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(71) Applicant: **NIPPON.CRUCIBLE CO., LTD.**
21-3 Ebisu 1-chome
Shibuya-ku, Tokyo, 150(JP)

(72) Inventor: **OKADA, Tamino**
17-14, Chuo 5-chome
Warabi-shi, Saitama, 355(JP)

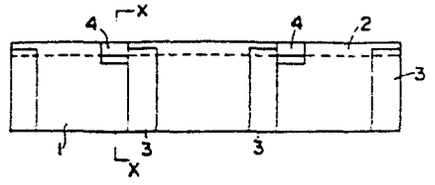
(72) Inventor: **SANO, Toshiaki**
5-78, Nogata 2-chome
Nakano-ku, Tokyo 165(JP)

(74) Representative: **Zumstein, sen., Fritz, Dr. Dr. F.**
Zumstein sen., Dr. E. Assmann Dr. R.
Koenigsberger et al,
Dipl.-Phys. R. Holzbauer Dipl.-Ing. F. Klingseisen Dr. F.
Zumstein jun. Bräuhausstrasse 4
D-8000 München 2(DE)

(54) **GUIDE TROUGHS FOR MOLTEN PRODUCTS.**

(57) Guide troughs for leading molten products tapped from blast furnaces or electric furnaces or the like. A lengthy trough body (1), formed in one block with monolithic refractories, is provided with hook-engaging means in order for the body to be lifted and transported. The hook-engaging means comprises supporting pipes (2) which are laid longitudinally in the upper portion of the body on both sides thereof; supporting transverse members (3) which are disposed in an appropriately spaced-apart relationship to interconnect the supporting pipes on both sides of the trough body; and cut-out portions (4) provided in the trough body at suitable locations to expose the supporting pipes (2) to be engaged by hooks. The fact that the trough body has such stout supporting means and hook-engaging means which does not project from the upper surface of the trough body as the suspension plates in the conventional guide trough of this type, allows the following advantages to be obtained. Namely, the hook-engaging means is protected against radiant heat and splashing from high temperature molten products flowing through the trough. This greatly enhances safety during transportation. In addition, as there are no objects projecting from the upper surface of the trough body, the guide troughs can be stored by stacking. This permits a reduction in storage space.

FIG. 1



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SPECIFICATION

GUIDE TROUGH FOR MOLTEN PRODUCTS

Field of the Invention

This invention relates to improvements in guide troughs to be used for conducting molten products from a melting furnace, such as a blast furnace and an electric furnace, and more particularly to a large size guide trough constructed in one block with monolithic refractory material.

Background of the Invention

In the recent tendency of the art, a long guide trough is constructed by stamping monolithic refractory material in one block instead of being constructed by brickworks, and transported and settled in the place where it is to be used. The method is also used for repairing the troughs, in which, when the inner surfaces of the troughs are worn by running molten products, whole of the trough is replaced with a new one instead of repairing by lining worn surfaces.

Such troughs are so heavy - some of them weigh about 1 ton or more - that the outside of the refractory body is reinforced by a supporting member, such as plates or frame works, which are usually provided with hook plates projecting upwards and having hook engaging holes for hanging the trough body.

As the hook plates are projecting upwards from the trough

body, hook plates are exposed to the heat radiation and splashes of the hot running molten products while in use, and this may weaken the hook plates and cause damages. Further, piling up of the troughts in the storage is hindered by such projections.

Summary of the Invention

The guide trough of the present invention includes a long trough body made of the monolithic refractory material and provided with a runway for conducting molten products in the top surface; a supporting means for supporting said trough body having a couple of holding beams buried at both side upper corners of said trough body and extending longitudinally, said holding beams being connected with supporting cross members disposed at intervals; and a hook engaging means provided by removing a part of said trough body and exposing the holding beams for engaging hook means. Thus a strong and rigid supporting and hook engaging means may be provided, as well as the hook engaging means does not project out from the trough body, so that it is not exposed to the heat radiation nor splashes of hot running molten products and the damages thereof can be prevented absolutely. Also, the troughs may be piled up easily in the storage.

The invention will be described in more detail with reference to the accompanying drawings.

Brief Description of the Drawing

Fig.1 is a side view of a trough according to the present invention;

Fig.2 is a cross-sectional view taken along line X-X of Fig.1;

Fig.3 is a top plan view of the trough in Fig.1;

Fig.4 is a partial front view showing one example of hook means;

Fig.5 is a side view of a trough of another embodiment of the present invention;

Fig.6 is a cross-sectional view taken along line Y-Y of Fig5;

Fig.7 is a top plan view of the trough in Fig.5.

Description of the Preferred Embodiment

The trough shown in Fig.1-Fig.3 includes a long body 1 formed by stamping monolithic refractory material and provided with a runway for conducting molten products in the top surface.

The body 1 is reinforced by a couple of holding beams 2 of cylindrical form buried at both side upper corners and extending longitudinally. The holding beams 2 are connected by U-shaped supporting cross members 3 disposed at intervals.

Hook engaging means 4 are provided at suitable portions of the body 1 by removing a part of body 1 and exposing the

holding beams 2 for engaging hook means.

The trough may be hung by engaging the hook 6 of the hanging members 5 such as shown in Fig.4 with a portion of the holding beam 2 in the hook engaging means 4, and thus the trough can be transported.

The hook engaging means 4 are not projecting from the body 1 so that the troughs can be piled up easily in the storage. Further the hook engaging means 4 are not exposed to the heat radiation or splash of hot molten products runing through the runway of body 1, so that the damages of the hook engaging means can be prevented.

Pipings, flat or angle bars may be used for the holding beams 2. Also connecting members 7 may be used for connecting and securing supporting cross members 3 at the bottom of the body 1 as shown in Fig.3.

Fig.5-Fig.7 shows a trough of another embodiment of the present invention, in which two flat bars 8 and 8' are used as a holding beam 2'.

Flat bars 8 and 8' are piled up together with a reinforcing member such as wire nettings 3' therebetween which is lined inside of the supporting cross members 3. Wire nettings 3' are secured to the flat bars 8 and 8' with bolts 9, and supporting cross members 3 are welded to the outside bar 8.

CLAIM

A guide trough for molten products, comprising a long body made of monolithic refractory material and provided with a runway for conducting molten products in the top surface thereof; a supporting means for supporting said body, having a couple of holding beams buried at both side upper corners of said body and extending longitudinally, said holding beams being connected with supporting cross members disposed at intervals; and a hook engaging means provided by removing a part of said body and exposing the holding beams for engaging hook means.

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FIG. 1

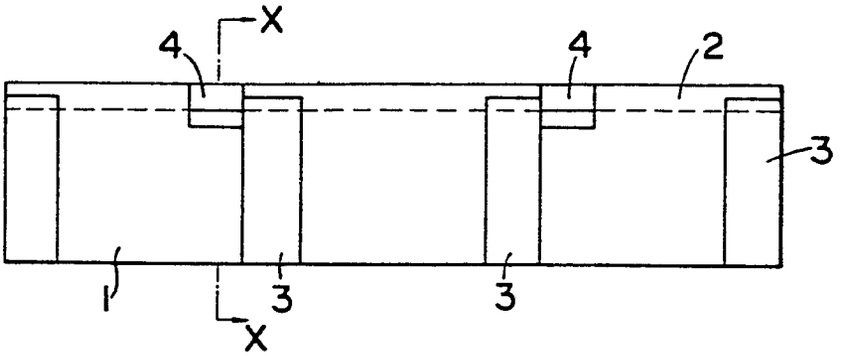


FIG. 2

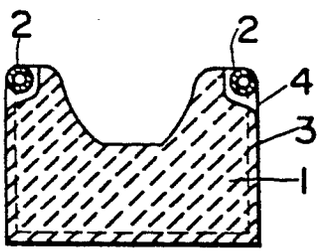


FIG. 4

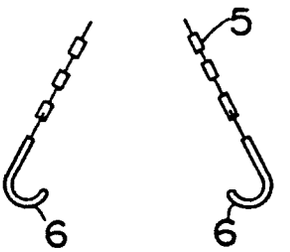


FIG. 3

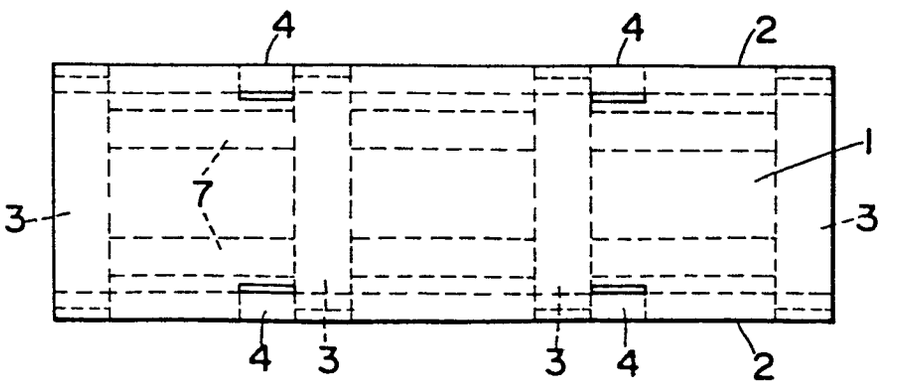


FIG. 5

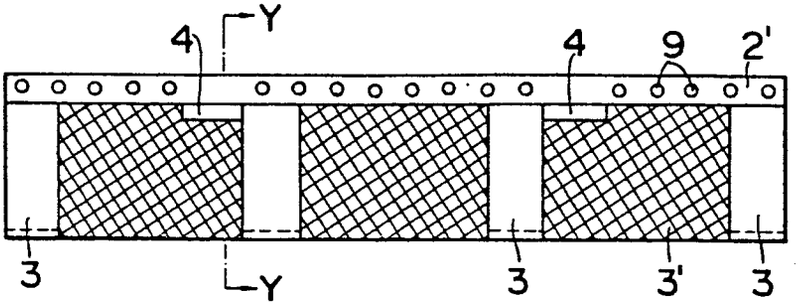


FIG. 6

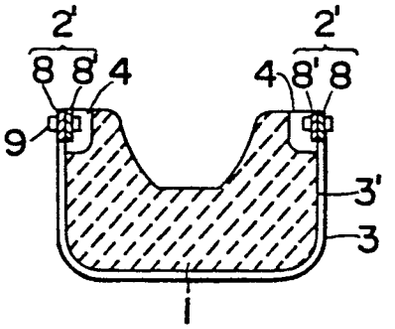
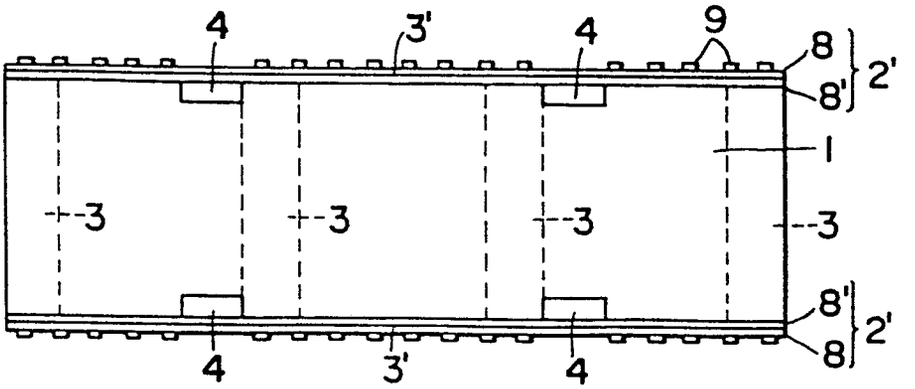


FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP79/00016

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

F 27 D 3/14

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	F 27 D 3/14

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

Jitsuyo shinan koho 1939 - 1979
Kokai jitsuyo shinan koho 1951 - 1979

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
P	JP, Y2, 53-8060, 1978-3-1	

* Special categories of cited documents: [15]

"A" document defining the general state of the art

"E" earlier document but published on or after the international filing date

"L" document cited for special reason other than those referred to in the other categories

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but on or after the priority date claimed

"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention

"X" document of particular relevance

IV. CERTIFICATION

Date of the Actual Completion of the International Search [3]	Date of Mailing of this International Search Report [3]
16 April 1979 (16.04.79)	23 April 1979 (23.04.79)
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Japanese Patent Office	

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