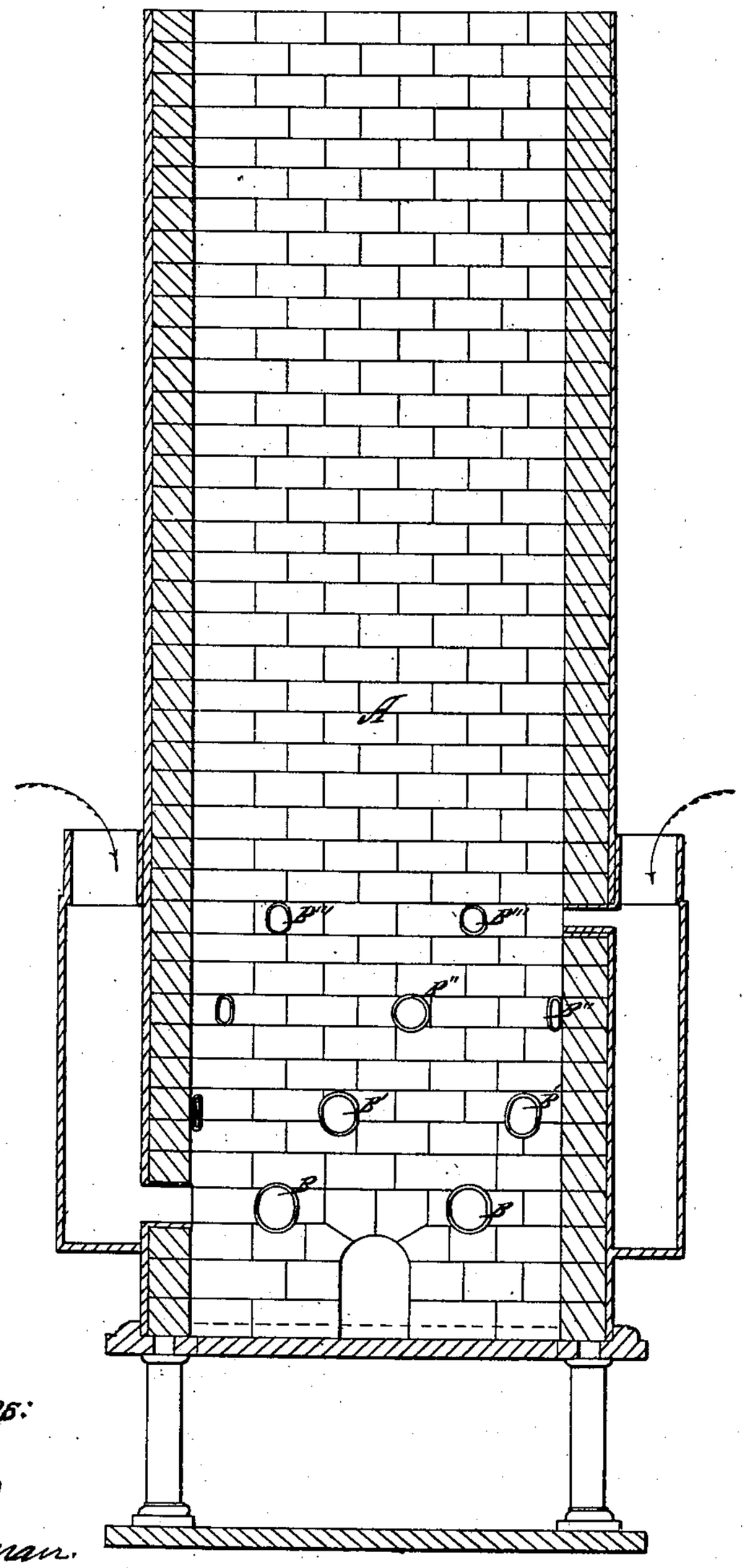
No. 60,440. PATENTED DEC. 11, 1866.

C. TRUESDALE.

CUPOLA FURNACE.



Witnesses:

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IMPROVEMENT IN CUPOLA FURNACES.

CHARLES TRUESDALE, OF CINCINNATI, OHIO, ASSIGNOR TO HIMSELF AND WM. RESOR, & CO., OF SAME PLACE.

Letters Patent No. 60,440, *dated December* 11, 1866.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that I, CHARLES TRUESDALE, of Cincinnati, Hamilton county, Ohio, have invented a new and useful improvement in Cupolas, and other Melting Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making part of this specification.

The object of this invention is to secure an active and uninterrupted melting action, especially towards the conclusion of the heat at which period the common cupola is liable to "fall of" in delivery of the metal in consequence of becoming clogged by the bridging of congealed slag, metal, cinder, &c., opposite and around the issues of the tuyeres. In the customary horizontal arrangements of tuyeres whose ventages are in a common plane, that portion of the metal, slag, &c., which descends near the wall, on coming in contact with the comparatively cold air from the tuyeres, becomes congealed, and forming an impenetrable barrier to the blast, deflects the same violently against the lining of the cupola near the issue of each tuyere, causing the fire brick or other lining material to burn out rapidly at those parts; moreover, when once a bridge has commenced forming the accumulated debris in front of each tuyere becomes the nucleus of farther accretions, until the entire area immediately above the tuyeres is obstructed by an arch of slag, cinder, &c., which arrests the melting process, and which is required to be laboriously removed before the furnace can be employed for another melting.

My improvement consists in the employment of several tiers of tuyeres, of which those of each tier above the lowest have a less issue or ventage than those below them, so as to distribute the blast in numerous equi-distant or nearly equi-distant jets all over that portion of the furnace devoted especially to melting, but with a gradual increase of blast toward the lower portion.

The accompanying drawing is a vertical section of a cupola embodying my improvement.

A is the wall of the cupola, and, B B′ B″ B‴, are successive tiers of tuyeres, of which those, B, in the lowest tier are the largest, and of which the succeeding ones are of gradually less area, those B‴ in the uppermost tier being the least. The blast action being thus distributed generally over the melting portion of the furnace, with a gradually greater intensity at the lower portions, effectually prevents the "bridging" of the melting space by accretions of slag, &c. By making the issues or ventages of each tier of tuyeres above the bottom one, somewhat less than those immediately below, I secure a gradual softening and reduction of the material, the smaller tuyeres, at and near the upper portion, operating to disintegrate the fragments of ore and flux, so as to prepare them for the melting action of the more powerful tuyeres below, and greatly accelerating the activity of the furnace and the delivery of molten metal. The tuyers in each ascending range may be either in vertical columns, or may have the oblique or alternate arrangement selected for illustration.

I claim herein as new and of my invention.

The provision in a cupola or blast furnace of the several tiers of tuyeres in an ascending series with diminished issues, substantially as set forth.

In testimony of which invention, I hereunto set my hand.

CHARLES TRUESDALE.

Witnesses:

GEO. H. KNIGHT,

JAMES H. LAYMAN.