

[54] ROOF AND WALL STRUCTURES
MORE PARTICULARLY OF HEAT
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[58] Field of Search.....52/484, 485, 486,
52/573; 110/99

[56]

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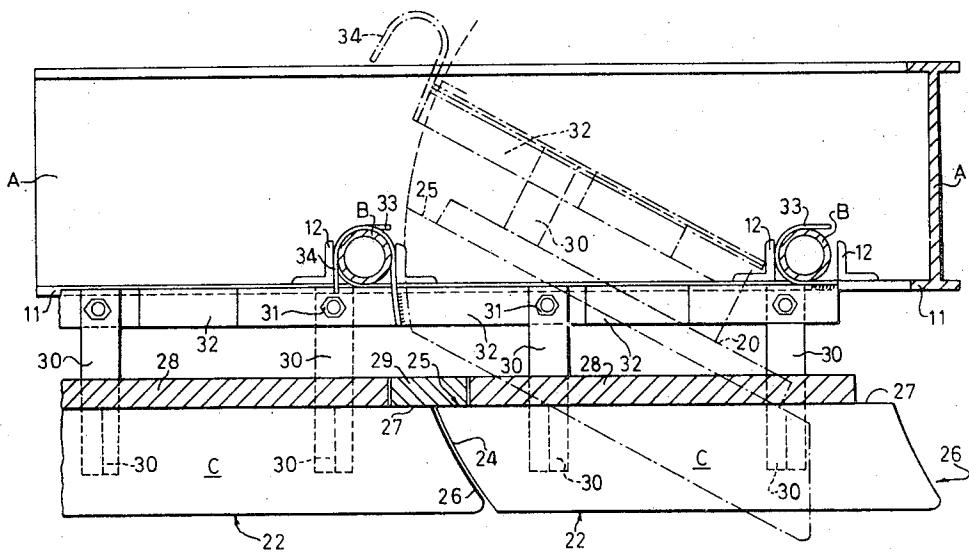
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ABSTRACT

The present invention relates more particularly to furnace enclosures and provides a suspended roof or wall system, and blocks therefor, which permits of the pivoting of individual blocks of the system into and out of installed position without disturbing fellow blocks.

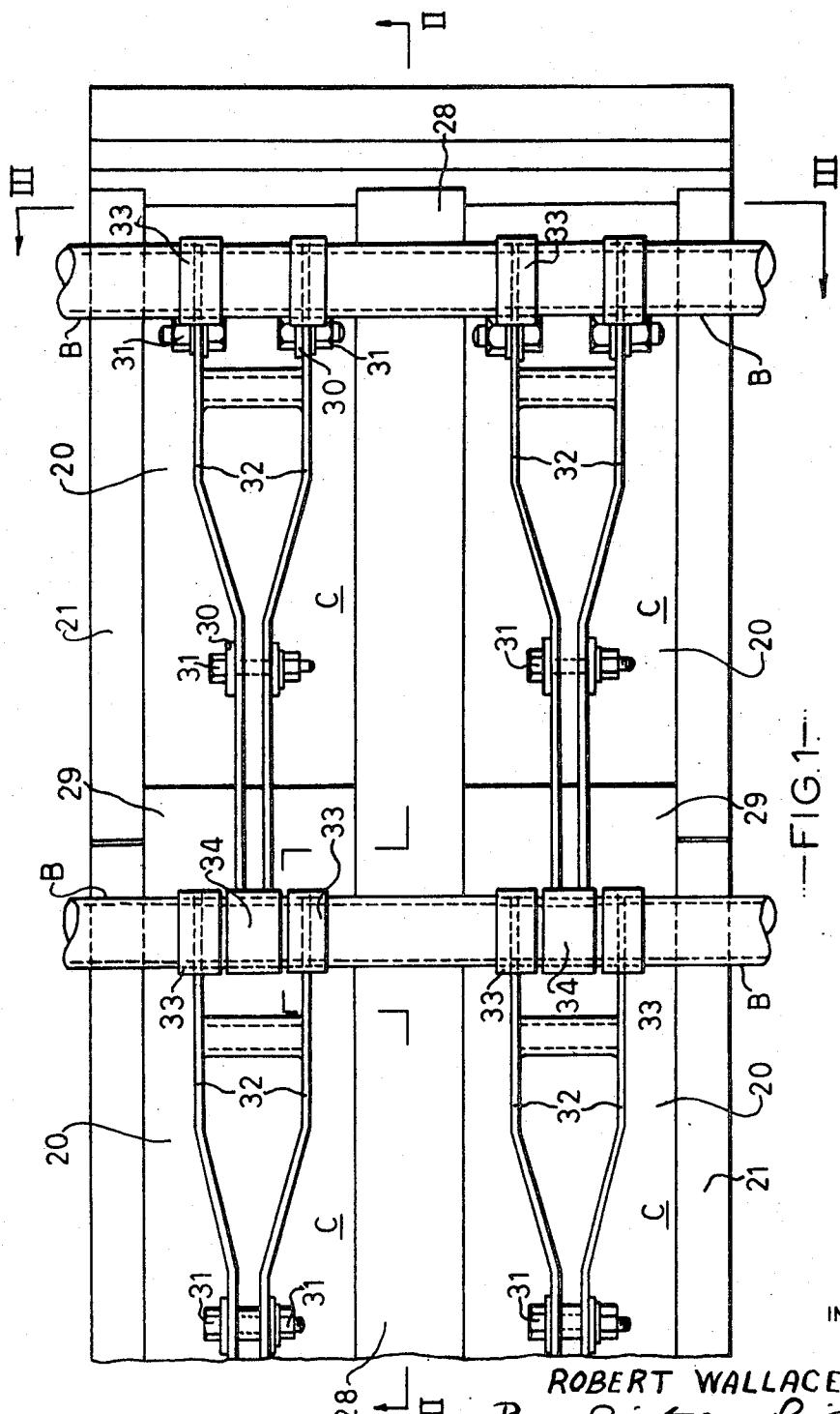
5 Claims, 5 Drawing Figures



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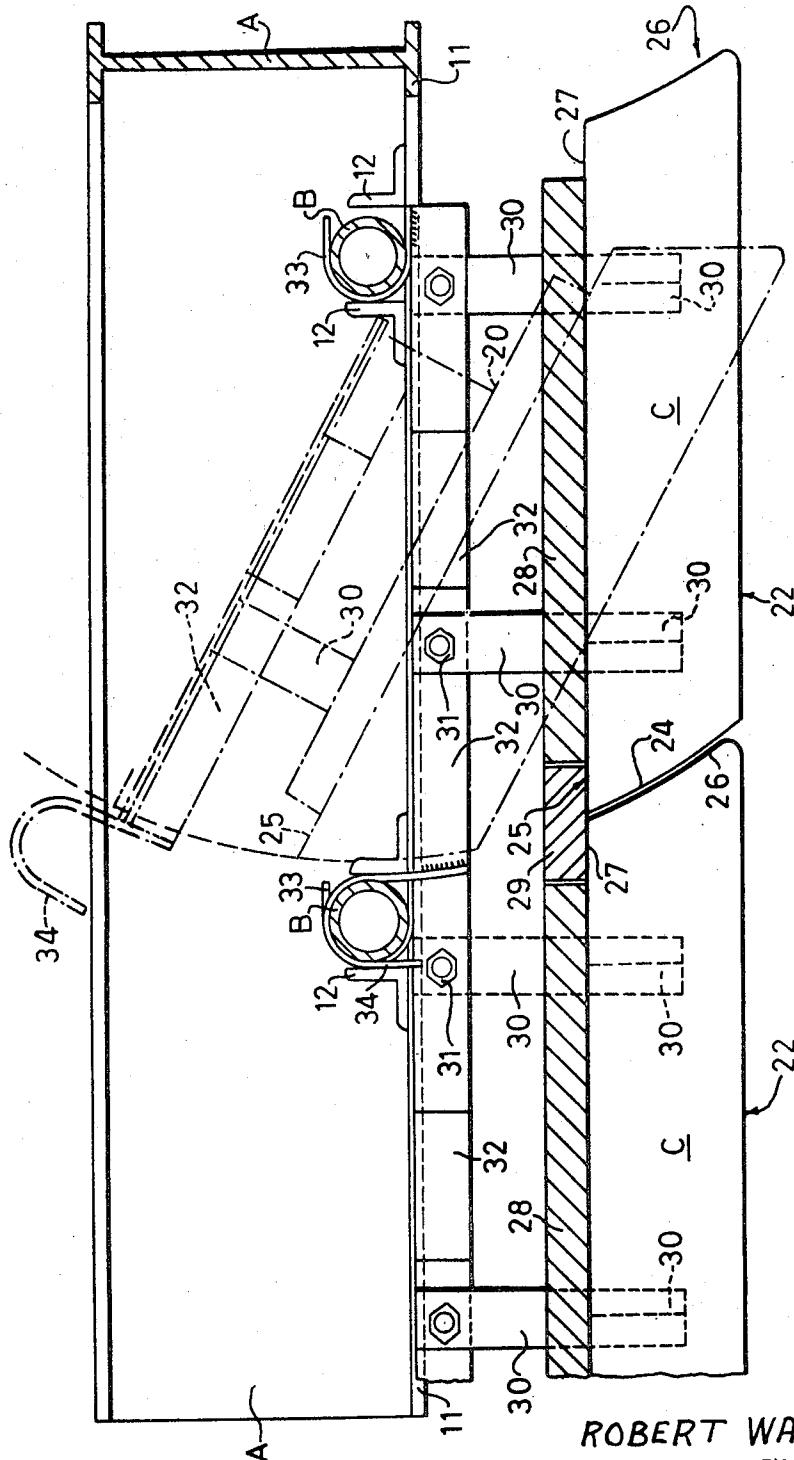
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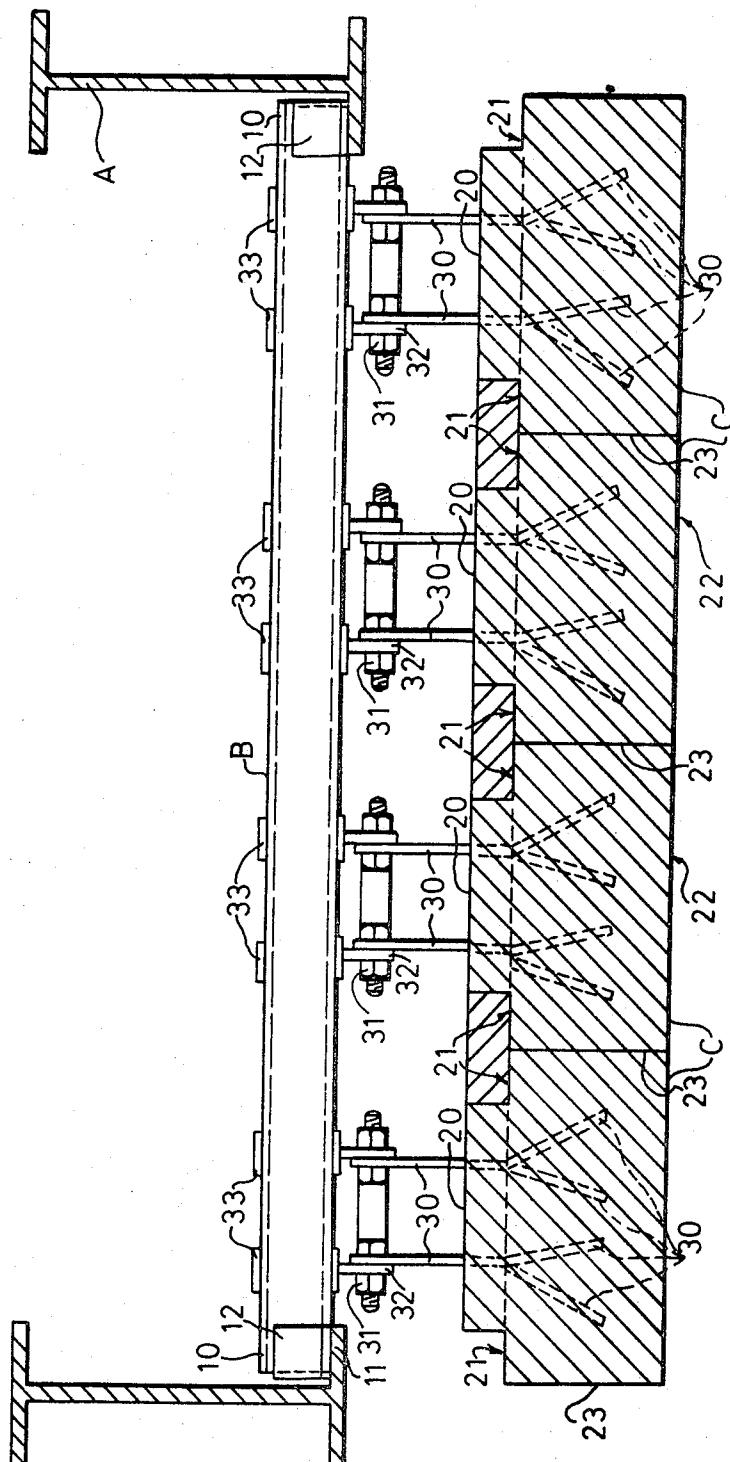
—FIG. 2—

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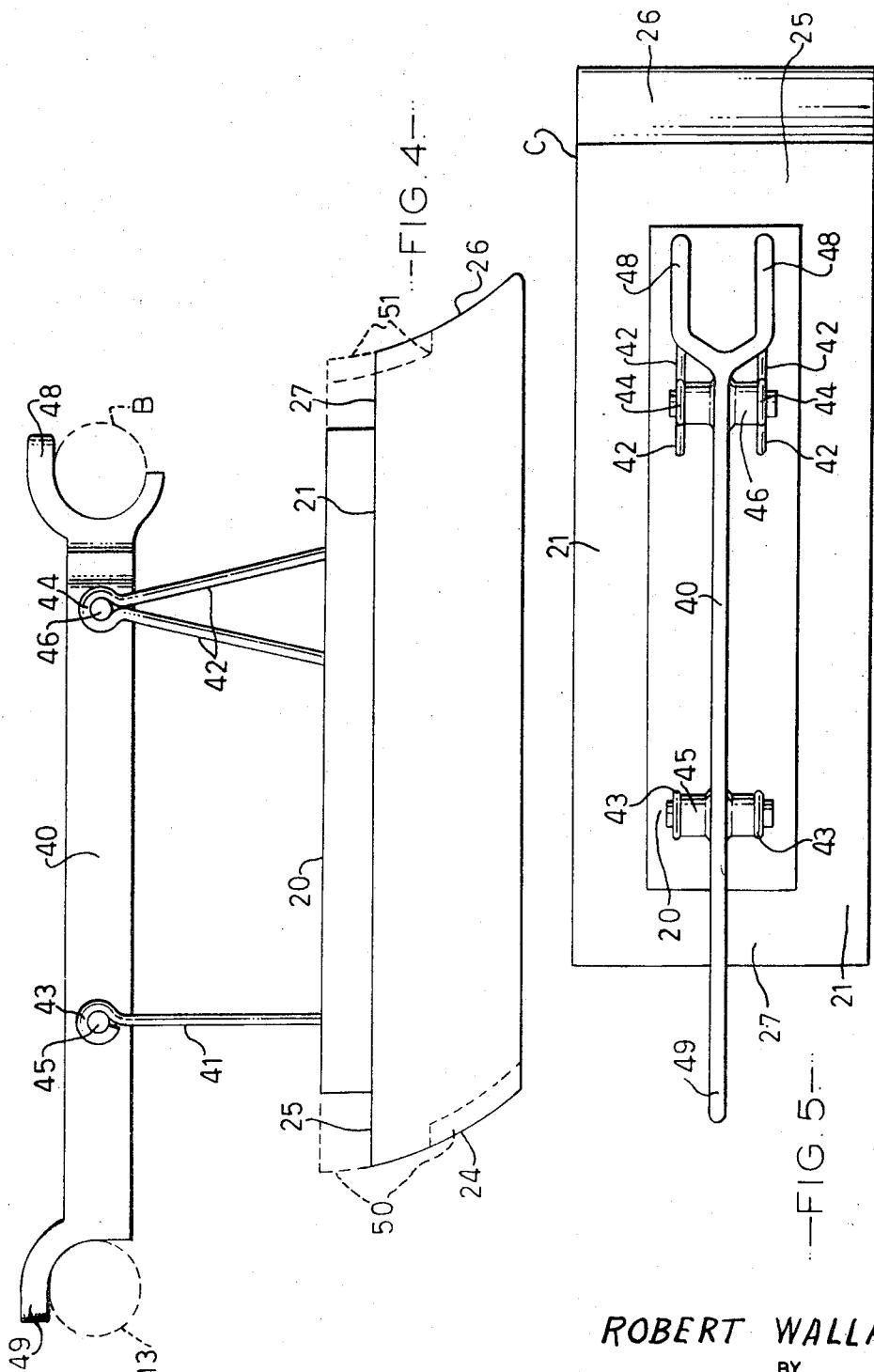
...FIG. 3...

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ROOF AND WALL STRUCTURES MORE PARTICULARLY OF HEAT ENCLOSURES

This invention relates e.g., roof and wall structures, more particularly for heat enclosures, e.g., furnaces, soak pits, billet and slab re-heat furnaces, and the like (all hereinafter for convenience of reference included in the term 'furnace') and has for its object to provide a new or improved suspended roof or wall structure.

Suspended block systems for furnace enclosures are of course known, but heretofore the shape and configuration of the blocks used, and the supporting means therefor, have been of a complex nature which necessitated the employment of skilled labor in their installation. Further, renewal and replacement of the blocks of such known structures for maintenance purposes is a time wasting and therefore expensive procedure.

The present invention has for its object to provide an improved and simplified suspended block system, and blocks therefor, which obviates or substantially so the disadvantages of previous systems.

To this end a suspended block roof or wall system according to the present invention, and in one mode of embodiment, comprises main support means, spacedly arranged subsidiary support members carried by said main support means, rows of blocks each suspended from said subsidiary support members by means of front and rear suspension members, and each of said blocks being of generally rectangular configuration with one end face downwardly and inwardly, usually curvedly, inclined and the opposite end face downwardly and outwardly, usually curvedly, inclined whereby said block may be pivoted about one of said subsidiary support members into and from installed position without disturbing its fellow blocks.

Preferably one front suspension member is provided and two rear suspension members, the latter suspension members being spaced one on either side of the axis of said front suspension member. The latter extends beyond the front edge of the block while said rear members are located inwardly from the block's rear edge.

Usually, the pitch centers of the suspension members and subsidiary supports will be equal to or substantially so the length of a block to be suspended thereby.

Said inclined end faces of the block may be of stepped configuration, and the upper face thereof provided with a longitudinal rebate at each side for the reception of juncture closing subsidiary blocks. Alternatively, in lieu of stepped end faces, said blocks may be provided with a rebated upper surface at each end for the reception of juncture closing subsidiary blocks.

The invention is further described with the aid of the accompanying explanatory drawings which illustrate by way of example only and not of limitation two modes of embodiment.

In said drawings in which like characters of reference are used to denote like parts wherever they occur:

FIG. 1 is a fragmentary plan view of a suspended roof structure according to the invention.

FIG. 2 is a sectional view taken as on line II-II of FIG. 1, and

FIG. 3 a sectional view taken as on line III-III of FIG. 1.

FIGS. 4 and 5 are elevation and plan respectively depicting a modified form of block.

Referring to said drawings, and first to FIGS. 1-3, the roof structure basically comprises main supports A, subsidiary supports B, and refractory blocks C which constitute the roof proper.

In this instance, the supports A are I-section steel beams or joists and the subsidiary supports B lengths of tubular steel the ends 10 (FIG. 3) whereof rest upon and are supported by the lower flanges 11 of the beams A. Said ends 10 are located between angle brackets 12 welded or otherwise secured to said flanges 11 and the distance between said brackets 12 is such as to permit of said supports B having a degree of movement, as shown most clearly in FIG. 2.

Each of said blocks C is of a refractory substance or material suited to its intended use, and comprises an upper surface 20 which has a rebate 21 at each longitudinal side (see more particularly FIG. 3), a flat undersurface 22 which is substantially parallel with the upper surface 20, and flat parallel sides 23. The forward (in use) end face 24 of said block is downwardly and inwardly, curvedly inclined and formed with rebate 25, whilst the opposite end face 26 is downwardly and outwardly curvedly inclined and formed with a rebate 27. Said end faces 24, 26 are of corresponding inclination and curvature whereby the co-operating faces 24, 26 of adjacent end-on blocks C mate as shown best in FIG. 2.

The junctures between the longitudinal sides 23 of adjacent blocks may be closed by subsidiary blocks 28 located in the channels formed by the adjacent side rebates 21. The transverse junctures may be closed by subsidiary blocks 29 which are located in the transverse channels formed by adjacent rebates 25, 27. The subsidiary blocks may be located in place by undercutting or raking the sides of the rebates and/or the blocks as and where necessary.

Each block C is formed or provided with hanger bars, generally designated 30, and which may be of stainless steel or other substance suited to the temperatures they will have to withstand. Connected to said hanger bars 30 by bolts and nuts 31 are side arms 32 which extend substantially parallel with the upper surface 20 of said block and carry at their rear ends spacedly arranged hook members 33. At their fore ends said side arms 32 converge and carry a single suspension member 34. The member 34 is located beyond the front face 24 of the block C and has a downwardly facing entrance. The rear members 33 lie inwardly of the rear face 26 of said block C, as shown best in FIGS. 2 and 3, and have rearwardly facing entrances.

In the erection of a roof structure, each block C is supported between the adjacent supports B by first engaging the suspension members 33 on one of said supports and then pivoting the fore end of said block until the suspension member 34 engages the adjacent support B.

The inclination and radius of curvature of the end faces 24, 26 of adjacent rows of blocks C ensure that any individual block can be removed without disturbing its fellow blocks, it being merely necessary to lift out the subsidiary blocks 28 and 29, and pivot the block C in question about the axis afforded by the support B engaged by its rear suspension members 33, as indicated in broken lines in FIG. 2.

It is to be noted that the provided movement of each support B between its locating brackets 12 permits of

the structure to "work" as is desirable under the influence of varying temperature.

It is also to be noted that the suspension members 33, 34 of each block C provide a three point suspension which ensures that each block is located without any tendency to rock.

In an alternative embodiment the hanger bars 30 may be replaced or constituted by suitable refractory tile pieces cast with the block C and to which tile pieces suspension units, i.e., side members as 32 with suspension members 33, 34, may be bolted.

In a yet further embodiment, blocks according to the invention may be manufactured in the form of pre-fired firebrick tiles having hanger means formed integrally therewith to which suspension units incorporating suspension members as 33, 34 may be bolted.

Referring now to FIGS. 4 and 5 these depict a block C which is substantially similar in shape to the blocks already described with reference to FIGS. 1 to 3, but which is attached to a suspension bar 40 of cast iron by means of arms 41 and 42 of stout, stainless steel wire the lower ends whereof are cast firmly into the block. Said arms 41, 42 are formed with looped upper parts 43, 44 as shown, which parts 43, 44 are engaged with shouldered studs or bosses 45, 46 formed integrally on each side of said suspension bar 40. The bar 40 at its rear end is formed with two laterally spaced arcuate suspension members 48 for pivotally engaging a first support member B as before referred to, and on its fore end with a single suspension member 49 for engaging and resting upon a second adjacent support member B.

If desired, and to obviate the need for providing in a block C transverse end rebates 25, 27 (FIGS. 1-3), and for providing subsidiary blocks as 29 (FIG. 2), the inclined end faces 24, 26 of the blocks C may be of stepped configuration and shaped as indicated in broken lines at 50, 51 in FIG. 4.

Whilst the invention has herein been described more particularly in relation to a roof structure, it will be apparent that inclined and, mutatis mutandis, vertical structures may be constructed in accordance with the invention.

It is also envisaged that in some circumstances roof or wall structures according to the invention may be erected for use other than as furnace enclosures.

I claim:

1. A suspended roof or wall system, more particularly for a furnace enclosure, comprising main support

means, spacedly arranged subsidiary support members carried by said main support means, rows of blocks, front suspension members, rear suspension members with each pair thereof spaced one on each side of the axis of one of said front suspension members, each front suspension member connected to one of said blocks and extending beyond the front edge of its connected one of said blocks and each pair of said rear suspension being connected to one of said blocks and located inwardly from the rear edge of its connected one of said blocks, said suspension members being detachably connected to said subsidiary support members with said blocks suspended therefrom and each of said blocks being of generally rectangular configuration with its front end face downwardly and outwardly inclined whereby said block may be pivoted about one of said subsidiary support members into and from installed position without disturbing its fellow blocks.

2. A suspended roof or wall system, as claimed in claim 1, wherein the upper surface of each block is formed with rebates and subsidiary blocks for covering the junctures between adjacent blocks seated in said rebates.

3. A suspended roof or wall system, as claimed in claim 2, wherein each block is provided with a longitudinal rebate at each side and with a transverse rebate at each end.

4. A suspended roof or wall system, as claimed in claim 3, wherein brackets are provided on the flanges of said main support beams and the ends of said subsidiary support members are located between said brackets, and said brackets are located so as to provide said subsidiary support members with a degree of movement.

5. A block for use in the construction of a suspended roof or wall system, comprising a block that is of a generally rectangular configuration having its front end face downwardly and inwardly inclined and its rear end face downwardly and outwardly inclined, and means extending from the upper face of said block carrying a front suspension member which extends beyond the front edge of the block and two rear suspension members lying inwardly of the rear edge of the block, said front suspension member being of a hook-like form with a downwardly facing opening and said rear suspension members each being of hook-like form with rearwardly facing openings.

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