of said jacket being curved outwardly and constituting a strengthening-brace for said lining, vertical partitions between said lining and said jacket, thereby subdividing said jacket into a plurality of vertical passage-ways, twyers in the walls of said furnace communicating with the lower ends of said passage-ways, and ports and closures therefor in the outer wall of said air-jacket and in alignment with each of said twyers, whereby the twyers may be freed from obstructions.

4. A blast-furnace, comprising a rectangular refractory lining, and an air-jacket surrounding said lining, the outer wall of said air-jacket being curved outwardly and provided with a plurality of spacing-braces, whereby the air-jacket and its braces constitute a truss for strengthening the walls of the furnace.

5. In a blast-furnace, a lining of refractory material, an air-jacket surrounding the same, vertical partitions in said air-jacket, each of said partitions being provided with a plurality of perforations, twyers communicating with the lower end of said air-jacket, and means whereby the twyers may be freed from obstructions and foreign matter removed from the air-jacket.

6. A blast-furnace, comprising a lining of refractory material, an air-jacket surrounding said lining, vertical perforated spacing partitions in said air-jacket subdividing the space between the jacket and the lining into a plurality of passages, means for admitting air to said jacket adjacent one end of the passages, means for admitting air from the lower end of said passages through said lining, and means for drawing off the contents of said furnace adjacent the lower end thereof.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HIRAM WEASE HIXON.

Witnesses:

N. HILLARY,
JAS. F. NEWTON.