

Aug. 31, 1965

H. T. HALLOWELL, JR

3,203,689

REFRACTORY-LINED TUNDISHES

Filed May 10, 1962

Fig. 1.

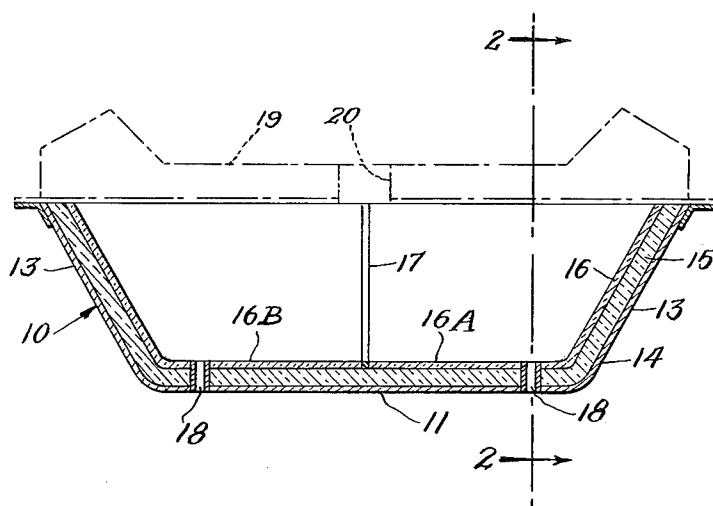
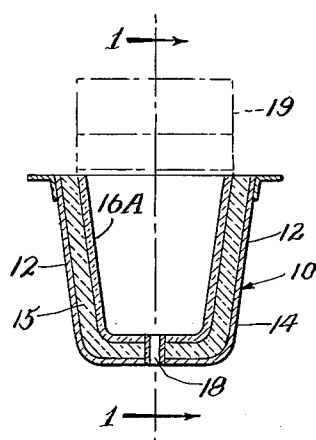


Fig. 2.



INVENTOR.

HOWARD THOMAS HALLOWELL JR.

BY

Symmetrict & Lichner
ATTORNEYS

1

3,203,689
REFRACTORY-LINED TUNDISHES
Howard Thomas Hallowell, Jr., Rydal, Pa., assignor to
Standard Pressed Steel Co., Jenkintown, Pa., a corpora-
tion of Pennsylvania
Filed May 10, 1962, Ser. No. 193,789
Claims priority, application Great Britain, May 15, 1961,
17,635/61
2 Claims. (Cl. 266—43)

This invention relates to a vessel of the type known as a tundish for containing molten metal, and comprising a metal casing lined with refractory material. A tundish is used in casting operations as an intermediate vessel between a ladle and a mould, to receive a charge of molten metal from the ladle and to pour it at a controlled rate into the mould, as required.

A tundish is usually preheated to a high temperature to reduce the amount of metal solidifying in it, and this and other operating factors result in the refractory lining having to be replaced regularly. For example, the refractory lining of a tundish associated with a continuous casting machine may be satisfactory for only one casting operation, whereas the lining of a ladle may remain satisfactory for fifteen similar operations.

It has previously been known to make a refractory lining for a tundish from refractory bricks, or by ramming sand or other granular refractory material around the inner surface of the metal casing, but these methods are slow and laborious.

According to the present invention a tundish has an inner lining of moulded ceramic material preformed as one or more monolithic shells and fitted inside the outer casing.

Preferably, for small vessels, the ceramic lining is of one-piece shell construction, but if the lining comprises several preformed shells these may be joined together by cement having good refractory properties.

A layer of heat-insulating material may be placed between the outer casing and the ceramic lining.

The tundish may have one or more nozzles for pouring molten metal into moulds. In one arrangement the nozzle or each nozzle extends through registering apertures in the ceramic lining and the outer casing; alternatively the nozzle or nozzles may be moulded integrally with the ceramic lining.

The invention may be carried into practice in various ways but one specific embodiment will now be described by way of example with reference to the accompanying drawings, in which:

FIGURE 1 is a side elevation of a tundish, in section on the line I—I of FIGURE 2, and

FIGURE 2 is a crosssection on the line II—II of FIGURE 1.

In the illustrated embodiment the invention is applied to a tundish 10 of generally rectangular plan having a flat base portion 11 and upwardly extending, nearly vertical side walls 12. The end walls 13 of the tundish are inclined to the vertical at about 30°.

The tundish 10, which is of rigid construction, comprises an outer steel casing 14 capable of supporting the weight of the tundish together with a charge of molten metal contained in it. The steel casing 14 is lined with a layer of heat-insulating material 15 in any conventional

2

manner, and the layer 15 is covered by a monolithic ceramic shell 16 comprising the refractory lining of the tundish. If the tundish 10 is of small dimensions, it will be convenient to construct the ceramic lining shell 16 in a single piece, but in the illustrated embodiment, which is a large tundish, the shell 16 is formed in two pieces 16A and 16B constituting identical prefabricated monolithic shells whose edges 17 are abutted and joined together, either in the tundish or before being placed in it, by a cement having good refractory properties.

The tundish 10 is provided with a pair of nozzles 18 in its base portion 11. The nozzles 18 might be formed integrally with the ceramic shells 16A and 16B, but in this case separate nozzle members are provided which extend into the interior of the tundish through apertures in the shells 16A and 16B, the nozzles passing through the insulating layer 15 and the outer steel casing 14.

The tundish may be used in conjunction with a detachable roof indicated at 19, which covers the open top of the tundish. The roof 19 is provided with a central aperture 20 through which molten metal can be poured from a ladle into the tundish, the metal from the tundish being distributed at a controlled rate through one or each of the pouring nozzles 18 into moulds located beneath the tundish, the moulds for example being incorporated in a continuous casting machine.

The ceramic shells 16A and 16B which constitute the lining of the tundish 10 can be mass-produced under factory conditions, and because they can be quickly replaced when worn out or damaged they enable the operating costs of casting processes involving the use of the tundish to be reduced, since less time and labour will be required for re-lining the tundish as compared with previously used arrangements.

I claim:

1. A tundish comprising a rigid metallic outer casing having upwardly extending sides and a flat bottom portion, said casing being capable of supporting the weight of the tundish together with a charge of molten metal, a layer of heat insulating material within said outer casing, an inner monolithic lining for said tundish formed from a high strength refractory material, said lining forming a structurally self-sustaining shell removable as a unit, said inner lining, said heat insulating material and said outer casing each being provided with aligned apertures located in the bottom portion of the tundish, and a nozzle inserted in and projecting through said aligned apertures.

2. A tundish as claimed in claim 1 in which the lining is a ceramic lining of a one piece shell construction.

References Cited by the Examiner

UNITED STATES PATENTS

2,438,559	3/48	Hubbell	266—43
2,650,255	8/53	Hogel et al.	266—38
2,826,793	3/58	Flickinger et al.	22—85
2,871,008	1/59	Spire	266—39
2,961,722	11/60	Lilljekvist et al.	22—84
3,028,642	4/62	Stauffer	22—85

J. SPENCER OVERHOLSER, *Primary Examiner.*
MARCUS U. LYONS, MICHAEL V. BRINDISI,
Examiners.