

1) Family number: 29255641 (US4610296A)

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Title: Melting cast installation

Abstract: The raw material in a raw material feeding apparatus of a melting cast installation is supplied, through a guide cylinder vertically mounted inside a furnace wall, towards a melting pot of a casting apparatus. A plurality of plasma arc torches, for heating the raw material, are positioned on the upper rotatable half of said furnace wall and are radially arranged around the axis of said guide cylinder with front ends thereof directed individually towards said melting pot. The raw material feeding apparatus may consist of a rotatable cylindrical drum laid substantially horizontally and a helical compartment wall to define a raw material path inside said cylindrical drum. A cylindrical limiter may be vertically mounted, inside said guide cylinder, for vertical movement so as to form an adjustable annular path for raw material between said limiter and the internal surface of said guide cylinder. An ignition piece, common for all the plasma torches, may be provided for retreat from an igniting position into a receptacle.

Classifications:

International (ipc 8-9): B22D11/04 B22D11/041 B22D11/14 B22D21/00 B22D23/06 B22D27/02 B65G33/14 B65G33/26 C22B9/20 C22B9/21 F27B3/08 F27D11/08 H05B7/18 (Advanced/Invention); C22B9/00 (Advanced/Non-invention); B22D11/041 B22D11/14 C22B9/16 F27B3/08 F27D11/08 H05B7/00 (Core/Invention); C22B9/00 (Core/Non-invention)

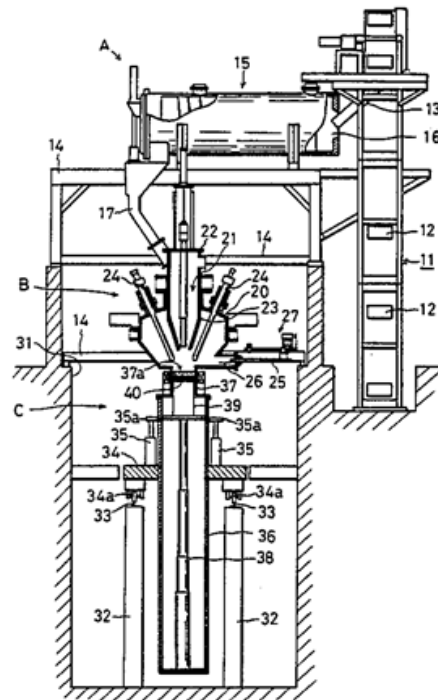
International (ipc 1-7): B22D11/04 B22D11/14 B22D19/00 B22D21/00 B22D23/06 B22D27/02 B22D3/00 B22D7/00 B22D9/00 B65G33/14 B65G33/26 C22B9/00 C22B9/20 F27B3/08 F27B3/18 F27D11/08 H05B7/18

CPC: B22D11/14 B22D23/06

European: B22D11/14 B22D23/06

US: 164/469 164/495 164/508 164/514

PatBase - US4610296_A

**Family:**

Publication number	Publication date	Application number	Application date
DE3445534 A1	19850620	DE19843445534	19841213
DE3445534 C2	19940922	DE19843445534	19841213
FR2556253 A1	19850614	FR19840019013	19841212
FR2556253 B1	19890407	FR19840019013	19841212
GB2151761 A1	19850724	GB19840030608	19841204
GB2151761 B2	19861029	GB19840030608	19841204
GB8430082 A0	19850109	GB19840030082	19841128
GB8430608 A0	19850109	GB19840030608	19841204
JP1677078 C3	19920626	JP19830234807	19831213
JP1998895 C3	19951208	JP19840130245	19840625
JP3031770 B4	19910508	JP19830234807	19831213
JP60126585 A2	19850706	JP19830234807	19831213
JP61009960 A2	19860117	JP19840130245	19840625
JP7022818 B4	19950315	JP19840130245	19840625
US4610296 A	19860909	US19840680869	19841212

Priority:

JP19830234807 19831213 JP19840130245 19840625

Probable Assignee: DAIDO STEEL CO LTD

Assignee(s): (std): DAIDO STEEL CO LTD ; DAIDOTOKUSHUKO KK

Assignee(s): DAIDO TOKUSHUKO KK ; DAIDOTOKUSHUKO K K ; DAIDOTOKUSHUKO K K NAGOYA AICHI JP ; DAIDOTOKUSHUKO KABUSHIKI KAISHA ; DAIDOTOKUSHUKO KABUSHIKIKAISHA ; DAIDOTOKUSHUKO KABUSHIKIKAISHA 66 AZA KURIDASHI HO

Inventor(s): (std): TAKEO KATO ; SUSUMU HIRATAKE YOICHI NAKANISHI SINOBU INUZUKA TA ; NAKANISHI YOUICHI ; KATOU TAKAO ; KATO TAKAO ; YAMADA HIROYUKI ; WATANABE YASUO ; NAKANISHI YOICHI ; KATO TAKEO ; INUZUKA SINOBU ; HIRATAKE SUSUMU ; INUZUKA SHINOBU

Inventor(s): HIROYUKI YAMADA ; HIRATAKE SUSUMU KASUGAI AICHI JP ; INUZUKA SINOBU INAZAWA AICHI JP ; KATO TAKEO NAGOYA AICHI JP ; NAKANISHI YOICHI NAGOYA AICHI JP ; SUSUMU HIRATAKE ; SINOBU INUZUKA ; YOICHI NAKANISHI ; YASUO WATANABE ; YAMADA HIROYUKI KOHMAN AICHI JP ;

2) Family number: 8490710 (US5408494A)

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Title: Material melting and incinerating reactor with improved cooling and electrical conduction

Abstract: A reactor for incinerating and melting materials such as waste and/or toxic materials has a containment housing inside of which an upright, open-ended drum is rotatably mounted. The drum is lined with refractory, forms a central discharge opening for the removal of incinerated and melted materials, and has an upright, outer wall. Incineration heat is supplied by a plasma torch which is mounted to the containment housing and extends into the drum. A steel throat ring concentric with the discharge opening is connected with the exterior of the drum; e.g. an outer drum wall, by grounding arms which extend non-radially; e.g. tangentially from a periphery of the throat ring to the inside surface of the drum wall, so that electric discharge from the torch to the upwardly oriented surfaces of the throat ring and the grounding arms is possible. The throat ring and the grounding arms are otherwise embedded in insulating refractory material carried by a rotating base plate of the drum which has a radially open, horizontally disposed slit that extends radially from a periphery of the base plate to the vicinity of the discharge opening. Several cooling water nozzles are mounted to the containment housing opposite the slit for directing cooling water jets radially into the slit. The rotation of the drum generates centrifugal forces which aid in the removal of the cooling water from the slit.

Classifications:

International (IPC 8-9): F23G5/00 F23G5/08 F23G5/10 F23G5/20 F23G5/24 (Advanced/Invention);

F23G5/00 F23G7/06 (Advanced/Non-invention);

F23G5/00 F23G5/08 F23G5/20 (Core/Invention)

International (IPC 1-7): F23G5/00 F23G5/027 F23G5/08 F23G5/10

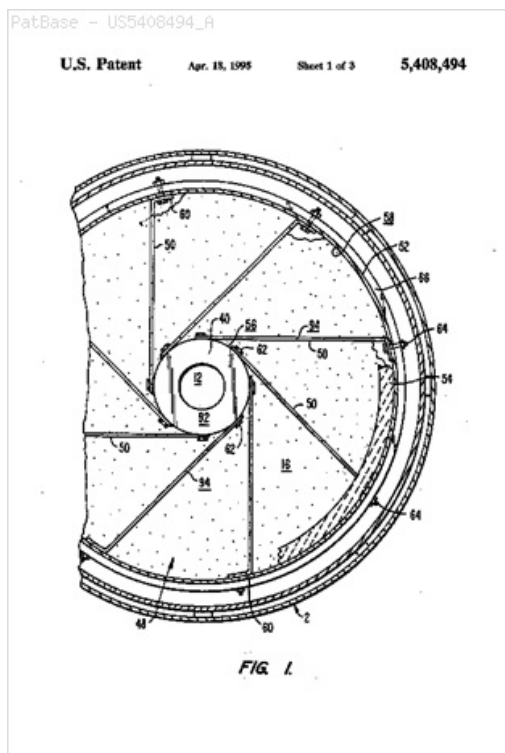
F23G5/20 F23G5/24 F23G7/06 F27B3/08 H05B7/00

CPC: F23G5/085 F23G5/10 F23G5/20 F23G2203/202 F23G2203/205 F23G2204/201

European: F23G5/08C F23G5/10 F23G5/20 R23G203/202

R23G203/205 R23G204/201

US: 110/346 219/121.36 373/18 373/20



Family:

Publication number	Publication date	Application number	Application date
AU199468758 A1	19950209	AU19940068758	19940727
AU680506 B2	19970731	AU19940068758	19940727
CA2128797 AA	19950129	CA19942128797	19940726
DE69416743 D1	19990408	DE19946016743	19940725
DE69416743 T2	19990701	DE19946016743T	19940725
EP0636839 A2	19950201	EP19940111563	19940725
EP0636839 A3	19950906	EP19940111563	19940725
EP0636839 B1	19990303	EP19940111563	19940725
JP7174318 A2	19950714	JP19940175163	19940727
KR100340299 B1	20020927	KR19940018536	19940728
KR19950003695 A	19950217	KR19940018536	19940728
US5408494 A	19950418	US19930098532	19930728

Priority:

US19930098532 19930728 CA19942128797 19940726

Probable Assignee: RETECH SYSTEMS LLC

Assignee(s): (std): RETECH INC ; LOCKHEED MARTIN ADVANCED ENVIR

Assignee(s): LOCKHEED MARTIN ADVANCED ENVIRONMENTAL SYSTEMS INC ; FLIGHT RAIL CORP ; LOCKHEED ENVIRONMENTAL SYSTEMS AND TECHNOLOGIES CO ; M4 ENVIRONMENTAL LP ; RETECH SYSTEMS LLC ; RETETSUKU INC ; LOCKHEED MARTIN ADVANCED ENVIRROMMENTAL SYSTEMS IN ; LOCKHEED MARTIN ADVANCED ENVIRROMMENTAL SYSTEMS INC UKIAH CALIF US ; LOCKHEED MARTIN ADVANCED ENVIRONMENTAL SYSTEMS INC UKIAH CALIF US ; SCHLIENGER MAX P ; WACHOVIA BANK NA

Inventor(s): (std): SCHLIENGER MAX P ; MATSUKUSU PII SHIYURIINGAA

Inventor(s): MAX P SCHLIENGER ; SCHLIENGER MAX P UKIAH CA 95482 US

Agent(s): SPRUSON AND FERGUSON; ASPEN PHARMA PTY LTD; FETHERSTONHAUGH AND CO

Designated states: CH DE FR GB IT LI SE

Title: PLASMA WHIRL REACTOR APPARATUS AND METHODS OF USE

Abstract: Apparatus for synergistically combining a plasma with a comminution means such as a fluid kinetic energy mill (jet mill), preferably in a single reactor and/or in a single process step is provided by the present invention. Within the apparatus of the invention potential energy is converted into kinetic energy and subsequently into angular momentum by means of wave energy, for comminuting, reacting and separation of feed materials. Methods of use of the apparatus in the practice of various processes are also provided by the present invention.

Classifications:

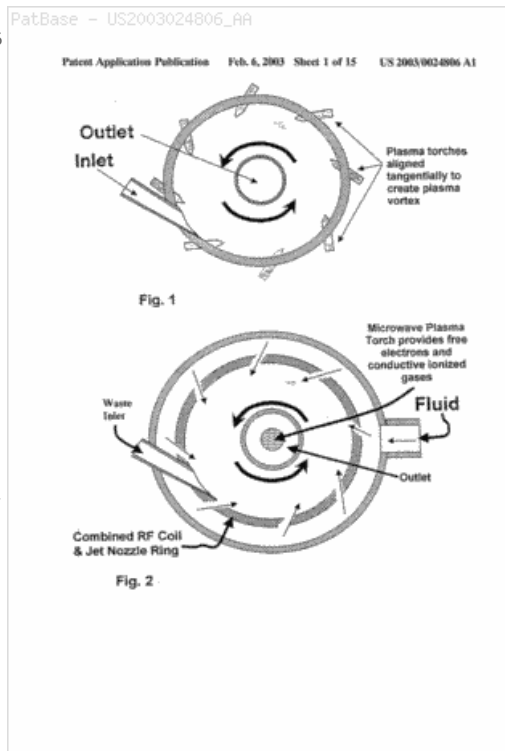
International (IPC 8-9): B01J19/08 B01J19/12 B01J19/24 B02C19/06 B02C23/00 B04C5/103 B04C5/24 B04C9/00 B23K10/00 C01B17/04 C01B17/58 C01B3/22 C01B3/24 C01B3/34 C01F11/18 C01F11/24 C01F11/46 C01F7/06 C02F1/00 C02F1/30 C02F1/34 C02F1/38 C02F1/46 C02F1/467 C02F11/00 C02F9/00 C04B18/04 C04B7/44 C10B23/00 C10J3/54 C10J3/56 C22B4/00 D21C11/12 H01J37/32 H05H1/42 H05H1/44 (Advanced/Invention); C02F1/46 (Advanced/Non-invention); B01J19/08 B01J19/12 B01J19/24 B02C19/06 B02C23/00 B23K10/00 C01B17/00 C01B3/00 C01F11/00 C01F7/00 C02F1/00 C02F1/30 C02F1/461 C02F11/00 C02F9/00 C04B7/00 C10J3/46 C22B4/00 D21C11/12 (Core/Invention)

International (IPC 1-7): B01J19/08 H05F3/00

CPC: C01B3/22 H01J37/32009 C10B23/00 H05H1/44 C04B18/04 B23K10/00 C04B7/4453 H05H1/42 B01J19/088 B01J19/126 B01J19/129 B01J19/2405 B01J2219/089 B01J2219/0892 B01J2219/0894 C01B3/24 C01B3/342 C01B17/046 C01B17/58 C01B2203/0238 C01B2203/0272 C01B2203/0861 C01F7/066 C01F11/18 C01F11/24 C01F11/46 C10J3/54 C10J3/56 C10J2200/09 C10J2300/093 C10J2300/0943 C10J2300/0946 C10J2300/0956 C10J2300/0959 C10J2300/0969 C10J2300/0973 C10J2300/0983 C10J2300/123 C10J2300/1238 C22B4/005 D21C11/12 Y02E50/32 Y10S588/90 Y02P40/121 Y02P40/18 Y02P40/44 C02F1/006 C02F1/34 C02F2301/024 C02F2301/026 C02F1/385 B04C5/103 B04C5/24 B04C9/00 B04C2009/007 C02F1/4608 C02F1/30 C02F1/302 C02F1/305

European: B01J19/12D12 B01J19/12D6 B01J19/24B C01B17/04B14 C01B17/58 C01B3/24 C01B3/34G C01F11/18 C01F11/24 C01F11/46 C01F7/06H C02F1/00R C02F1/30 C02F1/34 C04B7/44D C10J3/54 C10J3/56 C22B4/00B D21C11/12 L01J219/08M12 L01J219/08M8J L01J219/08P M01B203/02B4D M01B203/02F2 M01B203/08B10 M02F1/30B M02F1/30E M02F1/46J M02F301/02D M02F301/02F M10J200/09 M10J300/09D12 M10J300/09D14 M10J300/09D6 M10J300/09F12 M10J300/09F14 M10J300/09F2 M10J300/09F4 M10J300/09H M10J300/12H M10J300/12H2

US: 1/1 110/245 110/246 110/346 201/19 204/157.43 204/164 204/176 204/176S 219/121.36 219/121.37 219/121.43 219/121.48 219/121.51 219/121.52 219/121.59 241/15 241/15S 241/39 241/39P 241/39S 241/5 241/5P 29/888.021 315/111.21 315/111.51 422/186 422/186.07 422/186.070P 422/186S 588/900 588/901

**Family:**

Publication number	Publication date	Application number	Application date
CA2683165 AA	20091005	CA20072683165	20070405
CA2683165 C	20130611	CA20072683165	20070405
US2003024806 AA	20030206	US20020196466	20020715
US2007253874 AA	20071101	US20070784327	20070405
US2010044477 AA	20100225	US20090577130	20091009
US2010044483 AA	20100225	US20090577166	20091010
US2013126332 AA	20130523	US20130746193	20130121
US2013126485 AA	20130523	US20130746152	20130121
US2014299459 AA	20141009	US20140308149	20140618
US2014299584 AA	20141009	US20140308805	20140619
US2017001886 AA	20170105	US20160264725	20160914
US7622693 BB	20091124	US20020196466	20020715
US8324523 BB	20121204	US20090577130	20091009
US8357873 BB	20130122	US20090577166	20091010
US8785808 BB	20140722	US20130746193	20130121
US8796581 BB	20140805	US20130746152	20130121
US9127205 BB	20150908	US20140308149	20140618
US9127206 BB	20150908	US20140308805	20140619
US9481584 BB	20161101	US20070784327	20070405
US9771280 BB	20170926	US20160264725	20160914
WO08008104 A2	20080117	WO2007US08529	20070405
WO08008104 A3	20080731	WO2007US08529	20070405

Priority:

US20010305833P	20010716	US20020196466	20020715	US20030500445P	20030905
US20040935786	20040907	US20060789655P	20060405	US20060789670P	20060405
US20070784327	20070405	US20070784326	20070405	WO2007US08529	20070405
US20090577130	20091009	US20090577166	20091010	US20110215207	20110822
US20110215223	20110822	US20130746193	20130121	US20130746152	20130121
US20140308149	20140618	US20140308805	20140619	US20160264725	20160914

Probable Assignee: FORET PLASMA LABS LLC

Assignee(s): (std): FORET PLASMA LABS LLC ; FORET TODD

Assignee(s): FORET TODD L

Inventor(s): (std): FORET TODD L ; FORET TODD

Agent(s): SHAPIRO COHEN; AVENTUM IP LAW LLP; CHALKER FLORES LLP; DANIEL J; EDWIN S; CHALK FLORES LLP; CHALKER DANIEL ET AL

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS

4) Family number: 11008628 (US5178203A)

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Title: APPARATUS FOR THE COUNTERGRAVITY CASTING OF METALS

Abstract: A counter-gravity metal casting apparatus (10) comprises a reservoir (14) having a casting chamber (46) therein. An electro-magnetic pump (66) is accommodated in the chamber (b 46) and is responsive to input voltage for pumping molten metal from the chamber (46) into an above-situated distribution vessel (78) and mold (12). The chamber 46 is enclosed by cover (40) and supplied with inert gas (60) for purging the space (62) above the metal or outside atmospheric contaminated gases. A feed back controller (98) is also provided for continuously measuring the actual pressure of the pumped metal of the casting cycle and then controlling the output of the pump (66) to conform the actual metal pressure with an ideal reference metal pressure versus casting cycle time schedule.

Classifications:

International (IPC 8-9): B22D18/04 B22D18/08

B22D21/00 (Advanced/Invention);

B22D18/00 B22D18/04 B22D21/00 (Core/Invention)

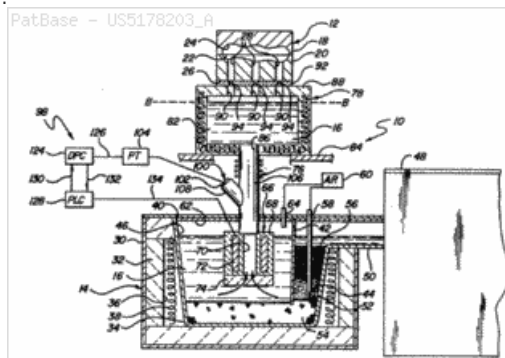
International (IPC 1-7): B22D18/04 B22D18/08

CPC: B22D18/04 B22D18/08 B22D21/007

European: B22D18/04 B22D18/08 B22D21/00B2

US: 164/134 164/147.1 164/155 164/155.4 164/259 164/337

164/457 164/500



Family:

Publication number	Publication date	Application number	Application date
US5178203 A	19930112	US19920897323	19920611

Priority:

US19920897323 19920611

Probable Assignee: CMI INT INC

Assignee(s): (std): CMI INT INC

Assignee(s): CMI INTERNATIONAL INC ; CANADIAN IMP ; CANADIAN IMP BANK OF COMMERCE ADMINISTRATIVE AGENT AS ; CMI INT ; CMI INT A CORP OF MICHIGAN

Inventor(s): (std): KUHN JOHN W ; WYLIE RICHARD J

5) Family number: 44004986 (US2009285695A)

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Title: MAGNETIC INDUCTION PUMP

Abstract: A magnetic induction pump for pumping molten metal. The pump includes a motor and a shaft operatively connected to the motor. The pump further includes at least one bipolar permanent magnet operatively connected to the shaft and a conduit for the passage of molten metal. The motor rotates the shaft and magnet about the conduit inducing eddy currents in the molten metal in the conduit which react with the moving magnetic field to produce force to pump the metal through the conduit with the metal coming into contact with only an interior surface of the conduit.

Classifications:

International (IPC 8-9): B22D17/30 F04B15/02 F04B15/06

F04B43/12 F04D13/02 F04D13/06 F04D33/00 F04D7/00 F04D7/04

F04D7/06 H02K44/00 H02K44/04 H02K44/06

H02K44/08 (Advanced/Invention);

B22D17/30 F04D7/06 H02K44/06 (Advanced/Non-invention);

F04D13/06 F04D7/00 H02K44/00 (Core/Invention)

International (IPC 1-7): H02K44/06

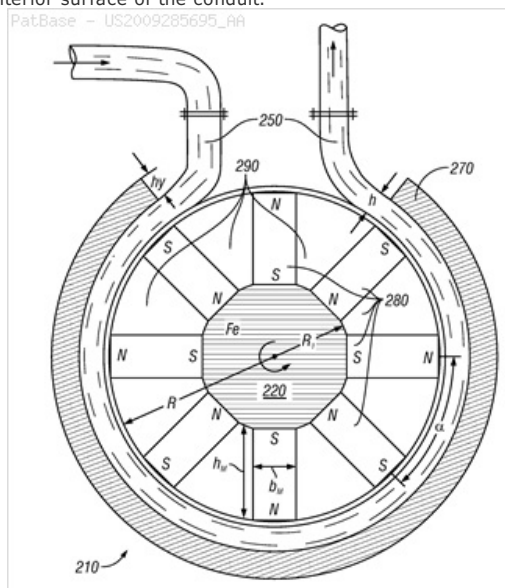
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H02K44/06

European: F04B15/02 F04B15/06 F04B43/12G F04D13/02

F04D7/06B H02K44/06

US: 417/423.1 417/423.100S 417/50 417/50P



Family:

Publication number	Publication date	Application number	Application date
AU2009249623 AA	20091126	AU20090249623	20090218

AU2009249623 BB	20131212	AU20090249623	20090218
BRPI0905930 A2	20150623	BR2009PI05930	20090218
CA2715671 AA	20100816	CA20092715671	20090218
CA2715671 C	20130423	CA20092715671	20090218
CN101953058 A	20110119	CN200980104065	20090218
CN101953058 B	20140702	CN200980104065	20090218
DE09750904 T1	20120906	DE20090750904T	20090218
DE09750904 T8	20130425	DE20090750904T	20090218
EP2279555 A2	20110202	EP20090750904	20090218
EP2279555 A4	20111116	EP20090750904	20090218
EP2279555 B1	20161019	EP20090750904	20090218
ES2373531 T1	20120206	ES20090750904T	20090218
ES2373531 T3	20170503	ES20090750904T	20090218
IN02421KN2010 A	20100924	IN2010KN02421	20100702
JP2011514127 T2	20110428	JP20100545902T	20090218
JP5258903 B2	20130807	JP20100545902T	20090218
KR101225350 B1	20130123	KR20107020821	20090218
KR20100119799 A	20101110	KR20107020821	20090218
MX2010010129 A1	20110329	MX20100010129	20090218
PL2279555 T3	20170531	PL20090750904T	20090218
RU2436223 C1	20111210	RU20100138450	20090218
TR201700354 T4	20170221	TR20170000354T	20090218
US2009285695 AA	20091119	US20080123068	20080519
US8267669 BB	20120918	US20080123068	20080519
WO09142673 A2	20091126	WO2009US01064	20090218
WO09142673 A3	20100121	WO2009US01064	20090218
WO09142673 A4	20100311	WO2009US01064	20090218

Priority:

US20080123068 20080519 EP20090750904 20090218 WO2009US01064 20090218

Probable Assignee: HAZELETT STRIP CASTING CORP

Assignee(s): (std): HAZELETT STRIP CASTING CORP ; HAZWLETT STRIP CASTING CORP ; KAGAN VALERY G ; KHEJZELETT STRIP KASTING CORP

Assignee(s): KHEJZELETT STRIP KASTING KORPOREJSHN

Inventor(s): (std): KAGAN VALERY G ; VALERY G KAGAN ; KEJGEN VALERI G ; KAGAN VALERY

Inventor(s): ERFINDER WIRD SPAETER GENANNT WERDEN

Agent(s): IP GATEWAY PATENT AND TRADEMARK ATTORNEYS; IP GATEWAY PATENT AND TRADEMARK ATTORNEYS PTY LTD; IP GATEWAY PATENT AND TRADE MARK ATTORNEYS PTY LTD; MBM INTELLECTUAL PROPERTY LAW LLP; OFFICE FREYLINGER; CURELL MIREIA; FULYA SUEMERALP; MCCORMICK PAULDING AND HUBER LLP; VANDERLEEDEN KEVIN H ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

6) Family number: 57359201 (US2014252697A)

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Title: MAGNETIC PUMP INSTALLATION

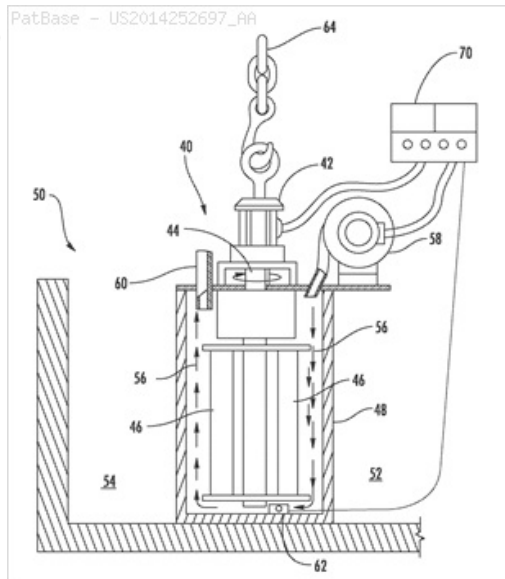
Abstract: A magnetic pump in a pump well in a molten metal furnace with a long, relatively thin side wall that wraps around a significant fraction of the circumference of the pump, which facilitates creation of an eddy current based flow field in the molten material with better magnetic coupling, thereby enhancing the effectiveness of the pump. Breach of the well wall will not result in spillage of metal outside the furnace, and the well can be monitored for any such breach or other change so that the pump can be lifted out of the well to protect it from contact with the molten metal in the event of such a breach, or other appropriate action can be taken.

Classifications:

International (IPC 8-9): C21C1/06 F27B17/00 F27D19/00 F27D21/00 F27D27/00 F27D9/00 H02K7/116 (Advanced/Invention)

CPC: C21C1/06 F27D19/00 F27D21/0014 F27D21/00 F27D9/00 F27D2021/0085 F27D2019/0003 F27D2009/0005 F27D27/005

US: 1/1 266/233 266/234 266/44 266/99



Family:

Publication number	Publication date	Application number	Application date
BR112015016959 A2	20170711	BR20151116959	20140310
DE602014009360 D1	20170614	DE201460009360T	20140310
EP2825678 A1	20150121	EP20140718213	20140310
EP2825678 B1	20170503	EP20140718213	20140310
HU033155 T2	20171128	HU20140718213T	20140310
JP2016518577 T2	20160623	JP20160500950T	20140310
JP6338650 B2	20180606	JP20160500950T	20140310
KR101766105 B1	20170807	KR20157028078	20140310
KR20150131121 A	20151124	KR20157028078	20140310
US2014252697 AA	20140911	US20140202090	20140310
US2014252698 AA	20140911	US20140202123	20140310
US2016313065 AA	20161027	US20160187905	20160621
US9395120 BB	20160719	US20140202123	20140310
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WO14164413 A1	20141009	WO2014US22364	20140310

Priority:

US20130776316P 20130311 EP20140718213 20140310 US20140202090 20140310
US20140202123 20140310 WO2014US22364 20140310 US20160187905 20160621

Probable Assignee: NOVELIS INC

Assignee(s): (std): NOVELIS INC

Assignee(s): NOVELIS INC ATLANTA ; WELLS FARGO BANK NATIONAL ASSOCIATION ; STANDARD CHARTERED BANK ; BANK OF AMERICA NA ; MORGAN STANLEY SENIOR FUNDING INC

Inventor(s): (std): EDWIN L RAUCH ; RAUCH EDWIN L

Inventor(s): RAUCH EDWIN L FULTON

Agent(s): WEICKMANN AND WEICKMANN PATENT U RECHTSANWAELTE PARTMBB; FELLER FRANK; WEICKMANN AND WEICKMANN PARTMBB; SAMEJIMA MUTSUMI; TANAKA MITSUO; KILPATRICK TOWNSEND AND STOCKTON LLP; PRATT JOHN S ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

7) Family number: 6076686 (FR2623210A)

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Title: Process for the production of thixotropic metal gels by electromagnetic rotation

Abstract: Process for the production of thixotropic metal gels in an annular crucible. The process employs the properties of rotating permanent magnets to create shearing forces, of viscous origin, in an alloy whose temperature is lower than that of the liquidus. The invention finds its application in metallurgy, in all cases where it is desired to exploit the properties of thixotropic metal gels to improve the forming and the structure of moulded articles or of ingots and also when it is desired to obtain high-performance composite materials.

Classifications:

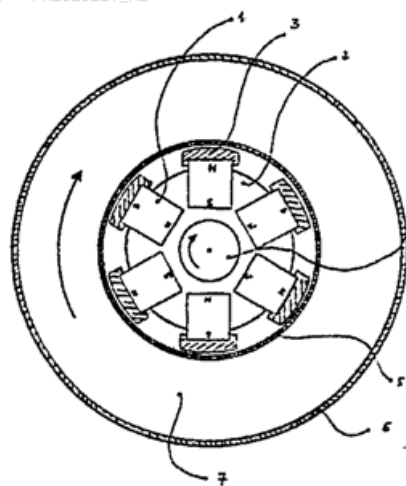
International (IPC 8-9): C22C1/00 C22F3/02 (Advanced/Invention); C22C1/00 C22F3/00 (Core/Invention)

International (IPC 1-7): C22F3/02

CPC: C22C1/005 C22F3/02

European: C22C1/00D C22F3/02

PatBase - FR2623210_A1



Family:

Publication number	Publication date	Application number	Application date
FR2623210 A1	19890519	FR19870015817	19871112
FR2623210 B1	19930423	FR19870015817	19871112

Priority:

FR19870015817 19871112

Probable Assignee:

VIVES CHARLES

Assignee(s): (std):

VIVES CHARLES

8) Family number: 33083640 (US2006133194A)

© PatBase

Title: AGITATOR, AGITATING METHOD, AND MELTING FURNACE WITH AGITATOR

Abstract: An agitator for agitating a melt includes a heat-resistive container having a blast opening through which cooling air is blown and an exhaust opening for exhausting air having been subjected to heat exchange, and a rotating magnet assembly composed of a permanent magnet housed in the heat-resistive container in a rotatable manner, magnetic lines of force emitted from the permanent magnet penetrating through the heat-resistive container to exit outside, and then penetrating the heat-resistive container again to return to the permanent magnet.

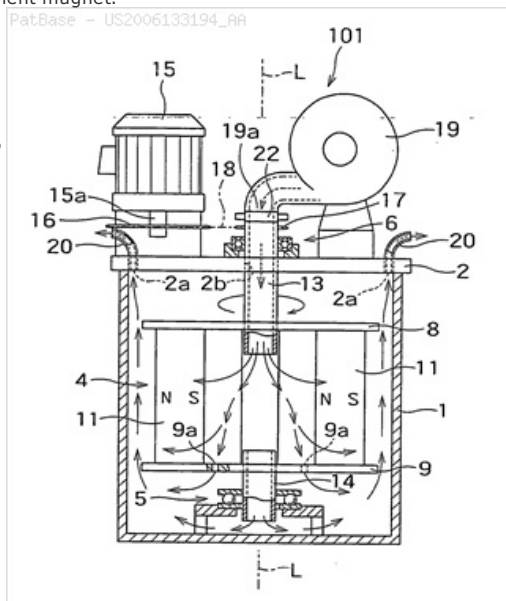
Classifications:

International (IPC 8-9): B01F13/08 B01F15/06 B22D1/00 B22D45/00 C22B9/16 C22C1/02 F27B17/00 F27B3/00 F27B3/10 F27D23/04 F27D27/00 (Advanced/Invention); B22D1/00 B22D45/00 C22B9/16 C22C1/02 F27B3/00 F27B3/10 F27D27/00 (Core/Invention)

CPC: B01F5/102 B01F13/0809 B01F2215/0075 F27B17/00 H02K44/06 F27D27/00

European: B01F13/08B B01F5/10B F27B17/00 F27D27/00 H02K44/06 L01F215/00A90

US: 266/234 366/137 366/147 366/147P 366/273 366/273S 417/50



Family:

Publication number	Publication date	Application number	Application date
■ CN100443153 C	20081217	CN200510099200	20050913
■ CN101255505 A	20080903	CN200710160674	20050913
■ CN101261090 A	20080910	CN200710160675	20050913
■ CN1793765 A	20060628	CN200510099200	20050913
■ DE602005020241 D1	20100512	DE200560020241T	20051221
■ EP1674814 A2	20060628	EP20050257929	20051221
■ EP1674814 A3	20070530	EP20050257929	20051221
■ EP1674814 B1	20100331	EP20050257929	20051221
■ JP2006177612 A2	20060706	JP20040371236	20041222
■ JP2006189229 A2	20060720	JP20050002938	20050107
■ JP4376771 B2	20091202	JP20040371236	20041222
■ JP4413786 B2	20100210	JP20050002938	20050107
■ KR101213559 B1	20121218	KR20050086559	20050915
■ KR20060071849 A	20060627	KR20050086559	20050915
■ US2006133194 AA	20060622	US20050313811	20051222
■ US8158055 BB	20120417	US20050313811	20051222

Priority:

JP20040371236 20041222 JP20050002938 20050107

Probable Assignee: KENZO TAKAHASHI

Assignee(s): (std): KENZO TAKAHASHI ; TAKAHASHI KENZO

Inventor(s): (std): KENZO TAKAHASHI ; TAKAHASHI KENZO

Agent(s): JENKINS PETER DAVID; HELLER EHRMAN WHITE AND MCAULIFFE LLP; MAYER BROWN LLP

Designated states: AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK NL PL PT RO SE SI SK TR YU

9) Family number: 43075236 (WO09124510A1)

© PatBase

Title: AIR-COOLED MOLTEN ALUMINUM PERMANENT MAGNET PUMP

Abstract: An air-cooled molten aluminum permanent magnet pump has a sealed pipe (35), a main electromotor (12), a rotor module (36) with permanent magnets (16), a forced-air cooling device (15) and a lifting device (32). The permanent magnets (16) are respectively arranged on one or both of the upper and lower sides, or inside of the sealed pipe (35). The rotor module (36) is arranged inside the sealed pipe (35). The forced-air cooling device (15) is used to lower the temperature in the permanent magnet pump. The rotor module (36) connected to the main electromotor (12) connects with the lifting device (32). When the temperature in the permanent magnet pump is too high, the lifting device (32) will hoist the rotor module (36) out of said pump, thus protecting the permanent magnets (16) from damage due to high temperature. The permanent magnet pump is characterised by energy-saving, high efficiency, low costs and high reliability.

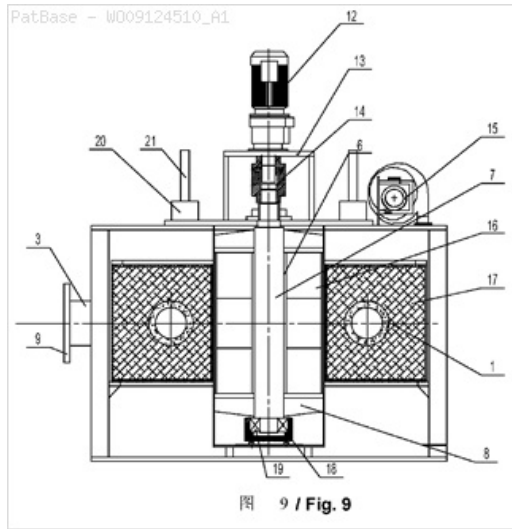
Classifications:

International (IPC 8-9): F04D13/06 F04D29/58 F04D7/06 F27D27/00 H02K44/06 (Advanced/Invention);

F04D13/06 F04D29/58 F04D7/00 H02K44/00 (Core/Invention)

CPC: F04D13/027 F04D7/065 H02K9/00 H02K44/06 H02K49/04

European: F04D13/02B3 F04D7/06B H02K44/06 T02K49/04 T02K9/00

**Family:**

Publication number	Publication date	Application number	Application date
■ CN101382153 A	20090311	CN200810103731	20080410
■ CN101382153 B	20110615	CN200810103731	20080410
■ CN201335610 Y	20091028	CN200820123881U	20081124
■ WO09124510 A1	20091015	WO2009CN71223	20090410

Priority:

CN200810103731 20080410 CN200820123881U 20081124

Probable Assignee: BEIJING YUANWANG GAOQIAO MAGNE**Assignee(s):** (std): BEIJING YUANWANG GAOQIAO MAGNE ; CHEN LI ; LI CHEN**Assignee(s):** BEIJING YUANWANG GAOQIAO MAGNETIC ENERGY TECHNOLOGY CO ; BEIJING YUANWANG GAOQIAO MAGNETIC ENERGY TECHNOLOGY CO LTD**Inventor(s):** (std): LI CHEN ; CHEN LI**Agent(s):** BEIJING BEIXIN ZHICHENG INTELLECTUAL PROPERTY AGENT CO LTD

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

10) Family number: 45941186 (US2010244338A)

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Title: NON-FERROUS METAL MELT PUMP AND NON-FERROUS METAL MELTING FURNACE USING THE SAME

Abstract: A non-ferrous metal melting furnace includes a non-ferrous metal melt pump, a vortex chamber body, and a magnetic field device formed of permanent magnets. The vortex chamber body makes a non-ferrous metal melt flow into a vortex chamber from an inlet, makes the non-ferrous metal melt flow in a spiral shape by applying a driving force to the non-ferrous metal melt in the vortex chamber, and discharges the non-ferrous metal melt from the vortex chamber to an outlet. The magnetic field device formed of permanent magnets is disposed outside the vortex chamber and below a bottom plate of the vortex chamber, and applies the driving force to the non-ferrous metal melt by an electromagnetic force that is generated by current flowing in the non-ferrous metal melt and magnetic lines of force from the magnetic field device formed of permanent magnets.

Classifications:

International (IPC 8-9): B22D11/00 B22D11/10 B22D35/00 B22D41/00 F04B15/04 F04D11/00 F04D13/06 F04D35/00 F04D7/06 F27B17/00 F27B19/04 F27B3/10 F27D27/00 F27D3/14 H02K44/02 (Advanced/Invention); B22D11/00 B22D11/10 B22D35/00 B22D41/00 F04B15/00 F04D11/00 F04D13/06 F04D35/00 F04D7/00 F27B17/00 F27B19/00 F27B3/10 F27D27/00 F27D3/14 H02K44/00 (Core/Invention)
CPC: F27B19/04 F27D3/14 F27D27/005 H02K44/02 H02K44/04
European: F27B19/04 F27D27/00B F27D3/14 H02K44/02 H02K44/04
US: 222/594 266/200 266/234 266/237 266/237P

Patent Application Publication Sep. 30, 2010 Sheet 1 of 7 US 2010/0244338 A1

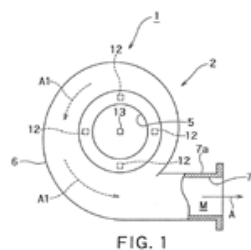


FIG. 1

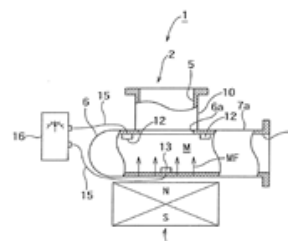


FIG. 2

Family:

Publication number	Publication date	Application number	Application date
AU2009251116 AA	20100715	AU20090251116	20091222
AU2009251116 BB	20120906	AU20090251116	20091222
CA2689311 AA	20100626	CA20092689311	20091223
CA2689311 C	20130514	CA20092689311	20091223
CN101837433 A	20100922	CN200910252546	20091225
CN101837433 B	20170503	CN200910252546	20091225
CN201688718 U	20101229	CN200920174367U	20091225
DE602009041770 D1	20161124	DE200960041770T	20091223
EP2206998 A2	20100714	EP20090180642	20091223
EP2206998 A3	20100825	EP20090180642	20091223
EP2206998 B1	20181010	EP20090180642	20091223
EP2381201 A1	20111026	EP20110156821	20091223
EP2381201 B1	20161012	EP20110156821	20091223
JP2010169381 A2	20100805	JP20090131249	20090529
JP4995234 B2	20120808	JP20090131249	20090529
KR101200867 B1	20121113	KR20090129278	20091222
KR20100076889 A	20100706	KR20090129278	20091222
US2010244338 AA	20100930	US20090644637	20091222
US2012104669 AA	20120503	US20120343327	20120104
US8703043 BB	20140422	US20120343327	20120104

Priority:

JP20080334089	20081226	JP20090131249	20090529	US20090644637	20091222
CA20092689311	20091223	EP20090180642	20091223	EP20110156821	20091223
CN200920174367U	20091225	US20120343327	20120104		

Probable Assignee: ZMAG LTD**Assignee(s):** (std): TAKAHASHI KENZO ; ZMAG KK ; ZMAG LTD**Assignee(s):** ZMAG LTD MATSUDO SHI**Inventor(s):** (std): KENZO TAKAHASHI ; TAKAHASHI KENZO**Agent(s):** GRIFFITH HACK; FETHERSTONHAUGH AND CO; CASALONGA AND PARTNERS; DOSSMANN GERARD; WINSTON AND STRAWN LLP,PATENT DEPARTMENT; OBLON SPIVAK MCCLELLAND MAIER AND NEUSTADT LLP**Designated states:** AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**11) Family number: 54627216 (US2016138868A)**

© PatBase

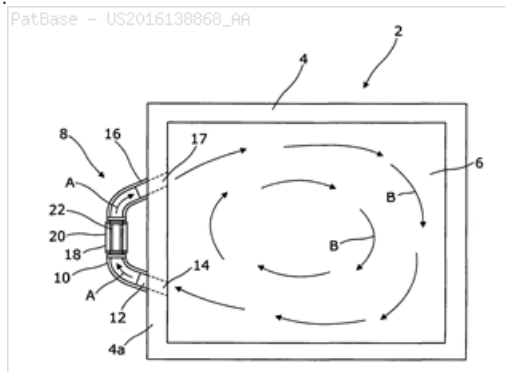
Title: METALLURGICAL APPARATUS

Abstract: A metallurgical apparatus comprises a vessel for holding a body of liquid metal and a circulating apparatus for circulating the body of liquid metal within the vessel. The vessel has a peripheral wall and a base, and the circulating apparatus comprises a launder that provides an open-topped flow channel and a pumping device for pumping liquid metal through the launder. The launder has an inlet end connected to a first opening in the peripheral wall and an outlet end connected to a second opening in the peripheral wall. The pumping device is configured to pump liquid metal through the launder so that liquid metal flows out of the vessel through the first opening and into the vessel through the second opening, thereby causing the body of liquid metal within the vessel to circulate.

Classifications:

International (IPC 8-9): B01F13/08 B22D1/00 C21C5/46 C21C5/52 C22B9/05 C22B9/16 F27D27/00 F27D3/00 H05B6/34 (Advanced/Invention)

CPC: C21C5/5247 F27D27/00 B22D1/00 C21C5/46 C22B9/16 F27B3/10 C22B9/02 C22B21/066 B01F5/10 Y02P10/234 F27D3/00 F27B9/16 C21C5/52 F27D2003/0054 F27D27/005

US: 266/235 266/44**Family:**

Publication number	Publication date	Application number	Application date
EP3011245 A1	20160427	EP20140736009	20140617
GB201311078 A0	20130807	GB20130011078	20130627
GB2515475 A1	20141231	GB20130011078	20130627
GB2515475 B2	20160831	GB20130011078	20130627
US2016138868 AA	20160519	US20140900095	20140617
WO14202966 A1	20141224	WO2014GB51859	20140617

Priority:

GB20130011078	20130627	GB20130011078	20130627	WO2014GB51859	20140617
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Probable Assignee: EMP TECHNOLOGIES LTD**Assignee(s):** (std): EMP TECH LTD ; EMP TECHNOLOGIES LTD**Inventor(s):** (std): BOSWORTH PAUL ; JASON DENNIS MIDGLEY ; MIDGLEY JASON DENNIS ; PAUL BOSWORTH**Agent(s):** RAYNOR SIMON MARK; URQUHART DYKES AND LORD LLP

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

12) Family number: 11440448 (US5984999A)

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Title: APPARATUS HAVING GAS-ACTUATED PUMP AND CHARGE WELL AND METHOD OF MELTING METAL THEREWITH
CHARGE A WELL OF A METAL-MELTING FURNACE

Abstract: The charge well of a metal melting furnace is provided with an internal cavity having a circular cross section when viewed from the top, preferably a cavity of cylindrical or conical configuration, and with a peripheral exit port located tangentially with respect to said cavity at a lower level thereof for exit of molten metal into the main chamber of the furnace. An inert gas bubble-actuated molten metal pump brings molten metal from a hotter section of the furnace, advantageously directly from the main chamber, and has its exit port located tangentially to the periphery of the cavity at an upper level thereof, thereby creating vortical flow of molten metal within the charge well for the more rapid and efficient melting of metal chips and scraps into the molten metal therein and for circulation of hotter molten metal throughout the furnace. A head of molten metal can be created in the charge well, which advantageously has an exit port of restricted internal cross-sectional area, to assist with attainment of these objectives. A heat and flame-resistant cover may be located above the cavity and advantageously has an aperture therein for the loading of metal chips or scrap thereinto. A gravity-feed chip charger may surmount the aperture for the discharge of new metal chips or scrap into the cavity through the said aperture.

Classifications:

International (IPC 8-9): C22B21/00 (Advanced/Invention);
C22B21/00 (Core/Invention)

International (IPC 1-7): C22B9/16 C22B9/187

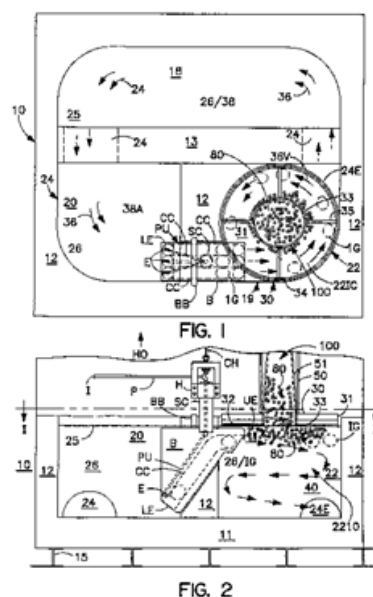
CPC: Y10S266/90 Y10S266/901 C22B21/0092 Y02P10/218

European: C22B21/00J2

US: 266/233 266/900 266/901 75/583 75/594 75/612 75/638 75/686 75/687

PatBase - US5984999_R

U.S. Patent Nov. 16, 1999 Sheet 1 of 4 5,984,999



Family:

Publication number	Publication date	Application number	Application date
AU199934898 A1	19991101	AU19990034898	19990409
US5984999 A	19991116	US19980058495	19980410
WO9953109 A1	19991021	WO1999US07914	19990409

Priority:

US19980058495 19980410 WO1999US07914 19990409

Probable Assignee: AREAUX MR LARRY

Assignee(s): (std): PREMELT PUMP INC

Assignee(s): AREAUX MR LARRY

Inventor(s): (std): AREAUX LARRY D ; AREAUX LARRY D SR

Inventor(s): LARRY D AREAUX

Designated states: AT AU BE BR CA CH CY DE DK ES FI FR GB GR IE IT LU MC MX NL NZ PT SE

13) Family number: 54824697 (US2013249149A)

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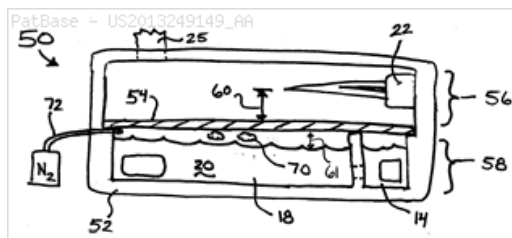
Title: MOLTEN METAL FURNACE

Abstract: An improved molten metal furnace including an enlarged buffer plate of nickel-based superalloy material which seals and separates the furnace burners from the product to be heated. The seal from the buffer plate provides for the creation of a generally inert atmosphere for the bath of molten metal. Additionally, angling the interconnecting passageways between the furnace regions improve the thermal efficiency of the circulating molten metal.

Classifications:

International (IPC 8-9): C22B7/00 F27B3/04 F27B3/10 F27B3/20
F27B3/26 F27D7/06 F27D99/00 (Advanced/Invention)

CPC: F27B3/26 F27B3/045 F27B3/10 F27D99/0073 F27D7/06
F27B3/205 F27D99/0033 C22B21/0084 C22B7/003 Y02P10/212

**Family:**

Publication number	Publication date	Application number	Application date
US2013249149 AA	20130926	US20120402590	20120222
US2013341840 AA	20131226	US20130010983	20130827
US8784727 BB	20140722	US20120402590	20120222
WO15031915 A2	20150305	WO2014US58950	20141003
WO15031915 A3	20150514	WO2014US58950	20141003

Priority:

US20110506121P 20110710 US20120402590 20120222 US20130010983 20130827

Probable Assignee: MORANDO JORGE**Assignee(s):** (std): MORANDO JORGE ; MORANDO JORGE A**Inventor(s):** (std): MORANDO JORGE ; MORANDO JORGE A**Agent(s):** VINCENT RE PLLC; RE VINCENT

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

14) Family number: 60747588 (US2015323255A)

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Title: SYSTEM AND METHOD FOR MELTING LIGHT GAUGE SCRAP

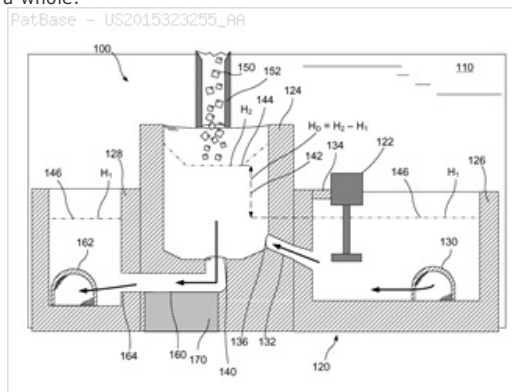
Abstract: An exemplary furnace system for melting stock metal includes a main hearth and a side well subsystem, which includes a melting well disposed downstream of the main hearth for receiving flow from the main hearth, an input flow inducer disposed upstream of the melting well and downstream of the main hearth, and an output flow inducer disposed downstream of the melting well and upstream of the main hearth. The input flow inducer drives molten metal into the melting well, thereby forming a differential metal head in the melting well. The output flow inducer evacuates molten metal from an output conduit, thereby reducing counter-pressure at an output port of the melting well communicating with the output conduit. This allows atmospheric pressure to add to the differential metal head in the melting well, resulting in an increase in productivity of the side well subsystem and of the furnace system as a whole.

Classifications:

International (IPC 8-9): C22B21/00 C22B7/00 C22B9/16 F27B3/04 F27B3/10 F27B3/18 F27B3/19 F27D27/00 F27D3/14 (Advanced/Invention)

CPC: F27B3/19 F27B3/045 F27B3/18 C22B9/16 C22B7/003 C22B21/0092 F27B3/10 F27D27/00 Y02P10/218

US: 266/236 266/237 266/239 75/414

**Family:**

Publication number	Publication date	Application number	Application date
CA2977480 AA	20170822	CA20152977480	20150429
EP3140431 A1	20170315	EP20150721511	20150429
US2015323255 AA	20151112	US20140273717	20140509
US2018023894 AA	20180125	US20170720793	20170929
US9803922 BB	20171031	US20140273717	20140509
WO15171399 A1	20151112	WO2015US28275	20150429

Priority:

US20140273717 20140509 WO2015US28275 20150429 US20170720793 20170929

Probable Assignee: ALTEK EUROPE LTD**Assignee(s):** (std): ALTEK EUROP LTD ; ALTEK EUROPE LTD ; ALTEK L L C ; ALTEK LLC**Assignee(s):** CHANDLER RICHARD C**Inventor(s):** (std): CHANDLER RICHARD C**Agent(s):** AIRD AND MCBURNEY LP; NORENS PATENTBYRA AB; TUCKER ELLIS LLP; GALIN M DAVID

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

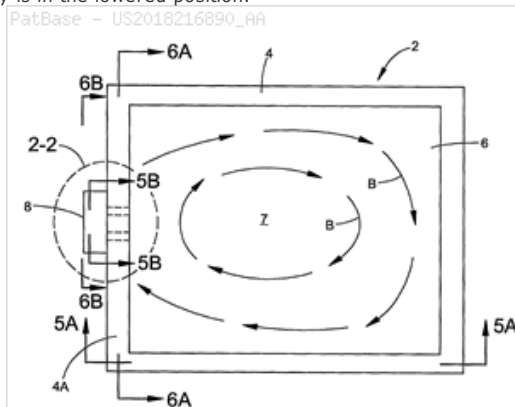
Title: METALLURGICAL APPARATUS

Abstract: A circulating apparatus for circulating the body of molten metal within an associated furnace is provided. The circulating apparatus includes a molded body with an inlet and an outlet. The inlet and the outlet are aligned with corresponding openings on the associated furnace. The inlet and the outlet define a flow chamber within the molded body. An inductor is secured to a portion of the molded body. The inductor is configured to pump molten metal from the associated furnace and into the flow chamber. A flow channel is spaced from the inlet and the outlet on the molded body. A dam assembly is positioned adjacent the outlet. The dam assembly is movable between a raised position and a lowered position relative to the outlet. The molten fluid flows back into the associated furnace when the dam assembly is in the raised position and the molten fluid flows to the flow channel when the dam assembly is in the lowered position.

Classifications:

International (IPC 8-9): C22B21/00 C22B7/00 C22B9/00 F27B14/06 F27B14/08 F27B14/14 F27D11/02 F27D27/00 F27D3/14 F27D99/00 (Advanced/Invention)

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: PERMANENT MAGNET TYPE CYLINDRICAL MOLTEN-METAL AGITATOR AND MELTING FURNACE WITH PERMANENT MAGNET TYPE SUCTION PUMP

Abstract: There is provided an energy-saving agitator that suppresses the amount of generated heat, is easy to use and carry out maintenance, has flexibility in an installation position, and can also adjust an agitating ability. The agitator includes a furnace body that includes a molten metal room storing a molten metal, and an agitating unit that agitates the molten metal stored in the furnace body. The agitating unit includes a molten-metal driving room-forming part that is disposed in the molten metal room, applies a driving force to the molten metal, and forms a driving room of which both ends are opened; a pair of electrodes that is disposed in the driving room and makes current flow in the driving room under the presence of the molten metal; and a magnetic field unit which is formed of a permanent magnet disposed outside the furnace body, of which one pole of an N pole and an S pole faces the furnace body so that magnetic lines of force generated from the one pole cross the current, and which generates an electromagnetic force for driving the molten metal from one end toward the other end in the driving room.

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