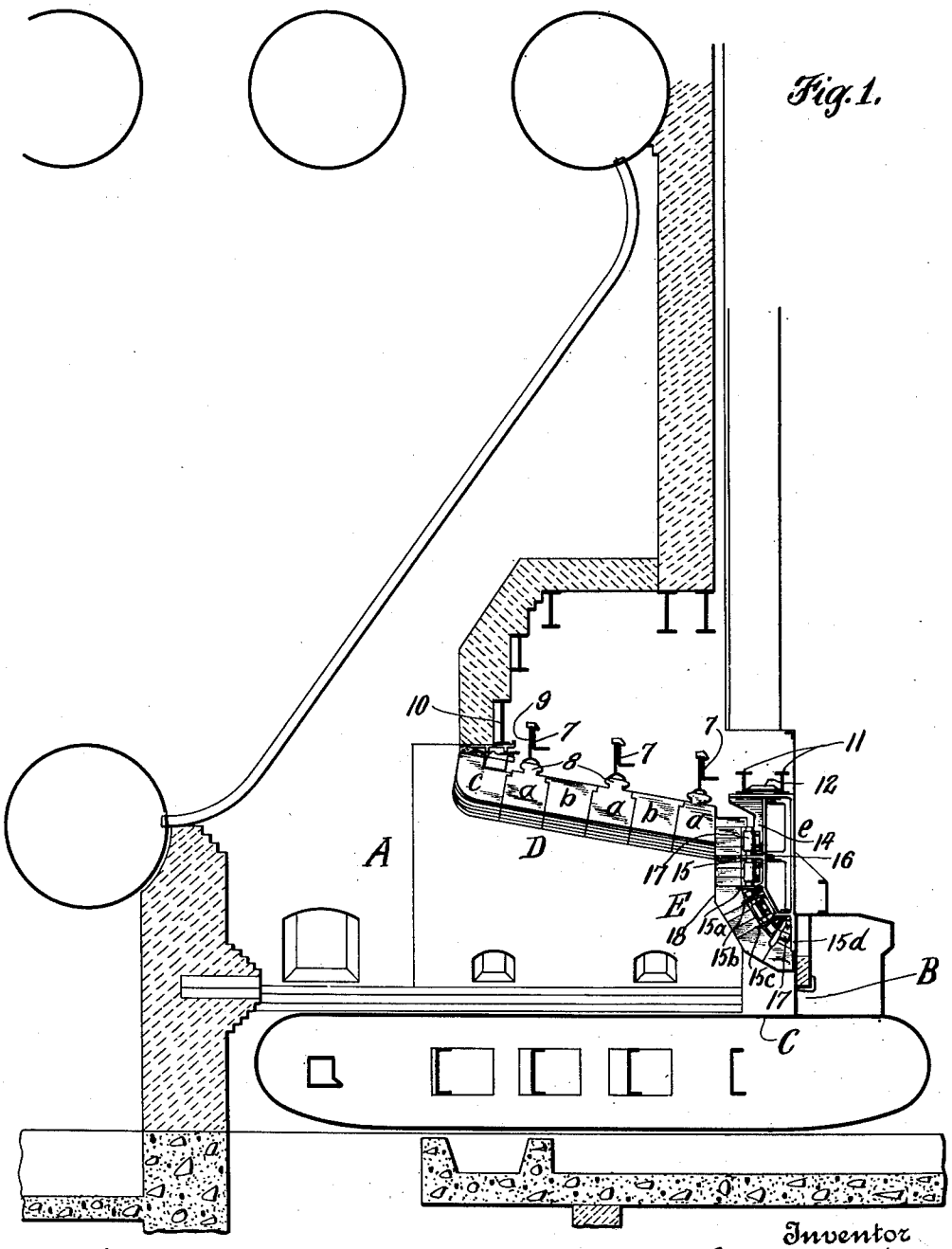
May 26, 1931. B. DOBIE 1,806,747

FURNACE STRUCTURE

Filed Aug. 10, 1922 3 Sheets-Sheet 1

Fig. 1.



Witness
Gustav Genzlinger.

Inventor
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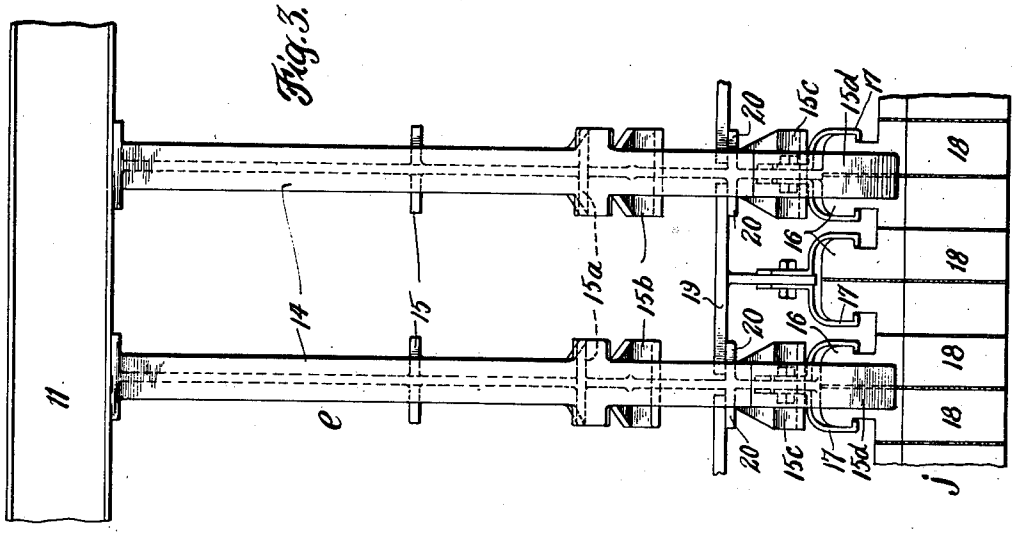
By Attorneys
Spencer & Lockwood

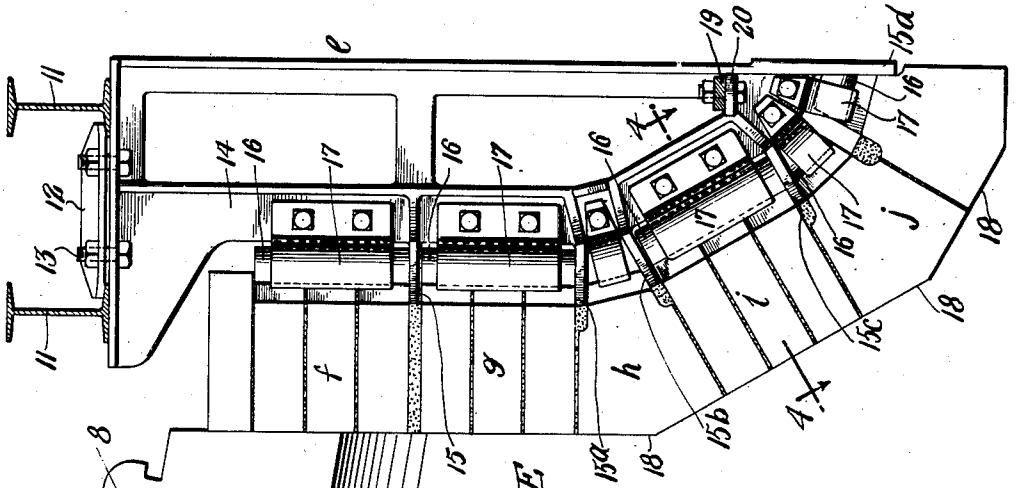
May 26, 1931. B. DOBIE 1,806,747

FURNACE STRUCTURE

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Fig. 3.





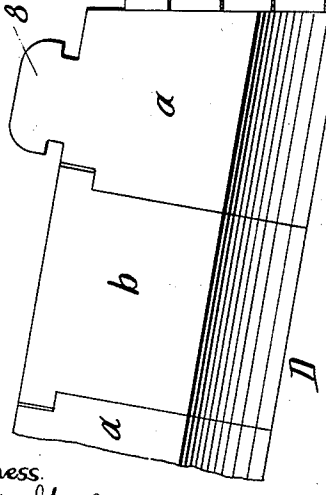


Fig. 2.

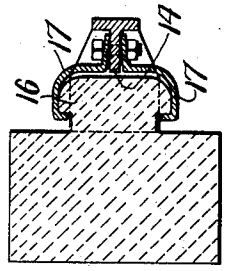


Fig. 4.

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May 26, 1931. B. DOBIE 1,806,747

FURNACE STRUCTURE

Filed Aug. 10, 1922 3 Sheets-Sheet 3

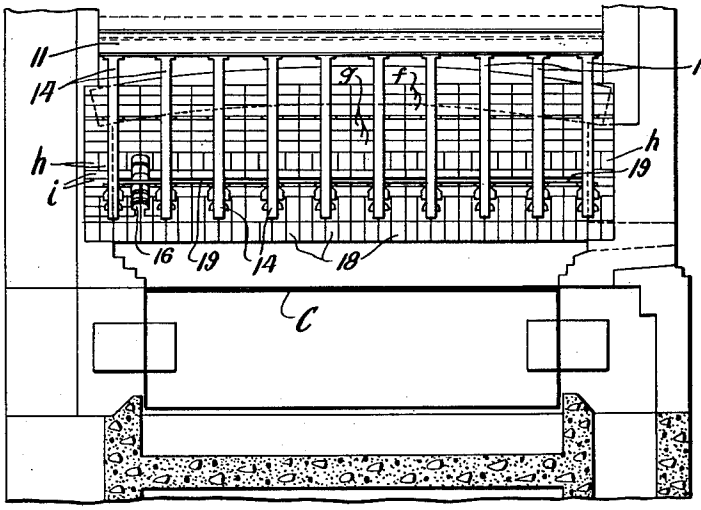
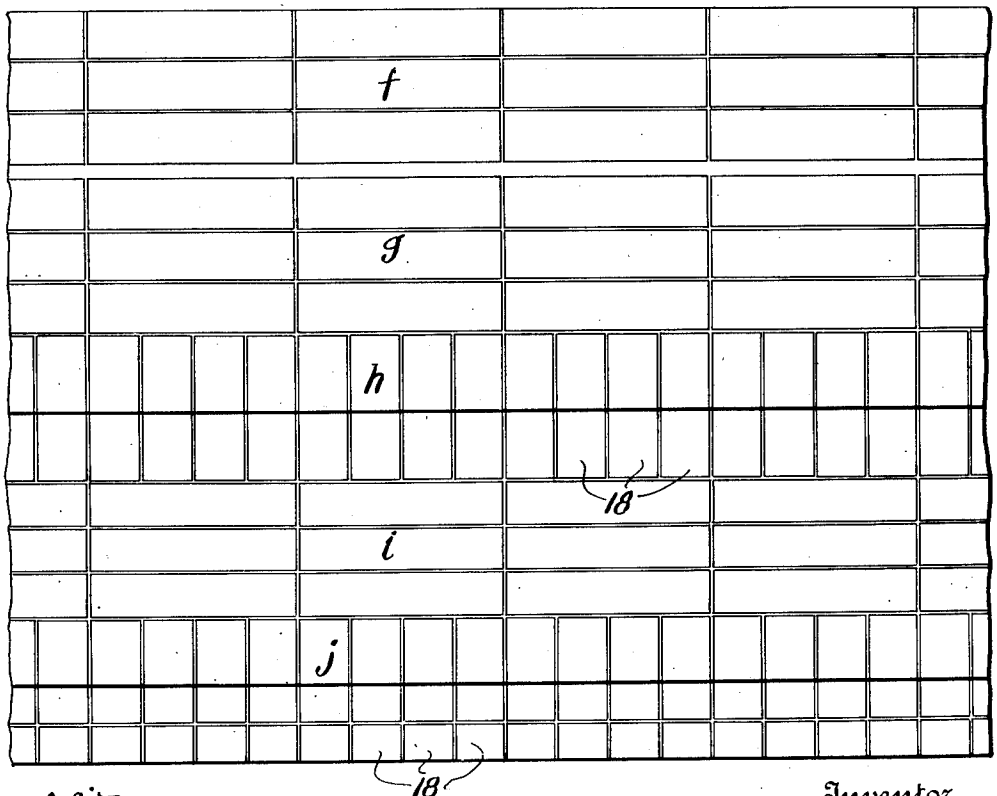


Fig. 5.

Fig. 6.



Witness.
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Patented May 26, 1931 1,806,747

UNITED STATES PATENT OFFICE

BRADLEY DOBIE, OF RIDGEWOOD, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN ARCH COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

FURNACE STRUCTURE

Application filed August 10, 1922. Serial No. 580,856.

My invention relates to furnace structures and particularly to the refractories of the furnace chamber, the invention being especially useful in connection with what is ordinarily termed the ignition arch of a combustion chamber.

One of the primary objects of my invention is to provide a construction capable of general application to new or existing furnaces or combustion chambers of varying size and design and in which standard parts may be utilized notwithstanding such variation, thus, among other things, reducing manufacturing costs.

Another part of the invention is the provision of a construction of sectional character in which the bricks are arranged and supported in independent groups of one or more bricks each, to facilitate installation, repair and replacement and to prevent localization of load.

More specifically, my invention is directed to the provision of an ignition arch, so called, which is of simplified and inexpensive construction, is easy to install, repair or replace; and the size of which may be readily increased or cut down for use with main arches of varying height or to compensate for other variations.

My invention also contemplates an improved arrangement of independently hung main and ignition arches; and in addition an ignition arch permitting the radiant heat from the main arch to most effectively strike the incoming or green fuel.

The foregoing, together with such other objects and advantages as may hereinafter appear or are incident to my invention, I obtain by means of a construction which I have illustrated in the preferred form in the accompanying drawings, wherein

Figure 1 is a fragmentary vertical section through a chain grate stoker fired furnace;

Figure 2 is an enlarged sectional view illustrating my improved ignition arch and its relation to the main arch;

Figure 3 is an end elevation of Figure 2;

Figure 4 is a cross-section taken on the line 4—4 of Figure 2;

Figure 5 is a sectional view showing the ignition arch and its supporting means in front end elevation, and

Figure 6 is an enlarged fragmentary elevation illustrating the manner in which the bricks of the ignition arch are disposed.

Referring now to Fig. 1, only such parts of the furnace as are necessary to an understanding of my invention will be described. In this figure the combustion chamber is indicated by the reference letter A, the green fuel being introduced thereinto through the admission opening or door B by means of the chain grate stoker mechanism diagrammatically indicated at C. The reference letter D indicates the main arch and the reference letter E the ignition arch.

The main arch comprises a plurality of transverse rows of bricks suspended from beams 7 in the following manner: The bricks of the rows marked *a* have heads 8 which are adapted to be engaged by hangers 9 secured to the beams 7. At their upper edges the bricks *a* are cut away and the bricks of the rows marked *b* are T-shaped so as to fit between the rows *a* and interlock with the bricks of such rows. The rear row of bricks marked *c* is supported from the I-beam 10.

The ignition arch E is built up in the following manner: A plurality of hangers or supporting members *e* are suspended from I-beams 11 through the medium of the plates 12 and bolts 13 (see Fig. 2), such arrangement making it possible to compensate for variations that may occur in the spacings of the I-beams 11. The supporting members *e* are each provided with a web 14, the shape of the supporting members being such that this web is substantially centrallv located with respect to the I-beams 11; that is to say, it extends in a plane very closely approximating a plane midway between the I-beams 11. Each supporting member is also provided with a plurality of seats or shelves 15, 15*a*, 15*b*, 15*c*, 15*d*. Each supporting member carries a tier of bricks, such bricks being arranged in groups or sections, each consisting of one or more bricks, each group or section being adapted to be supported by one of the seats mentioned so that each tier is in effect of sectional character with its sections supported

independently of one another. The upper group or sections f, g are composed of three bricks each, the bricks being of rectangular shape and provided with T-shaped heads 16. These heads are adapted to be embraced by clip members 17 bolted to the web 14 of the supporting member. The next section h is composed of four wedge-shaped bricks 18 set on edge, the over all length of the four wedge shaped bricks being equal to the rectangular bricks of the sections f and g. The wedge-shaped bricks 18 are supported in pairs, the ends next the hanger being so shaped that when a pair of the bricks are assembled a T-shaped head, such as before described, is formed, such head being adapted to be engaged as before by clips 17 secured to the webs of the supporting members. The arrangement and support for the wedge-shaped bricks will be readily understood from an inspection of Fig. 3. The next section i of the tier of bricks is composed of three bricks of the same shape as the bricks of the sections f and g; and the last section j is composed of two rows of the wedge-shaped bricks 18; the bricks of the sections i and j being supported by clips 17.

Referring now to Fig. 3 it will be seen that the pair of bricks 18 intermediate the pairs of such bricks supported directly from the hangers or supporting members e, are supported from the T-shaped members 19 adapted to rest on shoulders 20 formed on the supporting members e. It will also be understood that the intermediate pair of bricks in the section h are supported in a similar manner but in this case the T-shaped members 19 are preferably bolted to the shoulders 20.

The bricks of a tier are of course suitably cemented together, but in case it is necessary to replace a brick or bricks of any section, this can be done by simply cracking the joint and removing the brick or bricks without disturbing the remaining bricks of the tier. Transversely considered the bricks of the tiers constitute the courses of the arch.

Among the advantages of the foregoing arrangement the following may be mentioned. The bricks of the ignition arch may be readily assembled, repaired or replaced, the sectional arrangement and independent support of the various groups of bricks constituting a tier preventing a localization of the load and thus obviating the difficulties which would be otherwise encountered in carrying on these operations. The time and expense involved in making repairs or replacements is also cut down very considerably, and in addition to this the height of the ignition arch may vary by using more or less bricks as may be required, depending upon the level of the main arch in the particular installation. In this latter connection it will be noted that the main arch and the ignition arch are independently hung, the upper end of the ignition arch coming opposite the front end of the main arch. It will also be noted that the shape of the hangers or supporting members e is such that the weight comes substantially centrally of the I-beams 11 so that the tendency to distortion or bending of the supporting members is reduced to a minimum and the load on the ignition arch considered as a whole is more evenly distributed between the I-beams. The arrangement is also one such as will permit of the construction of the ignition arch with a minimum number of standard parts, the variations in the height and width of the arch which may be necessary being obtained simply by using a greater or smaller number of the standard bricks and other supporting parts as the exigencies of the particular case may demand.

It will also be observed that the ignition arch, considered as a whole, has a fantailed shape, resulting from the contour of the supporting hangers and the particular shapes of bricks used. The advantage of the fantailed arrangement of arch is that opportunity is afforded for the radiant heat from the main arch to directly strike the green fuel as it is carried through the inlet or admission door B, as a result of which ignition takes place more promptly. Heretofore it has been impossible to obtain this advantage without involving complications in the arrangement and support of the bricks constituting the ignition arch.

An additional advantage is had by virtue of the fact that the hangers; the supporting members e and all of the attaching means for securing the bricks to the supporting members are readily accessible from the front of the furnace and are also protected from the heat.

On inspection of Fig. 2 it will be noted that the distance between the seats 15, 15a, 15b, etc., is slightly greater than the over all vertical dimensions of the respective groups or sections of the tiers, so that the expansion of the bricks as they become hot can readily take place.

The arrangement of the bricks of the ignition arch is such that certain ones thereof are disposed flatwise and others on edge, and this arrangement is one that lends strength to the arch and secures simplicity of brick patterns.

Still another advantage of the arrangement is that I am enabled to keep the weight and size of the wedge bricks within practical limits.

(In Figure 5 the heads of a few only of the bricks 18 are shown in order to avoid confusion.)

What I claim is:

1. An ignition arch structure for furnace chambers including in combination with an arch nose, a plurality of supporting members

and a plurality of bricks arranged vertically to form a vertical wall extension, each member supporting an approximately upright tier of vertically alined superimposed bricks and having a plurality of seats, each of which extends between adjacent faces of bricks of the same tier and supports a plurality of the bricks of the tier, means for supporting said supporting members and means for securing the bricks to the respective supporting member as against lateral displacement and in position to shield the supporting members from the furnace heat.

2. A wall structure for a furnace chamber including horizontally disposed supporting members, vertical frame bars suspended from said members, a plurality of horizontal wall sections of bricks forming a vertical furnace surface, one section disposed vertically above another and each section including a plurality of courses of bricks, a plurality of vertically spaced-apart horizontal rows of ledges extending from said vertical bars toward the furnace chamber and serving to separately support the sections of bricks, a lower horizontal row of ledges supporting a lower section of bricks and a higher horizontal row of ledges supporting a higher section of bricks above the lower section and spaced therefrom to provide expansion spaces, means for positively holding the bricks to the vertical bars separately with respect to the several sections to prevent horizontal displacement of the bricks toward the furnace, said ledges extending from the vertical bars toward the furnace chamber a less distance than the extent of the bricks from the vertical bars, and means at said expansion spaces protecting the supporting structure from the furnace heat while permitting individual vertical expansion of the furnace faces of the several sections.

3. A wall structure for a furnace chamber including horizontally disposed supporting members, vertical brick retaining members supported from said supporting members, a plurality of horizontal wall sections of bricks forming a vertical furnace surface, one section disposed vertically above another and each section including a plurality of courses of bricks, a plurality of vertically spaced-apart horizontal rows of metallic ledges fixed with respect to said vertical retaining members and extending toward the furnace chamber and serving to separately support the sections of bricks, a lower horizontal row of ledges supporting a lower section of bricks and a higher horizontal row of ledges supporting a higher section of bricks above the lower section and spaced therefrom to provide expansion spaces, said bricks and said vertical retaining members cooperating to provide an interlock therebetween for positively holding the sections of bricks to the vertical retaining members separately with respect to different sections to prevent horizontal displacement of the bricks toward the furnace, said ledges extending a less distance toward the furnace chamber than the extent of the bricks to leave said expansion spaces between sections adjacent to the inner side of the wall, and material at said expansion spaces protecting the supporting structure from the furnace heat while permitting individual vertical expansion of the furnace faces of the several sections.

4. A wall structure for a furnace chamber including horizontally disposed supporting members, vertical metallic frame bars suspended from said members, a plurality of horizontal wall sections of bricks forming a vertical furnace surface, one section disposed vertically above another and each section including a plurality of rows of bricks, a plurality of vertically spaced-apart horizontal rows of metallic ledges extending from said vertical bars toward the furnace chamber and serving to separately support the several sections of bricks, a lower horizontal row of ledges supporting a lower section of bricks and another higher horizontal row of ledges supporting another higher section of bricks above the lower section and spaced therefrom to provide expansion spaces, clips engaging said bars and said bricks for positively holding the sections of bricks to the vertical bars separately with respect to different sections to prevent horizontal displacement of the bricks toward the furnace, said ledges extending from the vertical bars toward the furnace chamber a less distance than the extent of the bricks from the vertical bars to leave said expansion spaces between sections adjacent the ledges, and material in said expansion spaces protecting the ledges from the furnace heat while permitting individual vertical expansion of the furnace faces of the several sections.

5. A furnace construction including, in combination, a supporting structure, vertically-extending hanger members supported thereon, inwardly extending shelf-means carried by said members, a vertically-extending inner refractory wall structure divided into sections each section of which is carried by a horizontal row of shelf-means and extends inwardly beyond said shelves, and means for tying blocks of the sections to the hanger members, which carry them, to restrain the sections as against inward displacement.

6. In a well structure, the combination of hangers, bricks supported thereby, and tie means embracing a hanger and engaging a plurality of bricks.

7. A furnace wall construction including in combination, a supporting structure, hangers carried thereby, a sectional refractory block wall carried on said hangers, and

members engaging said hangers and blocks of the wall to secure the wall as against lateral displacement.

8. A furnace wall construction including in combination, a supporting structure, hangers carried thereby, a sectional refractory block wall, each section being carried on a plurality of hangers, and members engaging said hangers and blocks of the wall to secure the wall as against lateral displacement.

In testimony whereof I have hereunto signed my name.

BRADLEY DOBIE.