

(12) UK Patent Application (19) GB (11) 2520192 (13) A

(43) Date of Reproduction by UK Office 13.05.2015

(21) Application No: 1422902.5  
(22) Date of Filing: 13.09.2013  
Date Lodged: 22.12.2014  
(30) Priority Data:  
(31) 2012204464 (32) 18.09.2012 (33) JP  
(86) International Application Data:  
PCT/IB2013/002130 En 13.09.2013  
(87) International Publication Data:  
WO2014/045116 En 27.03.2014

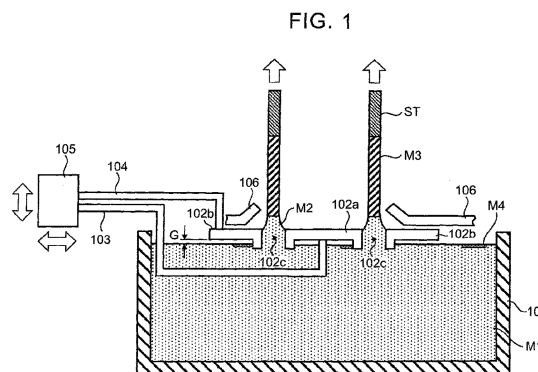
(51) INT CL:  
B22D 11/04 (2006.01) B22D 11/128 (2006.01)  
B22D 11/14 (2006.01)  
(56) Documents Cited:  
GB 1487587 A WO 2012/035752 A1  
US 4944925 A  
JPS59182292  
JPS59203798  
JPS5815097  
JPH02205232  
Journal of Crystal Growth, Vol. 132, Nos. 3-4, MH Lin,  
"Crystal pulling with floating wetted shapers", pp.  
467-470.  
Journal of Crystal Growth, Vol. 166, No. 1, CW Lan,  
"Shape control in crystal pulling from a floating die",  
pp. 458-462

(71) Applicant(s):  
Toyota Jidosha Kabushiki Kaisha  
1, Toyota-cho, Toyota-shi, Aichi-ken 471-8571, Aichi,  
Japan  
(72) Inventor(s):  
Tetsuya Nakajima  
Yuichi Furukawa  
Tsukasa Kato  
Keiichi Morita  
Jun Yaokawa  
Yasushi Iwata  
Yoshio Sugiyama  
(74) Agent and/or Address for Service:  
D Young & Co LLP  
120 Holborn, LONDON, EC1N 2DY, United Kingdom

(58) Field of Search:  
INT CL B22D, C30B  
Other: Online: EPO Internal, WPI

(54) Title of the Invention: **Up-drawing continuous casting apparatus and up-drawing continuous casting method**  
Abstract Title: **Up-drawing continuous casting apparatus and up-drawing continuous casting method**

(57) An up-drawing continuous casting apparatus includes a holding furnace that holds molten metal, a shape determining member that is arranged near a molten metal surface of the molten metal held in the holding furnace, and that determines a sectional shape of a casting by the molten metal passing through the shape determining member, and a cooling portion that cools the molten metal that has passed through the shape determining member. The shape determining member includes, on a main surface on the molten metal surface side, at least one of a protruding portion that protrudes from the main surface, or a recessed portion that is recessed from the main surface.



GB 2520192 A