T. H. BLYTHE & S. B. MOREY.

Horizontal Rotary Ore-Roaster.

No. 215,562. Patented May 20, 1879.

Fig. 1.

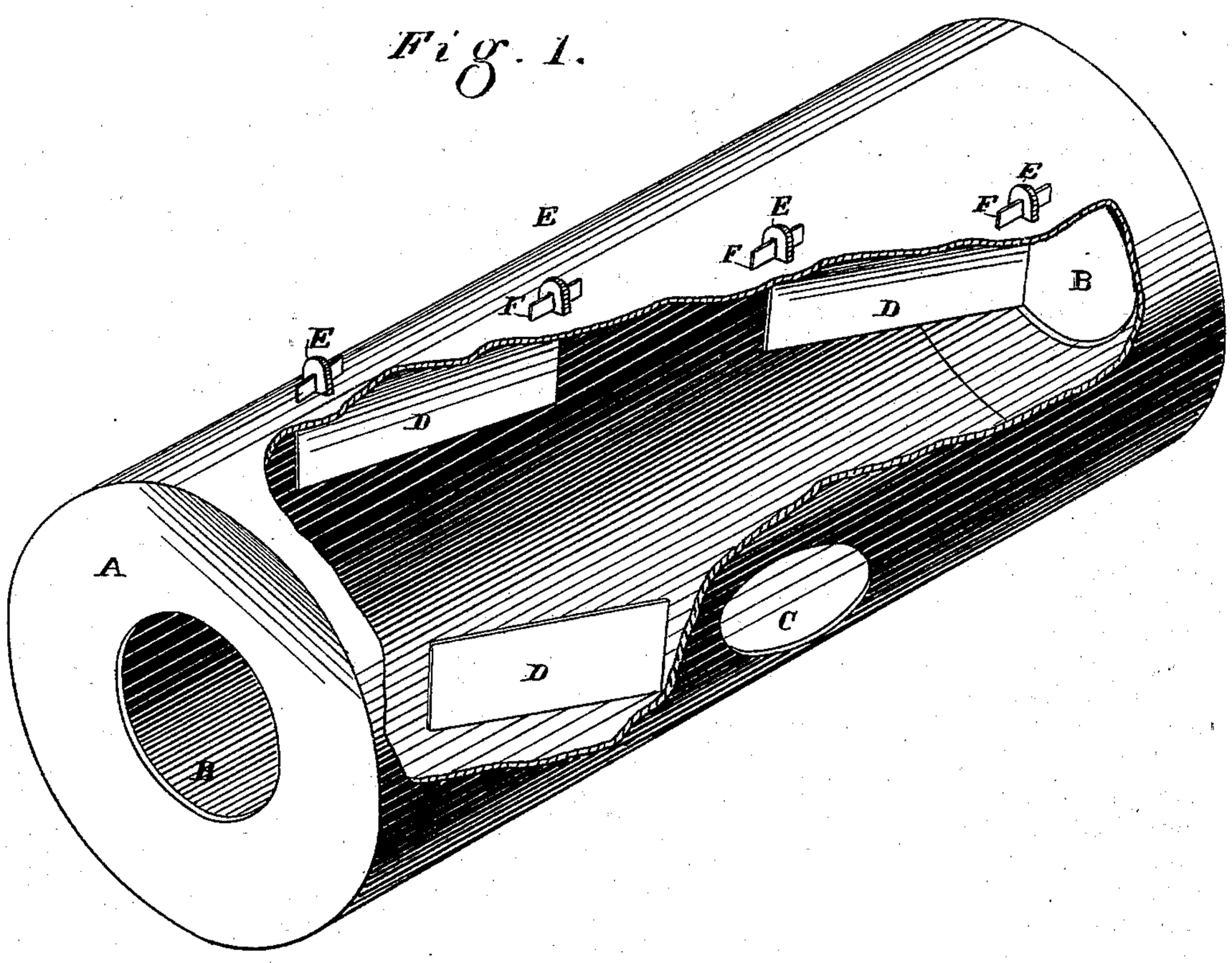
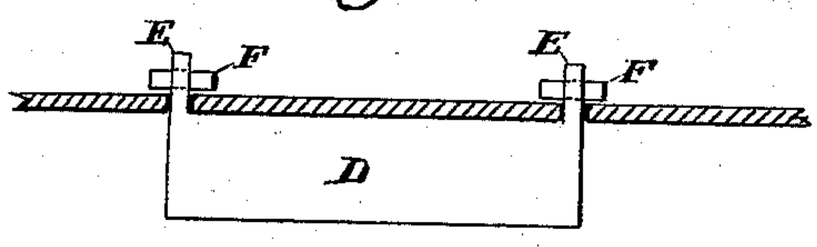


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS H. BLYTHE AND SIMON B. MOREY, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN HORIZONTAL ROTARY ORE-ROASTERS.

Specification forming part of Letters Patent No. **215,562,** dated May 20, 1879; application filed February 16, 1878.

To all whom it may concern:

Be it known that we, THOMAS H. BLYTHE and SIMON B. MOREY, of the city and county of San Francisco, and State of California, have invented an Improvement in Horizontal Furnaces; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

Our invention relates to certain improvements in horizontal rotary furnaces; and it consists in a novel construction of longitudinal spiral stirrers, which are placed within the furnace so as to leave breaks or openings at certain points, and these open spaces not only facilitate the roasting by breaking up any masses or accumulation of ore, and by a regular movement through the cylinder, but they also facilitate its discharge when desired, besides causing the cylinder to revolve steadily and without jerky motion.

We are aware that spiral flanges have been used in the rotating cylinders of furnaces, and that these flanges have been used to break and mix the ore. Spiral flanges (continuous) having but very little projection, or others extending across the cylinder in form of a partition, have been used, as is shown in the patents to Brückner, Nos. 60,134 and 65,538.

Spiral flanges have also been used to convey the ore through the cylinder, and in combination with these flanges for mixing the ore have been used.

The flanges in our furnace are not flat, and do not project to more than about one-third of the diameter of the cylinder, and are for the purpose of breaking and mixing the ore, and to prevent a jerking motion, as will be hereinafter described.

To prevent the flanges from carrying the material contained in the cylinder to one part of the same, we make breaks in the line of the spiral, so that the ore may drop down between two adjacents ends of the blades.

In the accompanying drawings, Figure 1 is a view of our furnace. Fig. 2 shows the method of fastening the flanges in place.

A is the outer cylinder, which may be made of any desired length and diameter, and lined with fire-brick or fire-resisting material. This cylinder is so mounted as to be gradually rotated, while the heat from a furnace is allowed to pass through it from end to end.

The cylinder may be mounted upon rollers or supported in any other suitable manner, and it has openings B at each end for the ingress and egress of heat. Openings C are also made in the sides of the cylinder for the purpose of discharging it when desired. These openings may be made at any point; but we have shown them near the center, and they are closed by plates when the cylinder is to be charged.

The stirring apparatus consists of spiral flanges, which project into the cylinder and extend longitudinally through it. These flanges are made in the following manner: Iron plates D are formed of a suitable width, and have lugs or projections E upon one side, slotted, so as to receive keys F, and the sides of the cylinder are perforated, so as to allow these lugs to pass through, the keys being then inserted and driven fast. The plates are held firmly in place, and it will be seen that they can be readily removed or renewed whenever desired.

By fastening the plates in this way the fastenings do not come in contact with the flame, and are not liable to be destroyed by the action of the heat. The liability of being destroyed by the action of the heat would be much greater if the plates were fastened to the shell of the cylinder by means of bolts passing through or alongside of the plates from the outside of the cylinder-shell to that edge of the plates nearest the fire, and having a nut or head at this edge, as has been done before.

These plates are lined or surrounded by fire-brick or other non-destructible substance, to resist the action of the heat and also the products of the roasting. These flanges are not made continuous, but are made in sections, as shown, with considerable space between them, so that as the cylinder rotates the ore will fall from the ends of these flanges. This not only stirs the ore more thoroughly and insures a more perfect roasting, but it seems to break up the mass which may become matted together by the heat; whereas if the spirals were continuous, they would carry the ore from end to end without properly stirring and breaking it up. These breaks or spaces in the

flanges also assist greatly in discharging the ore after it is roasted and the openings C are unclosed, thus rendering the apparatus very efficient and economical. In addition to this the irregular arrangement of the flanges insures a steady rotation of the cylinder, and prevents the teeth of the driving-gear from becoming broken by sudden jerks, which often happens if a continuous spiral is used, because the ore collects and is carried up to the top and then suddenly falls off.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

The cylinder A, provided with longitudinal spirally-arranged flanges D, placed so that in the direction of their length spaces will be left between them, and so that the material contained in the cylinder will not be conveyed to one part of the cylinder, but drop down between the blades, said flanges being secured in place by slotted lugs E, projecting through the cylinder, and by the keys F, substantially as and for the purpose set forth.

In witness whereof we have hereunto set our hands and seals.

THOMAS H. BLYTHE. [L. S.]
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Witnesses:
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