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## (54) Liquid metal dispensing oven

(57) The dispensing oven has a tank (1) for storing liquid metal and projecting from its external surface with an ascending inclination is a dispensing tube (2) furnished with a discharge mouth (3) from which liquid metal is supplied directly to a mould or injection machine. In this way there is a reduction in the dispensing times to the injection machine and at the same time breakages of the dispensing tube are avoided, thereby reducing unwanted downtime. The dispensing tube enables reduction in heat loss, enabling an exact temperature to be maintained on casting and reduces oxidation.

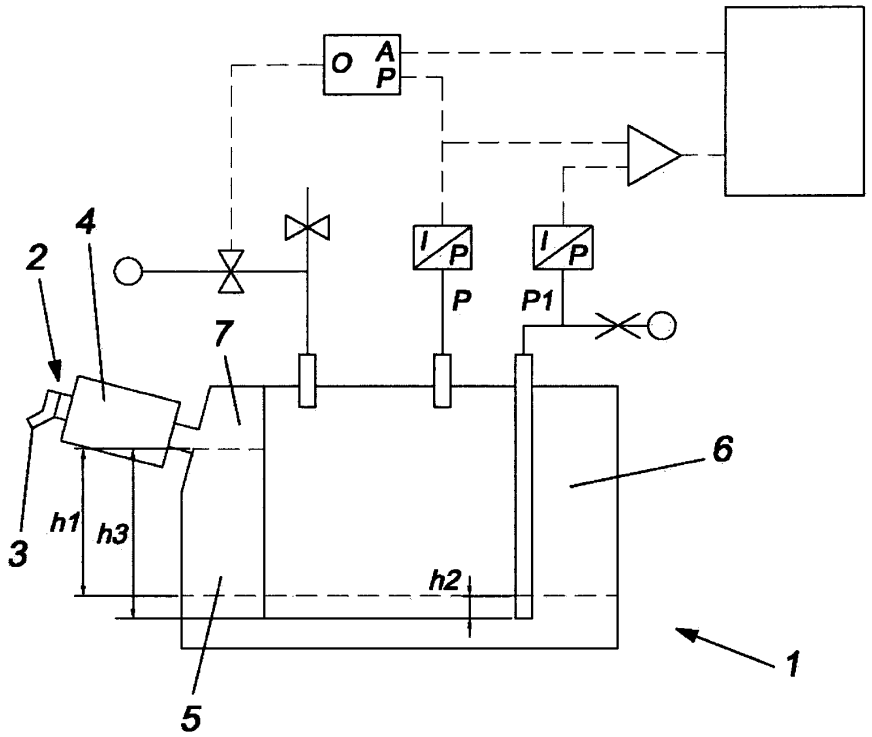


FIG. 1

EP 2 180 281 A1

## Description

### PURPOSE OF THE INVENTION

**[0001]** This invention refers to a dispensing oven used for keeping metals molten and for dispensing these metals to injection machines or moulds, which form the items. The invention is of preferential application for aluminium ovens without a crucible.

**[0002]** The purpose of the invention is the development of a dosing oven with a means of dispensing that enables a reduction in the time required to supply liquid metal to the injection machine or mould and at the same time is strategically situated and designed in order to avoid breakdowns and therefore unwanted downtime.

**[0003]** The purpose of the invention is also to enable the dosing oven to reduce heat loss, to supply an exact temperature to the casting and reduce oxidation.

### BACKGROUND OF THE INVENTION

**[0004]** Dosing ovens generally have at least one exit channel on the outside of the oven through which molten metal leaves towards the mould or injection machine used to shape the final item. Connected to this exit channel, the oven has a dispensing tube that is largely submerged inside the oven tank and through which the liquid metal ascends towards the exit channel.

**[0005]** These dispensing tubes are subject to high temperatures and to sudden changes in temperatures and can receive unwanted blows, for example during cleaning and maintenance operations, that may give rise to breakages.

**[0006]** Breakage of the dispensing tube implies the need to stop the oven for repair, therefore rendering it inoperative for a period of time, making it non-productive.

**[0007]** The fact of having an exit channel at the dispensing tube implies that the cycle time for an item, from the dispensing order to the moment when the quantity required for the item has been dispensed is the sum of the times T1+T2+T3, in which T1 is the response time from when the measurement system detects the first appearance of metal from the tank in the channel, sends the signal to the pressure system and the ejected liquid metal appears in the channel, T2 is the time of flow of metal in the channel and T3 is the dispensing time.

**[0008]** Also the time during which the liquid metal passes through the channel implies that the metal can cool in contact with the air and unwanted oxidation can take place.

### DESCRIPTION OF THE INVENTION

**[0009]** The dosing oven that is the object of this invention enables a reduction in the time per item and therefore an increase in productivity, and at the same time, it improves reliability. This is the consequence of incorporating a dispensing tube that is totally external to the oven tank, in which this dispensing tube is inclined upwards and has a discharge mouth from which the liquid metal is directly poured into the injection machine or mould.

**[0010]** This dispensing tube enables the pouring of liquid metal directly, without the use of any channel, as the liquid metal is ready to exit to the outside from the discharge mouth. In this way, the communication channel between the oven and the injection machine or mould is considerably reduced.

**[0011]** The tank is normally pressurised and the means of applying pressure are those that control the exit of liquid metal. In this case, the fact of having an exclusively external dispensing tube enables the incorporation of a partition inside the tank that defines two inter-communicating chambers; a first chamber, closest to the dispensing tube and a second chamber where the liquid metal is loaded from the outside. In this way, the first chamber can have a level of liquid metal that is higher than that in the second chamber.

**[0012]** With this division of the tank into two chambers, the liquid metal of the first chamber can be constantly close to the discharge mouth for its immediate exit to the injection machine or mould, located nearby. In this way, a considerable reduction in response times can be achieved.

**[0013]** For safety reasons and for ease of access to its inside, the first chamber can have an access point on top covered by a lid.

**[0014]** The dispensing tube can be heated or not. The fact that it is heated allows the maintenance of the temperature of the liquid metal over the whole length of the tube until it finally emerges through the discharge mouth without loss of heat, thereby achieving exact temperature control of the metal on casting.

**[0015]** Also, the fact that the dispensing tube is closed implies that the liquid metal is not in contact with air, in contrast to the situation with a channel, and therefore the liquid metal does not oxidise.

**[0016]** The control system for dispensing liquid metal can be a conventional system incorporating a contact sensor located close to the discharge mouth or it may be the system described by the applicant of this invention in the European patent application titled "Dose control system for a liquid metal dispensing oven".

**[0017]** By using a dispensing tube that is completely external to the tank, the tasks of cleaning and maintenance of the oven tank are simplified, avoiding breakages and unnecessary downtime.

### DESCRIPTION OF THE FIGURES

**[0018]** In order to complement the description above and with the purpose of better understanding of the characteristics of the invention, this description is accompanied by a single Figure 1, which is an integral part of this description, schematically illustrating a preferred and non-limitative embodiment of the dispensing oven of this invention.

## PREFERRED EMBODIMENT OF THE INVENTION

**[0019]** With reference to Figure 1, a preferred embodiment of the dispensing oven is described below.

**[0020]** Figure 1 shows that the dispensing oven has a tank (1) storing liquid metal and projecting from its external surface with an ascending inclination is a dispensing tube (2) furnished with a discharge mouth (3) from which liquid metal is supplied directly to a mould or injection machine.

**[0021]** The dispensing tube (2) shown in Figure 1 has means of heating (4) that controls the temperature of the liquid metal inside.

**[0022]** The tank (1) consists of two inter-connected chambers (5, 6), in this case separated by a partition (7). The first chamber (5) is connected to the dispensing tube (2) in order to allow the liquid level in the first chamber (5) to be close to the discharge mouth and higher than the liquid level in the second chamber (6).

**[0023]** In Figure 1 it can be seen that the tank (1) has an access point at the top (8) and a lid (9) connected with the first chamber (5) in order to facilitate access to the inside.

**[0024]** The dispensing oven represented in Figure 1 can maintain liquid metal on two levels, in which the liquid metal in the first chamber (5) is normally at the same level as the position of the discharge mouth (3) and so ready to be supplied.

### Claims

1. Dispensing oven that consists of a tank (1) for storing of liquid metal **characterised in that** it includes a dispensing tube (2) extending out from the external surface of the tank (1) with an ascending inclination, furnished with a discharge mouth (3) from which liquid metal is directly supplied to a mould or injection machine.

2. Dispensing oven according to claim 1 **characterised in that** the dispensing tube (2) has a means of heating (4) that controls the temperature of the liquid metal inside.

3. Dispensing oven according to any of the previous claims **characterised in that** the tank (1) consists of two inter-connected chambers (5, 6), the first chamber (5) is connected to the dispensing tube (2) in order to enable the liquid in the first chamber (5) to be at a level similar to that of the discharge mouth and to be higher than the liquid level in the second chamber (6).

4. Dispensing oven according to claim 3 **characterised in that** the first and second chambers (5, 6) are separated by a partition (7).

5. Dispensing oven according to any of the claims 3 or 4 **characterised in that** the tank (1) has an access at the top (8) and a lid (9) connected to the first chamber (5) in order to facilitate access to the inside.

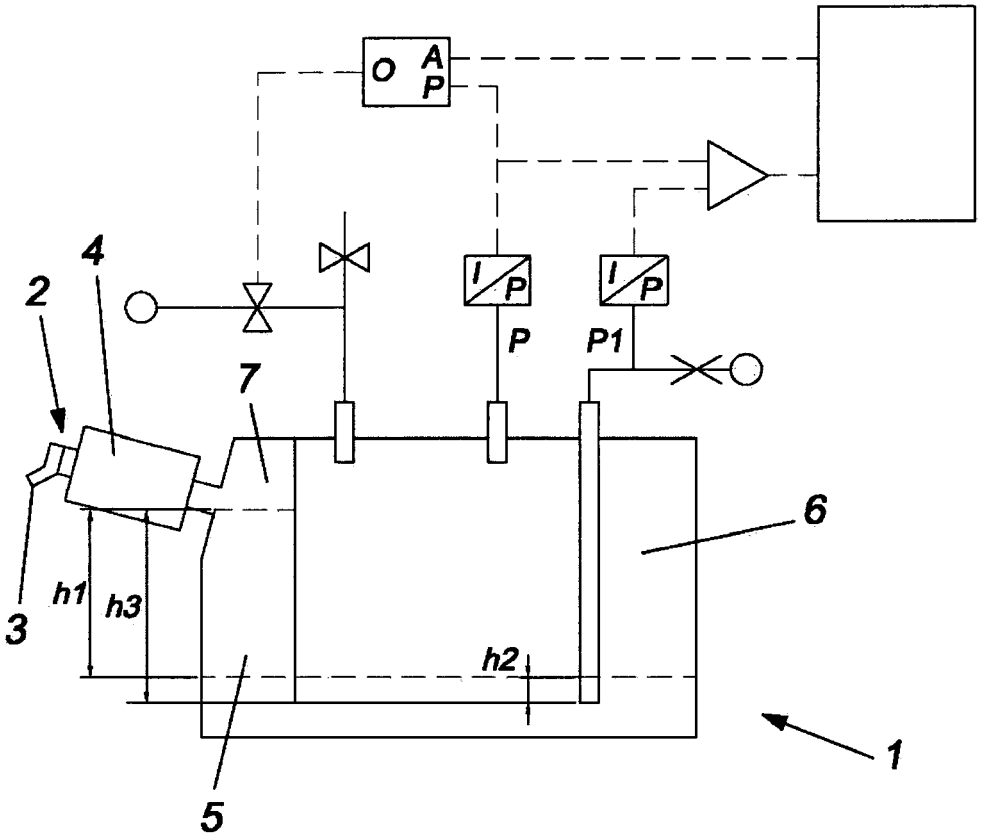


FIG. 1

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# EUROPEAN SEARCH REPORT

Application Number
EP 08 38 0305

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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TECHNICAL FIELDS SEARCHED (IPC)

F27B
F27D
B22D

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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| The Hague | 23 March 2009 | Peis, Stefano |

CATEGORY OF CITED DOCUMENTS

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& : member of the same patent family, corresponding document

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2

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 38 0305

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