

John P. Arey's Feeder for Roasting Furnaces.

Fig. 1
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PATENTED AUG 8 1871

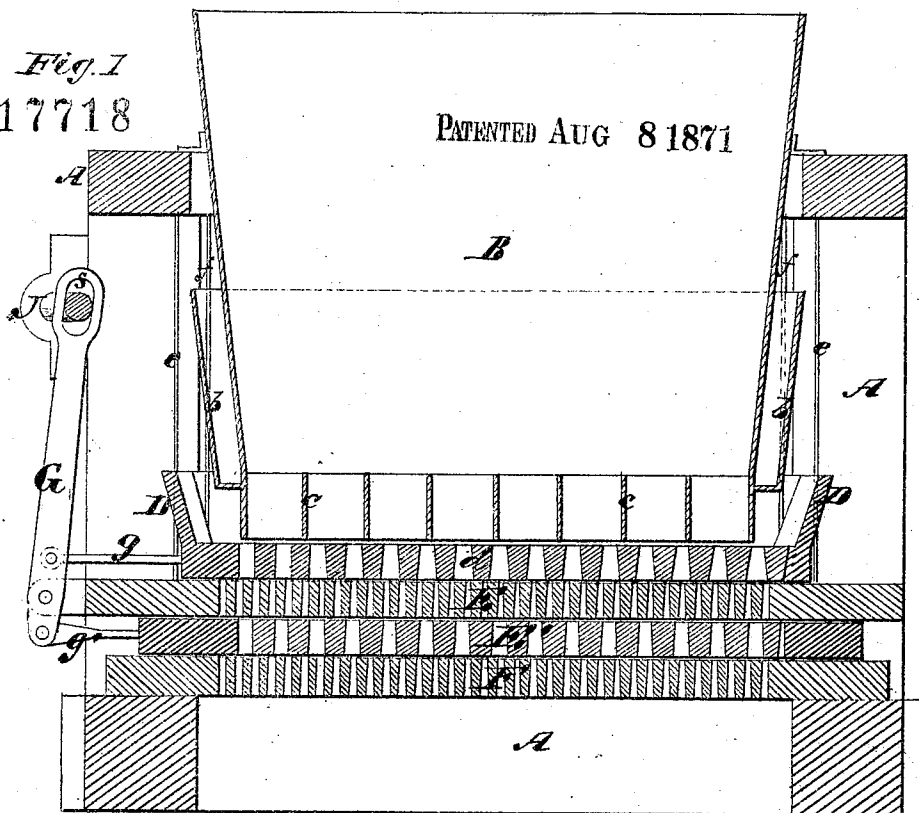
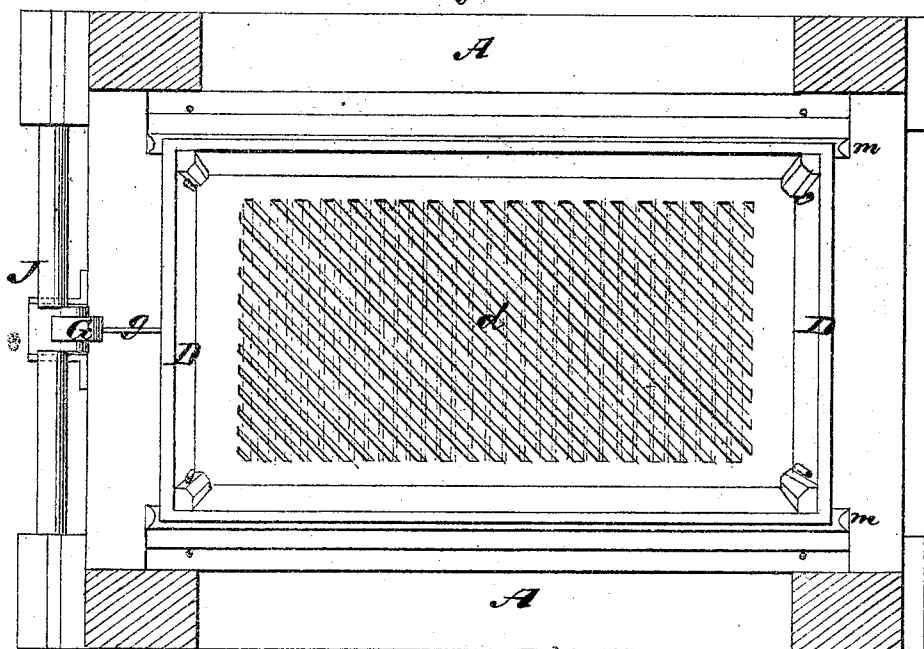


Fig. 2



Witnesses.
N. Humphrell.
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Inventor
John P. Arey
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UNITED STATES PATENT OFFICE.

JOHN P. AREY, OF GEORGETOWN, COLORADO TERRITORY.

IMPROVEMENT IN FEEDERS FOR ORE-ROASTING FURNACES.

Specification forming part of Letters Patent No. 117,718, dated August 8, 1871.

To all whom it may concern:

Be it known that I, JOHN P. AREY, of Georgetown, in the county of Clear Creek and Territory of Colorado, have invented a new and Improved Feeder for Ore-Roasting Shaft-Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a sectional view of the feeder taken longitudinally and vertically through its center. Fig. 2 is a horizontal section through the frame of the feeder with the frame removed.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a novel device which is applicable to the furnace for oxidizing and chloridizing ores, for which Letters Patent of the United States were granted to me on the 17th day of May, 1870, and which is used on top of the shaft or stack through which the ore is dropped. The invention relates to a mode of keeping the feed-funnel cool; and also to a mode of uniformly distributing the powdered ore while it is being fed into the stack of the furnace.

The following description will enable others skilled in the art to understand my invention and one practical mode of carrying it into effect.

In the accompanying drawing I have not represented any feeder applied to a furnace, as it is applicable to stack or shaft-furnaces for oxidizing, chloridizing, and desulphurating ores, and especially to my improved furnace referred to above. A represents the frame of the feeder, which may be made of cast-iron, and which is adapted to fit upon the top of the stack or shaft into which the ore is introduced. B represents the funnel or receiver for the ore, which has a grated bottom, *c*, and which is surrounded below by a tank, *b*, through which water is made to flow for keeping the receiver cool. Below this receiver is a pan, D, which has a grated bottom, *d*, the bars of which are arranged obliquely. This pan, with its grated bottom, is hung from frame A by wires *f*, and is guided between two ribs, *m m*, which rise from a grate, E. The grate E has bars which extend transversely across it at right angles to its length, and this grate is rigidly fixed to the frame A. Beneath the grate E is another grate, E', the bars of which are obliquely arranged, and beneath the last-named grate is still another grate, F, the bars

of which are transversely arranged, like the grate E. The grates D and E' are longitudinally movable, and are moved by means of a lever, G, the shortest arm of which is connected to the grate E' by a rod, *g'*, and the shortest arm of which is connected to the pan D and its grate *d* by means of a rod, *g*. The lever *g* has a loop, *s*, on the upper end of its longest arm, through which passes the crank of a shaft, J. This crank-shaft J has its bearings on frame A, and it is rotated by power applied to one of its ends. The feeder hereinabove described is subjected to the influence of the heat in the shaft or flue of the furnace on which it is supported, and for this reason the grates will become highly heated. I prevent the receiver B from becoming unduly heated by means of water, which may be kept running through the tank B.

It has been shown that the grates are composed of oblique and transverse bars, and that two movable grates, *d E'*, are employed in combination with two stationary grates, E F. The object of this arrangement I will now explain. The ore is in a state of fine powder, and in order to properly subject it to the roasting, oxidizing, and chloridizing processes it should be discharged into the shaft of the furnace in a shower rather than in a compact stream. A single screen or grate will not do this, as the material will naturally collect at and near its center, while at the ends there will be very little discharge. By the employment of a grate with oblique bars, in combination with a grate whose bars are transverse, the action of the crossing-spaces when one of the grates is moved will be to distribute the powder uniformly over the surfaces of the grates and prevent its collection at one point more than at another.

I do not confine myself to the number of grated distributors represented in the drawing, as any required number of them may be employed.

The tendency of the powdered ore is to pack at the bottom of the hopper B; but this is prevented by the narrow transverse strips *c*, which will allow the powder to pass between them as it is removed by the highest grate *d*.

In carrying my invention into effect I shall apply a cone-pulley on the crank-shaft J, so that by changing the driving-belt from one of the surfaces of such pulley to another the movements imparted to the grates can be made faster or slower, as may be required.

It will be seen from the above description that,

by the employment of grates or slotted distributors which will spread the powdered ore uniformly over a given surface, I am enabled to feed fast or slow, as circumstances require. Both plates of a pair may have diagonal bars, but, of course, the bars must cross each other. Both bars may be movable, but in reverse directions.

I am aware that it is not new to move a wire screen over a stationary sheet-metal screen, the latter mounted upon stationary bars at the top of a shaft-furnace. This is shown in Charles Stetefeldt's patent of March 1, 1870. I also am aware that a circulation cooling-chamber has been constructed upon the top of a shaft-furnace, in close proximity to the hopper. This also is shown in said patent of Stetefeldt. I am not aware that a hopper with grated bottom has ever been arranged above reversely-moving grated plates, the bars of one plate crossing the bars of another plate; nor am I aware that several pairs of such plates for grinding and agitating or diffusing the ore in its passage to the furnace from the hopper have ever been devised previously to my invention; neither

am I aware that the ore has been subjected to a shearing action in its passage from the hopper to the furnace; neither am I aware that a hopper mounted above the feeder has ever had combined directly with it a cooling and circulation-chamber, the chamber being portable with the hopper and feeder. Therefore, while I do not claim anything shown in said patent of Stetefeldt,

What I claim as new is—

1. A feeder for an ore-roasting furnace, which is composed of grated plates which have a shearing feeding operation, substantially as described.

2. The hopper B, provided with a subdivided bottom and arranged over grated distributors, substantially as described.

3. The combination of a hopper, B, and a circulating cooling-tank, b, substantially in the manner described.

JOHN P. AREY.

Witnesses:

J. N. CAMPBELL,
R. T. CAMPBELL.