May 21, 1946. H. JONES 2,400,827

FURNACE AND LIKE BUILDING CONSTRUCTION

Filed Jan. 18, 1943 3 Sheets-Sheet 1

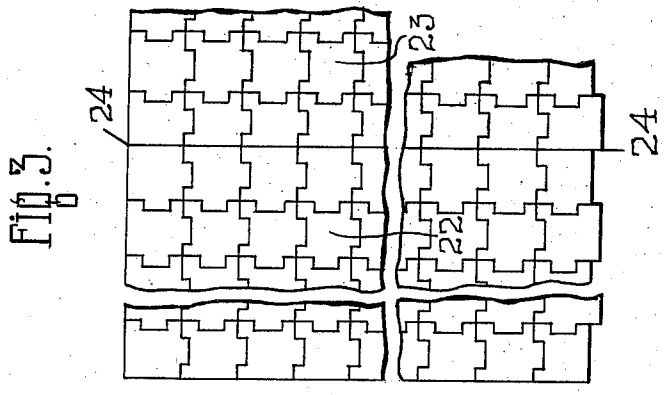


Fig. 3.

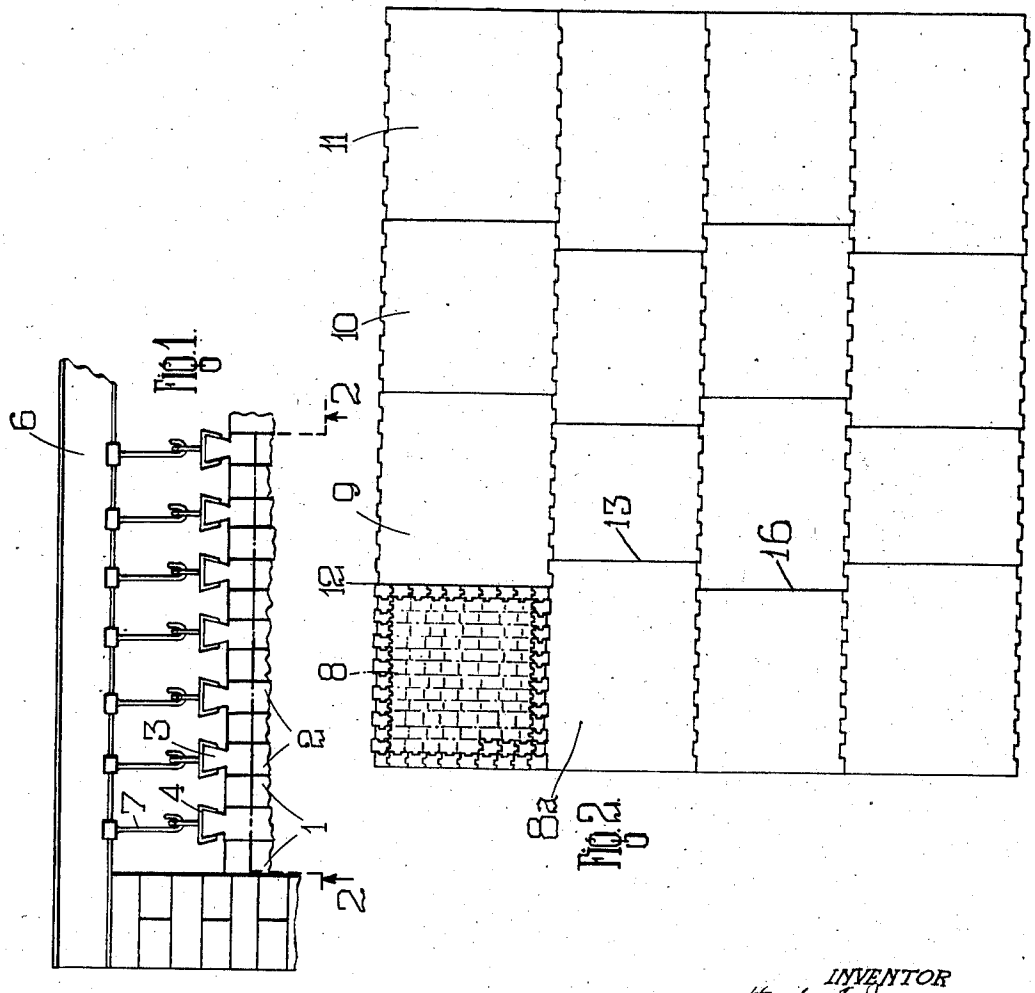


Fig. 1.

Fig. 2.

INVENTOR
Herbert Jones
BY
John J. V. Armstrong
ATTORNEY.

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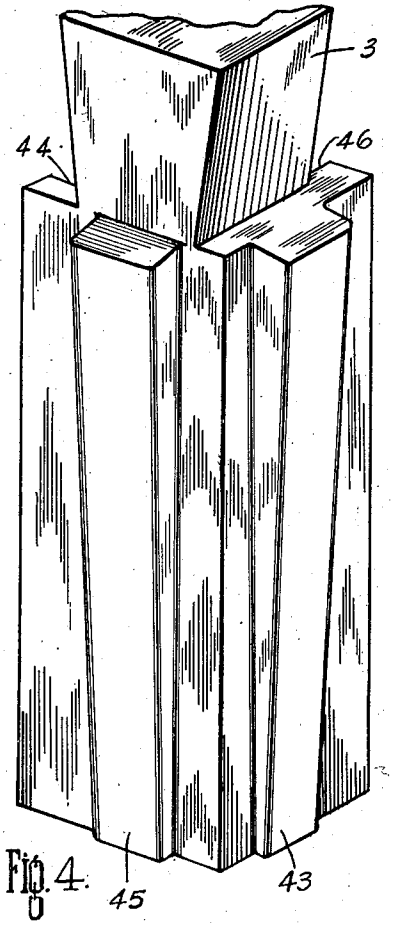


Fig. 4.

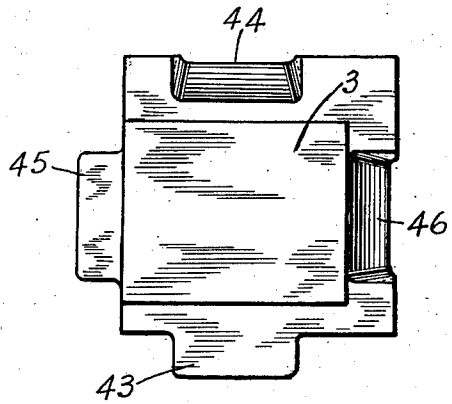


Fig. 5.

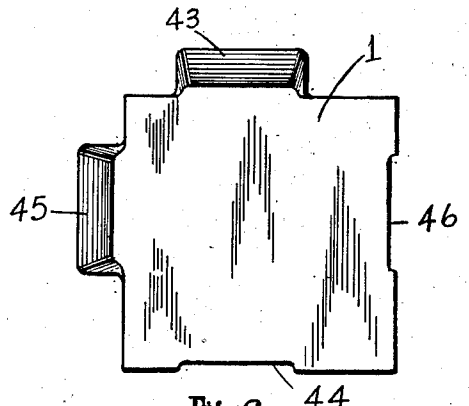


Fig. 6.

INVENTOR
Herbert Jones
BY
John J. Armstrong
ATTORNEY

May 21, 1946. H. JONES 2,400,827

FURNACE AND LIKE BUILDING CONSTRUCTION

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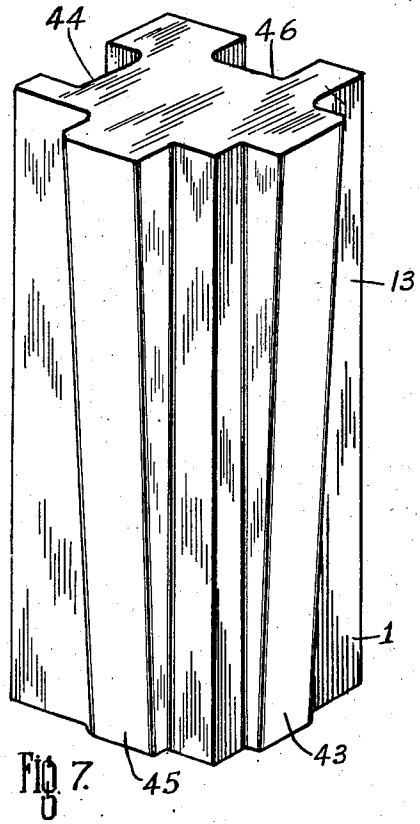


FIG. 7.

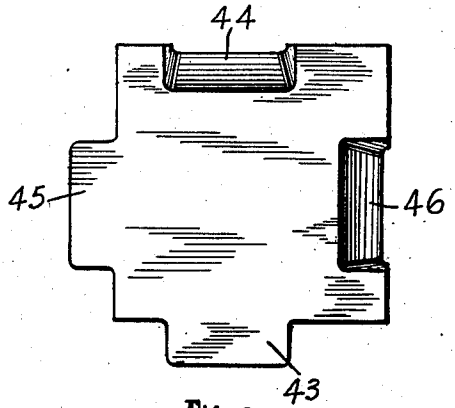


FIG. 8.

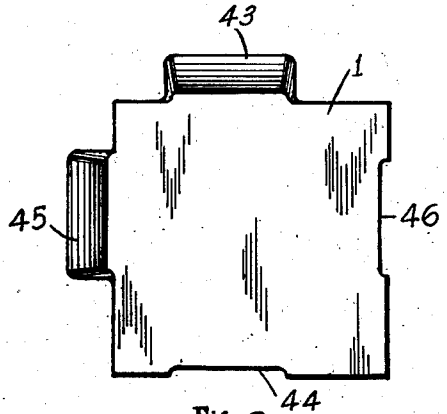


FIG. 9.

INVENTOR
Herbert Jones
BY
John J. V. Armstrong
ATTORNEY.

Patented May 21, 1946

2,400,827

UNITED STATES PATENT OFFICE

2,400,827

FURNACE AND LIKE BUILDING CONSTRUCTION

Herbert Jones, Pen-y-Ffordd, near Chester, England

Application January 18, 1943, Serial No. 472,755
In Great Britain January 2, 1942

3 Claims. (Cl. 110—99)

The present invention relates to improvements in furnaces and like building constructions and more particularly to a furnace arch, crown or roof.

An object of the invention is to provide a furnace arch, crown or roof built up from interlocking refractory blocks which in the event of spallage of a portion thereof taking place can be readily dismantled in the region where this occurs without complete dismantling.

A further object is to provide a furnace arch, crown or roof which will be substantially free of internal stress during operation and particularly during heating up or cooling down of the furnace.

The invention is more particularly described with reference to the accompanying drawings, in which:

Figure 1 is a view showing a suspended furnace arch, crown or roof,

Figure 2 is a horizontal section on line 2—2 of Figure 1 viewed from below drawn to a reduced scale, illustrating a method of assembly of blocks in accordance with the present invention,

Figure 3 is a view showing a portion of the arch crown or roof depicted in Figure 2 on an enlarged scale,

Figure 4 is a perspective view of one form of block,

Figure 5 is a corresponding top plan view,

Figure 6 is a corresponding bottom plan view,

Figure 7 is a perspective view of another form of block, having means for pendulous support,

Figure 8 is a corresponding top plan view,

Figure 9 is a corresponding bottom plan view.

The furnace arch, crown, or roof is built up from a plurality of areas of six-sided refractory blocks. Each of these areas includes a set of blocks having interlocking means, selected from the group consisting of rib interlocking means and groove interlocking means complementary to said rib interlocking means, on all four of their vertical sides: and a set of blocks having interlocking means, selected from the aforesaid group, on at least two vertical sides and having at least one plane vertical side.

One form of block is illustrated in Figures 4, 5 and 6. The blocks 1 have two sides ribbed at 43 and 45 and grooved at 44 and 46.

One of the blocks 2, similar as regards its ribbed and grooved sides, as at 43, 45 and 44, 46 respectively, but having dovetail ends 3 for pendulous support by hooks 7 and clips 4, is shown in Figures 4, 5 and 6. Both these types of blocks are characterised by having the ribs tapered both as regards protrusion and width, the grooved sides being complemental to the ribbed sides, and by having the median axis of the ribs unsymmetrically disposed on the ribbed sides. These blocks are more fully described in my co-pending application, Serial Number 472,756.

The blocks may be arranged alternately of the pendulously supported type of Figures 4, 5 and 6, and of the other type of Figures 7, 8 and 9, to form a furnace arch, crown or roof as shown in Figure 1.

Additionally to the two types of block depicted as 1 and 2 respectively in Figure 1, and more fully described with reference to Figures 7, 8 and 9 and Figures 4, 5 and 6, a furnace arch, crown or roof embodying the present invention makes use of a relatively small number of blocks having either one or two plane sides associated with three or two sides having grooves or ribs as described in connection with the aforementioned two types of block. These plane sided blocks may or may not have a dovetail extension for pendulous support thereof.

Thus an area 8, Fig. 2, is built up largely from blocks having interlocking means, selected from the group consisting of rib interlocking means such as the rib 43, Fig. 4, and groove interlocking means such as groove 44, Fig. 4, complementary to said rib interlocking means, on all four vertical sides of the said blocks, in combination with a relatively small number of blocks having either two or one plane vertical sides, the remaining sides thereof having interlocking means selected from the aforesaid group. The vertical side of any and every block having interlocking means on all its four vertical sides which is in contact with a vertical side of a similar block interlocks therewith by coaction of complementary interlocking means. The blocks at each of the four corners of the substantially rectangular area 8 have two plane adjacent vertical sides, and two adjacent vertical sides having interlocking means which coact with complementary interlocking means of adjacent blocks. The remaining blocks used to build up the area 8 have one plane vertical side and three vertical sides having interlocking means thereon. Thus of the blocks having at least one plane vertical side and at least two vertical sides having interlocking means thereon, it will be observed that all interlock with adjacent blocks on at least one vertical side, whilst on opposite sides of the area these latter blocks are assembled with their plane sides in alignment so as to

present a straight laterally extending vertical face such as 12. The blocks defining the two remaining opposite sides of the area present an interrupted laterally extending vertical face on each of said sides.

A first set of substantially rectangular areas 8, 9, 10, 11, of equal width along the plane sides thereof, are arranged as a strip having plane ends and sides presenting interrupted laterally extending faces. A second set of areas, 8a and and so on is similarly arranged so that one of its sides is complementary to one of the sides of the first area. By having at least those areas (8 and 8a), which form the corresponding respective ends of the two strips, of different length (as measured between opposite plane sides of said areas) the lines of junction between adjacent areas of each strip are offset from the corresponding lines of junction in the adjacent strip.

Thus a limited movement is permissible between such areas by inclusion of the straight junction between adjacent areas of the same strip; in the case of spallage dismantling is simplified.

The purpose of having the straight lines of juncture between areas in each strip offset from the corresponding lines of juncture in adjacent strips is to decrease the possibility of weakness in the furnace arch, crown, or roof which might result if straight lines of juncture extended right across the furnace.

I claim:

1. In a furnace arch, crown, or roof: an area of refractory blocks each having four substantially vertical side faces, a top face and a bottom face comprising: a first set of blocks, each block having an interlocking means, selected from the group consisting of rib interlocking means and groove interlocking means complementary to said rib interlocking means, on each of their four vertical sides, and assembled so that each vertical side of any and every block of said first set in contact with a vertical side of an adjacent block of said first set interlocks therewith by coaction of a rib interlocking means and a complementary groove interlocking means: and a second set of blocks, each block having an interlocking means, selected from the aforementioned group, on at least two of its vertical sides, and having at least one plane vertical side, the blocks of the second set being assembled in interlocking relationship with one another on at least one vertical side and having their plane vertical sides in alignment so as to present, on two opposite sides of said area, straight lateral faces formed by said aligned laterally extending vertical faces of said second set of blocks.

2. In a furnace arch, crown, or roof: a first substantially rectangular area of refractory blocks each having four substantially vertical side faces, a top face and a bottom face comprising: a first set of blocks, each block having an interlocking means, selected from the group consisting of rib interlocking means and groove interlocking means complementary to said rib interlocking means, on each of their four vertical sides, and assembled so that each vertical side of any and every block of said first set in contact with a vertical side of an adjacent block of said first set interlocks therewith by coaction of a rib interlocking means and a complementary groove interlocking means: and a second set of blocks, each block having an interlocking means, selected from the aforementioned group, on at least two of its vertical sides, and having at least one plane vertical side, the blocks of the second set being assembled in interlocking relationship with one another on at least one vertical side, and having their plane vertical sides in alignment so as to present, on two opposite sides of said area, straight lateral faces formed by said aligned laterally extending vertical faces of said second set of blocks; in combination with a second substantially rectangular area constructed similarly to said first area and disposed so that one of the straight lateral faces of said second area bears against one of the straight lateral faces of the first area.

3. In a furnace arch, crown, or roof built up from a plurality of substantially rectangular areas of refractory blocks each having four substantially vertical side faces, a top face and a bottom face, each area comprising: a first set of blocks, each block having an interlocking means, selected from the group consisting of rib interlocking means and groove interlocking means complementary to said rib interlocking means, on each of their four vertical sides, and assembled so that each vertical side of any and every block of said first set in contact with a vertical side of an adjacent block of said first set interlocks therewith by coaction of a rib interlocking means and a complementary groove interlocking means: and a second set of blocks, each block having an interlocking means, selected from the aforementioned group, on at least two of its vertical sides, and having at least one plane vertical side, the blocks of the second set being assembled in interlocking relationship with one another on at least one vertical side, and arranged on two opposite sides of the area with their plane vertical sides in alignment to form plane sides presenting straight laterally extending vertical faces, each of the two remaining sides of the area presenting an interrupted laterally extending vertical face; a first set of areas each constructed as aforesaid and all having equal width as measured along their plane sides, arranged plane side to plane side in a rectangular strip having plane ends and presenting interrupted laterally extending vertical faces along the sides thereof: in combination with a second set of areas similarly arranged as a strip of which one side is complementary to one side of the first-mentioned strip, at least those corresponding areas in each strip forming the respective ends thereof being of different length as measured between opposite plane sides of each area so that a line of junction between plane sides of adjacent areas in one strip is offset from the corresponding line of junction in the other strip.

HERBERT JONES.