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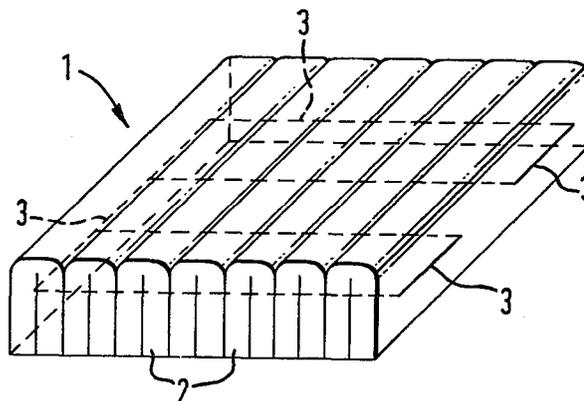
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**Thermally insulating blocks.**

A thermally insulating block (1) for use in lining the roofs, walls, floors, doors and ducting in furnaces, kilns, ovens or the like, comprising a plurality of strips (2), preferably of U-shaped section, of a low thermal mass material, which are secured together under compression and in side-by-side relationship, by retaining means (3) capable of withstanding the operating temperature of a furnace, kiln, oven or the like in which the block (1) is used as at least part of an inner lining thereof. Preferably, the retaining means is in the form of a flexible thread or cord (3) extending through the interior of the block generally transversely with respect to the strips. The invention also includes methods of making the block, one preferred method comprising the steps of folding a layer of low thermal mass material to form a corrugated block of the material, truncating the so-formed corrugations on at least one major face of the block to form a series of strips in side-by-side relationship, transversely compressing the elongate strips together, and maintaining the so-compressed strips under compression with retaining means capable of withstanding the operating temperature of a furnace, kiln, oven or the like in which the manufactured block is used as at least part of an inner lining thereof.



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1 THERMALLY INSULATING BLOCKSDESCI PTION

5 This invention relates to thermally insulating blocks for use in lining the roofs, walls, floors, doors and ducting in furnaces, kilns, ovens and the like.

A known furnace lining comprises an inner layer of a plurality of thermally insulating blocks each formed from  
10 individual rectangular strips of low thermal mass material stacked adjacent one another and wrapped, under compression, in cotton or other scrim cloth which burns up when the blocks are first used.

A disadvantage associated with this known form of  
15 thermally insulating block is that the cotton or other scrim cloth is under tension, when wrapped around the block to retain the low thermal mass strips under compression, which does not permit sufficient flexing of the block when it is being secured to a curved or uneven surface of an  
20 inner wall of a furnace, kiln, oven or the like. Another disadvantage is that the cotton or other scrim cloth burns up when the block is first used, thereby eliminating or at least substantially reducing the compressive forces holding the low thermal mass strips together, thus resulting in the  
25 eventual break-up of the block.

The present invention sets out to eliminate, or at least substantially avoid, these disadvantages associated with known thermally insulating blocks by providing, in accordance with one aspect thereof, a thermally insulating  
30 block comprising a plurality of strips of a low thermal

1 mass material which are secured together, under compression  
and in side-by-side relationship, by retaining means which  
is capable of withstanding the operating temperature of a  
furnace, kiln, oven or the like in which the block is used  
5 as at least part of an inner lining thereof.

Preferably, said retaining means is flexible, in  
which case, it may be in the form of a thread or cord made  
from the same low thermal mass material as that of the  
strips. Such flexible thread or cord may extend around the  
10 exterior of the block, to retain the strips under  
compression and in side-by-side relationship, or may be  
threaded transversely, in a back and forward fashion, through  
the compressed strips, as long as the thread or cord is  
capable of withstanding the operating temperature of a  
15 furnace, kiln, oven or the like in which the block is  
installed as at least part of the inner liner thereof.

In this latter embodiment, wherein the flexible  
thread or cord passes transversely through the block, its  
inherent flexibility permits the block to be flexed during  
20 installation, thus permitting it to be secured to the  
contour of a curved or uneven surface of an inner wall of  
a furnace, kiln, oven or the like.

Alternatively, however, said retaining means may be  
in the form of at least one "skewer" passing transversely  
25 through the compressed and side-by-side low thermal mass  
strips, such a skewer preferably being made of a metallic  
material which can withstand the operating temperature of  
the furnace, kiln, oven or the like.

In one preferred embodiment of the inventive  
30 thermally insulating block, the low thermal mass material,  
from which the strips are made, is a refractory fibre of  
alumina and silica suitable for continuous exposure to  
operating temperatures of 1260°C (2300°F). A suitable  
material for operating at a higher temperature of, say,  
35 1425°C (2600°F) is a fibrous refractory material of an

1 alumina, silica and chromia composition. As indicated above,  
said retaining means, and preferably when in the form of  
a thread or cord, can also be made of either fibrous  
refractory material.

5 In a further preferred embodiment of the inventive  
thermally insulating block, the strips are U-shaped, thereby  
providing a block with one of its major surfaces corrugated  
and the other, planar.

In accordance with another aspect of the invention,  
10 there is provided a method of manufacturing a thermally  
insulating block, comprising the steps of arranging a  
plurality of strips of low thermal mass material in side-  
by-side relationship, transversely compressing the strips  
together, and maintaining the so-compressed strips under  
15 compression with retaining means which is capable of  
withstanding the operating temperature of a furnace, kiln,  
oven or the like in which the manufactured block is used  
as at least part of an inner lining thereof.

In a preferred embodiment of the inventive method,  
20 there is provided the steps of folding a layer of low  
thermal mass material to form a corrugated block of said  
material, truncating the so-formed corrugations on at least  
one major face of the block to form a series of strips  
in side-by-side relationship, transversely compressing the  
25 strips together, and maintaining the so-compressed strips  
under compression with retaining means which is  
capable of withstanding the operating temperature  
of a furnace, kiln, oven or the like in which the block is  
used as at least part of an inner lining thereof. As a  
30 modification of this method, the transverse compressing and  
maintaining under compression steps may precede the  
corrugation truncating step.

The thermally insulating blocks, in accordance with  
the invention or when made by a method in accordance there-  
35 with, can be secured to the inner surfaces of, say, a furnace,

1 by cementing one of the major surfaces thereof and then  
pressing this surface against the furnace wall in the  
required position. In the case of the corrugated block  
having U-shaped strips, it is the planar major surface  
5 which is preferably secured to the internal surface of the  
furnace wall.

A preferred embodiment of thermally insulating  
block in accordance with the invention, as well as its  
inventive method of manufacture, will now be described  
10 by way of example and with reference to the accompanying  
drawing which shows a perspective view of the block.

In the drawing, a thermally insulating block 1,  
for use in lining the inner surfaces of a furnace wall,  
comprises a plurality of U-shaped strips 2 of a low  
15 thermal mass material which are secured together under  
compression by a retaining thread 3. This retaining thread  
3 passes along the outside surface of the U-shaped strip 2  
at the left hand side of the block 1, through the block at  
four positions transversely with respect thereto, and along  
20 two portions of the outer surface of the U-shaped strip at  
the right hand end of the block. The thread 3 retains the  
strips 2 under transverse compression and it is to be  
understood that any other suitable form of retaining means,  
such as, at least one transverse rod, may be used instead of  
25 the thread 3, as long as it is capable of withstanding the  
operating temperature of the furnace.

In a modified form of the block 1, a scrim cloth  
of the same material as that from which the strips 2 are  
made, is wrapped around the block, preferably leaving the  
30 opposed end faces of the U-shaped strips 2 exposed. Such  
wrapping can be adhesively secured to the block 1.

In the manufacture of the block 1, a single layer of  
low thermal mass material, such as either of those described  
above and capable of withstanding respective operating  
35 temperatures of 1260°C (2300°F) and 1425°C (2600°F), has

1 been folded to form an intermediate corrugated block. One  
major face of the intermediate block has then had its  
corrugations truncated, thereby forming the plurality of  
side-by-side, generally U-shaped strips 2 which are  
5 subsequently subjected to a transverse compressional  
force. Alternatively, and as also indicated above, this  
truncation step may follow the compression and retaining  
steps.

In this compressed state, the thread 3 passes  
10 transversely through the strips 2 and is secured in a  
suitable manner to maintain the block 1 under compression.

It will be appreciated that such a block 1 could  
also be made by forming two or more intermediate blocks,  
of equal thickness, which may then be secured together in  
15 side-by-side relationship under compression.

The or each block 1 can then be fixed to the internal  
surface of a furnace wall by cementing the planar, truncated  
face thereto. Also, it will be appreciated that the  
transversely compressing and maintaining under compression  
20 steps can be formed simultaneously, and preferably when  
the retaining means is in the form of a flexible thread  
or cord passing transversely through the side-by-side  
strips, whereby tightening or tensioning of the thread or  
cord 3 actually compresses the strips together and, then,  
25 subsequently retains them in the compressed state.

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1     CLAIMS

1           1. A thermally insulating block (1) for use in  
lining the roofs, walls, floors, doors and ducting in  
5     furnaces, kilns, ovens or the like, comprising a plurality  
of strips (2) of a low thermal mass material, which are  
secured together, under compression and in side-by-side  
relationship, by retaining means (3),

characterised in

10           that said retaining means (3) is capable of  
withstanding the operating temperature of a furnace, kiln,  
oven or the like in which the block (1) is used as at  
least part of an inner lining thereof.

15           2. A thermally insulating block (1) according  
to claim 1, wherein said retaining means (3) comprises  
a flexible thread or cord.

20           3. A thermally insulating block (1) according to  
claim 1 or 2, wherein said retaining means (3) extends  
through the interior of the block (1) generally  
transversely with respect to the plurality of strips  
(2) of low thermal mass material.

25           4. A thermally insulating block (1) according  
to any preceding claim, wherein the plurality of strips  
(2) are made of a fibrous refractory material containing  
alumina and silica.

5. A thermally insulating block (1) according to  
claim 4, wherein the fibrous refractory material also  
contains chromia.

30           6. A thermally insulating block (1) according to  
any preceding claim, wherein said retaining means (3) is  
of the same material as that of the strips (2).

35           7. A thermally insulating block (1) according to  
any preceding claim, wherein the strips (2) are generally  
U-shaped, whereby one major surface of the block is  
corrugated and the other major surface of the block (1)

1 is planar.

8. A furnace, kiln, oven or the like having a lining of which part comprises one or more blocks (1) according to any preceding claim.

5 9. A method of manufacturing a thermally insulating block (1), comprising the steps of arranging a plurality of strips (2) of low thermal mass material in side-by-side relationship, transversely compressing the strips (2) together, and maintaining the so-compressed  
10 strips (2) under compression with retaining means (3), characterised in

that said retaining means (3) is made of a material capable of withstanding the operating temperature of a furnace, kiln, oven or the like in which  
15 the manufactured block (1) is used as at least part of an inner lining thereof.

10. A method of manufacturing a thermally insulating block according to claim 9, wherein the plurality of strips (2) are formed by folding a layer of  
20 low thermal mass material to form a corrugated block (1) of the low thermal mass material and truncating the so-formed corrugations on at least one major face of the block (1) to form said series of strips (2) in side-by-side relationship.

25 11. A method according to claim 9 or 10, wherein said retaining means (3) is provided as a flexible thread or cord.

12. A method according to any of claims 9 to 11, wherein said retaining means (3) is passed through the  
30 interior of the block (1), such that it extends generally transversely with respect to the plurality of strips (2) of low thermal mass material.

13. A method according to any of claims 9 to 12, wherein the plurality of strips (2) are made of a fibrous  
35 refractory material containing alumina and silica.

1           14. A method according to claim 13, wherein the  
fibrous refractory material also contains chromia.

5           15. A modification of the method according to  
any of claims 10 to 14, wherein the transversely  
compressing and maintaining under compression steps  
performed upon the strips (2) precede the corrugation  
truncating step.

10          16. A method according to any of claims 9 to 14,  
or a modified method according to claim 15, wherein the  
transversely compressing and maintaining under compression  
steps are performed simultaneously when said retaining  
means (3) is applied to the side-by-side strips (2).

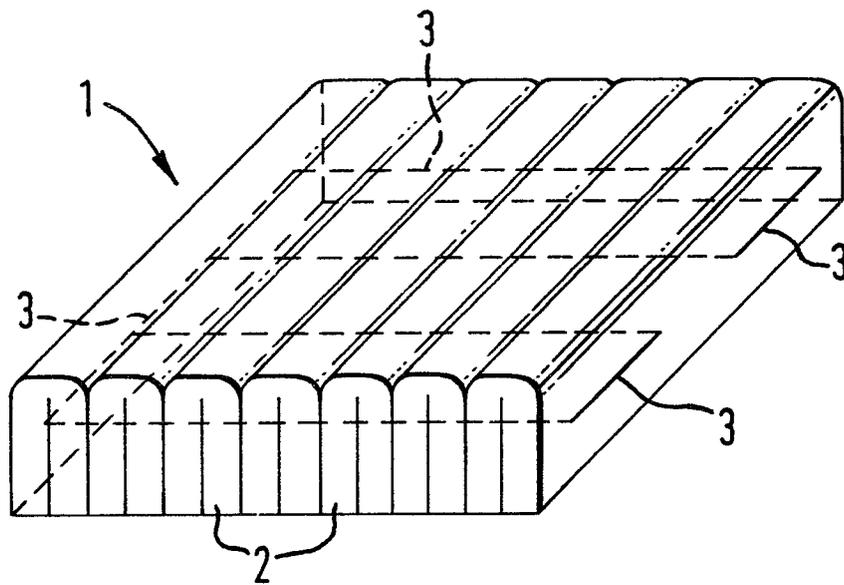
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European Patent  
Office

**EUROPEAN SEARCH REPORT**

0090518

Application number

EP 83 30 1228

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. 3)
Y	US-A-3 819 468 (R.A. SAUDER)  * Claim 1-8, claim 20; figures 4,6; column 3 *	1,2,3,9,11,12	F 27 D 1/00
Y	US-A-3 832 815 (J.K. BALAZ)  * Claims 1,2; column 5; figures *	1,2,3,9,11,12	
Y	GB-A-2 004 626 (STUDWELPRO - UK LTD.) * Page 2, lines 6-11; figure 4; claims *	9,10,12	
Y	FR-A-2 454 071 (HEATTREATMENT ADVISING CY.) * Claims *	1,2,3,8,9,12	TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
Y	GB-A-2 070 748 (DUCTILE HOT MILL LDT.) * Claims, figures *	8,9	F 27 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-04-1983	Examiner COULOMB J.C.
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>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</p> <p>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  &amp; : member of the same patent family, corresponding document</p>			