May 1, 1962 W. R. McLAIN 3,032,327

APPARATUS FOR CLEANING OPEN HEARTH FURNACE ROOF

Filed Sept. 4, 1959

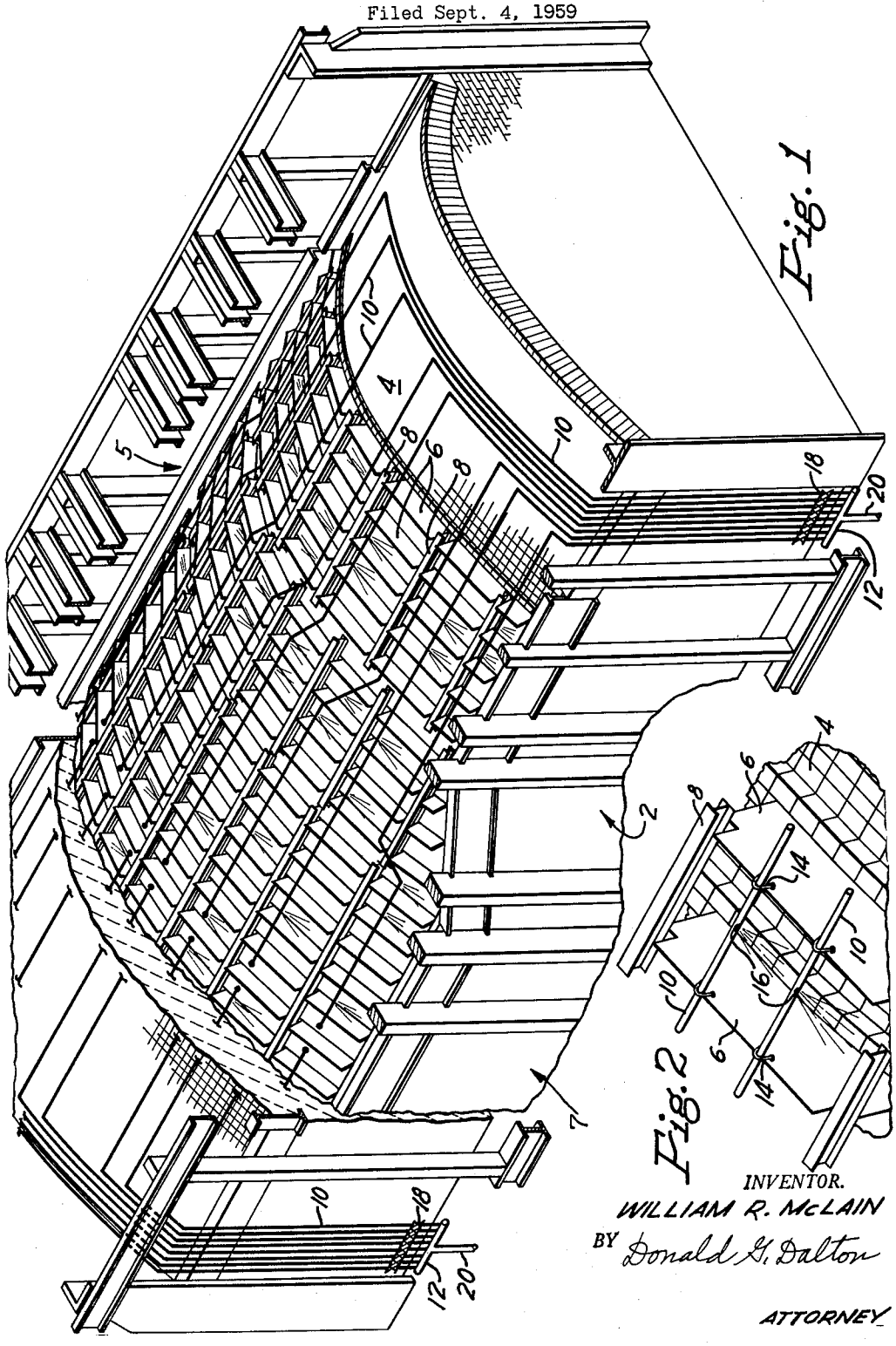


Fig. 1

Fig. 2

INVENTOR.
WILLIAM R. McLAIN
BY Donald G. Dalton
ATTORNEY

United States Patent Office

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APPARATUS FOR CLEANING OPEN HEARTH FURNACE ROOF

William R. McLain, Chicago, Ill., assignor to United States Steel Corporation, a corporation of New Jersey

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1 Claim. (Cl. 263—44)

The present invention relates generally to open hearth furnaces and more particularly to apparatus for cleaning the upper surface of the arched roof of an open hearth furnace.

Bricks made of chrome magnesite or other basic refractory are used in building open hearth furnace roofs due to the fact that basic brick open hearth roofs have been found to have longer operating life, require less maintenance and withstand higher operating temperatures within the furnace than do furnace roofs constructed of other types of refractories. However, in order to obtain these benefits it is essential that the basic brick open hearth roof be kept clean while the furnace is operating since basic brick in an open hearth roof burns readily if its cold or upper face is insulated while the furnace is operating. As is well known, the atmosphere in an open hearth furnace shop is laden with dust made up of particles of graphite, dolomite and other materials. The dust settles out of the atmosphere continuously and accumulates on the furnace roofs. Even a relatively slight accumulation of dust on the furnace roof will act as an insulation blanket or layer on the brick of the roof thereby causing the roof to burn out prematurely. Therefore, it is important that the furnace roof be kept clear of dust accumulation while it is operating.

Some open hearth roof constructions present an irregular or uneven upper surface including pockets, corners, slits, etc., formed by upwardly projecting plates, beam or other structural elements spaced therealong, which not only are difficult to clean but also cause dust to accumulate in spotty layers more quickly than relatively smooth surface roofs. One example of an open hearth furnace roof having an irregular upper surface is shown in copending application Serial No. 744,733 filed June 26, 1958.

It is, accordingly, the primary object of my invention to provide apparatus for blowing the dust from the arched roof of a furnace.

This and other objects will become more apparent after referring to the following specification and attached drawings, in which:

FIGURE 1 is a partial perspective view of an open hearth furnace having the apparatus of the invention installed thereon; and

FIGURE 2 is an enlarged detail partial view showing method of fastening the pipes of the apparatus of the invention to the roof plates.

Referring more particularly to the drawings reference numeral 2 designates an open hearth furnace having an arched basic brick roof 4. The roof 4, a front wall 5, and a rear wall 7 are provided with upstanding roof plates 6 aligned in spaced transversely extending rows along its length. The roof is also provided with longitudinally extending hold-beams 8.

The structure just described is old and is not claimed

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as my invention the details of which will now be described.

The apparatus of the invention comprises a grid of pipes 10 extending over each half of the furnace roof from a header 12 disposed on the tapping side of the furnace adjacent each end thereof. The pipe sections extending over the roof are supported by the upper edges of the roof plates 6 and are secured thereto by means of U-clips 14 which are welded to the plates 6. Each of the pipes 10 is provided with air outlets 16 spaced along the portion of the length thereof extending along the roof. The air outlets are preferably positioned between row of plates 6.

A valve 18 is provided in each of the pipes at the header for controlling the passage of compressed air or other fluid under pressure therethrough. A conduit 20 connects the header with the source (not shown) of the fluid. The opposite ends of the pipes are capped.

In operation, the valves 18 are manipulated, one at a time, once every eight hours for a period of approximately one minute to cause compressed air to pass through the pipes and blow the roof clean of dust. If desired, the apparatus may be operated at more or less frequent intervals and in any other sequence.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claim.

I claim:

In an open hearth furnace having a non-insulated basic roof, a front wall, and a rear wall, said roof being arched transversely along its length and having a forward portion extending toward the front wall of said furnace and a rearward portion extending toward the rear wall of said furnace, the improvement therewith of apparatus for removing dust from said roof to maintain the upper surface of the roof non-insulated and cool while exposed to the atmosphere which comprises a grid of pipes overlying said roof, the pipes in said grid extending longitudinally of said roof along the majority of their lengths, a header to which said pipes are connected at one end, a connection from said header to a source of fluid under pressure, control means connected with said pipes whereby fluid can be introduced into each of said pipes selectively, said pipes having fluid-discharge holes spaced therealong close to said roof, the holes in the pipes overlying the forward portion of said roof being directed angularly toward said roof in the direction toward the front wall of said furnace, the holes in the pipes overlying the rearward portion of said roof being directed angularly toward said roof in the direction toward the rear wall of said furnace, said holes being adapted to discharge fluid under pressure onto said roof to thereby remove dust therefrom.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No, 3,032,327 May 1, 1962

William R. McLain

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 58, after "brick roof 4" insert -- , a front wall 5, and a rear wall 7 --; same column, lines 58 and 59, strike out ", a front wall 5, and a rear wall 7 are" and insert instead -- is --.

Signed and sealed this 11th day of September 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents