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(54) LONGITUDINAL CONTINUOUS FURNACE APPLICABLE TO CONSTRUCTION CERAMIC MATERIAL

(57) Longitudinal continuous furnace applicable to construction ceramic material, comprising a main body (1) lined inside with refractory brick provided internally with a row of nozzles (2) intended to diffuse hot air generated by coaxial gas burners (4); air blowers (3) are arranged on the opposite wall and inject pressure air at room temperature from the outside; rails (7) placed on the ground are provided for the circulation of wagons (6) which transport the bricks to be burnt (5); a skirt (8) is arranged inside at the height at which travels the horizontal top surface of the wagons (6).

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Description

PURPOSE

[0001] This descriptive report refers to a longitudinal continuous furnace applicable to construction material, the obvious use of which lies on its configuration as a mechanism that causes the drying and baking of the clay with which the construction ceramic material is manufactured so that it acquires its own characteristics.

[0002] The invention permits the drying and baking of clay by means of providing heat that uses pressurized air as the conductor element. This characteristic gives it good performance and effectiveness for the work entrusted, at the same time as the configuration as a longitudinal and continuous furnace provides the invention with a high degree of automation of the drying and baking process and avoids time losses associated to the intermittency that characterize conventional discontinuous furnaces.

SCOPE

[0003] The invention has its application scope within the industry dedicated to the manufacture of industrial furnaces, more specifically within the industry dedicated to the manufacture of industrial furnaces applicable to construction ceramic materials.

HISTORY

[0004] Manufacture of construction ceramic material is based on two fundamental activities, molding and baking, the first of which is normally carried out by introducing the unworked clay under pressure into molds in the negative shape of the brick section it is desired to manufacture, obtaining a continuous form of plastic clay that is subsequently cut into the desired lengths by means of a wire or similar.

[0005] So that the clay has homogeneous properties and does not present air bubbles, it is made to pass through rollers located before being molded under pressure. This is usually carried out by means of an endless screw that places the clay in the above described molds.

[0006] Once the plastic and humid clay bricks are obtained in the length and section desired, they are grouped together and placed in a furnace which first dries them at moderate temperature and then bakes them at an appreciably higher temperature.

[0007] The furnaces normally used are of the discontinuous and very large type which must be heated before placing the load of bricks to be dried and baked inside them so that, after approximately thirty hours, the supply is cut off and the furnace slowly cooled in order to extract the product.

[0008] The process is slow and the size of the furnaces, although directly dependent on the capacity of the plant, is usually very large.

[0009] It would be advisable to have furnaces applicable to the manufacture of construction ceramic material that decreased the time the product is inside them and reduced their general size. These improvements would give rise to a proportional decrease in the investment, proportional to the size, and in the operating costs, proportional to the time the bricks are inside the furnace.

[0010] The applicant, on the other hand, has no record of the existence of longitudinal continuous furnaces specifically applicable to the drying and baking of construction ceramic material.

DESCRIPTION OF THE INVENTION

[0011] The longitudinal continuous furnace applicable to construction ceramic material, purpose of this descriptive report, constitutes an obvious novelty within its field of application, as it allows the drying and baking of construction ceramic material in a substantially shorter time than the conventional discontinuous furnaces applicable to this field, and with a smaller-sized furnace the characteristics indicated as desirable for a device of this type are thus obtained.

[0012] More specifically, the invention is constituted of a main body of the furnace in the shape of a very long and squared section tunnel, coated inside with refractory bricks and provided with rails on the floor along which low speed wagons that transport groups of bricks through it circulate.

[0013] There are two types of devices on the lateral walls of the main body of the furnace that inject air inside, nozzles located on one of the interior lateral faces that blow hot air coming from gas burners located outside and, on the opposite internal face, fans that blow outside air at ambient temperature which, together with the previous ones, obtain spiral currents the axis of which is parallel to the large size of the main body of the tunnel.

[0014] In this way it is obtained that the hot air in movement reaches all the points of the bricks conveyed on the wagons, accelerating the drying and baking processes as regards the conventional furnaces, in other words, whilst the transmittal of heat in traditional furnaces is basically made by radiation, in this invention it is made by convection.

[0015] The calories provided inside the invention by the nozzles can be regulated by varying the gas flow burnt per unit of time in same, thus the temperature throughout the main body of the furnace can be varied at will, creating a drying area with a suitable temperature in the initial area of the main body of the furnace, followed by a second high temperature area suitable for the baking of the bricks and a third area, in the final section of the mentioned main body of the furnace, with progressive temperature reduction in order to reach slow cooling of the bricks so that stresses in same are

not created.

[0016] The speed of the wagons must be studied so that, due to the length of the main body of the furnace, the time the bricks are inside said furnace is suitable.

DESCRIPTION OF THE DRAWINGS

[0017] In order to better understand the terms in which this descriptive report is written, two sheets of drawings are attached in which the following has been represented in an illustrative but not limiting way:

Figure 1 shows a section view of the invention where the wagons that contain the bricks, nozzles and, by means of a spiral curve, the shape of the hot air current created along the inside of the main body of the furnace can be seen.

Figure 2 shoes a perspective view of the invention from the inlet mouth where a wagon loaded with bricks and, by means of a line with arrows, the hot air flow lines can be seen.

Figure 3 shows the same object that represents the above figure but without the brick wagon, observing the hot air nozzles and blowers in depth.

PREFERRED PERFORMANCE OF THE INVENTION

[0018] In view of the figures it can be seen how the proposed longitudinal continuous furnace applicable to construction ceramic material is made up of a main body of the furnace (1), constituted by a rectangular base prismatic body where one of the sizes parallel to the horizontal is comparatively much larger that the other two, that are appreciably the same, constituting a body in the shape of a squared section tunnel which is covered on the inside by refractory bricks and the upper area of which has a line of hot air nozzles (2) on one of its inside lateral faces that diffuse the hot air provided by gas burners (4), located coaxially on the outside area of the main body of the furnace (1).

[0019] The diffused air temperature may vary by means of modifying the gas flow with which the mentioned gas burners (4) are supplied.

[0020] It can also be noticed that on the opposite inside face there are a number of blowers (3) which are supplied by means of compressed air at ambient temperature and the mission of which is to create convection currents inside the main body of the furnace (1) to permit rapid drying and baking of the bricks (5) that go through the inside of the invention a low speed on wagons (6) that circulate on rails (7).

[0021] The bricks (5) must be placed on the wagons so that their holes are aligned according to the normal direction of the larger size of the main body of the furnace (1) to facilitate the formation of the convection currents and so that these easily penetrate inside said bricks (5).

[0022] On the inside area of the main body of the furnace (1), in the region where the horizontal surface of the wagons (6) passes by, there is a projection (8) on each lateral wall in order to prevent that the air currents flow through the inferior area of the wagons (6), creating longitudinal flows that come into contact with the bricks (5) placed inside the invention. In the same way, the brick load (5) must be placed near the ceiling and walls of the main body of the furnace (1)

[0023] In the preferred performance of the invention, the main body of the furnace (1) is manufactured in brickwork, although it can be perfectly made in teal provided with suitable insulating components.

Claims

1. Longitudinal continuous furnace applicable to construction material, characterized by the fact that it is made up of a main body of the furnace (1), manufactured in brickwork and covered inside by refractory bricks, that has one on or its inside lateral walls a line of nozzles (2) that spread hot air generated in gas burners (4) located coaxially, that the opposite interior wall has a number of blowers (3) that inject pressurized air at ambient temperature from the outside and that is has some rails (7) on the floor along which wagons (6) transporting the bricks (5) to be baked can circulate.

2. Longitudinal continuous furnace applicable to construction ceramic material, according to the first claim, characterized by the fact that inside the main body of the furnace (1) there is a projection (8) located in the region through which the horizontal surface of the wagons (6) circulates.

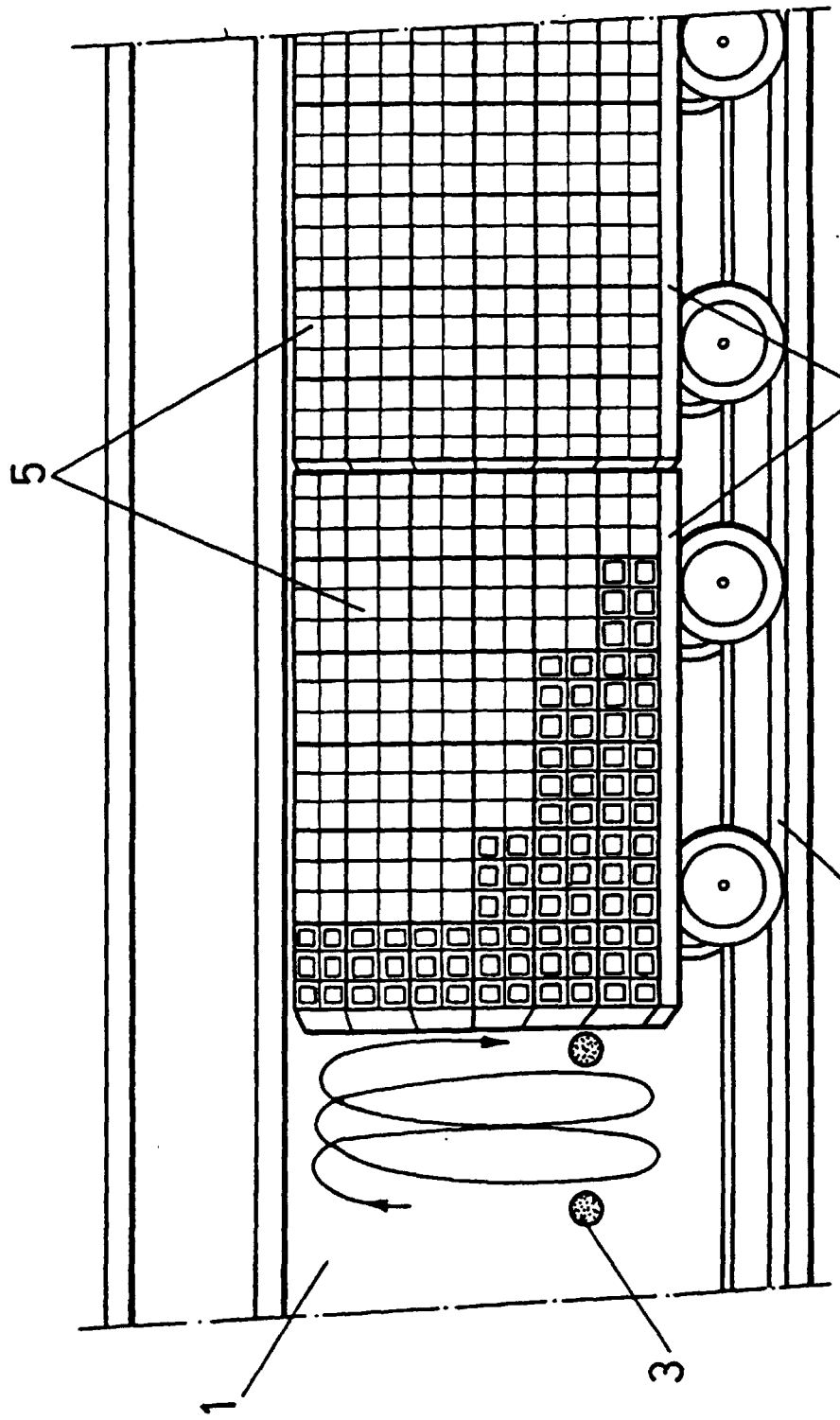

FIG.1

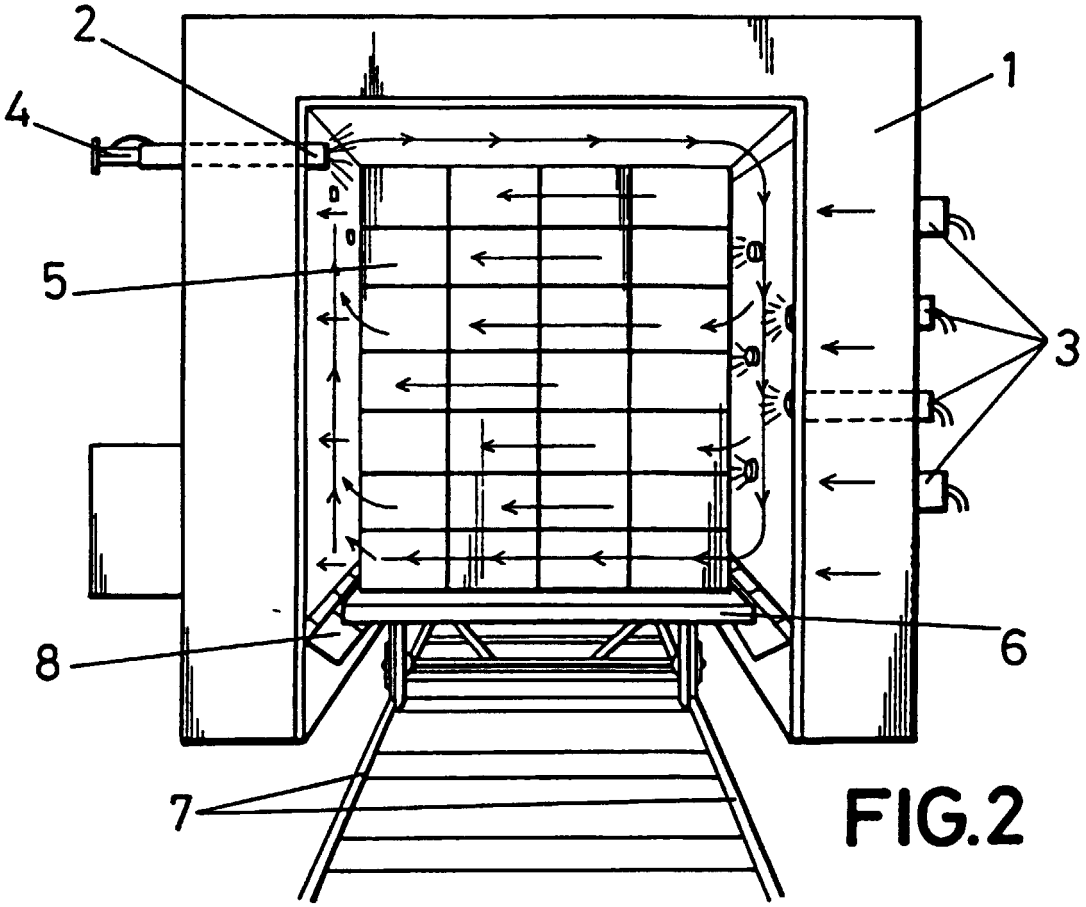

FIG.2

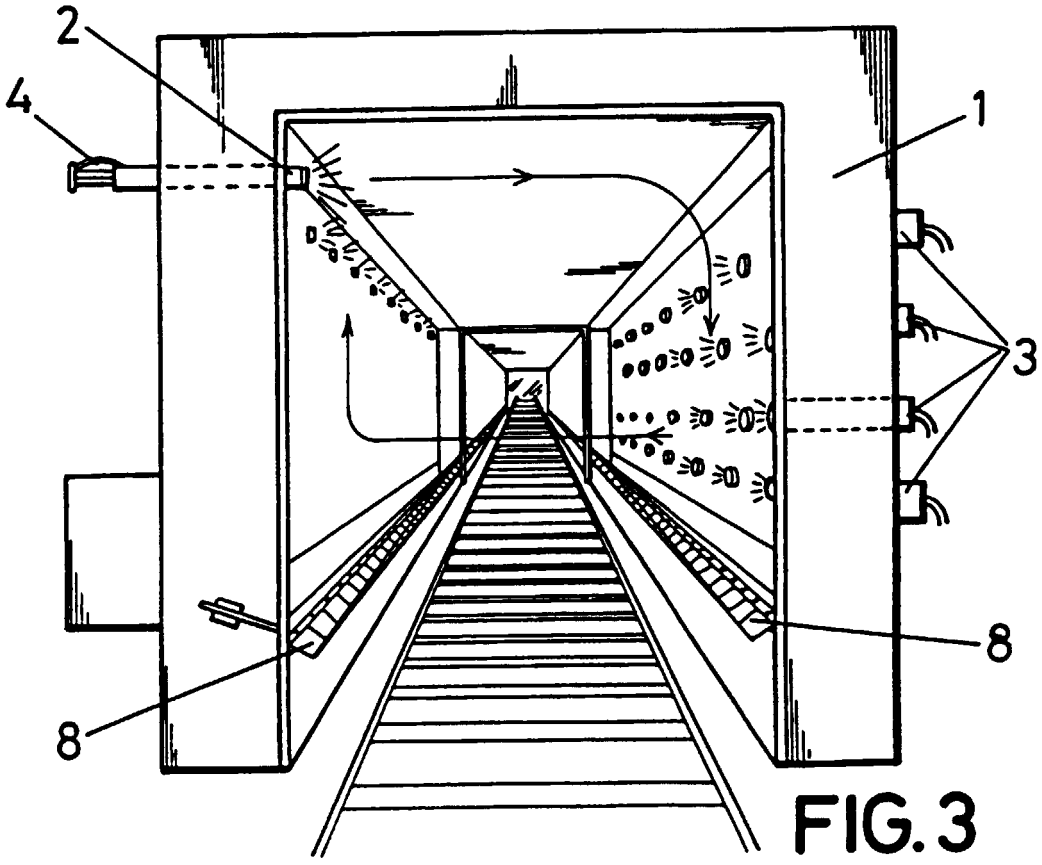

FIG.3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 99/00126

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6: F27B9/26

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6: F27B

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 368 036 A (KREMHELLER) 11 January 1983 (11.01.83) column 3, line 18 - column 4, line 9, figures 1, 2	1,2
A	DE 3 131 603 A (KERAMIK WTB) 2 September 1982 (02.09.82) abstract, figures 1-3	1
A	ES 0 441 520 A (MAZO DAVILA) 1 April 1977 (01.04.77), the whole document	1,2
A	US 4 005 981 A (TUMBULLI) 1 February 1977 (01.02.77)	
A	DE 3 138 232 A (KRAMER) 28 April 1983 (28.04.83)	

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 September 1999 (20.09.99)	27 September 1999 (27.09.99)
Name and mailing address of the ISA/ SPTO Facsimile No.	Authorized officer Severino Falcon Morales Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/ ES99/00126

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