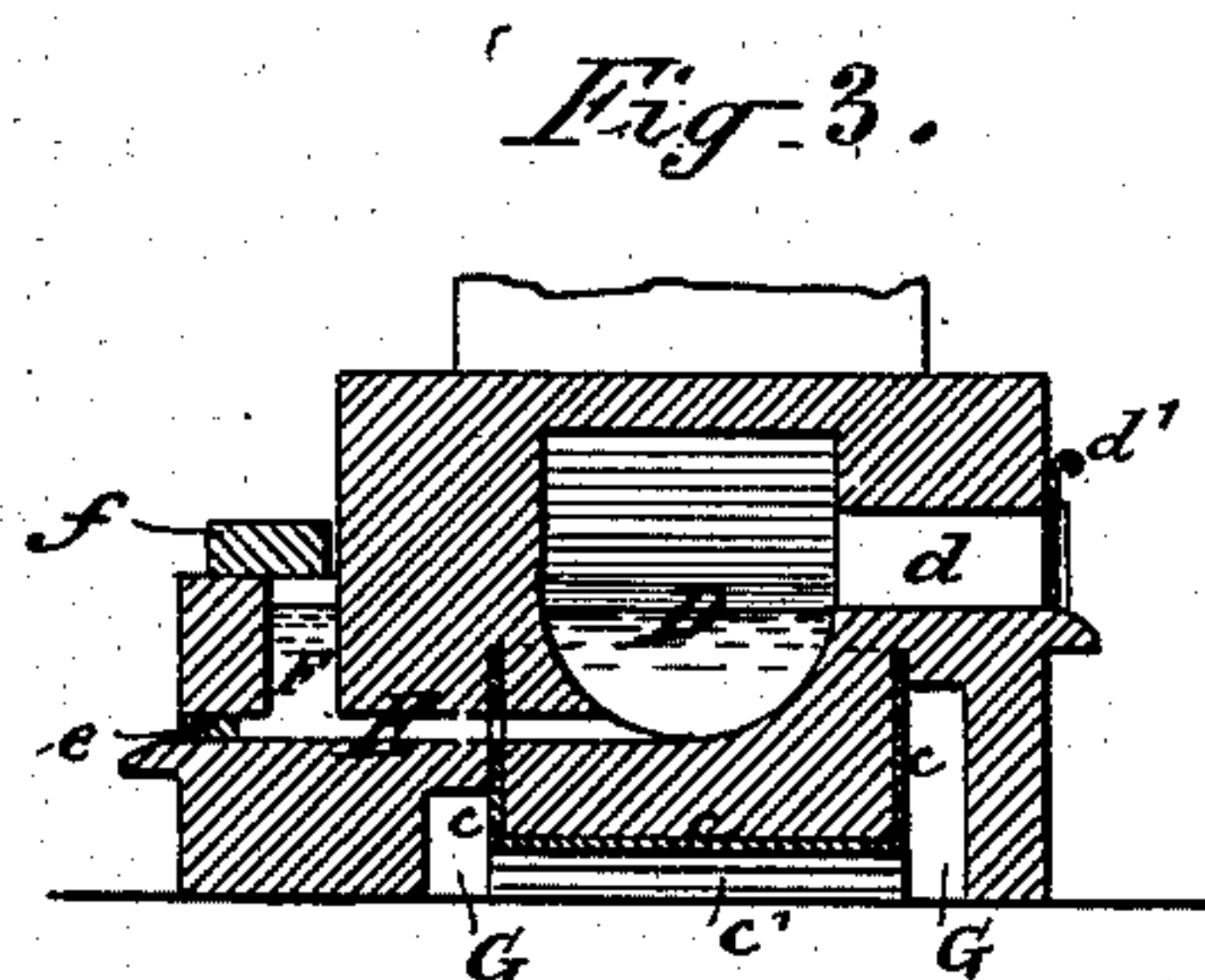
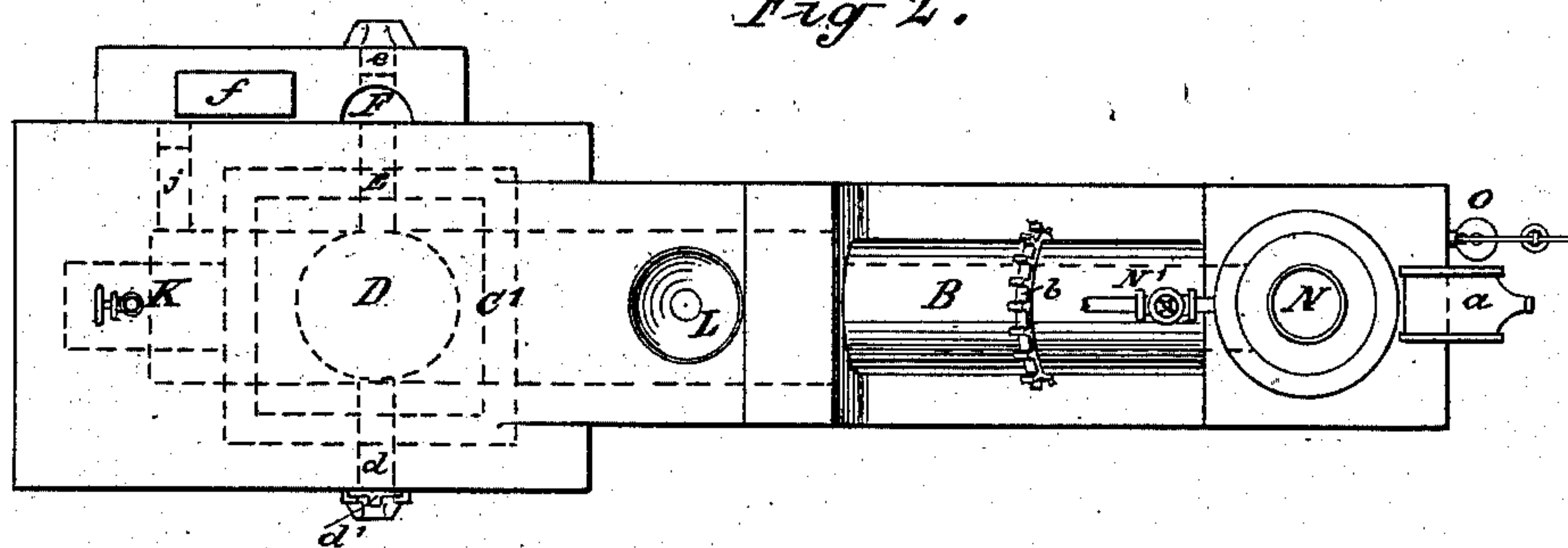
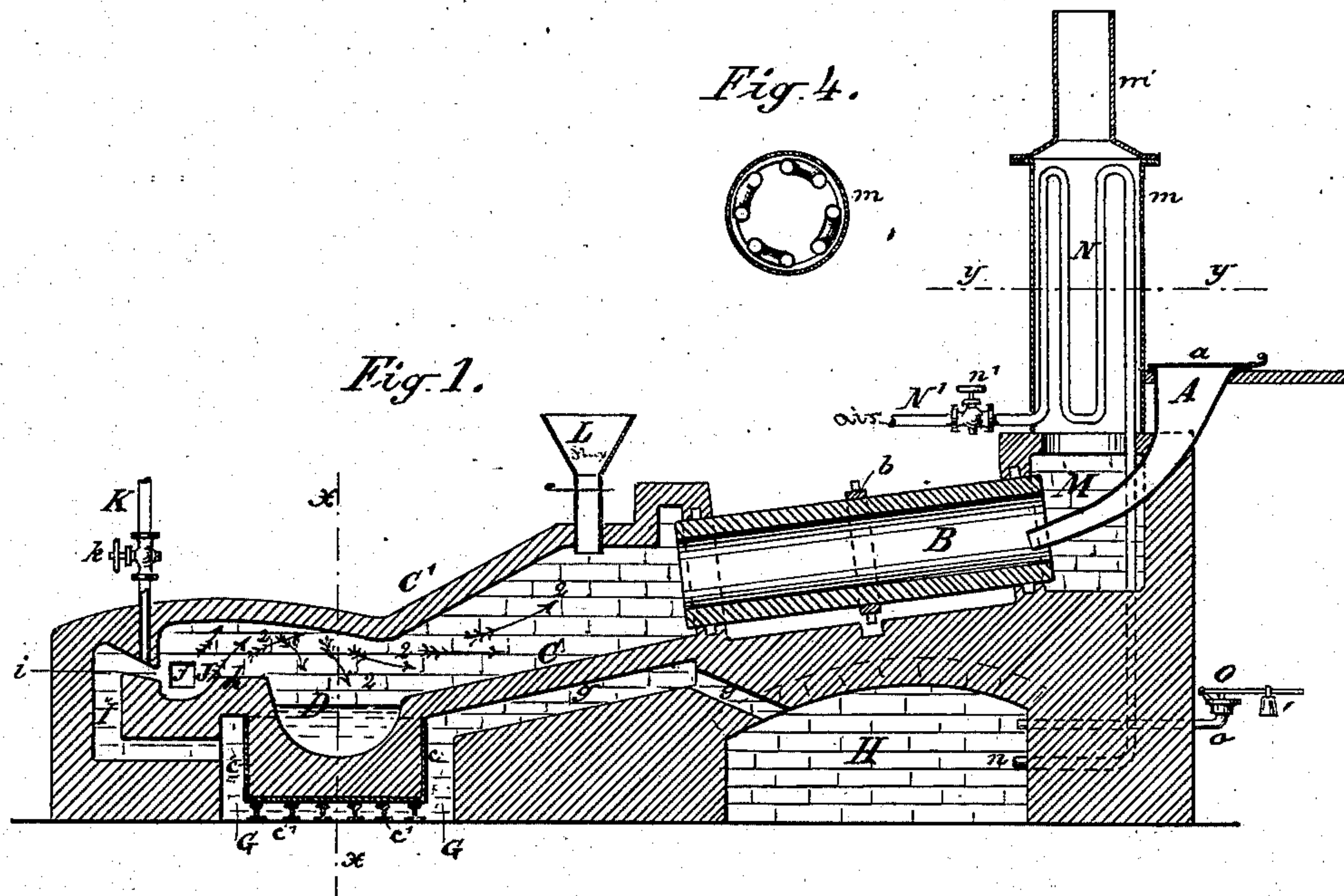


(No Model.)

S. G. SACKETT.
SMELTING FURNACE.

No. 278,279.

Patented May 22, 1883.



WITNESSES:

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SHERMAN G. SACKETT, OF DENVER, COLORADO.

SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 278,279, dated May 22, 1883.

Application filed March 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, SHERMAN G. SACKETT, a citizen of the United States, and a resident of Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Smelting-Furnaces, of which the following is a specification.

The object of my invention is to provide an efficient apparatus for first roasting the ore and then smelting it upon a reverberatory hearth by hydrocarbon fuel and hot-air blast; and it consists in the construction and combination of the various parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of a lead-smelting furnace constructed according to my present invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical cross-section on the line *xx* of Fig. 1, and seen in the direction of arrow 1. Fig. 4 is a detail horizontal section of a portion of the ore-heating device, the section being taken on the line *yy* of Fig. 1.

Like letters of reference indicate like parts in the several figures.

The construction of the various parts of the apparatus will be plainly understood and sufficiently described by referring to them incidentally in describing the operation.

The ore is charged by means of a spout and hopper, A, into an inclined slowly-revolving cylinder, B. The spout or hopper A is provided with a cover, *a*, to prevent the gases of combustion from escaping that way. As the cylinder B revolves, the sulphurous ore is gradually roasted by the heat from the furnace, (which heat passes through the said cylinder,) and gradually tumbles down upon an inclined hearth, C, of a low reverberatory furnace, C'. It is there melted and runs down into the lead-crucible D, whence the slag floating on top of the melted lead is raked out through the slag-tap *d*, the latter being provided at its outer end in the side of the furnace with a suitable cover, *d'*. The bottom of the crucible D is connected by a channel, E, with a lead-well, F, into which the melted lead enters (when the outer end of the channel E is closed by the plug or gate *e*) to the same level as within the crucible D. The top of the lead-well F is covered by a gate or other cover, *f*, made of

fire-clay. It will thus be seen (see Fig. 3) that none of the slag, but only the melted lead, can get into the well F, and by removing the cover *f* the lead can be dipped out of the well in various quantities, as well for sampling as for casting smaller ingots, or for other purposes, while for emptying the crucible without dipping it is only necessary to remove the plug *e* from the end of the bottom channel, E. The brick-work of which the crucible D is formed is inclosed in an iron casing, *c*, to prevent the lead from accidentally escaping through the crevices in the brick, and also for strengthening and protecting the latter, the said casing being supported on underlying rails *c'*. An air-chamber, G, surrounds the casing *c* of the crucible. This air-chamber G is connected by a channel, *g*, underlying the hearth C, with a large air-chamber, H, arranged at a distance underneath the cylinder B. On the side opposite to the channel *g* an air flue or channel, I, connects the chamber G with a downwardly-inclined air-jet opening, *i*, directing the air-blast into the fire-box J, charged through the opening *j*. Liquid hydrocarbon is supplied through the pipe K, provided with a regulating-valve, *k*, the said pipe being arranged vertically, with its lower end in the jet-opening *i*, as shown in Fig. 1.

L is a hopper in the roof of the furnace, above the inclined hearth C, for entering the flux necessary for the smelting.

The cylinder B is revolved upon rollers provided in or about bearings at its ends, and is provided with a chain-wheel, *b*, by which motion may be communicated from any suitable machinery to revolve it. The waste heat from the furnace and cylinder enters into a chamber or chimney-breast, M, and thence through a heating-drum, *m*, which, with the extension *m'*, also constitutes the chimney of the furnace. In the latter is arranged a series of pipes, N, into which air is admitted through its horizontal exterior branch, N', provided with a regulating-valve, *n'*. The interior end branch of the coil N enters the large air-chamber H at *n*. The pressure in the air-chamber H and its connections is regulated by an adjustable weighted valve, O, arranged upon the outer end of a pipe, *o*, which leads from the chamber H into the outer atmosphere. A fan or other blower is connected to force air

through the outer branch, N', into the coil N, whence, heated by the waste heat from the furnace, it enters through the lower branch, n, into the large air-chamber H, in which it expands, and in which, as well as in a channel, g, chamber G, and channel I, it is heated, or, at least, its heat is retained, as it passes to the jet-opening i, the circulation of air in the chamber G around the crucible-pan c protecting the latter from being overheated. In the jet-opening i the air meets and atomizes the liquid hydrocarbon entering into the pipe K, and the vaporized fuel strikes into the fireplace, is then deflected to whirl over the bridge h up to the roof of the furnace, thence reverberated, as indicated by the arrows 2, until, after smelting the ore upon the hearth C, and roasting the feed ore in the cylinder B, and heating the blast in the drum m, it finally escapes through the chimney m'.

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

The combination of the fuel-jet i K, reverberatory furnace C', having the crucible D, inclined hearth C, and flux-hopper L, the cylinder B, chimney-breast M, heating-drum m, air-coil N, pressure-regulator O o, chambers H G, and the connecting air-channels g I, all constructed and operating substantially as hereinbefore set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 1st day of March, 1883.

SHERMAN G. SACKETT.

Witnesses:

L. S. SMITH,

J. A. BENTLEY.