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(54) Title: METHOD AND PLANT FOR MANUFACTURING LIGHT ALLOY CASTINGS BY INJECTION DIE CASTING WITH NON-METALLIC CORES

(57) Abstract: A method for manufacturing light alloy castings by die casting with disposable cores (71, 72), including a mold (6) filling phase in which the parameters of pressure and speed of the molten alloy (1) are controlled at levels tolerable by the cores (71, 72) until the cavities around the latter are filled by the molten alloy (1), and thereafter the pressure and speed parameters are controlled at levels suitable for completing and compacting the casting, the alloy (1) being kept at a temperature close to its melting temperature throughout the whole path between the pump (2) that pressurizes it and the entrance to the cavities around the cores (71, 72). The invention relates also to a plant implementing said method by means of a pump (2) connected to a mold (6) through a duct (54, 55, 57) that comes out within the casting envelope at a point close to the centroid of the cores (71, 72).

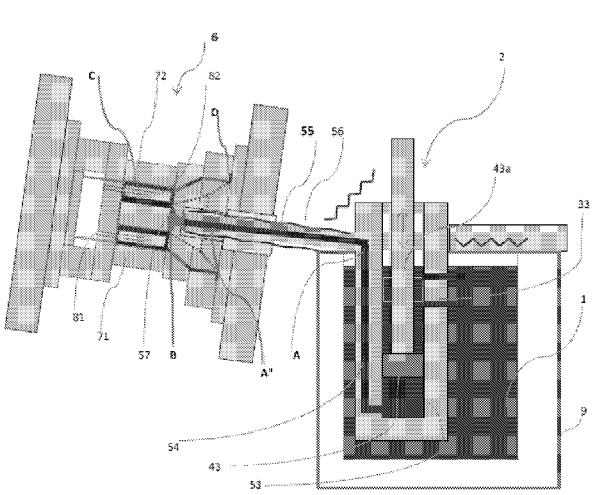

Fig.3

WO 2013/179225 A4

AMENDED CLAIMS
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1. Method for manufacturing light alloy castings by hot chamber injection die casting with disposable cores (71, 72) placed in cavities of a metal mold (6), comprising a first phase of filling said cavities of said mold (6) around said cores (71, 72) in which the parameters of pressure and speed of the molten alloy (1) are controlled at levels tolerable by the cores (71, 72) until the cavities around the latter are filled by the molten alloy (1), and a second phase of filling the mold (6), thereafter, in which said pressure and speed parameters are controlled at levels suitable for completing and compacting the casting, characterized in that in said first filling phase the parameters of pressure and speed of the molten alloy (1) are respectively controlled at values between 1 to 10 bar and 0,3 to 3 m/s, in said second filling phase the parameters of pressure and speed of the molten alloy (1) are respectively controlled at values between 10 to 300 bar and 3 to 15 m/s, in that the molten alloy (1) is injected in the mold (6) at a point close to the centroid of the cores (71, 72), and in that the alloy (1) is heated substantially along the whole path between a pump that pressurizes it and the entrance to the cavities around the cores (71, 72) so as to keep it at a temperature comprised between its upper melting temperature and a temperature at which the solid fraction content of the molten alloy (1) is not greater than 25% of the liquid fraction content.

2. Method according to claim 1, characterized in that the injector piston of the pump moves back right after the solidification of the casting and prior to the casting cooling phase, allowing a partial recovery of molten or semi-molten alloy.

3. Method according to any of the preceding claims, characterized in that a portion of the supply duct (55) that leads into the cavities around the cores (71, 72) is filled with molten alloy (1) before completion of the mold (6) closure.

4. Method according to any of the preceding claims, characterized in that in the cavities of the mold (6) and in the volumes directly connected thereto a pressure below atmospheric pressure is established prior to injecting the molten alloy (1).

5. Plant for manufacturing light alloy castings by hot chamber injection die casting with disposable cores (71, 72), comprising a pump connected through a duct (54, 55, 57) to a mold (6) containing said cores (71, 72), characterized in that said duct

(54, 55, 57) comes out within the casting envelope at a point close to the centroid of the cores (71, 72), and in that it further comprises means (56) suitable to heat the molten alloy (1) within the duct (54, 55, 57) so as to keep it at a temperature comprised between its upper melting temperature and a temperature at which the solid fraction content of the molten alloy (1) is not greater than 25% of the liquid fraction content.

6. Plant according to claim 5, characterized in that some portions of the duct (54, 55, 57) and/or of the mold (6) are made of a tungsten alloy.

7. Plant according to claims 5 or 6, characterized in that at least the internal surface of the duct (54, 55, 57) is protected by means of a ceramic material.

8. Plant according to any of claims 5 to 7, characterized in that some portions of the mold (6) are thermoregulated.