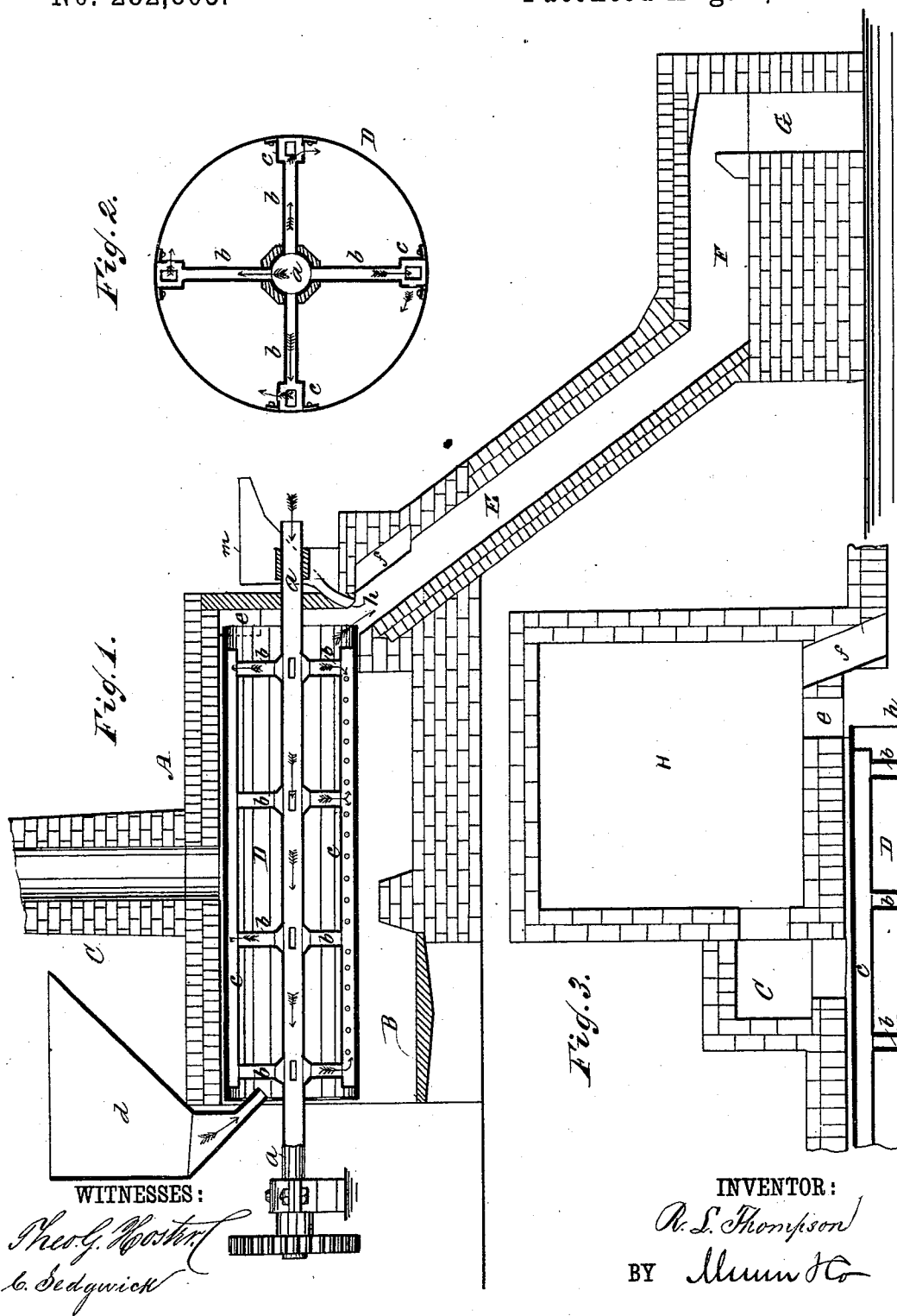


(No Model.)

R. L. THOMPSON.
ORE ROASTING FURNACE.

No. 282,803.

Patented Aug. 7, 1883.



WITNESSES:
Theo. G. Hooster
C. Sedgwick

INVENTOR:
R. L. Thompson
BY *Munn & Co*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT L. THOMPSON, OF BOULDER, COLORADO.

ORE-ROASTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 282,803, dated August 7, 1883.

Application filed September 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. THOMPSON, of Boulder, in the county of Boulder and State of Colorado, have invented a new and Improved Ore-Roasting Furnace, of which the following is a full, clear, and exact description.

My improvements relate to furnaces for roasting ores, of the class in which a cylinder is fitted for revolution within the furnace.

The invention consists in the peculiar construction and arrangement of the parts, as hereinafter more fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section of my improved apparatus. Fig. 2 is a cross-section of the roasting-cylinder. Fig. 3 is a partial plan view, showing the settling-chamber.

A is the roasting-furnace, formed with fire-box B, and with a smoke-stack, C. D is a hollow cylinder, fitted within the furnace A upon a hollow axle, *a*, that is supported on suitable bearings at its ends, and provided with a gear-wheel for connection with the power to revolve the cylinder.

The axle *a* is provided with hollow arms *b*, which connect at their outer ends with tubes *c*, running lengthwise of the cylinder, upon which tubes the shell is secured. These lengthwise tubes *c* are made of rectangular form in cross-section, so that they project as shelves or lifts from the inner surface of the cylinder, for raising the ore in its passage through. *d* is the feed-hopper supplying the ore to the cylinder.

E is an inclined flue or chute, extending from the rear end of the furnace A, at the end of the cylinder D, downward at a steep incline to the smelting oven or hearth F of a second furnace, G. At the rear end of the roasting-furnace A is a flue, *e*, extending into the settling-chamber H, and at the upper end of the inclined flue E, at the point where the ore is discharged from the cylinder into the chute, is a flue, *f*, also extending to the settling-chamber H.

In the operation of the furnace the ore passes in a continuous stream from the feed-

hopper *d* to the revolving cylinder D, which is heated externally by the furnace A. The cylinder is supplied with air, which is forced by a blower or other means from the outside through the hollow axle *a*, and passes through the hollow arms *b* to the longitudinal tubes *c*, which are perforated, as shown, to allow escape of the air into the cylinder in contact with the ore. In this passage of the air through the hollow axle and arms it becomes partially heated by contact with the heated tubes, thereby effecting economy in the fuel required for roasting the ore. At the same time the air, by its absorption of heat from the axle and arms of the cylinder, keeps those parts from becoming excessively heated and increases their durability. As the cylinder revolves the ore is lifted by the tubes *c* and carried to the upper side, from whence it drops again to the bottom of the cylinder, and it is thus worked forward and finally discharged from the end of the cylinder into the flue E, through which it passes in a thin stratum exposed to the action of the flame from the furnace G, and is finally received upon the hearth F, on which it is permitted to lie a suitable length of time, according to the kind of ore that is being worked, before being raked out upon the cooling-hearth.

In case chloridizing of the wasted ore is required, salt is to be introduced by a continuous-feeding device at the point marked *h*, at the upper end of the chute E, where the hot ore leaves the cylinder D and enters the inclined flue. At this point the salt is rapidly decomposed and utilized with the greatest economy in the chloridizing of the ore. The chlorine gases and other products of the decomposition pass by the flue *f* directly through the settling-chamber H, so that they do not come in contact with and destroy the iron-work of the furnace. The sulphurous gases and other products of the roasting process in the cylinder are taken directly by the flue *e* into the settling-chamber, while the smoke and gases from the fire-box B pass out by the smoke-stack C, thereby lessening the volume of gas passing through the settling-chamber, and to that extent decreasing the current in the chamber and hastening the settling process. The draft of the furnace G is to be regulated so as to ex-

pose the ore to a carbonaceous or reducing flame, for the purpose of decomposing the sulphates present in the ore, or for the admission of a greater quantity of air, as required in chloridizing the ore.

I am aware that roasting-furnaces have been provided with revolving cylinders externally heated and supplied with air through a hollow axle.

I am aware that in a machine for dressing feathers a cylinder containing the feathers has been revolved around a stationary hollow axis into which steam is introduced, the hollow axis connecting by hollow radial arms with perforated longitudinal tubes, whereby steam is admitted to the feathers in the rotation of the cylinder; and I therefore lay no claim to such invention, which differs materially from my construction, in which the outer shell of the cylinder is secured to the longitudinal perforated tubes.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent--

1. In ore-roasting furnaces, the revolving cylinder D, consisting of a hollow axle, *a*, having a series of hollow radial arms, *b*, connected at their outer ends with the hollow longitudinal perforated pipes *c*, to which the shell of the cylinder is secured, the perforated pipes *c* serving the threefold purposes of supports to which the shell of the cylinder is secured, as a means for introducing air into the cylinder, and as a means for raising the ore in the cylinder, substantially as shown and described.

2. The combination, with the furnace-chamber A, provided with the fire-box B and revolving cylinder D, fire-place G, hearth F, and chute E, connecting both furnace-chambers, of the settling-chamber H, provided with the flues *e f*, substantially as shown and described.

ROBERT LAWRENCE THOMPSON.

Witnesses:

ALVIN M. SAWYER,
S. M. ALLISON.