J. KRALUND.

METALLURGICAL FURNACE.

APPLICATION FILED SEPT. 10, 1915.

1,284,711.

Patented Nov. 12, 1918.

Fig. 1.

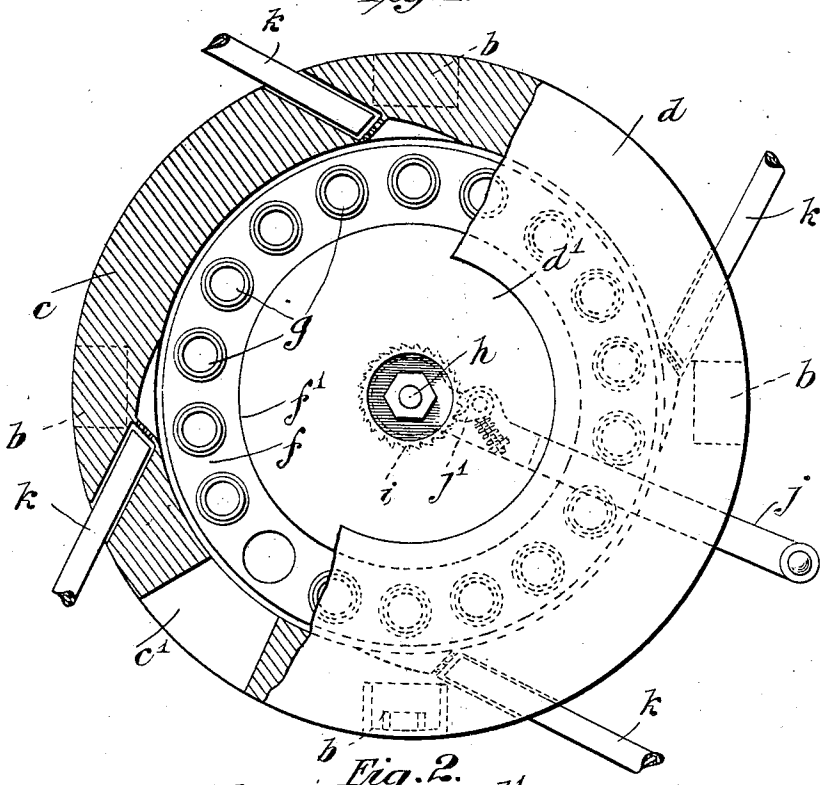
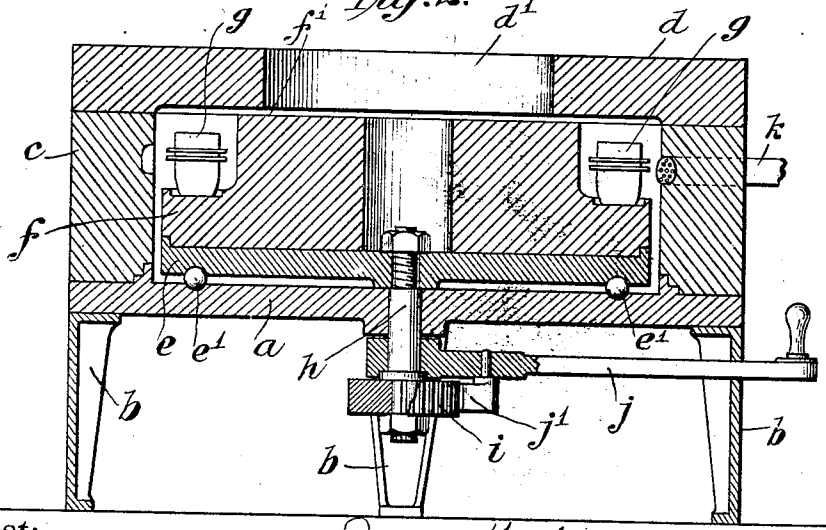


Fig. 2.



Attest:

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UNITED STATES PATENT OFFICE.

JOHN KRALUND, OF BROOKLYN, NEW YORK, ASSIGNOR TO DOEHLER DIE CASTING COMPANY, A CORPORATION OF NEW YORK.

METALLURGICAL FURNACE.

1,284,711. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed September 10, 1915. Serial No. 49,858.

To all whom it may concern:

Be it known that I, JOHN KRALUND, a citizen of the United States, residing at the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Metallurgical Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to metallurgical furnaces and more particularly to a type thereof adapted for use in the conditioning of high fusing metal alloys for pressure die casting.

In the method or art of casting fluid metals invented by H. H. Doehler and described in an application filed by him September 10, 1915, Serial No. 49,874, it is essential that metal of substantially the bulk of the casting to be made, be subjected, while in the melting pot or crucible from which it is poured from within an inclosed chamber through a constricted passageway into the mold, to a temperature at substantially that of the fusing point of the metal. To secure the desired capacity of the apparatus used in carrying on this method or art, it is essential that a plurality of melting pots or crucibles containing molten metal shall be maintained in readiness to be transferred to the inclosed chamber of the apparatus so as to provide a supply of metal, commensurate with the speed of operation of the apparatus.

By my invention, I provide a furnace wherein a plurality of such melting pots or crucibles are simultaneously subjected to the desired temperature, said furnace being so constructed that said melting pots may be brought consecutively into position before the opening in the furnace so as to permit their removal therefrom, or the insertion of a crucible containing metal to be conditioned, one at a time. In this furnace, the melting pots or crucibles are positioned upon a traveling support, means being provided whereby said support may be actuated in a manner to insure each crucible containing metal inserted in the furnace being subjected to the desired temperature for an interval sufficient to insure the melting of the metal before said crucible is again brought to the opening through which it may be removed from the furnace and transferred to the pressure chamber of the casting apparatus. By bringing the melting pots or crucibles to this opening at intervals in accord with the requirements of the operator of the casting apparatus, I not only make each crucible conveniently accessible to the operator, but insure its being in the furnace for a sufficient time to properly condition the metal for the casting operation.

In some alloys it is desirable that a flame shall not impinge directly thereupon, and consequently I prefer to so arrange the gaseous fuel burners about the walls of the furnace as to cause the flame therefrom to impinge upon the side of the melting pot or crucible.

The invention consists primarily in a metallurgical furnace embodying therein a refractory side wall having an opening therethrough, means for delevoping the required temperature within said wall, a traveling support of refractory material within said wall, said support being adapted to receive a plurality of melting pots or crucibles adjacent the outer edge thereof, means adapted to impart movement to said support to bring said melting pots or crucibles successively in position adjacent said opening whereby said melting pots or crucibles may be inserted in or removed from within said furnace one at a time and will remain therein a sufficient time to insure the desired conditioning of the metal therein contained, and in such other novel features of construction and combination of parts as are hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings:—

Figure 1 is a plan view of a furnace embodying my invention with a portion of the top thereof broken away; and

Fig. 2 is a side elevation thereof with a portion thereof broken away.

Like letters refer to like parts in both of said views.

In the embodiment of my invention shown in the drawings, I provide a base *a*, elevated by means of the legs *b* to a height to permit convenient access to the furnace. Carried by the base *a* is a circular wall *c* of refractory material having a top *d* of similar ma-

terial, said top having a central vent opening d'.

Mounted within the wall c is a traveling support adapted to sustain adjacent the edge thereof a line of small melting pots or crucibles. In the form of the invention shown this support comprises a circular plate e mounted in any suitable manner as by means of ball bearings e' upon the base a. The plate e is provided with a facing f of refractory material extending from which into close proximity to the vent opening d', is a central hollow column f' forming a narrow annular chamber between said column and the wall c.

The facing f of the said annular chamber is preferably provided with a plurality of depressions into which the melting pots or crucibles shown at g are adapted to be seated. These depressions are designed primarily to secure the proper spacing of the melting pots or crucibles within the furnace.

The said wall c is provided with an opening c' therethrough on substantially the level of the top surface of the facing f of the annular chamber, this opening being restricted to an area sufficient merely to permit the convenient insertion or removal of a melting pot or crucible from the furnace.

To permit the melting pots or crucibles upon the support f to be successively brought in the proper relation to the said openings c', I provide means for imparting movement to said support, said means being so constructed as to time the movements of the support to the requirements of the operator and at the same time insure the subjection of the crucibles containing the metal to the high temperatures within the furnace for a sufficient time to have the metal in each melting pot or crucible as it approaches said opening in condition to be transferred to the pressure chamber of the casting apparatus. In the form of the invention shown, this means comprises a vertical shaft h carried by the plate e and rotatably mounted in the base a. The lower end of this shaft carries a ratchet wheel i and mounted upon the said shaft adjacent said ratchet wheel is a swinging lever j carrying a spring pressed pawl j', coöperating with the ratchet wheel i.

In connection with the mechanism above described, I provide means for developing the desired temperatures within the wall c, which means preferably comprises a plurality of gaseous fuel burners k extending through the wall e at an angle substantially tangentially to the periphery of the plate e and above the refractory facing f thereof. These burners are so positioned as to cause the jets of flame therefrom to impinge against the sides of the melting pots or crucibles g, said melting pots or crucibles being successively subjected directly to the action of each of said jets of flame.

The operation of the herein described mechanism is substantially as follows:—

When first charging the furnace, a plurality of melting pots or crucibles g, containing metal to be melted, are successively inserted through the openings c', and placed upon the refractory facing f, the said traveling support being moved as required to successively expose succeeding portions of the said support adjacent the opening c'. When each of the depressions in the facing f has a melting pot or crucible seated therein, the first melting pot or crucible inserted in the furnace will be in position adjacent the opening c' and the metal therein will be in condition to be cast. Thereafter as a charge of metal is required for the casting apparatus, movement will be imparted to said support in a manner to insure the timely bringing of each succeeding melting pot or crucible adjacent the opening c'.

As each melting pot or crucible is removed from the furnace, a melting pot or crucible containing metal to be conditioned will be inserted in its place, thus insuring a continued supply of molten metal in the furnace, in readiness to be removed to the pressure chamber. By maintaining the temperature of the furnace at approximately that of the fusing point of the metal, the melting pots or crucibles may remain in the furnace indefinitely without injuriously affecting the metal therein.

By using a hand-operated feeding mechanism, I secure an intermittent movement of the support at those times when it is required to transfer a melting pot or crucible to the casting apparatus, and am enabled to keep the said support stationary during those times when a melting pot or crucible is being removed therefrom or placed thereon. Other means for actuating said support may be used, however, without departing from the spirit and scope of the invention, so long as the travel of the support for the melting pots or crucibles is so timed as to insure the proper conditioning of the metal and bring the melting pots or crucibles successively into position at the opening c' when required for transfer to the pressure chamber.

By arranging the burners about the periphery of the furnace, the flame is caused to impinge directly upon the melting pots or crucibles and the requisite temperature is applied thereto in a manner to secure the desired rapid fusing of the metal therein. At the same time the temperature conditions throughout the furnace are substantially identical. By using a plurality of such burners, I secure a better and more uniform distribution of the heat and at the same time, a more rapid fusion of the metal.

It is not my intention to limit the inven-

tion to the precise details of construction shown in the accompanying drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention what I claim as new and desire to have protected by Letters Patent is:—

1. A metallurgical furnace having a circular refractory inclosing wall having a single charging and discharging opening therethrough, a top of refractory material having a vent opening therethrough, a rotatable support having a top surface of refractory material, within said inclosing wall, said top surface of said support having seating depressions adapted to receive a plurality of melting pots adjacent one edge thereof, a plurality of gaseous fluid jet burners projecting through said wall at spaced points around the same, above the top of said support and in position to direct flame against the sides of the melting pots on said support, said burners being arranged to simultaneously subject the melting pots to substantially uniform temperature, and means for rotating said support step-by-step as desired, whereby the melting pots may be inserted through said opening and removed therethrough, one at a time.

2. A metallurgical furnace embodying therein a refractory side wall having an opening therethrough, a top therefor, a central vent opening therein, means for developing the desired temperature within the said wall, a rotatable support having a top surface, and a column extending adjacent said top closure, of refractory material, said support being mounted within said wall and said top surface being adapted to receive a plurality of melting pots or crucibles adjacent one edge thereof, and means adapted to impart movement to said support to bring said melting pots or crucibles successively in position adjacent said opening whereby said melting pots or crucibles may be inserted in or removed from within said furnace one at a time and will remain therein a sufficient time to insure the desired conditioning of the metal therein contained.

3. A metallurgical furnace embodying therein an elevated base, a cylindrical side wall of refractory material carried thereby, a rotatable support mounted upon said base within said side wall, said support having a top surface and a central column of refractory material whereby an annular heating chamber is formed adjacent said side wall, a plurality of gaseous fuel jet burners projecting through said side, and directed substantially parallel with and above the bottom of said heating chamber, a closure top above said heating chamber, said top having a vent opening therein above said column, said heating chamber being adapted to receive a plurality of melting pots or crucibles, and means adapted to impart rotary movement to said support and bring said melting pots or crucibles successively in position adjacent said opening whereby said melting pots or crucibles may be inserted in or removed from within said furnace one at a time and will remain therein a sufficient time to insure the desired conditioning of the metal therein contained.

In witness whereof I have hereunto affixed my signature in the presence of two subscribing witnesses, this 1st day of September, 1915.

JOHN KRALUND.

Witnesses:
F. T. WENTWORTH,
A. S. HUNKELE.