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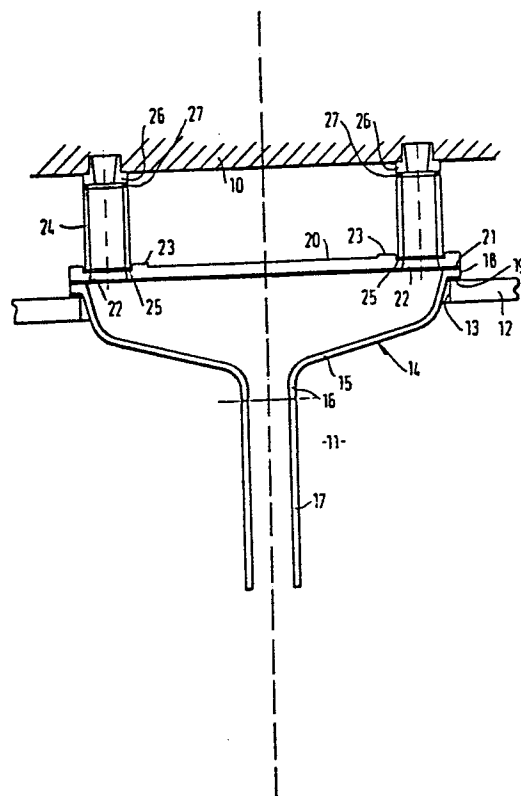
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(54) **Die casting.**

(57) A low pressure die casting machine which has two or more dies which are fed from a common manifold (14) via intermediate tubes (24). The manifold (14) is situated so that it is at least partly exposed to heat from the furnace (11) to retain the metal in the manifold (14) molten.

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Die Casting

This invention relates to low-pressure die casting machines and will be described in relation to the manufacture of die-cast wheels. However the invention may be used in die casting machines designed for other purposes.

5 In a conventional low-pressure die casting machine the die is arranged over a furnace in which the metal to be cast is maintained molten. A feed tube leads down from the die and dips into the metal in the furnace. When the die is to be filled, gas pressure is applied to the surface of the metal
10 in the furnace so that the metal flows up the feed tube into the die. When the latter is full the gas pressure is reduced and the metal in the feed tube descends once more into the furnace. If the machine has a single die set then there is a single feed tube from the furnace to the die. Some machines
15 have two or more die sets and it has been proposed to have separate feed tubes from the furnace, one to each die set. Since the furnace crucible tapers towards its bottom it is sometimes difficult to get these separate feed tubes in.

 It has also been proposed to have a feed tube passing up
20 through the furnace and, above the furnace lid, to have a Y-piece to die sets. With this arrangement it is necessary to provide added heat to the Y-piece to keep the metal therein molten and this heat is also applied to the die base which is undesirable. Furthermore, the die base is used to seal the
25 top of the Y-piece and it has been found in practice that this is a very difficult joint to seal.

 It is an object of the invention to provide a low pressure die casting machine which has two or more die sets which overcomes the problem set out above.

30 According to the invention a low pressure die casting machine comprises a die base carrying two or more dies, a

furnace for molten metal below the die base, a lid for the furnace spaced below the die base, a feed tube extending into the furnace, a manifold at the upper end of the tube and separate intermediate tubes extending upwardly from the manifold to each die, at least the lower part of the manifold being within the furnace whereby, when the machine is in use, heat from the furnace retains any metal in the manifold in a molten condition.

This arrangement has two advantages over the last arrangement described above. Firstly, it is unnecessary to provide such an additional source of heat to maintain the metal in the Y-piece molten since such heat is provided by radiation and convection from the metal in the furnace. Secondly, because there is no external heat applied to the Y-piece, the die base can be kept cooler than heretofore and there can be some air space between the furnace lid and the die base.

The manifold may be entirely within the furnace and inside the furnace lid with the intermediate tubes projecting through the lid. It is preferred, however, that the manifold be inset in the furnace lid and comprises a lower part extending through the lid and an upper, releasable cover above the lid.

The invention will now be described in detail by way of example with reference to the accompanying drawing which is a detail section of a low pressure die casting machine embodying the invention showing the feed arrangement for the die.

Referring to the drawing, the die base of the machine is indicated at 10. Beneath the die base is a furnace indicated generally at 11 and having a lid 12 which closes the top of the furnace. Within the lid 12 is an aperture 13.

Received in the aperture is a Y-shaped manifold indicated generally at 14. The manifold has a lower part 15

having a spigot 16 to which is secured a feed tube 17 which extends downwardly into the furnace. The upper edge of the lower part 15 is provided with a flange 18 which overlies the furnace lid 12 around the aperture 13 and is sealed thereto by a gasket 19.

The open top of the manifold is closed by a cover 20 which is sealed to the part 15 by a gasket 21.

The manifold, feed tube and manifold cover may all be made from cast iron lined with a refractory material.

10 Adjacent each end thereof the manifold cover is provided with an aperture 22 and surrounding the upper edge of the aperture is a rib 23. Received within each circular rib 23 is an intermediate tube 24, this tube being sealed to the manifold cover by a gasket 25.

15 Received in the die base are two sprue bushes 26 which register with the upper ends of the intermediate tubes 24 and are sealed thereto by gaskets 27. The intermediate tubes 24 may be made of cast iron lined with refractory material and the sprue bushes may also be made of cast iron.

20 Each of the sprue bushes 26 leads to a die set, not shown, mounted above the die base.

In use, molten metal in the furnace is forced up the feed tube 17 by gas pressure, normally air pressure, applied to the surface of the metal between that surface and the furnace lid 12. The metal moves up the feed tube 17 into the manifold and from the manifold through the apertures into the intermediate tubes 24 and into the dies. When the dies are full, the air pressure is reduced so that the metal level in the feed tube and manifold falls. Normally the air pressure will be reduced until the molten metal level is within the manifold. The metal in the manifold is retained molten due

to heat applied to the manifold from the furnace by radiation and convection.

5 It will be seen that there is a considerable air space between the manifold cover 20 and the die base 10 so as to prevent the conduction of unwanted heat from the furnace and manifold to the die base. In some circumstances it is necessary to keep the tubes 24 very hot and in such circumstances the air space gives room to place inwardly-facing rings of gas burners around the tubes.

10 We have found that in practice it is considerably easier to seal the joint between the manifold and the manifold cover as shown with a gasket 21 rather than to seal the manifold with the die base as has previously been done.

15 Should there be any freezing of metal in the intermediate tubes then it is comparatively easy to lift the die base and remove the tubes for cleaning out.

It will be seen that the invention provides an improved low-pressure die casting machine in which two or more dies are fed with molten metal from a common furnace.

CLAIMS

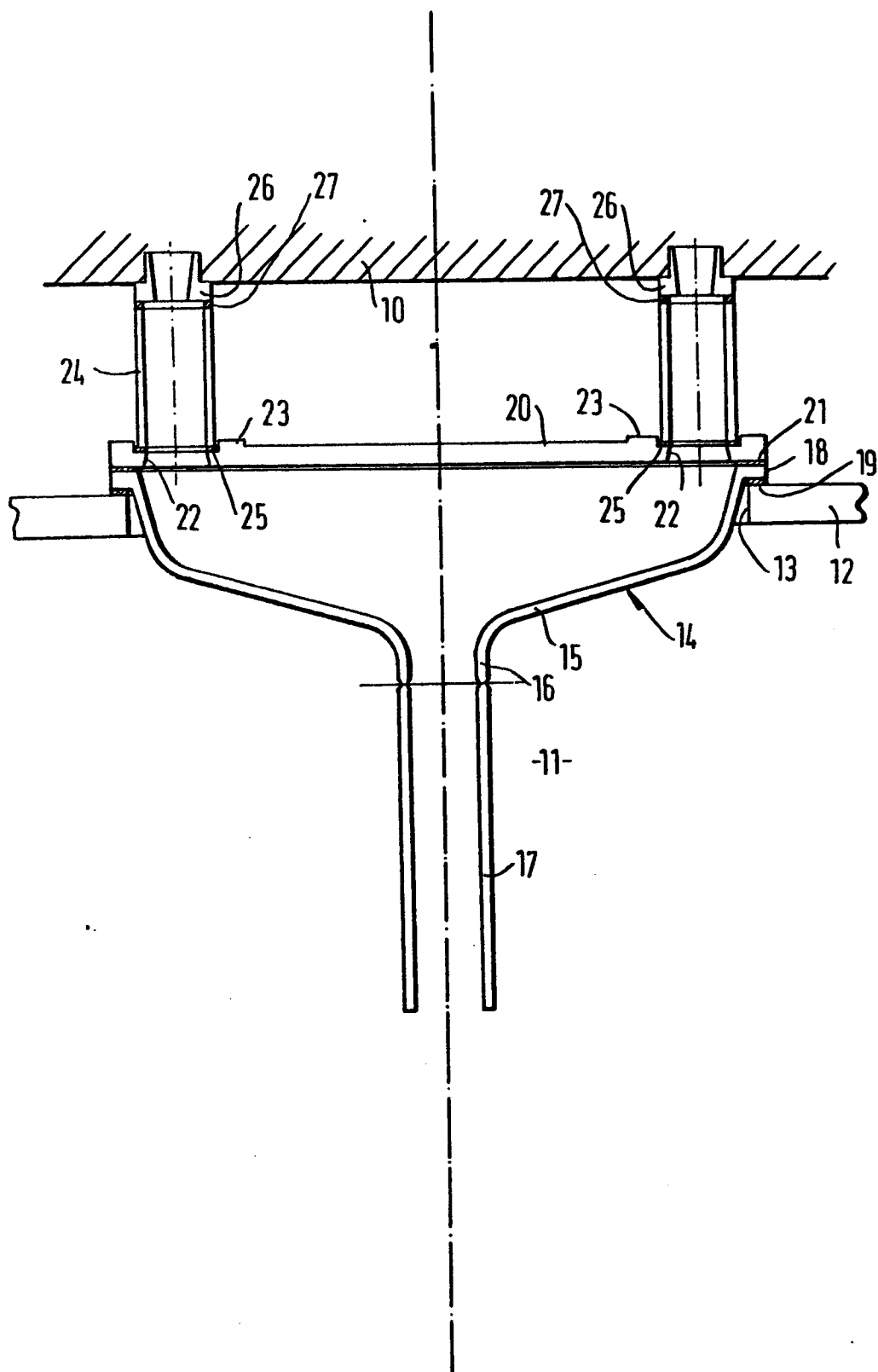
1. A low-pressure die casting machine comprising a die base carrying two or more dies, a furnace for holding molten metal below the die base and a feed connection for molten metal between the furnace and the dies characterised in that
5 the top (12) of the furnace is spaced below the base (10) of the dies and that the feed connection between the furnace and the dies comprises a feed tube (17) extending into the furnace, a manifold (14) at the upper end of the feed tube (17) and separate intermediate tubes (24) extending upwardly
10 from the manifold (14) to the dies; at least the lower part (15) of the manifold being within the furnace whereby, when the furnace is in use, heat from the furnace retains the metal in the manifold in a molten condition.

2. A machine according to Claim 1 further characterised in that the manifold (14) is inset into the furnace
15 top (12) and comprises a lower part (15) extending into the furnace through the top (12) and an upper, removable cover (20) having means (22) affording communication between the manifold and the tubes (24).

3. A machine as claimed in Claim 2 further characterised in that the manifold (14) is sealed to the top (12)
20 of the furnace and to said cover (20), and said tubes (24) are sealed at their ends to said cover (20) and to an entry portion of a respective die.

4. A machine as claimed in Claim 1 further characterised in that the manifold (14) is located entirely within
25 the furnace (11) with said tubes (24) projecting upwardly through the furnace top (12).

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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>DE - A1 - 2 438 060</u> (KOHASZATI, GYARE-PITÖ VALLALAT) * claim 1 *	1	B 22 D 18/04

	<u>US - A - 3 656 539</u> (AMSTED INDUSTRIES INCORPORATED) * fig. 1 *	1	

	GIESSEREI-PRAXIS Nr. 18, 1973, Berlin, G.G. WARTEY "Niederdruck-Kokillenguß" pages 329 to 336 * page 333; fig. 6 and 7 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.)

A	<u>DE - B - 1 280 505</u> (AMERICAN RADIATOR AND STANDARD SANITARY CORP.) * claim 4 *	1	B 22 D 18/00

A	<u>DE - A1 - 2 548 215</u> (GROUPEMENT POUR LES ACTIVITES ATOMIQUES ET AVANCEES) * fig. 3 *	1	CATEGORY OF CITED DOCUMENTS

A	<u>US - A - 4 076 070</u> (REGIE NATIONALE DES USINES RENAULT et al.) * fig. 1 *	1	X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons

X	The present search report has been drawn up for all claims		&: member of the same patent family, corresponding document
Place of search Berlin		Date of completion of the search 26-10-1979	Examiner GOLDSCHMIDT