July 7, 1964 L. S. LONGENECKER 3,139,846

MELTING FURNACE BACK WALL CONSTRUCTION

Filed July 19, 1960 4 Sheets-Sheet 1

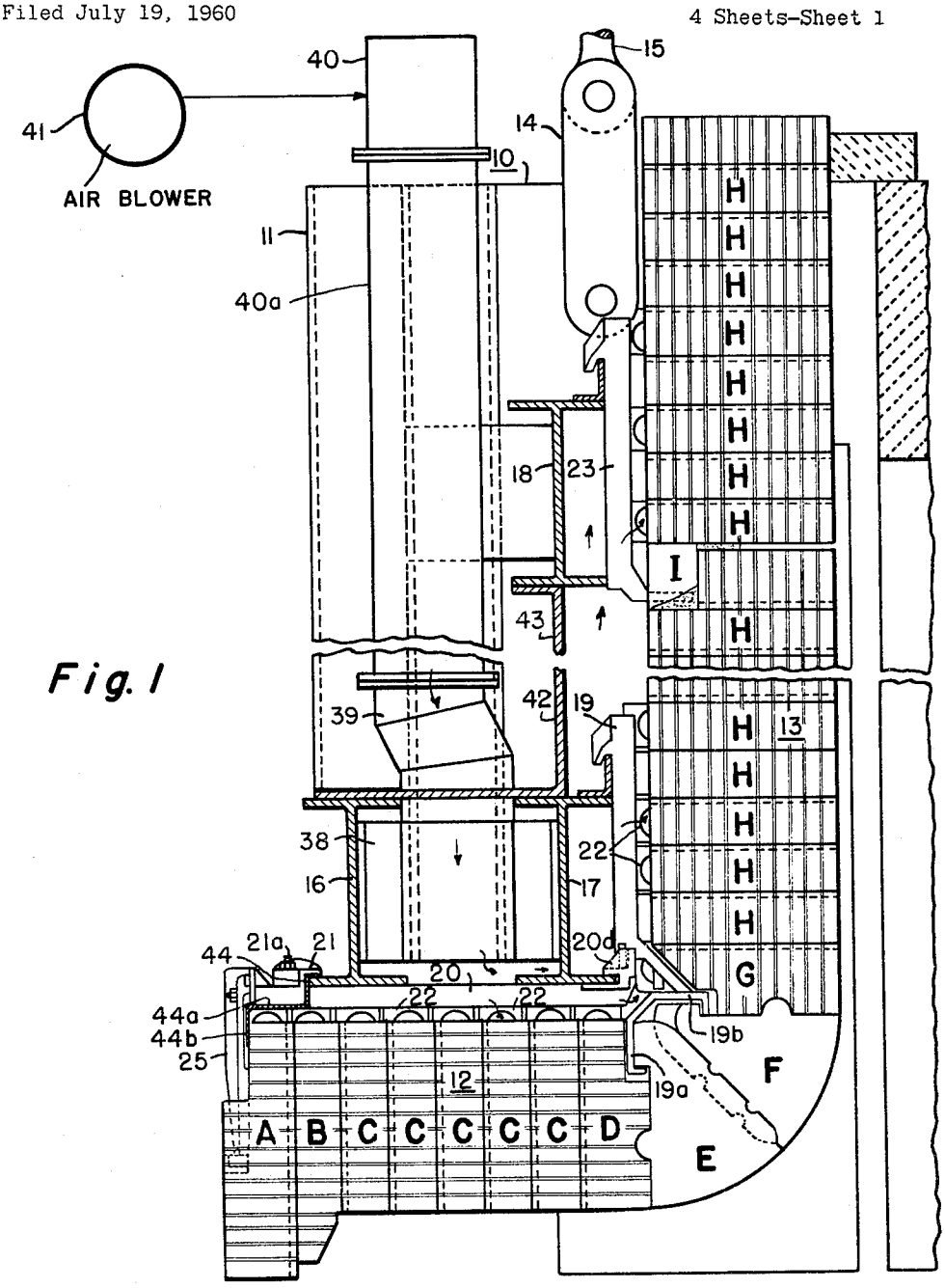


Fig. 1

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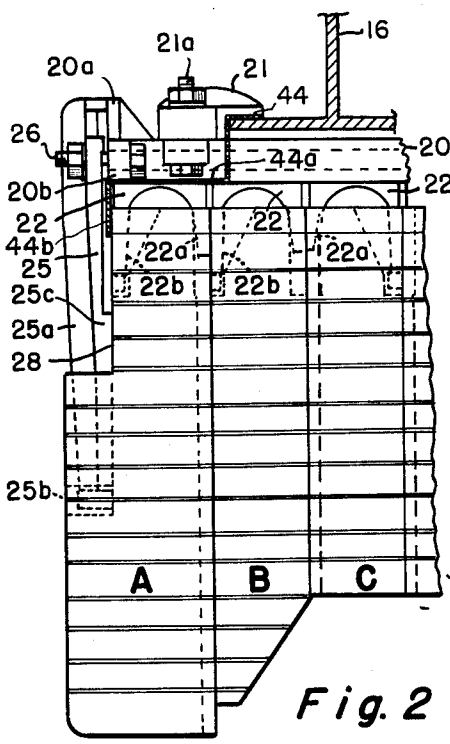


Fig. 2

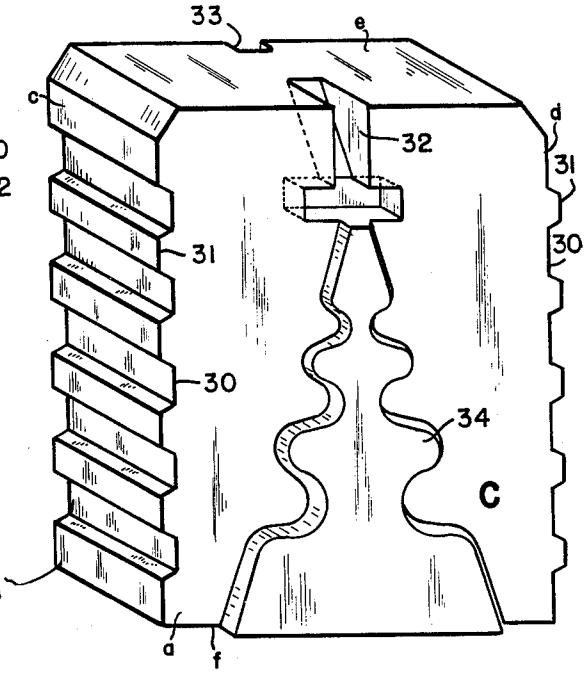


Fig. 4

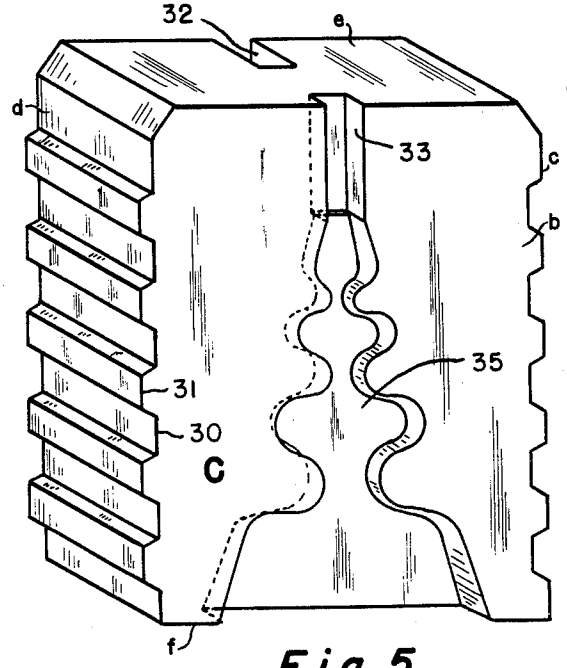


Fig. 5

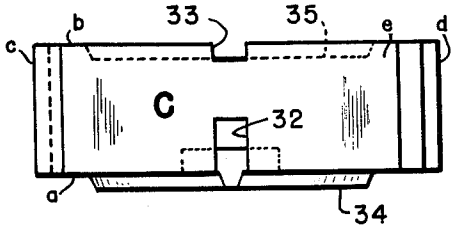


Fig. 6

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MELTING FURNACE BACK WALL CONSTRUCTION

Filed July 19, 1960 4 Sheets-Sheet 3

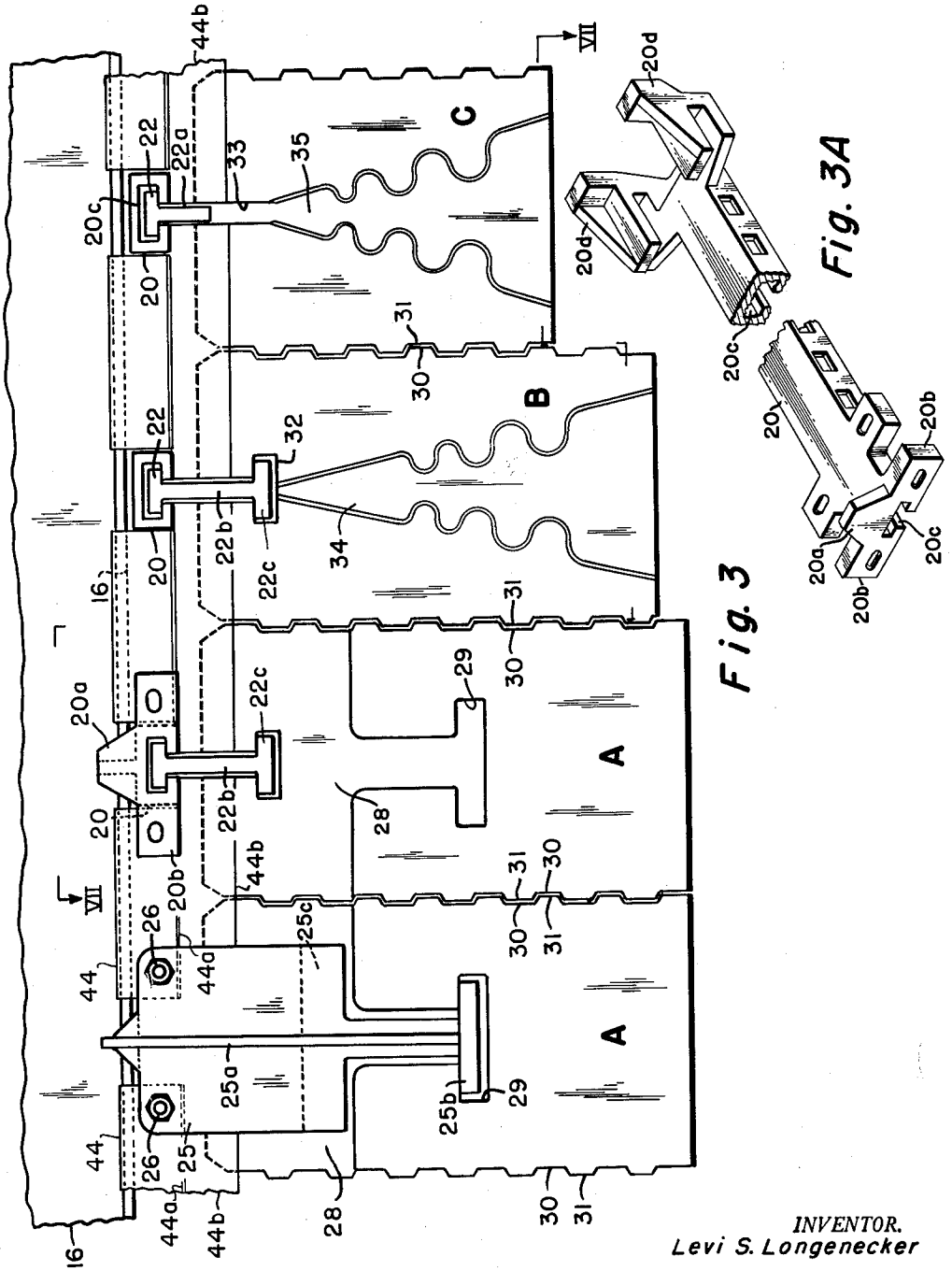


Fig. 3

Fig. 3A

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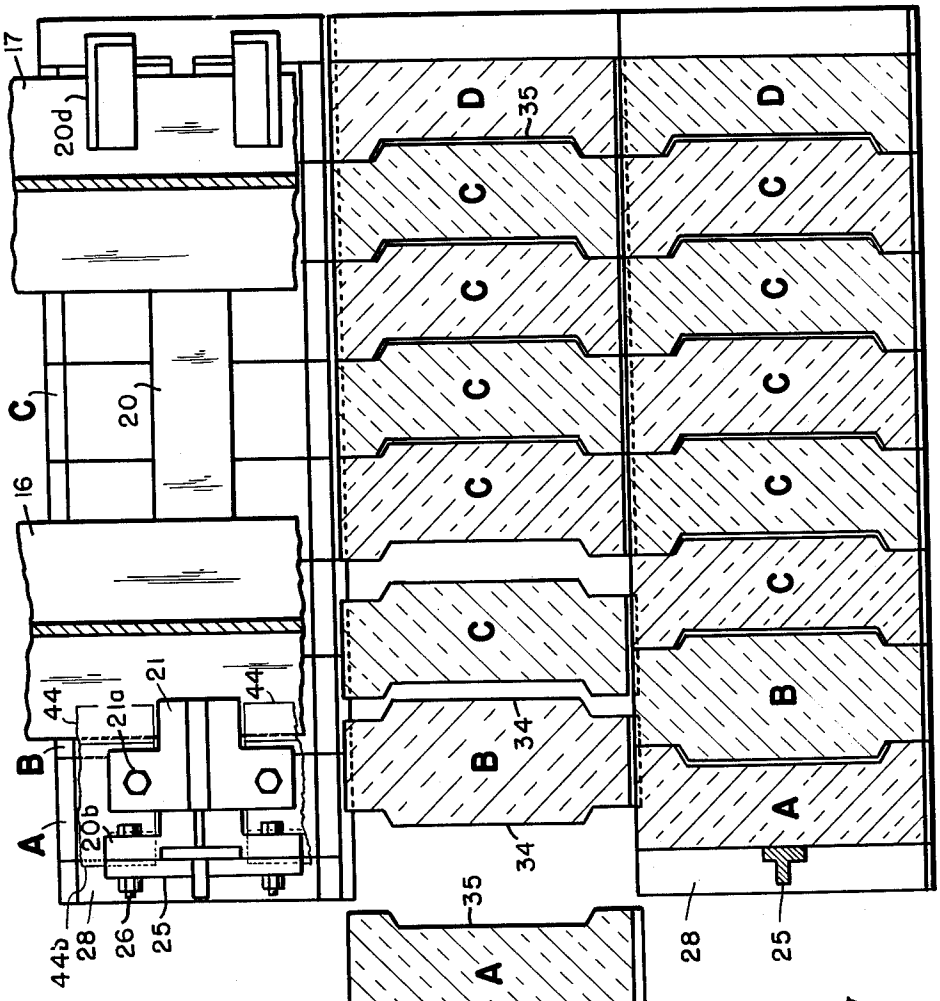
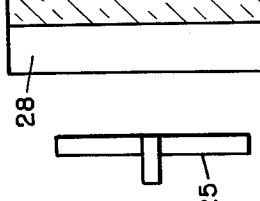


Fig. 7



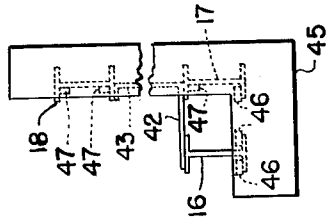


Fig. 9

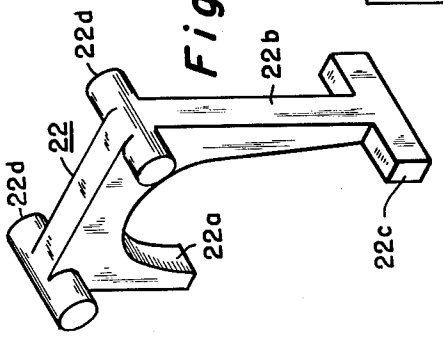


Fig. 8

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United States Patent Office 3,139,846 Patented July 7, 1964

3,139,846
MELTING FURNACE BACK WALL CONSTRUCTION

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Filed July 19, 1960, Ser. No. 43,860
12 Claims. (Cl. 110—99)

This invention relates to a tank type of furnace for melting materials, such as vitreous material used in the manufacture of glass, and particularly to an improved refractory block assembly and mounting construction of a nature to meet a problem involved in the suspended back wall construction of a melting furnace.

A phase of the invention deals with the problem which has been encountered in connection with a furnace back wall which defines a mouth or feed opening for materials being fed into the furnace and which desirably is of a type that may be vertically raised and lowered to adjust the size of such feed opening or mouth of the heating or melting chamber of the furnace. Such a suspended back wall is adapted to be mounted or supported independently of the walls and roof of the furnace and, as shown in FIGURE 1 of the drawings, is actively supplied with cooling fluid such as air as, for example, introduced along the outside of the refractory brick or block lining by suitable means, such as wind chests.

Prior to my present invention, it has been customary to close-off and secure refractory brick or tile rows of a suspended back wall with respect to adjacent rows by cementing materials to facilitate the mounting, replacement and maintenance of such brick during their utilization. Before my invention, no practical way of providing an interlocking relation between adjacent tile rows of a suspended back wall construction and particularly, of its apron wall part, could be attained, although it has been practical for a furnace roof wall. Since the refractory brick or tile assembly of a back wall is to be subjected to air sprays for cooling purposes, and since the entire back wall is adjustable or movable, difficulty has arisen from the standpoint of so-called rat holes. These holes generally start where there is an air leak (even if a pin hole), as slight fluxing-outs of the refractory brick or tile, particularly in the cement joints between brick rows. This chews the tile of the back wall up and thins it, in that the holes progressively grow until the back wall is lost and it is then necessary to shut down for replacement. The life period of the tile is thus materially reduced due to this so-called flank attack by the cooling air.

The present-day tendency is towards the use of larger size glass tanks or furnaces for melting the granular materials, and there is thus a need for an increased volume of air to get more effective cooling. For a typical doghouse or charging bay of about 20 feet in width, I contemplate applying about 10,000 cubic feet air at about 5 to 6 inches of water pressure at the top of the manifold, as contrasted to an original employment of about 5,000 cubic feet at a lesser pressure. It is thus apparent that the problem of leakage and rat-holing becomes more and more acute with an increase in volume and pressure of the cooling air.

There is also a tendency of the mortar or cement joints to drop-out under the high temperature usage and particularly, under the temperature differential conditions under which the tile is used wherein its inner side is subjected to the intense heat of the melting chamber and its outer side is subjected to an active application of the cooling medium. Various attempts have been made to increase the life of a back wall by adjusting its positioning so as to minimize heat absorbed by reflection from the high temperature melting batch, but such attempts have to be made taking into consideration any resultant loss of efficiency of the heating furnace from the standpoint of the batch being conditioned therein.

In view of the above considerations, it has been an object of my present invention to provide a practical solution to the problem outlined above and particularly, from the standpoint of increasing the life of the refractory tile lining and without adversely affecting features of ease of installation and simplicity of manufacture and minimization of cost of tile members;

Another object has been to find a solution to the factors arising in connection with the problem and to provide a practical solution therefor;

Another object has been to devise a new and improved type of suspended back wall construction for a melting furnace and particularly, from the standpoint of the mounting and utilization of refractory tile members;

Another object has been to facilitate and increase the efficiency of cooling a suspended back wall and, at the same time, provide it with a longer operating life;

A further object of my invention has been to devise an improved construction of refractory tile in a back wall construction which will make practical the employment of an interlatching or positive joint relation between tile rows and will eliminate the need for purely mortar or cement joints therebetween and will, at the same time, provide for ease of installation, simplicity of manufacture and assure a minimization of rat-holing, such that the life of the refractory tile, as utilized, will be about doubled;

A still further object of my invention has been to devise an improved refractory wall construction which will make it particularly suitable for a suspended back wall wherein the tile members may be interlocked with each other, not only from the standpoint of those in a given row, but also from the standpoint of tile members between adjacent or abutting rows, while at the same time permitting slide-in and out mounting and dismounting of the tile members with respect to each other in the wall assembly;

These and other objects of my invention will appear to those skilled in the art from the drawings and the following description as well as the claims.

In the drawings, FIGURE 1 is a vertical section in elevation of a suspended back wall construction of my invention taken longitudinally along the center line of a melting furnace and illustrating its utilization in association with a feed mouth for the batch feeding of the materials that are being conditioned or melted in the furnace;

FIGURE 2 is an enlarged fragment in vertical side section of a projecting or forward end portion of a rear, substantially horizontal or apron portion of the back wall construction;

FIGURE 3 is a back view in vertical elevation on the scale of FIGURE 2, taken along the projecting or rear end portion of FIGURE 2, and illustrating the mounting of selected tile of adjacent tile rows with respect to each other and individually, from the standpoint of an overhead apron or nose hanger casting; in this figure one row shows an end refractory tile as held in position by an end clamp of FIGURE 2, a second row illustrates the same tile, but with the end clamp removed, a third row illustrates a second tile in a suspended relation, and a fourth row shows a third brick in a suspended relation;

FIGURE 3A is a perspective view showing details of the construction of hanger castings for the back wall of the furnace that are employed as indicated in FIGURES 1 and 2;

FIGURE 4 is a greatly enlarged isometric view in elevation of a refractory tile or brick constructed in accordance with my invention and particularly, showing the tongue face side of tile illustrated by the fourth row of FIGURE 3;

FIGURE 5 is an elevation on the scale of FIGURE 4 of the tile of FIGURE 4, taken from its opposed or grooved face side;

FIGURE 6 is a top plan view on the scale of FIGURES 4 and 5 and illustrating the tile of such figures;

FIGURE 7 is a top view, partially in plan and in section, on the scale of and taken along the line VII—VII of FIGURE 3, to particularly illustrate how the tile members of each row are assembled and disassembled with respect to each other and with respect to adjacent rows and to also illustrate how steel supporting members for the tile are utilized;

FIGURE 8 is an enlarged perspective view of a metal hanger employed for individually suspending a refractory tile member;

And FIGURE 9 is a greatly reduced side view in elevation of my back wall construction illustrating side plate member structure for closing-off transverse ends of cooling fluid chambers.

In carrying out my invention, I employ positively sealed joints between the refractory tile members, with the tile in an apron part **12** being of staggered heights or lengths. A labyrinth type of joint is used that is positively sealed and that does not depend on mortar or cement for support of the tile members. However, a thin layer of cement may be employed for surface to surface sealing.

Referring particularly to FIGURE 1 of the drawings, I have disclosed a suspended back wall construction **10** having metal or steel support structure **11**, backwardly or rearwardly-projecting, substantially horizontal, refractory apron or wing wall part **12**, and an upwardly-projecting or substantially vertical refractory back wall part **13**. Means **14** and **15** is shown for suspending the back wall construction **10**, so that it may be raised and lowered or adjusted with respect to the under-positioned feed mouth of the furnace.

My Patent No. 2,272,217 of February 10, 1942, illustrates the general construction of a suspended back wall as employed in a melting furnace and in connection with the feeding of batch materials into the mouth of the furnace in effecting their melting and conditioning.

In the particular construction shown in FIGURE 1, a pair of spaced-apart cross I-beam members **16** and **17** are employed for supporting the refractory apron wall **12** and a series of vertically-spaced cross I-beam members **18** are employed for supporting or suspending the upright refractory wall **13** in association with vertically-positioned, box-like hanger castings **19** and **23** which are adapted to engage at their hooked end portions with channel pieces carried by the I-beam members **17** and **18**.

The apron or horizontal refractory wall **12** is carried by or suspended from the I-beam pair **16** and **17** through a susbtantially horizontal, longitudinally-rearwardly-extending, box-like hanger casting **20** (see also FIGURE 3), which at one end has a hook or nose portion **20***d* to engage over the bottom flange of the I-beam **17**, and which at its other end is removably clamped over the bottom flange of the I-beam **16** by a mounting clamp **21**, as removably secured thereto by bolt and nut assembly **21***a*. It will be noted that hanger castings **19**, **20** and **23** are slidably mounted to slide transversely along their beam supports. Refractory tile members may be installed by starting at the center of the apron or wing wall part **12** and setting them up tightly at their joints. When the tile members are heated, they expand and the wall is pushed or expanded at or along the casting hanger points. By employing my construction, I can also use silica tile which has a high rate of growth or expansion. For example, in a 20 foot wall, it may be pushed about 2 inches at each end (4 inches total). As to the wall parts **12** and **13**, I find that it is thus advisable to employ expansion slots or joints, as between the ends of vertical wall sections and with respect to the wing wall. In FIGURE 1, I have illustrated a ship-lap seal I between adjacent row sections of the refractory tile members H.

The refractory wall **12** consists of a transverse series of adjacent longitudinally-rearwardly-projecting or extending face-to-face positioned refractory tile member rows; the tile members of each row are designated A, B, C, and D, and are shown as carried or suspended by individual metal suspension hangers **22** having T-shaped upper and opposite end portions that are slidably positioned or carried by a longitudinal guide slot **20***c* (see FIGURE 3) along the hanger casting **20** and cooperate with the individual tile members of each row. Each tile member of susbtantially rectangular shape is thus carried or suspended by its own hanger **22**, and centrally in a balanced relation, by engagement along opposite, centrally-disposed side slots in the tile member. Further, each hanger **22** defines an air circulation top slot or window above the tile member that it suspends.

A forward brick or tile member D of each row of the wall part **12** has an offset portion to cooperate with a pair of conventional swing-mounted nose block members E and F and a downwardly-projecting arm portion **19***a* of the hanger casting **19** which serves as a nose post. The nose post or hanger bracket **19** also has a substantially horizontal upper arm portion **19***b* to support a lower tile member G of the refractory wall **13** as well as the nose block F. Above the hanger casting **19**, vertically spaced hanger castings **23** are employed for suspending the remainder of the row sections of the vertical wall part **13**. It will be noted that the lower, substantially vertical arm portion **19***a* also supports the nose block E. The nose block E and F may be of a construction and mounting, such as illustrated in my Patent No. 2,806,452 of September 17, 1957.

As shown particularly in FIGURES 1 and 2, the last or end tile member A of each row is held in position by an end clamp or heel casting **25** so as to hold the other tile members of the same row as an assembly in forward alignment against the arm portion **19***a*, see also FIGURE 3. The end clamp **25** has a centrally-disposed, reinforcing, vertical rib **25***a*, and a downwardly-projecting, T-shaped, latching leg portion **25***b* that is adapted to fit in and along an end latching slot **29** of the tile member A. In addition, an under-face portion **25***c* of the clamp **25** (see FIGURES 2 and 3) is adapted to abut against an inwardly-offset upper portion **28** of the outer end face of the tile A. The clamp **25** is removably held in position by nut and bolt assemblies **26** which project through holes in side lugs **20***b* of an end-clamping portion **20***a* of the hanger casting **20**. It thus will be seen that when the clamp **25** is removed, the tile members of each row can be slid or moved longitudinally-outwardly of such row to replace members thereof, as desired.

As shown particularly in FIGURES 2, 3 and 8, each metal hanger **22** is of inverted U-shape and has a projecting hanger leg **22***a* of I-shape at one end thereof to fit along one longitudinal, open-end, centrally-disposed, side suspension slot or pocket **33** that lies along one face of the tile, and has an opposed projecting leg **22***b*, **22***c* of T-shape that is adapted to fit in and latch with a similarly-shaped, open-end, centrally-disposed, side suspension slot or pocket **32** of the tile member. As shown, portion **22***c* constitutes a latching portion that extends transversely of the end of the portion **22***b*. In this manner, I avoid a lever type of suspension, such as involved with the use of a corner or edge suspension which imparts a lever action to face-latching tongue and grooves of the tile members, and thus avoid setting-up damaging force action in the tile members and provide a tile-balancing, stronger type of suspension. The connecting body or arched top portion of each hanger **22** carries at each end a pair of rounded or roller-shaped side lugs or support fingers **22***d* that are adapted to span the bottom slotted portion of an associated hanger casting and ride along the inside of its box-like shape, see FIGURE 3. It will be apparent that the hanger **22** is thus suspended by a pair of spaced-apart portions adjacent its opposite ends for sliding movement along an associated hanger casting.

As shown particularly in FIGURES 1 and 2, the hangers **22** for the tile members A and B have their legs **22***b*

positioned rearwardly and the hangers **22** for the tile members C and D have their legs **22***b* positioned forwardly or, in other words, in a reverse relationship.

The tile members B and C are of the same construction, except that they are of slightly different length. The tile members A, as previously pointed out and, as shown the tile members D and G, have a special type of face on one side, but are otherwise of the same general construction as tile members B and C. The tile members H are of the same construction as the members C.

Referring particularly to FIGURES 4, 5 and 6, we have shown a tile member having opposite, substantially planar, wide side faces *a* and *b*, one face *a* of which carries a longitudinally-extending centrally-positioned, somewhat tree-shaped, latching tongue portion **34** disposed along its face and extending up to its T-shaped top suspension slot **32**. The other side face *b* has a complementary latching groove portion **35** which extends longitudinally and centrally along the block up to the I-shaped top suspension slot **33**. As shown particularly as to the block C, the slot **33** serves as a guide slot while the slot **32**, see brick B of FIGURE 3, serves as a pivot-latch suspension slot. It will be noted that the slot **32** has a transverse latching portion **32***a* to receive latching portion **22***c* of one of the hangers **22** (see FIGURES 3 and 4). The slots **32** and **33** are open to the outer or top ends *e* of the tile members and are positioned substantially centrally on the opposed side faces.

The latching tongue and groove portions **34** and **35** diverge towards the inner or lower ends *f* of the tile members and are adapted to interfit and latch with respect to each other when the tile members of a row are slid longitudinally into an assembled relationship, as indicated in FIGURE 7. Also, as shown in FIGURE 7, the tile members A and D have a latching groove portion **35** along their inner side faces, and the tile B as a pair of tongue portions **34**, while the tile C have tongue and groove portions **34** and **35** on their opposite faces. Each block or tile member has opposed narrow end faces *c* and *d* which are, in effect, corrugated or provided with alternate or staggered, transversely-extending slide-fitting, tongues and grooves **30** and **31**, with the tongues and grooves along one end of each block being staggered with those on the other or opposite end so that, as shown in FIGURES 3, 4, 5 and 7, the tile of adjacent rows may slidably fit or latch together for longitudinal sliding movement into and out of position in their respective longitudinal rows and for longitudinal sliding movement of tile members of one row with respect to tile members of adjacent rows. It is thus apparent in view of FIGURE 7, that the individual refractory block of each row interlatch with each other in a complementary fashion when they are slidably moved into an abutting relation, and that are adapted to slide endwise along the complementary corrugations or latching tongues and grooves of adjacent rows. As a result, an improved interlatched and substantially 100% sealed relationship is provided between the blocks in their assembled relationship; at the same time, I provide for easy positioning and replacement of the tile during the operation life of the furnace. It will be noted that longitudinal slide slots along the bottom or inside of each hanger casting **19**, **20** (**20***c* of casting **20**) and **23** is open at its back end, so that the individual hangers **22** and their associated tile members of each row may be slid longitudinally-backwardly or forwardly in and out when assembling and disassembling the tile rows. The bracket or heel member **25** closes the slot **20***c* when each apron tile row is assembled. Thus, each tile member may be easily swung into and out of position with respect to its hangers at the end of the hanger casting, such as **20**.

In FIGURE 1, I have shown an enclosed wind box **38** positioned between and defined by the beams **16** and **17** and as being supplied with cooling fluid by a wind manifold **39** and a pipe **40**. Cooling fluid or air may be thus

supplied from a remotely-positioned blower **41** under pressure to cool the outside of the back wall tile members and particularly, those members constituting nose and apron portions of the back wall construction **10**. The arrows of FIGURE 1 show the flow of cooling air under pressure downwardly from the window box **38**, between beams **16** and **17**, between transversely spaced hanger castings **20**, along the upper or outer ends of the tile members A, B, C and D, through the arches of hangers **22**, through throats defined between arms **19***a* and **19***b* of hanger casting **19** and the end of hanger castings **22**, up along the inside of beams **17** and **18**, between and along the inner sides of hanger castings **19** and **23**, through the arches of hangers **22**, along the outer ends of the refractory tile members G, H and I, and out into the atmosphere from the upper end of the wall part **13**. Transverse closure members, such as **42** and **43**, cooperate with the beam members **16**, **17** and **18** to seal-off and define the wind box **38** and define connected fluid-flow chambers behind the wall parts **12** and **13**. Angle-shaped transverse or back closure plate members **44** (see FIGURES 1, 2, 3 and 7) fit over a back bottom flange of the beam member **16** (under clamp **21**), have vertical portions that close-off the spacing between the hanger castings **20**, have back horizontal leg portions **44***a* to close-off an upper portion of the tile assembly, and have vertical back leg portions **44***b* to abut upper portions of outer side faces of the tile A and close-off the back end of the assembly. As shown particularly in FIGURE 9, a continuous angle-shaped side plate member **45** is adapted to be removably secured, as by cement, on transverse ends of the beam supports **16**, **17** and **18**. For this purpose, each end plate member **45** has clips or lugs **46** which engage over bottom flanges of the beam members **16** and **17** and clips or lugs **47** which engage webs and adjacent flanges of the beam members **17** and **18**. Opposed end plate members **45** thus abut ends of the beam supports, tile members of the outer side rows, and back closure members **42** and **43** to close-off the transverse sides of the fluid-flow chambers of the back wall **10**.

It will be noted that in my back wall construction or assembly, I employ hanger castings that extend longitudinally and define the refractory tile rows. These hanger castings slidably carry inverted U-shaped individual hangers **22** that directly suspend the refractory tile members from a bottom, longitudinal, T-shaped slotted portion in the box-like structure of the hanger castings. Each hanger casting is transversely-carried by flanges of transversely-extending I-beam support members for slidable movement longitudinally therealong. The wide side faces of the refractory tile members define the tile rows that are at right angles or perpendicular to the supporting beam members, as are the hanger castings. The arching-away of the body portions of the metal hangers **22** from the outer or upper ends of the tile members that are individually suspended thereby in a balanced relation and without the aid of the interlatching means of their planar side faces, provides cooling fluid passages between the hangers and the adjacent ends of the tile members. The complementary, staggered corrugations along the opposite edge faces of the tile members, when such members are assembled as longitudinal rows, provides a depthwise-latching relation between adjacent tile rows, longitudinally of such rows, parallel to the hanger castings, and at right angles to the support beams. It will be noted that the tile member rows, as assembled, have expansion joints, that the hanger castings are slidable on their support beams and that the metal hangers are slidable on their hanger castings to permit expansion and contraction without undue stress and strain upon the individual tile members.

What I claim is:

1. In a furnace back wall for suspension over a furnace charging bay, transversely-extending spaced-apart support beams providing a structural support for the back wall, longitudinally-extending spaced-apart hanger castings mounted for sliding movement along said support beams,

each hanger casting having a box-like shape in section and a bottom provided with a slotted portion longitudinally therealong, inverted U-shaped metal hangers each having a body portion adapted to extend into the slotted portion of one of said hanger castings and having side lugs adjacent opposite ends of said body portion to span the slotted portion and ride longitudinally along the bottom of said hanger casting, refractory tile members each being of substantially rectangular shape and having opposed substantially planar wide side faces and opposed relatively narrow edge faces extending between the side faces, each hanger having a pair of opposite legs extending from said body portion, one of said legs having a latching portion, each tile member having a pair of opposed suspension slot portions; one suspension slot portion being open to an outer end of the tile member, having a latching portion, and extending substantially centrally of one side face to receive said one leg and its latching portion of one of said hangers; the other suspension slot of the tile member being also open to the outer end thereof and extending substantially centrally of its other side face to receive the other leg portion of said one hanger, so that the tile member will be suspended at its outer end from said one hanger independently of other tile members, said tile members being suspended by said hangers as longitudinal tile rows along each of said hanger castings with the tile members of each row having their planar side faces in an abutting relation and having their edge faces in longitudinal alignment along the row, means interlatching the planar side faces of the tile members of each tile row in a face abutting relation with respect to each other within the row, and means interlatching the edge faces of the tile members of each tile row with the edge faces of adjacent tile rows for guided-sliding movement of the tile members of each row longitudinally-endwise with respect to the tile members of adjacent rows.

2. A furnace back wall as defined in claim 1 wherein said means interlatching the edge faces of the tile members of adjacent rows comprises transverse corrugations along the edge faces of one tile row and staggered complementary transverse corrugations along the edge faces of adjacent tile rows, such that the tile members of one tile row are slidable longitudinally of the tile row with respect to tile members of adjacent tile rows.

3. A furnace back wall as defined in claim 1 wherein said means interlatching the planar side faces of the tile members of each tile row comprises a somewhat tree-shaped centrally-disposed latching groove portion along one planar side face of each tile member and a complementary latching tongue portion along the opposite planar side face of each tile member.

4. A furnace back wall as defined in claim 1 wherein said tile member rows as assembled have expansion joints, and said hangers are slidable along associated hanger castings and said hanger castings are slidable along said support beams when the assembled tile members expand under the influence of furnace heat.

5. In a furnace wall for a suspended back wall and in which a refractory group of tile members is actively-cooled on its outer side and consists of adjacent longitudinal rows of refractory tile that are each carried by hangers on a longitudinal metal hanger member in a suspended and endwise-slidable relationship therefrom, and each tile member is carried on the hangers for longitudinally-endwise slide-in mounting with adjacent tile members of the same row, a refractory tile construction and assembly for the group that provides for positive interlatching of the tile members with respect to each other along each row and for a longitudinally-slidable latching engagement of adjacent tile member rows with respect to each other comprising, refractory tile members each having a pair of substantially planar opposed wide side faces with latching face portions thereon, one side face having a centrally-disposed and longitudinally converging and projecting latching tongue portion, the other opposed side face having a centrally-disposed and longitudinally converging and projecting inset latching groove portion that is complementary with said latching tongue portion, each tile member having a pair of opposed narrower edge faces connecting said opposed side faces and each edge face having alternate tongues and grooves extending transversely between the opposed side faces, the tongues and grooves of one edge face of each tile member being staggered with respect to the tongues and grooves of the opposed edge face thereof, the refractory tile members of each row of the group being assembled with the latching tongue portion and the planar face of one side face of one tile member in a complementary abutting and interlatching relation with the latching groove portion and the planar face of the opposed side face of adjacent tile members of the same row and with the tile members of each row having the same edge faces in longitudinal alignment along one longitudinal side thereof and having the same opposed edge faces in longitudinal alignment along an opposite longitudinal side thereof, and with the transversely extending tongues and grooves of the tile members along the one longitudinal side of one row being in a depthwise-latching and longitudinally-endwise slidable and guided relation with an opposite longitudinal side of an adjacent row.

6. A furnace wall as defined in claim 5 wherein each refractory tile member has opposed outer-end latching-slot portions in a balanced suspension-engagement individually by one of the metal hangers.

7. A furnace wall as defined in claim 5 wherein the latching tongue and groove portions of each tile member are of a somewhat pyramidal shape.

8. A furnace wall as defined in claim 5 wherein, the tongues and grooves of the edge faces of each tile member are provided along the full extent of their edge faces and are open to opposed side faces thereof, whereby each tile member row defines longitudinally-continuous tongues and grooves along each of its longitudinal sides that are longitudinally-slidable with respect to the tongues and grooves of the tile members of adjacent rows.

9. In a glass furnace back wall for an open back end of a melting chamber of the furnace and for an open top of a backwardly extending dog house of the furnace, the back wall having a suspended vertical wall part to close-off the open back end of the furnace and having a suspended backwardly-projecting apron wall part to partially close-off the open top of the dog house of the furnace, in which the vertical wall part has adjacent longitudinal rows of refractory tile members with the tile members of each row carried by engaging metal hangers on upright longitudinal metal hanger members to project vertically-downward of the furnace, the apron wall part has adjacent longitudinal rows of refractory tile members with the tile members of each row carried by engaging metal hangers on a substantially horizontally-positioned longitudinal metal hanger member to project downwardly therefrom, the refractory tile members of each row of the wall parts are carried on the hangers for longitudinal-endwise slide-in mounting with adjacent tile members of the same row, and refractory nose tile are carried at adjacent end portions of the vertical and apron wall parts; a refractory tile construction and assembly of each wall part that provides for positive slide-in interlatching of the refractory tile members with respect to each other longitudinally-endwise along each row and for a longitudinal-endwise slide-in latching relationship of the tile members of each row into and out of position with respect to the tile members of adjacent rows of the same wall part comprising, refractory tile members each having a pair of substantially planar opposed wide side faces with latching face portions thereon and having a pair of substantially cross-corrugated opposed narrow edge faces, each refractory tile member having a centrally-disposed and longitudinally extending outwardly-projecting latching tongue portion on one of its side faces

and having a centrally-disposed and longitudinally-extending indented groove portion on its opposed side face that is complementary with said latching tongue portion, the refractory tile members of each wall part being assembled as adjacent longitudinal brick rows with the latching tongue portion of the side face of the tile members of each row engaging within the latching groove portion of the opposite side face of adjacent tile members of the same row and with their planar side faces being in close abutment, whereby the tile members of each row are in an interlatching relationship with respect to each other along each row against depthwise and transverse movement with respect to each other, the corrugations of the edge faces of each tile member of each row having alternate tongues and grooves extending transversely between its opposed side faces and open thereto and with the tongues and grooves of one edge face of each tile member being staggered with the tongues and grooves of the opposed edge face of the same tile member, the tile members of each row of each wall part being assembled with their edges faces of the same alignment of tongues and grooves in continuous aligned progression longitudinally along each side of the same row and with the tongues and grooves along the sides of the same row in a complementary depthwise-interlatching and longitudinally-endwise slidably-guided relation with the tongues and grooves of adjacent rows.

10. A refractory tile member for a furnace construction, said tile member having a substantially rectangular body with relatively wide substantially planar opposed side faces and relatively narrow opposed edge faces, hanger-receiving suspension-slot portions extending from an outer end of said body substantially centrally along said opposed side faces, pyramidal-shaped complementary latching tongue and groove portions along said opposed side faces that diverge towards an inner end of said body, so that tile members of the defined construction may be assembled with their opposed side faces in a latching relation to define a tile row wherein their opposed edge faces are in longitudinal alignment along the row, corrugations extending transversely across said edge faces between said opposed side faces, and the corrugations on one of said edge faces being staggered in a complementary manner with the corrugations on the other edge face, so that adjacent tile members may be guidably-slid along their edge faces with respect to each other with their corrugations in an interlatching relation.

11. In a furnace back wall for suspension over a furnace charging bay, transversely-extending spaced-apart support beams providing a structural support for the back wall, longitudinally-extending spaced-apart hanger castings mounted for sliding movement along said support beams, each hanger casting having a box-like shape in section and a bottom provided with a slotted portion longitudinally therealong, inverted U-shaped metal hangers each having a body portion adapted to extend into the slotted portion of one of said hanger castings and having side lugs adjacent opposite ends of said body portion to span the slotted portion and ride longitudinally along the bottom of said hanger casting, refractory tile members each being of substantially rectangular shape and having opposed substantially planar wide side faces and opposed relatively narrow edge faces extending between the side faces, each hanger having a pair of opposite legs extending from said body portion, one of said legs having a latching portion, each tile member having a pair of opposed suspension slot portions; one suspension slot portion being open to an outer end of the tile member, having a latching portion, and extending substantially centrally of one side face to receive said one leg and its latching portion of one of said hangers; the other suspension slot of the tile member being also open to the outer end thereof and extending substantially centrally of its other side face to receive the other leg portion of said one hanger, so that the tile member will be suspended at its outer end from said one hanger independently of other tile members, said tile members being suspended by said hangers as longitudinal tile rows along each of said hanger castings with the tile members of each row having their planar side faces in an abutting relation and having their edge faces in longitudinal alignment along the row, means interlatching the planar side faces of the tile members of each tile row in a face abutting relation with respect to each other within the row, means interlatching the edge faces of the tile members of each tile row with the edge faces of adjacent tile rows for guided-sliding movement of the tile members of each longitudinally-endwise with respect to the tile members of adjacent rows, closure members cooperating with adjacent pairs of said support beams to define a central wind box therebetween and connecting cooling fluid circulating chambers behind the outer ends of the tile members of said tile rows, and means connected to said wind box to supply cooling fluid under pressure thereto and to the connected fluid circulating chambers.

12. In a furnace back wall as defined in claim 11 wherein the body portions of said metal hangers are arched away from the tile members suspended thereby to define cooling fluid passageways.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,139,846 July 7, 1964

Levi S. Longenecker

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 9, line 21, for "edges" read -- edge --; column 10, line 34, after "each" insert -- row --.

Signed and sealed this 1st day of December 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents