May 31, 1932. J. J. SEAVER 1,860,368

CHECKERWORK SUPPORTING AND HOLDING MEANS FOR BLAST STOVES

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Fig. 1

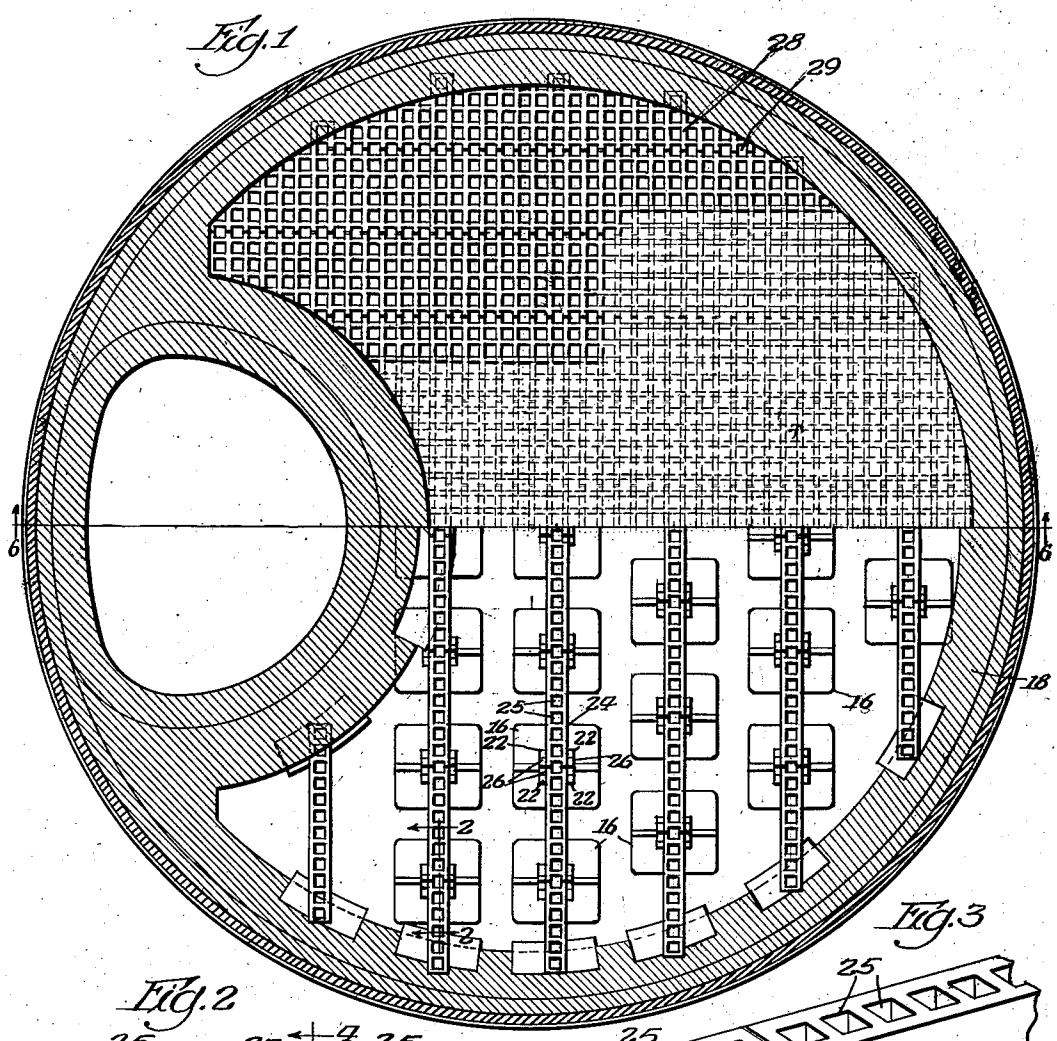


Fig. 2

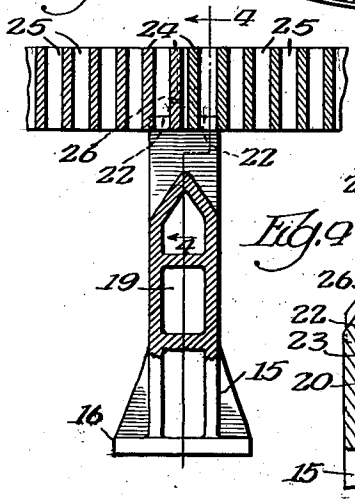


Fig. 3

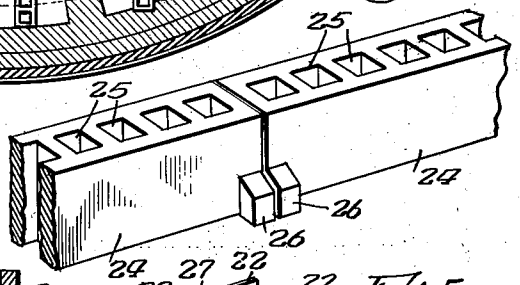


Fig. 4

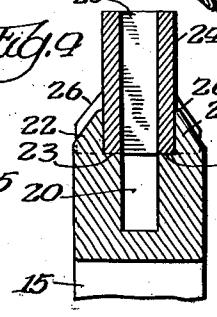
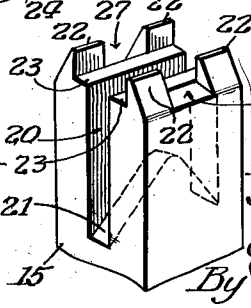


Fig. 5



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Fig. 6

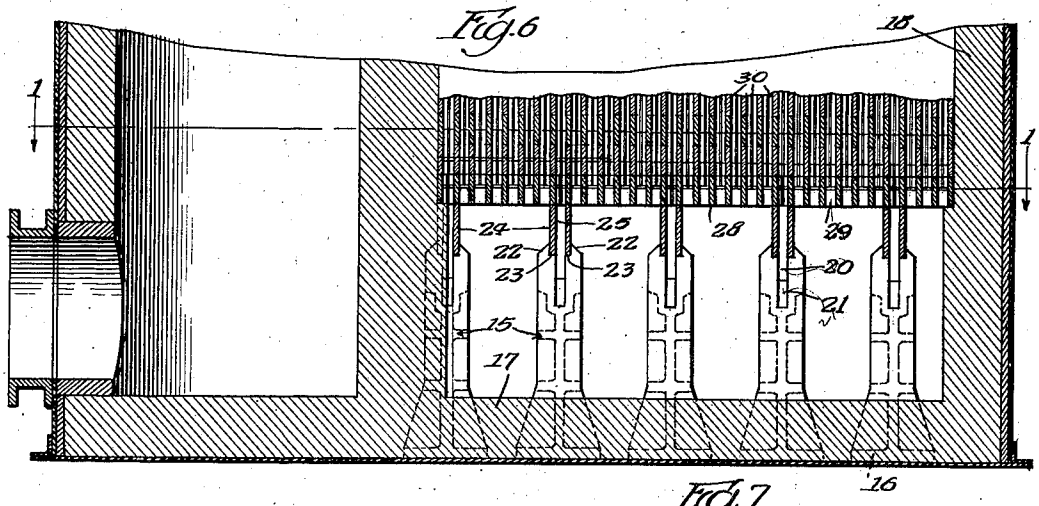


Fig. 7

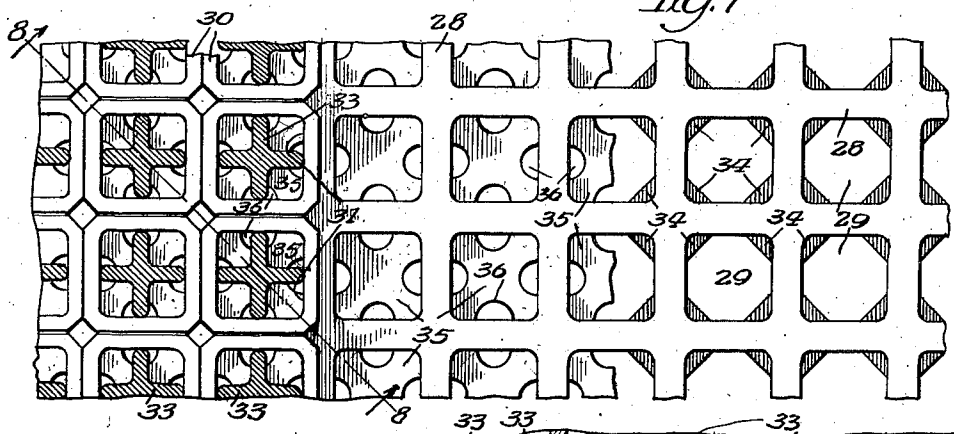


Fig. 10

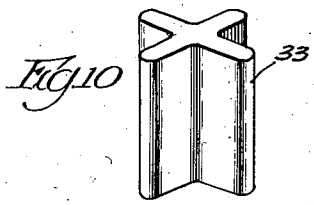


Fig. 9

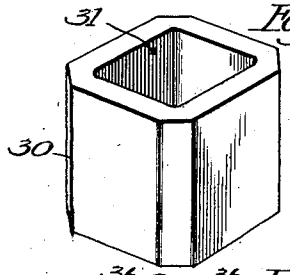
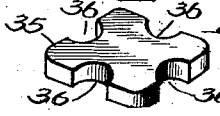


Fig. 11



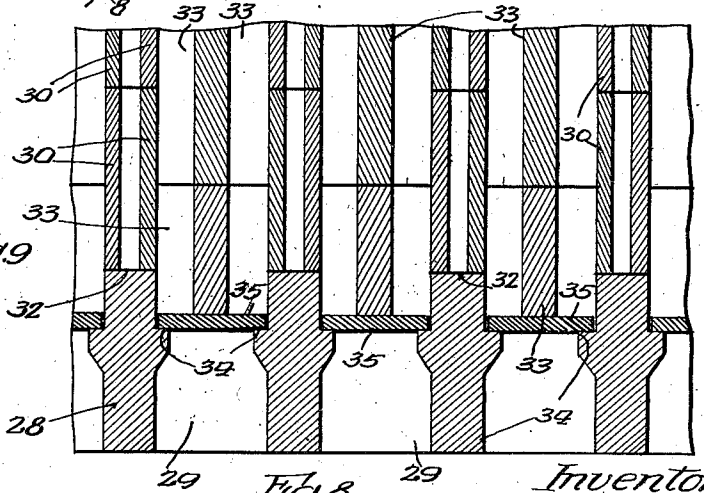


Fig. 8

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UNITED STATES PATENT OFFICE

JAY J. SEAVER, OF EVANSTON, ILLINOIS, ASSIGNOR TO H. A. BRASSERT & COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

CHECKERWORK SUPPORTING AND HOLDING MEANS FOR BLAST STOVES

Application filed March 30, 1931. Serial No. 526,198.

Heretofore hot blast stoves for heating air for blast furnaces have usually been constructed with checker supports constructed of brick piers and brick arches, also of metallic supports consisting of columns, girders and metallic grids, but in such constructions it is well known that the metallic support or bottom has a far greater coefficient of expansion than first quality fire brick. It will therefore be manifest that due to the heating and cooling of the stove, the checker brick and metallic grids will move out of alinement, with the result that the circulation of air and the products of combustion through the grids and checkers will be impeded.

It is one of the objects of the present invention to provide improved means for maintaining the openings in the checker bricks in alinement with the openings or passages through the metal supports upon which the checker bricks rest so as not to interfere with the circulation of the products of combustion and air.

A further object is to provide improved means whereby a sufficient distance between adjacent grids will be maintained to permit of expansion thereof.

A further object is to provide an improved construction of grid, whereby filler bricks or tile which are usually inserted into the checker bricks, but which will provide passages through the checker bricks, will serve as a means for interlocking with the grid, the row of checker brick adjacent thereto, by extending into both the checker brick and the grid to break joint therewith. The filler brick is preferably of a length to terminate for a substantial distance short of the top of the checker brick so as to permit of the insertion into the checker brick one end of another filler member or brick for the next adjacent superposed checker brick, to interlock the checker brick of one row with the respective bricks of the next adjacent row.

A further object is to provide an improved form of supporting column for the checker bricks, so shaped as to allow the products of combustion, as well as the hot blast, ready entrance into the flues directly above the columns.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is an irregular horizontal sectional view taken on line 1—1, Figure 6, of a stove of this character constructed in accordance with the principles of this invention.

Figure 2 is a vertical sectional view taken on line 2—2, Figure 1.

Figure 3 is a detail perspective view of the proximate ends of adjacent girders or supporting beams.

Figure 4 is a detail sectional view taken on line 4—4, Figure 2.

Figure 5 is a detail perspective view of the upper end of one of the supporting columns.

Figure 6 is a vertical sectional view taken on line 6—6, Figure 1.

Figure 7 is a view partially in top plan, partially in section and partially broken away, showing the supporting grids, checker brick, filler brick and supportnig plates, with parts omitted.

Figure 8 is a sectional view taken on line 8—8, Figure 7.

Figure 9 is a perspective view of one of the checker brick.

Figure 10 is a perspective view of one of filler bricks.

Figure 11 is a perspective view of one of the supporting plates for the filler brick.

Referring more particularly to the drawings the numeral 15 designates generally the supporting columns arranged in the bottom of the stove with the bases 16 resting upon the bottom 17 of the stove 18. These columns are constructed of any suitable material and are of any desired size and height according to the distance that it is desired to arranged the checker brick support above the bottom of the stove.

The body portions of the columns 15 are cored out as at 19 and in the upper ends of the column is provided a cored out or re-

cessed portion 20 opening through the top of the column. The bottom of the recess 20 is preferably tapered as at 21 and the recess 20 is of a sufficient depth so as to permit the products of combustion and the hot gases to enter and flow through the recess 20 unobstructed. Arranged at the top of the columns are spaced upwardly projecting ears or extensions 22 and shoulders 23 are formed in the walls of the recess 20 at the base of the projections 22 to form a support for girders or beams 24.

The beams 24 may be constructed of any suitable material but are usually of a metallic formation and may be of any desired height and width, and extending through the girders are flues or openings 25. Arranged at the base of each of the girders and at the extremities thereof are laterally projecting lugs 26.

The girders or beams 24 rest upon the columns 15 so that the bottoms of the girders are supported by the shoulders 23 and the lugs 26 will enter spaces 27 between the respective ears or projections 22 as shown more clearly in Figures 2 and 4, and the spaces 27 into which the lugs 26 project are of a size so that when the ends of two of the girders or beams rest upon the columns 15 the proximate ends of the adjacent beams will terminate short of each other to form a space therebetween so as to permit of expansion of the girders. The lugs 26 and ears 22 also co-operate to hold the girders in position.

Resting upon the beams 25 is the support upon which the checker bricks directly rest and this support is preferably formed of a plurality of separate grids 28 which may also be of a metallic construction and the grids are of such a size that if desired the proximate ends of adjacent grids will terminate short of each other so as to permit of expansion of the grids.

These grids are provided with openings 29 therethrough of any desired size and when the grids are placed upon the beams 24, the openings 29 will be in register with the openings 25 and by reason of the cored out portion or recesses 20 in the columns 15 the flues immediately above the columns will not be blocked and the products of combustion and the air may freely flow therethrough permitting an easy entrance to the flues directly above the columns.

The checker brick 30 may be of the ordinary and well known construction, but is here shown as being octagonal in outer configuration and is provided with the usual opening 31 therethrough. These checker brick are placed upon the upper surface of the supporting grids 28 as shown more clearly in Figure 8, and the width of the upper surface 32 of the grids 28 between the adjacent openings 29 is sufficient to receive one edge of adjacent tiles.

The remaining rows of checker brick 30 are superposed upon the first row, as is usual in stoves of this character.

The checker brick are of a ceramic nature while the supporting grids 28 are of a metallic structure and by reason of the different characteristics of these parts the metallic supports or bottoms have an inherent greater coefficient of expansion than a first quality fire brick or a ceramic product from which the checker bricks are constructed, and it will therefore be manifest that during the operation of the stove due to the heating up and the cooling off of the stove, the checker brick and the metallic grids will be displaced one with respect to the other so that the registering openings therethrough will move out of alinement or register.

Therefore in order to overcome this objection and difficulty it is proposed to interlock the checker brick with the grids and for that purpose the filler brick 33 which is usually inserted within the checker brick 30 is made use of.

To that end the grids 28 are preferably provided with shoulders 34 which are arranged within the openings 29 and are spaced for a substantial distance below the upper surface 32 of the grids. As these openings 29 are usually rectangular in cross section the shoulders 34 are preferably arranged across the corners of the openings as shown more clearly in Figure 7.

A supporting plate 35 which may be constructed of any suitable material is provided to fit within the openings 29 above and to rest upon the shoulders 34. These supporting plates 35 are provided with cut away portions 36 to form passages for the products of combustion and the air so as not to interrupt the circulation thereof through the openings 29 in the grids and into the checker brick 30.

The filler bricks 33 are so shaped as to form passages through the checker brick 30 as shown more clearly in Figure 7.

In assembling the structure the lower row of checker brick 30 is placed upon the supporting surface 32 of the grids with the openings 31 in alinement with the openings 29, previous to which, however, the supporting plates 35 are placed in the openings 29 upon the shoulders 34.

The filler brick 33 are then placed in the lower row of the checker brick and the filler brick are of such a length that the lower end thereof will project beyond the bottom of the checker brick and into the opening 29 of the grid 28 to engage and rest upon the plate 35. In this position the filler brick 33 will terminate for a considerable distance short of the top of the checker brick, so that when another row of checker bricks is superposed upon a lower row of checker bricks additional filler bricks 33 may be inserted thereinto so as to project beyond the lower edge of the super-

posed row and into the space above the filler brick of the next lower row.

It will therefore be manifest that with this construction the filler bricks will interlock the checker bricks not only with the grids 29 but with each other and by so doing the filler bricks will break joint with the grid and of the checker brick or tile to maintain them against any mis-alinement, and to prevent any shifting between these parts from taking place, as in order to do so it will be necessary to shear the cross section of the filler bricks, and, as these filler bricks are of a substantial construction, such a shearing or breaking of the filler bricks is not possible, with the result that these parts and especially the openings therethrough will be maintained in alinement or register so that the circulation of the products of combustion and of the air will not be impeded.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. In a hot blast stove an apertured support for the checker brick, hollow checker brick supported thereupon with the openings in the brick in alinement with the openings in the support, said support and checker brick having different co-efficients of expansion, and filler bricks in the checker bricks, a portion of the filler bricks projecting beyond the checker bricks and into the respective apertures in the support for maintaining the checker brick against lateral movement with respect to the support.

2. In a hot blast stove a checker brick support having openings therethrough, shoulders in said openings a substantial distance from the top of the support, open checker bricks mounted upon the support with their openings in communication with the openings in the support, and locking elements inserted in the checker bricks to extend therebelow and into the respective openings in the support to break joint with the bricks and support, said element being supported by said shoulders.

3. In a hot blast stove a checker brick support having openings therethrough, shoulders in the openings a substantial distance below the top thereof, supporting plates in said openings resting upon said shoulders and spaced from the top of the support, and locking elements in the bricks and extending therebelow and into the openings in the said support and resting upon said plate.

4. In a hot blast stove a checker brick support having openings therethrough, a plurality of superposed rows of checker bricks resting upon the supports, said support and said checker bricks having different co-efficients of expansion, said bricks having openings therethrough, the openings in the respective bricks of the rows and the openings in the respective support being in register, and means within the bricks and extending from one row to the next adjacent row and breaking joint with the respective bricks of the rows and with said support for maintaining the parts locked against relative lateral displacement.

5. In a hot blast stove, columns, metallic girders supported by the columns, means for interlocking the girders with the columns and for maintaining the proximate ends of the girders normally spaced, a metallic apertured support for and upon which the checker bricks rest, and means for interlocking the checker bricks and the said support against displacement one with respect to the other under the influence of contraction or expansion of any of the parts.

6. In a hot blast stove, columns, metallic girders resting upon said columns, means for interlocking the ends of the girders with the columns, the proximate ends of adjacent girders being normally maintained spaced to permit of expansion of the girders, the said means operating to permit a relative movement of the girders with respect to the columns, a support for the checker bricks resting upon the girders, and means for interlocking the checker bricks and said support to maintain them against relative displacement under the influence of relative contraction and expansion of the co-operating parts.

7. In a hot blast stove, columns, girders resting upon the columns, said girders having upright flues therethrough, the portions of the columns adjacent the girders being cored in a manner that the columns will form no obstruction to any of the flues in the girders, and checker bricks supported above the girders.

8. In a hot blast stove, columns, girders resting upon the columns, said girders having upright flues therethrough, the portions of the columns adjacent the girders being cored in a manner that the columns will form no obstruction to any of the flues in the girders, checker bricks supported above the girders, and co-operating means in the girders and columns for maintaining the proximate ends of adjacent girders normally spaced to permit expansion of the girders, the said means also operating to permit a relative movement of the girders with respect to the columns under the effects of expansion and contraction.

9. In a hot blast stove, columns, spaced pairs of ears at the top of the columns, the ears of the respective pairs being spaced, girders resting upon the top of the columns between the pairs of ears, projections on the girders extending between the ears of the re-

spective pairs, the proximate ends of adjacent girders being spaced to permit of expansion of the girders, and checker bricks supported above the girders.

10. In a hot blast stove, columns, spaced pairs of ears at the top of the columns, the ears of the respective pairs being spaced, girders resting upon the top of the columns between the pairs of ears, projections on the girders extending between the ears of the spective pairs, the proximate ends of adjacent girders being spaced to permit of expansion of the girders, apertured grids supported by the girders, checker bricks supported by the grid, and means for interlocking the checker bricks and grid whereby relative displacement of one with respect to the other under the influence of contraction and expansion will be prevented.

11. In a hot blast stove, columns, spaced pairs of ears at the top of the columns, the ears of the respective pairs being spaced, girders resting upon the top of the columns between the pairs of ears, projections on the girders extending between the ears of the respective pairs, the proximate ends of adjacent girders being spaced to permit of expansion of the girders, the columns being shaped in a manner that they will form no obstruction to any of the flues in the girders.

12. In a hot blast stove, columns, girders supported by the columns, grids supported by the girders, checker work supported by the grids, means for interlocking the checker work and grids together for maintaining them against relative displacement under the influence of different degrees of expansion or contraction thereof, and registering flues through the girders, grids and checker work, the columns being so shaped as to form no obstruction to any of the said flues.

In testimony whereof I have signed my name to this specification, on this 27th day of March, A. D. 1931.

JAY J. SEAVER.