Oct. 2, 1962 J. W. HOSBEIN ET AL 3,056,362

ROOF OR WALL TILE

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Fig. 1

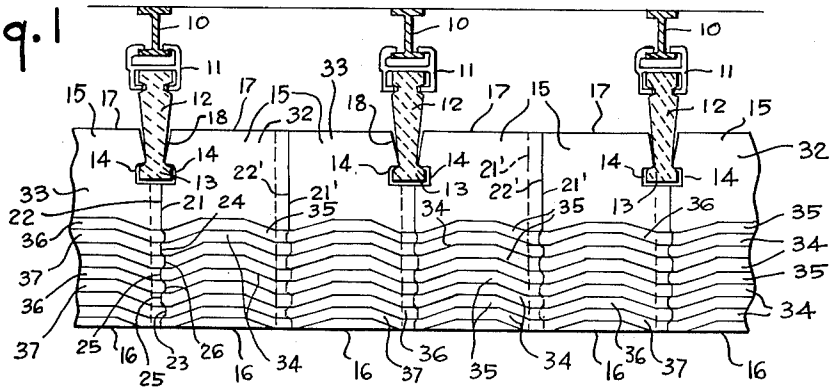


Fig. 2

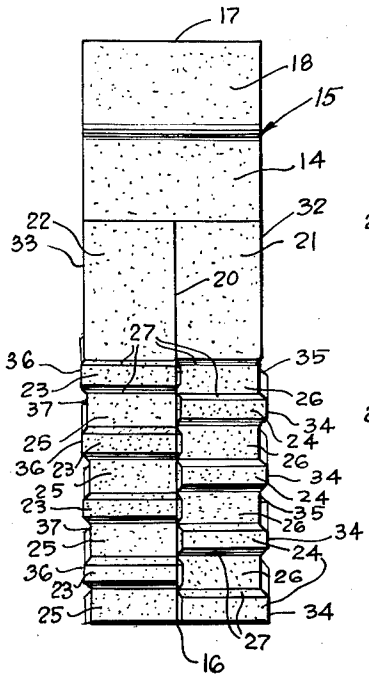
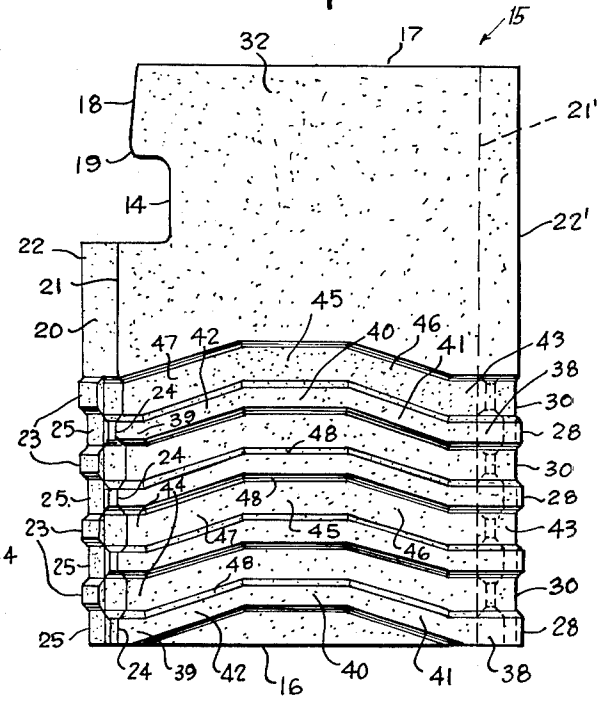


Fig. 3



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Fig. 4

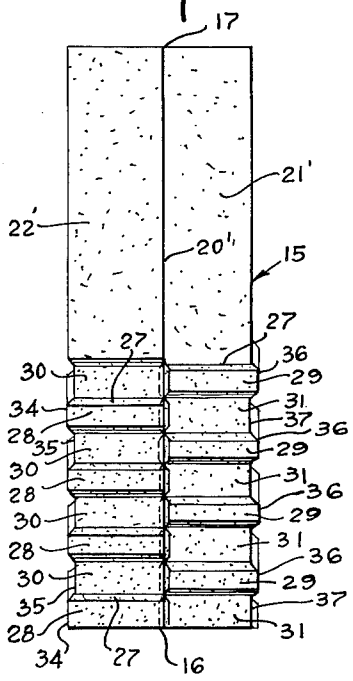


Fig. 5

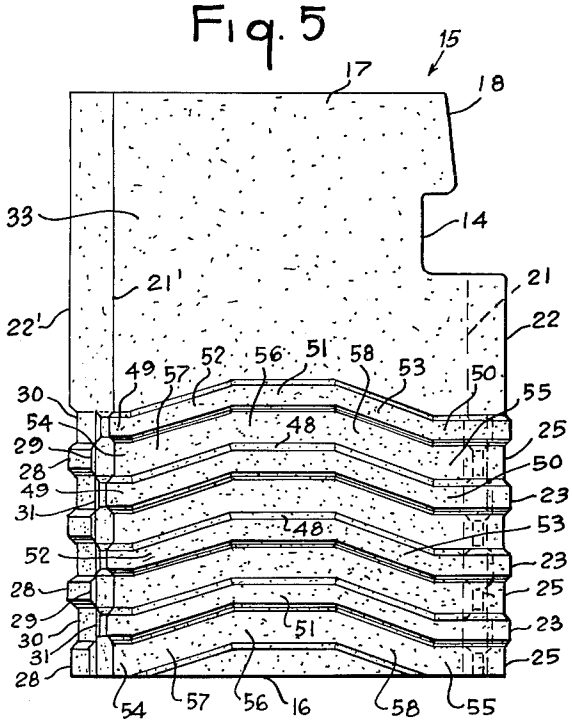


Fig. 6

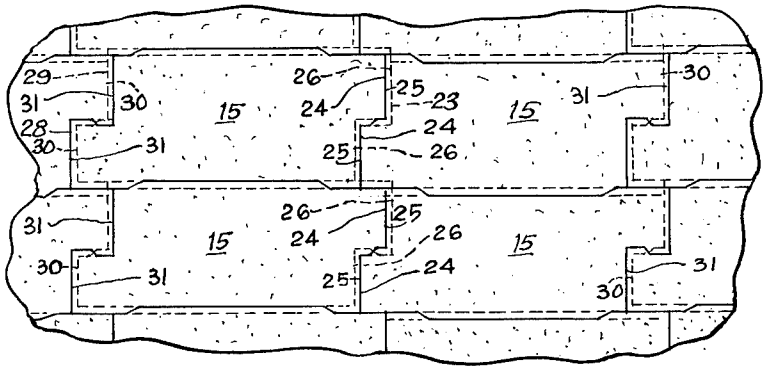
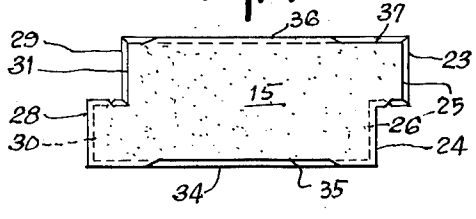


Fig. 7



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ROOF OR WALL TILE

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Fig. 8

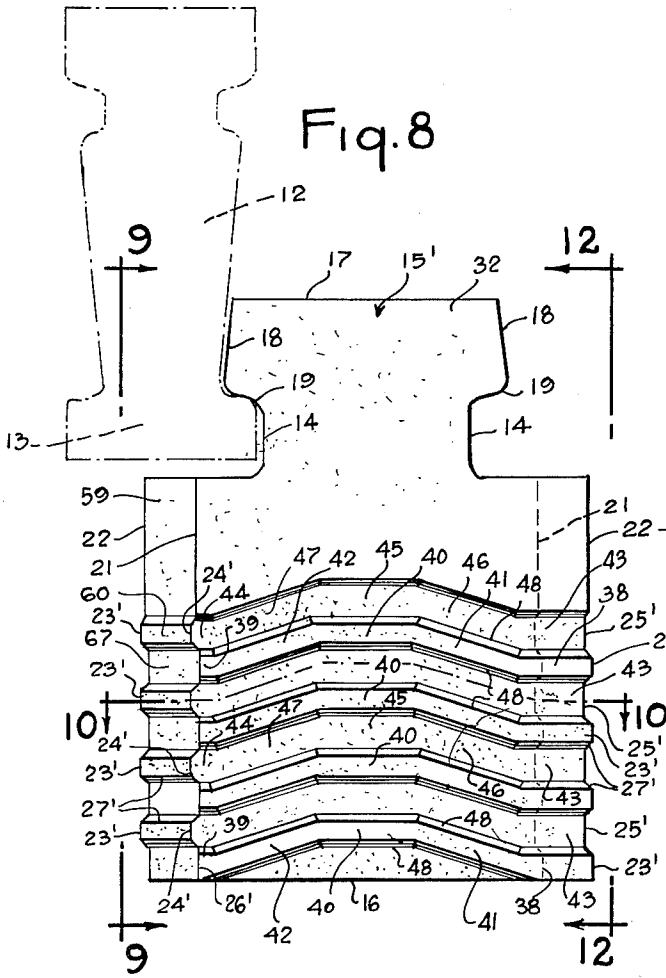


Fig. 9

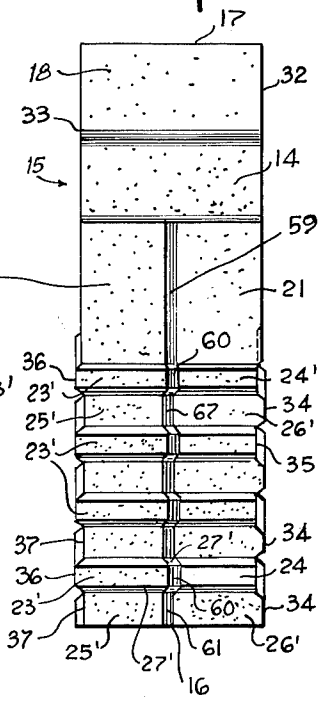
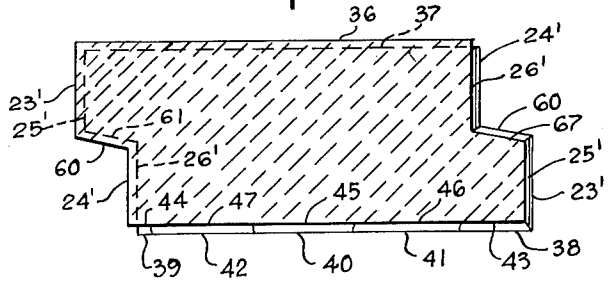


Fig. 10



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Fig. 11

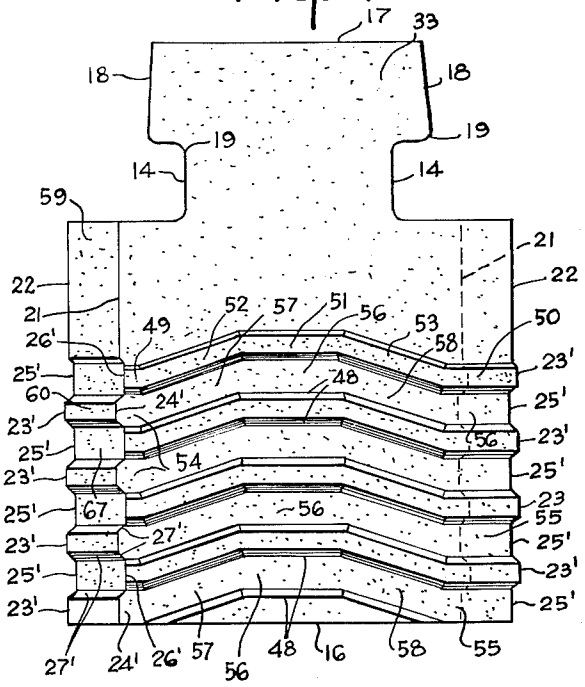


Fig. 12

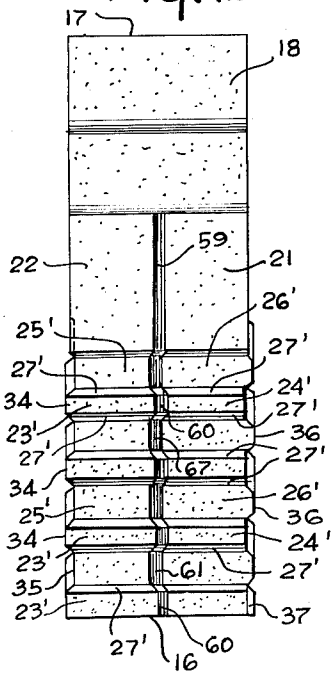


Fig. 13

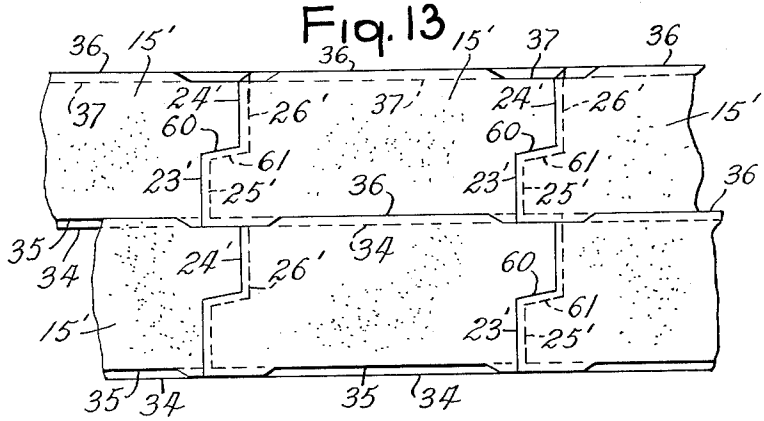
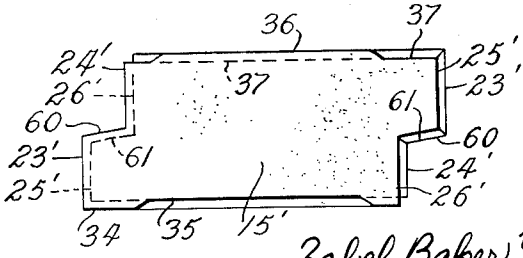


Fig. 14



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3,056,362
ROOF OR WALL TILE

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Filed Dec. 17, 1959, Ser. No. 860,144
11 Claims. (Cl. 110—99)

Our invention relates to refractory tiles, and more particularly to a refractory roof or wall tile that is of greater width than thickness to provide a pair of wide side faces and a pair of narrow side faces thereon.

It is the principal purpose of our invention to improve interlocking wall or roof tiles so as to reduce the likelihood of spalling thereof and to reduce air leakage into the furnace wall or roof and gas leakage from the furnace through said wall or roof.

It is a further purpose of our invention to provide a roof or wall tile of the above referred to character, that has an offset joint between the narrow side faces of the tiles to thus provide for broken joints between the tiles in the direction of the length of a row thereof.

More specifically our invention comprises a refractory tile that has a ribbed and grooved portion having alternating ribs and grooves that extend transversely across the wide side faces of the tiles, with the ribs on one wide side face opposite the grooves in the other wide side face so that ribs and grooves will interfit or intermesh, and in which each of the ribs and grooves have portions out of longitudinal alignment with each other so as to reduce the possibility of spalling of the tiles on transverse lines, which would be horizontal lines in a roof tile and vertical lines in a wall tile.

Further, in order to reduce the seepage of gas from the furnace through the roof or wall, or the entrance of air into the furnace through the roof or wall, said ribs and grooves are continuous along said wide side faces of said tile, each rib or groove comprising parallel portions that are out of longitudinal alignment and a pair of oppositely inclined portions connecting said out of alignment parallel portions.

In order to additionally provide for a better seal between the adjacent wall or roof forming tiles, the wide side faces of said tiles are provided with planar portions that are adapted to lie in face to face engagement in the wall or roof and the narrow side faces are provided with planar portions and ribbed and grooved portions, the planar portions being on the outer end faces of said tiles and the ribbed and grooved portions being on the inner ends thereof. By providing a recess for receiving a hanger bracket in only one of said narrow side faces, a continuous face to face engagement is provided between the narrow side faces of said wall or roof tiles that are opposite the recessed faces, thus providing a better seal than where such recesses are provided in both narrow side faces of the wall or roof forming tiles.

In order to provide a better seal between the adjacent tiles lengthwise of the row and to hold the same in better alignment each of said narrow side faces is offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of the narrow side faces being opposite the receding portion of the other narrow side face, with the grooves in the receding portion of each narrow side face in alignment with the ribs on the protruding portion of said narrow side face. Thus the roof or wall forming refractories can be mounted on refractory hanger members, in rows that extend lengthwise of the hanger members in pairs facing oppositely, that is, with the hanger receiving recesses on the right and left sides of said roof or wall forming tiles, and all of the ribs and grooves in the wide side faces of said tiles will

interfit. Similarly, the grooves and ribs in the protruding and receding narrow side faces of the tiles will interfit in the rows that extend transversely of the length of the refractory hanger members.

Instead of providing a hanger bracket receiving recess in only one of the narrow side faces of the tile, such hanger bracket recesses can be provided in both narrow sides of said tiles if this is desired. When such recesses are provided in both narrow sides of the tiles there is no necessity of turning the adjacent tiles through 180°, as is necessary to properly assemble the tiles relative to each other in the form of the invention utilizing only the single recess for the reception of the hanger bracket.

In view of the fact that this reversal of the position of the tiles in a row is not necessary in this last mentioned form of the invention, it is possible to provide for an arrangement of the alternating ribs and grooves in the narrow side faces of the tiles whereby the ribs continue entirely across said narrow side faces and the grooves extend similarly entirely thereacross. Thus there will be a rib on the projecting portion of each narrow side face in horizontal alignment with a rib on the receding face at said narrow side and a groove in horizontal alignment with a groove on the other narrow side opposite said ribs. There is an advantage in this, in that the seal between the grooved and ribbed portions is more perfect if the grooves and ribs continue entirely across the narrow side faces than if a rib is horizontally opposite a groove, as in the form of the invention in which a single hanger receiving recess is provided in each tile.

Other objects and advantages of our invention will appear as the description of the drawings proceeds. We desire to have it understood, however, that we do not intend to limit ourselves to the particular details shown or described, except as defined in the claims.

In the drawings:

FIG. 1 is a vertical sectional view through a fragmentary portion of a furnace roof, showing our improved roof or wall forming tiles mounted in position therein.

FIG. 2 is an elevation on an enlarged scale of one of said tiles as viewed from the recessed side thereof.

FIG. 3 is a side elevational view of the tile shown in FIG. 2 as viewed from the right of FIG. 2.

FIG. 4 is an elevation of the tile shown in FIG. 2 as viewed from the narrow side thereof that is not recessed.

FIG. 5 is a side elevational view of the tile shown in FIG. 2 as viewed from opposite side thereof to FIG. 3.

FIG. 6 is a bottom plan view of a fragmentary portion of the wall shown in FIG. 1 on an enlarged scale.

FIG. 7 is an end view of one of the tiles shown in FIG. 6 as viewed from the inner or heat exposed end thereof.

FIG. 8 is a view in side elevation of a slightly modified form of tile, showing a hanger bracket in engagement therewith in dotted lines.

FIG. 9 is an elevation of the tile as viewed from the line 9—9 of FIG. 8.

FIG. 10 is a section taken on the line 10—10 of FIG. 8.

FIG. 11 is a side elevation of the tile shown in FIG. 8 as viewed from the side thereof opposite that shown in FIG. 8.

FIG. 12 is an elevation taken on the line 12—12 of FIG. 8.

FIG. 13 is a bottom plan view of a fragmentary portion of a wall utilizing the tile shown in FIG. 8, and

FIG. 14 is an end view of one of the tiles shown in FIG. 13 as viewed from the inner or heat exposed end thereof.

Referring in retail to the drawings, in FIG. 1 is shown a furnace roof that is mounted on a metallic frame-

work having frame members 10 on which metal brackets 11 are mounted, from which the refractory hanger members 12 extend, said refractory hanger members being hung from the metal brackets 11 and having heads 13 thereon that are received in sockets or recesses 14 in the wall or roof forming refractories 15. The wall or roof forming refractories 15 are all alike and are assembled in alternating reversed positions in the wall or roof. That is, each refractory member 15 of a row, such as that shown in FIG. 1, is reversed 180° from the refractory member 15 adjacent thereto. Said refractory wall or roof forming members 15 are of a generally rectangular character, having flat inner and outer end faces 16 and 17 that extend parallel to each other and wide and narrow side faces that extend perpendicularly to the inner and outer end faces 16 and 17. The faces 16 and 17 are referred to as inner and outer end faces because of the fact that whether the refractory members 15 are mounted in a roof or wall, said faces will be on the inner and outer sides of the wall, respectively. In other words, the faces 16 will be the heat exposed faces of the refractory members 15.

One narrow side wall of each of said refractory members 15 is provided with the recess 14 and will be referred to hereinafter as the recessed side face of the wall or roof forming refractory tile. Said face has a planar portion 18, which extends at an oblique angle toward the outer end face 17 from the recess 14, and a curved wall portion 19 connects said planar portion 18 with the walls of the recess 14. Toward the inner end of the said recessed side wall, from the recess 14, the said narrow side wall is offset midway between the longitudinal edges thereof, said offset being indicated by the numeral 20. Thus a receding wall portion 21 and a protruding wall portion 22, that are flat faced or planar, are provided on opposite sides of the offset 20 immediately adjacent the recess 14, the protruding portion being on the left of the narrow side face as viewed in FIG. 2. Said side face is offset similarly from said recess 14 to the inner end face 16 of said tile, but the portion lying inwardly beyond the planar faced portions 21 and 22 is alternately ribbed and grooved, the ribs on the protruding portion being indicated by the numeral 23 and the ribs on the receding portion being indicated by the numeral 24, while the grooves in the protruding portion are indicated by the numeral 25 and the grooves in the receding portion are indicated by the numeral 26. All of the ribs 23 and 24 and all of the grooves 25 and 26 are parallel to each other, and it will be noted that each rib 23 has a groove 26 in transverse alignment therewith and that each rib 24 has a transverse groove 25 in alignment therewith. The bottoms of the grooves 25 and 26 and the crests of the ribs 23 and 24 are connected by beveled wall portions 27.

Referring now to FIG. 4, the narrow side face of the tile 15 opposite that shown in FIG. 2, is shown therein. said side face may be referred to as the planar or unrecessed face to distinguish from the recessed face shown in FIG. 2. The said narrow side face has a planar portion comprising a protruding portion 22' and a receding portion 21', which lie on opposite sides of the offset 20' and extend from the ribbed portion of the said end face to the outer side face 17 of the tile. When the tiles 15 are assembled in the roof or wall the recessed narrow side faces are directed toward each other. It will be noted that the socket or recessed portion 14 extends all the way across the tile and intersects both the protruding face 22 and the receding face 21, the portion of the socket in the receding face 21 being shallower than that in the protruding face 22, as will be obvious from FIGS. 1 and 3.

The portion of the planar or unrecessed face of the tile that is nearest the inner or heat exposed end 16 thereof is ribbed and grooved in the same manner as the recessed face. The ribs on the protruding portion of the unrecessed face are indicated by the numeral 28 and the ribs on the receding portion of said narrow side face are indicated by the numeral 29, while the grooves in the protruding portion are indicated by the numeral 30 and the grooves in the receding portion are indicated by the numeral 31. The ribs and grooves have the same relationship in this face of the tile as in the recessed face and are provided with the inclined or beveled connecting wall portions 27 previously described. It will be obvious that the planar or flat faced portions 21, 22 and 21' and 22' lie midway between the crests of the ribs and the bottoms of the grooves in the said portions of the narrow side faces on which they are provided.

Referring to FIGS. 1 and 6, it will be noted that when the refractory wall or roof forming tiles 15 are assembled with the hanger members 12 the socketed or recessed side faces of the wall or roof forming tiles will be toward each other, while those that do not have any sockets will be toward each other, the arrangement of socketed and unsocketed end faces facing each other alternating in the row shown in FIG. 1. With the wall forming tiles in this position, the ribs 23 on the projecting face of one of the tiles 15 will be seated in the grooves 26 of the receding portion of the tile opposite the same and the ribs 24 on said receding portion will be seated in the grooves 25 of the projecting portion of the tile opposite the same.

At the opposite narrow side faces of the tiles, that do not have any sockets or recesses therein, the ribs 28 on the projecting portion of one tile seat in the grooves 31 of the receding portion of the other tile, while the ribs 29 of said receding portion seat in the grooves 30 of the projecting portion of the opposite tile. The flat or planar wall portion 22' on the projecting portion of one tile seats against the planar or flat wall portion 21' on the receding portion of the other tile, while the offset portions 20' of the tiles are in engagement with each other, thus providing a very effective seal at this joint.

The wide side faces of the tiles 15 have planar or flat portions extending from the outer ends 17 of the tiles, the one planar face being indicated by the numeral 32 and the opposite planar face parallel thereto by the numeral 33. The inner ends of each of the wide side faces of the tiles are provided with ribbed and grooved portions, the ribs and grooves alternating, and said ribs and grooves extend from the inner heat exposed ends 16 of said tiles to the plane faced portions 32 and 33. When the tiles are arranged in the wall as shown in FIG. 1, the plane faces 32 and 33 alternate along the row, that is, each tile is reversed with respect to the adjacent one.

The ribs on the side face of the tile having the flat face 32 are indicated generally by the numeral 34 and the grooves alternating therewith generally by the numeral 35, while the ribs on the opposite faces of the tiles are indicated by the numeral 36 and the grooves alternating therewith by the numeral 37.

Each of the ribs 34 has parallel end portions 38 and 39 that are in longitudinal alignment with each other and a portion 40 that is parallel to the portions 38 and 39, but out of longitudinal alignment therewith or offset laterally from the portions 38 and 39. Connecting the portions 38 and 39 of said ribs with the portion 40 are oppositely inclined obliquely extending rib portions 41 and 42. Said ribs 34 are continuous from the end portion 38 thereof to the end portion 39 thereof and thus form a continuous undulating rib that may be referred to as of a herringbone shape. The grooves 35 have parallel end portions 43 and 44 that lie between the portions 38 and 39 of the ribs and which are in longitudinal alignment with each other and grooved portions 45 that are parallel with the grooved portions 43 and 44, but offset therefrom so as to be out of longitudinal alignment therewith. The grooved portions 43 and 44 are connected with the grooved portions 45 by oppositely inclined grooved portions 46 and 47, said grooves 35 being continuous across the side face of the tile. Beveled wall

portions 48 connect the crests of the ribs with the bottoms of the grooves.

The ribs 36 are of a similar character to the ribs 34 and the grooves 37 are of a similar character to the grooves 35. Thus the ribs 36 have straight end portions 49 and 50 that are in alignment with each other and a portion 51 parallel thereto, that is offset from the portions 49 and 50 and is connected therewith by means of the inclined rib portions 52 and 53. The grooves 37 have straight end portions 54 and 55 that are in alignment with each other and portions 56 that are parallel thereto but offset therefrom, and said portions 56 are connected with the portions 54 and 55 by oppositely inclined groove portions 57 and 58. Beveled or inclined wall portions 48 connect the crests of the ribs with the bottoms of the grooves.

Upon reference to FIGS. 3 and 5, it will be noted that when two of the tiles 15 are located in side by side relation with the socket portions 14 thereof facing in the same direction the rib portions 51 of one tile will be seated in the grooves 45 of an adjacet tile, the rib portions 52 will be seated in the grooves 46 and the rib portions 53 will be seated in the grooves 47, while the rib portions 50 will be seated in the groove portions 44 and the rib portions 49 will be seated in the groove portions 43. Similarly, the rib portions 40 will be seated in the groove portions 56, the rib portions 42 will be seated in the groove portions 58, the rib portions 41 in the groove portions 57, the rib portions 38 in the groove portions 54 and the rib portions 39 in the groove portions 55. Thus the ribbed and grooved portions of the adjacent tiles 15 in the direction of the length of the hanger members 12 will have the ribs and grooves so interfitting that the adjacent faces of the tiles will intermesh. Furthermore, due to the fact that such intermeshing exists and that the ribs and grooves are continuous, there are no openings between the ends of ribs such as have existed in older constructions, through which some leakage of gas or air might have occurred. In addition to that, since the portions of the ribs and grooves that extend transversely of the tiles, such as the portions 38, 39, 40, 43, 44 and 45, do not extend in a straight line across the tiles, any weakened portion that might cause horizontal spalling off of a layer of the tile is avoided. Furthermore, by providing the engaging flat faces 21, 22, 21' and 22', a tight seal is provided at the joints at which no hanger members are used. This also greatly increases the air and gas tightness of the wall or roof. Due to the projecting and receding narrow side wall portions an offset is provided in these cooperating walls, that further aids in providing a gas and air tight construction and aids in aligning the rows of tiles, such as that shown in FIG. 1.

In FIGS. 8 to 13 inclusive, a modified form of tile is shown which can be mounted on a framework in the same manner as that shown in FIG. 1 by means of refractory hanger members 12 having heads 13 thereon that are received in sockets or recesses 14 in both narrow side walls of the wall or roof forming refractories 15'. The wall or roof forming refractories are all alike and are all assembled in the same position in the wall or roof, that is, no reversal thereof, such as in the form of the invention shown in FIGS. 1 to 7, is necessary. The wall or roof forming members 15' are of a generally rectangular character having flat inner and outer faces 16 and 17, that extend parallel to each other, and wide and narrow side faces that extend perpendicularly to the inner and outer end faces 16 and 17.

Each of the narrow side faces of each of said refractory members 15' is provided with a planar portion 18, which extends at an oblique angle toward the outer end face 17 from the recesses 14, and a curved wall portion 19 that connects said planar portion 18 with the wall of the recess 14. Toward the inner narrow side of said end wall from the recess 14 each wall is offset midway between the longitudinal edges thereof, said offset being indicated by the numeral 59 and extending at an oblique angle to the receding wall portion 21 and the protruding wall portion 22 of each of said narrow side faces, the protruding portion being on the left of the narrow side faces as viewed in FIGS. 9 and 12. Said narrow side faces are offset similarly from the recesses 14 to the inner end face of the tile, but the portion of each narrow side face lying inwardly toward the planar faced portions 21 and 22 is alternately ribbed and grooved. The ribs on the protruding portions are indicated by the numeral 23' and the ribs on the receding portions by the numeral 24', while the grooves on the protruding portions are indicated by the numeral 25' and the grooves on the receding portions by the numeral 26'.

It will be noted upon reference to FIGS. 8, 10 and 11 that the grooves 25' are opposite the ribs 24' and that the grooves 26' are opposite the ribs 23', and upon reference to FIGS. 9 and 12, that the ribs 23' and 24' and the grooves 25' and 26' are horizontally aligned in the two portions of the narrow side faces. The bottoms of the grooves 25' and 26' and the crests of the ribs 23' and 24' are connected by beveled wall portions 27'. It will further be noted that when the tiles are assembled as shown in FIG. 13 the rib portions 23' and 24' of one tile will seat in the groove portions 26' and 25' of the next adjacent tile in the row. Also it will be noted that the ribs 23' and 24' are connected by means of rib portions 60 extending across the obliquely extending wall of the offset 59 and that grooves 61 alternate with the ribs 60 in said inclined wall portion. Thus there is an interfitting rib and groove connection provided between the narrow side faces of adjacent tiles longitudinally of the row throughout said ribbed and grooved portions thereof including the offset portions.

Each of the ribs thus is continuous across the narrow side face on which it is provided, each rib being made up of a portion 23', 60 and 24', while each groove is made up of a portion 25', a portion 61 and a portion 26'. The grooves 60 and 61 are provided with beveled connecting wall portions 27' in the same manner as the ribs 23' and the grooves 25' and ribs 24' and grooves 26'.

The wide side faces of the tiles 15' have planar or flat portions extending from the outer ends 17 of the tiles, these being indicated by the numerals 32 and 33, as in the form shown in FIGS. 1 to 7 inclusive. The inner ends of each of the wide side faces of the tiles are provided with ribbed and grooved portions, the ribs and grooves alternating and extending from the inner heat exposed ends 16 of the tiles to the plane faced portions 32 and 33. The ribs on the wide side faces of the tiles are indicated generally by the same numerals as in the form of the invention shown in FIGS. 1 to 7, and since said grooves and ribs are similarly related and of substantially the same character as the ribs and grooves shown in FIGS. 1 to 7, the same reference numerals are applied to the parallel end portions, the mid-portions and the inclined portions connecting them, as in the forms shown in FIGS. 1 to 7 inclusive.

When two of the tiles 15' are located in side by side relation, the same are so arranged that the ribs on one wide side of the tiles will fit in the grooves of the wide side of the tile adjacent thereto in the same manner as the ribs and grooves in the wide side faces of the tiles 15 interfit. Accordingly the joints between the wide sides of the tiles 15' are of the same character as the joints between the wide sides of the tiles 15 and the only variation between the form of the invention shown in FIGS. 8 to 13 from that shown in FIGS. 1 to 7 inclusive, is in the narrow side portions of the tiles.

What we claim is:

1. A refractory tile having inner and outer ends parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and

grooves extending continuously transversely across said side faces, each of said ribs and grooves having portions out of longitudinal alignment with each other and said tiles having narrow-side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, one of said narrow faces having an attaching recess therein and the other narrow face having flat sealing faces extending continuously from said ribbed and grooved portions to the outer end of said tile.

2. A refractory tile having inner and outer ends parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending continuously transversely across said side faces in parallelism, each of said ribs and grooves having portions out of longitudinal alignment with each other, the ribs on one of said side faces being opposite the grooves on the side face opposite thereto, and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, one of said narrow faces having an attaching recess therein and the other narrow face having flat sealing faces extending continuously from said ribbed and grooved portions to the outer end of said tile, the ribs and grooves extending transversely of said protruding and receding portions and the grooves in said receding portions aligning transversely of said narrow faces with the ribs on the protruding portions adjacent thereto.

3. A refractory tile having inner and outer ends parallel wide side faces each having a planar outer portion and a ribbed and grooved inner portion having alternating ribs and grooves extending transversely across said side faces, each of said ribs and grooves having portions out of longitudinal alignment with each other and said tiles having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding narrow side face portion and a receding narrow side face portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, said planar portions being located outwardly from said grooved and ribbed portion, one of said narrow faces having an attaching recess in the planar portion thereof extending across both said receding and protruding portion thereof, and the other narrow face having flat sealing faces extending continuously from said ribbed and grooved portions to the outer end of said tile.

4. A refractory tile having parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending continuously transversely across said side faces in parallelism, each of said ribs and grooves having parallel portions out of alignment wtih each other and inclined portions connecting said parallel portions and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, one of said narrow faces having an attaching recess therein.

5. A refractory tile having parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending continuously transversely across said side faces in parallelism, each of said ribs and grooves having parallel portions out of longitudinal alignment with each other and oppositely inclined portions connecting said parallel portions and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, one of said narrow faces having an attaching recess therein.

6. A refractory tile having inner and outer ends parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending transversely across said side faces, each of said ribs and grooves having portions out of longitudinal alignment with each other and said tile having narrow side faces extending prependicularly to said wide side faces and each offset midway across the same to provide a protruding narrow side face portion and a receding narrow side face portion, the protruding portion of each of said end faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, one of said narrow faces having an attaching recess therein and the other narrow face having offset flat sealing faces extending continuously from said ribbed and grooved portions to the outer end of said tile, said narrow face provided with said attaching recess having a flat faced portion extending from said recess to the outer end of said tile at an oblique angle to said protruding and receding portions of said narrow faces.

7. A refractory tile having parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending transversely across said side faces, each of said ribs and grooves having portions out of longitudinal alignment with each other and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding narrow side face portion and a receding narrow side face portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, said tile being provided with means for attaching the same to a hanger tile.

8. A refractory tile having parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending continuously transversely across said side faces in parallelism, each of said ribs and grooves having parallel portions out of longitudinal alignment with each other and oppositely inclined portions connecting said parallel portions and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, said tile being provided with means for attaching the same to a hanger tile.

9. A refractory tile having inner and outer ends parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending transversely across said side faces, each of said ribs and grooves having portions out of longitudinal alignment with each other and said tiles having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the

same to provide a protruding narrow side face portion and a receding narrow side face portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, each of said narrow faces having an attaching recess therein and a flat faced portion extending from said recess to the outer end of said tile at an oblique angle to said protruding and receding portions of said narrow faces.

10. A refractory tile having inner and outer ends parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending continuously transversely across said side faces in parallelism, each of said ribs and grooves having parallel portions out of longitudinal alignment with each other and oppositely inclined portions connecting said parallel portions and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion, each of said end faces having an attaching recess therein and a flat faced portion extending from said recess to the outer end of said tile at an oblique angle to said protruding and receding portions of said narrow faces.

11. A refractory tile having parallel wide side faces each having a planar portion and a ribbed and grooved portion having alternating ribs and grooves extending continuously transversely across said side faces in parallelism, each of said ribs and grooves having end portions in transverse alignment with each other, a mid-portion extending parallel to said end portions out of alignment with said end portions and inclined portions connecting said mid-portions with said end portions and said tile having narrow side faces extending perpendicularly to said wide side faces and each offset midway across the same to provide a protruding portion and a receding portion, the protruding portion of each of said narrow faces being opposite the receding portion of the other narrow face, each of said portions of said narrow faces having a planar portion and a grooved and ribbed portion.

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