

Oct. 7, 1930.

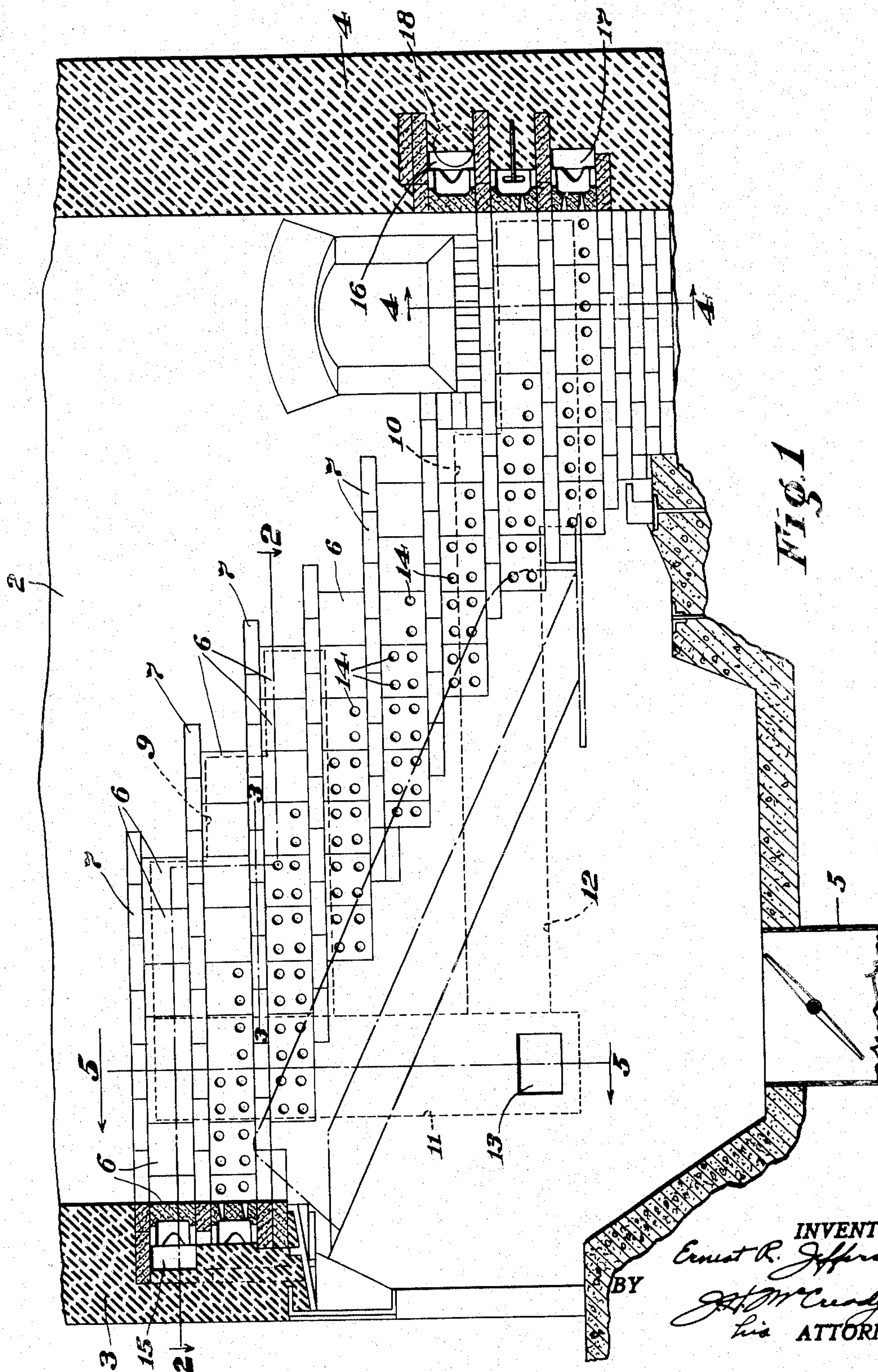
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**1,777,922**

FURNACE WALL

Filed April 11, 1929

3 Sheets-Sheet 1





Oct. 7, 1930.

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FURNACE WALL

Filed April 11, 1929

3 Sheets-Sheet 2

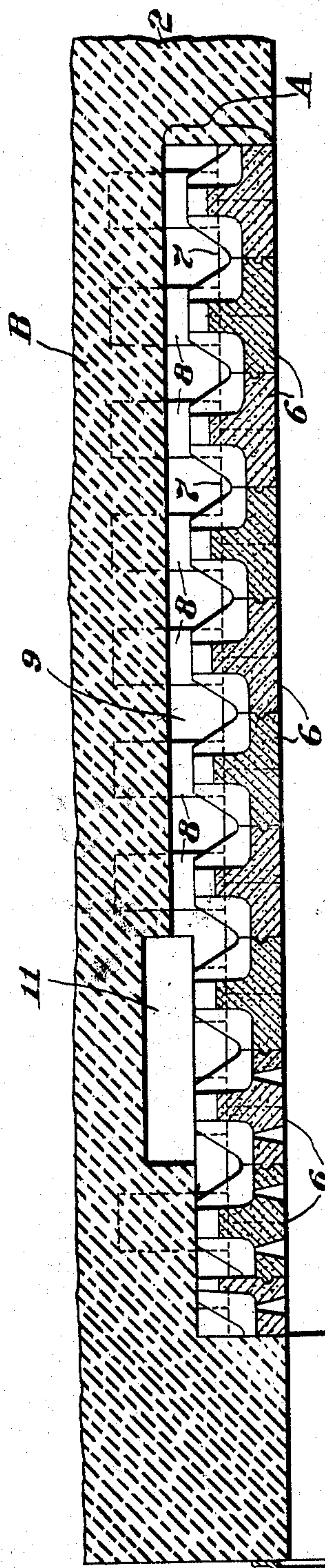


FIG. 2

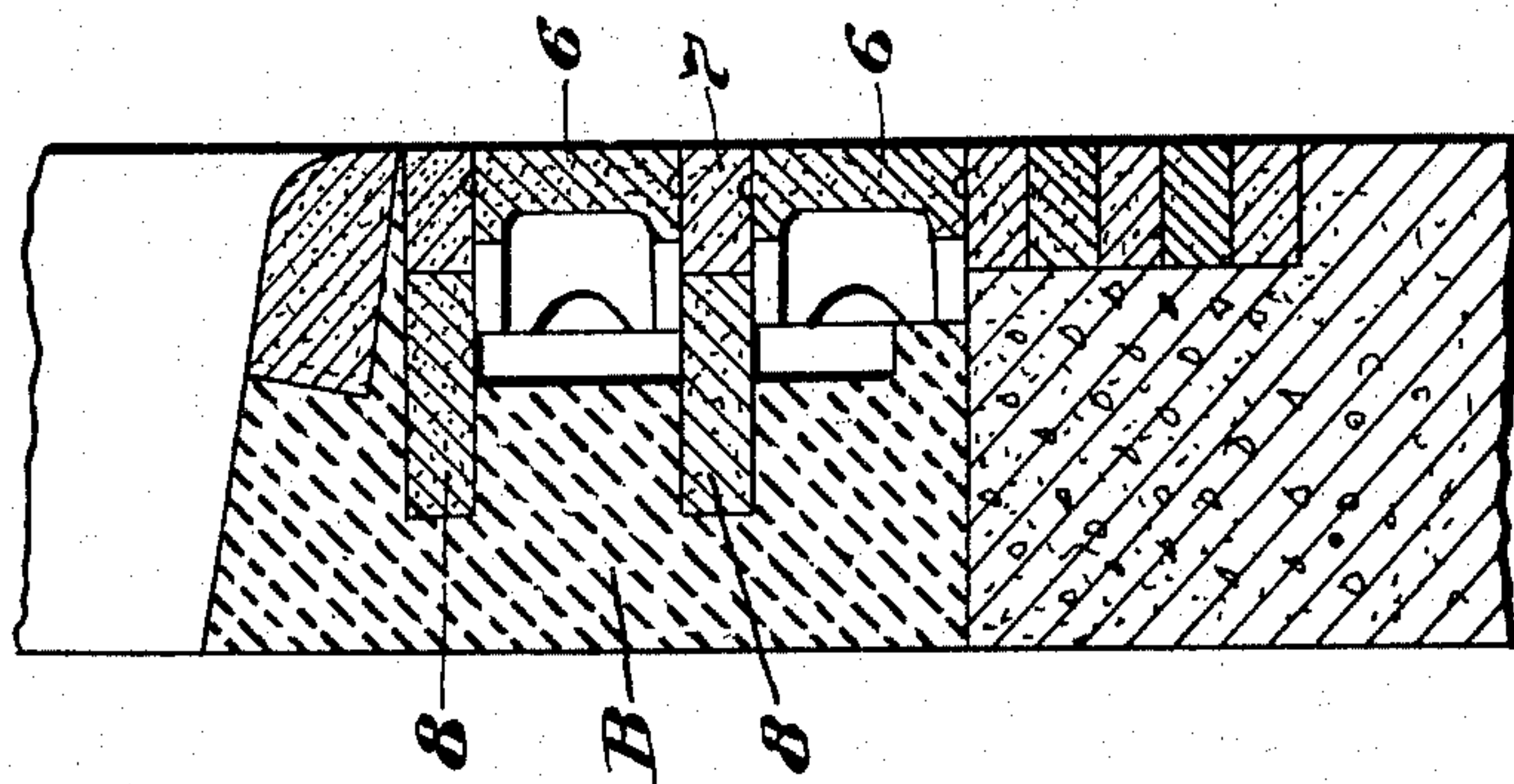


FIG. 4

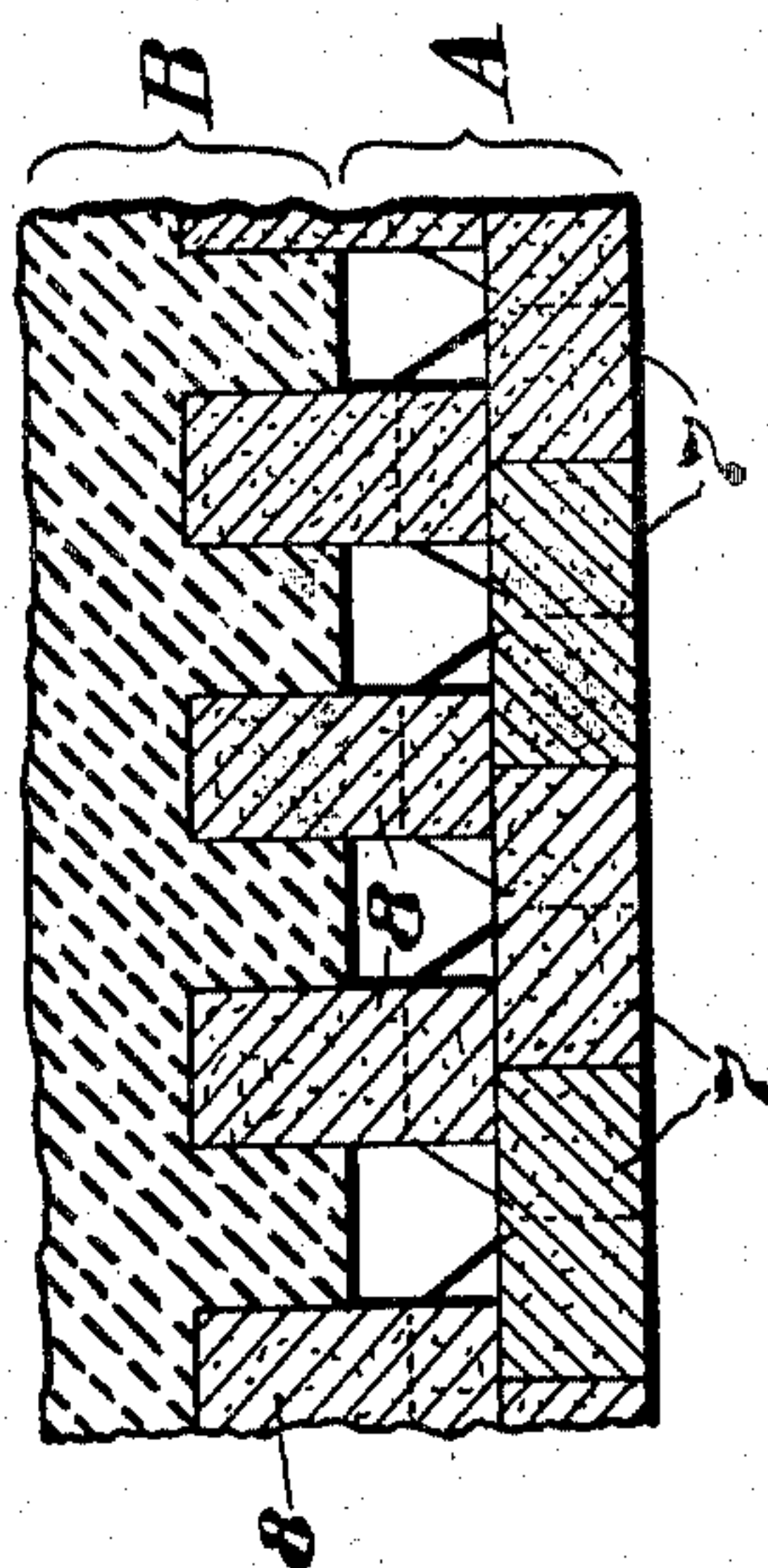


FIG. 3

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FURNACE WALL

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3 Sheets-Sheet 3

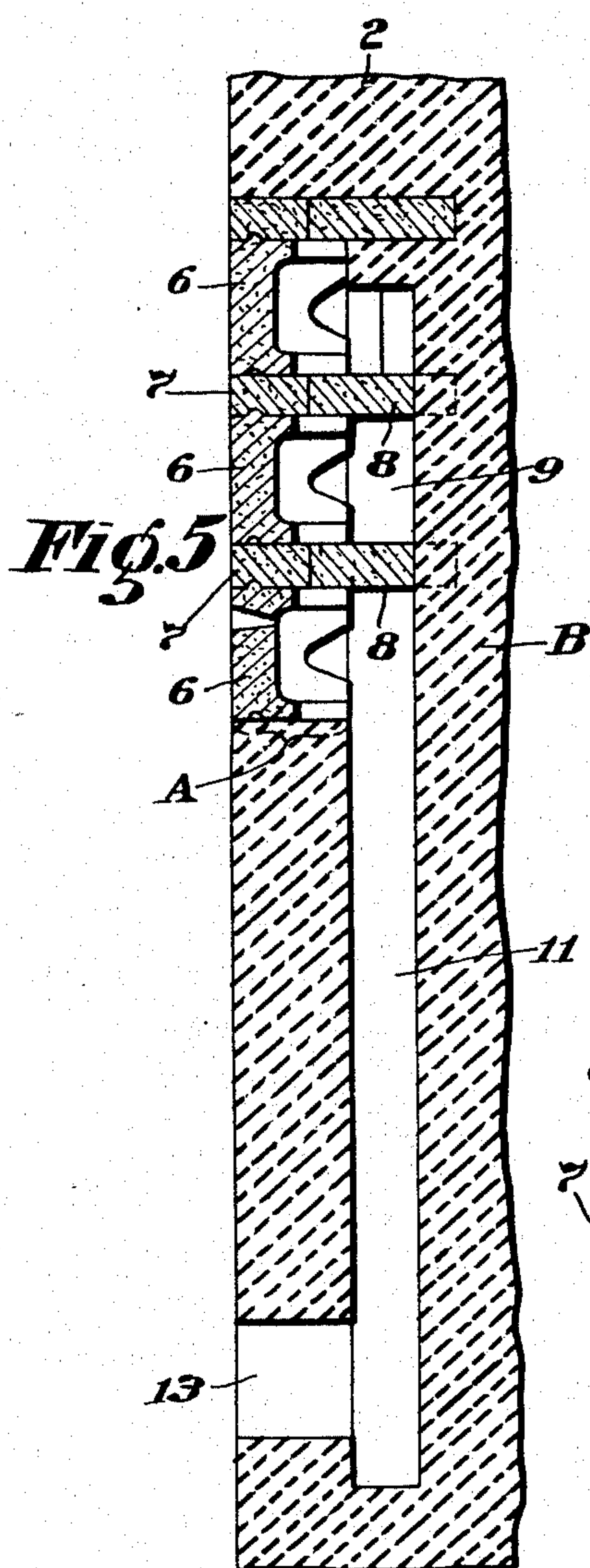


Fig. 5

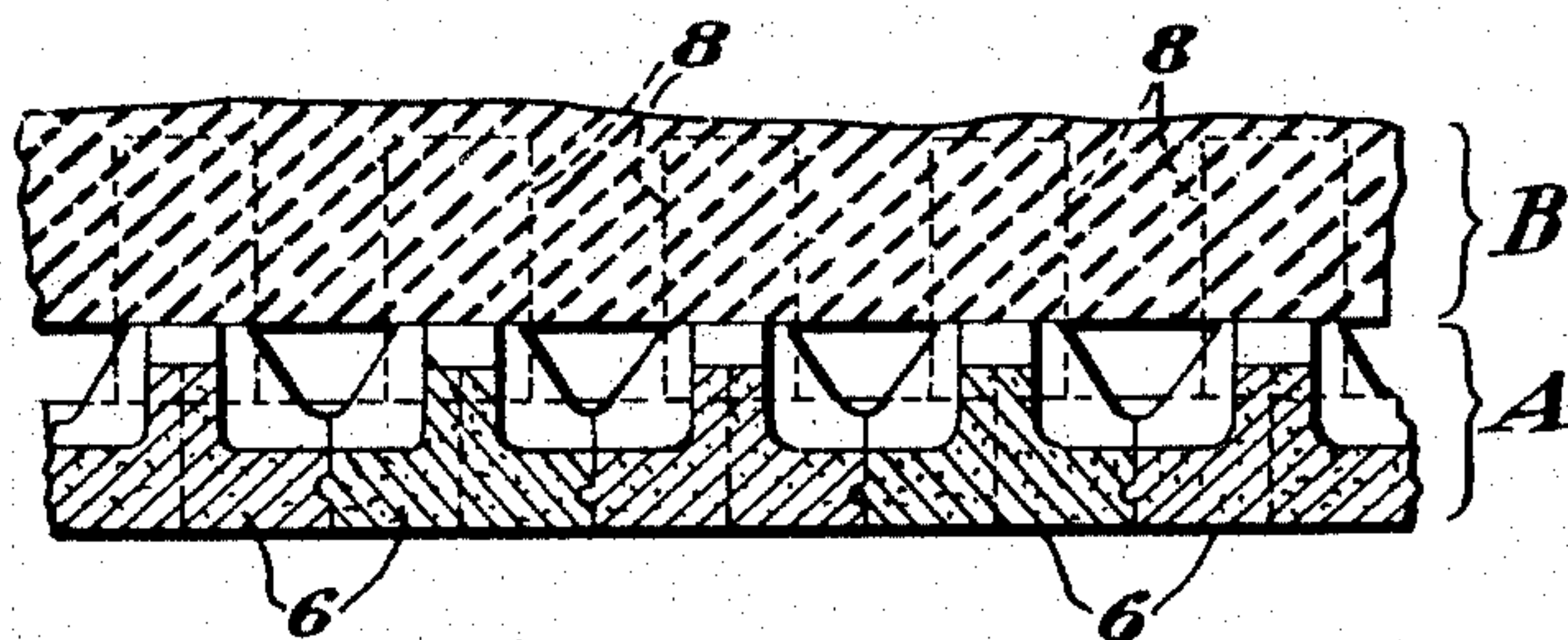


Fig. 6

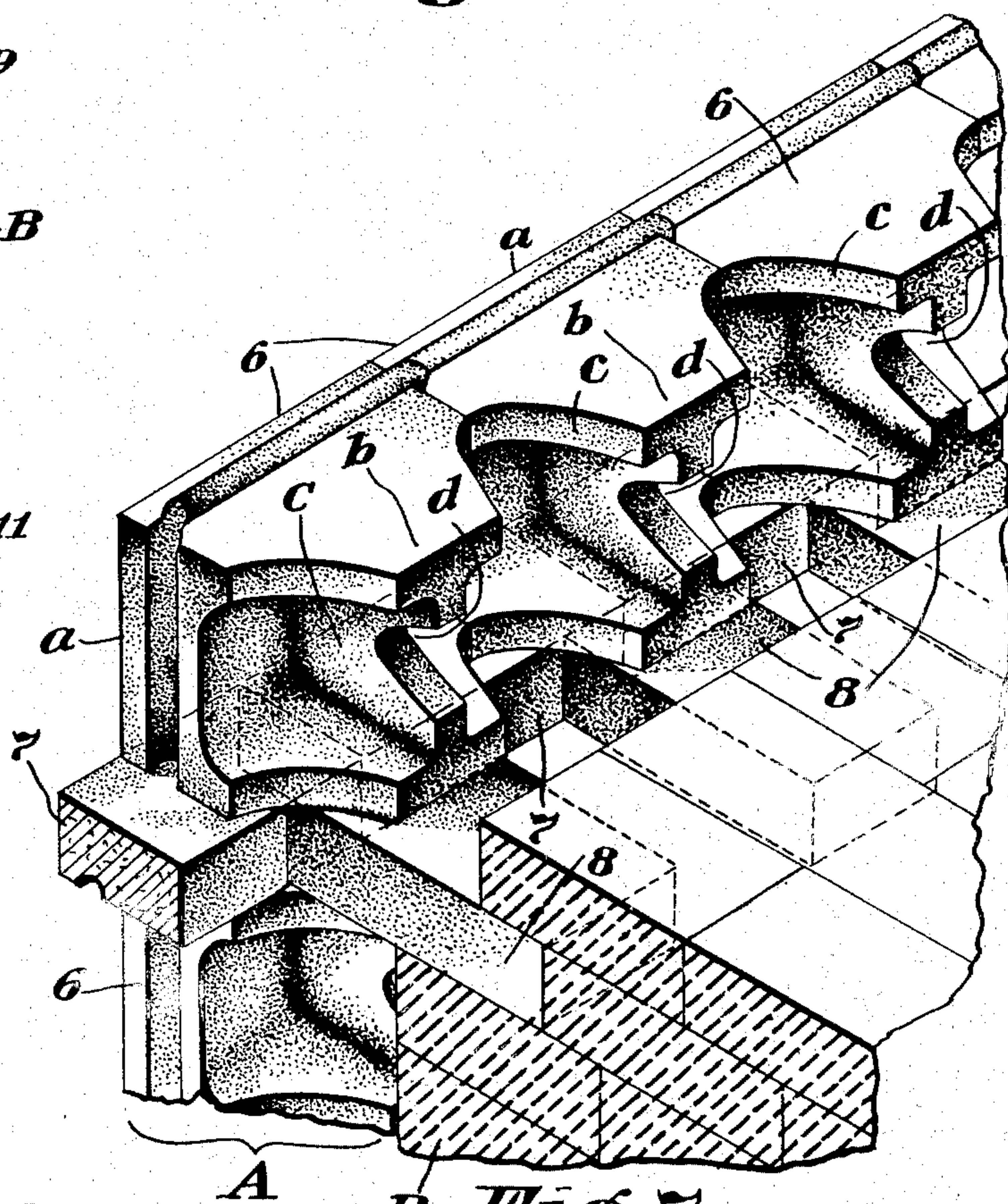


Fig. 7

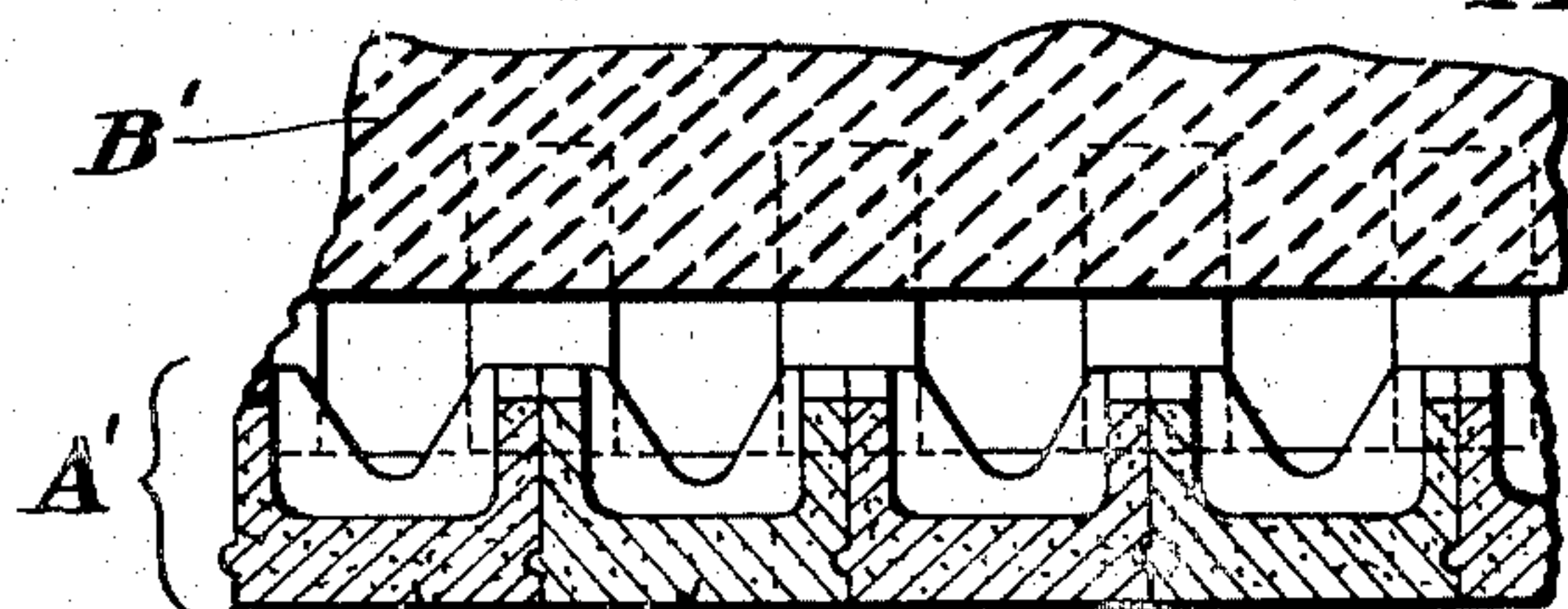


Fig. 8

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# UNITED STATES PATENT OFFICE

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## FURNACE WALL

Application filed April 11, 1929. Serial No. 354,405.

In prior patents assigned to the assignee of the present invention, furnace walls are described and claimed which include front and rear sections with an air space between them through which air is circulated for the purpose of reducing the temperature of the front section or lining. The present invention relates to walls of this general type for furnaces, gas generators, and the like. It aims to devise a wall structure of this character which can be manufactured more economically than these prior constructions, and which will still have most of the advantages of the earlier constructions.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a view, partly in side elevation and partly in vertical section, of portions of a furnace wall constructed in accordance with this invention;

Figs. 2, 3, 4 and 5 are sectional views substantially on the lines 2—2, 3—3, 4—4 and 5—5, respectively, of Fig. 1;

Fig. 6 is a horizontal sectional view somewhat like Fig. 2 but taken at a lower point in the wall;

Fig. 7 is a perspective view of a portion of a wall embodying this invention; and

Fig. 8 is a horizontal sectional view showing a modified construction.

The drawings show parts of the wall of a stoker furnace. Referring to Fig. 1 the side wall is indicated at 2, the front wall at 3, and the bridge wall at 4. A blower (not shown) forces air under pressure through the conduit 5 into the space under the stoker grate and provision is made for conducting this air into and through portions of the wall and discharging it into the combustion chamber at a multitude of points.

Referring to Figs. 1 to 7, inclusive, which show the side wall 2, it will be observed that this wall comprises a front section or lining A and a rear section B. It will also be seen that the front section A is composed of alter-

nating courses of hollow blocks 6 and plain bricks 7. Preferably the blocks are of substantially the construction shown at D in Patent No. 1,696,812 assigned to the assignee of this invention. Usually these blocks are made of silicon carbide, or some other highly refractory material, and each block comprises a front or body portion *a*, Fig. 7, with a flange or projection *b* extending rearwardly from the central part thereof, this flange being hollowed out or cut away centrally at opposite sides thereof to provide a relatively narrow upright web *c*. Usually this web is notched transversely as shown at *d*.

The plain bricks 7 preferably are of the usual shape and dimensions of ordinary bricks, namely,  $9\frac{1}{2}$  inches long by  $4\frac{1}{2}$  inches wide and 2 inches thick, although it may be necessary or desirable in some cases to make these bricks of different dimensions. The blocks 6 are considerably larger, as indicated in the drawings. It is preferable to make the bricks 7 of the same material as that used in the manufacture of the blocks 6. In view of the fact that the blocks 6 are customarily made with their edges tongued and grooved, it is ordinarily desirable to make the bricks 7 with a groove on one side to take the tongue of the block 6 next adjacent to it. This is done simply to accommodate the tongue of the standard block, and when the blocks are not tongued and grooved the bricks 7 have plain surfaces. These bricks are herein referred to as "plain bricks" since they are of substantially the same construction as common bricks, and this term serves to distinguish them from the blocks 6.

In laying up this wall the rear section B ordinarily is made of masonry construction and the ends of the rearwardly extending projections of the blocks 6 are abutted against the front face of the rear section B. One, or sometimes more, courses of plain brick are then laid on each course of the blocks 6, and in order to unite the front and rear sections of the wall, while still providing ample space for the circulation of air between these sections, tie bricks 8 are used in horizontal alignment with the courses of plain bricks 7. These tie bricks consist of plain bricks located at



right angles to the bricks 7, and each tie brick is positioned on the projection *b* of the block 6 immediately below it. Since the courses of blocks 6 and bricks 7 usually alternate with each other, the forward end of each tie brick 8 is ordinarily locked between the extensions *b* of the blocks 6 immediately above and below it, while the rearward end of each brick is embedded in the rear wall section B. Also, since the tie bricks are alined vertically with the projections *b* of the blocks 6, they are spaced laterally from each other, and the spaces by which they are separated are vertically alined with the tapered spaces between adjoining blocks 6. This is clearly shown, for example, in Figs. 2, 6 and 7. Ample space, therefore, is provided for the free circulation of air vertically between the front and rear wall sections. The presence of the notches *d* in the blocks 6 also provides for a free horizontal flow of air between the front and rear sections of the wall.

In order to distribute the air properly through the side wall 2, headers indicated in Fig. 1 at 9 and 10, are provided, these headers being connected by ducts 11 and 12, respectively, with a port 13, Fig. 1, which opens into the air space below the grates. The duct 11 and header 9 are also shown in Figs. 2 and 5, while Fig. 7 shows the wall under construction at a point opposite the lower part of the header 9. In the headers the rearward ends of the projections *b* of the blocks 6 do not abut against the rear wall section B but are spaced from it by a distance equal to the width of the header. These headers and ducts, however, conduct air to suitable points in the wall for distribution, the air flowing vertically from them through other parts of the wall and being discharged into the combustion chamber through the apertures 14 provided in most of the blocks 6. Some of these blocks do not have apertures and the air simply circulates behind them and serves to cool them to a somewhat less degree than those through which it is discharged. Due to the fact that a forced circulation of air is maintained through the wall, an abundant flow of air is provided to hold the temperature of the lining below the point at which ash and slag will fuse to it.

In the front wall 3 a part of the header is shown at 15, Fig. 1, and upper and lower headers are shown in the bridge wall 4 at 16 and 17, respectively. The air supply pipe for the upper header of the bridge wall is indicated at 18; Fig. 1.

This construction provides a wall which is very sturdy and substantial mechanically, and which, because of the use of plain bricks with the blocks 6, can be built more economically than walls of the type in which these blocks have been used heretofore, while at the same time affording a degree of pro-

tection for the lining which is ample for many installations.

Instead of using blocks 6 as above described, hollow blocks of substantially the type shown in Patents Nos. 1,696,813 and 1,697,403 may be substituted for them. Fig. 8 shows a wall in which U-blocks 20 of the type shown in the former patent are used instead of the T-blocks 6, the wall in other respects being like that above described.

While I have herein shown and described a preferred embodiment of my invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof. In mentioning bricks as being in abutting or engaging relationship, it will be understood that the presence of cement between the bricks is not regarded as affecting said relationship.

Having thus described my invention, what I desire to claim as new is:

1. A furnace wall comprising front and rear wall sections with an air space between said sections, said front section including courses of plain brick spaced apart by courses of hollow blocks having projections extending rearwardly from the front portions thereof and abutting against the rear section of said wall, and means engaging both said rear section and said plain bricks in the front section for tying said front and rear sections together.

2. A furnace wall having front and rear sections, said front section comprising courses of plain brick interspersed with courses of blocks having projections extending rearwardly from the front portions thereof, said wall having an air space between said front and rear sections, said air space extending between the rear of said front portions of said blocks and said rear wall section and tie bricks cooperating with said projections to connect said front and rear wall sections together.

3. A furnace wall having front and rear sections, said front section comprising courses of plain brick interspersed with courses of blocks having projections extending rearwardly from the front portions thereof and abutting against the rear section of said wall, said courses of plain bricks and the front portions of said blocks being separated from said rear wall section by an air space and tie bricks projecting rearwardly from said courses of plain brick and bonded to said projections and to said rear section.

4. A furnace wall comprising front and rear wall sections with an air space between said sections, said front section comprising courses of plain bricks interspersed with courses of blocks having upright flanges projecting rearwardly from the front portions thereof, extending across said air space and abutting against said rear wall section, and tie bricks having their rear ends embedded



in said rear section and their front ends held between superposed flanges of said blocks, said tie bricks serving to connect said front and rear sections together.

5 5. A furnace wall having front and rear sections, said front section comprising courses of plain brick interspersed with courses of blocks having projections extending rearwardly from the front portions thereof, and  
10 tie bricks having their rear ends embedded in said rear section and their front ends secured between superposed projections of said blocks, said tie bricks and projections cooperating to space said front and rear sections  
15 apart and being themselves spaced laterally to provide a free circulation of air between said front and rear sections.

6. A furnace wall comprising front and rear wall sections with an air space between  
20 said sections, said front section including courses of plain brick spaced apart by courses of blocks having projections extending rearwardly from the front portions thereof and abutting against the rear section of said wall,  
25 and tie bricks having their rear ends embedded in said rear section and their front ends anchored between superposed projections of said blocks, said tie bricks and projections being spaced and said projections being  
30 shaped to provide a free circulation of air between said sections in directions transverse to each other.

7. A furnace wall having front and rear sections, said front section comprising  
35 courses of plain brick interspersed with courses of blocks having projections extending rearwardly from the front portions thereof, said wall having an air space between said front and rear sections, said air space  
40 extending between the front portions of said blocks and said rear wall section and tie bricks extending rearwardly from said courses of plain brick and each superposed on and bonded to one of said projections of  
45 a block in a lower course, the rearward ends of said tie bricks being anchored in said rear wall section.

8. A furnace wall having front and rear sections, said front section comprising  
50 courses of plain brick interspersed with courses of hollow blocks having projections extending rearwardly from the central portions thereof, said wall having an air space between said front and rear sections, said air  
55 space extending between the front portions of said blocks and said rear wall section and tie bricks having their rear ends embedded in said rear wall section and their front ends in superposed relationship to said projections  
60 and bonded to them.

9. A furnace wall having front and rear sections, said front section comprising  
65 courses of plain brick interspersed with courses of blocks having projections extending rearwardly from the central portions

thereof and abutting against the rear section of said wall, said wall having an air space between said front and rear sections, and tie bricks having their rear ends embedded in said rear wall section and their front ends  
70 in superposed relationship to said projections and bonded to them, said projections and tie bricks being spaced apart and said projections being shaped to provide a free circulation of air between said front and rear sections.  
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