

(No Model.)

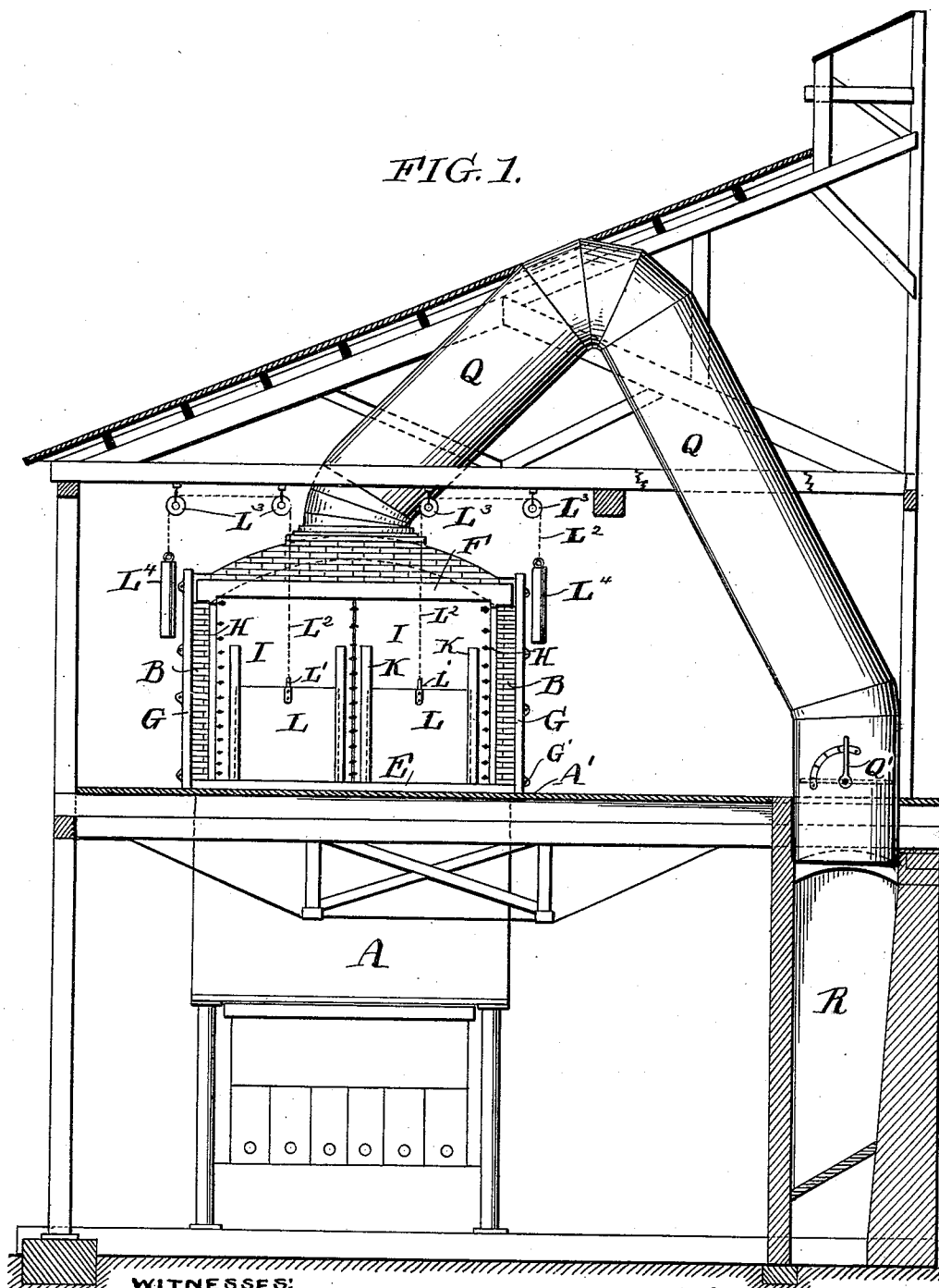
2 Sheets—Sheet 1.

M. W. ILES.
BLAST FURNACE TOP.

No. 484,018.

Patented Oct. 11, 1892.

FIG. 1.



WITNESSES:

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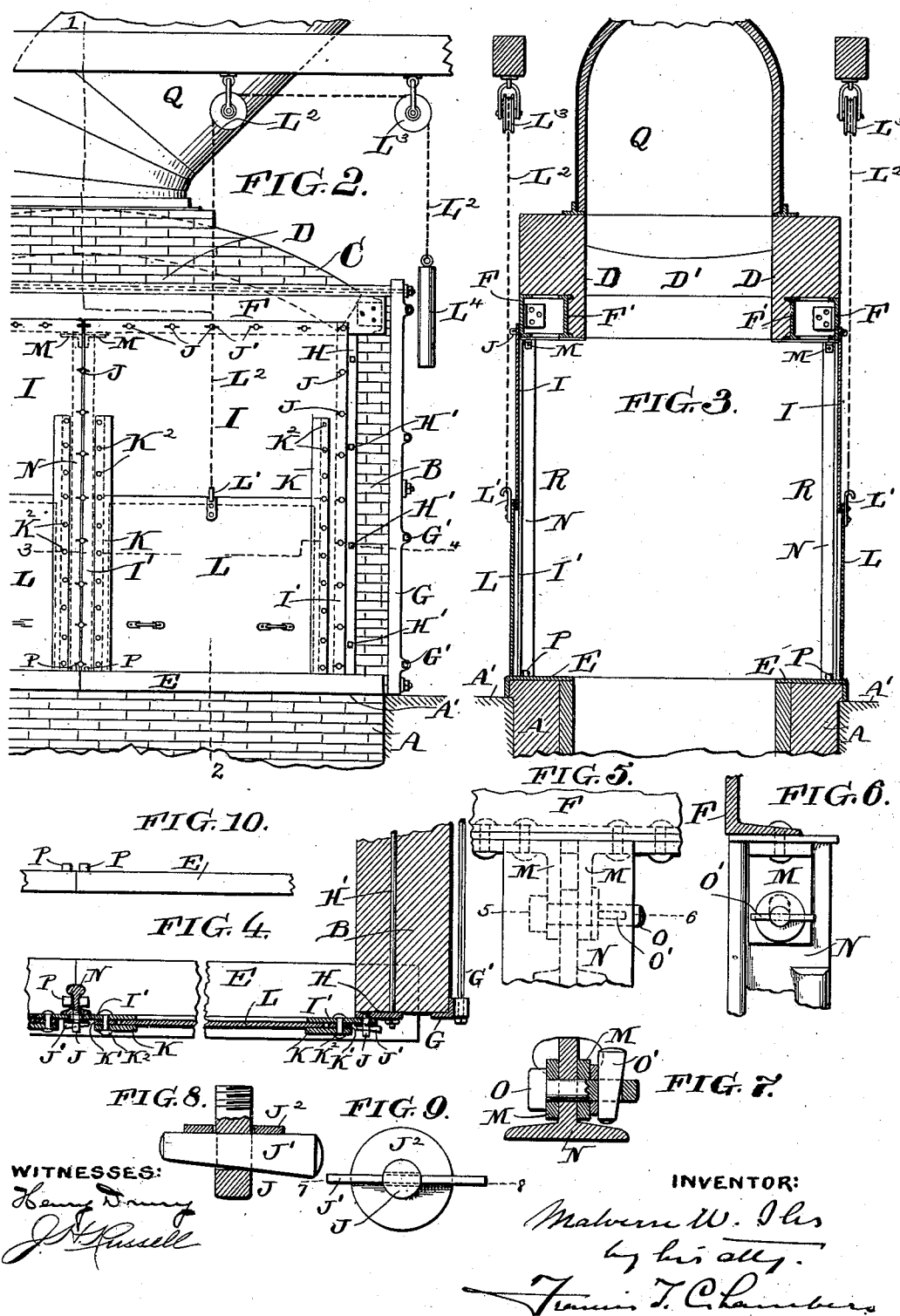
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UNITED STATES PATENT OFFICE.

MALVERN W. ILES, OF DENVER, COLORADO.

BLAST-FURNACE TOP.

SPECIFICATION forming part of Letters Patent No. 484,018, dated October 11, 1892.

Application filed May 25, 1892. Serial No. 434,245. (No model.)

To all whom it may concern:

Be it known that I, MALVERN W. ILES, of the city of Denver, county of Arapahoe, State of Colorado, have invented a certain new and useful Improved Blast-Furnace Top, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the construction of blast-furnaces, and especially, though not exclusively, to argentiferous lead-smelting and to copper-smelting.

The object of my invention is to so construct the top of the furnace as at the same time to insure an even central draft through the furnace, to prevent the escape of smoke, gas, and fumes into the furnace-room, and to provide ample facilities for the proper feeding and distribution of the ore and for the barring off of the walls of the furnace below the feed-floor. By "barring off" I mean knocking off from the walls the solid material which accumulates upon them.

The nature of my invention will be best understood as described in connection with the drawings, in which it is illustrated, and in which—

Figure 1 is a front elevation of a furnace constructed in accordance with my invention; Fig. 2, an enlarged and more detailed elevation of a portion of the furnace, showing the feed-doors thereof. Fig. 3 is a vertical section taken on the line 1 2 of Fig. 2. Fig. 4 is a horizontal cross-section taken on the line 3 4 of Fig. 2. Fig. 5 is an enlarged view showing details of construction. Fig. 6 is a side view of the device shown in Fig. 5; Fig. 7, a cross-section on the line 5 6 of Fig. 5; Fig. 8, a detailed view of the fastening device which I prefer to use, taken on the section-line 7 8 of Fig. 9; Fig. 9, a front view of the fastening device, and Fig. 10 a front view of a portion of the sill.

A indicates the body of the furnace, the end walls of which are carried up, as indicated at B, and the top of which (shown at D) is partly supported by an arched construction C and partly by beams F F', secured together by plates and resting on the end walls B. By this construction large apertures (indicated at R R in Fig. 3) are formed in the front and

back of the furnace above the feed-floor. Iron sill-plates E are secured at the bottom of this aperture, extending to a height of some inches—say six inches—above the level of the feed-floor. The purpose of thus elevating the sills is to prevent the barrows used in charging the furnace from being dumped directly into it, thus making it necessary to elevate the ore to insure the proper distribution. At the corners of the end walls B are secured angle-irons G G, &c., braced together by long bolts G', and at the inside corners plates H are secured along the outside edges of the walls, being firmly held in place, as by means of bolts passing through the masonry. N is a removable iron beam, preferably made, as shown, from a railway-rail, and so secured to the sill E and face-plate F at the top of the aperture as to be readily removable. As shown, the beam N is held in place on the sill E by lugs P P, extending up from the center of the sill, which fit between the head and bottom flanges of the rail. At the top of the rail or beam N the head is planed off to the level of the central web, so that this web can be readily inserted between lugs M M, which lugs are secured to the beam or plate F, as indicated in Fig. 5, and, of course, are situated directly opposite the lugs P P.

A convenient device for holding the beam N in position is indicated in Figs. 5, 6, and 7, consisting of a bolt O, which passes through the lugs M M and the web of beam N and is held by means of a wedge O', passing through a slot in the end of the bolt. I I are plates or doors extending across the top of the apertures between the beam N and the side plates H and having downwardly-projecting strips or extensions I' I', in effect making a rectangular opening in the bottom of each plate I, the dimensions of which are such as are suitable for the feed-doors of the furnace. The plates I are attached to the fixed plates H and F and to beam N, so as to be readily removable, most conveniently by means of wrought-iron pins, as indicated at J, (shown in detail Figs. 8 and 9,) these pins being provided with slots, into which fit wedges J', J² indicating a washer which it is advisable to use. The plates I are of course provided with slots or apertures, which permit the pins to extend through the plate when in position,

and the wedges J are then inserted, holding the plate securely in position, while at the same time permitting its ready removal by taking out the wedges.

- 5 To the plates I and down along their extensions I', I rivet guides K, held at a proper distance from the plates by means of an intervening strip K', the rivets being indicated at K², and in the guides thus formed are secured sliding doors L, properly counterbalanced by means of a weight L⁴, attached to a cord or chain L², which chain or cord is attached to an eye L' at the top of the door and passes over pulleys L³ L³. The take-off flue of the furnace extends from an opening D' at its top and is indicated at Q, Q' being a damper to regulate the draft, and R the dust-chamber or masonry flue, to which the conduit Q leads.
- 20 By my construction the draft through the furnace is central, no side of it being exposed to undue destructive action of the gases. In the ordinary process of feeding the furnace the feed-apertures are no larger than are necessary for that purpose and at the same time are properly distributed. Feed-apertures of this size are not sufficiently large to enable the furnace-men to get at the inside of the furnace when it is necessary to bar off accretions; but when this becomes necessary the removable plates I, carrying with them the doors L, can be rapidly and easily taken away, as can also the beam N, and we have then a broad high opening through the sides of the furnace, which enables the workmen to perform their task readily and speedily, the opening being closed easily and rapidly by replacing the beam and plates.

40 Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

- 45 1. In combination with a furnace having a smoke-flue at its top and openings through its sides above the feed-floor, one or more removable plates I, secured across the vertical apertures through which the furnace is fed, and sliding feed-doors secured to said plates by guides, which permit them to move thereon.

2. In combination with a furnace having a smoke-flue at its top and openings through its sides above the feed-floor, a removable vertical beam N, secured across said aperture, independently-removable plates I I, secured to said beam and to the top and sides of the furnace, and sliding feed-doors L, secured to said plates I by guides, substantially as shown and described.

3. In a furnace having a smoke-flue at its top and openings through its sides above the feed-floor, the combination of a plate E on the sill of the aperture, having lugs P P, a plate F at the top of the aperture, having lugs M M, facing-lugs P, a beam N, adapted to fit between lugs P P and M M, removable plates I, and means for securing said plates to beam N and the sides of the furnace, all substantially as and for the purpose specified.

4. In a furnace having a smoke-flue at its top and openings through its sides above the feed-floor, the combination of a plate E on the sill of the aperture, having lugs P P, a plate F at the top of the aperture, having lugs M M, facing-lugs P P, a beam N, adapted to fit between lugs P P and M M, a bolt O, and wedge O' for holding the top of beam N, side plates H, secured to the edges of the aperture, plates I, secured to the plates F and to the beam N by wedges, and sliding doors L, secured to plates I in guides, all substantially as shown and described.

5. In combination with a furnace having a smoke-flue at its top and openings through its sides above the feed-floor, an iron sill-plate E, extending above the feed-floor, iron top and side plates H H and F, permanently secured in place, a removable vertical beam N, means for securing said beam to the sill and top plate, removable plates I I, secured to the beam N and to the top and side plates, as described, and sliding doors L L, secured in guides on plates I I, all substantially as shown and described.

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Witnesses:

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