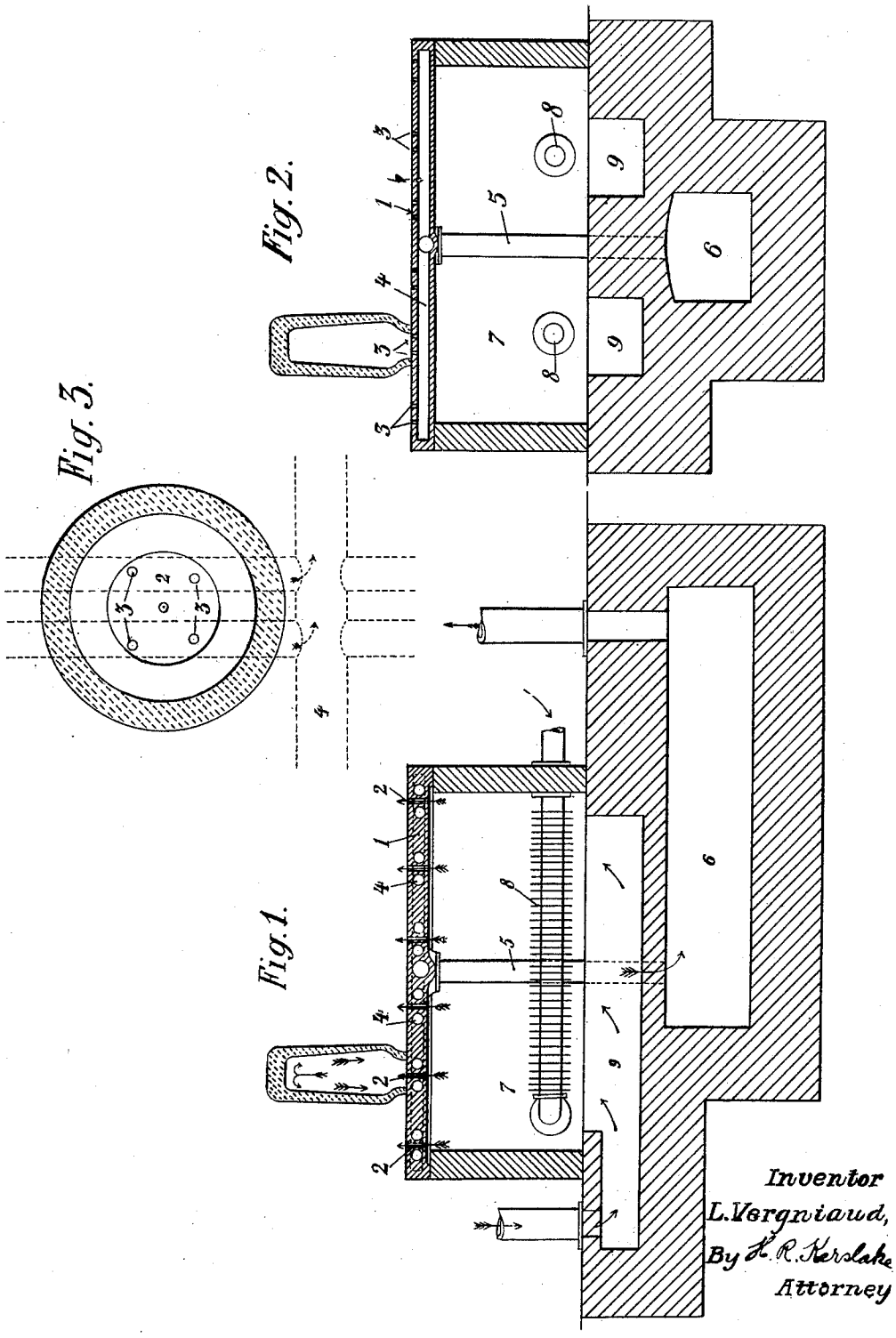
L. VERGNIAUD.

PROCESS AND APPARATUS FOR DRYING CRUCIBLES.

APPLICATION FILED JULY 9, 1919.

1,373,688. **Patented Apr. 5, 1921.**



UNITED STATES PATENT OFFICE.

LOUIS VERGNIAUD, OF PARIS, FRANCE, ASSIGNOR TO CORPORATION SAID: ETABLISSEMENTS JACOB HOLTZER.

PROCESS AND APPARATUS FOR DRYING CRUCIBLES.

1,373,688. Specification of Letters Patent. Patented Apr. 5, 1921.

Application filed July 9, 1919. Serial No. 309,775.

To all whom it may concern:

Be it known that I, LOUIS VERGNIAUD, a citizen of the French Republic, residing at 43 Rue des Marais, Paris, have invented certain new and useful Improvements in Processes and Apparatus for Drying Crucibles, of which the following is a specification.

Crucibles made of a clay paste or the like which are intended for use in melting metals such as steel and other substances, that is to say, are designed to be exposed to a very high temperature, can be put into use only after they have been subjected to a thorough and protracted drying process.

The thoroughness of this drying is of vital importance in order to avoid a cracking of the crucible which would not fail to occur on being heated and as a result of the rapid evaporation of the moisture that is still contained in the paste if the latter has not been completely dried.

All drying processes, whatever their method of operation may be, consist, with a few exceptions, in drying the crucibles in a chamber which is maintained at a more or less high temperature.

In these circumstances the drying of the crucibles takes place gradually from the outside toward the inside and requires a very long time.

The disadvantages of this method are many:—

(*a*) The relatively long duration of the drying process entails, in the case of works using a fairly large number of crucibles, the carrying of very large stocks that may at certain times, represent a considerable amount of dead capital.

(*b*) The drying is irregular as regards its duration because it takes more or less time and is more or less thorough according to the season of the year, the temperature and the hygrometric condition of the atmosphere of the drying chamber.

(*c*) The last mentioned disadvantage entails irregularities in the quality of the crucibles which occasion not unfrequently disappointments when the crucibles are in use.

The improved process of drying crucibles that forms the subject matter of the present invention enables those disadvantages to be avoided and it is characterized essentially by the feature that a systematic drying of the crucibles is effected by causing it to take place uniformly, regularly and simultaneously from the inside and outside of the walls of the crucible.

A practical constructional form of the improved apparatus for carrying into effect the improved drying process of the present invention, is illustrated by way of example in the accompanying drawings in which:—

Figures 1 and 2 are vertical sections taken at right angles to each other of the improved apparatus.

Fig. 3 is a horizontal section on a larger scale of a crucible in position upon the improved drying apparatus.

According to the improved process the external drying of the crucibles is effected by placing the crucibles upon heating tables 1 in a chamber that are constructed specially for the purpose and are maintained at as uniform a temperature as possible.

The crucibles are kept upright on those tables over sets of holes 2 and 3 formed therein, in an inverted position such that the rim of the mouth of each crucible resting upon the surface of the table circumscribes and surrounds the whole of its set of holes 2 and 3 in an air-tight manner. The size and arrangement of each set of holes are such that the latter allows hot air to circulate systematically inside each crucible from its center to its periphery and thus effect its internal drying.

In the example shown the central hole 2 of each set of holes 2 and 3, extends through the entire thickness of the table top 1, while the holes 3 situated around the hole 2 extend only through a comparatively thin portion of the table top that is left between the top surface of the table top 1 and a passage 4 formed in the thickness of the said table top.

The central hole of each set establishes communication between a chamber 7 underneath the table top 1 and the central inner space of the crucible being dried, whereas the holes 3 provide a communication between the periphery of the inside surface of the crucible and the passage 4 and thence through a central collecting pipe 5 and a flue 6 for carrying off the vapor from the drying crucibles.

In the chamber 7 under the table top 1, ribbed heating pipes 8 are arranged over air inlet channels 9.

The flow of the hot air in the chamber 7 may be produced either by exhausting the

air in the passages 4 communicating with the holes 3 situated near the inner periphery of each crucible, or by driving the hot air of the chamber 7 out through the hole 2 that is situated exactly underneath the center of each crucible.

In both cases a continuous flow of hot air is produced from the center toward the periphery of the crucible in the downward direction along the axis of the crucible in the first portion of its course (Fig. 1), and in the downward direction along the sides of the crucible in the second portion of its course (Fig. 2).

In addition to the internal flow of hot air in the crucible, the heat given off by the heating table top 1 insures a uniform temperature of the air on the outside of the crucibles.

Under these circumstances the drying of the crucibles is effected regularly and uniformly outside as well as inside, and the length of the operation which can be regulated as desired, is very considerably shortened.

The advantages afforded by the improved drying apparatus are:—

(1) A great uniformity in the quality of the crucibles which may reach the maximum.

(2) A very great increase in the output.

(3) A reduction in the size of the stock of crucibles required for the work of the factory.

The hereinbefore described constructional arrangements are given here solely by way of example; the shapes, dimensions, details of construction and the applications may be varied without thereby departing from the nature of the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A process for drying crucibles consisting in placing the crucibles in inverted position on a heated surface, subjecting the interior of the crucibles directly to a continuous circulation of hot air, and simultaneously subjecting the exterior surfaces of the crucibles to the heat given off by the heated surface, whereby the crucibles are dried rapidly and systematically.

2. An apparatus for effecting an artificial drying of crucibles by the process claimed in claim 1, which consists of a heating table top upon which the crucibles are placed in an inverted position, and which is situated over a heating chamber inclosing heating pipes; the said table top being provided with holes communicating with the interior of the said heating chamber, and being also provided with holes that are arranged around each of the aforesaid holes and are in communication through a suitable passage with a flue that carries off the vapor and gases resulting from the drying operation.

3. An apparatus for drying crucibles including a table adapted to receive inverted crucibles and provided with a series of perforations, one of which communicates with the interior of each crucible, and means for producing a circulation of hot air through said perforations for the purpose of directly heating the interior of the crucibles.

4. An apparatus for drying crucibles including a heating table adapted to receive or support inverted crucibles, said table being provided with a series of perforations adapted to permit heated air from beneath the table to directly enter the interiors of the crucibles and directly contact with the inner surfaces of the same, a closed chamber beneath said table, heating elements in said chamber, and means to produce a circulation of air about the heating elements and through the perforations of the heating table

5. An apparatus for heating crucibles, including a heating table adapted to support inverted crucibles, said table being provided with perforations corresponding to the axes of said crucibles, a closed chamber beneath said table, heating elements in said chamber, and a system of pipes emptying into said chamber to produce a circulation of air about the heating elements and through the perforations of said heating table.

6. An apparatus for drying crucibles, including a heating table adapted to support inverted crucibles, said table being provided with perforations corresponding to the axes of said crucibles, a closed chamber beneath said table, heating elements within said chamber, a pipe system emptying into said chamber to produce a circulation of air about the heating elements and through the perforations of the heating table, and means to evacuate from the crucibles the hot air and steam produced.

7. An apparatus for drying crucibles, including a heating table adapted to support inverted crucibles and provided with perforations corresponding to the axes of said crucibles, a closed chamber beneath said table, heating elements within said chamber, a pipe system emptying into said chamber to produce a circulation of air about the heating elements and through the perforations of the table, said table being also provided with perforations arranged concentrically to the central perforations and below the crucibles, passages in the thickness of the heating table into which empty said concentric perforations, and means to evacuate from the heating table the air coming from the crucibles as well as the steam evolved.

8. An apparatus for drying crucibles, in-

cluding a heating table adapted to support inverted crucibles and provided with perforations corresponding to the axes of said crucibles, a closed chamber beneath said table, heating elements in said chamber, a pipe system emptying into said chamber to produce a circulation of air about the heating elements and through the perforations of the heating table, said table being also provided with perforations arranged concentric with the central perforations and beneath the crucibles, parallel passages in the thickness of the heating table into which empty said perforations, a collector arranged axially in said heating table to connect the passages which are arranged transversely, and a passage connecting said collector to the chimney for evacuating the air coming from the crucibles as well as the steam evolved from their walls.

9. An apparatus for drying crucibles comprising a heated table provided with a heating chamber and unobstructed perforations leading from said chamber and opening outwardly from the top of the table, said table being adapted to support a crucible in inverted position and said crucible being arranged over said perforation for permitting heated air from the heating chamber to pass through said perforation and directly contact with the interior wall of the crucible, and means for heating said chamber.

Dated this 7th day of October, 1918.

LOUIS VERGNIAUD.