

PATENT ASSIGNMENT

Electronic Version v1.1
 Stylesheet Version v1.1

SUBMISSION TYPE:	NEW ASSIGNMENT																												
NATURE OF CONVEYANCE:	Amended and Restated Patent Security Agreement																												
CONVEYING PARTY DATA																													
<table border="1"> <thead> <tr> <th>Name</th> <th>Execution Date</th> </tr> </thead> <tbody> <tr> <td>Novelis, Inc.</td> <td>05/13/2013</td> </tr> <tr> <td>Novelis Corporation</td> <td>05/13/2013</td> </tr> </tbody> </table>		Name	Execution Date	Novelis, Inc.	05/13/2013	Novelis Corporation	05/13/2013																						
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Novelis, Inc.	05/13/2013																												
Novelis Corporation	05/13/2013																												
RECEIVING PARTY DATA																													
<table border="1"> <tr> <td>Name:</td> <td>Wells Fargo Bank, National Association</td> </tr> <tr> <td>Street Address:</td> <td>1100 Abernathy Road</td> </tr> <tr> <td>Internal Address:</td> <td>Suite 1600</td> </tr> <tr> <td>City:</td> <td>Atlanta</td> </tr> <tr> <td>State/Country:</td> <td>GEORGIA</td> </tr> <tr> <td>Postal Code:</td> <td>30328</td> </tr> </table>		Name:	Wells Fargo Bank, National Association	Street Address:	1100 Abernathy Road	Internal Address:	Suite 1600	City:	Atlanta	State/Country:	GEORGIA	Postal Code:	30328																
Name:	Wells Fargo Bank, National Association																												
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PROPERTY NUMBERS Total: 140																													
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Application Number:	61778028
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Application Number:	13055910
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Application Number:	61776316
Application Number:	13489709
Application Number:	13318113
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Application Number:	61779879
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Application Number:	61798603
Application Number:	61788637
Application Number:	61798769
Application Number:	13421266
Application Number:	13066486
Application Number:	13335090
Application Number:	12928353
Application Number:	12928356
Application Number:	13695783
Application Number:	12928355
Application Number:	61780374
Application Number:	61788970

CORRESPONDENCE DATA

Fax Number: 9177777373
Correspondence will be sent via US Mail when the fax attempt is unsuccessful.
 Phone: 212-735-3000
 Email: andrew.patrick@skadden.com
 Correspondent Name: Skadden Arps Slate Meagher & Flom LLP
 Address Line 1: Four Times Square
 Address Line 2: Attn: Elaine Ziff, Esq.
 Address Line 4: New York, NEW YORK 10036

ATTORNEY DOCKET NUMBER:	597600/39
NAME OF SUBMITTER:	Elaine Ziff
Signature:	/eziff/
Date:	05/21/2013

PATENT
REEL: 030462 FRAME: 0245

Total Attachments: 13

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AMENDED AND RESTATED PATENT SECURITY AGREEMENT

AMENDED AND RESTATED PATENT SECURITY AGREEMENT, dated as of May 13, 2013 ("Patent Security Agreement"), by NOVELIS INC., a corporation formed under the Canada Business Corporations Act, having its business address at 3560 Lenox Road, Suite 2000, Atlanta, GA 30326, and NOVELIS CORPORATION, a corporation formed under the laws of Texas, located at 3560 Lenox Road, Suite 2000, Atlanta, GA 30326 (individually, an "Assignor", and, collectively, the "Assignors"), in favor of WELLS FARGO BANK, NATIONAL ASSOCIATION, a National Banking Association located at 1100 Abernathy Road, Suite 1600, Atlanta, GA 30328, in its capacity as collateral agent pursuant to the Credit Agreement (in such capacity, the "Assignee").

W I T N E S S E T H:

WHEREAS, the Assignors are party to a Security Agreement of even date herewith (the "Security Agreement") in favor of the Assignee pursuant to which the Assignors are required to execute and deliver this Patent Security Agreement;

NOW, THEREFORE, in consideration of the foregoing premises and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, each Assignor and the Assignee hereby agree as follows:

SECTION 1. Defined Terms. Capitalized terms used but not otherwise defined herein shall have the meanings given to them in the Security Agreement. For purposes of this Patent Security Agreement, the term "Patents" shall mean, collectively, all patents, patent applications, certificates of inventions, industrial designs and rights corresponding thereto throughout the world (whether established or registered or recorded in the United States or any other country or any political subdivision thereof), together with any and all (i) rights and privileges arising under applicable law with respect to any of the foregoing, (ii) inventions and improvements described and claimed therein, (iii) reissues, divisions, continuations, renewals, extensions and continuations-in-part thereof and amendments thereto, (iv) income, fees, royalties, damages, claims and payments now or hereafter due and/or payable thereunder and with respect thereto including damages and payments for past, present or future infringements or other violations thereof, (v) rights corresponding thereto throughout the world and (vi) rights to sue for past, present or future infringements or other violations thereof.

SECTION 2. Grant of Security Interest in Patent Collateral. As collateral security for the payment and performance in full of all the Secured Obligations, each Assignor hereby pledges and grants to the Assignee for the benefit of the Secured Parties, a lien on and security interest in all of the right, title and interest of such Assignor in, to and under the following property, wherever located, and whether now existing or hereafter arising or acquired from time to time (collectively, the "Pledged Patent Collateral"):

(a) all Patents of such Assignor, including, without limitation, the registered and applied-for Patents of such Assignor listed on Schedule I attached hereto; and

(b) all Proceeds and products of each of the foregoing and all accessions to, substitutions and replacements for, and rents, profits and products of, each of the foregoing, and any and all Proceeds of any insurance, indemnity, warranty or guaranty payable to such Assignor from time to time with respect to any of the foregoing.

Notwithstanding anything to the contrary contained in clauses (a) and (b) above, the security interest created by this Patent Security Agreement shall not extend to any Excluded Property.

SECTION 3. Security Agreement. The lien and security interest granted pursuant to this Patent Security Agreement is granted in conjunction with the lien and security interest granted to the Assignee pursuant to the Security Agreement and Assignors hereby acknowledge and affirm that the rights and remedies of the Assignee with respect to the lien and security interest in the Patents made and granted hereby are more fully set forth in the Security Agreement. In the event that any provision of this Patent Security Agreement is deemed to conflict with the Security Agreement, the provisions of the Security Agreement shall control unless the Assignee shall otherwise determine.

SECTION 4. Recordation. Each Assignor hereby authorizes and requests that the Commissioner of Patents and Trademarks record this Patent and Security Agreement.

SECTION 5. Termination. When all the Secured Obligations have been paid in full and the Commitments of the Lenders to make any Loan or to issue any Letter of Credit under the Credit Agreement shall have expired or been sooner terminated and all Letters of Credit have been terminated or cash collateralized in accordance with the provisions of the Credit Agreement, this Patent Security Agreement shall terminate. Upon termination of this Patent Security Agreement the Pledged Patent Collateral shall be released from the lien and security interest granted pursuant to this Patent Security Agreement and upon the request and at the sole cost and expense of the Assignors, the Assignee shall execute, acknowledge, and deliver to the Assignors an instrument in writing in recordable form releasing the Pledged Patent Collateral from the Lien of this Patent Security Agreement.

SECTION 6. Counterparts. This Patent Security Agreement and any amendments, waivers, consents or supplements hereto may be executed in any number of counterparts and by different parties hereto in separate counterparts, each of which when so executed and delivered shall be deemed to be an original, but all such counterparts together shall constitute one and the same agreement. Delivery of an executed counterpart of a signature page of this Patent Security Agreement by facsimile, e-mail or other electronic transmission (including in pdf format or other similar format) shall be effective as delivery of a manually executed counterpart of this Patent Security Agreement.

SECTION 7. Governing Law. This Patent Security Agreement shall be construed in accordance with and governed by the law of the State of New York, without regard to conflicts of law principles that would require the application of the laws of another jurisdiction.

SECTION 8. INTERCREDITOR AGREEMENT GOVERNS. NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, THE LIEN AND SECURITY INTEREST GRANTED TO THE ASSIGNEE, FOR THE BENEFIT OF THE SECURED PARTIES, PURSUANT TO THIS PATENT SECURITY AGREEMENT AND THE EXERCISE OF ANY RIGHT OR REMEDY BY THE ASSIGNEE AND THE OTHER SECURED PARTIES HEREUNDER ARE SUBJECT TO THE PROVISIONS OF THE INTERCREDITOR AGREEMENT. IN THE EVENT OF ANY CONFLICT OR INCONSISTENCY BETWEEN THE PROVISIONS OF THE INTERCREDITOR AGREEMENT AND THIS PATENT SECURITY AGREEMENT, THE PROVISIONS OF THE INTERCREDITOR AGREEMENT SHALL GOVERN AND CONTROL.

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ABL

IN WITNESS WHEREOF, each Assignor has caused this Patent Security Agreement to be executed and delivered by its duly authorized officer as of the date first above written.

NOVELIS INC.

By: 

Name: Leslie J. Parrette, Jr.
Title: Authorized Signatory

NOVELIS CORPORATION

By: 

Name: Leslie J. Parrette, Jr.
Title: Authorized Signatory

AMENDED AND RESTATED PATENT SECURITY AGREEMENT

PATENT
REEL: 030462 FRAME: 0249

ABL

Accepted and Agreed:

WELLS FARGO BANK, NATIONAL ASSOCIATION
as Assignee

By: Samantha Alexander
Name: Samantha Alexander
Title: Director

AMENDED AND RESTATED PATENT SECURITY AGREEMENT

PATENT
REEL: 030462 FRAME: 0250

ABL

ACKNOWLEDGEMENT OF ASSIGNOR

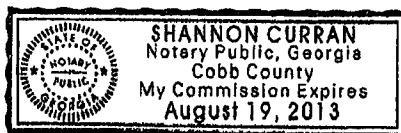
STATE OF Georgia)
COUNTY OF Fulton) ss.

On this _____ day of May, 2013 before me personally appeared Leslie J. Parrette, Jr., proved to me on the basis of satisfactory evidence to be the person who executed the foregoing instrument on behalf of Novelis Inc., who being by me duly sworn did depose and say that he is an authorized officer of said corporation, that the said instrument was signed on behalf of said corporation as authorized by its Board of Directors and that he acknowledged said instrument to be the free act and deed of said corporations.



Notary Public

My Commission Expires: August 19, 2013



AMENDED AND RESTATED PATENT SECURITY AGREEMENT

PATENT
REEL: 030462 FRAME: 0251

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ACKNOWLEDGEMENT OF ASSIGNOR

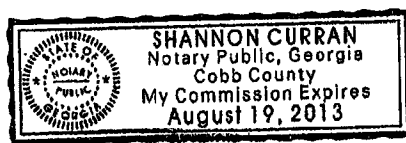
STATE OF Georgia)
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Notary Public

My Commission Expires: August 19, 2013



AMENDED AND RESTATED PATENT SECURITY AGREEMENT

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REEL: 030462 FRAME: 0252

SCHEDULE I
to
PATENT SECURITY AGREEMENT

U.S. PATENTS AND PATENT APPLICATIONS

Patents:

App Number	Pat Number	Title	Status
10/863557	7029543	New Automotive Alloy To Meet Japanese Autosheet Requirements	Issued
10/138844	6780259	New Automotive Alloy To Meet Japanese Autosheet Requirements	Issued
09/489119	6165291	Improvement Of Aluminum Fin Alloy Properties By Using Twin Roll Casting Process	Issued
10/297941	7172664	A Method Of Making Aluminium Foil For Fins	Issued
10/311650	7200935	Compliant Work Rolls For Closed Gap Rolling	Issued
09/489082	6238497	Conductivity Control In High Conductivity Aluminum Fin Alloys (Related To Ir 5187)	Issued
10/726181	7267734	Method For Faster Dc Casting Of Lithographic Quality Aa1050 Ingots W/Out Formation Of Electrograining Defects In Final Product	Issued
09/633584	6755236	Linear Nozzles	Issued
10/846423	6910524	Linear Nozzles	Issued
09/782797	6531006	Ultra High Strength Foils	Issued
10/574459	7380583	Aluminum/Aluminum Alloy Belts For The Casting Of Light Metals	Issued
10/433499	7497402	Improving The Flatness Of Coiled Strip By Coiling On A Contoured Spool	Issued
10/488848	7789978	An Alloy For Lithographic Sheet That Contains Additions Of Zinc To Improve The Electrograining Properties Of 1050a In Critical Electrolytes - X-Ref Ir5458	Issued
10/483684	8012333	Formation Of Roughened Surfaces By Etching Preanodised 1050a In Alkali Solutions	Issued
09/620110	6609557	A System For Providing Consistent Flow Through Multiple Permeable Walls In A Casting Mould	Issued
10/461631	6808009	A System For Providing Consistent Flow Through Multiple Permeable Walls In A Casting Mould	Issued
11/361881	7250221	Method Of Producing Clad Aluminum Products	Issued
10/735075	6973955	New Heated Trough Design Concept	Issued
11/724449	7823623	Belt Casting Machine With Mould Section Providing Variable Contact Length With The Metal Slab	Issued
10/467206	7040569	Coil Core With Asymmetrical Waves/Grooves	Issued

App Number	Pat Number	Title	Status
10/471617	7516637	Low Cost Texturing Using Tandem Embossing	Issued
11/712672	7748434	Novel Invention For Production Of Readily Oxidized Alloys With One Or More Layers	Issued
10/875978	7472740	Novel Method For Production Of Multi-Layered Ingots	Issued
12/807739	8312915	Novel Method For Production Of Multi-Layered Ingots	Issued
12/291820	7819170	Novel Method For Production Of Multi-Layered Ingots	Issued
11/827693	7608302	Suppression Of The Reaction Of Aluminum With Refractory Materials In A Dc Ingot Mold	Issued
10/735076	7077186	Horizontally Oriented Mould With Gas And Fluid Lubrication	Issued
08/171964	6060013	Rotary Gas Dispersion Device For Treating A Liquid Aluminium Bath	Issued
10/735074	7004229	System For Independent Mould Feed And Evacuation In A Continuous Horizontal Caster	Issued
10/735077	7028750	Horizontal Cast Billet Support System	Issued
08/495332	5640872	Process And Device For Cooling Heated Metal Plates And Strips	Issued
09/462083	6331269	Inert Tank For Treating Oxidable Liquid Metal	Issued
08/955286	5902543	Process And Device For Cooling An Article - Microjet	Issued
10/574414	7448432	Texturing Of Belts For Belt Casters	Issued
12/380487	7871478	In-Situ Homogenization Of A Dc Cast Ingot	Issued
08/954784	6158498	Casting Of Molten Metal In An Open-Ended Mold Cavity	Issued
09/572644	6260602	Casting Of Molten Metal In An Open-Ended Mold Cavity	Issued
09/693494	6546995	Casting Of Molten Metal In An Open-Ended Mold Cavity	Issued
11/588517	7516775	In-Situ Homogenization Of A Dc Cast Ingot	Issued
11/067768	7459896	Improved Electrode Configuration For Limca (Part Of Limca Cm)	Issued
10/931137	7485255	Self-Annealing Enclosure For Aluminum Coils	Issued
11/471171	7547463	Non-Stick Foil	Issued
11/807456	7947218	Method Of Cooling Coils Using Air	Issued
11/125565	7191032	Optimization Of Pressure Ram Forming And Like Hydroforming Operations	Issued
11/293424	7353681	Patterned Tandem Roll Texturing	Issued
11/982607	7624609	Patterned Tandem Roll Texturing	Issued
10/284912	6802196	Pressure Ram Forming (Prf) Aluminum Beverage Containers (Contains Data From Merged Ir's 5712 & 5713)	Issued
10/788636	7107804	Pressure Ram Forming (Prf) Aluminum Beverage Containers (Contains Data From Merged Ir's 5712 & 5713)	Issued
09/202252	6267870	A Method Of Cleaning Lithographic Sheet To Reduce Surface Defects On Subsequent	Issued

App Number	Pat Number	Title	Status
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09/381882	6350532	A New Aluminum Alloy For The Household Foil	Issued
09/508172	6248193	Method Of Mfg. Al Alloy Sheet With Superior Resistance To Stress Corrosion Crack & Exc. Shape Stability After Form Work	Issued
09/024849	6120623	High Strength Aluminum Alloy With Excellent Formability And Surface Appearance For Automotive Skin Panel Applications	Issued
09/622488	6533877	Method Of Producing Household Aluminium Foil Of High Strength	Issued
09/121638	6592688	High Conductivity Aluminum Fin Alloys For Automotive Applications As Filed: Aluminum Alloy Fin Stock And Its Preparation	Issued
09/036649	6086690	Process For Making 5000 Series Alum. Alloy Auto Sheet By Continuous Casting And Hot Rolling	Issued
09/051735	6408938	Higher Strength Corrosion Resistant Finstock Alloy (Alloy Ch27)	Issued
08/449418	5622562	A Method For Applying 100% Solids Coatings To Aluminum Strip By Combining An Adc With A Screw Extruder.	Issued
08/849605	5879437	Siloxane Pretreatment	Issued
08/764983	5728241	Integrated Heat Treatm't Process To Produce Coated/Uncoated Heat Treatable Auto Sheet With Improved Paint Bake Response (Ir4377)	Issued
08/849674	5997721	An Electrolytic Method For Cleaning Aluminum Strip	Issued
10/209071	6725904	Influence Of Water Vapour On The Heat Flow And Surface Quality Of Cast Ingot In A Belt Caster.	Issued
09/664301	6470959	Influence Of Water Vapour On The Heat Flow And Surface Quality Of Cast Ingot In A Belt Caster.	Issued
08/279214	5616189	Age Hardening Aluminum Alloys And A Process For Automotive Panel Applications	Issued
08/128907	5514478	Hydrophilic Corrosion Resistant Coating On Aluminum Sheet	Issued
08/547151	5614035	Hydrophilic Corrosion Resistant Coating On Aluminum Sheet	Issued
08/532586	6019939	Brazing Alloy (X900)	Issued
08/615217	5998044	Production Of A Matt Rolled Finish For Lithographic Sheet	Issued
09/393997	6524768	Production Of A Matt Rolled Finish For Lithographic Sheet	Issued
08/456780	5671800	Molten Metal Injector For Continuous Caster	Issued
08/278849	5636681	Molten Metal Injector For Continuous Caster	Issued
08/168000	5582884	A Method Of Preparing A Peelable Foil	Issued

App Number	Pat Number	Title	Status
		Lidding Material	
08/395179	5514211	Siloxane Pretreatment	Issued
08/125343	5701775	Cooling Of Strip	Issued
09/029133	6267922	A Precipitation Hardened Alloy For Automotive Structural Applications	Issued
09/656293	6329329	Improved Avt Press Lubricant Case 2 (Lubricated Metal Workpiece And Method)	Issued
12/661862	8122938	Stationary Means Of Metal Containment For The Sides Of A Twin Belt Caster	Issued
12/802517	8210236	Cavity Shape Measuring Method	Issued
11/786840	7762310	Clad Product For Superplastic Forming	Issued
12/072029	7975752	Novel Method Of Engineering The Interface Of A Clad Interface Using Alcoa's Simultaneous Multiple Alloy Casting Technology	Issued
13/333469	8347949	Novel Method Of Eliminating The Shrinkage Cavity Commonly Found In The Head Of The Direct Chill Ingot	Issued
09/806497	6576184	Tilting Tank For Processing Liquid Metal And Device For Sealed Connection With Fixed Chute	Issued
08/329871	5476249	Ladle For The Filtration Of Liquid Metal Over A Filter Medium With Improved Heating	Issued
12/220954	7882887	Reverse Taper Embodiment	Issued
12/924580	8420008	Mechanical Pump/Vortex For Closed Reverb Furnace	Issued
12/454655	8336603	Molten Metal Skimmers For Fusion Process	Issued
12/462224	8096344	Sequential Solidification Of An Ingot With Two Or More Chambers With Overlapping Freezing Ranges	Issued
09/680459	6527042	Roll For The Continuous Casting Of Metal Strips Comprising A Cooling Circuit	Issued
08/442752	5494265	Ladle For Processing Molten Metal With Minimal Space Requirements And Improved Performance	Issued
12/653894	8349470	Oy Water Resistant Liner And Interlayer Combination For Heat Exchanger	Issued
10/514165	7648674	Device For The In-Line Treatment Of Liquid Metal By Means Of Gas And Filtration	Issued
11/703029	7617864	Use Of Hot-Crack Insensitive Clad Layer For The Purpose Of Reducing The Overall Amount Of Grain Refiner While Retaining Excellent Castibility For A Monolithic Alloy Of A Single Composition	Issued
12/587368	7789124	Use Of Hot-Crack Insensitive Clad Layer For The Purpose Of Reducing The Overall Amount Of Grain Refiner While Retaining Excellent Castibility For A Monolithic Alloy Of A Single Composition	Issued
10/524119	7364690	Device For Injecting A Treatment Gas Into A Molten Metal	Issued
13/134835	8418630	Aluminum Pallet Formed From Tube	Issued

App Number	Pat Number	Title	Status
13/421350	8365807	Novel Method To Use A Dual Chambered Mold To Remove Heat From The Metal During The Starting Phase Of An Ingot Cast	Issued
12/931724	8418748	Temperature Compensation For The Maintenance Clad Interfaces During Casting	Issued
12/807740	8415025	Composite Metal as Cast Ingot	Issued
11/572832	8425698	Aluminum Alloy Sheet and Method for Manufacturing Same	Issued
12/806939	8414825	Moveable Sweat Hearth for Metal Melting Furnace	Issued

Patent Applications:

App Number	App Date	Title	Status
12/927519	11/12/2010	In-Situ Homogenization of a DC Cast Ingot	Published
13/648002	N/A	Novel Method For Production Of Multi-Layered Ingots	Unpublished
13/649960	10/11/2012	In-Situ Homogenization Of A Dc Cast Ingot	Published
12/290257	10/29/2008	Improved Electrode Configuration For Limca (Part Of Limca Cm)	Published (on appeal)
13/467328	5/9/2012	Car Body Part	Published
11/259617	10/25/2005	Pulsed Air Jet Piping And Equipment Arrangement And Method Used To Maintain Maximum Airflow Through A Regenerative Burner Media Bed	Published
61/776241	N/A	Improving Flatness Of Sheet	Provisional
61/778028	N/A	Low Loss Control Using A Resistor Ladder Network To Maintain A Constant Current Over An Ultra-Capacitor Discharge Cycle (Limca Ii)	Provisional
13/328394	12/16/2011	All Aluminum Solar Absorber Panel Incorporating Fusion Clad Sheet	Published
13/066474	4/14/2011	Novel Method Of Isolating Metal Transfer Trough Rfrc From Its Supporting Structure And Isolating The Joint Between Adjacent Metal Transfer Trough Rfrc Section To Prevent Molten Metal Leakage And Flow By Means Of A Rfrc Saddle	Published
13/055910	3/16/2011	Automotive Sheet Product With Extreme Formability	Published
12/928354	12/8/2010	Novel Method Of Insulating A Molten Metal Trough	Published
13/765490	N/A	Coarse Constituent Particle Size Control Through Thermo-Mechanical Contraction Of In Situ Homogenized Aluminum Ingot	Unpublished
12/930561	1/11/2011	Novel Method Of Attaching A Moveable Metal Transfer Trough Cover Or Top Heater To The Trough's Support Structure	Published
13/708644	N/A	Method Of Producing A High Strength And High Thermal Conductivity Aluminum Fin Alloy	Unpublished
61/776316	N/A	Permanent Magnet Metal Pump In Isolation	Provisional

App. Number	App. Date	Title	Status
		Well	
13/489709	6/6/2012	Aluminum Alloy Sheet And Method For Manufacturing The Same	Published
13/318113	2/2/2012	High Speed Electrolytic Graining Alloy	Published
12/661861	3/24/2010	Variable Width Flexcaster.	Published
12/930557	1/10/2011	Idea For Controlling Prf Expansion Process Without Thermal Gradient	Published
61/789215	N/A	Casting Alloys As Cladding Alloys For Brazing Sheet	Provisional
61/788970	N/A	An Approach To Explore Possibility Of Using Commercially Available X320-O/Hxx Type Alloy For Automotive Inner Panel Applications	Provisional
61/779149	N/A	Brazing Sheet Packages With Improved Corrosion Life	Provisional
13/765500	N/A	Method For Improving The Efficiency Of A Continuous Casting Machine Such As The Twin-Belt Flexcaster	Unpublished
61/788341	N/A	Recycle-Friendly Multi-Purpose Al-Mg-Cu-Si Heat-Treatable Aluminum Alloy	Provisional
61/776925	N/A	Measurement Of The Thermal Crown Of Work Rolls Using Ultrasound (Ultrasonic) Waves	Provisional
61/778044	N/A	Unique Particle Discrimination Firmware Algorithms For A Two Probe Design To Differentiate Different Metal Inclusion Sizes And Noise In Real Time	Provisional
61/779879	N/A	Kiln Control Strategy And Programming	Provisional
61/680644	N/A	Development Of A New Lubrication For The Needed Slippery Characteristics At The Can Ends Makers	Provisional
61/777574	N/A	Use Pin Pulses To Produce Metal Level Dithering At The Start Of A Cast Facilitating Metal Flow Into The Mold Corners And Short Faces Of The Ingot Mold	Provisional
61/798603	N/A	Targetted Cooling Of Aluminum Hot Rolling Mill To Maximize Speed While Rolling Coiling Temperature-Limited Products	Provisional
61/788637	N/A	Dulled Gloss Or Satin Finish Surface	Provisional
61/798769	N/A	Targeted Lubrication Of Selected Rolls Of Aluminum Hot Rolling Tandem Mill To Rapidly Improve Reroll Surface Quality And Mill Performance	Provisional
13/421266	3/15/2012	Top Blow-Off Plate For Cold Mill Sheet Cooling	Published
13/066486	4/14/2011	Novel Method Of Starting And Stopping The Flow Of High Temperature Liquid In An Open Flow Channel	Published
13/335090	12/22/2011	Reverse Flow Regenerative Bed	Published
12/928353	12/8/2010	Novel Method Of Creating A Leak-Proof Joint Between Adjacent Sections Of Refractory Trough Used For Molten Metal	Published

App. Number	App. Date	Title	Status
		Transfer Trough	
12/928356	12/8/2010	Novel Method Of Creating A Crack Resistant And Thermally Conductive Refractory Trough Section For Molten Metal	Published
13/695783	1/16/2013	Aa4xxx Alloy For Compound Tubes	Unpublished
12/928355	12/8/2010	Novel Method Of Fabricating And Utilizing A Compression Rod In A High Temperature Application	Published
61/780374	N/A	Wiper/Lubricant Applicator Blade	Provisional
61/788970	N/A	An Approach To Explore Possibility Of Using Commercially Available X320-O/Hxx Type Alloy For Automotive Inner Panel Applications	Provisional