

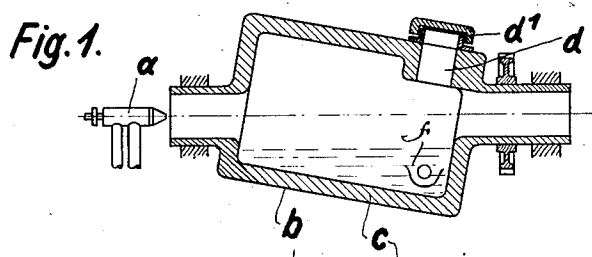
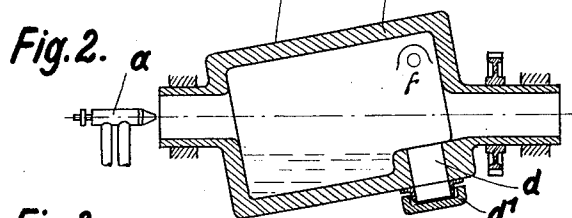
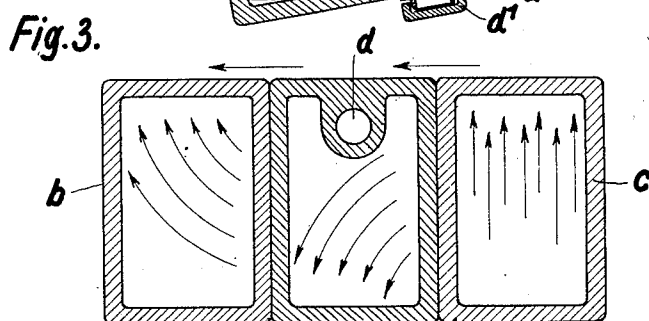
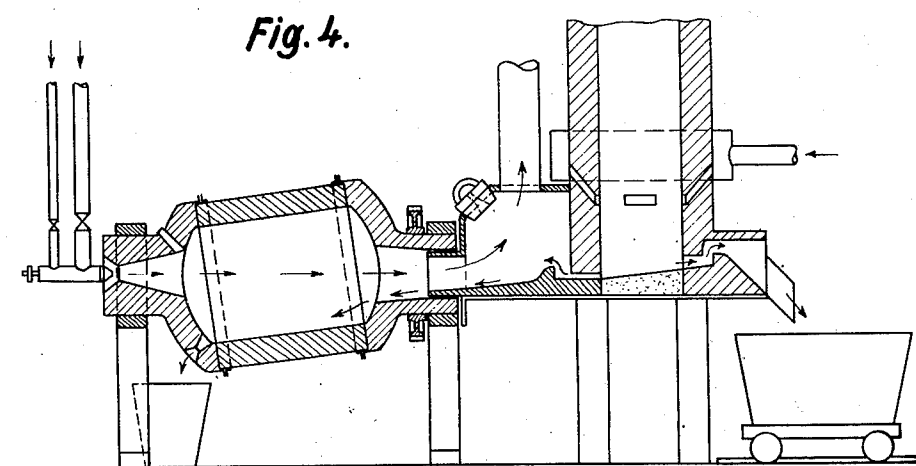
April 21, 1931.

W. BUESS

1,801,792

MELTING FURNACE

Filed July 7, 1927



Inventor:
Wilhelm Buess
By: Dr. Adolf J. Krumm
Attorney

UNITED STATES PATENT OFFICE

WILHELM BUESS, OF HANOVER, GERMANY

MELTING FURNACE

Application filed July 7, 1927, Serial No. 204,084, and in Germany July 18, 1926.

This invention has reference to rotatable melting furnaces adapted to be operated by oil or gaseous fuel, and it is intended to provide means of producing a thorough agitation of the material, to facilitate the manipulation of devices of this kind, to greatly improve the quality and the amount of the output, and to achieve other important objects and advantages which will appear from the specification and drawing. The heat required for the treatment of the metallic charge is produced in the well-known manner by means of burners for liquid or gaseous kinds of fuel disposed at one front side of the oven or furnace which is preferably arranged, so as to constitute a rotatable drum, the jet of the flame being projected into the interior of the oven and through the hollow bearing of the drum. In accordance with this invention the drum-shaped oven which is rotatable through full 360 degrees is arranged in such a manner that its longitudinal axis is inclined with relation to the horizontal axis of rotation. By this means the liquid melt is very thoroughly mixed during the rotation of the oven in a manner not obtainable by any of the rotatable cylindrical ovens or furnaces heretofore known, inasmuch as a continuous submersion and emerging of the various portions of the melt which are of different specific gravity are obtained in this manner both in the tangential, as well as in the axial direction. The advantages resulting therefrom will produce a highly improved convection of heat and thereby intensify the efficiency of the oven, and in addition this novel kind of agitating movement results in a very important improvement, in and the ennobling of, the quality of the molten material by mechanical means. As a result of the rolling and simultaneous rocking movement the injurious amounts of occluded gases and any still existing remnants of slag or impurities contained in the bath are very rapidly acted upon and are moved to the surface of the charge and are expelled. While the gases are expelled, the slag which has risen to the top of the metal bath as a result of the rolling, rocking and somewhat cooling movement, and by means of the constant

agitation to which the slag is itself submitted is thereby compelled to part with any still adhering amounts of metal. In this case of alloys the important advantage of a continuous and intimate mixture of the components is obtained.

In further pursuance of my invention the charging hopper, funnel or the like is arranged at one side of the body of the furnace or oven and in such a manner that even in its deepest position it will not be flooded by the liquid molten metal so as to prevent the liquefied metal from entering and freezing in the feeding opening. With this point in view the hopper is disposed at a point which is as near as possible to the rotating axis and the lining of the oven at this point is provided with an enlargement or a shoulder operating as a partition.

The invention is shown by way of exemplification on the accompanying drawing in Figure 1 in the longitudinal section showing an embodiment of a construction according to this invention in the position ready for charging. Fig. 2 shows the oven according to Fig. 1 in a position turned through an angle of 180 degrees with relation to Fig. 1. In Fig. 3 a diagram is shown representing the movement of the melt upon the rotation of the furnace or oven; and Fig. 4 illustrates an oven or furnace according to Figs. 1 to 3 connected with a cupola furnace.

The burner *a* for oil or gaseous fuel is disposed at a front side of the oven. The body portion of the oven in the embodiment shown constitutes an elongated rotation-body *b* such as, for instance, a cylinder with hollow bearings. Its longitudinal axis forms an acute angle with the horizontal rotating axis. The charging opening *d* with cover *d'* is situated as near as possible to the axis of rotation; the lining *c* of the oven or furnace is reinforced or thickened at this point, or it is provided with a projecting enlargement which, in the position of the oven according to Figure 2, prevents the access of the molten metal to the charging opening. The said liquid metal which at the completion of the rolling and rocking movement of the oven or furnace has collected in the pocket, 100

provided by the inclination thereof is prevented from comparatively rapid cooling by the existing cover of slag and by the inwardly projecting wall of the tubular feeding opening *d*. The liquid cover of slag which is ordinarily of greater fluidity than the bath of metal may be run off through the port in the end wall opposite the burner and through the tubular opening *d*, while the liquid metal after the removal of the slag may be drawn off by inclining the furnace or oven or through a separate discharging hole in the position according to Figure 1 and indicated at *f*; or this hole *f* in the position of Figure 2 may be used as a means of removing the slag by the insertion of a ladle or the like.

It appears from Figure 3 of the drawing that the liquid melt at its initial position according to Figure 1 will first perform a rolling movement in the tangential direction. After the oven has been turned through 180 degrees, the material has been moved in the axial direction towards the left and has become thoroughly intermixed thereby. Upon turning the oven or furnace through another 180 degrees the melting material, while being moved in the opposite direction, is again intimately mixed, so as to be in condition for an efficient ennobling by this mechanical treatment.

The oven-body according to this invention may also be employed as a kind of fore-hearth for cupola-furnaces, blast furnaces and other melting furnaces, as shown for instance in Figure 4 of the drawing. In these cases the charging opening *d* may be dispensed with and one of the ends of the oven may serve as the admission means for the melt or the material under treatment.

In practice modifications of the specific construction shown may be made to adapt the invention to varying conditions of application and without thereby deviating from the spirit and scope of the invention, as defined in the appended claims.

I claim:—

1. In a device of the kind described a substantially cylindrical rotatable oven, inclined with relation to its axis of rotation, front and rear walls on said oven, coaxially disposed ports in said walls of smaller diameter than the oven, tubular charge controlling means in the side of the oven adjacent one of said ports and inwardly extending up to the opening of said port.

2. In a device of the kind described, a substantially cylindrical rotatable oven inclined with relation to its axis of rotation, end walls on said oven, coaxially disposed ports in said end walls of smaller diameter than the oven, inwardly projecting, substantially tubular charge controlling means, close to the end walls at a point of the outer wall of the fur-

nace nearest its axis of rotation and inwardly extending within vicinity of said ports.

3. In a device of the kind described, a substantially cylindrical rotatable oven inclined with relation to its axis of rotation, end-walls on said oven, coaxially disposed ports in said end walls of smaller diameter than the oven, heat admitting means communicating with the ports, peripherally disposed outwardly closable charge controlling means in the side wall of the oven close to the end walls at a point nearest the axis of rotation and extending up to the port-opening.

4. In a device of the kind described, a substantially cylindrical rotatable oven, inclined out of its axis of rotation, end-walls on said oven, coaxially disposed ports in said end-walls of smaller diameter than the oven, substantially tubular charge controlling means in the side wall of the oven, substantially parallel with and close to the end-walls and inwardly extending substantially up to the port at a point nearest the axis of rotation, an annular thickening of the oven-wall surrounding the inwardly extending part of the feeding means, closing means for the feeding means at the outer end thereof, and heat admitting means communicating with the ports.

5. In a device of the kind described, a substantially cylindrical, rotatable oven, inclined out of its axis of rotation, rotating means for the oven, end-walls on said oven, coaxially disposed ports in said end-walls of smaller diameter than the oven, heat-admitting means communicating with one of said ports, and an axially disposed outwardly projecting communicating and operating sleeve at the other port, a substantially tubular conduit in the side-wall of the oven, adjacent the end-wall at a point relatively nearest to the axis of rotation, and inwardly extending substantially up to the adjacent port, and an annular thickening of the oven-end-wall surrounding the inwardly extending tubular portion of the conduit.

6. In a device of the kind described, a substantially cylindrical rotatable oven inclined with relation to its axis of rotation, end walls on said oven, horizontal, coaxially disposed ports of smaller diameter than the oven and unequally spaced from the side-walls respectively surrounding said ports, charge receiving means at the end of the oven, close to the port and to the end of the respectively shorter-distanced side wall, and heating means cooperating with the ports.

WILHELM BUESS.