CONVENTION OR NON-CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

31146

I/ We(a) Kazumi IKIO

(b) 41-8 Yomiya 2-chome, Tobata-ku,
Kita-kyushu City, Fukuoka Pref.
Japan.

hereby apply for the grant of a (c) patent/patent of addition for an invention entitled (d) DOOR FOR A COKE OVEN FURNACE which is described in the accompanying (c) provisional/complete specification.

I/ We request that the patent be granted as a patent of addition to the patent applied for on application No. 10000 in the name of ... in the name of...

I/ We request that the term of the patent of addition be the same as that of the patent for the main invention or so much of the term of the patent for the main invention as is unexpired.

This application is a Convention application and is based on the following application or applications for a patent or patents or similar protection made in the following country or countries on the following date or dates:—

Utility Model

No. (g) 51-161485 in (h) Japan on (i) Dec. 2 1976...
No. (g) in (h) Japan on (i) 19...
No. (g) in (h) Japan on (i) 19...

My/Our address for service is care of CLEMENT HACK & CO., Patent Attorneys, 140 William Street, Melbourne, Victoria, 3000, Australia.

(j) Dated this 1ST day of DECEMBER 1977

(k) Kazumi IKIO

CLEMENT HACK & CO.
AUSTRALIA PATENT DECLARATION FORM
(CONVENTION OR NON-CONVENTION)

(Note: This is a comprehensive form, and parts inappropriate to a particular case must be deleted. This declaration must be signed by the applicant(s), if individuals. If applicant is a Company, this declaration must be signed by a person on its behalf and the Company seal or stamp should not be applied.)

Forms 7 and 8

COMMONWEALTH OF AUSTRALIA

31146/77

DECLARATION IN SUPPORT OF A CONVENTION OR NON-CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

INSTRUCTIONS

(a) Insert No. if available.
(b) Insert full names of applicant(s).
(c) Insert title of invention.
(d) Insert full names of declarant(s) who must be PERSON or PERSONS, NOT a corporate body. (See head note)
(e) Insert address of declarant(s).

(f) Delete entirely if applicant is a corporate body.
(g) Delete entirely if applicant is personal.

(h) Delete entirely if Convention priority NOT claimed.

(i) Insert country in which first basic application was filed.
(j) Insert date of first basic application.
(k) Insert full names of basic applicant(s).
(l) Insert address of basic applicant(s).
(m) Insert full names of any inventor(s) NOT inventor(s) of basic applicant(s).
(n) Insert address of any inventor(s) NOT inventor(s) of basic applicant(s).
(o) Recite manner in which applicant(s) derive title from actual inventor(s) of basic applicant(s) or inventor(s) NOT inventor(s) of basic applicant(s).
(p) Delete entirely if Convention priority NOT claimed.
(q) Recite manner in which applicant(s) derive title from basic applicant(s) or inventor(s) NOT basic applicant(s).
(r) Signature(s) of declarant(s).

N.B. No seal or stamp impression to be applied.

L. In support of the application No. (a) 31146/77, made by (b) Kazumi Ikio

for a patent/ patent of addition for an invention entitled (c) "DOOR FOR A COKE OVEN FURNACE."

1. (d) Kazumi Ikio

of (e) 41-8, Yomiya 2-chome, Tobata-ku, Kita-kyushu City, Fukuoka Pref. Japan,

do solemnly and sincerely declare as follows:-

1. (f) I am the applicant (g) for the patent/application

2. The basic application (g) as defined by Section 141 of the Act was/were made in the following country or countries on the following date (h) by the following applicant (i) namely:-


3. (k) Ikio Tekkosho Co. Ltd.

3. (l) Kazumi Ikio

3. (m) the actual inventor(s) of the invention.

3. (n) is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:-

4. The basic application (g) referred to in paragraph 2 of this Declaration was/were the first application (g) made in a Convention country in respect of the invention the subject of the application.

Declared at Tobata-ku Kita-kyushu-Shi this 24 day of June 1978
Claim 1. A coke oven door construction for closing an opening in a coke oven furnace comprising a vertically elongated brick supporter for carrying a brick block in the coke oven furnace opening which is exposed to high temperature within the coke oven furnace, a door body spaced from the brick supporter and connected thereto for carrying the brick supporter in the coke oven furnace opening, said brick supporter being subject to vertical thermal expansion of varying degree along its vertical length due to the high temperature in the coke oven furnace with higher expansion at an upper portion than at a lower portion of said brick supporter, a pair of horizontally spaced and horizontally extending connecting pins rigidly connected between said brick supporter and said door body at one vertical location on said door body, a plurality of spaced sliding mechanisms connected between said brick supporter and said door body for providing a sliding engagement between said brick supporter and said door body, whereby vertical thermal expansion of said brick supporter is .../2
not transmitted to said door body so that said brick supporter and door body are not warped and distorted, said connecting pins being connected at a vertical position above the horizontal centreline of said door body and brick supporter so that the thermal expansion of the upper portion of said brick supporter above said connecting pins is equal to the thermal expansion of the lower portion of said brick supporter below said connecting pins. A sealing plate connected around the periphery of said brick supporter, and a knife edge connected around the periphery of said sealing plate bearing against a periphery of the coke oven furnace opening to maintain a seal between said brick supporter and the coke oven furnace opening.
AUSTRALIA
PATENTS ACT 1952

COMPLETE SPECIFICATION
(ORIGINAL)

31146/77

FOR OFFICE USE:

Application Number:
Lodged:

Class
Int. Class

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

Name of Applicant(s): Kazumi IKIO

Address of Applicant(s): 41-8, Yomiya 2-chome,
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Actual Inventor(s): IKIO

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140 William Street,
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Australia

Complete Specification for the invention entitled:

"DOOR FOR A COKE OVEN FURNACE"

The following statement is a full description of this invention, including the best method of performing it known to me/us
The present invention relates in general to a coke oven furnace construction, and more particularly to a coke oven door utilizable to seal the opening of a coke oven furnace.

Prior to the present invention door bodies of coke oven doors have been situated outside the openings of coke oven furnaces in order to fit locking mechanisms, and brick supporters which carry bricks directly subject to extremely high temperatures in the coke oven furnace have been integrally constructed and secured directly to the door bodies by means of bolt or the like.

For these reasons, there have been generated great differences in temperature between the bricks and the supporters subject to such extremely high temperatures as reach from 800°C to 1100°C, and the door body, which tends to bend or distort the door body outwardly due to heat expansion.

So it is a disadvantage of this construction that such a phenomenon often prevents the opening of the coke oven furnace from being firmly sealed by means of the door, and through some crevice produced between the door and the opening of the coke oven furnace is leaked gas or tar, resulting in air pollution. Another disadvantage of this construction is that to prevent these it is necessary to adjust frequently knife edges.
According to the present invention the bricks and supporters are separated from the door body in order to prevent these from interrupting each other in relation to heat expansion.

Such a construction makes it possible for the bricks and supporters subject to extremely high temperatures not to directly affect the door body though they themselves extend, but the door body will not be distorted or bent.

A conventional door for a coke oven furnace has been made in general of such large-sized and thick material as has a high stiffness in order to prevent the door body from being distorted due to heat expansion, and to increase bearing stresses, thus the total weight and size of the door often becomes increased to an undesirable extent so that the opening and closing and the attaching and detaching operations for the door become difficult, and that a large-sized door lifter is also needed, but according to the present invention, it is not necessary to strengthen the door body, unlike conventional ones, so that a light-weighted door can be used, which enables the attaching and detaching operations to be easily carried out.
According to the present invention, there is provided a coke oven door construction for closing an opening in a coke oven furnace comprising a vertically elongated brick supporter for carrying a brick block in the coke oven furnace opening which is exposed to high temperature within the coke oven furnace, a door body spaced from the brick supporter and connected thereto for carrying the brick supporter in the coke oven furnace opening, said brick supporter being subject to vertical thermal expansion of varying degree along its vertical length due to the high temperature in the coke oven furnace with higher expansion at an upper portion than at a lower portion of said brick supporter, at least one connecting pins rigidly connected between said brick supporter and said door body at one vertical location on said door body, a plurality of spaced sliding mechanisms connected between said brick supporter and said door body for providing a sliding engagement between said brick supporter and said door body, whereby vertical thermal expansion of said brick supporter is not transmitted to said door body so that said brick supporter and door body are not warped and distorted, said at least one connecting pins being connected at a horizontal central line of said door body and brick supporter so that the thermal expansion of an upper portion of said brick supporter above said at least one connecting pins is equal to the thermal expansion of the lower portion of
said brick supporter below said connecting pins, a
sealing plate connected around the periphery of said
brick supporter, and a knife edge connected around
the periphery of said sealing plate bearing against
a periphery of the coke oven furnace opening to maintain
a seal between said brick supporter and the coke oven
furnace opening.

Referring now to the attached drawings;

Fig. 1 is a side sectional view taken on the
line C-C' of Fig. 3 showing a door for a coke oven
furnace constituted in accordance with a preferred
form of the present invention.
Fig. 2 is a sectional view taken on the line A-A' of Figure 1.

Fig. 3 is an enlarged sectional view taken on the line B-B' of Figure 1.

Fig. 4 is an enlarged sectional view showing the sliding mechanism portion.

Fig. 5 is an enlarged sectional view showing the portion secured by means of connecting pins.

In the embodiment shown on the drawing, 1 designates a door body, which is constructed almost the same size as the opening 5 of a coke oven furnace 4, and which has locking bars 14 and locking bar holders 15 on the outer surface thereof, at upper and lower positions.

A metallic brick supporter 2 is secured to the door body 1 across a certain space a, as shown in figure 1, by means of connecting pins 8. The brick supporter 2 is constructed slightly smaller than the opening 5 and carries a brick block 3 to be situated within the opening to close it.

A sealing plate 6 made of stainless steel is located at the periphery of the supporter 2. The sealing plate 6 has knife edges 6' provided therearound to make contact with a receiving frame 7 built into the coke oven furnace 4, surrounding the opening 5.

The brick supporter 2 is secured to the door body 1 by means of connecting pin 8 at the welded position 8', and such welding is made at the two points horizontally to door body 1 in vertical position.
In addition, said connecting pin 8 is preferably positioned at a higher position than the middle of door body, since at the opening 5, the temperatures increase in the vertical upward direction so that thermal expansions are different from each other at the lower and upper portions while centering on connecting pin 8.

9 is an open elongate channel shaped member constituting a guide supporter utilizable for a sliding mechanism 10 provided between door body 1 and brick supporter 2 in order to maintain a certain space a, and said guide supporter presents its section to define a T-shaped slot 9' facing toward door body 1.

13 is a T-shaped insert inlaid into said guide supporter 9, and fixed to door body 1 by means of bolt 11 and nut 12.

A plurality of spaced sliding mechanisms 10 connect the door body 1 with brick supporter 2 by way of space a at the upper and lower part of connecting pin 8. And said brick supporter 2 is so constructed as to extend its in the directions indicated by the arrows X & Y as shown in figure 1.

The brick supporter 2 can be moved vertically, centering on connecting pin 8, and when said brick supporter 2 and brick block 3 are affected by extremely high temperatures in the coke oven furnace, they extend vertically due to heat expansion with no respect to door body, that is, door body 1 is not distorted by heat expansion.
If the door body 1 and supporter 2 are integrally secured and fixed, then the door body 1 tends to be distorted but with the construction described above, the door body will not bend nor distort.

In addition, there is provided in the embodiment sealing plate 6 around said brick supporter 2, and at the periphery of the former there is provided a continuous knife edge to be in contact with receiving frame 7, so that if said brick supporter 2 slides vertically, a knife edge 6' can move smoothly along the surface of receiving frame 7. And as mentioned above, said brick supporter 2 moves vertically due to heat expansion, but is little distorted, so that the tip of knife edge 6' will not discontact with the surface of receiving frame 7.

The construction described above thus will perform the following effectively.

1) There is no danger of gas or tar leakage due to sealing failure, since the construction is capable to form a firm sealing of the opening 5 of the coke oven furnace 4.

2) Efficient closing or sealing of the door makes it possible to reduce or eliminate adjustment operations for the knife edge.

3) It is not necessary to unduly increase the stiffness of the door body, so that a lighter one can be used, thus resulting in obtaining a lighter and smaller-sized door lifter.
4) There is provided a certain space a to constitute an air layer, which effectively insulates the door from the high temperatures inside the coke oven. For these reasons door body 1 will not be distorted due to heat, thus there is found an advantage that operational errors with the limit switching for attaching and detaching the door, and locking, will disappear.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A coke oven door construction for closing an opening in a coke oven furnace comprising a vertically elongated brick supporter for carrying a brick block in the coke oven furnace opening which is exposed to high temperature within the coke oven furnace, a door body spaced from the brick supporter and connected thereto for carrying the brick supporter in the coke oven furnace opening, said brick supporter being subject to vertical thermal expansion of varying degree along its vertical length due to the high temperature in the coke oven furnace with higher expansion at an upper portion than at a lower portion of said brick supporter, said brick supporter and a plurality of spaced sliding mechanisms connected between said brick supporter and said door body for providing a sliding engagement between said brick supporter and said door body, whereby vertical thermal expansion of said brick supporter is not transmitted to said door body so that said brick supporter and door body are not warped and distorted, said at least one connecting pins being connected at a vertical position above the central vertical position of said door body and brick supporter so that the thermal expansion of an upper portion of said brick supporter above said at least one connecting pins is equal to the thermal expansion of the lower
portion of said brick supporter below said connecting pins. a sealing plate connected around the periphery of said brick supporter, and a knife edge connected around the periphery of said sealing plate bearing against a periphery of the coke oven furnace opening to maintain a seal between said brick supporter and the coke oven furnace opening.

2. A coke oven door according to claim 1 wherein said sliding mechanism comprises an open channel-shaped member connected to said brick supporter and a T-shaped insert connected to said door body and slidable within said channel-shaped member.

3. A coke oven door substantially as described herein with reference to and as illustrated in the accompanying drawings.

DATED THIS 17TH DAY OF MARCH, 1980

KAZUMI IKIO
By His Patent Attorneys:

CLEMENT HACK & CO.
