G. B. FIELD.

Ore Roaster.

No. 67,862. Patented Aug. 20, 1867.

Fig. 1.

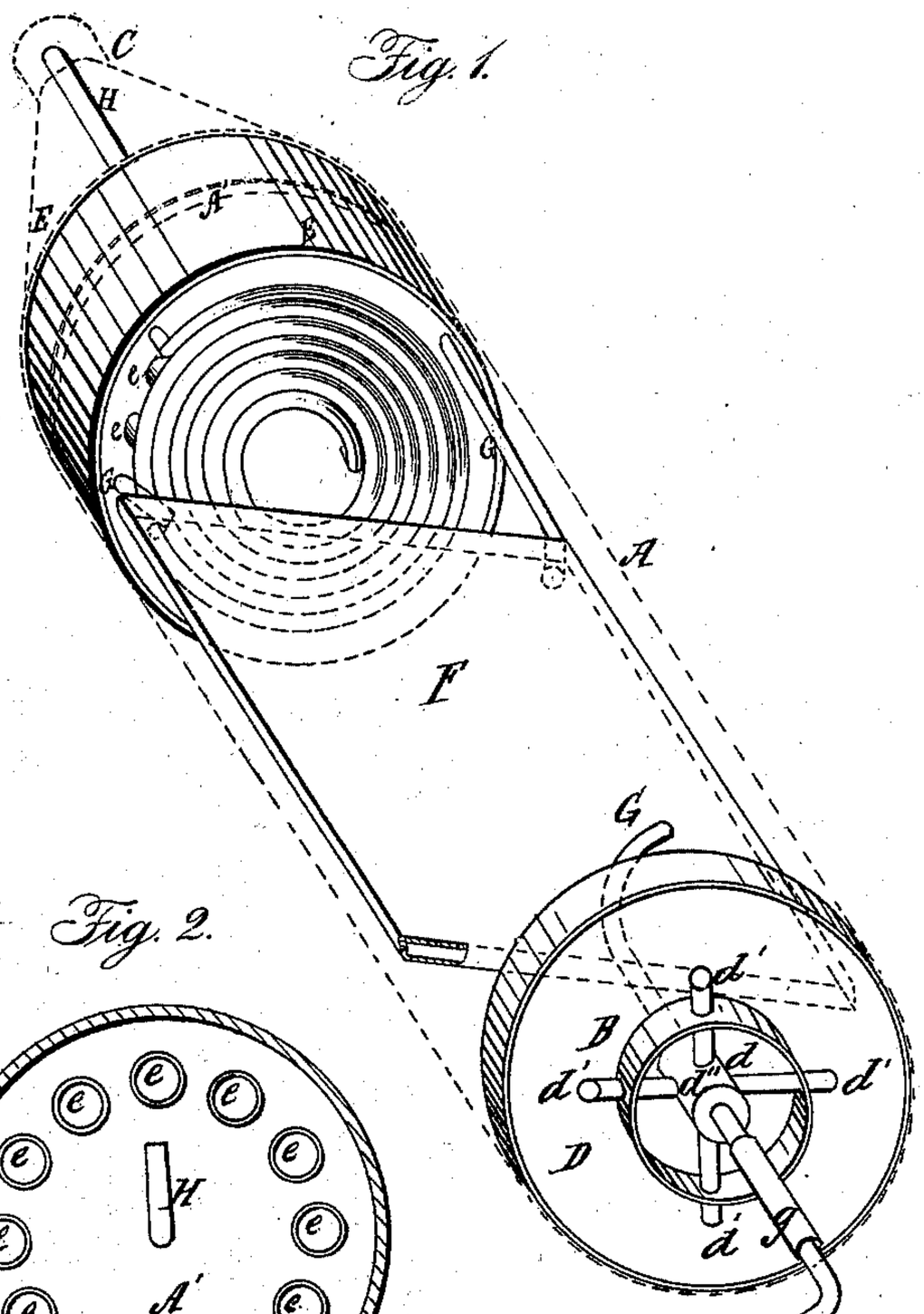
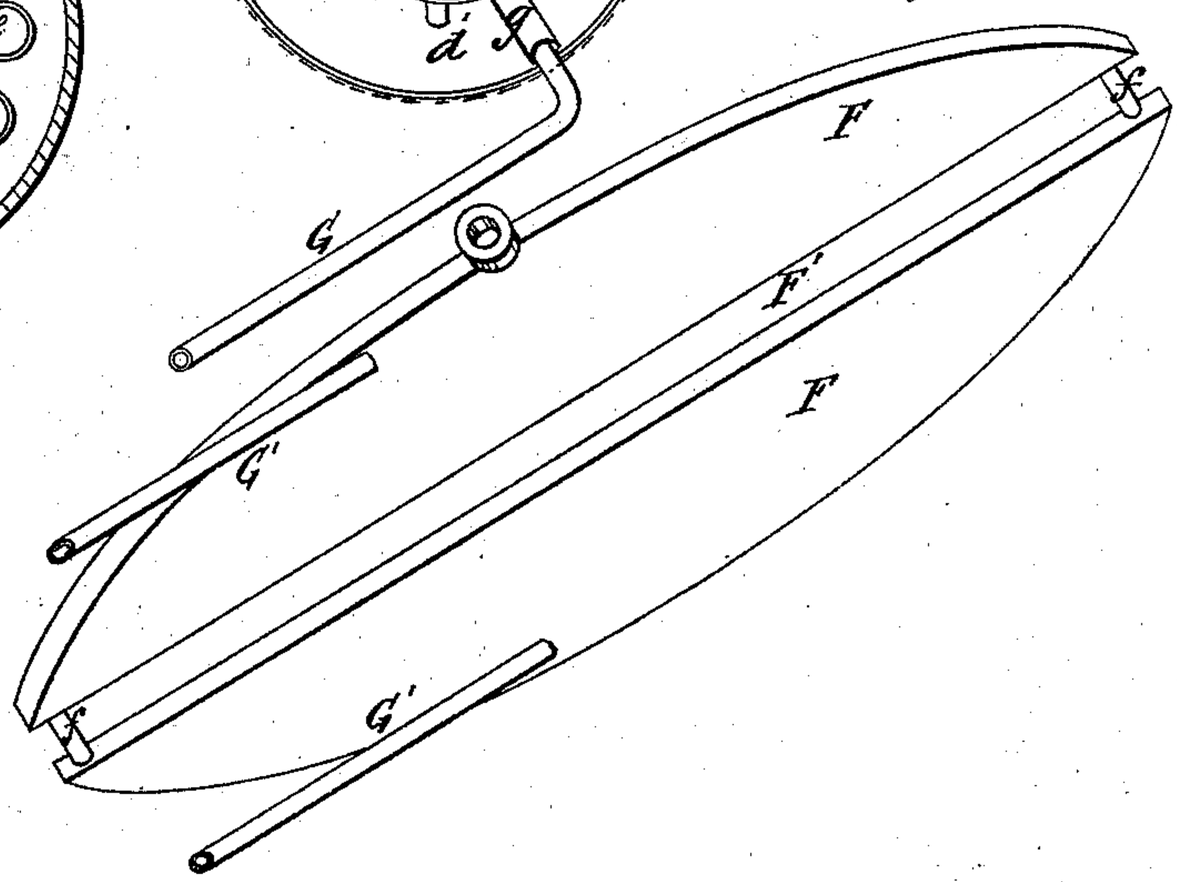


Fig. 2.

Fig. 3.



Witnesses:

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GEORGE B. FIELD, OF NEW YORK, N. Y

Letters Patent No. 67,862, *dated August* 20, 1867.

IMPROVED ORE-ROASTING FURNACE.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE B. FIELD, of the city, county, and State of New York, have invented a new and improved Ore-Roasting Furnace; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 represents a perspective view of my invention.

Figure 2 shows a cross-section of the same through the centre of the flues *e e e*.

Figure 3 represents a peculiar form of plate F.

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

This invention relates to ore-roasting and desulphurizing furnaces, provided with an attachment for agitating the ores while roasting.

The invention consists in making the various parts of such attachment hollow or tubular for the admission of steam or water to keep them from being destroyed by the intense heat to which they are subjected.

In order that others skilled in the art to which my invention appertains may be enabled to make and use the same, I will proceed to describe it in detail.

In the drawings, A A represent the cylinder, within which the ores are roasted, B being the neck or tube where it joins the furnace, and through which it receives its heat in the commencement of the desulphurizing process, and C being the pipe through which the smoke, gases, and steam pass to the chimney after doing their work. The sides of the cylinder A are lined with fire-brick to prevent their destruction by heat. One end, D, of the cylinder, next to the furnace, is a circular plate, lined with fire-brick, and having a circular aperture, *d*, in its centre. Suspended in the centre of this aperture, upon four or more radii *d' d'*, attached to the plate D, is the hub or journal-box *d''*. The radii *d' d'* are made hollow, to better protect them from being destroyed by the fire. The opposite end of the cylinder is formed into a separate compartment, A', by means of the plates E E', and serves the purpose of a steam and water-chest. Flues *e e e* pass through it, permitting the escape of the vapors of combustion from the fire-chamber of the cylinder to the smoke pipe C. In the interior of the fire-chamber A is a hollow plate-rake or shelf, F, of iron or other suitable material, bolted firmly to the cylinder, and connected at one end to the tube G which passes through and bears in the hub *d''*, and is connected with a reservoir of water, and having its other end connected with the steam and water-chest A' by means of the tubes G' G'.

In working an apparatus of this kind the process is to place the ores in the fire-chamber A, and connect this chamber at B with the furnace. For awhile the assistance of the furnace will be required, but as the heat in the chamber A begins to vaporize the sulphur of the ores, the latter will take fire and burn with an intense heat, quite sufficient for the remainder of the process, and the furnace may now be disconnected from the cylinder. Meanwhile, by means of a pump or other suitable apparatus, the plate F, tubes G and G' G', and the lower portion of the chamber A', have been filled with water, and the cylinder, with its enclosed apparatus, (if it is a rotary furnace,) has been made to revolve by means of machinery not necessary here to be described. As it revolves, the outer extremities of the pipes G' G' alternately pass under and over the water in the lower part of the chamber A', and any steam that may be generated within them, or within the plate F or tube G, will collect in the upper part of the chamber A', from which it is carried to the smoke stack by means of the pipe H. The latter enters the head of the cylinder E at its centre, and bends upward to some distance to prevent the escape of the water from the chamber, and insure only the escape of the dry steam. The pipe H has to be fixed in order to maintain the upright position of its bent extremity within the chamber A', and therefore must be suitably packed where it passes through the plate E. The end of the tube G that is attached to the reservoir must, of course, be stationary, while the opposite end attached to the cylinder must revolve. To admit this I provide a suitable joint at *g*, where the revolving extremity of tube G may be made to fit into and bear in the fixed extremity of the same tube. An apparatus of this kind being in operation, the steam generated in any part of the interior pipes of the hollow plate F will pass freely to the chimney, while the water contained in the same parts will be held there in any required quantity. By this means the tubes and the plate F will be constantly cooled, and will be able to withstand the great heat of the fire-chamber

for an indefinite time. To further utilize the heat of the chamber A, a bent tube or steam-generator, K, may be attached to the plate E′, and may be placed in any suitable position inside of the fire-chamber. By placing the flues *e e e* around the edge of the plate E′, and then attaching the tube K in front of them, closely convoluting it, as shown in the drawing, but leaving a sufficient open space in the centre, as shown at *k*, the escaping flame and smoke may be made to pass through the aperture *k*, and between the convolutions, and then across the sections of tube on their rear side to the outlet flues *e e e*, thoroughly heating the water or superheating the steam in the pipe K. The steam thus generated, as well as the steam generated in the plate F and its attached tubes, may be used for heating the air in buildings, or for operating a steam engine about the establishment, if conveyed to it by the pipe H instead of being allowed to escape up the smoke stack.

I do not intend to confine myself to any particular shape of the parts herein described, except in case of the tube H with its bent extremity, but may use any form of construction that will answer my purpose. Especially I do not wish to limit myself to the particular form of the plate F, shown in the drawing, but mean to use any form of plates, shelves, or agitators for the manipulation of the ores. My invention does not consist in any particular outward form of these parts, but in making them hollow for the admission of water, for the purposes set forth, and, whatever form may be used or patented by others, I desire to secure to myself the exclusive right to make the parts hollow for the admission of water or steam. I also desire to secure to myself the exclusive right to use, as a motive power, or for regulating the temperature of the air, the steam and water in the hollow apparatus which may be adopted. I do not desire to limit myself to the rake, shelf, or agitating apparatus fixed to and revolving with the cylinder A, but desire to be at liberty to use, if I prefer it, a fixed and stationary rake, shelf, or agitator, F, inside of a revolving or stationary cylinder, A.

The plate F may be made, if thought best, in the form shown in fig. 3, an ellipse, having the central slot F′, across which the pipes *f f* connect two sides of which it is composed.

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

1. The tube G, in conection with the agitating apparatus, substantially as and for the purpose described.

2. The eduction pipe H, having its extremity bent upward, substantially as and for the purpose specified.

3. The introduction of water or steam inside of hollow shelves, rakes, or agitators, for the stirring or manipulating of ores in ore-roasting furnaces, substantially as and for the purpose specified.

4. The introduction of steam-generators in the inside of roasting-furnaces, for the purposes specified.

GEO. B. FIELD.

Witnesses:

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