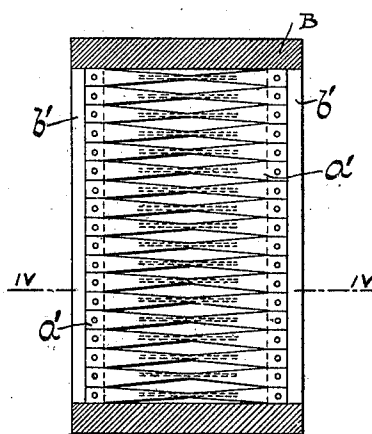
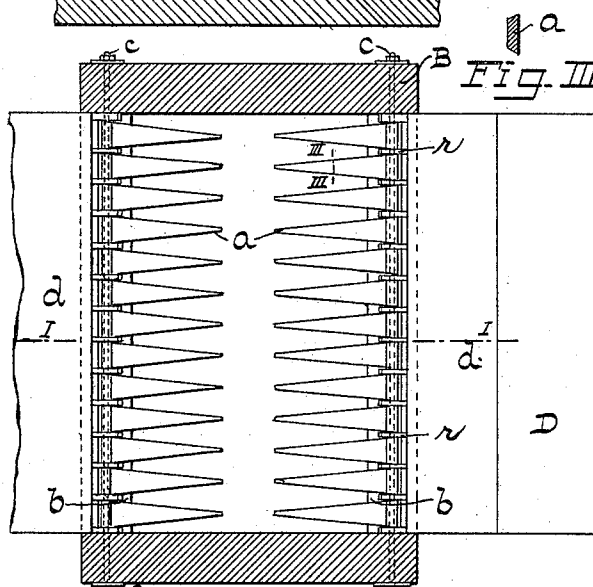
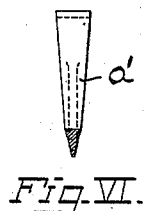
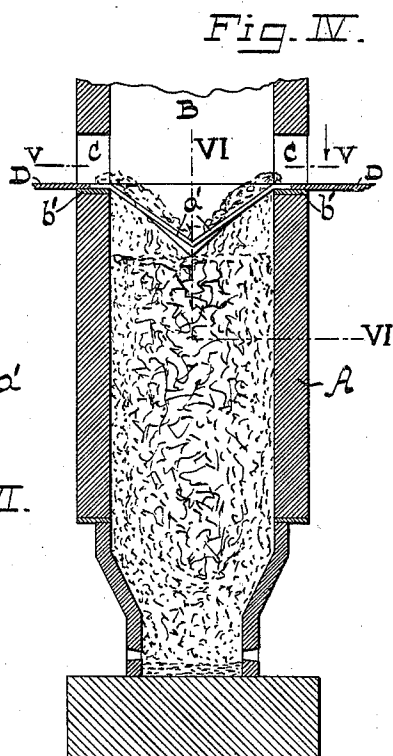
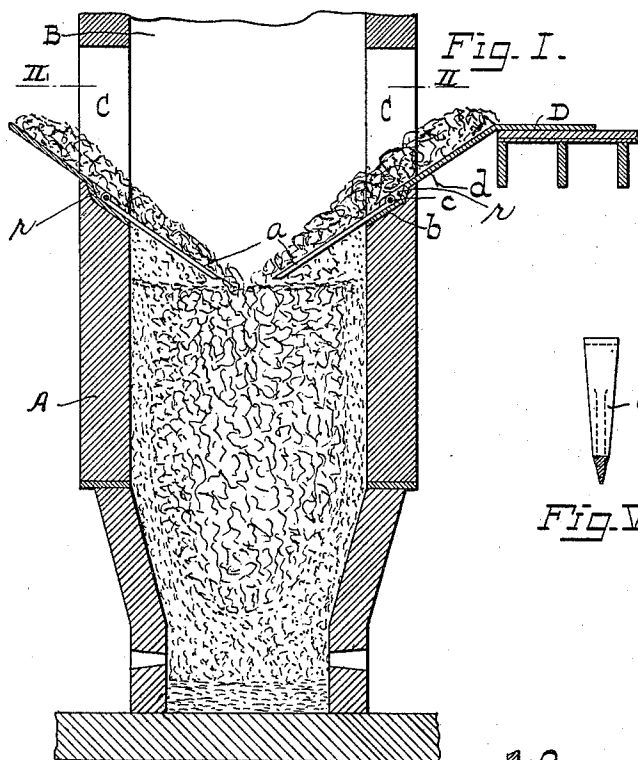


(No Model.)

R. H. TERHUNE.  
BLAST FURNACE.

No. 585,297.

Patented June 29, 1897.



WITNESSES:

Chas. W. Thomas.  
G. W. Eisenbraun

Fig. II.

INVENTOR:  
Richard H. Terhune,

BY  
Arthur du Sautoy,  
ATTORNEY

# UNITED STATES PATENT OFFICE.

RICHARD H. TERHUNE, OF SALT LAKE CITY, UTAH.

## BLAST-FURNACE.

SPECIFICATION forming part of Letters Patent No. 585,297, dated June 29, 1897.

Application filed January 21, 1897. Serial No. 620,018. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD H. TERHUNE, a citizen of the United States of America, and a resident of Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Blast-Furnaces, of which the following is a specification.

My invention relates to improvements in apparatus for charging blast-furnaces. The charge in a blast-furnace for the reduction of ores consists of materials of different degrees of fineness varying from the size of grains of sand to irregular pieces as large as one-eighth of one cubic foot. The relative position and distribution of these pieces in a furnace greatly affects the direction and strength of the ascending current of gases, which under ordinary circumstances have a tendency to pass upward principally along the walls in the direction of the least resistance, whereby their efficiency in drying and heating or preparing the ore is impaired.

The object of my invention is to prevent this tendency of the gases hugging the walls, and I accomplish this object by distributing the particles of the charge according to size, the finer particles toward the walls and the coarser ones toward the center.

My invention will be best understood by reference to the annexed drawings, in which—

Figure 1 is a vertical section of a blast-furnace on line I I of Fig. 2 embodying my invention. Fig. 2 is a horizontal section on the line II II of Fig. 1. Fig. 3 is a cross-section, on an enlarged scale, of the grate-bars on the line III III of Fig. 2. Fig. 4 is a vertical section of a furnace on the line IV IV of Fig. 5, showing a modified form of the charging apparatus. Fig. 5 is a horizontal section on the line V V of Fig. 4. Fig. 6 is a section on the line VI VI of Fig. 4.

Similar letters refer to corresponding parts in the several views.

Referring now to Figs. 1, 2, and 3, the letter A designates the stack of a blast-furnace; B, the chimney; C, the charging-openings; D, the charging-floor, and *b* the supporting-plates from which gratings extend toward the center of the furnace, said gratings being formed of inclined bars *a*, gradually narrowing or tapering toward their inner ends, so

that the clear spaces left between adjoining bars gradually widen toward the center of the furnace. As shown in the drawings, the bars *a* do not fully extend to the center, but leave a space between the inner ends of opposite bars somewhat wider than the spaces between adjoining bars. The bars *a* may, however, be made to extend to the center of the furnace. The cross-section of the bars I make by preference as shown in Fig. 3, the lower side being narrower than the upper, so as to prevent jamming of the charge. The inclination of the bar varies with the natural slope of the material. Generally an angle of about thirty-five degrees to the horizon will answer. At their inner ends the bars *a* rest upon the plate *b* and are hinged or hooked to a bolt *c*, passing through ribs or lugs *r* of the plate *b*. The bars *a* may be turned upon the bolt and exchanged by removing the bolt.

*d d* are feed-plates upon which the charge is dumped and is then screened in passing down over the gratings, the finest particles dropping through at or near the walls, while the coarser ones are carried more or less toward the center.

In Figs. 4, 5, and 6 I have shown a modification in which the grate-bars *a'* extend clear across the top of the furnace, the central cross-section being shown in Fig. 6.

My invention is not restricted to the specific construction of the apparatus here shown, since inclined gratings with openings the width of which increases from the outside toward the center may be constructed and supported in various ways.

What I claim as new is—

1. In a blast-furnace, a grating placed over the top of the furnace and inclined downwardly from the outside toward the center of the furnace; said grating being provided with openings gradually increasing in width from the outside toward the center of the furnace, substantially as and for the purpose specified.

2. In a blast-furnace, a grating placed over the top of the furnace and inclined downwardly from the outside toward the center of the furnace; said grating consisting of a series of inclined bars removably supported upon the stack, the spaces between the bars gradually increasing in width from the out-

side toward the center of the furnace, substantially as and for the purpose specified.

3. In a blast-furnace, gratings placed over the top of the furnace and inclined downwardly from two opposite sides toward the center of the furnace; said gratings consisting of inclined bars hinged or hooked to a bolt passing through a ribbed supporting-plate, the spaces between the bars gradually increasing in width from the outside toward the cen-

ter of the furnace, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 11th day of January, 1897.

RICHARD H. TERHUNE.

Witnesses:

HENRY G. McMILLAN,  
WM. F. COLTON.