

(19)



(11)

EP 1 925 897 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

28.05.2008 Bulletin 2008/22

(51) Int Cl.:

F27D 1/04 (2006.01)

(21) Application number: **07021683.3**

(22) Date of filing: **08.11.2007**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE
SI SK TR**

Designated Extension States:

AL BA HR MK RS

(30) Priority: **27.11.2006 RO 200600922**

(71) Applicant: **Tatar, Daniel**

Galati, Judet Galati (RO)

(72) Inventor: **Tatar, Daniel**

Galati, Judet Galati (RO)

(74) Representative: **Enescu, Lucian et al**

**Rominvent SA,
35, Ernil Pangratti Street,
Sector 1**

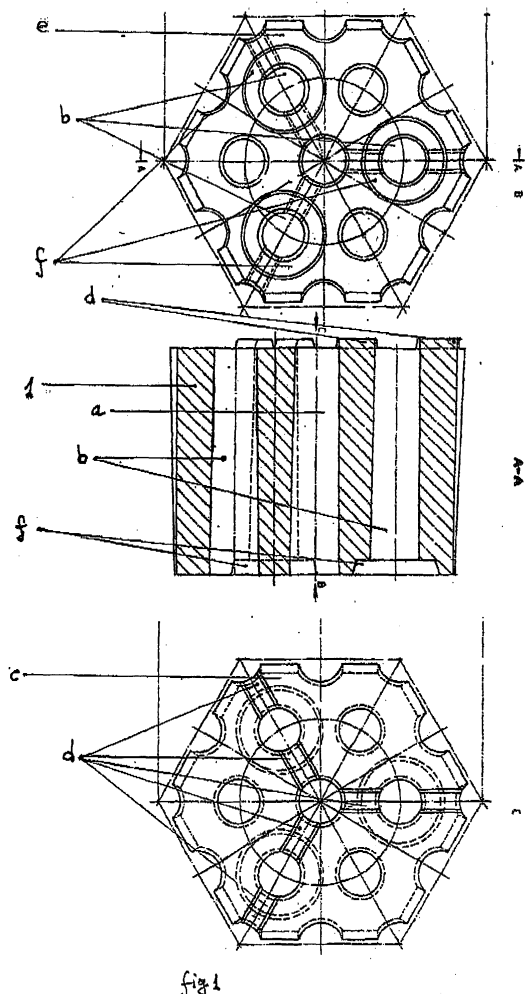
7000 Bucharest (RO)

Remarks:

Amended claims in accordance with Rule 137(2)
EPC.

(54) **Adapting brick for heat exchangers**

(57) The present invention refers to an adapting brick for carrying out heat exchangers of furnace air pre-heaters. The brick according to the invention comprises a shaped refractory material body having, in its central part, a longitudinal channel and other longitudinal channels evenly distributed around thereof, characterized in that on the upper face c, there were provided radial ribs d and, on the lower face e, there were provided grooves in the shape of an annulus f.



EP 1 925 897 A1

Description

[0001] The present invention refers to an adapting brick for realizing heat exchangers of furnace air pre-heaters,

[0002] It is known a brick of a six-angle shape in axial section, also destined to realize heat exchangers, provided with a plurality of longitudinal or outwardly shaped channels and having on both upper and lower faces "groove - and - tongue"- type joint elements as an outwardly projected annulus, on one face, and as annular channels performed in correspondence with the annulus, on the other face (FR Patent No. 1096652).

[0003] It is also known a refractory brick for the same purpose, of the same six-angled shape in axial section, yet whereat the joint elements are this time as ribs and channels, respectively, disposed in a radial direction on the upper face and lower face, respectively (RO Patents No. 114914 and No. 107441).

[0004] The first type of brick presents as advantage the fact that it has an increased volume and refractory mass-per cubic meter of structure -given the second type of brick, the one provided with ribs, at the same diameter of the holes.

[0005] Yet, the second type of brick presents an increased exchange surface, per cubic meter of structure and, at the same time, allows a better gas circulation on the horizontal at the same diameter of the holes or, in other words, it allows a better thermal transfer.

[0006] The technical problem solved by the present invention consists in realizing an intermediary brick for adapting or assembling together the two types of bricks such that to become possible to realize a structure combining the advantages of the first type of brick, which has an increased volume and refractory mass - per cubic meter of structure - with the advantages brought by the bricks that allow a better thermal transfer. In other words, to make possible the use of two different types of bricks, that is "groove- and - tongue" - type joint elements at the lower part and, above thereof, - by means of the adapting brick - there will be overlapped rib-joint bricks. The adapting brick for heat exchangers removes the above-mentioned disadvantages and solves the proposed technical problem in that it forms a horizontal complete row in the heat-exchanger structure which has, under said row, bricks of a "groove - and - tongue"- type joint elements and, above said row, bricks provided with a rib-type joint element, and which is thus made up that its lower part is shaped similar to the lower faces of the lower rows of the adapting row and, its upper face is shaped similar to the bricks that form the rows above the adapting row.

[0007] The advantage brought by the invention consists in that, above a heat exchange structure realized from the beginning up to a certain height, with bricks having "groove - and - tongue" - type joint elements, the assembling may be continued until the final height of the heat exchanger, by using a brick having a rib-type joint elements.

[0008] It is further disclosed an invention embodiment example, in connection with the drawing representing, in longitudinal section, an adapting brick for heat exchangers, as well as a view of the upper and lower faces thereof.

[0009] The connecting brick for heat exchangers according to the invention is made up of a body **1** made of shaped refractory material having in its central part a longitudinal channel **a** and, evenly distributed around thereof, other longitudinal channels **b**.

[0010] On the upper face **c** of the body **1** there were provided radial ribs **d** oriented from the center of the longitudinal channel **a**, at 120 degree angles with respect to each other, up to the edges of the upper face **c**.

[0011] On the lower face **e** of the body **1**, there were provided grooves in the form of an annulus **f** around channels **b**, playing the part of a "groove" for the "groove - and - tongue" - type joints realized with the row of bricks they are placed on.

Claims

1. Adapting brick for heat exchangers, comprising a shaped refractory material body having, in its central part, a longitudinal channel and other longitudinal channels evenly distributed around thereof, **characterized in that** on the upper face **c** there were provided radial ribs **d** and, on the lower face **e**, there were provided grooves in the shape of an annulus **f**,

Amended claims in accordance with Rule 137(2) EPC.

1. Adapting brick for heat exchangers comprising a shaped refractory material body having, in its central part, a longitudinal channel and, other longitudinal channels evenly distributed around thereof **characterized in that** on the upper face **c** there were provided radial ribs **d** and, on the lower face **e** there were provided grooves in the shape of an annulus **f** disposed around some of the longitudinal channels.

2. Adapting brick according to claim 1 **characterized in that** it is used for obtaining a single horizontal adapting row for heat exchanger.

3. Heat exchanger structure made of refractory bricks **characterized in that** it contains:

- a) a lower part formed by many horizontal brick rows of a "groove-and-tongue" type joint elements;
- b) an upper part formed by many horizontal brick rows of "rib-type" joint elements; and
- c) a horizontal bricks row made of adapting bricks defined in claim 1, said bricks row forming an intermediary adapting structure between the

lower "groove-and-tongue" brick structure and the upper "rib-type" brick structure.

5

10

15

20

25

30

35

40

45

50

55

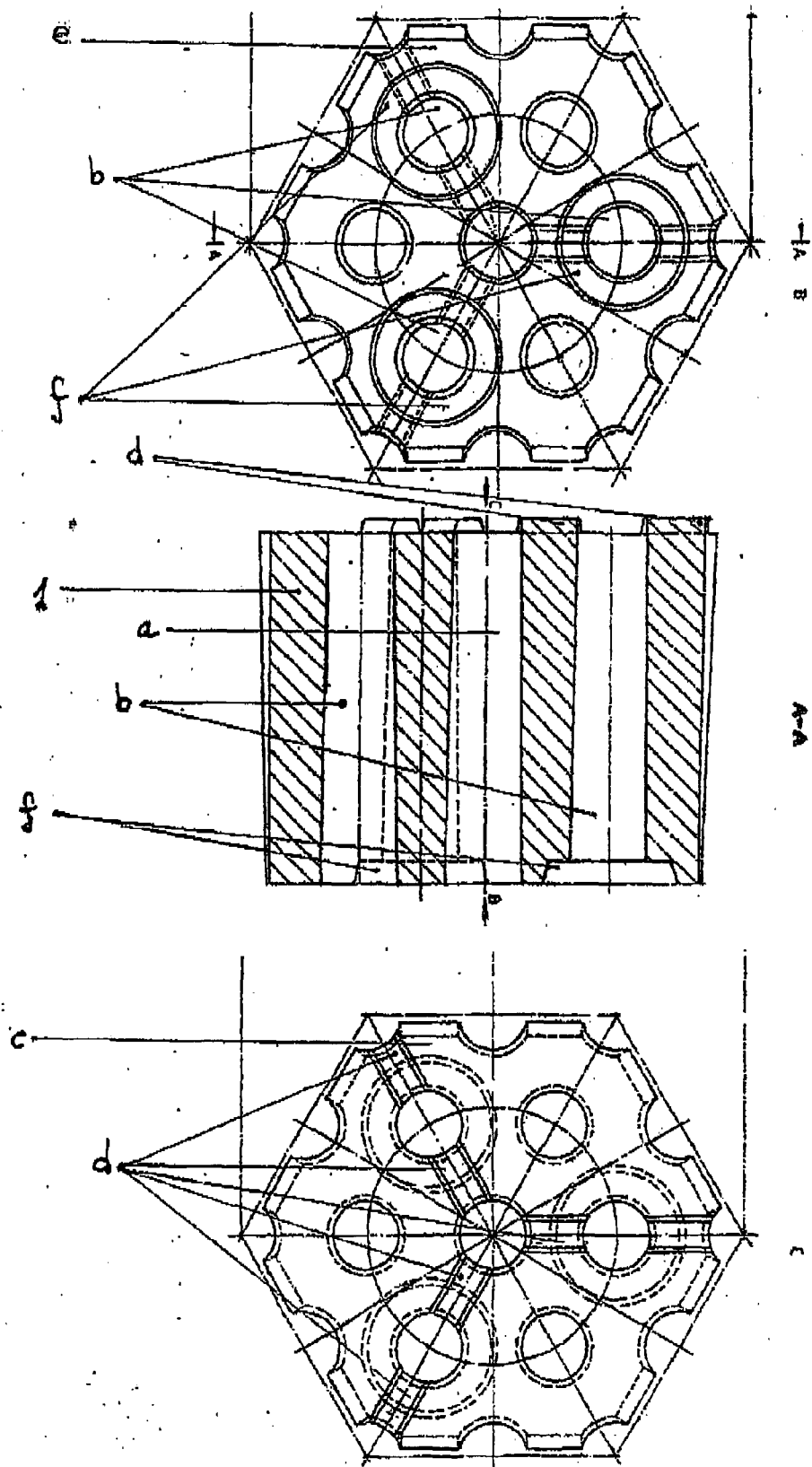


fig 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 02 1683

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 18 15 101 A1 (HEUSER FRIEDRICH) 25 June 1970 (1970-06-25) *page 2, first and last paragraph* * figures 1-4 *	1	INV. F27D1/04
X	----- US 5 924 477 A (DORU TATAR [RO]) 20 July 1999 (1999-07-20) * column 1, line 56 - column 2, line 39; claim 1 * * figures 1-3 *	1	
X	----- RO 113 869 B1 (TATAR DORU [RO]) 30 November 1998 (1998-11-30) * the whole document *	1	
A	----- US 4 150 717 A (BALKE GEORGE L [US] ET AL) 24 April 1979 (1979-04-24) * column 4, line 19 - lines 20,47 *	1	
A	----- US R E27 020 E (DRESSER IND INC.) 5 January 1971 (1971-01-05) * the whole document *	1	
A	----- US 3 549 136 A (BAAB KENNETH A ET AL) 22 December 1970 (1970-12-22) * claim 1; figures 2,3 *	1	
A	----- GB 994 833 A (STEULER INDUSTRIEWERKE GMBH) 10 June 1965 (1965-06-10) * claims 1-6; figures 1-4 *		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 December 2007	Examiner Gavriliu, Alexandru
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

3

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 02 1683

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-12-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 1815101	A1	25-06-1970	NONE	

US 5924477	A	20-07-1999	DE 69612743 D1	13-06-2001
			DE 69612743 T2	07-02-2002
			EP 0832406 A1	01-04-1998
			WO 9635915 A1	14-11-1996
			JP 2854985 B2	10-02-1999
			JP 10506984 T	07-07-1998
			RO 114914 B1	30-08-1999

RO 113869	B1	30-11-1998	NONE	

US 4150717	A	24-04-1979	NONE	

US RE27020	E	05-01-1971	NONE	

US 3549136	A	22-12-1970	DE 1930725 A1	08-01-1970
			FR 2011114 A5	27-02-1970
			GB 1277897 A	14-06-1972

GB 994833	A	10-06-1965	AT 247500 B	10-06-1966
			DE 1225802 B	29-09-1966
			LU 41409 A1	21-05-1962

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- FR 1096652 [0002]
- RO 114914 [0003]
- RO 107441 [0003]