UNITED STATES PATENT OFFICE.

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METHOD OF REPAIRING BRICK FURNACE-ARCHES.

1,132,028.


To all whom it may concern:

Be it known that I, PATRICK J. O’DONNELL, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Repairing Brick Furnace-Arches; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to improvements in a method of repairing brick furnace arches, and it consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described and then pointed out in the claims.

Figure 1 is a vertical, transverse section of the fire box of a water tube boiler in line 1—1 of Fig. 3. Fig. 2 is a like section disclosing my newly invented method of repairing the burned out arch of such a fire box. Fig. 3 is a longitudinal, vertical section in line 3—3 of Fig. 1. Fig. 4 is a bottom plan showing an arch as it generally appears when burned out. Fig. 5 is a plan of a device employed in my method of repairing such arches.

Fire brick arches for mechanically stoked water tube boilers are usually built with comparatively little rise in the center thereof. As a result, the intense flame is diverted toward the side of the fire box and strikes the arch near the junction of the heels thereof and the sides of the firebox a short distance from the front of the same. This flame in passing toward the rear or combustion chamber soon burns away the heels of the arch throughout almost its entire length, so that in the course of a short period of time the same collapses and a rebuilding thereof becomes necessary. In actual practice an arch 7 feet wide by 10 feet long has a useful life of approximately four months, after which the present practice is to wreck the same and rebuild it; the cost of which work ranges from $50.00 to $60.00 for each rebuilding.

In practicing my invention, I do not wreck the arch at all. On the other hand, I support the same underneath throughout its area, except at the burnt portion or portions, and bodily jack up the arch so as to be free from any support on the heels or footings thereof. This jacking up loosens the fire brick adjacent the burned out portion, which portion extends transversely from three to six courses of brick from the sides of the fire box and almost the entire length thereof. After the arch is wholly supported upon suitable jacks, I operate from the interior of the fire box and cut away all burned and partially burned brick from the arch and the sides of the firebox adjacent thereto and replace the same with new brick, setting the latter in fire clay in the usual manner. Just as soon as this is completed, I lower the jacks and permit the arch to again rest on its footing, and after allowing the arch to set for a day to permit the fireclay to thoroughly harden, the arch will be found to be as good as an entirely new arch. The cost of this repair averages $12.50 and it may be repeated almost indefinitely.

Referring now to the drawings 10 indicates the furnace as a whole and 11 the grates therein, while 12 illustrates the fire arch and 13 and 13 the upper, inner longitudinal edges thereof. The sides of the furnace are represented by the numerals 14 and 14, while 15 and 15 are the heels or footings of the arch formed in connection with the said walls 14 and 14. The relieving arch for the fire arch is indicated at 16 and its purpose is to support the brick work 17 and front end of a boiler 18, so that the fire arch is relieved of all superimposed weight. At 19 and 19, Figs. 2 and 4, is indicated generally the extent of the burned out portion of an arch 12, prior to repair thereof. In Fig. 2 I illustrate the means employed in making repairs in accordance with my invention. I first place under the arch a series of planks 20 the full length thereof and the total width minus the burnt portion of said arch. Then underneath these planks I place two turning irons 21 of the proper curve; one iron near the front of the arch and the other near the rear, and under these, supported by the grates 11, I place suitable jacks 22. This done, I gradually raise the turning irons and planking by means of the jacks until the former are in solid contact with the under side of the arch. Simultaneous manipulation of the jacks is now continued until the arch is entirely free from its footings 13 and 13 and is wholly sup-
ported by the planking 20, the turning irons 21, and the jacks 22. It is now a simple matter to cut out and remove the burnt out brick surrounding the burnt out portions of the arch and to replace the same with new brick properly set in fire clay. As soon as these bricks are placed the jacks are at once lowered and the arch again permitted to rest upon the footings, which completes the job.

In the turning irons 21 are produced a plurality of spaced apart holes 23, into which are entered studs 26 of beveled heads 27, mounted upon the jacks 22, the object of which being to prevent possible slippage of said jacks.

Attention is now directed to the vast saving in time and money by the employment of my invention over the present practice. Now, when the upper inner edge of an arch is burned out, the same, the relieving arch 16, and the brickwork 17 are wrecked or pulled down and entirely rebuilt—a loss of several days' time, whereas by my method, the whole work can be performed in a day at a saving of from $40.00 to $50.00 over the present modus operandi.

Having thus fully described my invention I claim as new, and desire to secure to myself by Letters Patent of the United States:

1. The art of repairing brick furnace arches, which, consists in bodily elevating and wholly supporting said arch free from its footings so that said arch may elongate slightly between its ends, and thus remove the endwise pressure upon said arch, and then cutting out and removing the burnt bricks and defective portions of said arch, replacing the same with new brick set in fire clay, and finally lowering said arch to again rest upon its footings and thus again apply endwise pressure upon said arch.

2. The art of repairing brick furnace arches, which consists in wholly supporting said arch from underneath, by a temporarily arranged support, the top surface of which extends nearly the entire length of said arch and is curved to correspond to the curve of the bottom of the arch, elevating the said support and said arch and lifting the ends of said arch free from its footings or end supporting abutments, then cutting out and removing the burnt and defective bricks, fitting new bricks in place thereof properly set in fire clay and finally lowering said arch support to restore the ends of said arch to their supporting position upon the footings or end abutments, and again apply endwise pressure to said arch.

In testimony whereof I have set my hand in the presence of two subscribing witnesses.

PATRICK J. O'DONNELL.

Witnesses:

WILLIAM O. STARK,

W. HARDING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."