

Search query (2): [SP]: cross-reference to related applications[0001] this application claims priority to and the benefit of u.s. provisional patent application no. 62/007,284 filed jun. 3, 2014, the contents of which are incorporated herein by reference.background of the invention[0002] 1. field of the invention[0003] the present disclosure relates to granulated slag products and processes for their production.[0004] 2. field of the invention[0005] slag is a by-product of metal production processes conducted in metallurgical furnaces. although the composition and quantity of slag produced is highly dependent on the specific process, slag typically comprises a mixture of metal oxides with silica, and is produced in amounts ranging from roughly 10 percent to several times the amount of metal produced by the process.[0006] during metal production, slag is present in the metallurgical furnace in molten form. molten slag is periodically tapped from the furnace and may be processed into a granulated slag product. granulated slag has been used as an aggregate for concrete and as a cementitious material, and recently there has been interest in the use of granulated slag as proppants in oil and gas production, as roofing granules, abrasives or as catalyst supports.[0007] slag granulation is typically performed by a wet granulation process, conducted using water sprays which contact the stream of slag, and disperse it into droplets which solidify into granules that are conveyed down the sluicing launder, and then to a yard where they land in a pond for collection.[0008] during the wet granulation process, large amounts of water are added to the slag to cool the molten slag. the waste water produced by the process is contaminated by contact with the slag and its disposal results in additional cost. furthermore, water granulation often results in the production of slag granules which have an unacceptably high water content and which are considered unfit for many uses. the drying of wet slag granules also results in additional cost, and in many cases is not economically feasible. attempts to address this problem by controlling the amounts of water added to the granulation process have met with limited success. wet granulation of sulfur-containing slags has also been known to produce unacceptably high emissions of sulfur-containing gases.[0009] dry granulation of slag overcomes some of the problems associated with the wet granulation process. in a dry granulation process, the molten slag is typically dispersed or atomized by a pressured gas stream, or by mechanical means. although dry granulation uses less water than wet granulation, and typically produces a dry product, the dry granulation process can produce large quantities of slag "wool", consisting of low density fibers of slag produced when the slag has poor droplet-forming properties. the slag wool has low density and high volume, making its handling, transportation, and recovery difficult. in extreme cases, the amount of slag wool formation may be as high as 90 percent by weight. the production of slag wool is particularly problematic for slags having high viscosity, and has limited the application of dry granulation, and in particular gas atomization, to specific types of slag which have a low tendency to produce slag wool.[0010] also, it is difficult to process slag at high flow rates in a gas atomization apparatus, due to the tendency of the slag to gather into thick streams which are difficult to disperse with air. furthermore, the thickness of the slag stream affects the size of the particles produced by air atomization. therefore, inconsistency in the thickness of the slag stream can result in a lack of control over the particle size of the slag granules, and can result in products having a very broad particle size distribution. to avoid these issues, gas atomization processes tend to operate on a small scale, limiting their usefulness.[0011] there remains a need for simple, economically feasible processes for slag granulation which avoid the above-mentioned problems associated with known wet and dry granulation processes.summary of the invention[0012] in one aspect, there is provided a process for the production of substantially dry slag granules. the process comprises: (a) providing a stream of molten slag, which may comprise a metallurgical slag (b) adding a controlled amount of water to the slag (c) granulating the stream of molten slag to produce solidified slag wherein the solidified slag comprises said substantially dry slag granules and slag wool, and wherein a quantity of the slag wool produced by the process is less than that which would be produced by granulating the stream of molten slag without addition of the controlled amount of water. for example, the quantity of the slag wool produced by the process is less than about 10 percent by weight of the solidified slag.[0013] in an embodiment, the controlled amount of water is less than about 300 kg water per tonne of slag, and may be less than about 100 kg water per tonne of slag. for example, the controlled amount of water may be such that the substantially dry slag granules have a water content of less than about 5 percent by weight.[0014] in another embodiment, the step of granulating the stream of molten slag comprises dispersion of the molten slag by contact of the molten slag with a stream of an atomizing fluid, which may comprise gas.[0015] in yet another embodiment, at least a portion of the controlled amount of water is added to the slag simultaneously with the contact of the molten slag with the atomizing fluid, such that the atomizing fluid may further comprise the controlled amount of water.[0016] in yet another embodiment, at least a portion of the controlled amount of water is added to the molten slag prior to the contact of the molten slag with the atomizing fluid.[0017] in yet another embodiment, at least a portion of the controlled amount of water is added to the molten slag immediately after the contact of the molten slag with the atomizing fluid, as the dispersed slag is projected through an atomizing chamber and before it lands in a collection area of the atomizing chamber.[0018] in yet another embodiment, the step of granulating the stream of molten slag comprises dispersion of the molten slag by contact of the molten slag with a rotating mechanical element.[0019] in another aspect, there is provided an apparatus for the production of substantially dry slag granules. the apparatus comprises: (a) an inclined surface having an upper end for receiving a stream of molten slag and a lower end for discharging the stream of molten slag (b) a dispersion device at the lower end of the inclined surface for dispersion of the stream of molten slag discharged from the inclined surface (c) one or more water addition devices for adding a controlled amount of water to the molten slag and (d) a collection area adjacent to the dispersion device for deposition of solidified slag produced by the dispersion of the molten slag, wherein the solidified slag comprises said substantially dry slag granules and slag wool, and wherein a quantity of the slag wool is less than that which would be produced by granulating the stream of molten slag without addition of the controlled amount of water.[0020] in one embodiment, the dispersion device comprises an atomizer in which the molten slag is contacted with a stream of an atomizing fluid. for example, the dispersion device may comprise a gas atomizer and the atomizing fluid may comprise gas.[0021] in another embodiment, at least one of said water addition devices is located proximate to the lower end of the inclined surface and is associated with the gas atomizer, such that the gas and the controlled amount of water added by said at least one water addition device together comprise the atomizing fluid.[0022] in yet another embodiment, the gas atomizer comprises a blower, and the at least one water addition device located proximate to the lower end of the inclined surface comprises one or more spray nozzles, said spray nozzles being located above and/or below the lower end of the inclined surface.[0023] in yet another embodiment, the dispersion device comprises a first rotating mechanical element, and wherein at least one of said water addition devices are located between the upper end of the inclined surface and the first rotating mechanical element.[0024] in yet another embodiment, a slag flow direction is defined between upper and lower ends of the inclined surface, and the inclined surface has a width which is transverse to the slag flow direction the apparatus further comprises a flow distribution element, for distributing the flow of the molten slag across the width of the inclined surface and the flow distribution element is located between the upper end of the inclined surface and the first rotating mechanical element.[0025] in yet another embodiment, the one or more water addition devices are located along the slag flow direction between the upper end of the inclined surface and the flow distribution element.[0026] in yet another embodiment, the one or more water addition devices comprises one or more water spray nozzles provided above the inclined surface and directed downwardly toward the inclined surface.[0027] in yet another embodiment, the flow distribution element comprises a second rotating mechanical element which extends across the width of the inclined surface, is rotatable about an axis extending transversely across the inclined surface, and extends across substantially the entire width of the inclined surface, and is spaced from the inclined surface by a gap.[0028] in yet another embodi

Results: 7

Search history

Search TAC=(granulation and slag and reduced and slag wool) (Results 4)

1:

Search [SP]: cross-reference to related applications[0001] this application claims priority to and the benefit of u.s. provisional patent application no. 62/007,284 filed jun. 3, 2014, the contents of which are incorporated herein by reference.background of the invention[0002] 1. field of the invention[0003] the present disclosure relates to granulated slag products and processes for their production.[0004] 2. field of the invention[0005] slag is a by-product of metal production processes conducted in metallurgical furnaces. although the composition and quantity of slag produced is highly dependent on the specific process, slag typically comprises a mixture of metal oxides with silica, and is produced in amounts ranging from roughly 10 percent to several times the amount of metal produced by the process.[0006] during metal production, slag is present in the metallurgical furnace in molten form. molten slag is periodically tapped from the furnace and may be processed into a granulated slag product. granulated slag has been used as an aggregate for concrete and as a cementitious material, and recently there has been interest in the use of granulated slag as proppants in oil and gas production, as roofing granules, abrasives or as catalyst supports.[0007] slag granulation is typically performed by a wet granulation process, conducted using water sprays which contact the stream of slag, and disperse it into droplets which solidify into granules that are conveyed down the sluicing launder, and then to a yard where they land in a pond for collection.[0008] during the wet granulation process, large amounts of water are added to the slag to cool the molten slag. the waste water produced by the process is contaminated by contact with the slag and its disposal results in additional cost. furthermore, water granulation often results in the production of slag granules which have an unacceptably high water content and which are considered unfit for many uses. the drying of wet slag granules also results in additional cost, and in many cases is not economically feasible. attempts to address this problem by controlling the amounts of water added to the granulation process have met with limited success. wet granulation of sulfur-containing slags has also been known to produce unacceptably high emissions of sulfur-containing gases.[0009] dry granulation of slag overcomes some of the problems associated with the wet granulation process. in a dry granulation process, the molten slag is typically dispersed or atomized by a pressured gas stream, or by mechanical means. although dry granulation uses less water than wet granulation, and typically produces a dry product, the dry granulation process can produce large quantities of slag "wool", consisting of low density fibers of slag produced when the slag has poor droplet-forming properties. the slag wool has low density and high volume, making its handling, transportation, and recovery difficult. in extreme cases, the amount of slag wool formation may be as high as 90 percent by weight. the production of slag wool is particularly problematic for slags having high viscosity, and has limited the application of dry granulation, and in particular gas atomization, to specific types of slag which have a low tendency to produce slag wool.[0010] also, it is difficult to process slag at high flow rates in a gas atomization apparatus, due to the tendency of the slag to gather into thick streams which

are difficult to disperse with air. furthermore, the thickness of the slag stream affects the size of the particles produced by air atomization. therefore, inconsistency in the thickness of the slag stream can result in a lack of control over the particle size of the slag granules, and can result in products having a very broad particle size distribution. to avoid these issues, gas atomization processes tend to operate on a small scale, limiting their usefulness.[0011] there remains a need for simple, economically feasible processes for slag granulation which avoid the above-mentioned problems associated with known wet and dry granulation processes.summary of the invention[0012] in one aspect, there is provided a process for the production of substantially dry slag granules. the process comprises: (a) providing a stream of molten slag, which may comprise a metallurgical slag (b) adding a controlled amount of water to the slag (c) granulating the stream of molten slag to produce solidified slag wherein the solidified slag comprises said substantially dry slag granules and slag wool, and wherein a quantity of the slag wool produced by the process is less than that which would be produced by granulating the stream of molten slag without addition of the controlled amount of water. for example, the quantity of the slag wool produced by the process is less than about 10 percent by weight of the solidified slag.[0013] in an embodiment, the controlled amount of water is less than about 300 kg water per tonne of slag, and may be less than about 100 kg water per tonne of slag. for example, the controlled amount of water may be such that the substantially dry slag granules have a water content of less than about 5 percent by weight.[0014] in another embodiment, the step of granulating the stream of molten slag comprises dispersion of the molten slag by contact of the molten slag with a stream of an atomizing fluid, which may comprise gas.[0015] in yet another embodiment, at least a portion of the controlled amount of water is added to the slag simultaneously with the contact of the molten slag with the atomizing fluid, such that the atomizing fluid may further comprise the controlled amount of water. [0016] in yet another embodiment, at least a portion of the controlled amount of water is added to the molten slag prior to the contact of the molten slag with the atomizing fluid.[0017] in yet another embodiment, at least a portion of the controlled amount of water is added to the molten slag immediately after the contact of the molten slag with the atomizing fluid, as the dispersed slag is projected through an atomizing chamber and before it lands in a collection area of the atomizing chamber.[0018] in yet another embodiment, the step of granulating the stream of molten slag comprises dispersion of the molten slag by contact of the molten slag with a rotating mechanical element.[0019] in another aspect, there is provided an apparatus for the production of substantially dry slag granules. the apparatus comprises: (a) an inclined surface having an upper end for receiving a stream of molten slag and a lower end for discharging the stream of molten slag (b) a dispersion device at the lower end of the inclined surface for dispersion of the stream of molten slag discharged from the inclined surface (c) one or more water addition devices for adding a controlled amount of water to the molten slag and (d) a collection area adjacent to the dispersion device for deposition of solidified slag produced by the dispersion of the molten slag, wherein the solidified slag comprises said substantially dry slag granules and slag wool, and wherein a quantity of the slag wool is less than that which would be produced by granulating the stream of molten slag without addition of the controlled amount of water.[0020] in one embodiment, the dispersion device comprises an atomizer in which the molten slag is contacted with a stream of an atomizing fluid. for example, the dispersion device may comprise a gas atomizer and the atomizing fluid may comprise gas.[0021] in another embodiment, at least one of said water addition devices is located proximate to the lower end of the inclined surface and is associated with the gas atomizer, such that the gas and the controlled amount of water added by said at least one water addition device together comprise the atomizing fluid.[0022] in yet another embodiment, the gas atomizer comprises a blower, and the at least one water addition device located proximate to the lower end of the inclined surface comprises one or more spray nozzles, said spray nozzles being located above and/or below the lower end of the inclined surface.[0023] in yet another embodiment, the dispersion device comprises a first rotating mechanical element, and wherein at least one of said water addition devices are located between the upper end of the inclined surface and the first rotating mechanical element. [0024] in yet another embodiment, a slag flow direction is defined between upper and lower ends of the inclined surface, and the inclined surface has a width which is transverse to the slag flow direction the apparatus further comprises a flow distribution element, for distributing the flow of the molten slag across the width of the inclined surface and the flow distribution element is located between the upper end of the inclined surface and the first rotating mechanical element.[0025] in yet another embodiment, the one or more water addition devices are located along the slag flow direction between the upper end of the inclined surface and the flow distribution element.[0026] in yet another embodiment, the one or more water addition devices comprises one or more water spray nozzles provided above the inclined surface and directed downwardly toward the inclined surface.[0027] in yet another embodiment, the flow distribution element comprises a second rotating mechanical element which extends across the width of the inclined surface, is rotatable about an axis extending transversely across the inclined surface, and extends across substantially the entire width of the inclined surface, and is spaced from the inclined surface by a gap.[0028] in yet another embo (Results 7)

1) Family number: 36972241 (GB190929365A)

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Title: Improved Apparatus for Atomising Liquid Slag.

Abstract: Source: GB190929365A 29,365. Buderussche Eisenwerke. Dec. 28, 1908, [Convention date]. Aerated sprayers. -- A spray-producer comprises a pipe 13 formed with a nozzle 14 and having at the other end a valved connexion with a supply of air or steam, or both. Liquid may be admitted through a valved pipe 16. The spray-producer is vertically and angularly adjustable.

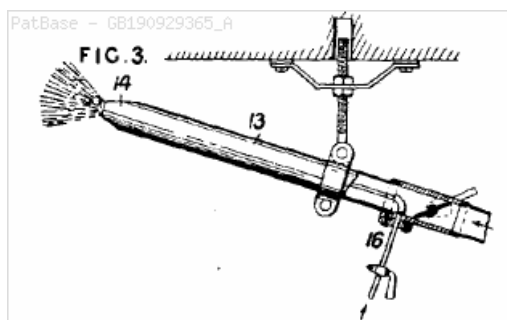
Classifications:

International (IPC 8-9): C21B3/08 (Advanced/Invention);

C21B3/00 (Core/Invention)

CPC: C21B3/08

European: C21B3/08



Family:

Publication number	Publication date	Application number	Application date
GB190929365 A	19100908		00000000

Priority:

19081228

Probable Assignee: BUDERUS EISENWERK

Assignee(s): (std): BUDERUS EISENWERK

Assignee(s): BUDERUS SCHE EISENWERKE

2) Family number: 1544832 (CA1110072A)

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Title: PROCESS FOR PRODUCING SOLIDIFIED GRANULAR SLAG FROM MOLTEN BLAST FURNACE SLAG AND APPARATUS THEREFOR

Abstract: Source: CA1110072A A continuous stream of blast furnace molten slag flows down through a trough. The slag stream is dispersed by blowing a jet air stream against the back side of the stream in an upwardly inclined direction crossing the stream. The dispersed slag is carried by the air stream to granulate the slag. The amount of the jet air stream is not less than 500 m3 per ton of the slag stream; The width of the jet air stream is greater than the width of the slag stream against

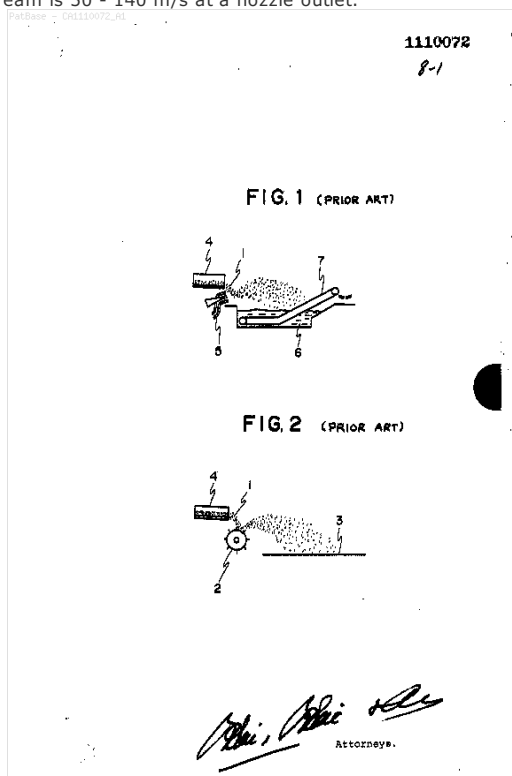
which the air stream is blown, and the blowing speed of the jet air stream is 50 - 140 m/s at a nozzle outlet.

Classifications:

International (IPC 8-9): C04B5/02 (Advanced/Invention);

C04B5/00 (Core/Invention)

International (IPC 1-7): C04B5/02



Family:

Publication number	Publication date	Application number	Application date
CA1110072 A1	19811006	CA19780308483	19780731

Priority:

CA19780308483 19780731

Probable Assignee: NIPPON STEEL CORP

Assignee(s): (std): NIPPON STEEL CORP

Assignee(s): CHIKAKIYO TAKAO ; KOZIMA YUSUKE ; MATSUI HIDEO

Inventor(s): (std): MATSUI HIDEO ; KOZIMA YUSUKE ; CHIKAKIYO TAKAO

Agent(s): ROBIC ROBIC AND ASSOCIES ASSOCIATES

3) Family number: 29594541 (US5944861A)

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Title: Process and apparatus for making expanded slag

Abstract: Source: US5944861A Metallurgical slag is expanded to produce a lightweight solid by forming a stream of molten liquid slag of controlled rate of flow and mixing the stream of slag with a controlled quantity of water and flowing the interacting mixture of slag and water into a receptacle. The interaction between slag and water is allowed to proceed for a predetermined period of time to form an expanded solid without the addition of any additional cooling water which would otherwise quench the material and vitrify it. In the receptacle, a vaned rotor operates to segment the interacting mixture of slag and water and project the segmented mixture through the air for collection into a heap.

Classifications:

International (IPC 8-9): C04B5/00 C04B5/02 C21B3/06 C21B3/08

C21C5/36 (Advanced/Invention);

C04B5/00 (Advanced/Non-invention);

C04B5/00 C21B3/00 C21C5/28 (Core/Invention)

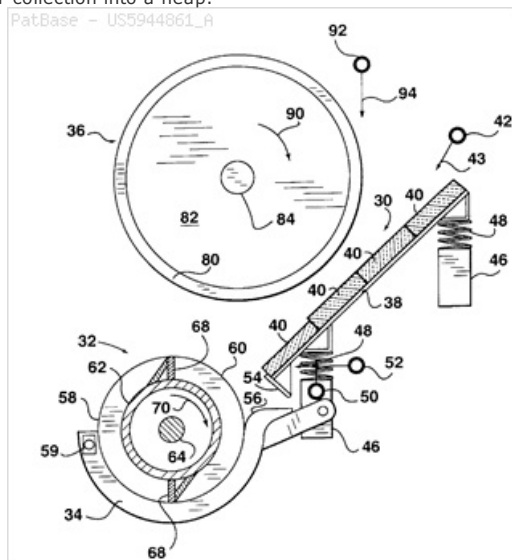
International (IPC 1-7): C03B19/08 C03B5/18 C04B5/00 C04B5/02

C21B3/06 C21C5/36

CPC: C21B3/08

European: C21B3/08

US: 241/15 241/39 425/8 65/141 65/19 65/190 65/20



Family:

Publication number	Publication date	Application number	Application date
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AT248135 E	20030915	AT19980928036T	19980612
AU199880060 A1	19990104	AU19980080060	19980612
AU733179 B2	20010510	AU19980080060	19980612
BRPI9810931 A	20000926	BR1998PI10931	19980612
CA2207780 AA	19981213	CA19972207780	19970613
CA2207780 C	20030729	CA19972207780	19970613
CN1198770 C	20050427	CN19988006168	19980612
CN1260768 A	20000719	CN19988006168	19980612
CZ296063 B6	20060111	CZ19990004337	19980612
CZ9904337 A3	20010214	CZ19990004337	19980612
DE69817566 D1	20031002	DE19986017566	19980612
DE69817566 T2	20040325	DE19986017566T	19980612
EP0988259 A1	20000329	EP19980928036	19980612
EP0988259 B1	20030827	EP19980928036	19980612
ES2205502 T3	20040501	ES19980928036T	19980612
JP2002504060 T2	20020205	JP19990503448T	19980612
JP4521605 B2	20100811	JP19990503448T	19980612
KR100527646 B1	20051115	KR19997011741	19980612
KR20010013726 A	20010226	KR19997011741	19991213
MXPA99011501 A1	20041015	MX19990011501	19980612
NZ501730 A	20010525	NZ19980501730	19980612
PL193635 B1	20070228	PL19980337283	19980612
PL337283 A1	20000814	PL19980337283	19980612
RO119412 B1	20041029	RO19990001301	19980612
US5944861 A	19990831	US19970994763	19971219
WO9857903 A1	19981223	WO1998CA00576	19980612

Priority:

CA19972207780 19970613 CZ19990004337 19980612 KR19997011741 19991213
WO1998CA00576 19980612

Probable Assignee: NATIONAL SLAG LTD

Assignee(s): (std): LAFARGE CANADA INC ; NAT SLAG LTD ; NATIONAL SLAG LIMITED ; NATIONAL SLAG LTD

Assignee(s): LAFARGE CANADA INC MONTREAL ; MACKENZIE PETER A ; HORVAT DAVID T

Inventor(s): (std): DAVID T HORVAT ; HORVAT DAVID T ; MACKENZIE PETER A ; PETER A MACKENZIE ; MAC KENZIE PETER A

Inventor(s): HORVAT DAVIDT ; MACKENZIE PETERA ; HORVAT T ; MACKENZIE A

Agent(s): SHELSTON IP; SHELSTON IP PTY LTD; GOWLING LAFLEUR HENDERSON LLP

Designated states: AL AM AT AU AZ BA BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CU CY CZ DE DK EE ES FI FR GA GB GE GH GM GN GR GW HU ID IE IL IS IT JP KE KG KP KR KZ LC LK LR LS LT LU LV MC MD MG MK ML MN MR MW MX NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT UA UG UZ VN YU ZW

4) Family number: 47884177 (CN101914643A)

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Title: ADJUSTABLE EXPANDED SLAG BEAD CHUTE

Abstract: Source: CN101914643A The invention relates to an adjustable expanded slag bead chute, in particular to processing equipment for dry granulation of blast furnace slag. The invention aims to provide the adjustable expanded slag bead chute which has simple structure, is convenient to operate and can avoid slag wool and control the volume weight and grain size of the slag beads. The chute comprises an upper expansion chute and a lower expansion chute, wherein the upper expansion chute is fixedly installed below a blast furnace slag channel in a downward inclining manner; the width of the upper expansion chute is more than that of the blast furnace slag channel; the lower expansion chute is arranged below the outlet of the upper expansion chute in a downward inclining manner and is installed on a movable trolley by a tilt angle adjusting device; and expansion chute cooling systems are arranged in the bodies of the upper expansion chute and the lower expansion chute.

Classifications:

International (IPC 8-9): C21B3/08 C21B7/14 (Advanced/Invention)

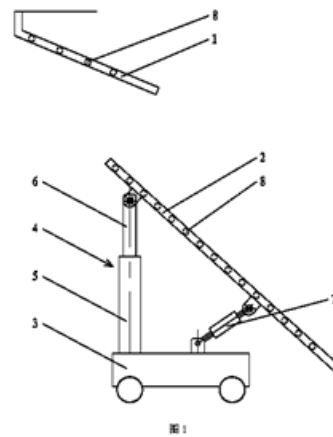


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Family:

Publication number	Publication date	Application number	Application date
CN101914643 A	20101215	CN201010279430	20100913

Priority:

CN201010279430 20100913

Probable Assignee: BEIJING HUIDESHENG ENERGY SAVING TECHNOLOGY CO LTD**Assignee(s):** (std): BEIJING HUIDESHENG ENERGY SAVING TECHNOLOGY CO LTD**Assignee(s):** BEIJING HUIDESHENG ENERGY SAVING TECHNOLOGY CO**Inventor(s):** (std): HAIXIN ZHANG ; LIWEI XIU ; SHUSEN CHENG ; WENQUAN TANG**Inventor(s):** XIU LIWEI ; ZHANG HAIXIN ; CHENG SHUSEN ; TANG WENQUAN**5) Family number: 51071850 (CN102433401A)**

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Title: MELTING FURNACE SLAG QUENCHING DRY TYPE GRANULATION AND SENSIBLE HEAT RECOVERY GENERATING SYSTEM AND METHOD USING SAME

Abstract: Source: CN102433401A The invention provides a melting furnace slag quenching dry type granulation and sensible heat recovery generating system and a method using the same and belongs to the technical field of steel metallurgy furnace slag treatment and complementary energy recovery. The melting furnace slag quenching dry type granulation and sensible heat recovery generating system provided by the invention comprises a slag-receiving device, a high-pressure water-air pulverization furnace slag quenching and granulating device, a furnace slag slow-cooling device, a sensible heat recovery generating device and a waste gas purification treatment device. According to the invention, the melting furnace slag is quenched and granulated by utilizing the high-pressure water-air pulverization device, so that the melting furnace slag is rapidly cooled to be in a glassy state; and then through a water-cooled type vibration grid plate, the melting furnace slag in the glassy state is further subjected to heat exchange with cold air so as to facilitate the subsequent recovery of the sensible heat. By the system provided by the invention, the melting furnace slag is quenched and granulated, and the high-temperature sensible heat resource of the furnace slag is sufficiently recovered and is used for generation on the basis that the water activity quality of the furnace slag is not influenced.

Classifications:**International (IPC 8-9):** C21B3/06 C21B3/08

F27D17/00 (Advanced/Invention)

CPC: Y02W30/543 Y02P10/265 Y02P10/283 Y02P10/242

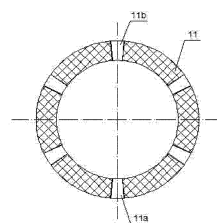


图 2

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Family:

Publication number	Publication date	Application number	Application date
CN102433401 A	20120502	CN201110427527	20111220
CN102433401 B	20130403	CN201110427527	20111220

Priority:

CN201110427527 20111220

Probable Assignee: NANJING TRIUMPH KAINENG ENVIRONMENT AND ENERGY CO LTD**Assignee(s):** (std): NANJING TRIUMPH KAINENG ENVIRONMENT AND ENERGY CO LTD**Assignee(s):** NANJING TRIUMPH KAINENG ENVIRONMENT AND ENERGY CO**Inventor(s):** (std): BINCAI HOU ; HE ZHANGCHEN ; HONGYI YANG ; HOU BINCAI ; JIYUAN SONG ; LIU YALEI ; SONG JIYUAN ; WANG XIAOPING ; XIAOPING WANG ; YALEI LIU ; YANG HONGYI ; ZHANGCHEN HE**6) Family number: 61053004 (US2017137912A)**

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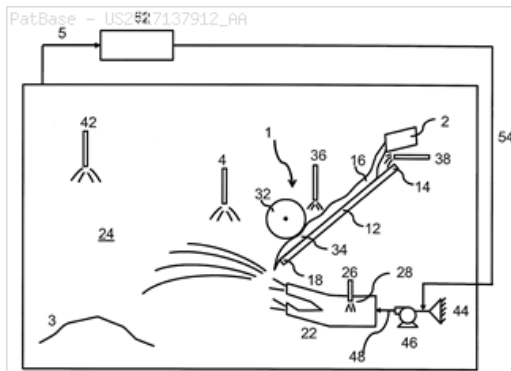
Title: PROCESS AND APPARATUS FOR DRY GRANULATION OF SLAG WITH REDUCED FORMATION OF SLAG WOOL

Abstract: Source: US2017137912A A process for producing substantially dry slag granules comprises adding a controlled amount of water to a molten stream of slag, and granulating the slag to produce solidified slag comprising substantially dry slag granules and slag wool. An apparatus for producing substantially dry slag granules comprises: (a) an inclined surface having an upper and lower ends for receiving and discharging the stream of slag; (b) a dispersion device at the lower end of the inclined surface for dispersion of the molten slag; (c) one or more water addition devices for adding a controlled amount of water to the molten slag; and (d) a collection area adjacent to the dispersion device for deposition of solidified slag produced by the dispersion. The quantity of slag wool produced by the process and apparatus is less than that which would be produced without the addition of water.

Classifications:

International (IPC 8-9): C04B18/14 C04B28/02 C04B5/00 C04B5/02 C21B3/06 C21B3/08 C22B7/04 (Advanced/Invention); C04B111/00 (Advanced/Non-invention)

CPC: C04B28/02 C04B211/0081 Y02P10/212 Y02W30/94 C04B18/141 C21B3/08 C22B7/04 C04B5/00

**Family:**

Publication number	Publication date	Application number	Application date
AU2015271597 AA	20151210	AU20150271597	20150320
CA2935621 AA	20160209	CA20152935621	20150320
CA2935621 C	20170606	CA20152935621	20150320
CN105722803 A	20160629	CN201580001925	20150320
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Priority:

US20140007284P 20140603 US20150915451 20150320 WO2015CA50210 20150320

Probable Assignee: ECOMAISTER CO LTD

Assignee(s): (std): ECOMAISTER CO LTD ; HATCH LTD

Assignee(s): HERNANDEZ VICTOR ; RAFFERTY TOM ; MOSTAGHEL SINA ; OH SANG YOON ; METCALFE DARRYL ROBERT ; SO LAI CHI ; FAUCHER SANTIAGO ; DARINI MAURIZIO ; ECOMAISTER CO

Inventor(s): (std): FAUCHER SANTIAGO ; HERNANDEZ VICTOR ; METCALFE DARRYL ROBERT ; MOSTAGHEL SINA ; OH SANG YOON ; RAFFERTY TOM ; DARINI MAURIZIO ; SO LAI CHI

Inventor(s): TOM RAFFERTY ; VICTOR HERNANDEZ ; DARRYL ROBERT METCALFE ; SANG YOON OH ; SANTIAGO FAUCHER ; SINA MOSTAGHEL ; LAI CHI SO ; MAURIZIO DARINI

Agent(s): WRAYS PTY LTD; RIDOUT AND MAYBEE LLP; CARLOS REINALDO OLARTE GARCIA; SWINDELL AND PEARSON LTD

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: 64381965 (WO16197244A1)

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Title: SLAG UPGRADING BY GAS ATOMIZATION

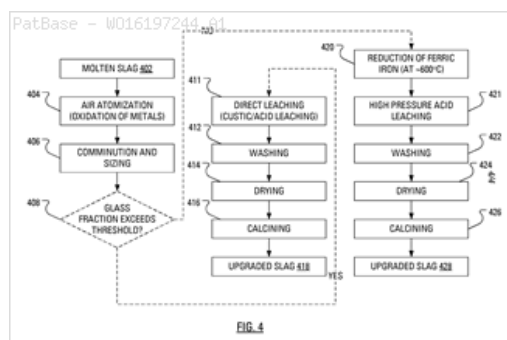
Abstract: A dry slag atomization is applied in upgrading slags. The atomized slag may be subjected to a leaching process to produce upgraded slag. In the case of titania-rich slags, conveniently, the titanium in the atomized slag has been oxidized to Ti⁴⁺, which does not dissolve in the leaching medium. In one embodiment, a method comprising receiving molten slag, atomizing the slag with material in a glass phase and material in a crystalline phase, wherein atomizing is carried out with varying gas composition to modify oxidation states and chemical make-up of the phases, thereby permitting upgrading of the slag.

Classifications:

International (IPC 8-9): C21B3/06 C22B3/04

C22B7/04 (Advanced/Invention)

CPC: C22B34/12 C22B34/1209 C22B34/124 C22B7/04 Y02W30/543



Family:

Publication number	Publication date	Application number	Application date
WO16197244 A1	20161215	WO2016CA50653	20160608

Priority:

US20150173922P 20150610

Probable Assignee: HATCH LTD

Assignee(s): (std): HATCH LTD

Inventor(s): (std): FAUCHER SANTIAGO ; MOSTAGHEL SINA ; NELL JOHANNES ; SO LAI CHI

Agent(s): RIDOUT AND MAYBEE 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 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