Dec. 11, 1928. 1,694,534

W. M. DUNCAN

FURNACE ARCH

Filed June 13, 1921 2 Sheets-Sheet 1

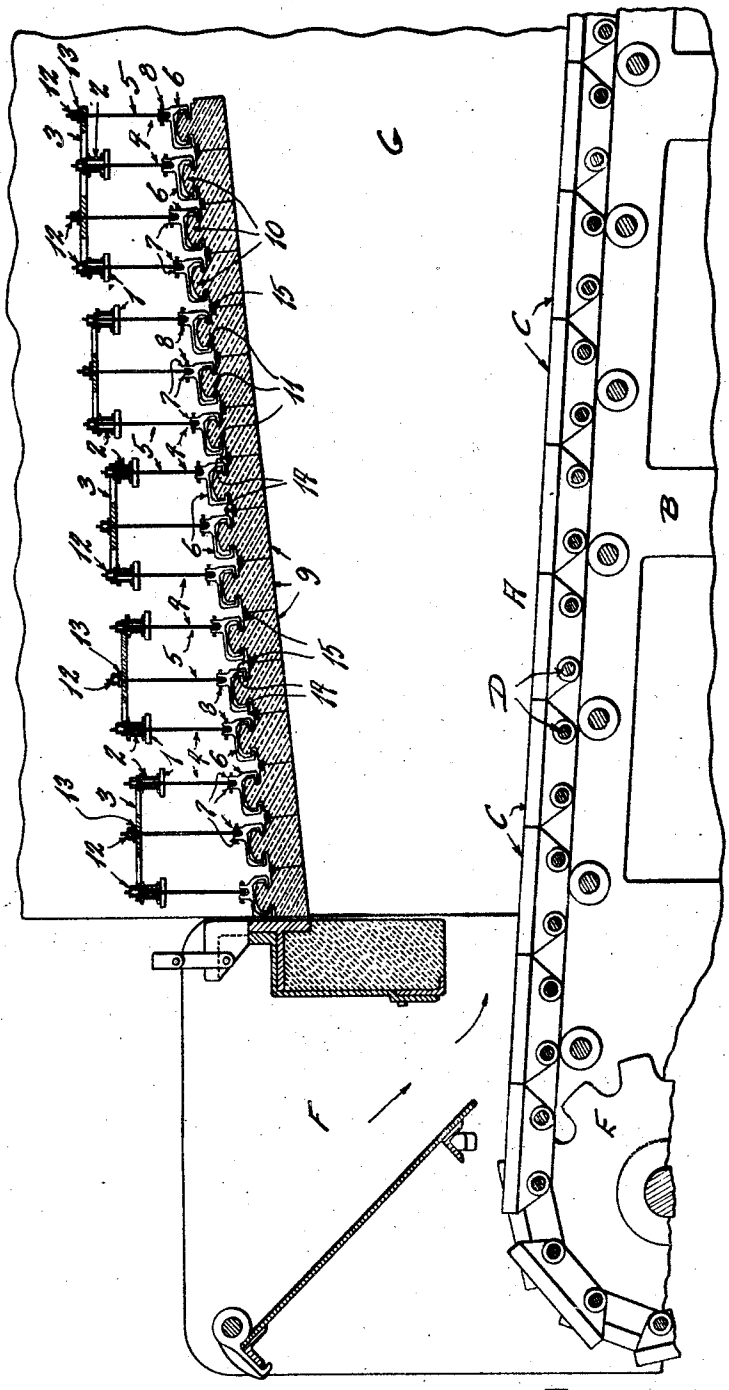


Fig. 1.

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FIG II

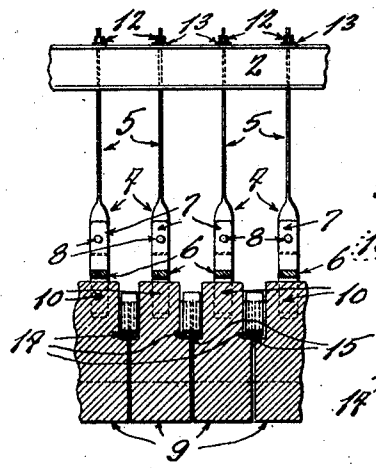


FIG III

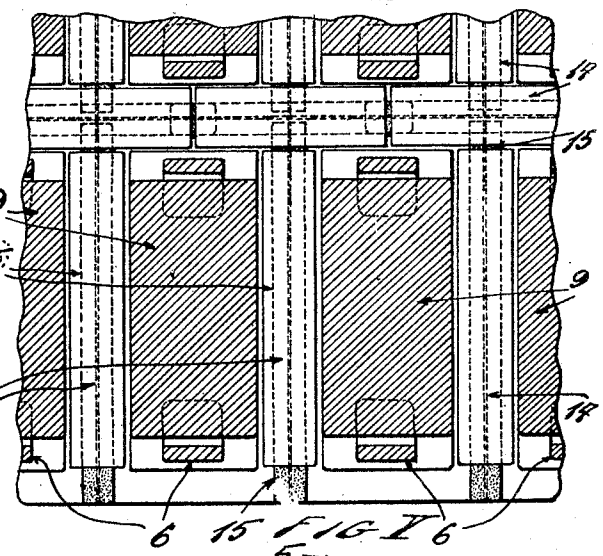


FIG IV

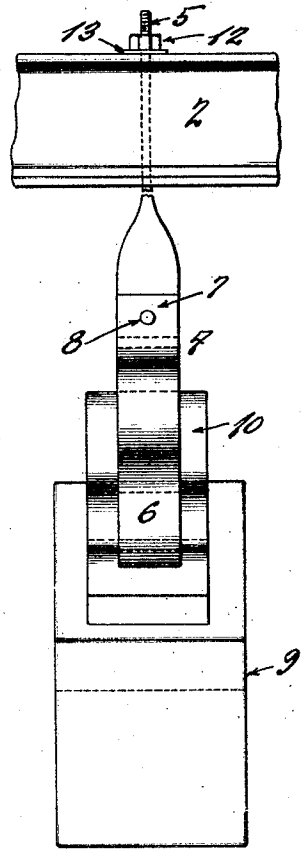
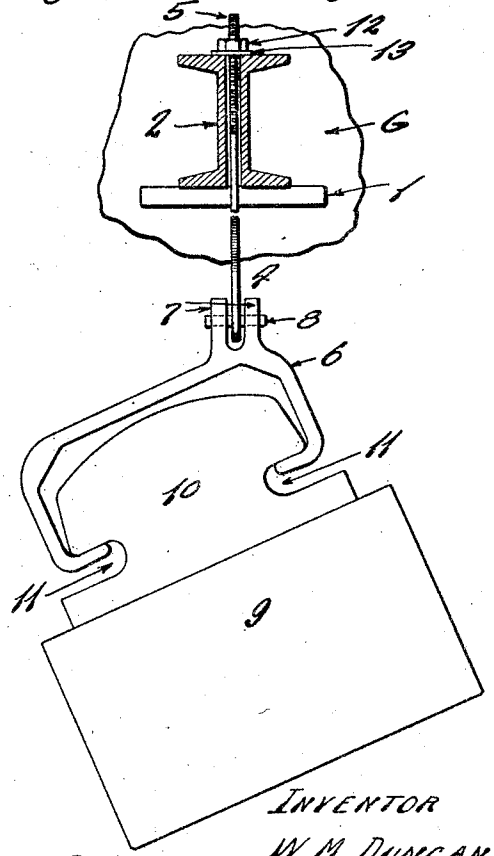


FIG I



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UNITED STATES PATENT OFFICE.

WILLIAM M. DUNCAN, OF ALTON, ILLINOIS.

FURNACE ARCH.

Application filed June 13, 1921. Serial No. 477,054.

My invention relates to that character of arches used in furnaces for the combustion of fuel which are known as ignition arches. Arches of this description commonly comprise a plurality of heat radiating blocks which are mounted in a variety of ways upon suitable supports. Because of the intense heat to which the heat radiating blocks of an ignition arch are subjected they frequently become impaired and when this happens it is necessary to remove the impaired block and replace it with a new one, an operation which heretofore has entailed quite an expenditure of time and labor due to the fact that it was often necessary to remove a number of the unimpaired blocks before the block it was desired to remove was reached, and after this block was removed and a new block substituted it was of course necessary to replace the unimpaired blocks in their original positions.

One object of my present invention is to provide an ignition arch from which any individual heat radiating block may be removed without disturbing any other block in the arch.

Another object of my invention is to provide a means whereby the heat radiating blocks which comprise the ignition arch may be individually adjusted whereby said arch is provided with a smooth inner face even though there are inaccuracies and variations in said blocks.

Still another object is to provide an ignition arch wherein the heat radiating blocks are so positioned as to provide a space between each block and the adjacent block whereby said blocks may expand when subjected to a change in temperature without danger of the blocks being fractured, a means being provided whereby the spaces may be closed to prevent the passage of air therethrough.

Briefly stated my improved ignition arch comprises supporting members which are secured at their ends to the side walls of the furnace and which extend transversely of said furnace. Short intermediate supporting members extend longitudinally of the furnace and are supported by having their opposite ends fixed to two adjacent transverse supporting members.

Secured to and depending from said supporting members are removable and vertically adjustable suspension rods, each of which is provided at its lower end with a hanger adapted to support one of the heat radiating blocks of which the arch is composed.

By this arrangement any individual block in the arch may be removed without disturbing the other blocks, and because the suspension rods are adjustable any block may be adjusted vertically with relation to the adjacent blocks.

To allow room for expansion of the blocks said blocks are so provided as to provide a space between each block and the adjacent block and to prevent the passage of air through these spaces I provide closures which will hereinafter be fully described.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown the preferred embodiment of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claim hereunto appended.

Fig. I is a fragmentary vertical section through a furnace showing my improved ignition arch in place therein.

Fig. II is a fragmentary vertical section showing a plurality of heat radiating blocks with their associated suspension devices and a fragment of a main supporting member.

Fig. III is an enlarged fragmentary horizontal section through a plurality of heat radiating blocks showing the closures whereby air is prevented from passing through the spaces around the heat radiating blocks.

Fig. IV is an enlarged end elevation of a heat radiating block with its suspension member.

Fig. V is an enlarged side elevation of a heat radiating block with its suspension device, the supporting member from which said block is suspended being shown in section.

To illustrate the invention I have shown a mechanical stoker comprising an endless chain grate A supported by a frame B. The chain grate comprises grate links C connected by means of pivot rods D arranged transversely of the grate. Any desired number of sprocket wheels, such as that indicated by the reference character E, are provided to transmit movement to the endless chain grate A. The fuel passes from a hopper F

to the top face of the grate, as indicated by arrows in Fig. I.

Fixed to the side walls G of the furnace by means of bearing plates 1, which are secured to said side walls, are a plurality of supporting members 2. These supporting members which are fixed at their ends to the bearing plates 1 in any suitable manner, comprise a pair of channel beams placed back to back with a space between.

Arranged transversely to the supporting members 2 and fixed at their ends to pairs of adjacently positioned supporting members 2, are intermediate supporting members 3, the purpose of which together with the utility of the supporting members 2 will be pointed out.

Secured to, and depending from said supporting members 2 and 3 are a plurality of suspension devices 4, each of which comprises a suspension rod 5 which passes through and depends from its supporting member, and a hanger 6 comprising a strap having the shape of an inverted U and being provided with inturned ends, the purpose of which will be hereinafter explained. Each hanger 6 is provided with a pair of ears 7, and each suspension rod 5 is provided with a flattened portion at its lower end located between two of the ears 7. A pin 8 passes through said ears and said flattened portion of the rod whereby they are pivotally secured together.

Supported by the suspension devices 4 are a plurality of heat radiating blocks 9, one of which is supported by each suspension device. Each heat radiating block 9 is provided with a reduced upper portion 10, said reduced portion having marginal grooves 11 formed in its end faces.

To attach one of the heat radiating blocks to its associated hanger it is necessary to insert the inwardly extending ends of the strap portion of said hanger into the grooves 11 of said heat radiating block. This is accomplished by bringing said hanger to a position where the inturned ends thereof are in alinement with the grooves 11 in the block 9 and sliding said hanger longitudinally of said block to its proper position thereon.

The means of securing each suspension rod 5 to its supporting member 2 comprises a nut 12 which engages the threaded portion of said rod 5, said nut 12 as will be observed by referring to Fig. V is of sufficient width to span the open space between the channel bars between which the rod 5 extends, and the nut bears against the washer 13 which is interposed between said nut and the top faces of said channel bars. Thus each heat radiating block is securely fixed to the supporting member with which it is associated.

The heat radiating blocks 9 are not always accurately manufactured and when there is a variation in the height of said blocks it is not always possible to provide the arch with a smooth inner face. This is remedied in the present invention by manipulating the nuts 12 whereby each heat radiating block may be individually adjusted with relation to the adjacent blocks.

By referring again to Fig. V of the drawing it will be noted that the ears 7 are located at such position on the hangers 6 as to cause the heat radiating block attached thereto to assume an inclined position and because the suspension rod 5 is alined with the center of gravity of said suspended block it will stay in such position. This permits the heat radiating blocks to be suspended in inclined positions with a slight space between each block and the adjacent block whereby said block may expand when subjected to changes in temperature without danger of injury to the block. To prevent the passage of air through these spaces between the heat radiating blocks, I provide closures 14 each of which preferably comprises a slab of tiling of sufficient width to overlap the edges of adjacent heat radiating blocks and span the space therebetween. A strip of asbestos or similar material 15 is interposed between each of said closures and said blocks to effect a more positive seal, one of said strips of material overlapping the other at points where two of said strips meet to prevent a leakage of air at that point.

I claim—

An inclined heat-radiating arch comprising heat-radiating blocks separated from each other to permit expansion thereof, and suspension members, each supporting only one of said blocks, each of said suspension members and the center of gravity of the block supported thereby being vertically alined and at an oblique angle to the face of the block.

In testimony that I claim the foregoing I hereunto affix my signature.

WILLIAM M. DUNCAN.