United States Patent [19]

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[11] **3,865,282**

[45] **Feb. 11, 1975**

[54] **DEVICE FOR METERING MOLTEN METAL TO CONSUMER STATIONS**

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[22] Filed: **May 31, 1973**

[21] Appl. No.: **365,745**

[30] **Foreign Application Priority Data**

June 5, 1972 Sweden 7372/72

[52] **U.S. Cl.** **222/356,** 141/22

[51] **Int. Cl.** **B22d 37/00**

[58] **Field of Search** ..... 222/356, 357, 165, 179.5, 222/DIG. 8; 141/22, 108-112; 73/425.4 R, 425.2, DIG. 9

[56] **References Cited**

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[57] **ABSTRACT**

A device and method for metering molten metal to consumer stations are described. The device comprises a ladling device which is arranged to pass into a bath of molten metal present in a container intended therefore, through an opening disposed in the container walls. The ladle is arranged to fit snugly in the opening so as to shield the surface of the melt from the undesirable effect of the ambient atmosphere.

3 Claims, 2 Drawing Figures

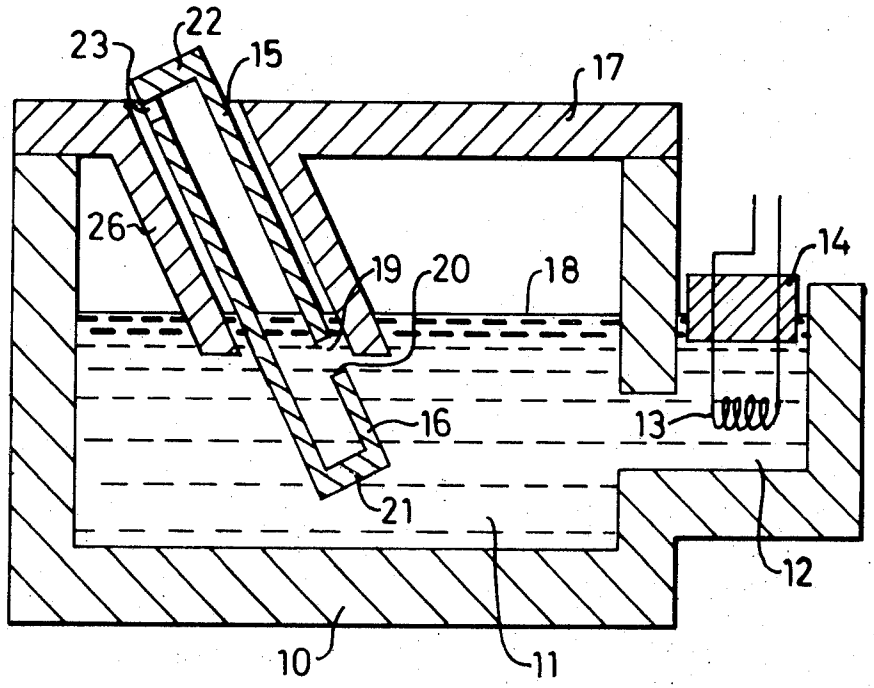


Fig. 1

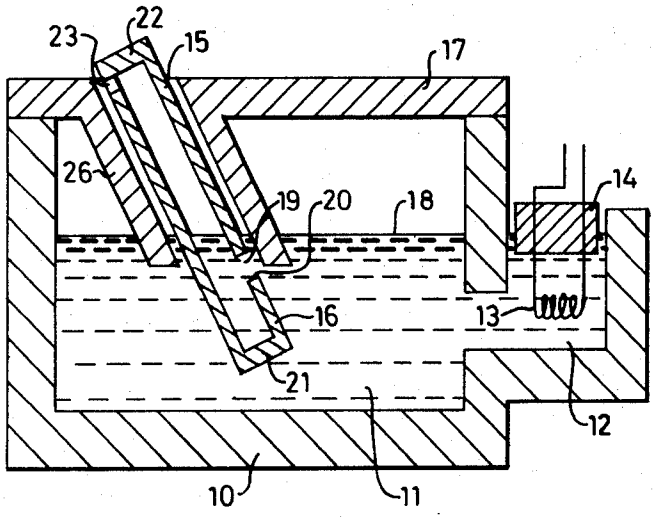
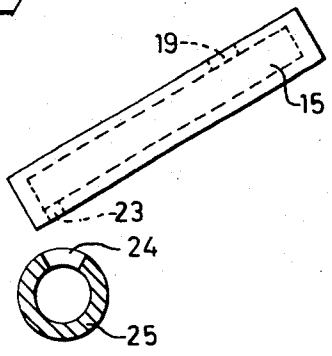


Fig. 2



DEVICE FOR METERING MOLTEN METAL TO CONSUMER STATIONS

The present invention relates to a device for metering molten metal to consumer stations, for example casting apparatus constructed on the basis of the so-called cold chamber method, in which there is used a ladle or like device capable of being immersed in a melt in a storage container and which can be moved between a ladle filling station in the melt and a ladle emptying station at the casting apparatus.

There are known to the art molten metal metering apparatus which comprise a ladling means made of a metal which, in principle, has but small resistance to the melt in which it is to be immersed when collecting metal. For this reason the ladling means have hitherto been dressed with a suitable chemical agent which protects the metal from which the ladle is made, during the short time the ladling means is in use. Thus, the known ladling means cannot be kept in the melt, but, when not in use, must be kept in the surrounding atmosphere in a position ready for use, which means that it is necessary to heat the ladle with a gas flame or the like to maintain the ladle at a temperature at which no freezing effect occurs in the metal to be conveyed in the ladle or in a melting furnace or the like. The ladling means is generally supported and controlled in a manner such as to enable it to be operated mechanically between a molten metal pick-up position in the melt and a molten metal discharge position at the consumer station, e.g., a casting machine. Further, with known ladle constructions the melt in the furnace is of necessity completely exposed to the influence of the atmosphere at least during the pick-up period, which means that the surface layer of the melt becomes oxidized, thereby causing considerable disadvantage.

The object of the present invention is to provide a metering means in the form of a ladle made of a material which is so resistant to the hot molten metal that the ladle can be kept in its pick-up position in the melt without it being necessary to move the ladle to a position of readiness externally of the furnace. A further object of the invention is to provide a device with which the furnace can be kept fully closed, i.e., so that the molten metal therein is substantially unexposed to the oxidizing effect of the surrounding atmosphere and so that the ladle forms a lid means for a molten metal pick-up opening arranged in the furnace wall.

In accordance herewith the invention is mainly characterized in that in an initial position the ladle extends with a relatively good fit through an opening confirming thereto and arranged in a portion of the walls of the storage container and arranged to close said container. In accordance with a preferred embodiment of the invention, the ladle has the form of a tube made of a material resistant to the molten metal and provided, at least at its pick-up end, with a bottom member and a filling opening located at a distance from said bottom member.

In accordance with a further embodiment of the invention, communication between the opening in the container wall and the surface of the melt is restricted by at least one shield member or the like immersed in the melt.

In accordance with an especially preferred embodiment of the invention, the storage container is provided with a removable lid, the opening being arranged in the lid and shielded from the major portion of the atmosphere in the container above the surface of the melt by a shield member immersed in the melt.

The invention will now be described in more detail with reference to an embodiment thereof diagrammatically illustrated in the drawing, further features of the invention being disclosed in connection therewith.

In the drawing,

FIG. 1 is a vertical sectional view of a furnace containing molten metal and provided with a ladle means according to the invention.

FIG. 2 shows the ladle tipped to its emptying position above an opening **24** intended to receive a specific quantity of molten metal carried by the ladle.

In the drawing, the reference numeral **10** indicates a furnace which is well insulated on all sides thereof and which contains a melt **11** of castable metal. The furnace communicates with a chamber **12** in which there is arranged a source of heat **13**, said source in the illustrated example being an electric resistance element carried by a so-called floating lid **14** of known type resting on the molten metal in the chamber **12**. Arranged in the upper portion of the furnace **10** is an opening through which the lower end, i.e., the pick-up end **16**, of a ladling device **15** constructed in accordance with the invention is dipped into the melt **11**. In the illustrated embodiment, the opening is arranged in a separate, removable furnace lid **17**. It also lies within the purview of the invention, however, to arrange the opening in any desired, suitable portion of the furnace walls. The illustrated ladling device **15** has substantially the form of a cylindrical tube. The device need not have round cross section, however, but may be of square, hexagonal or any other cross sectional shape.

In FIG. **1**, the tubular ladling device **15** is shown in its rest position, which also constitutes its pick-up position for collecting molten metal from the container. A filling opening **19** is arranged in the side of the tubular ladling device **15** adjacent the surface level **18** of the melt **11**, the lower end **20** of the opening **19** being located below the surface level of the melt, wherewith the quantity of molten metal contained between the closed bottom **21** of the ladling device and the lower end **20** of said device constitutes the pre-determined quantity of molten metal to be picked-up by the ladle and transferred to the consumer station. With the illustrated embodiment, the upper end of the ladling device **15** is also closed with a lid **22** or the like, there being arranged immediately beneath the lid **22** an opening **23** intended to serve as an outlet opening when the ladling device **15** is tipped to the position shown in FIG. **2**, with the outlet opening **23** located above the filling opening **24** in the filling cylinder or like device **25** of the consumer station (not shown). The opening **19** is also indicated in FIG. **2**. In FIG. **1**, the ladling device **15** is shown protected by means of a circular shield **26** which extends downwardly around the ladling device **15** from the furnace lid **17** to a position beneath the level of the molten metal **11**. The walls around the opening in the upper portion of the furnace and the inner walls **26** of the shield are intended to accommodate the ladling device **15** with a relatively good fit when said device occupies its beforementioned rest position in the furnace, which means that the device itself simultaneously forms a type of lid for the furnace. Communication between the outer air and the surface of the melt is restricted by the shield **26**, only a small portion of the surface of the

melt being in contact with the air outside the furnace during the time the ladling device is moved from its position in the opening in the upper portion of the furnace during a ladle emptying operation and is only briefly subjected to the influence of the surrounding atmosphere. Thus, there is virtually no risk of the surface of the melt freezing and only a minimum of oxides are formed on said surface. Since the major portion of the furnace **10** is insulated from the air outside the furnace, only a very small quantity of heat need be provided to maintain the furnace at the correct temperature. This enables inexpensive heat sources to be used.

The two aforesaid results, namely only slight oxidation and low energy consumption, together afford an extremely economic solution to the problems which previously prevailed.

Although not shown in the drawing, it is assumed that the ladling device **15** is carried by some mechanical control system capable of being operated manually or also automatically and which is arranged to move the ladling device from its rest position shown in FIG. **1**, i.e., the pick-up position, to the emptying position shown in FIG. **2** and back to its rest position, essentially by known methods.

The furnace chamber **12** may be connected to a system for distributing molten metal, e.g., to die-casting machines.

The invention is not restricted to the illustrated and described embodiments thereof, but can be modified within the scope of the following claims.

What is claimed is:

1. A device for metering molten metal to casting machines comprising, in combination, a storage container with melt therein, a ladling device capable of being dipped into the melt in said storage container and movable between a ladle filling position in the melt and a ladle emptying position at a casting machine, said ladling device extending in an initial position with a close fit through an opening in a portion of the walls of said storage container, and at least one shield member extending into the melt for restricting the communication between said opening in the walls of said storage container and the surface level of the melt.

2. A device according to claim **1**, wherein said storage container has a removable lid, said opening being arranged in said lid and being screened from the major part of the atmosphere in said container above the surface of the melt by said shield member extending into the molten metal.

3. A device according to claim **1**, wherein said ladling device has the form of a tube constructed of a material resistant to the melt and having at least at its pick-up end, a bottom member and a filling opening spaced from said bottom member.

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