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

Anpassungsziegelstein für Wärmetauscher

Brique d'adaptation pour échangeurs thermiques

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Description

[0001] The present invention refers to an adapting brick for realizing heat exchangers of furnace air preheaters.

[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). "Groove-and-tongue" type joint elements are known from DE-A-1815 101 while "ribs-type" joint elements are known from RO 113 869 B1.

[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 are 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 are 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 are provided radial ribs **d** and, on the lower face **e** there are 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.

Patentansprüche

1. Bearbeitungsziegelstein für die Schaltwärme , die von refraktärem Stoff geleistet wird , dessen Körper im Hauptteil einen Längskanal hat und andere Längskanäle um diesen , dieser wird **dadurch cha-**

rakterisiert, dass es auf der Oberseite **c** Radialrippen **d** und auf der Unterseite **e** einige Nutenringe **f** um einige Längskanäle gibt.

2. Bearbeitungsziegelstein gemäss der ersten Forderung, der **dadurch charakterisiert wird, dass** dieser für die Erhaltung einer einzigen horizontalen Bearbeitungsreihe für die Schaltwärme benutzt wird.

3. Die Struktur der Schaltwärme hat refraktäre Ziegelsteine, die **dadurch charakterisiert wird, dass** sie besteht aus :

a) einer Unterteile, die mehrere horizontalen Bearbeitungsreihen von Ziegelsteine mit Verbindungselemente mit Form von Rundkrone von Typ "Nut und Feder " hat ;
b) einer Oberteile, die mehrere horizontalen Bearbeitungsreihen von Ziegelsteine mit radialen Verbindungselemente von Typ " Rippen " hat ;
c) einer horizontale Reihe, die aus Bearbeitungsziegelsteine gemäss der ersten Forderung besteht, diese Reihe eine intermediäre Bearbeitungstruktur zwischen der Unterstruktur, die aus Ziegelsteine "Nut und Feder " besteht und Oberstrultur, die aus Ziegelsteine von Typ " Rippen ", bildet.

Revendications

1. Brique d'adaptation pour les échangeurs de chaleur réalisée en matériel réfractaire, dont le corps est prévu avec, dans sa partie centrale, un canal longitudinal, ainsi qu'avec d'autres canaux longitudinaux distribués uniformément autour de celui-ci **caractérisée par le fait que** sur la face supérieure c il y a des saillies radiales **d** et sur la face inférieure **e** il y a des rainures en forme de couronne circulaire **f** disposées autour de certains des canaux longitudinaux.

2. Brique d'adaptation conformément à la revendication **1 caractérisée par le fait qu'**elle est utilisée pour obtenir une seule rangée d'adaptation horizontale pour les échangeurs de chaleur.

3. Structure d'échangeur de chaleur formée par des briques réfractaires **caractérisée par le fait qu'**elle est composée de:

a) une partie inférieure formée de plusieurs rangées horizontales de briques prévues avec des éléments de jointure de type "rainure et languette".
b) une partie supérieure formée de plusieurs rangées horizontales de briques avec des éléments de jointure de type "saillie" et
c) une rangée horizontale formée de briques d'adaptation conformément à la revendication **1** de manière à ce que cette rangée forme une structure intermédiaire d'adaptation entre la structure inférieure formée par des briques "rainure et languette" et la structure supérieure, formée par des briques de type "saillie".

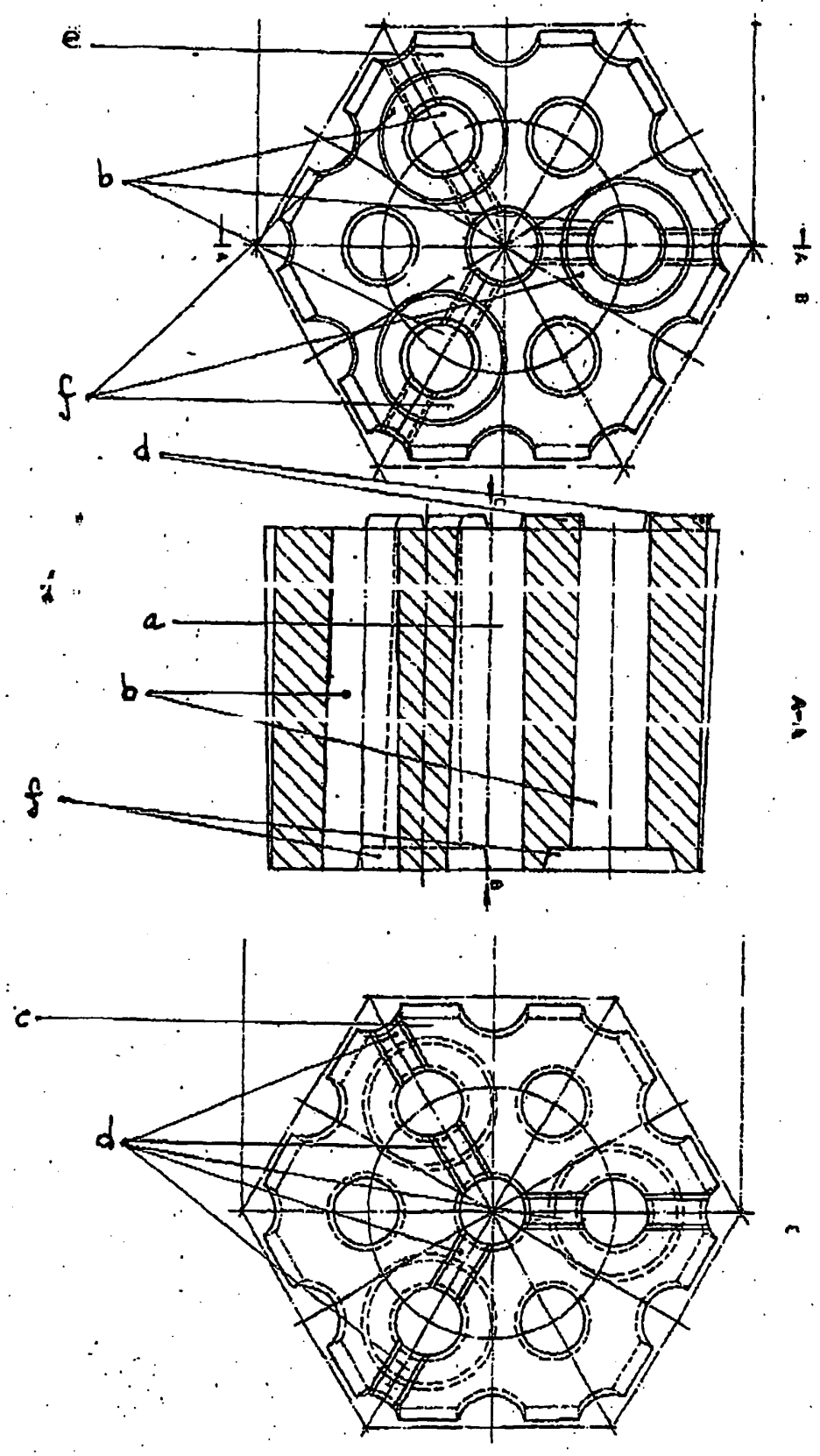

fig 1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- FR 1096652 **[0002]**
- RO 114914 **[0003]**
- RO 107441 **[0003]**
- DE 1815101 A **[0003]**
- RO 113869 B1 **[0003]**