(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 423 862 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90202611.1**

(51) Int. Cl.[5]: **C21B 9/10**

(22) Date of filing: **02.10.90**

(30) Priority: **19.10.89 NL 8902589**

(43) Date of publication of application:
24.04.91 Bulletin 91/17

(84) Designated Contracting States:
BE DE FR GB IT LU

(71) Applicant: **HOOGOVENS GROEP B.V.**
P.O. Box 10.000
NL-1970 CA IJmuiden(NL)

(72) Inventor: **Thomassen, Herman**
Jan Ligthartstraat 33
NL-2037 ET Haarlem(NL)
Inventor: **Stokman, Ronald Johannes Maria**
Albert Verweylaan 109
NL-2182 PV Hillegom(NL)

(74) Representative: **Van Breda, Jacobus, Mr. Ir. et al**
HOOGOVENS GROEP BV P.O. Box 10.000
NL-1970 CA IJmuiden(NL)

(54) Hot blast main contructions including a junction.

(57) A junction in a hot blast main construction is formed between first and a second horizontal, circular hot blast mains (1,2). Each main has a steel jacket (6) and inside the steel jacket refractory brickwork (7,9,10,11) bounding a passage for the hot blast through the main. To achieve a simple construction, at said junction the steel jackets (6) of circular cross-section of are coupled directly to each other without interposition of any intermediate jacket pieces and at the top side of both the first and second mains the brickwork is constituted by shaped bricks (9a,b,10a,b,11a,b) which are suspended from the steel jackets (6).

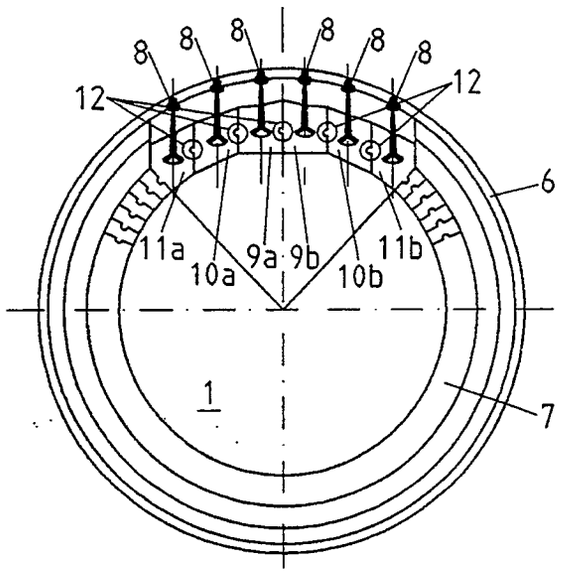

FIG. 3

EP 0 423 862 A1

HOT BLAST MAIN CONSTRUCTIONS INCLUDING A JUNCTION

The invention relates to a junction of a first and a second substantially circular hot blast mains which extend substantially horizontally, suitable for use in a hot blast main construction for feeding hot blast into a blast furnace. Each hot blast main comprises a circular-section steel jacket which is provided on its inside with refractory brickwork.

A junction of hot blast mains as described above is discussed in US-A-3 853 307, for use in the hot blast mains of a blast furnace. At the junction, in the brickwork a triangular flat arch is provided comprising special bricks which are suspended on a flat transitional steel plate by means of stainless steel suspension anchors. This flat transitional steel plate is interposed where the first and the second hot blast mains meet each other. The junction is also provided with intermediate steel pieces which complete the joint between the respective circular steel jackets of the hot blast mains and the triangular flat plate. These intermediate pieces are curved and the degree of curving depends on the diameters of the hot blast mains coupled together. In the case of equal diameters of the coupled mains, this curving is part-cylindrical in shape, but in the case of different diameters the intermediate pieces take the shape of a portion of a conic section. Furthermore the steel structure must be provided with reinforcements to ensure that the arch stays flat on the inside of the hot blast mains. This construction has the disadvantage of complexity of shapes of the steel jacket parts and of the brickwork.

SU-A-195561 and DE-A-2517026 illustrate junctions of hot blast mains but give no technical details of the refractory structure at the junctions.

The object of the invention is to provide a simplified structure at the junction of two hot blast mains and in particular to make fitting a new coupling into a hot blast main less costly because of the greater simplicity.

In accordance with the invention, at the junction the circular jackets of the first and second hot blast mains are directly coupled to each other without use of one or more intermediate transitional jacket pieces between the first and second mains and the brickwork at the top of both the hot blast mains is formed from shaped bricks which are suspended on the circular jackets of first and second hot blast mains.

The coupling joint in accordance with the invention provides the advantage that the steel jackets of the hot blast mains to be coupled together do not need to be replaced by a structure of a flat top piece with other complex shaped intermediate pieces, but that rather it suffices to suspend shaped bricks of the brickwork on for example stainless steel hangers which are suspended on the jackets of the two hot blast mains. With this structure it has been found possible to achieve good stability and good smoothness of the brickwork on the inside of the mains at the junction.

Shaped bricks, e.g. moulded bricks, which are used in the invention will be of a plurality of different shapes in order to provide the desired shape of the conduits at the junction, and for example in order to compensate for the differing distances which have to be bridged by the suspending hangers as a result of the circular shape of the hot blast mains.

Compared with the construction of US-A-3 853 307, the junction in accordance with the invention can also provide the further advantage that, where diameters of the first and the second hot blast main differ from one another, the top sides of the first and second hot blast main do not need to set at the same height. This is indeed required with the junction in accordance with the prior art. For this reason the invention offers significantly broader design possibilities for this kind of junction which in turn makes certain cost benefits feasible. One example could be less mechanical engineering in modifications to existing mains.

It is desirable that the shaped bricks be provided with tongue and groove joints at their abutting faces to prevent any relative vertical displacement.

The invention will now be illustrated by description of a non-limitative embodiment, with reference to the accompanying drawings, in which:-

Fig. 1 shows the hot blast main junction in accordance with the current state of the art in top view;

Fig. 2 shows a hot blast main junction in accordance with the invention in top view;

Fig. 3 shows a detail of the junction of Fig. 1 with the invention in cross-section.

In Fig. 1 a feeding main 1 of a hot blast mains system is shown which is coupled to a discharge main 2 at a junction 3. At the junction, there are additional pieces inserted which consist of a flat triangular top plate 4 and curved side pieces 5 which serve as intermediate or transition pieces between the feeder main 1 and the discharge main 2. As illustrated in Fig. 3 for the embodiment of the invention, the hot blast mains 1,2 of Fig. 1 have outer steel jackets and a refractory lining inside the jackets. The intermediate pieces 4,5 thus form coupling pieces joining the outer jackets of the mains 1,2.

The intermediate side pieces 5 are curved, and

the degree of curvature depends on the diameters of the hot blast mains 1 and 2 coupled together. Where the diameters of the hot blast mains 1 and 2 to be coupled together are the same, this curvature is circular, but where the diameters differ the intermediate side pieces 5 take the shape of a portion of a conic section.

In the construction of Fig. 2 which shows the junction embodying the invention the flat triangular top plate 4 of Fig. 1 is missing, as are the arched intermediate pieces 5. The steel jackets of the feeder main 1 and the discharge main 2 are coupled directly to each other. Thus the circular outer shape of the jackets mains 1 and 2 is not altered by the interposition of intermediate pieces, but the circular jackets join directly into each other. In the embodiment shown the two mains 1,2 are both horizontal and join at 90°, but other joining angles are possible.

Fig. 3 shows a transverse cross-section of the junction of Fig. 2. The plane of the section is transverse to the axis of the main 1, immediately adjacent the junction region and looking in the direction of the feeder main 1 away from the junction but the same view applies also the main 2 at both sides of the junction Fig. 3 shows the steel outer jacket 6 inside which the refractory lining 7 is placed. At the top of the mains 1,2 throughout the region of the junction, the refractory bricks are suspended by means of stainless steel hangers 8. These hangers 8 are connected to the steel jacket 6. The bricks so suspended are moulded bricks 9a, b, 10a, b and 11a, b. As Fig. 3 shows these bricks are of three different shapes, in order to provide the desired inner shape of the refractory lining and to fit to the adjacent bricks. The expert in this art is able to design suspended shaped bricks to complete the top parts of the mains at the junction.

The suspended bricks are provided with tongue and grooved structure 12 at their abutting faces to prevent their mutual vertical displacement under the effect of thermal expansion.

The connection of the moulded bricks of a feeder main 1 and a discharge main 2 of differing diameters may be made, for example by making the feeder main and the discharge main the same height on the top sides of the jackets of both mains (not shown in drawing). However, this is not a prerequisite of the invention. The junction of a feeder main 1 and a discharge main 2 in accordance with the invention does not place any demands on the relative positioning of the mains 1 and 2. This is a significant advantage of the junction in accordance with the invention compared with that in accordance with the current state of the art.

Claims

1. A hot blast main construction comprising a first hot blast main (2) and a second hot blast main (1) which joins into said first main (2) at a junction, each said main extending substantially horizontally at the region of said junction and having a steel jacket (6) which is substantially circular in cross-sectional view perpendicular to the axis of the main and inside the steel jacket refractory brickwork (7,9,10,11) bounding a passage for the hot blast, which brickwork is partly suspended from said jacket (6), chracterized in that at said junction, said steel jackets (6) of circular cross-section of said first and second mains (1,2) are coupled directly to each other without interposition of any intermediate jacket pieces and at the top side of both said first and second mains (1,2) at said junction said brickwork is constituted by shaped bricks (9a,b,10a,b,11a,b) which are suspended from said jackets (6) of said first and second mains.

2. A hot blast main construction according to claim wherein said shaped bricks (9a,b,10a,b,11a,b) are fitted together with tongue-and-groove joints (12), so as to prevent their mutual vertical displacement.

3. A hot blast main construction according to claim 1 or claim 2 wherein said first and second mains (1,2) have substantially the same diameter.

4. A junction of first and second hot blast mains (1,2) which extend horizontally and are circular in transverse cross-section, and wherein each said main (1,2) has a circular steel jacket (6) and refractory brickwork (7,9,10,11) inside said steel jacket, which brickwork is partly constituted of bricks suspended from said jacket, characterized in that at said junction said circular jackets (6) of said first and second mains are coupled to each other without interposition of any transitional jacket pieces and in that at said junction said brickwork at the upper side of both said first and second mains is constituted by shaped bricks (9a,b,10a,b,11a,b) suspended from said circular jackets (6) of said first and second mains.

PRIOR ART

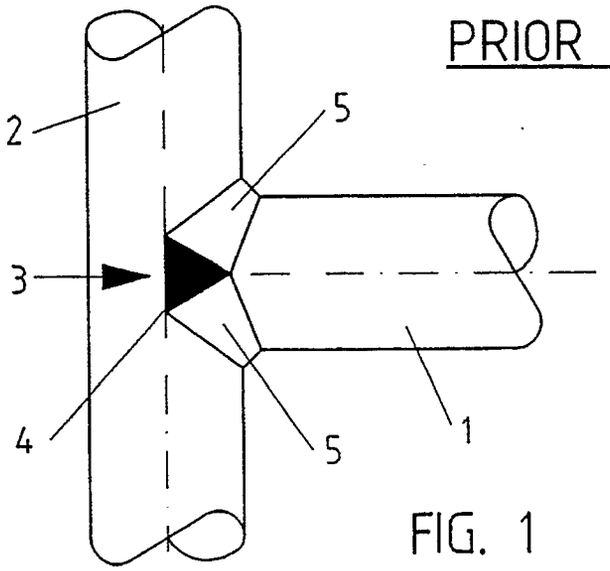

FIG. 1

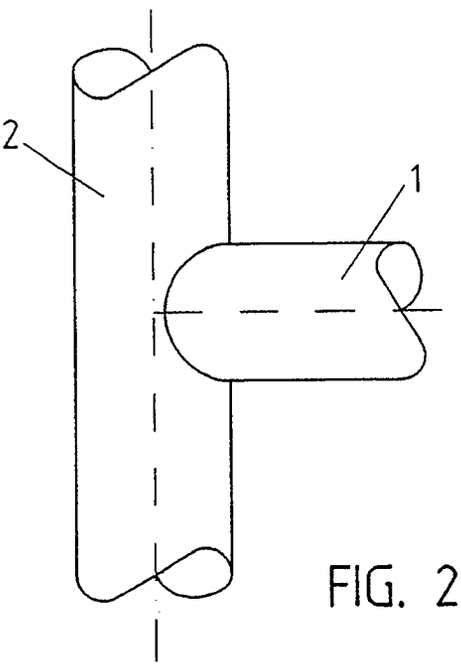

FIG. 2

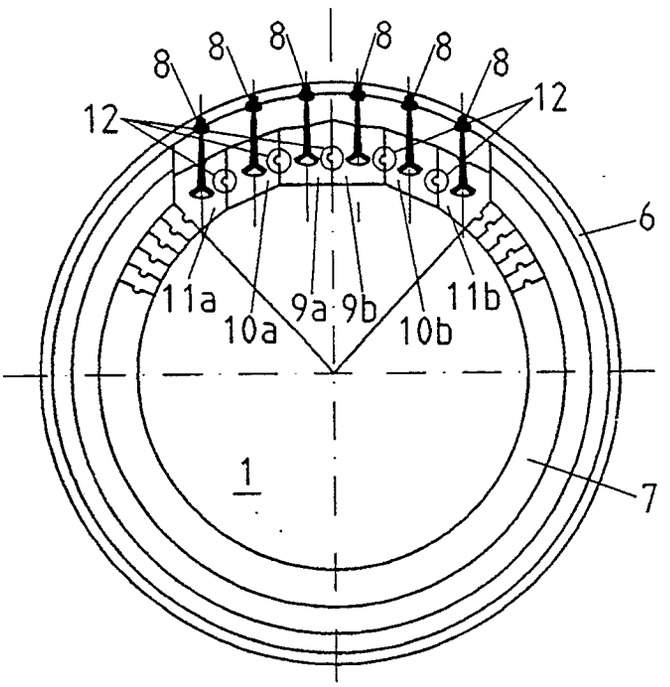

FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2611

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A,D	DE-A-2 517 026 (ZNII PROJEKTSTALKONSTRUKZIJA)		C 21 B 9/10
A,D	SOVIET INVENTIONS ILLUSTRATED, week 8934, 4th October 1989, Derwent Publications Ltd, London, GB; & SU-A-195 561 (SIBE METAL) 30-11-1988		
A	LU-A-8 217 6 (PAUL WURTH)		
A	GB-A-2 118 672 (CURTISS-WRIGHT)		
A,D	FR-A-2 193 174 (HOOGOVENS IJMUIDEN)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
C 21 B
F 16 L

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	16 January 91	ELSEN D.B.A.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
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