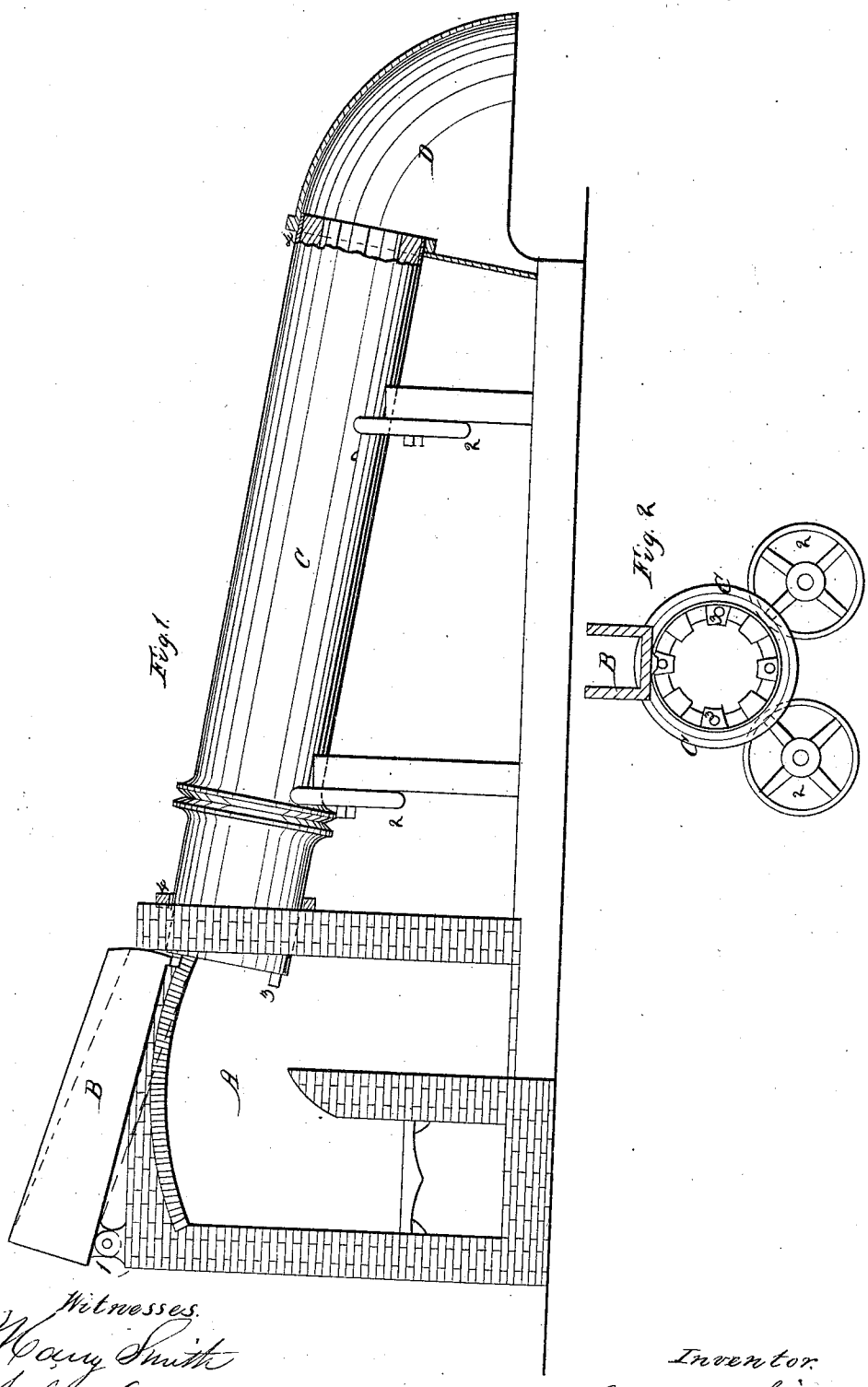
G. W. WHITE.

APPARATUS FOR ROASTING AND REDUCING ORES.

No. 44,145. Patented Sept. 6, 1864.



Witnesses.

Henry Smith

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IMPROVED APPARATUS FOR ROASTING AND REDUCING ORES

Specification forming part of Letters Patent No. **44,145**, dated September 6, 1864; antedated August 23, 1864.

To all whom it may concern:

Be it known that I, GEO. W. WHITE, of the State, city, and county of New York, have invented an Improved Machine for Calcining, Reducing, and Separating Ores; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a side elevation of the machine and part in section. Fig. 2 shows a transverse section of the cylinder.

The principal mechanical elements of my machine are a furnace, and a horizontally-rotating cylinder open at both ends to the atmosphere, and inclined so as to convey the ore from the receiving end of the cylinder at the furnace to the opposite or discharging end; and the object of the machine is to oxidize and desulphurize oxidizable ores, and to reduce and separate such as are non-oxidable. My said invention is therefore distinguished both from those which have a rotating cylinder closed to the atmosphere and conduct the ore to the furnace for the purpose of deoxidation, as in the treatment of iron ores, and from such as are designed for oxidation and desulphurization and have no revolving cylinder.

The nature of my invention therefore consists, first, in the employment of an inclined revolving cylinder, in combination with a furnace and a feeding device at one end of said cylinder, and an elbow or bonnet at the opposite end to conduct and direct the calcined ore into a suitable tank or other receptacle; secondly, in constructing the cylinder with longitudinal grooves in its inner periphery, substantially as hereinafter set forth; thirdly, in the use, in combination with the furnace and revolving cylinder, of a vibrating shoe or hopper to pass the ore into the end of the cylinder; fourthly, in vibrating such shoe by means of suitable projections on the revolving cylinder acting upon such shoe.

To enable others to make and use my invention, I will proceed to describe the same.

In the drawings annexed, A represents a suitable furnace.

B is a shoe or feeder. It is situated in the upper part of the furnace, and is hinged at 1 to admit of being oscillated or vibrated. It is also incased partially by the surface to prevent the escape of the heat. This casing may be formed in the shape of an arc at the end of the feeder, so as to conform to the motions thereof.

C is the cylinder, which may be either straight or conical. It is formed of heavy iron and lined with fire-brick or any suitable material adapted to resist intense heat. The interior surface of the cylinder is grooved lengthwise. This may be done by long and short bricks alternated in longitudinal rows, as seen in the sectional view, Fig. 2. The exterior surface may be jacketed to prevent the radiation of heat.

In order to obviate the use of a shaft and journals, which would obstruct the openings at the ends of the cylinder, and would be shortly destroyed by the heat, I support the cylinder by anti-friction wheels 2 2, which also form the bearings for the rotation of such cylinder. By thus throwing the bearings on the outer periphery of the cylinder, the ends thereof are entirely free and open for the ingress and egress of the ore.

At such end of the cylinder I provide an encircling collar, 4, in which the cylinder is free to rotate. Said collars fit as snugly as possible without actual contact. The cylinder is inclined downward from the furnace, and the lower end of the cylinder is inclosed in an elbow or bonnet, D, and its object is to direct the contents of the cylinder into a suitable tank or other receptacle. At the upper end of the cylinder are projections 3 3, which, in the rotation thereof, come into contact with the shoe B and move it intermittently to feed in the ore. The location or form of said projections is not material to the invention.

Power is applied to the machine by means of a wire band passing around the cylinder in the groove V thereon. As the cylinder revolves, the shoe or feeder B is shaken and the ore is fed slowly into the cylinder, and in the rotation thereof the ore, &c., gradually gravitate toward the lower end and escape calcined and reduced under the bonnet D at the lower end.

I claim as my invention and desire to secure by Letters Patent—

1. The use of an inclined rotating cylinder,

in combination with a furnace at the receiving end of said cylinder, and a bonnet at the discharging end thereof to conduct or direct the calcined ore into a tank or other receptacle.

2. Grooving the inner surface of the cylinder longitudinally, for the purpose and substantially as specified.

3. The employment, in combination with the furnace and rotating cylinder, of a vibrating shoe or feeder, for the purpose described.

4. Operating such feeder by means of the revolving cylinder through the agency of projections thereon, as specified, or any equivalent therefor, substantially as described.

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Witnesses:
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