Sept. 20, 1971 G. V. PRIBLE 3,605,370

PREASSEMBLED INSULATING PANELS FOR HIGH TEMPERATURE FURNACES

Filed March 23, 1970 2 Sheets-Sheet 1

FIG_1

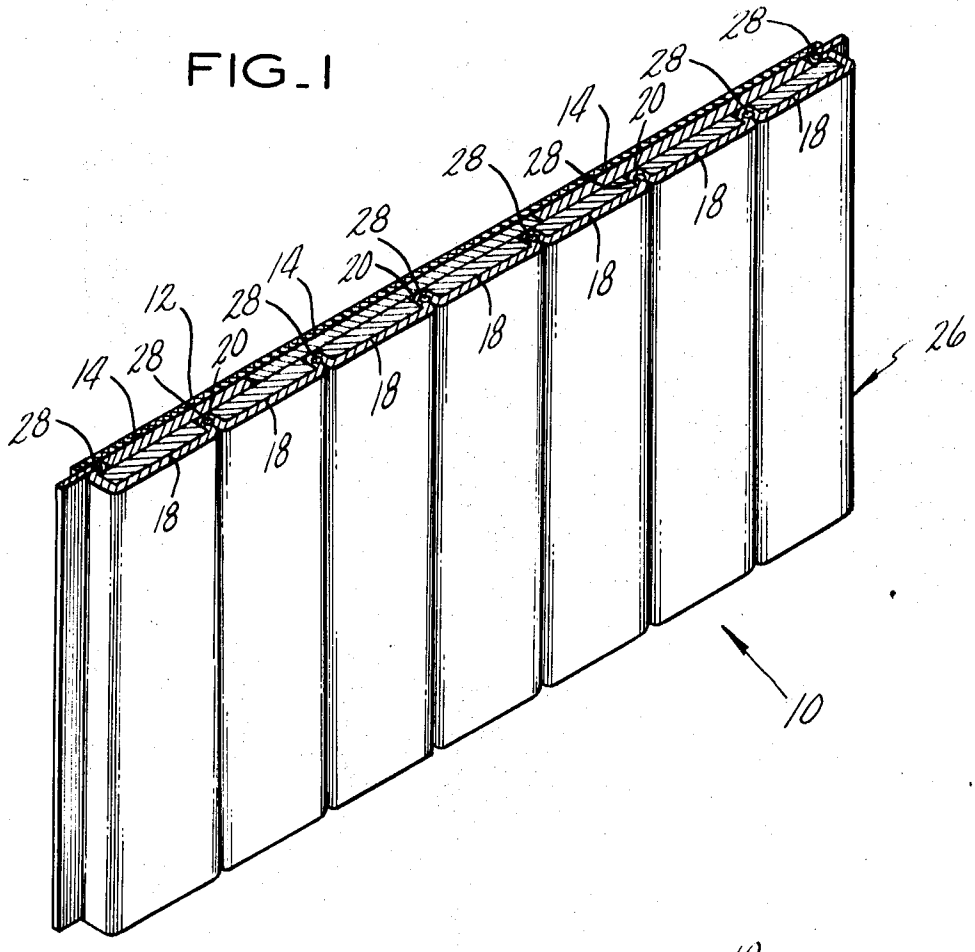


FIG_2

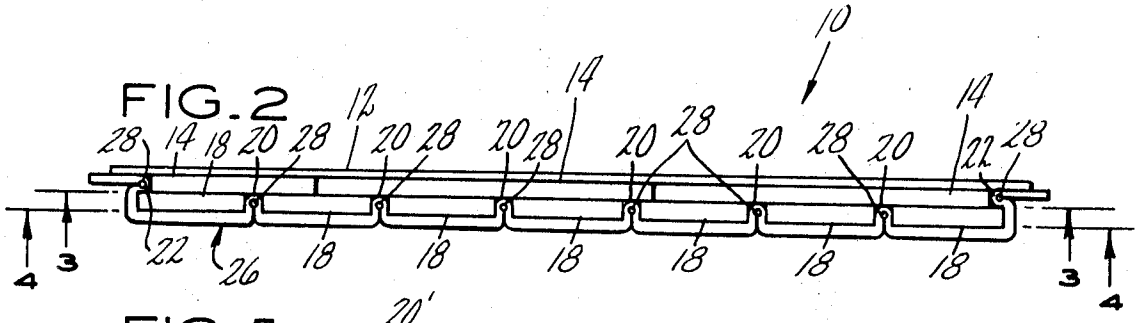
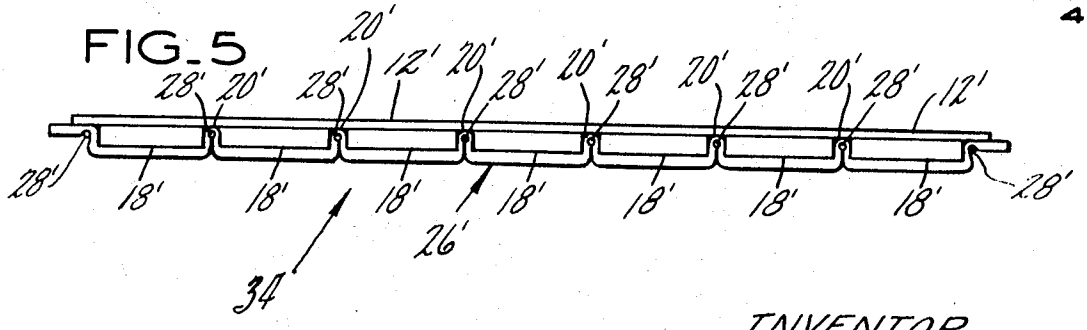


FIG_5



INVENTOR
GLENN V. PRIBLE
BY Lawrence P. Kessler
ATTORNEY

Sept. 20, 1971 G. V. PRIBLE 3,605,370

PREASSEMBLED INSULATING PANELS FOR HIGH TEMPERATURE FURNACES

Filed March 23, 1970 2 Sheets-Sheet 2

FIG_3

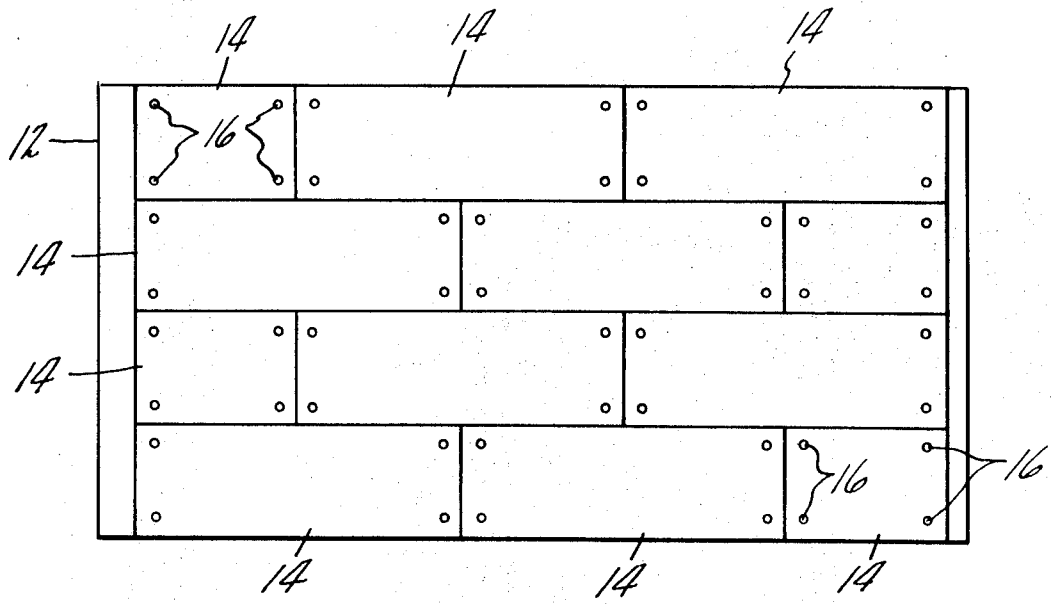
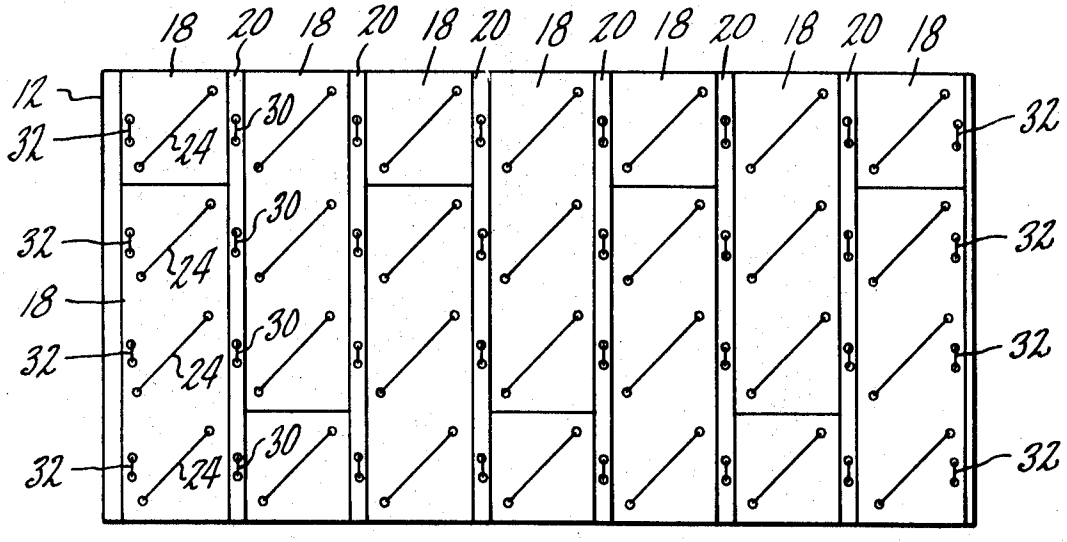


FIG_4



INVENTOR
GLENN V. PRIBLE
BY Lawrence P. Kessler
ATTORNEY

United States Patent Office 3,605,370 Patented Sept. 20, 1971

3,605,370

PREASSEMBLED INSULATING PANELS FOR HIGH TEMPERATURE FURNACES

Glen V. Prible, Malvern, Pa., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 23, 1970, Ser. No. 21,703
Int. Cl. E04b 1/80
U.S. Cl. 52—622 5 Claims

ABSTRACT OF THE DISCLOSURE

Preassembled insulating panels for high temperature furnaces having a nonexposed anchor for hot side refractory material. At least one layer of refractory block is fixed in rows to a metal backing so as to have transverse spaces between adjacent rows of the block. A high temperature insulating ceramic wool blanket is placed over the rows of refractory block and folded into the transverse spaces therebetween. The anchor mechanism for the ceramic blanket is placed in the folded portions of the blanket so as to be protected from direct furnace exposure.

BACKGROUND OF THE INVENTION

Furnaces, and more particularly high temperature furnaces such as heat treating, annealing or small reheat furnaces, have the walls thereof lined with refractory material for protection from the intense heat and corrosive atmosphere generated within these furnaces. The refractory material must maintain its structural and thermal characteristics at operating temperatures and offer maximum resistance to chemical reactions. It must also radiate heat and act as a barrier to retain products of combustion.

High temperature furnaces of the above type are usually formed by the laying of refractory bricks to build up the interior furnace wall structure or by any other similar on-site construction method. When the refractory is no longer useful in accomplishing its necessary functions, it must be stripped out and replaced with new refractory material. This rebricking procedure involves substantial time and labor as well as being high in cost. One technique used to overcome the economic disadvantages of rebricking is the preassembling of uniform, interconnectable panel units of refractory material which may be arranged to form the furnace interior. These panels are readily interchangeable upon wearing or other damage occurring within the furnace.

SUMMARY OF THE INVENTION

An improved preassembled insulating panel is herein provided for use in high temperature furnaces operating in a temperature range up to 2300° F. At least one layer of refractory block is fixed in spaced rows to a metal backing. A high temperature insulation ceramic wool blanket is placed over the rows of refractory block and folded into the transverse spaces between the rows. An anchor mechanism for the blanket is placed in the folded portions thereof so as to be protected from direct furnace exposure in order to extend the life of the anchor and thus the panel itself.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the improved preassembled insulating panel according to this invention.

FIG. 2 is a plan view of the improved preassembled insulating panel according to this invention.

FIG. 3 is a side elevational view of the panel taken along line 3—3 of FIG. 2.

FIG. 4 is a side elevational view of the panel taken along line 4—4 of FIG. 2.

FIG. 5 is a plan view of a second embodiment of the preassembled insulating panel according to this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, FIG. 1 shows a perspective view of the improved preassembled insulating panel **10** of this invention. Affixed to a metal backing **12** is an assembly of low temperature refractory blocks **14** (see FIG. 3) made from any suitable refractory material such as a calcium silicate. The blocks **14** are anchored to the metal backing **12** by means of speed clips **16**. It is noted that the metal backing **12** is preferably of the expanded metal lath type so as to facilitate connection of the speed clips and other anchoring mechanisms as well as permitting the use of a cement fill for the lath. As shown in FIG. 4, transversely oriented to the blocks **14** are a series of rows of high temperature refractory blocks **18** also preferably made of a calcium silicate. The composition of the high temperature blocks **18** is such that they will withstand temperatures of 1800–2000° F. The high temperature refractory blocks **18** are secured in the preassembled panel **10** by means of alloy wires **24** which pass through the blocks **18** and **14** and are tied to the metal backing **12**.

The rows of high temperature refractory block **18** are separated by transverse spaces **20** and furthermore have end spaces **22** (see FIG. 2). A high temperature insulating ceramic wool blanket **26** preferably formed of an alumina-silicate ceramic fiber is laid over the rows of high temperature refractory block **18** and folded into the transverse spaces **20** and **22**. In order to anchor the blanket **26** in the preassembled panel **10**, alloy rods **28** are placed in the folded blanket portions within the transverse spaces **20** and **22**. The rods **28** are then tied to the metal backing **12** by means of alloy wires **30** (within the spaces **20**) and **32** (within the spaces **22**). In this manner of construction, the rods **28** will be nested in the folds of the blanket **26** so as not to be exposed directly to the high temperature and corrosive atmosphere of the furnace. The rods **28** will therefore be longer lasting and will not require unnecessary replacing of panel segments due to premature rod failure. If it is desired to form insulating panels capable of withstanding up to 2300° F., a layer of ceramic wool (not shown) is inserted between the blocks **18** and the blanket **26**.

With the panel **10** so constructed, a series of panels can be assembled to form a furnace interior wall structure. The metal backing **12** may then be fixed by suitable means to any particular support structure. The uniform interchangeable modular form of the panels **10** permits economical removal and reinstallation of similar panels when a particular panel becomes damaged or excessively worn.

FIG. 5 shows a modified form **34** of the improved preassembled panel according to this invention. Panel **34** is comprised of a metal backing **12'** upon which high temperature refractory blocks **18'** are positioned in transverse, spaced rows. The refractory blocks **18'** which are similar to those of FIGS. 1–4 are affixed to the metal backing **12'** in a similar manner to that of the above-described panel. A high temperature insulating ceramic wool blanket **26'** is then placed over the refractory blocks **18'** and folded within the spaces **20'** therebetween. Then blanket **26'** is anchored to the metal backing **12'** by means of alloy rods **28'** nested within the folds of the blanket **26'**. The modified panel **34** contains only one layer of refractory block and therefore has lower temperature capabilities than the panel of FIG. 1. Specifically, this panel is designed for temperature use up to 1600° F.

From the foregoing it is apparent that there is herein provided a high temperature insulating panel of the preassembled type which may be readily used to form furnaces operating in a temperature range up to 2300° F. The panels are readily interchangeable so that upon the

failure of materials due to the furnace action, the panels can be readily and economically interchanged. Due to the unique construction of spaced rows of refractory block and overlying high temperature insulating ceramic wool blanket folded within the transverse spaces, it is possible to supply anchor mechanisms for the wool blanket which are not directly exposed to the high temperature and corrosive conditions of the furnace atmosphere and thus are not subject to premature failure.

While these preferred embodiments of the invention have been shown and described, it will be understood that they are merely illustrative and that changes may be made without departing from the source of the invention as claimed.

I claim:

1. Preassembled interconnectable insulating panels for high temperature furnaces, said panels comprising a metal backing, at least one layer of refractory block fixed in rows to said metal backing so as to have transverse spaces between adjacent rows, a high temperature insulating ceramic wool blanket covering said at least one layer of refractory block and folded into the transverse spaces between said adjacent rows, and anchor means for securing said high temperature insulating blanket to said metal backing, said anchor means positioned within said folds of said insulating blanket so as to be protected from direct furnace exposure.

2. The assembly of claim 1 wherein there is a first layer and a second layer of refractory block fixed to said metal backing, said first layer located between said backing and said second layer and oriented transversely to said second layer, said second layer lying in transversely spaced rows across said first layer.

3. The assembly of claim 1 wherein said at least one layer of refractory blocks are formed from calcium silicate.

4. The assembly of claim 1 wherein said high temperature insulating ceramic wool blanket is formed of an alumina-silicate ceramic fiber.

5. The assembly of claim 1 wherein said anchor means comprises elongated alloy rods positioned within said folds of said insulating blanket, said alloy rods being secured to said metal backing by means of alloy wire.

References Cited

UNITED STATES PATENTS

313,971	3/1885	White	52—622
1,487,578	3/1924	Kirkpatrick	52—513
3,176,433	4/1965	Davies et al.	52—622
3,209,503	10/1965	Mostoller	52—512
3,378,975	4/1968	Hill	52—404

FRANK L. ABBOTT, Primary Examiner

L. A. BRAUN, Assistant Examiner

U.S. Cl. X.R.

52—222, 512, 513