

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 April 2003 (24.04.2003)

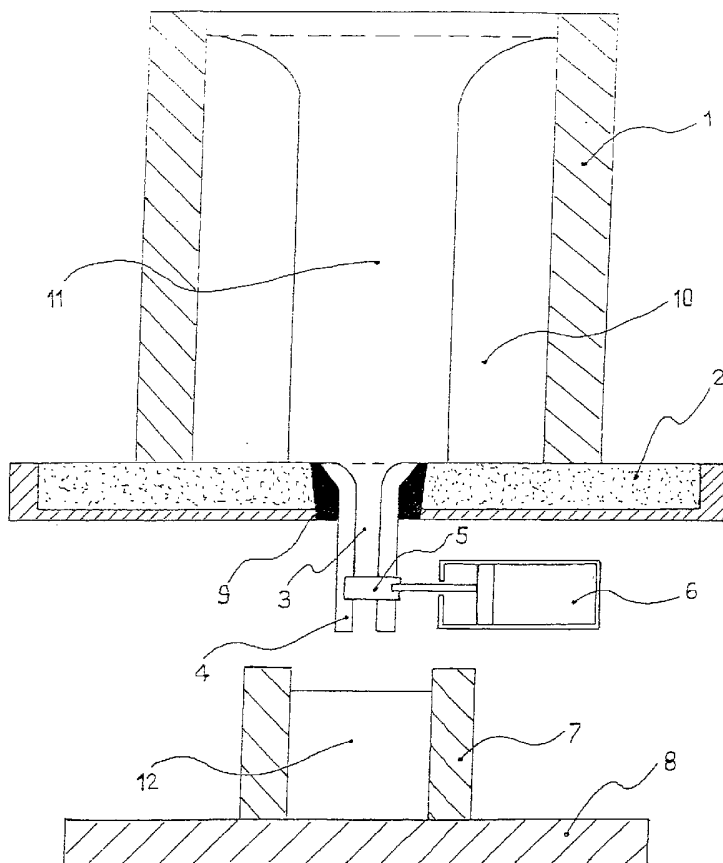
PCT

(10) International Publication Number
WO 2003/033191 A3

- (51) International Patent Classification⁷: B22D 19/16, 7/04, 7/02
 - (21) International Application Number: PCT/IB2002/004124
 - (22) International Filing Date: 9 October 2002 (09.10.2002)
 - (25) Filing Language: Italian
 - (26) Publication Language: English
 - (30) Priority Data:
MI2001A002098 11 October 2001 (11.10.2001) IT
MI2002A001165 30 May 2002 (30.05.2002) IT
 - (71) Applicant (for all designated States except US): CORINOX S.R.L. [IT/IT]; Via della Posta, 8, I-20123 Milan (IT).
 - (72) Inventor; and
 - (75) Inventor/Applicant (for US only): FALCK, Giorgio, Enrico [IT/IT]; Via Marchiondi, 5, I-20122 Milan (IT).
 - (74) Agent: MARIETTI, Andrea; Marietti, Gislon e Trupiano S.r.l., Via Larga, 16, I-20122 Milan (IT).
 - (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
 - (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: A METHOD FOR THE PRODUCTION OF HOLLOW METALLIC INGOTS OR COMPOUND METALLIC INGOTS



(57) Abstract: A method for the production of ingots, hollow or made of a plurality of metallic materials, of a first metallic material which includes the following phases: casting a first metallic material in liquid state into an ingot mould provided with a heat insulated bottom; allowing the aforesaid first metallic material to solidify only partially to obtain, in the centre of the ingot mould, a substantially cylindrical still in liquid state; discharge said substantially cylindrical zone of said first material still in liquid state, to form a substantially cylindrical cavity in the ingot. Subsequent cooling of the already solidified metallic material remaining in the ingot mould makes it possible to obtain an ingot equipped with a cylindrical through cavity perfectly coaxial to the ingot obtained. A second metallic material in liquid state may be cast inside said cavity to obtain a compound ingot.

WO 2003/033191 A3



(88) Date of publication of the international search report:
22 July 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 02/04124

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B22D19/16 B22D7/04 B22D7/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B22D C22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 121 781 A (STANDARD TELEPHONES CABLES LTD) 4 January 1984 (1984-01-04) claims 1,4,6,8,9; figure 1	10,11, 14,17
X	US 4 546 527 A (MIYAZAKI NORIYUKI ET AL) 15 October 1985 (1985-10-15) column 13, line 25 -column 13, line 39; claim 1; figure 6	10-12, 14,20-22
A	EP 0 464 780 A (KUBOTA KK) 8 January 1992 (1992-01-08) the whole document	1-22
	-/--	

Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*T* later document published 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</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*Z* document member of the same patent family</p>
--	--

Date of the actual completion of the international search 6 April 2004	Date of mailing of the international search report 15/04/2004
--	---

Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Bergman, L
--	---

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 02/04124

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 004, no. 125 (M-030), 3 September 1980 (1980-09-03) & JP 55 084260 A (HITACHI LTD), 25 June 1980 (1980-06-25) abstract; figure 1 ---	16
A	US 4 523 622 A (BINDERNAGEL ALI ET AL) 18 June 1985 (1985-06-18) the whole document ---	1-22
A	GB 1 189 724 A (OTANI) 29 April 1970 (1970-04-29) column 2, line 40 -column 3, line 43; claim 1; figures 3,6 ---	1-22
A	GB 760 501 A (ERIC WALTER SMITH;ENGLISH STEEL CORP LTD) 31 October 1956 (1956-10-31) the whole document ---	1-22
X	US 5 232 740 A (PRASSER CHRISTOPH ET AL) 3 August 1993 (1993-08-03) claims 1-5 -----	20-22

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/IB 02/04124

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2121781	A	04-01-1984	NONE	
US 4546527	A	15-10-1985	JP 1352985 C	11-12-1986
			JP 58093858 A	03-06-1983
			JP 61019699 B	19-05-1986
			JP 1350379 C	28-11-1986
			JP 58093859 A	03-06-1983
			JP 61016329 B	30-04-1986
			JP 1350380 C	28-11-1986
			JP 58097411 A	09-06-1983
			JP 61016330 B	30-04-1986
			JP 1350381 C	28-11-1986
			JP 58097412 A	09-06-1983
			JP 61016331 B	30-04-1986
			JP 1350382 C	28-11-1986
			JP 58096855 A	09-06-1983
			JP 61016332 B	30-04-1986
			JP 1350383 C	28-11-1986
			JP 58097413 A	09-06-1983
			JP 61016333 B	30-04-1986
			BE 895201 A1	31-03-1983
			DE 3244328 A1	14-07-1983
			FR 2517223 A1	03-06-1983
			GB 2113129 A , B	03-08-1983
			SE 447966 B	12-01-1987
			SE 8206812 A	02-06-1983
			JP 58173036 A	11-10-1983
EP 0464780	A	08-01-1992	JP 2898749 B2	02-06-1999
			JP 4176840 A	24-06-1992
			AU 7948291 A	09-01-1992
			DE 69118455 D1	09-05-1996
			DE 69118455 T2	31-10-1996
			EP 0464780 A1	08-01-1992
			JP 3234577 B2	04-12-2001
			JP 11264051 A	28-09-1999
			KR 9312181 B1	24-12-1993
JP 55084260	A	25-06-1980	NONE	
US 4523622	A	18-06-1985	DE 3134758 A1	17-03-1983
			GB 2104811 A , B	16-03-1983
			JP 58047554 A	19-03-1983
GB 1189724	A	29-04-1970	NONE	
GB 760501	A	31-10-1956	NONE	
US 5232740	A	03-08-1993	AT 115643 T	15-12-1994
			BR 9007180 A	28-01-1992
			CA 2033079 A1	17-11-1990
			CN 1047235 A , B	28-11-1990
			WO 9014446 A1	29-11-1990
			DE 59008036 D1	26-01-1995
			EP 0472546 A1	04-03-1992
			JP 2925093 B2	26-07-1999
			JP 4505184 T	10-09-1992
			KR 9310337 B1	16-10-1993