

(No Model.)

F. W. GORDON.
FURNACE PROTECTING.

No. 379,694.

Patented Mar. 20, 1888.

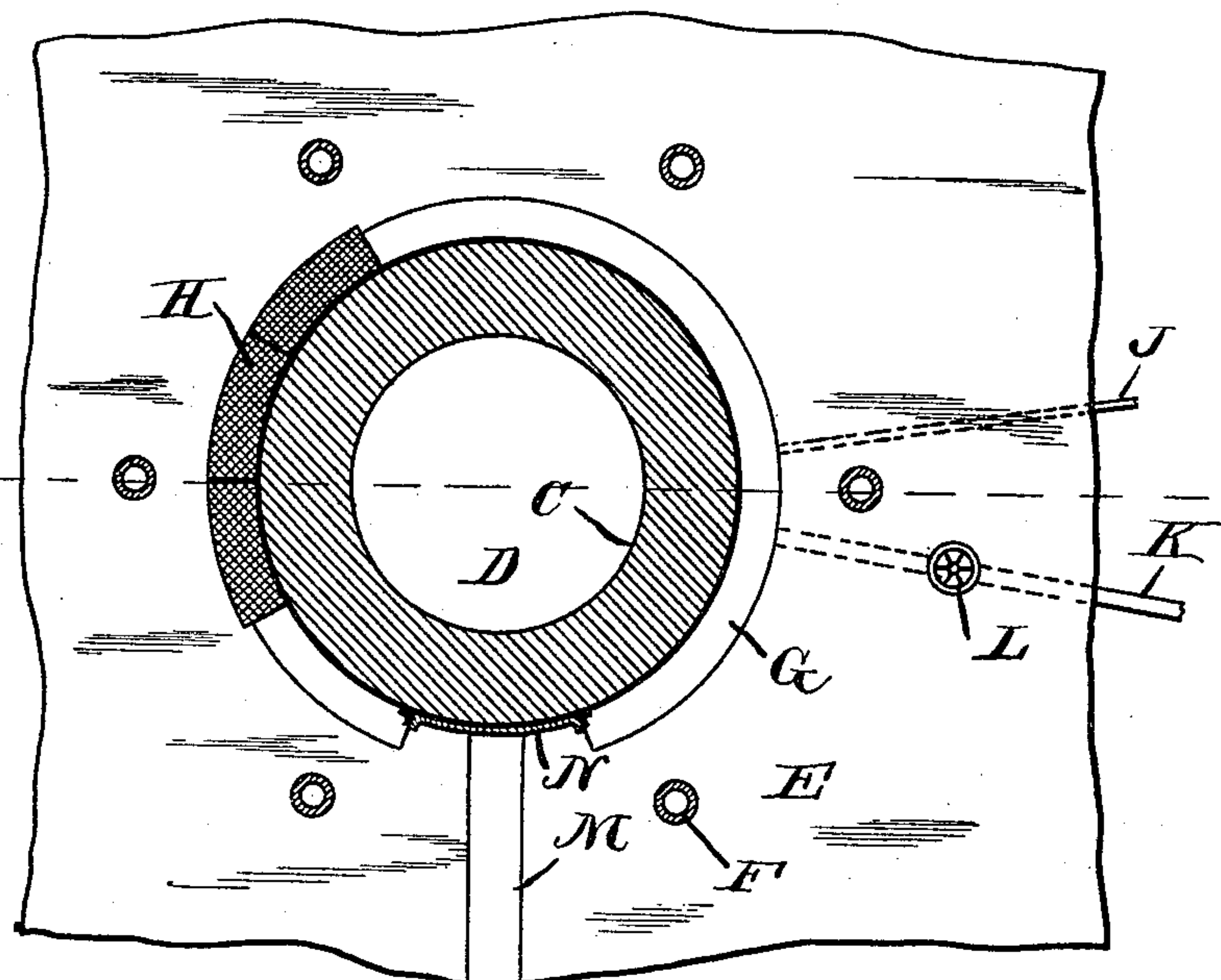


FIG. 2.

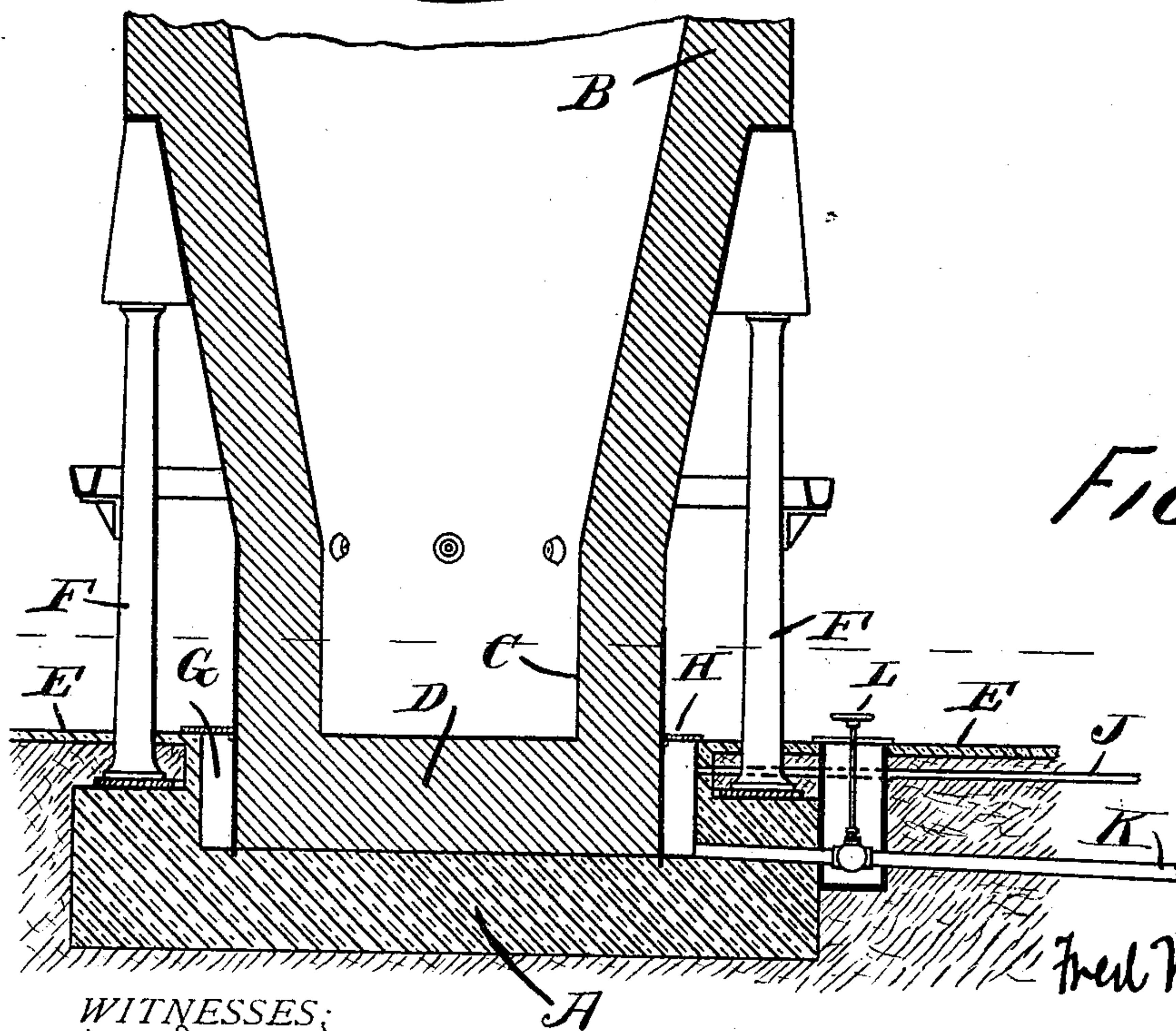


FIG. 1.

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FRED W. GORDON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
GORDON, STROBEL & LAUREAU, (LIMITED,) OF SAME PLACE.

FURNACE-PROTECTING.

SPECIFICATION forming part of Letters Patent No. 379,694, dated March 20, 1888.

Application filed August 3, 1887. Serial No. 246,001. (No model.)

To all whom it may concern:

Be it known that I, FRED W. GORDON, of Philadelphia, Philadelphia county, Pennsylvania, have invented certain new and useful
5 Improvements in Furnace-Protecting, of which the following is a specification.

My invention pertains to blast-furnaces, and relates to the protection of the bottom of the same, and will be readily understood from the
10 following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical diametrical section of the lower portion of a blast-furnace embodying my improvements; and Fig. 2, a horizontal
15 transverse section of the same through the hearth, in a plane between the hearth-bottom and the tuyeres.

In the drawings, A represents the foundation of the furnace; B, the stack-wall; C, the
20 hearth-wall; D, the hearth-bottom with its under surface resting upon the furnace-foundation; E, the working-level of the ground surrounding the furnace, this level corresponding substantially with the upper surface of the
25 hearth-bottom; F, the mantel-columns resting on the foundation and reaching upward to the mantel supporting the stack; G, an annular trough encircling the hearth-bottom, except, preferably, at the dam-plate, the bottom of
30 this trough extending downward to the level of the lower surface of the hearth-bottom; H, cover-plates laid over the trough around the hearth, a portion only of this plate-work being shown in position in Fig. 2; J, an open pipe
35 leading outwardly from the trough and in communication therewith a short distance below the top of the trough or the working-level E; K, a pipe leading outwardly from the bottom of the trough, and to be arranged to dis-
40 charge at some point below the level of the bottom of the trough; L, a valve in this pipe K, serving as a means by which communication through the pipe may be opened or closed; M, the usual iron trough, and N the usual
45 dam-plate.

The trough, while it may completely encircle the hearth, is preferably stopped at each side of the dam-plate, thus preventing iron from the tap-hole going into the trough. The trough
50 is to be kept nearly full of water, and the pipe

J, being always open, prevents the overflow of the same. The floor and outer wall of the trough may be formed of brick-work laid up with cement, and should be fairly water-tight. The hearth is, preferably, to be jacketed with
55 plate-iron carried down to the bottom of the trough and forming the inner wall thereof. Water may, if desired, be constantly sprayed against this jacket and allowed to trickle down into the trough. The bottom of the
60 trough, being far below the upper surface of the hearth-bottom and below the footing of the mantel-columns on the foundation, serves in cooling the outer portion of the entire hearth-bottom to its full depth, and serves to
65 prevent the iron from cutting outwardly under the mantel-columns. With the usual protection at the hearth the iron has been known to cut downwardly and outwardly and under-
70 mine the mantel-columns, and work far outside the circle of the columns, and at such a depth as to cause the danger to be unsuspected. When the trough is empty of water, it furnishes an inspection-recess reaching downwardly be-
75 low the footing of the mantel-columns, and far below the upper surface of the hearth-bottom, and shallow tap-holes in the floor of the trough permit investigation as to any outcutting which might have taken place in the
80 foundation. The trough is emptied of water by opening the valve L, the pipe K discharging upon a lower level than the bottom of the trough.

The hearth-jacket, if used, is carried down to the trough-bottom; but the inner lower por-
85 tion of the trough must not be water-tight, as it is essential to my improvement that the moisture penetrate inwardly under the hearth. The cutting of the hearth is thus confined to a directly downward course, and the column-
90 footings are free from danger. This result is not at all attainable by any water arrangement located outside the column-footings, or by any superficial cooling of the hearth-jacket at points above the level of the under surface
95 of the hearth-bottom.

If the hearth-jacket be omitted from the trough, the moisture will penetrate downwardly and inwardly in proper manner. If the jacket be employed, it must not be water-tight or the
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floor of the trough must not form a water-tight joint therewith. A brick trough-floor laid in cement to the jacket will be sufficiently permeable at the joint to permit the inward and
5 downward penetration of the water from the trough.

I claim as my invention—

1. In a blast-furnace, a furnace foundation, A, mantel-columns F, resting thereon and supporting the furnace-stack, a hearth, C, having a bottom, D, resting on the foundation at a point below the surrounding working-level, and an annular trough, G, provided with a permeable inner-wall bottom and encircling
15 the hearth, and having its bottom upon a level corresponding substantially with the lower surface of the hearth-bottom, combined substantially as and for the purpose set forth.

2. In a blast-furnace, a furnace-foundation, 20 A, mantel-columns F, resting thereon and sup-

porting the furnace-stack, a hearth, C, having a bottom, D, resting on the foundation at a point below the surrounding working-level, an annular trough, G, provided with a permeable inner-wall bottom and encircling the
25 hearth, and having its bottom upon a level corresponding substantially with the lower surface of the hearth-bottom, open pipe J, communicating with the upper portion of the trough, pipe K, communicating with the lowest portion of the trough and adapted to discharge at a point below the lowest portion of the trough, and valve L, adapted to open and close such last-mentioned pipe, combined substantially as and for the purpose set forth.

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Witnesses:

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