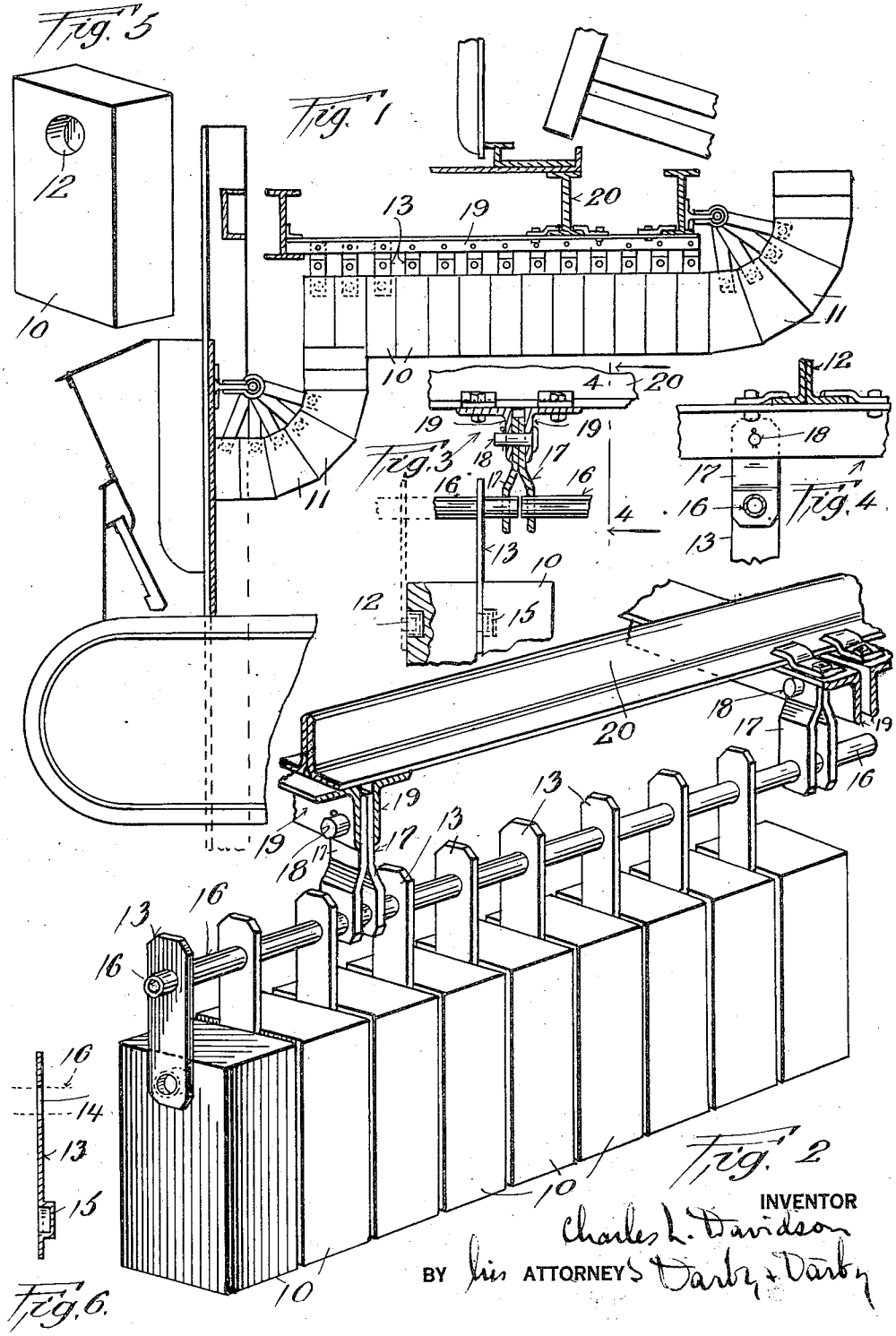
Dec. 16, 1924. 1,519,364

C. L. DAVIDSON

FIRE ARCH STRUCTURE

Filed Oct. 24, 1921



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Patented Dec. 16, 1924. 1,519,364

UNITED STATES PATENT OFFICE.

CHARLES L. DAVIDSON, OF NEW YORK, N. Y.

FIRE-ARCH STRUCTURE.

Application filed October 24, 1921. Serial No. 509,783.

To all whom it may concern:

Be it known that I, CHARLES L. DAVIDSON, a citizen of the United States, residing in the city of New York, county of New York, and State of New York, have made a certain new and useful invention in Fire-Arch Struetures, of which the following is a specification.

This invention relates to fire arch structures.

The object of the invention is to provide a fire arch structure in which the fire bricks composing the arch are supported for individual removal, separately and independently, for repair or replacement, without disturbing the other bricks in the structure.

A further object of the invention is to provide a fire arch structure in which are employed fire bricks of standard commercial shapes, and support them in the structure separately and independently for individual removal or replacement.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts all as will be more fully hereinafter set forth as shown in the accompanying drawing and finally pointed out in the appended claims.

In the accompanying drawing,

Fig. 1 is a view in vertical longitudinal section of a portion of a furnace showing a fire arch structure embodying the principles of my invention as applied to one type of furnace;

Fig. 2 is a view in perspective, parts broken off and in section, showing a structure of suspension of fire bricks in an arch structure, in accordance with the principles of my invention;

Fig. 3 is a broken detail view illustrating the manner of suspending the fire brick, in accordance with the principles of my invention;

Fig. 4 is a view in section on the line 4—4, Fig. 3, looking in the direction of the arrows;

Fig. 5 is a detail view in perspective, showing the fire brick of standard commercial shape formed to receive an individual supporting strap, in accordance with my invention;

Fig. 6 is an edge view of a suspending strap for the fire brick.

The same part is designated by the same reference numeral wherever it occurs throughout the several views.

In the construction of fire arches for furnaces, it is the customary practice to employ a lining of tiles or fire bricks in order to protect the metal framework from the effects of the heat generated in the furnace. Experience has shown that in the construction of fire arches, specially shaped tiles or fire bricks are frequently required to be of large size, and they are expensive as compared with ordinary standard commercial shapes of tiles or fire bricks for use in the structure of arches. Again it often happens that many different shapes of tiles or fire bricks are required for the installation of a single furnace. Experience has demonstrated that the large size of tiles or fire bricks frequently "spall off" due to rapid and unequal heating effects thereon, and when this takes place, the iron work of the setting becomes exposed to the intense heat of the furnace, thereby causing warping and burning frequently to the point of putting the entire structure out of service. When a brick or tile becomes "spalled off" or injured by burning or otherwise, and it becomes necessary to replace it, difficulty is encountered in effecting such replacement. In many types of commercial arches it is necessary to cool down the entire furnace, then remove all of the tiles or bricks carried on one support until the particular one to be removed is reached, and then, after placing in position the new tile or brick, the others previously removed are replaced in position. In accomplishing this it frequently happens that on account of the burning of the exposed surfaces, the tiles or bricks, on the respective sides of the particular row being worked on, are damaged, and have to be removed and replaced.

It has heretofore been endeavored to avoid the objections above pointed out, and others, by providing independently supported tiles or fire bricks whereby individual bricks may be removed without disturbing the others. It is among the special purposes of my present invention to provide a fire arch structure in which the bricks or tiles are separately and independently supported and may be individually removed and replaced in position, and in carrying out my invention I propose to provide such a structure capable of employing the standard com-

mercial sizes and shapes of tiles and bricks. To this end I propose to employ a thin hoop iron support for each brick, the thin hoop iron supports being suitably fabricated to engage the brick to be supported or suspended thereby, and also to be received upon a suitable support, and I arrange the support, in one form of embodiment of my invention, in the form of a rod or pipe which in turn is separated in short lengths capable of being easily removed to permit the individual bricks or tiles to be removed and replaced.

In the accompanying drawing I have shown a simple arrangement of suspended tiles or fire bricks for arches embodying my invention, wherein reference numeral 10 designates the fire brick or tiles to be individually supported. These are of standard commercial size and shape readily obtainable in the open market. Where curved surfaces of fire arch are to be provided, the bricks or tiles 11 may not be of rectangular shape but of suitable shape to conform to the curvature of the surface of the arch, but tiles or bricks for the curved portion of the wall or arch are nevertheless of commercial size and shape, and as in the case of the tiles 10, are not required to be specially constructed.

Each tile or brick is formed near one or both ends thereof with a depression or seat 12 (see Figs. 3 and 5). These depressions may either be pressed in when the bricks are molded, or they may be drilled or otherwise formed therein as desired at the time of constructing and erecting the arch, or when a replacement is to be made. Each brick is suspended or supported by a thin strip of metal indicated at 13, which may be stamped out of sheet metal, with a hole or opening 14 through the upper end thereof, and with the boss or lug 15 pressed out of the same at the other end thereof. This lug or projection 15 is adapted to be received in the depression 12 of the brick or tile. In addition to forming a seat to receive the boss or projection on the suspending strip 13, the seat or depression 12 in the tile, said seat when molded in the tile may also serve to receive a trade name or other designating or distinguishing mark. It is also obvious that the depression or seat may be formed in any desired shape so long as it affords a seat to receive the boss or projection on the suspending metal strip. The suspending straps 13 for a row or series of bricks or tiles are strung upon a supporting rod 16, which, if desired, may be in the form of a pipe constructed in sections of comparatively short length. The pipe sections 16 are suspended in any suitable or convenient manner from the setting or framework to permit the ready detachment and removal thereof. A simple arrangement is shown wherein suspending clips or plates 17 are employed for the ends of the supporting pipe sections 16, these clips or plates being detachably held by means of bolts 18 between the flanges 19 of angle bars which are supported from the girders 20 of the framework. By removing the clips 17, the supporting rods 16 or any desired section thereof may be withdrawn, thereby permitting any individual brick in the arch to be removed by driving the same upwardly or downwardly without disturbing any of the other bricks or tiles in the same row therewith or on opposite sides of the same row.

In this manner the bricks are suspended separately and independently, but are capable of being individually removed for repair or replacement without shutting down the furnace and without disturbance of other bricks of the arch.

A structure embodying my invention of suspended separately and independently removable bricks or tiles may be applied to the side walls as well as to the fire arch of furnaces, and in other situations where separate and independent individual removal of the tiles or bricks is desired.

From the foregoing description it will be seen that I provide an exceedingly simple, inexpensive and efficient fire arch structure, employing only such sizes and shapes of tiles or bricks as may be readily and easily procured in the open market, as well as other parts of the supporting or suspension devices and in the structure that I have shown and described as one practical embodiment of my invention it will be seen that several tiles or bricks may be readily and easily detached, removed or replaced separately and individually without disturbance of others in the same tier or row or in adjacent tiers or rows.

Having now set forth the objects and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention and desire to secure by Letters Patent is:

1. In a fire arch structure, the combination with a supporting member, and carrier members arranged in sections, each section being detachably connected to said supporting member, of thin metal strips strung upon said carrier member sections, and each having a laterally extending boss or projection, and fire bricks or tiles each having a depression or seat formed therein to detachably receive a projection or boss on one of said metal strips.

2. In a fire arch structure, the combination with a supporting beam, supporting clips detachably connected to said beam, and a supporting member arranged in short-length sections, each section being detach-

ably supported by said clips, of thin metal strips strung upon said supporting member sections, and each having a lateral boss or projection, and a fire brick or tile having a depression formed therein adapted to detachably receive the boss or projection on said strip.

3. In a fire arch structure employing fire bricks or tiles of standard commercial sizes and shapes, each having a seat or depression formed therein, the combination with thin metal strips, each having a laterally extending boss or projection adapted to be removably received in a seat or depression in a brick or tile, each strip also having a perforation therethrough, in combination with a supporting member extending through the perforations in said strips, and means to detachably support said supporting member.

4. In a fire arch structure employing fire bricks or tiles of standard commercial sizes and shapes, each having a seat or depression formed therein, the combination with thin metal strips each having a laterally extending boss or projection adapted to be removably received in a seat or depression in a brick or tile, each strip also having a perforation therethrough, in combination with a supporting member extending through the perforations in said strips, said supporting member arranged in short-length sections, and means to independently and detachably support each section of said supporting member.

5. In a fire arch structure employing fire bricks or tiles of standard commercial sizes and shapes, each having a seat or depression formed therein, the combination with thin metal strips, each having a laterally extending boss or projection adapted to be removably received in a seat or depression in a brick or tile, in combination with a pipe from which said strips are suspended, suspending clips for said pipe, and means to detachably support said suspending clips.

6. In a fire arch structure employing fire bricks or tiles of standard commercial sizes and shapes, each having a seat or depression formed therein, the combination with thin metal strips, each having a laterally extending boss or projection adapted to be removably received in a seat or depression in a brick or tile, in combination with a pipe from which said strips are suspended, said pipe being arranged in independent sections, and means to support each section for independent removal.

7. In a fire arch structure employing fire bricks or tiles of standard commercial sizes and shapes, each having a seat or depression formed therein, the combination with thin metal strips, each having a laterally extending boss or projection adapted to be removably received in a seat or depression in a brick or tile, in combination with a pipe from which said strips are suspended, said pipe being arranged in independent sections, suspending clips for each pipe section, and means to removably support the suspending clips of each pipe section.

In testimony whereof I have hereunto set my hand on this 14th day of October A. D. 1921.

CHARLES L. DAVIDSON.