(No Model.)

J. KENNEDY.

WATER COOLING DEVICE FOR FURNACES.

No. 479,430. Patented July 26, 1892.

Fig. 4.

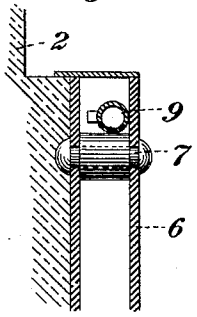


Fig. 1.

Fig. 2.

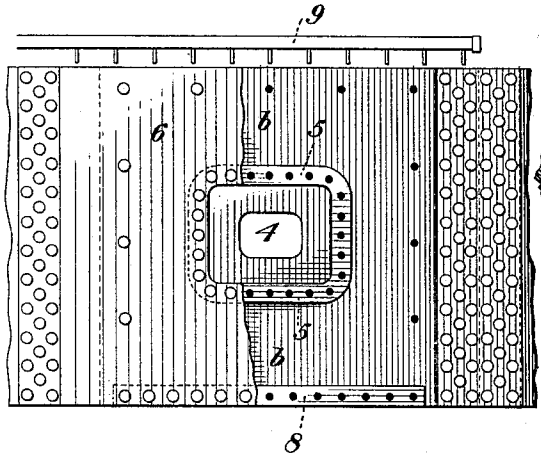
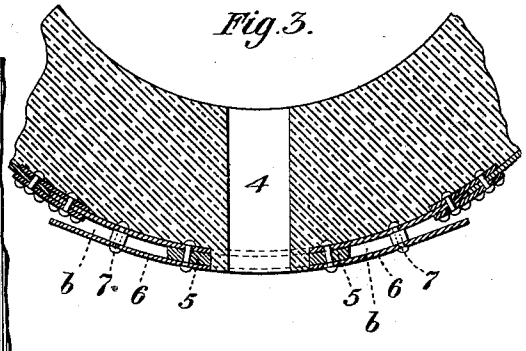


Fig. 3.



WITNESSES

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JULIAN KENNEDY, OF PITTSBURG, PENNSYLVANIA.

WATER-COOLING DEVICE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 479,430, dated July 26, 1892.

Application filed February 19, 1892. Serial No. 422,150. (No model.)

To all whom it may concern:

Be it known that I, JULIAN KENNEDY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Water-Cooling Devices for Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows a vertical section of the lower part of a blast-furnace, the section being through the iron tap-hole, which is provided with my improved water-cooling appliance. Fig. 2 is a view, on a larger scale, showing the iron tap-hole with part of the front plate broken away to illustrate better the construction. Fig. 3 is a horizontal section on the line III III of Fig. 1 on the same scale as Fig. 2. Fig. 4 is a vertical sectional view showing a modified arrangement of the water-supply pipe.

Like symbols of reference indicate like parts in each.

In the operation of the blast-furnaces trouble has been experienced heretofore in providing efficient water-cooling devices for cooling the iron tap-hole. The cooling of the wall of the furnace at other places around the hearth can be effected conveniently by discharging water upon the outer casing or jacket; but this has not been possible at the iron-tap because of the danger which would result from the access of water to the parts of the tap-hole from which the iron flows. Resort has been had, therefore, to water-cooled plates built in the furnace-wall; but the liability of such device to burn out or to become choked, especially where muddy water is used, and the difficulty of replacing them when choked or burned make them very undesirable.

The object of my invention is to obviate these difficulties and to provide a construction by which the wall of the furnace about the iron tap can be cooled as well as any other part of the exterior wall of the hearth and with as little danger.

To this end it consists in providing the furnace at the tap-hole with a splash-plate or exterior shell having a hole registering with the tap-hole and provided with an intermediate frame or guard, which separates the tap-hole from the space between the furnace-casing and said shell, water being discharged upon the furnace in the intermediate space, which is open at the top or at one or both of its ends, so as to afford easy access to the interior to prevent clogging up of the space and consequent danger of explosion, &c.

In the drawings, 2 represents the wall of a blast-furnace hearth, having the usual metal jacket 3, and 4 represents the iron tap-hole, which is formed in the wall, in register with a similar opening in the jacket.

5 is a frame or guard, which surrounds the tap-hole and projects laterally outwardly from the jacket.

6 is the splash-plate, consisting of a metal shell placed upon the frame 5 parallel with the metal jacket and separated thereby from the shell, so as to afford an intermediate space *b*. This plate projects to a considerable distance, as shown, beyond the sides and above and below the tap-hole and is secured to the furnace-jacket at proper intervals by rivets and separators 7. The joints between the frame 5 and furnace-casing and between the frame and splash-plate are tightly caulked, so as to prevent the leakage of water. The space *b* is open at the top and ends or at one of these places, but may be closed at the bottom by a metal bar or rib 8.

To cool the furnace-jacket within the splash-plate, I employ a water-supply pipe 9, set at the top of the space *b* and adapted to discharge continuous jets of water on the jacket. This water flows down the jacket within said space and around the frame 5, and thus keeps these parts cool, preventing their destruction by the heat of the furnace; but because of the presence of the frame the water is prevented from getting access to the iron tap-channel, and the device is thus rendered quite safe. The water escapes from the space *b* at the ends of the splash-plate, and thence flows into the usual discharge-gutter surrounding the furnace. By having the space *b* open at the ends access to the interior is afforded, enabling it to be cleaned readily by means of an iron rod if it should become clogged with dirt.

In Fig. 4 I show a modified arrangement of

the water-supply pipe, in which, instead of setting the pipe 9 below the splash-plate, it is set above the top thereof and in the space between the plate and furnace, this space being covered by a plate 10, which serves to prevent entrance of dirt and fine pieces of slag.

I claim as my invention—

A furnace having a tap-hole, a guard or frame surrounding the same, an exterior splash-plate fixed to the guard or frame and open to afford access to the intermediate space, and a water-supply pipe adapted to wet the furnace-walls within the splash-plate, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 15th day of February, A. D. 1892.

JULIAN KENNEDY.

Witnesses:
W. B. CORWIN,
H. M. CORWIN.