No. 757,222. PATENTED APR. 12, 1904.

A. R. PARTRIDGE.

HEARTH FOR SMELTING FURNACES.

APPLICATION FILED OCT. 22, 1900. RENEWED JULY 22, 1903.

NO MODEL.

Fig. 1.

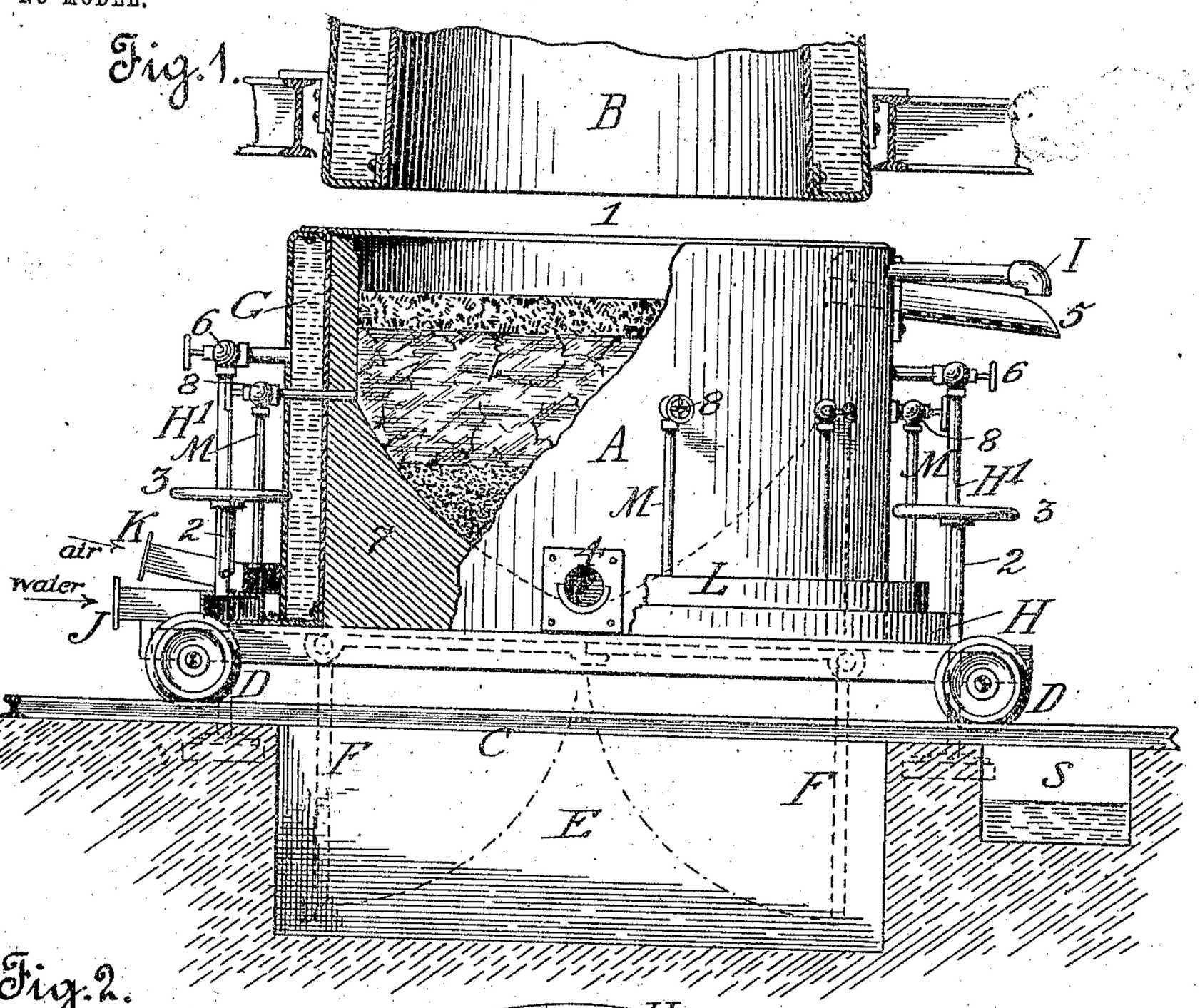
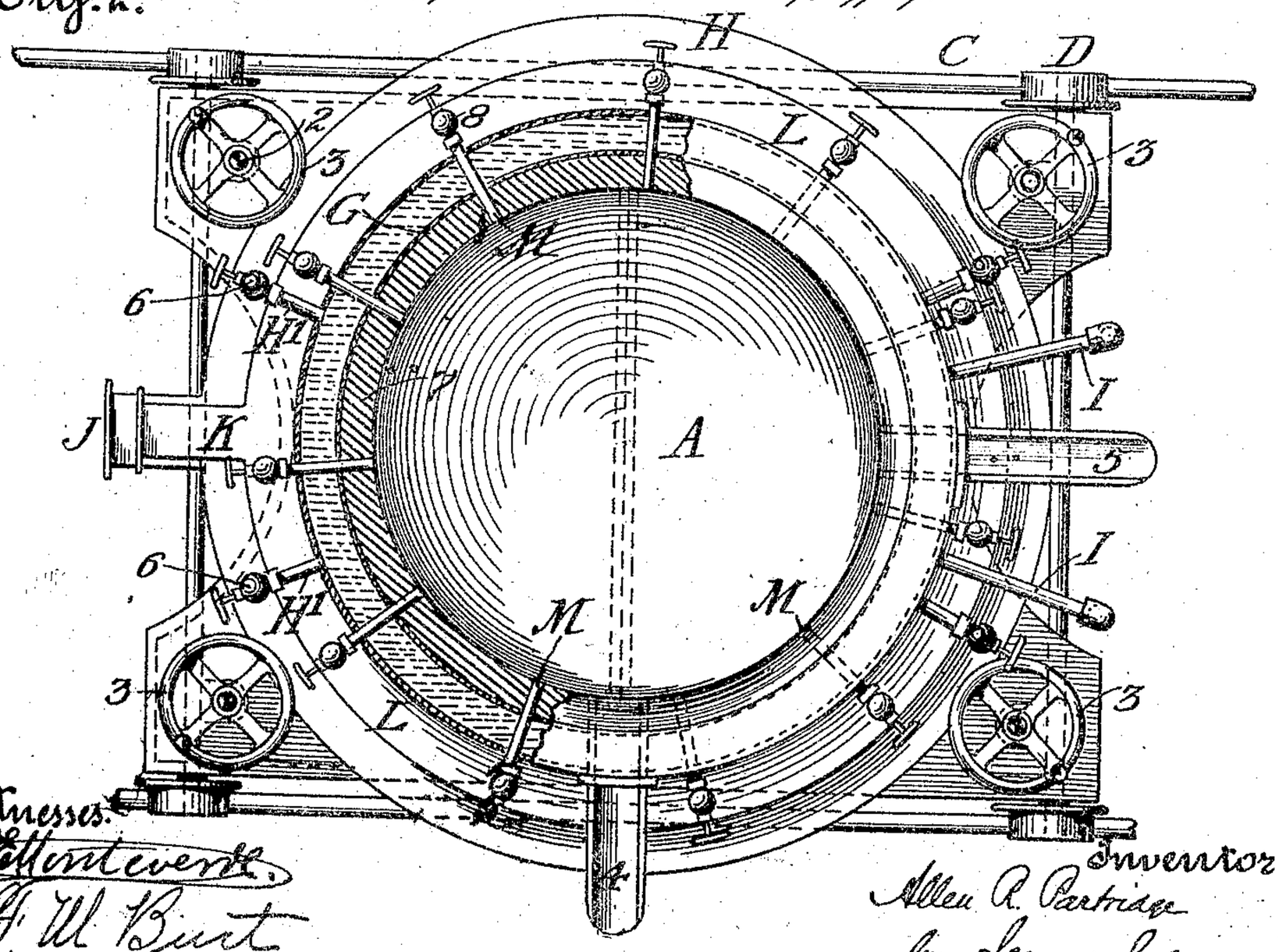


Fig. 2.



Witnesses:
Fellowes.
F. W. Burt

Inventor.
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UNITED STATES PATENT OFFICE.

ALLEN R. PARTRIDGE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FRANK W. PAGE, OF SAN FRANCISCO, CALIFORNIA.

HEARTH FOR SMELTING-FURNACES.

SPECIFICATION forming part of Letters Patent No. 757,222, dated April 12, 1904.

Application filed October 22, 1900. Renewed July 22, 1903. Serial No. 166,637. (No model.)

To all whom it may concern:

Be it known that I, ALLEN R. PARTRIDGE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Hearths for Smelting-Furnaces, of which the following is a specification.

My invention relates to the treatment of copper, molten and other ores and mattes for the refining and desulfurization of the same, and comprises a novel construction of the hearth or crucible of a smelting-furnace for accomplishing the stated purpose.

In the drawings, Figure 1 is an elevation of the lower part of a furnace and its hearth, the latter being partly broken away to show a section of the interior. Fig. 2 is a plan view, partly in section.

The hearth or crucible A is shown in connection with a smelting-furnace B, which may be of any suitable construction. I prefer, however, the construction of furnace described in my application for Letters Patent, Serial No. 10,760, filed March 30, 1900, in which the furnace is supported independently of the hearth and is separated from it, so as to form a draft-space 1. The hearth A is portable, being supported by rails C and carrying wheels D above the pit E.

F F are hinged doors constituting a drop-bottom, as shown in dotted lines.

The hearth is adjustable toward and from the smelter in order to diminish or increase the size of the draft-space, and so regulate the draft, the adjustment being conveniently effected by the screws 2 and hand-wheels 3.

The hearth is lined, as shown at 7, with fire-clay or other suitable refractory material and is provided with the discharge-spout 4 for molten material and with the slag-spout 5.

As a special improvement in hearths for smelters I make the metallic casing of the hearth double, so as to provide a water space or jacket G, and provide means for the circulation of water therein in order to reduce the temperature of the casing, and so prolong its life by tending to prevent warping and other destructive effects of the intense heat of its molten contents. Supported upon the frame or base of the hearth is a water-pipe H, extending around the hearth, from which rise the pipes H'. From each pipe H' a branch, provided with a cock 6, extends into the water-jacket. Water-discharge pipes leading from the jacket are shown at I, which preferably discharge into the exterior waterway S for slag, and the water-inlet to pipe H, which supplies water from any suitable source, is shown at J. Water can thus be admitted to the jacket at one, more, or all of a number of supply-points, so as to cool the casing at many different points, as distinguished from a jacket having a single discharge between which the water circulates exposed to great heat.

The principal part of my invention relates to the introduction of air under pressure directly into the hearth, whereby the molten mass can be refined or desulfurized without transfer to converting plants. For this purpose an air-inlet pipe K is connected to an air-forcing device or compressor. (Not shown.) This pipe enters an air space or accumulator L, which extends around the hearth above the base and which fills with air under pressure. Leading from this space at intervals around the hearth are twyers M, provided with valves 8, the jets or nozzles of which are carried through the water-jacket and the hearth-lining and open into the interior at a suitable height to force oxygen into the molten matte through any or all of such nozzles.

If the ore under treatment contains an iron base without copper or with only a small percentage of the latter and it is desired to concentrate or refine the resultant matte, the operation is conducted in the same manner.

The act of injecting oxygen into the iron matte will cause a large quantity of the iron to become oxidized and flow off as silicate of iron in the slag, precipitating the precious metals, owing to the higher specific gravity, to the bottom of the crucible. This operation is carried on until the slags show by assay that they contain precious metals. At this time I have a very highly-concentrated matte, or, in other words, a matte highly charged with precious metals, thereby making it pos-

sible to concentrate a large number of tons of ore into a very small volume of matte at one operation. The usual mode of procedure in the art is to resmelt the mattes in combination with clean silica, thereby obtaining higher concentration. In the present practice any approximation to the result which I obtain can only be secured by a resmelting of the matte with clean silica at great additional expense, since it requires two or more operations instead of one where my apparatus is employed.

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

1. In a hearth or crucible for a smelter, a double wall or casing for the same forming a water-space, extending continuously and entirely around the hearth, a water-supply pipe and a number of water-inlet pipes to said space, all in communication with said water-space.

2. In a hearth or crucible for a smelter, a double wall or casing for the same forming a water-space, extending continuously and entirely around the hearth, a water pipe or passage extending around the hearth, valved pipes extending from said passage into the water-space, a water-supply pipe leading into said passage and a water-discharge.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 7th day of September, 1900.

ALLEN R. PARTRIDGE.

Witnesses:
L. W. SEELY,
F. M. BURT.