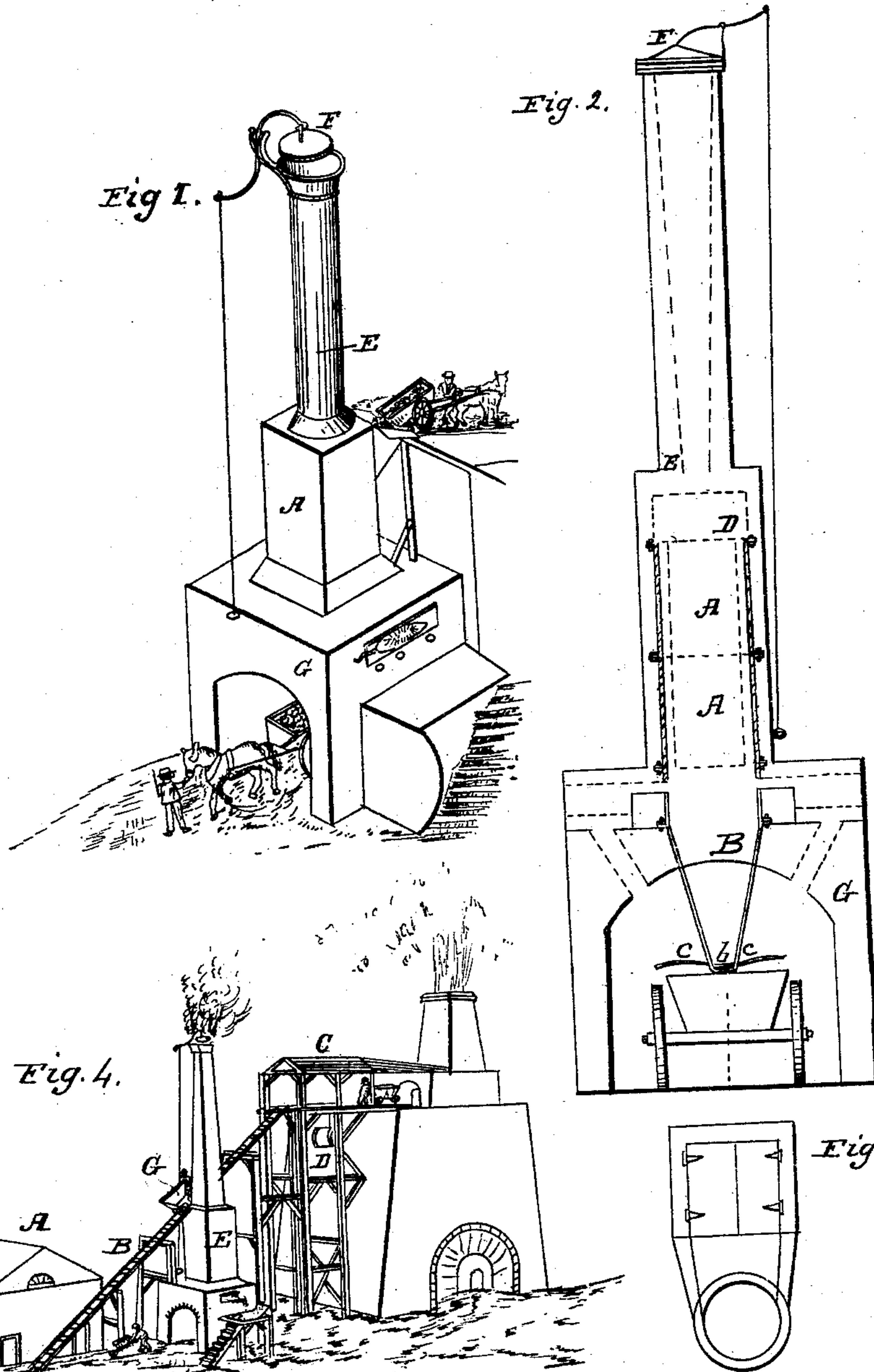


C. B. GRUBB.
Furnace for Roasting Ores.

No. 41,376.

Patented Jan. 26, 1864.



Witnesses:
Chas. H. Smith
James H. Smith

Inventor:
Charles B. Grubb

UNITED STATES PATENT OFFICE.

CLEMENT B. GRUBB, OF LANCASTER, PENNSYLVANIA.

IMPROVED FURNACE FOR ROASTING ORES.

Specification forming part of Letters Patent No. 41,376, dated January 26, 1864.

To all whom it may concern:

Be it known that I, CLEMENT B. GRUBB, of Lancaster, in the county of Lancaster and State of Pennsylvania, have invented and applied a new and Improved Mode of Constructing Kilns for Roasting Refractory Ores Preparatory to Smelting; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the structure built against the side of a hill or embankment, illustrating one method of feeding and also of removing the roasted ore. Fig. 2 is a plan and front elevation, drawn one-fourth of an inch to the foot, clearly showing its entire arrangement. Fig. 3 is a cross-section at the feed-slide. Fig. 4 shows the manner of constructing said roaster or kiln under the railway in common use at furnaces for conveying the ore from the stock-house to the upper filler, by means of cars drawn by a chain around a hoisting-drum operated by the power used to operate the machinery.

The roaster or kiln is in general character much like modern lime-kilns now in use, having a high stack—say, eleven or twelve feet—built upon an elevated base, under which there is an archway for a cart or other vehicle, giving access to the mouth of the cooler B, Fig. 2, where the roasted ore is lodged. This cooler B is an inverted cast-iron cone open at both ends. The lower or mouth, *b*, enters the archway, and is provided with sliding levered lids *c*, closing the orifice horizontally. The stack A may be formed of cast-iron cylinders with flanges, and bolted together with or without fire-brick lining. The chimney over this may be extended to the height of twenty-five feet, giving the whole an elevation of, say, fifty feet.

In the rear of the stack, at D, there is a feeding-door opening into the stack by an inclined plane, the upper and outer portion being on a level with the embankment when constructed apart from the furnace; but, for various considerations, it is preferable to construct the same as shown by Fig. 4. This will

be found to economise time and expense and facilitate the operation, and constitutes the most desirable feature of the improvement.

The drawings so clearly illustrate the several parts as to require no farther description.

All the ovens, clams, or kilns heretofore in use, however diversified in size and form, whether cylindrical, inverted cones, or a combination of an inverted and a right cone, or truncated ellipsoid, as well as reverberatory ovens and ordinary lime-kilns, all have signally failed to yield satisfactory results in such ores as most of the iron-masters use. After expending several thousand dollars in experimenting, I found that it required a deep stack, high draft chimney, of at least forty feet, instead of about eighteen feet, the highest kilns known to be used heretofore for roasting ore, and by adopting the archway conic cooler and upper feed, side furnaces, and damper, built under the railway, as mentioned and shown by Fig. 4, there is a combination presented of the greatest utility as well as novelty for furnace purposes, and altogether one which I have proved since August last, and it is so highly satisfactory in its results, after all my outlay in experimenting, that I deem it my duty to secure the same by patent.

I am aware that the lime-kiln of Richard Donaldson for the conic cooler and levered arms, for which he obtained Letters Patent the 19th day of February, 1861, for the purpose of burning lime, resembles it. I therefore do not claim any part or portion of my ore roaster for burning lime, confining myself wholly to its application for roasting ore; therefore

What I claim as my invention is—

The application of an elevated kiln provided with side furnaces, a cooler opening into an archway, constructed substantially in the manner described, for the purpose of roasting ore, as specified.

CLEMENT B. GRUBB.

Witnesses:

CHAS. R. FRAILEY,
JACOB STAUFFER.