

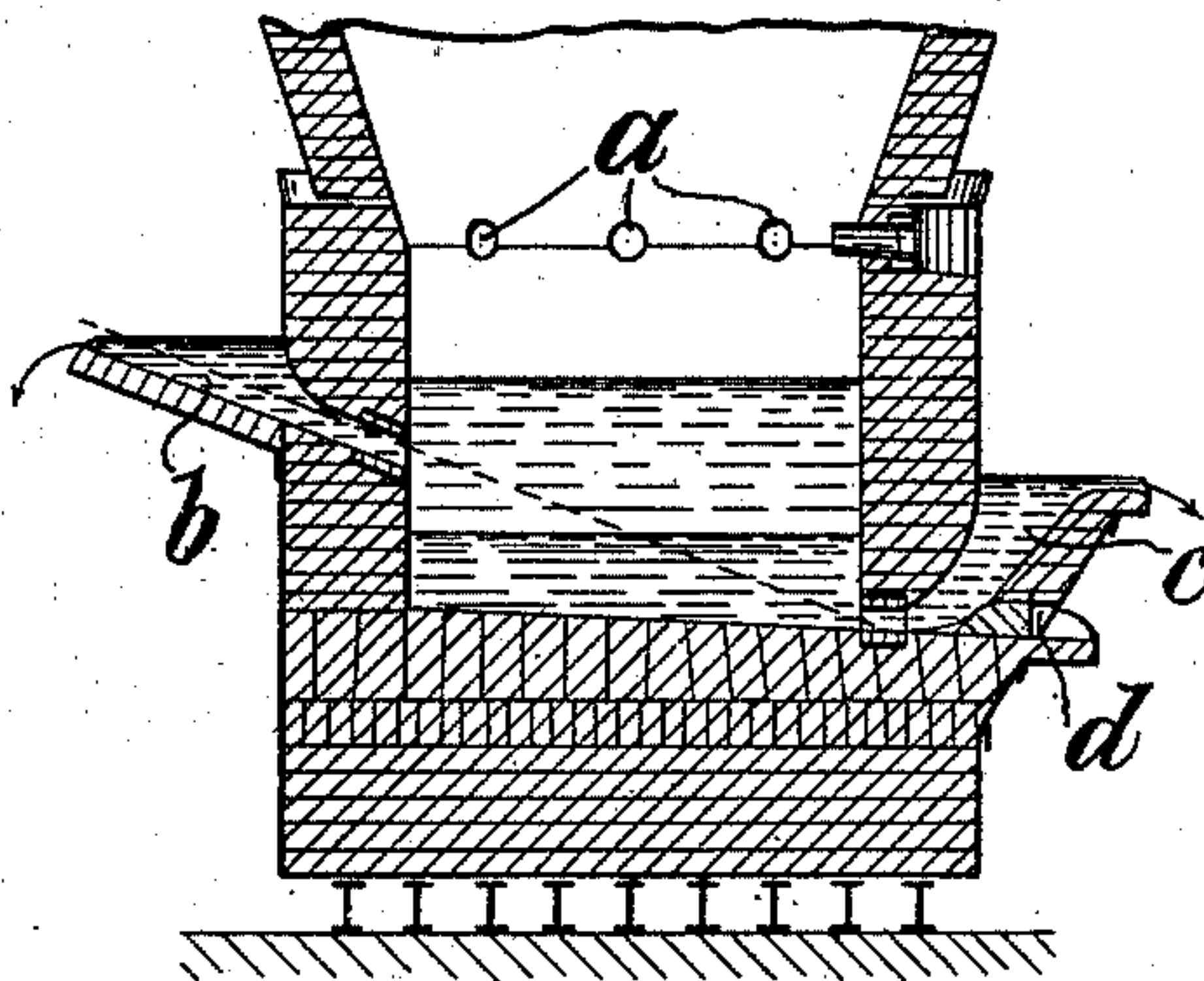
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T. STAPF.
BLAST FURNACE.

(Application filed Jan. 20, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

THOMAS STAPF, OF TERNITZ, AUSTRIA-HUNGARY.

BLAST-FURNACE.

SPECIFICATION forming part of Letters Patent No. 712,615, dated November 4, 1902.

Application filed January 20, 1902. Serial No. 90,561. (No model.)

To all whom it may concern:

Be it known that I, THOMAS STAPF, a subject of the Emperor of Austria-Hungary, residing at Ternitz, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Blast-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

A blast-furnace according to this invention is provided with outlet-passages arranged in such a way that crude iron and slag produced in the furnace are separately discharged therefrom in an automatic and continuous manner.

The advantages attendant on continuously removing the fused masses both of slag and of metal from the blast-furnace are so manifest that various constructions of furnaces have already been proposed to which, in contradistinction to most ordinary furnaces, intermittent opening and closing of the tap-hole is omitted. Apart from the saving in wages and other advantages accruing from dispensing with a very troublesome operation for the workmen continuous discharge of the fused material enables the charge to sink uniformly and necessitates the use of fewer or of less expensive devices for receiving and conveying away the metal and the slag produced and also renders it possible at all times to watch (and this is very important for rational working) the progress of the process of reduction and to control the working of the furnace by the appearance, the quantity, the condition, and the chemical composition of the fused products discharged.

In a blast-furnace according to this invention a continuous and automatic discharge of crude iron and slag is effected by means of trap-forming passages at different levels and leading from those parts of the furnace-chamber in which the masses of fused metal and slag collect, the trap or siphon-shaped arrangement of the said discharge-passages producing a gas-tight sealing of the same to the outside.

A cross-section of the collecting-chamber of an example of blast-furnace according to this invention is shown in the accompanying drawing.

Below the level of the twyers *a* there is arranged a receptacle to form a trap-forming slag-discharge passage *b* and immediately above the bottom a receptacle to form a crude-iron trap-forming discharge-passage *c*. These two passages, as before stated, are of trap-forming or siphon shape, but in other respects might be of any suitable form or cross-section, the maximum height to which the discharge-openings may be continued upwardly being determined in the case of the metal-discharge passage with reference to the base of the slag-outlet opening and in the case of the slag-opening with reference to the twyers, so that under all ordinary circumstances an air-tight seal is formed by the metal and by the slag, and the slag cannot enter the twyers *a*, and the metal cannot close the slag-passage *b*.

It is advantageous to arrange the two passages *b* and *c* at opposite sides of the chamber, and the passage *b* is preferably made straight, but inclined in such a way that when a rod is passed through it the said rod can reach the inner end of the crude-iron outlet-passage *c* to remove any deposits which may obstruct outlet of metal. The passage *c* may be curved, as shown, or be angular, and may be provided with a tap-hole *d*, which is coaxial with the inner end of the metal-outlet passage and is provided with a refractory stopper. It will be understood that there might be a tap-hole at some other portion of the periphery of the chamber.

I claim—

1. A blast-furnace provided with an open discharge-passage leading from the hearth or bottom of the metal-chamber outwardly and upwardly to a suitable height to cause a continuous discharge of metal, and with an open slag-discharge passage leading from a suitable point upwardly and outwardly to a suitable height to cause a continuous discharge of slag, for the purpose set forth.

2. A blast-furnace provided with an open discharge-passage on one side leading from the hearth or bottom of the metal-chamber outwardly and upwardly to a suitable height to

cause a continuous discharge of metal and with an open slag-discharge passage on the opposite side leading from a suitable point upwardly and outwardly to a suitable height
5 to cause a continuous discharge of slag, for the purpose set forth.

3. A blast-furnace provided with an open discharge-passage leading from the hearth or bottom of the metal-chamber outwardly and
10 upwardly to a suitable height to cause a continuous discharge of metal, and with an open slag-discharge passage in line with the opening leading from the hearth to the metal-discharge passage, said slag-passage leading from
15 a suitable point upwardly and outwardly to cause a continuous discharge of slag, for the purposes set forth.

4. In a blast-furnace, the combination with the hearth or metal-chamber provided with a
20 discharge-port in line with its bottom and with an oblique slag-discharge port below the line of twyers, opposite to and in line with said metal-discharge port; of means so organized as to permit the uninterrupted discharge
25 of metal and slag during the operation of smelting and to prevent access of air from without to either of said discharge-ports, substantially as set forth.

5. In a blast-furnace, a crucible or hearth, a receptacle for the reception of the molten
30 metal, a passage for the metal between the crucible and receptacle, and a second receptacle above the level of the first and an inclined passage between said receptacle and
35 crucible in alinement with the entrance of the passage for metal, substantially as described.

6. In a blast-furnace, a crucible or hearth, a receptacle for the molten metal, a passage for metal between the bottom of the crucible and the bottom of the receptacle, an opening
40 in the receptacle normally closed and in alinement with said passage, a second receptacle on the opposite side of the crucible above the level of the first for the reception of slag and
45 an inclined passage between said receptacle and crucible and in alinement with the entrance of the passage for metal in the crucible, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses. 50

THOMAS STAPP.

Witnesses:

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