

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 05-040065- -00004-0000

Fecha: 2007-09-27 16:38:58 Dep. 2020 NUECREACION:
Na: 11 PATENTE YII Eve: 379 FASENACIONALII
Act: 539 PETICION Folios: 2

AS: 96.820

Señores

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIVISION DE NUEVAS CREACIONES

E. S. D.

REF.: Expediente No. 05 040.065 - Solicitud de Patente FASE NACIONAL

Corresp. a la Solicitud Internacional PCT/IB2003/004504

a nombre de: **VITRO GLOBAL, S.A.**

Titulada: SISTEMA DE CONTROL PARA CONTROLAR LA ALIMENTACIÓN Y QUEMADO DE UN COMBUSTIBLE PULVERIZADO EN UN HORNO DE FUNDICIÓN DE VIDRIO.

JUAN PABLO CADENA SARMIENTO, vecino de Bogotá, portador de la tarjeta profesional No. 57492 del Consejo Superior de la Judicatura, obrando como apoderado de la Sociedad **VITRO GLOBAL, S.A.**, según lo acredita el documento de poder presentado en esa División, de acuerdo con el Artículo 44 de la Decisión 486 de la Comisión de la Comunidad Andina, me permito solicitar que se examine si la invención contenida en la solicitud en referencia es patentable.

De acuerdo con lo anterior, me permito anexar el recibo oficial de caja No. 07-67,215 por valor de \$202.000.

De la Señora Jefe atentamente,

JUAN PABLO CADENA SARMIENTO

C.C. No. 80.410.337 de Usaquén

T.P. No. 57492 del C.S.J.

Cra 7 No. 71-21 Torre B, Piso 4

Bogotá, 27 de septiembre de 2007

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AS. 96820

287
253

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 900176029-2

RECIBO OFICIAL DE CAJA : 07 - 67,215
FECHA : AGOSTO 21 DE 2007

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 05-040065- -00004-0000

Fecha: 2007-09-27 16:38:58 Dep. 2020 NUECREACIONE
Tra. 11 PATENTEIIII Eve: 379 FASENACIONALII
Act. 533 PETICION Folios: 2

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	Nº. PAGO	FECHA PGO	Vr. PAGO
BOY Y CASTRO	CONSIGNACION	BANCO POPULAR	050-00110-4	51181492	17/08/2007	16,740,000.00

***** CONCEPTO *****

CANT. RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	114 PTC CAP-II EXAMEN DE PATENTIBILIDAD	202,000.00
	TOTAL :	\$ 202,000.00

SON: DOSCIENTOS DOS MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

284
254

DIVISIÓN DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 05-40065

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION**

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **574** DE

FECHA **30 DE MARZO DE 2007** EL TÉRMINO HÁBIL SEÑALADO POR LA LEY

EXPIRA EL **03 DE JULIO DE 2007**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____ NO X

285
25



US 20020134287A1

(19) **United States**
(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0134287 A1**
Olin-Nunez et al. (43) **Pub. Date: Sep. 26, 2002**

(54) **METHOD AND SYSTEM FOR FEEDING AND BURNING A PULVERIZED FUEL IN A GLASS MELTING FURNACE, AND BURNER FOR USE IN THE SAME**

(52) **U.S. Cl.** **110/347; 110/261**

(57) **ABSTRACT**

(76) **Inventors:** Miguel Angel Olin-Nunez, Nuevo Leon (MX); Roberto Marcos Cabrera-Llanos, Nuevo Leon (MX); Jorge Loredano-Murphy, Nuevo Leon (MX); Gustavo Margain-Ortiz, Nuevo Leon (MX); Rafael Valadez-Castillo, Nuevo Leon (MX); Juan Gabriel Flores-Ponce, Nuevo Leon (MX)

A method and system for feeding and burning pulverized fuel, such as petroleum coke, in a glass melting furnace, which includes a glass melting and a plurality of burners associated with a pair of scaled regenerative chambers disposed side-by-side which act as heat exchangers, the burners are arranged in a series of ports that are associated with the glass melting region of the furnace. The system includes means for supplying the pulverized fuel by each one of the burners for melting glass raw materials. The emissions of flue gases produced by the combustion process of the fuel in the furnace are controlled in order to maintain clean the flue gases and for reducing the emission of impurities from the fuel such as SO_x, NO_x and particulates. The regenerative chambers are manufactured with selected refractories such as, magnesium, zircon-silica-alumina or magnesia and zirconium-silicate, for counteracting the erosive and corrosive effects produced by the combustion process of the fuel in the glass melting chamber. A burner is also provided for feeding the petroleum coke, the burner including means to simultaneously mix a primary air and pulverized fuel-air mixture for the burning of the pulverized fuel.

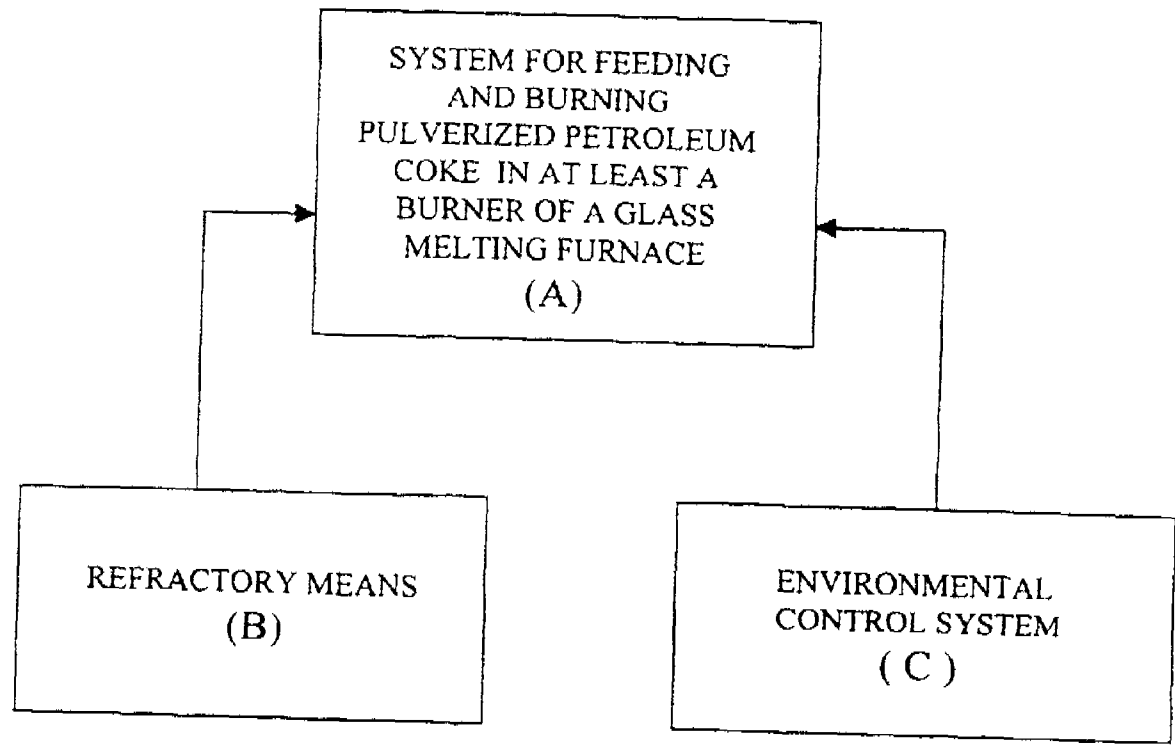
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(21) **Appl. No.:** 09/816,254

(22) **Filed:** Mar. 23, 2001

Publication Classification

(51) **Int. Cl.⁷** **F23C 1/10; F23C 1/12; F23D 1/00**



256
268

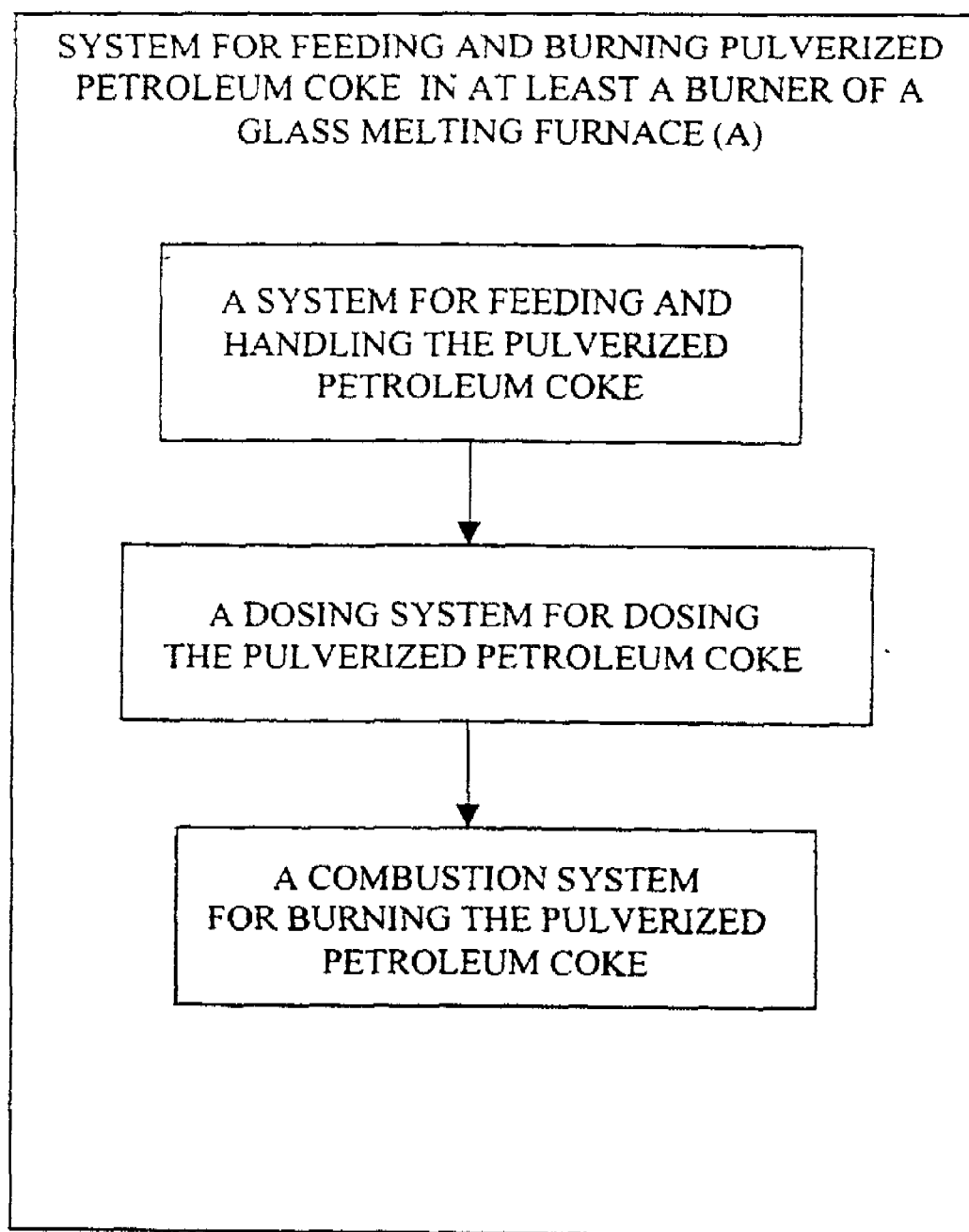
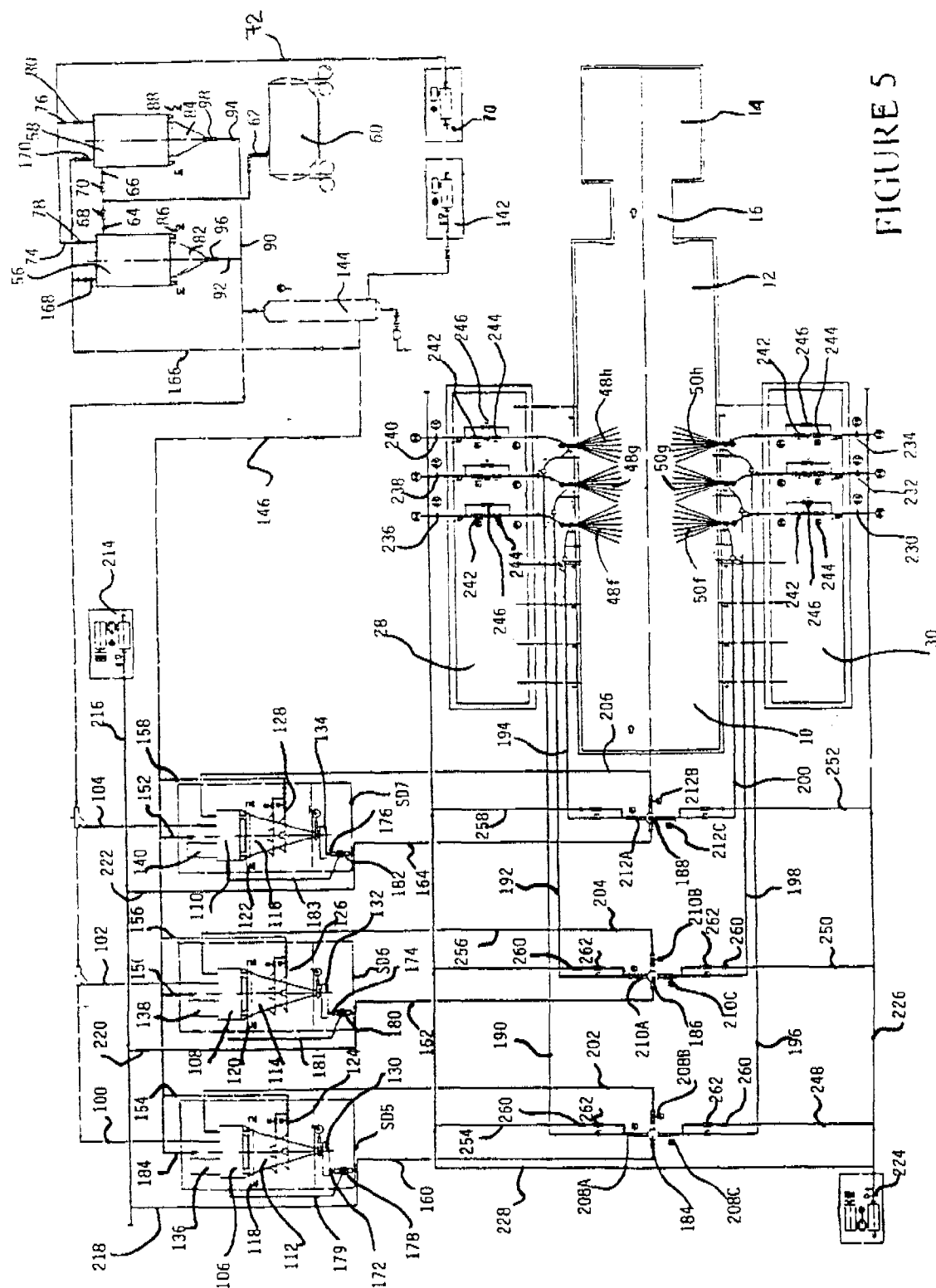


FIGURE 2



258
257
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removed from the refining chamber 12. The rear end 22 of the melting chamber 10 including a dog house 24 through which glass making materials are fed by means of a batch charger 26. A pair of regenerators 28, 30 are provided by each side of the melting chamber 10. The regenerators 28 and 30 are provided with firing ports 32, 34, connecting each regenerator 28, 30, with the melting chamber 10. The regenerators 28, 30 are provided with a gas regenerator chamber 36 and an air regenerator chamber 38. Both chambers 36 and 38 are connected to a lower chamber 40, which is arranged to be communicated by means of dampers 42 toward a tunnel 44 and a chimney 46 for the exhaust gases. Burners 48a, 48b, 48c, 48d, 48e, 48f, 48g and 48h, as well as burners 50a, 50b, 50c, 50d, 50e, 50f, 50g and 50h are arranged by each port 32, 34, in a neck portion 52, 54, of each firing ports 32, 34 in order to burn fuel, as natural gas, petroleum coke or other type of fuels for use in the glass melting furnace.

[0092] So, when the glass making materials are fed through the dog house 24 in the rear end of the melting chamber 10, the melting glass is melted by the burners 48a-h, 50a-h, and floats in a forward direction until completely melting to pass from the melting chamber 10 to the conditioning chamber 14. During the operation of the furnace, the regenerators 28, 30 are cycled alternately between combustion air and exhaust cycles. Every 20 minutes, or 30 minutes, depending on the specific furnaces, the path of the flame of a series of burners 48a-h or 50a-h are reversed. So, the resultant flame and products of combustion produced in each burner 48a-h, 50a-h, pass across the surface of the melting glass, and transfer heat to that glass in the melting chamber 10 and refining chamber 12.

[0093] FEEDING THE PULVERIZED PETROLEUM COKE (F)

[0094] Making now reference to FIGS. 5 and 6, the system for feeding and burning a pulverized fuel (A) in a glass melting furnace comprises in a first embodiment of the present invention, first storage silos or tanks 56 and 58 for store pulverized petroleum coke or other type of fuel for use in the glass melting furnace. The storage silos 56, 58 are fed through of a wagon or wagon train 60 by means of a first inlet pipe 62 connected between the wagon train 60 and the silos 56, 58. The first main pipe 62 having first branch pipes 64, 66, which are connected respectively to each silo 56, 58, for the filling of each silo 56, 58. Valves 68, 70 are connected to each first branch pipe 64 and 66 to regulate the filling of each silo 56, 58. Each silo 56, 58 are filled by means of a vacuum effect through of a vacuum pump 70 by means of a first outlet pipe 72. The first outlet pipe 72 having second branch pipes 74, 76, to be connected with each silo 56, 58. Valves 78, 80 are connected by each second branch pipes 74, 76, to regulate the vacuum effect provided by the vacuum pump 70 for the filling of each silo 56, 58.

[0095] At the bottom of each silo 56, 58, a conical section 82, 84, and a gravimetric coke feeding system 86, 88, are included for fluidizing and for assuring a constant discharge flow of the pulverized coke into a second outlet pipe 90 where the pulverized material is forwarded to a solid fuel dosing system SD-5, SD-6 and SD-7. The second outlet pipe 90 including a third branch pipes 92, 94, connected to the bottom of each conical section 82, 84 of each silo or tank 56,

58. Valves 96, 98, are attached to each third branch pipe 92, 94, to regulate the flow of the pulverized petroleum coke to the second outlet pipe 90.

[0096] DOSING SYSTEM (D) FOR THE PULVERIZED PETROLEUM COKE.

[0097] Making now reference to the dosing system (D) in accordance with the present invention, the pulverized petroleum coke is received in each solid fuel dosing system SD-5, SD-6 and SD-7 through the second outlet pipe 90. Fourth branch pipes 100, 102 and 104, are connected to the second outlet pipe 90, in order to transport the pulverized coke of the first silos or tanks 56 and 58 toward the solid fuel feeding system SD-5, SD-6 and SD-7. Each solid fuel feeding system SD-5, SD-6 and SD-7, including a second series of silos or tanks 106, 108, 110. The second series of silos 106, 108, 110, comprising a conical section 112, 114, 116; a gravimetric coke feeding system 118, 120, 122; an aeration system 124, 126, 128; a feeder 130, 132, 134; and a filter 136, 138 and 140, for discharging a constant flow of the pulverized coke toward each one of the burners 48f, 48g, 48h and burners 50f, 50g and 50h, as will be described later.

[0098] A pneumatic air compressor 142 and an air tank 144 are connected by means of a second main pipe 146. A first inlet branch pipes 148, 150, 152, are connected with the second main pipe 146 for supplying a filtered air—through of the filters 136, 138 and 140—to transport the coke toward the interior of each second series of silos or tanks 106, 108, 110. The second main pipe 146 also includes a first return branch pipes 154, 156, 158, that are connected with each aeration system 124, 126, 128, for permitting an adequate flow of the coke toward a third outlet pipes 160, 162, 164, as will described later. Additionally, a second inlet pipe 166 is connected with the second main pipe 146—after of the air tank 144—, which includes second inlet branch pipes 168, 170, that are connected on the upper part of each silo or tank 56, 58, for injecting air toward the interior of each silo or tank 56, 58.

[0099] The solid fuel feeding system SD-5, SD-6 and SD-7 including fourth outlet pipes 172, 174, 176, connected below of each feeder 130, 132, 134. A three-way regulatory valve 178, 180, 182, is connected respectively with the fourth outlet pipes 172, 174, 176, through a first way; a second way is connected with first return pipes 179, 181, 183, for returning the excess of pulverized coke toward each second series of silos or tanks 106, 108, 110, whereas the third way is connected with the third outlet pipes 160, 162, 164, which are used to supply an air-fuel mixture toward an arrangement of a four-way pipe 184, 186 and 188 related with the combustion system (E) as be now described.

[0100] COMBUSTION SYSTEM (E)

[0101] Making now reference to the combustion system (E), this is connected to each solid fuel feeding system SD-5, SD-6 and SD-7 through of a first way of the four-way pipe 184, 186 and 188, which are connected with each third outlet pipes 160, 162, 164 of each solid fuel feeding system SD-5, SD-6 and SD-7. A second way is connected respectively with fourth outlet pipes 190, 192, 194, for feeding the supply air-fuel mixture toward the burners 48h, 48g and 48f. A third way of the four-way pipe 184, 186 and 188, is connected to fifth outlet pipes 196, 198, 200 for feeding the air-fuel mixture toward the burners 50h, 50g and 50f; and a four

outlet of the four-way pipe 184, 186, 188, is connected respectively to second return pipes 202, 204, 206, for returning the excess of pulverized coke toward each of the second series of silos or tanks 106, 108, 110. The four-way pipe 184, 186 and 188 having ball valves 208 A to C, 210 A to C, 212 A to C, between a connection portion of the four-way pipe 184, 186 and 188 and the fourth outlet pipes 190, 192, 194; the fifth outlet pipes 196, 198, 200; and the second return pipes 202, 204, 206.

[0102] So in this way, during the operation of the furnace, the burners 48a-to-h or 50a-to-h are cycled alternately between combustion and non-combustion cycles. Every 20 minutes, or 30 minutes, depending on the specific furnaces, the path of the flame of a series of burners 48a-to-h or 50a-to-h are reversed. The air-fuel mixture that is arriving through the third outlet pipes 160, 162, 164, is regulated by the four-way pipe 184, 186 and 188 and ball valves 208 A-to-C, 210 A-to-C, 212 A-to-C, for alternating the injection of the air-fuel mixture between the burners 48a-to-h and 50a-to-h. When the alternately operating cycle between the burners 48a-to-h and 50a-to-h is carried out, an amount of air-fuel is returned to the second series of silos or tanks 106, 108, 110 by means of the second return pipes 202, 204, 206.

[0103] The supply air that is supplied through the third outlet pipes 160, 162, 164, is used for transporting the petroleum coke and for provoking high velocities of coke injection toward the nozzle of the each burner 48a-to-h and 50a-to-h. The supply air is supplied by means of a pneumatic supply air blower 214 through a third main pipe 216.

[0104] Fourth outlet pipes 218, 220 and 222 are connected with the third main pipe 216 and the third outlet pipes 160, 162, 164, for maintaining an elevated relation of the fuel-air mixture that is being supplied to the burners 48a-to-h and 50a-to-h.

[0105] For effectuating the combustion cycle of the burners 48a-to-h or 50a-to-h, each burner 48a-to-h or 50a-to-h are fed individually with the air-fuel mixture. This mixture will be supplied through an internal tube of each burner 48a-h or 50a-h, and will arrive to a distribution chamber to be distributed to the diverse injection nozzles of each burner 48a-h or 50a-h.

[0106] For increasing the turbulence of the flows and the mixture of the pulverized fuel with a pre-heated combustion air in each burner 48a-h or 50a-h, a primary air is injected from a primary air blower 224, which is supplied under pressure through of the injection nozzles of each burner 48a-h or 50a-h. So, the operation of the burners 48a-h or 50a-h, will have a injection of coke through of pneumatic transportation with an elevated relation solid-air and with an relation of primary air of approximately 4% of a stoichiometric air.

[0107] A sixth outlet pipe 226 and a seventh outlet pipe 228 is connected with the primary air blower 224. The sixth outlet pipe 226 being connected with fifth branch pipes 230, 232, 234 and the seventh outlet pipe 228 being connected with sixth branch pipes 236, 238, 240. The exit end of each fifth and sixth branch pipes 230, 232, 234, 236, 238, 240, being connected in a direct way with each burner 48f-to-h or 50f-to-h. The flow of primary air in each fifth and sixth branch pipes 230, 232, 234, 236, 238, 240, are regulated individually by an arrangement of a first glove valve 242, a first ball valve 244 and a second glove valve 246.

[0108] Additionally, the sixth outlet pipe 226 includes seventh outlet pipes 248, 250 and 252, which are connected respectively with the fifth outlet pipes 196, 198, 200. And, the seventh outlet pipe 228 includes sixth outlet pipes 254, 256, 258, which are connected respectively with the fourth outlet pipes 190, 192, 194. Each sixth and seventh outlet pipes 248, 250, 252, 254, 256, 258, having a check valve 260 and a ball valve 262.

[0109] Through the arrangement above described, the primary air blower 224 will supply primary air to the burners 48f-to-h (left burners) or burners 50f-to-h through the sixth outlet pipe 226 and the seventh outlet pipe 228 and by each fifth and sixth branch pipes 230, 232, 234, 236, 238, 240. The air blower 224 will operate to supply a maximum air flow during the operation of each burner 48f-to-h or burners 50f-to-h, meanwhile a minimum air flow will be provide for the burners 48f-to-h or burners 50f-to-h that are not operating by means of each sixth and seventh outlet pipes 248, 250, 252, 254, 256, 258, to guarantee the better conditions to be cooled.

[0110] Notwithstanding that the invention was described over the basis of three burners 48f, 48g, 48h and burners 50f, 50g and 50h, should be understood that the system described in the present invention is applied for all the burners 48a-to-h and 50a-to-h.

[0111] In an additional embodiment of the present invention, the melting of glass can be melted with two or three types of fuel, for example, in FIG. 3, the burners 48a-48d and 50a-50d can be fed with a pulverized fuel as petroleum coke; and the burners 48e-48h and 50e-50h can be fed with gas or fuel oil. In a third embodiment of the present invention, the burners 48a-48d and 50a-50d can be fed with a pulverized fuel as petroleum coke; the burners 48e-48f and 50e-50f can be fed with gas; and the burners 48g-48h and 50g-50h can be with fuel oil. These combinations are considering that at this date already exists glass melting furnaces that uses gas or fuel oil as the main fuel for melting glass, and that the behavior of said gas and fuel oil is well known in the art.

[0112] PULVERIZED FUEL BURNER

[0113] Additionally, for carrying out a good combustion of the pulverized petroleum coke, a special burner was designed to be used with the system for feeding and burning the pulverized fuel in the glass melting furnace. The FIGS. 7 through 12 shows a detailed view of the burner (48f) for feeding and burning a pulverized fuel in accordance with the present invention. The pulverized fuel burner (48f) comprising a main body 264 constructed of an outer pipe 266, an intermediate pipe 268, and an inner pipe 270 (FIG. 10), which are disposed concentrically one with the other. The outer pipe 266 being closed in the upper end 272 (FIG. 9). A first chamber 276 is formed in the space defined by the outer pipe 266 and the intermediate pipe 268. The outer pipe 266 having an inlet pipe 278 and an outlet pipe 280 (FIG. 8) through which cooling water is introduced in the first chamber 276 for the cooling of the burner (48f). The intermediate pipe 268 and the inner pipe 270 being extended beyond of the upper end 272 of the outer pipe 266.

[0114] On the upper part of the burner 48f, an air inlet pipe 282 is connected in a inclined form around the intermediate pipe 268, in order to be connected with the sixth branch pipe

264
264



①9 BUNDESREPUBLIK
DEUTSCHLAND



DEUTSCHES
PATENT- UND
MARKENAMT

⑫ **Offenlegungsschrift**
⑩ **DE 101 00 331 A 1**

⑤1 Int. Cl.⁷:
B 02 C 13/18
B 02 C 13/286
B 02 C 25/00
F 22 B 37/00

②1 Aktenzeichen: 101 00 331.5
②2 Anmeldetag: 5. 1. 2001
④3 Offenlegungstag: 18. 7. 2002

DE 101 00 331 A 1

⑦1 Anmelder:
ALSTOM Power Boiler GmbH, 70329 Stuttgart, DE

⑦4 Vertreter:
Rüger und Kollegen, 73728 Esslingen

⑦2 Erfinder:
Stegelitz, Peter, 75015 Bretten, DE

⑤6 Entgegenhaltungen:
DE 29 21 896 C2
DE 199 42 767 A1
DE 198 53 925 A1

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

Prüfungsantrag gem. § 44 PatG ist gestellt

⑤4 Mahleinrichtung und -Verfahren sowie Feuerungseinrichtung

⑤7 Um bei einer Mühleineinrichtung eine kontrollierte Rauchgaszuführung zu ermöglichen, sind in dem Rauchgaszuführungskanal zwei Rauchgas-Temperaturmesseinrichtungen vorgesehen. Zwischen beiden Temperatur-Messeinrichtungen wird über entsprechende Leitungen Temperierungsmittel zugeführt. Zur Überwachung der Temperatur des Temperierungsmittels dienen Temperierungsmittel-Temperaturmesseinrichtungen. Zur Erfassung des Temperierungsmittelzustroms dienen entsprechende Mengensmesseinrichtungen bzw. Mengensteuereinrichtungen. Eine Recheneinheit 43 errechnet aus der Abkühlung des Rauchgases und der Temperatur sowie der Menge des zugeführten Temperierungsmittels den Rauchgasstrom, der somit als kurzfristig verfügbarer und ständig aktueller Messwert der Prozesssteuerung zugrundegelegt werden kann.

DE 101 00 331 A 1

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.

Doctor(a)
JUAN PABLO CADENA SARMIENTO
Apoderado.

ASUNTO	Radicación	05-040065
	Trámite	011
	Evento	379
	Actuación	430
	Oficio	Ne 5 9 5 2
	Folios	19

Patente de Invención	☒	Patente de Modelo de Utilidad	☐
Vía Nacional	☐		
Vía PCT (fase nacional)	☒	Cap. I	☐
		Cap. II	☐
No. Sol. Internacional		PCT/IB2003/004504	
Fecha de Presentación Internal.		2003-10-01	

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

Descripción: Folios: 102-145

Reivindicaciones: Folios: 146-159.

Dibujos: Folios: 161-167

Prioridad: Se aceptó la correspondiente a Estados Unidos con número 10/261.968 de fecha 2002-10-01, según folio 4.

El peticionario presentó una solicitud de examen de patentabilidad de acuerdo con lo estipulado por el artículo 44 de la Decisión 486. (Folios 252-253)

2. Objeto de la invención

La presente solicitud fue titulada originalmente: "Sistema de control para controlar la alimentación y quemado de un combustible pulverizado en un horno de fundición de vidrio"

De acuerdo con el texto de la descripción, los dibujos y las reivindicaciones, el objeto de la presente solicitud es proporcionar un "sistema y un método de control para