No. 733,196. PATENTED JULY 7, 1903.

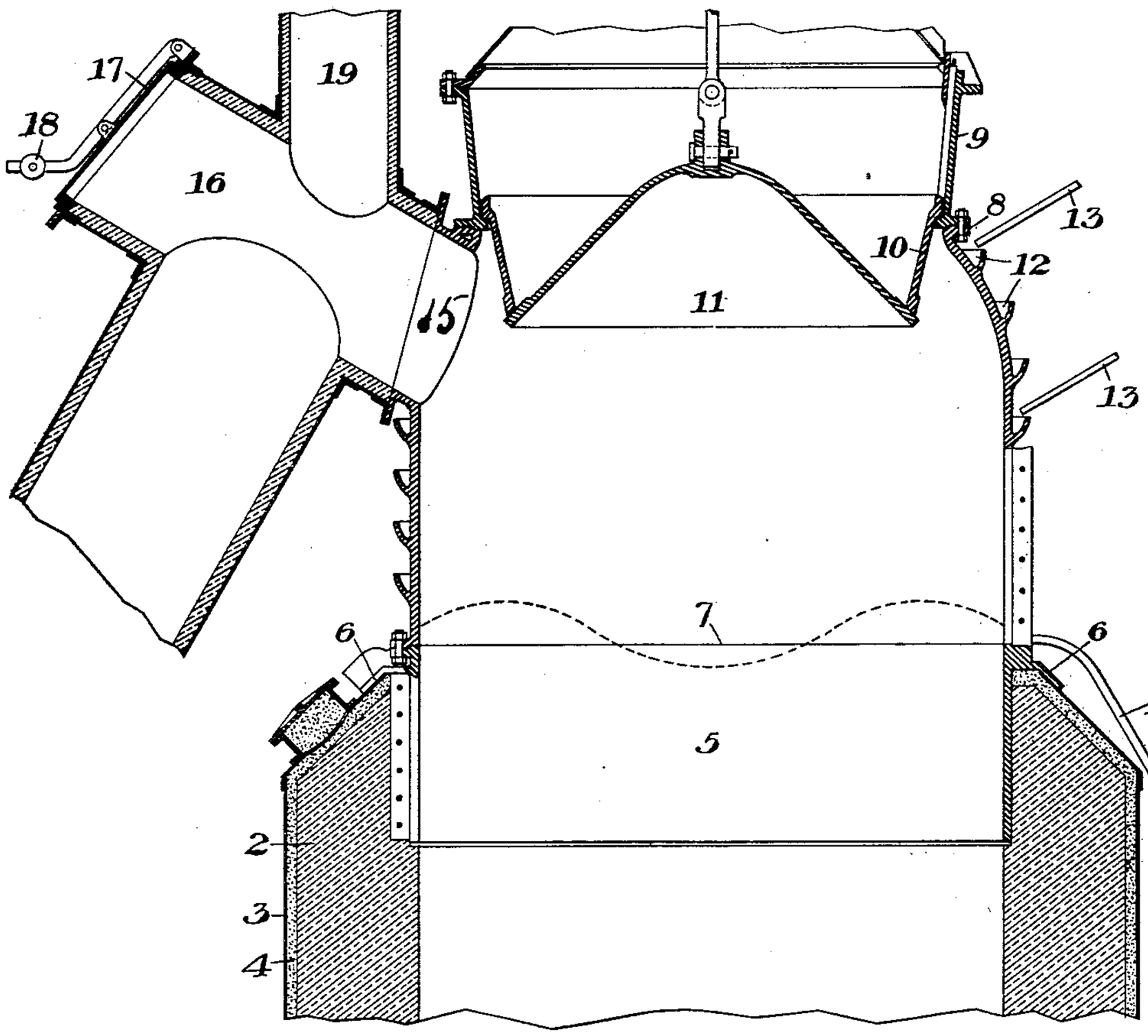
G. K. HAMFELDT & T. A. TESCH.

BLAST FURNACE TOP.

APPLICATION FILED MAY 14, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



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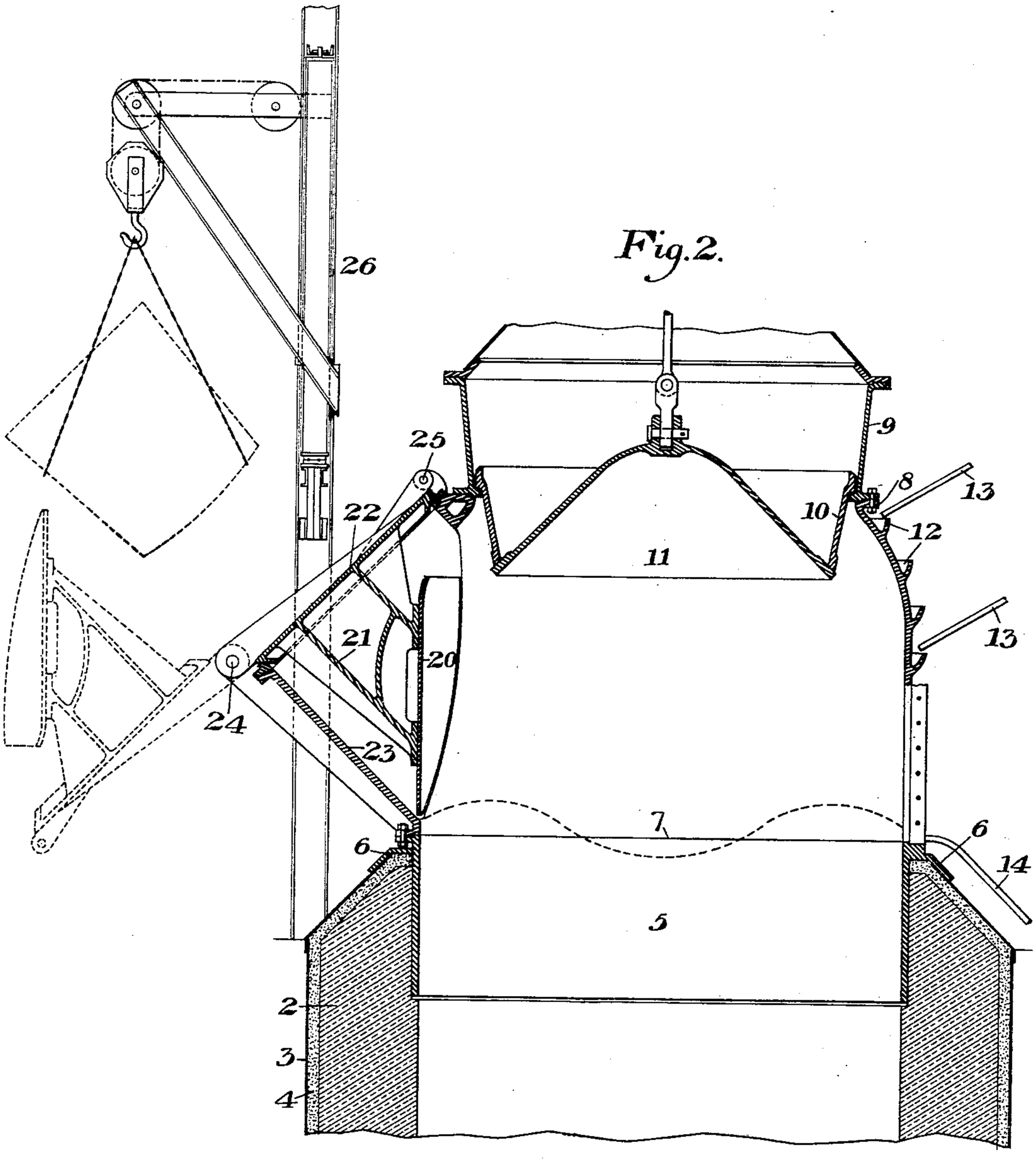
BLAST FURNACE TOP.

APPLICATION FILED MAY 14, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



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No. 733,196. Patented July 7, 1903.

UNITED STATES PATENT OFFICE.

GEORGE K. HAMFELDT, OF MUNHALL, AND TORSTEN A. TESCH, OF SWISSVALE, PENNSYLVANIA.

BLAST-FURNACE TOP.

SPECIFICATION forming part of Letters Patent No. 733,196, dated July 7, 1903.

Application filed May 14, 1902. Serial No. 107,257. (No model.)

To all whom it may concern:

Be it known that we, GEORGE K. HAMFELDT, of Munhall, and TORSTEN A. TESCH, of Swissvale, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Blast-Furnace Top, 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 is a central vertical section showing the top portion of a blast-furnace constructed in accordance with our invention. Fig. 2 is a similar view at right angles to the plane of Fig. 1.

Our invention relates to blast-furnace construction, and is designed to strengthen the top portion of the stack and to reduce the liability to sticking and slipping of the charge, also to render the top portion of the stack more durable and more easily repaired, and, further, to provide means for charging large pieces of metal or sculls which are too large for charging in the ordinary way.

In the drawings, 2 represents the usual masonry stack, 3 the outer shell, and 4 the loose filling between them. The masonry does not extend to the top of the stack, as in the ordinary construction, and the upper portion of the stack consists of a cylindrical metallic shell 5, which is preferably cast in sections, bolted together, as shown. This shell extends downwardly within the top of the masonry and projects a considerable distance above such masonry. It is preferably supported by the recess in the refractory portion and by a flange 6, which projects outwardly and downwardly over the masonry top. We have shown the metallic shell as divided transversely at 7, the upper and lower portions being bolted together; but the shell may be cast or otherwise formed in any desired number of parts.

The portion of the shell above the masonry is preferably contracted upwardly and inwardly, and is provided with a flange 8, to which the upper part 9 of the hopper is bolted. 10 is the lower part of the hopper, supported on the part 9, and 11 is the usual bell.

We prefer to cool the metallic shell in its upper projecting portion, and for this purpose we have shown troughs 12, a part of which are of successively larger diameter downwardly. These troughs may be made in separate arc-shaped portions or otherwise, as desired, and water is fed to the uppermost trough by a pipe or pipe 13, and thence overflows, trickling over the outer face of the shell and overflowing the successive troughs. The water may be withdrawn from the lower trough or trough-sections by a pipe or pipes 14, leading down to the ground-level.

The gas-outlet 15 is connected to the upper portion of the metal shell and is provided with a side extension 16, having an explosion-door 17, which is normally held closed by a weighted lever 18. 19 is the bleeder, leading upwardly from the gas-outlet. One or more of these gas-outlets may be employed, as desired.

To provide for the feeding in of large pieces of metal or sculls, we provide the shell upon one side with a large hole, which is normally closed by a plate 20, preferably conforming to the contour of the shell and secured to the inwardly-projecting bracket or filler portion 21 of a swinging door 22. This swinging door closes the outer end of an inwardly and downwardly inclined chute 23, the door being preferably pivoted at 24 and bolted in closed position 25, this bolt also forming a hinge. By removing one of the hinge-pintles the door may be swung open in either direction. To provide for the handling of the large pieces of metal or sculls, we preferably mount a small crane 26 at the top of the masonry stack by which the metal may be handled and swung into the charging-hole in the side of the shell.

In the operation of the furnace the stock-line is kept at about the level shown by dotted lines in Figs. 1 and 2. The charges as they drop upon the bell in its lowered position strike against the sides of the metal shell and drop upon the charge. We thus prevent the dropping stock from striking the masonry lining, and thus wearing it away in the zone around and below the charging-bell. The

water-cooling system prevents the shell from becoming overheated, and pieces too large for charging through the bell and hopper are inserted through the opening in the side of the shell.

The advantages of our invention result from the longer life of the furnace-top, the ease of repairing it, and the added strength of the structure. Lumps may be charged which heretofore must be broken up at considerable expense, while the top is comparatively cheap and not liable to get out of order. The sticking and slipping of the charge resulting from the eating away of the lining are largely avoided.

Many changes may be made in the form and arrangement of the shell and other parts without departing from our invention.

We claim—

1. A blast-furnace having an annular metal shell projecting above its masonry and having a contracted upper portion, a hopper supported on the contracted portion, and an outer annular cooling device for said shell; substantially as described.

2. A blast-furnace having an annular metal shell projecting above its masonry, and having a contracted upper portion, and outer annular cooling-troughs on said shell; substantially as described.

3. A blast-furnace having an annular shell projecting above its masonry, bell and hopper charging mechanism and a charging-opening in the side of said shell above the masonry; substantially as described.

4. A blast-furnace having an annular metal shell projecting above its masonry, bell and hopper charging mechanism, a charging-opening in the side of the shell above the masonry, a closure for said opening, and a crane arranged to feed lump material through said side charging-opening; substantially as described.

5. A blast-furnace having an annular metal shell projecting above its top, a gas-offtake leading from said shell above the masonry, said offtake having an explosion-door, and a bleeder leading upwardly from said offtake; substantially as described.

In testimony whereof we have hereunto set our hands.

GEO. K. HAMFELDT.
TORSTEN A. TESCH.

Witnesses:
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H. M. CORWIN.