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(54) **Refining ladle**

(57) The invention deals with the refining ladle for smaller volume of fluid metal 6 - 14 t, that consists of the steel bowl (1) with the side braces (2) and the lifting pins (3), which inside is provided with the insulation (4) with the permanent lining (5) and the working lining (6) and (7) of the ladle walls and bottom with the drain opening (8). The braces (2) located on the ladle steel bowl (1) with the lifting pins (3) are made in length of 0.7 h to 0.8 h, where h is the ladle steel bowl height (1), and the ladle steel bowl (1) height h to ladle mean diameter d ratio is 0.9 to 1.0.

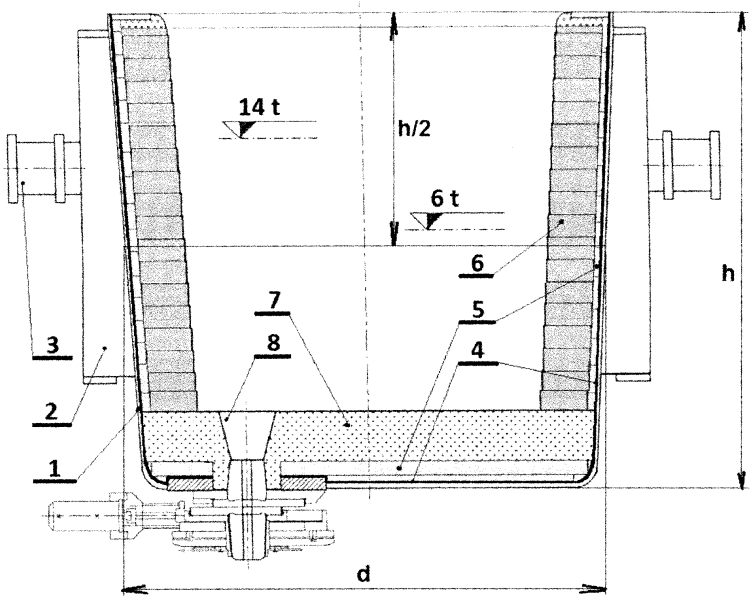


FIG. 1

EP 2 862 649 A1

Description

Technical Field

[0001] The engineering solution concerns the refining ladle for smaller volume of fluid metal that is designed for processing steel in the equipment of secondary metallurgy, however, mainly for processing smaller amount of fluid metal than minimally needed for the existing equipment.

Present State of the Art

[0002] At the present time, the application of the standard refining ladle that is designed for 15 - 20 t of fluid metal subsequently processed in the equipment of secondary metallurgy (ladle furnace, vacuum station) is always limited. The minimum amount of fluid metal in the ladle is 15 t and has to be observed mainly in order to keep the minimum metal level in the ladle. This maintained level is necessary for steel heating using graphite electrodes on the ladle furnace, further for sampling, measurement of temperature, activity, hydrogen content etc. The maximum amount of fluid metal in the refining ladle of secondary metallurgy is 20 t and is limited mainly in order to maintain the ladle height clearance above the steel level. It is necessary in order to ensure intensive inert gas blasting in case of vacuum steel processing. The standard refining ladle with lining for 15 - 20 t of fluid metal consists of a steel bowl with braces and lifting pins made in length of 0.5 to 0.6 of ladle steel bowl height and the ladle bowl height to ladle mean diameter ratio is 1.2 to 1.3. The bowl inside of the standard refining ladle is provided with insulation with permanent lining in the ladle bottom and walls made of fireclay blocks, further then with working lining of the walls made of magnesite building materials and working lining of the bottom made of monolithic refractory concrete. The ladle bottom is provided with a drain opening closed by gate valve. Dimensions of the standard refining ladle do not allow to process smaller amount of fluid metal than 15 tons in the given equipment.

Essence of the Engineering Solution

[0003] To a great extent, the above mentioned deficiencies are eliminated by the refining ladle for smaller volume of fluid metal 6 - 14 t, consisting of the steel bowl with the braces and lifting pins made in length of 0.7 to 0.8 of the ladle steel bowl height, when the ladle bowl height to ladle mean diameter ratio is 0.9 to 1.0. The ladle inside is provided with the insulation with the permanent and working lining of the ladle walls and bottom.

[0004] This arrangement results in ladle capacity reduction, while the steel level with smaller mass of fluid metal in the ladle remains saved. Saved at the same level also remains the ladle edge that is needed to fit and seal the ladle cover when processing in the equipment of secondary metallurgy.

[0005] The refining ladle having its steel bowl and braces with lifting pins acc. to the above mentioned engineering solution enables to process smaller amount of fluid metal in the given equipment for secondary metallurgy than the limit amount for the given equipment.

Pictures in the Drawing

[0006] The engineering solution is clarified more closely by means of a drawing. The Fig. 1 shows the sectional view of the refining ladle that consists of the steel bowl with the braces and lifting pins acc. to the engineering solution, the insulation, permanent and working lining in the ladle walls and bottom and the drain opening closed with the gate valve.

Example of Engineering Solution

[0007] The ladle consists of the steel bowl 1 with the braces 2 and the lifting pins 3. Provided on the bowl 1 inside is the insulation 4 with the permanent lining 5 made of fireclay blocks in the ladle walls and bottom. The working lining 6 of the ladle walls is made of magnesite building materials. The working lining 7 of the ladle bottom is made of monolithic refractory concrete. There is a drain opening 8 in the ladle bottom closed by the gate valve 9. The ladle capacity reduction is achieved by change of the braces 2 length to ladle steel bowl 1 height h ratio and by change of the ladle height h to ladle mean diameter d ratio.

Industrial Applicability

[0008] Acc. to the engineering solution, the refining ladle can mainly be used when processing smaller amount of metal than minimally needed for the given equipment of secondary metallurgy.

Claims

1. The refining ladle for smaller volume of fluid metal 6 - 14 t, consisting of the steel bowl (1) with the side braces (2) and the lifting pins (3), which inside is provided with the insulation (4) with the permanent lining (5) and the working lining (6) and (7) of the ladle walls and bottom with the drain opening (8), distinguished by the fact, that the braces (2) located on the ladle steel bowl (1) with the lifting pins (3) are made in length of 0.7 h to 0.8 h, where h is the ladle steel bowl height (1), and the ladle steel bowl (1) height h to ladle mean diameter d ratio is 0.9 to 1.0.

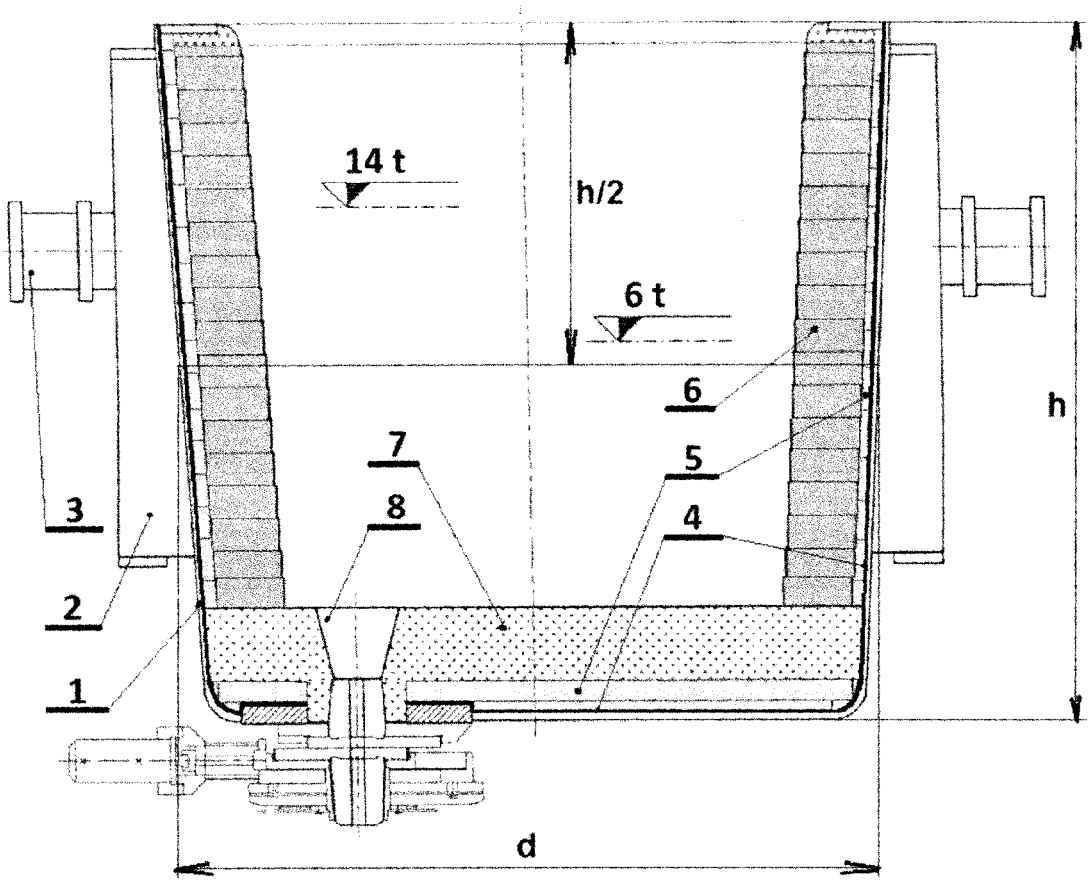


FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 14 46 6022

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 March 2015	Nikolaou, Ioannis

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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Application Number
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