(No Model.) 3 Sheets—Sheet 1.

H. C. RUDGE.

ORE ROASTING FURNACE.

No. 523,487. Patented July 24, 1894.

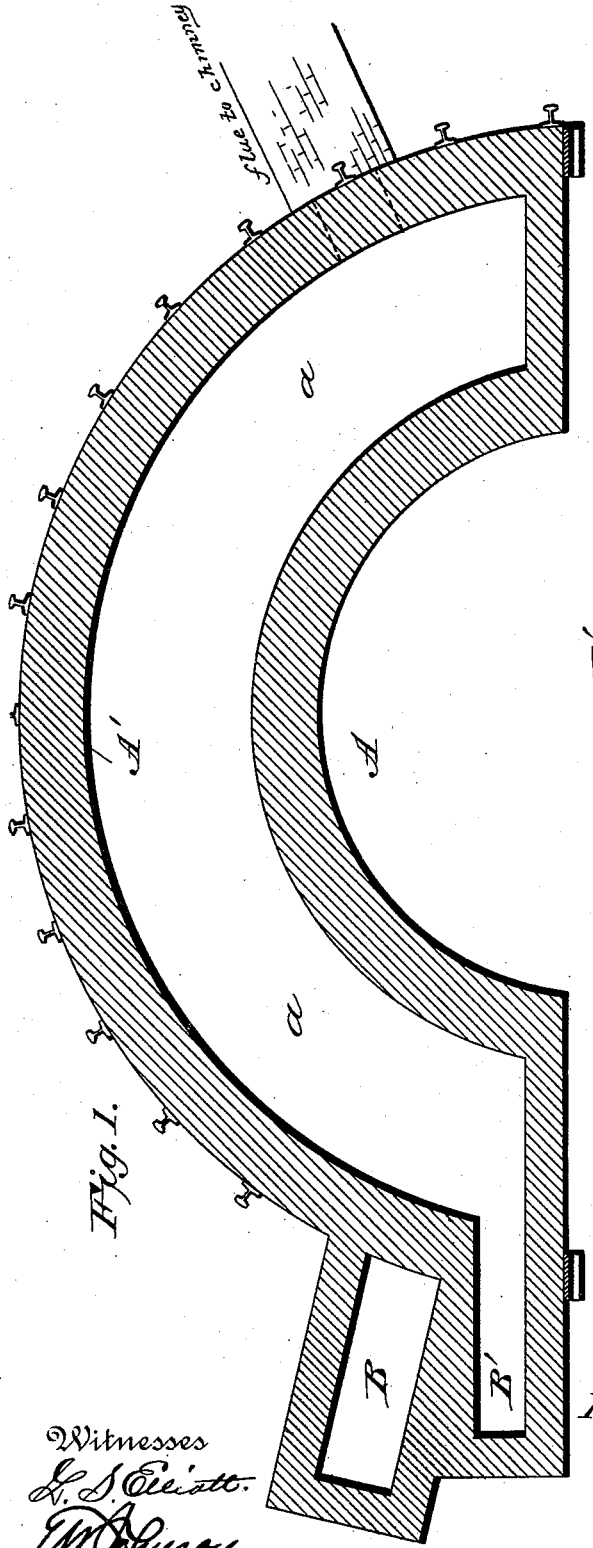

Fig. 1.

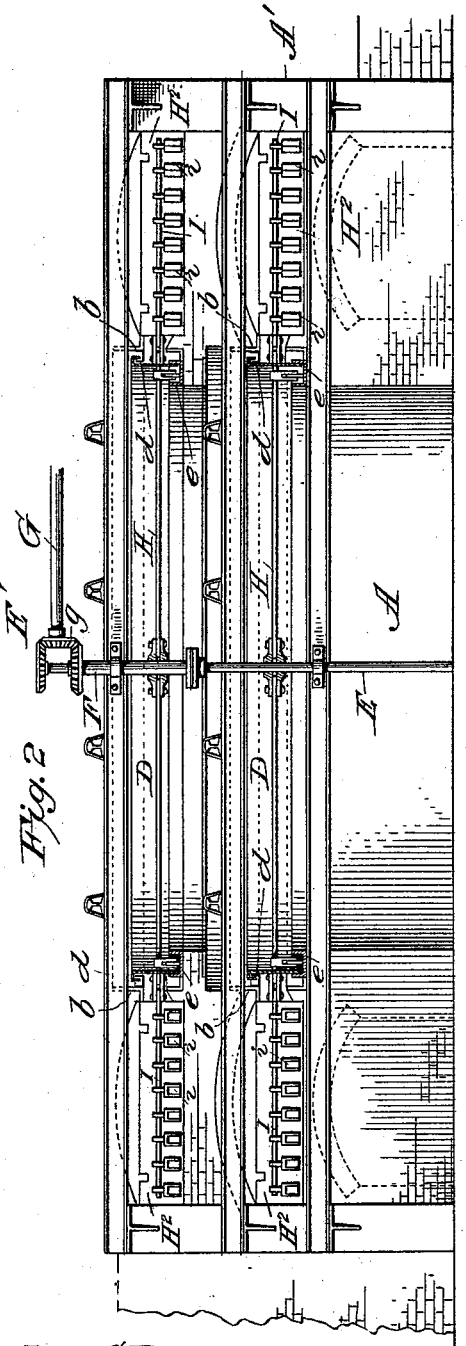

Fig. 2.

Witnesses
L. S. Elliott.
E. M. Johnson

Henry C. Rudge, Inventor
by Geo. P. Barton
Attorney

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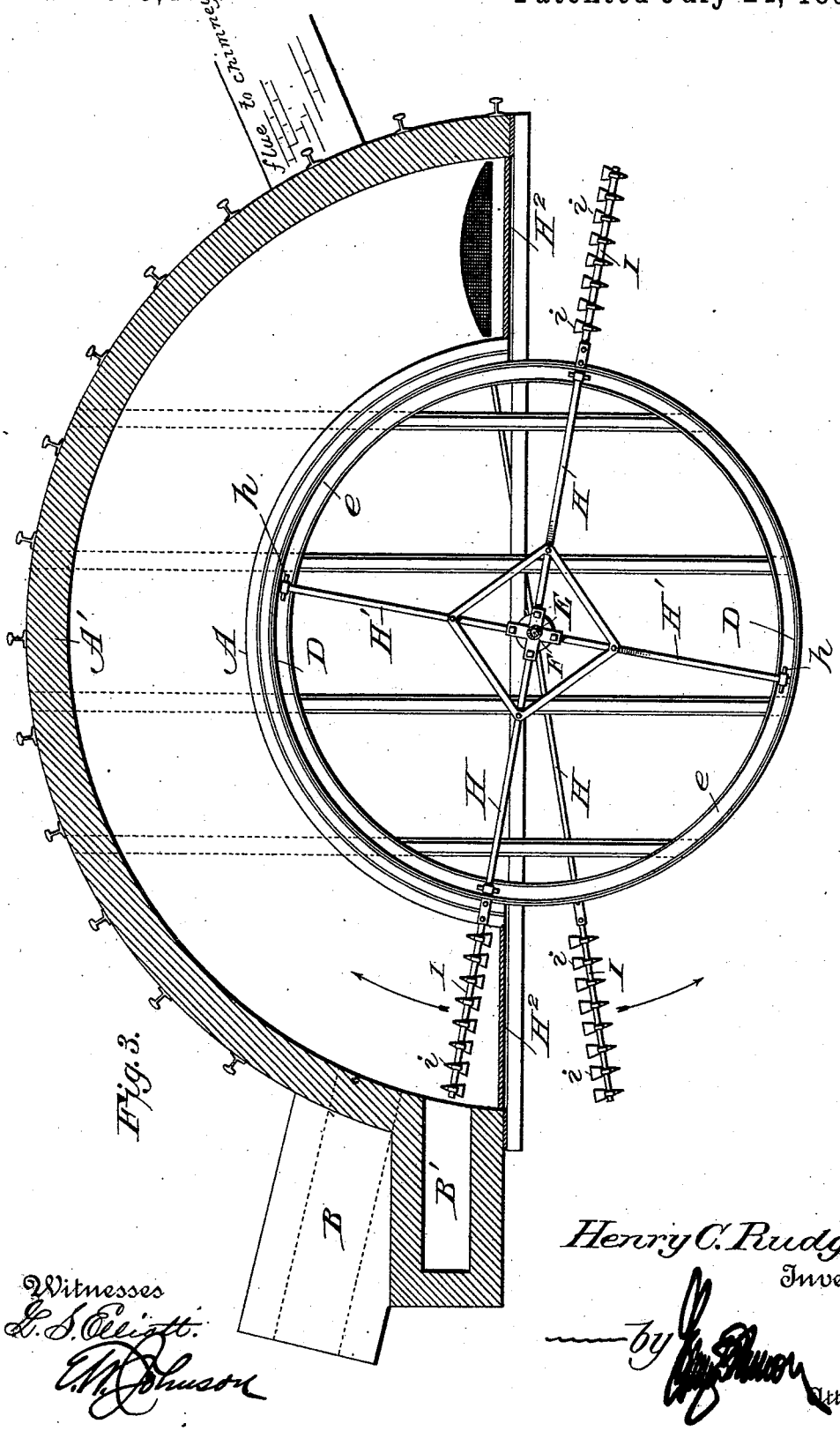

Fig. 3.

Witnesses
L. S. Elliott.
E. M. Johnson

Henry C. Rudge
Inventor
by
Attorney

(No Model.) 3 Sheets—Sheet 3.

H. C. RUDGE.

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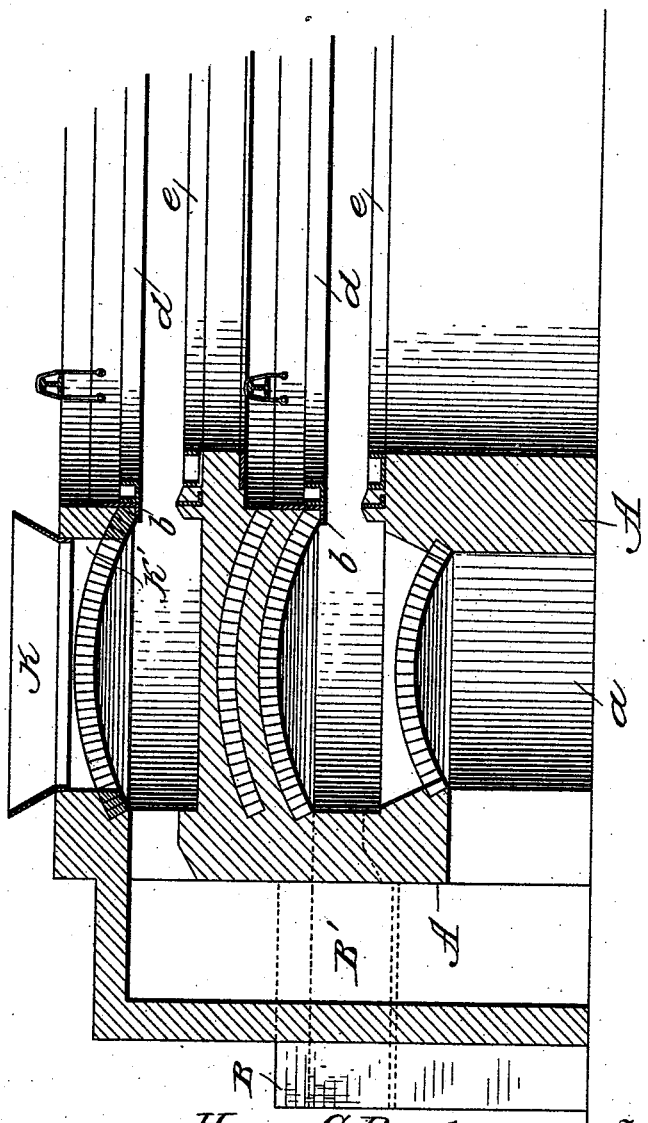
Fig. 4.



Witnesses
L. S. Effiatt.
E. M. Johnson

Henry C. Rudge Inventor
by Wright Brown
Attorney

UNITED STATES PATENT OFFICE.

HENRY C. RUDGE, OF DENVER, COLORADO.

ORE-ROASTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 523,487, dated July 24, 1894.

Application filed July 15, 1893. Serial No. 480,645. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. RUDGE, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Ore-Roasting Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in ore-roasting furnaces.

The object of this invention is to provide a furnace for desulphurizing and chloridizing ores and mattes, in which the mass of material is constantly stirred and also progressively moved from the inlet to the outlet.

In carrying out my invention I employ a furnace which is semi-annular in form instead of annular as heretofore constructed, and this peculiar form of furnace is an essential feature of my invention, as by such construction I am enabled to cool the stirrers or agitators for after performing their work they will pass out beyond the furnace and be cooled by atmospheric influences, and when the stirrers or agitators pass beyond the furnace they are in view of the attendant and should they be damaged from any reason they can be quickly repaired or removed and new ones substituted without loss of time or stoppage of the operation of roasting the ore.

The construction of ore-roasting furnaces is so well known in the art that it is only necessary to refer more particularly to those parts to which my invention directly appertains.

In the accompanying drawings, forming part of this specification: Figure 1 is a ground plan of an ore-roasting furnace constructed in accordance with my invention. Fig. 2 is a front elevation. Fig. 3 is a horizontal section, and Fig. 4 is a vertical section.

A and A′ designate the inner and outer walls of the furnace which are of suitable construction and provide below the hearths a flue *a*, which is connected in any suitable manner by a flue with a chimney.

B designates the fire-place of the furnace and B′ a flue which leads from the upper hearth to the flue *a* by which the products of combustion are conducted to a suitable chimney.

I prefer to use two roasting hearths arranged one above the other, and the heat which passes from the furnace B passes into the lower hearth and travels along the same in a direction opposite to the movement of the ore to the end thereof and from there passes through an opening to the upper hearth and along the same into the flue B′ and from thence downwardly to the flue *a* from which it passes into the chimney.

The outer wall A′ of the semi-annular furnace is braced by angle-bars and supports the I-beams which support the inner part of the upper hearth and crown and the operating mechanism. The inner wall only extends as high as the inner hearth and above that the inner part of the furnace is supported by the horizontal I-beams hereinbefore referred to, and this construction provides the slots or horizontal openings through which the shafts carrying the agitators or stirrers pass.

To the angle-irons *b b* which are supported from the horizontal I-beams and which support the inner part of the structure are bolted troughs *d d*, which are circular and therefore extend beyond the ends of the semi-annular furnace to form continuous ways, and if desired the angle-irons *b* may be extended beyond the ends of the furnace to complete the circle and support the troughs all the way round.

Beneath the troughs *d* and a slight distance beyond the inner side of the hearths are supported circular troughs *e* which are of greater width than the troughs *d*, as in addition to receiving the lower edges of the shields they also provide bearings or tracks for rollers carried by the arms to which the stirrers are attached. The troughs *d* and *e* are intended to contain water and with the circular shields or plates D provide means for closing the openings through which the arms carrying the stirrers pass.

E designates a vertical shaft which is suitably supported in bearings and located at the center of the structure, and upon the upper end of the shaft is keyed a bevel-gearwheel

E′ with which meshes a bevel-gearwheel at the end of the driving-shaft G, said gearwheel *g* also meshing with a gearwheel at the upper end of a hollow shaft F which is placed over the shaft E and revolves thereon. By the gearing hereinbefore described it will be seen that the shafts E and F are revolved in opposite directions.

To the shafts E and F are secured arms H H, said arms passing through the shields D D beyond which they are provided with sleeves or other suitable means for coupling thereto the arms I I which carry the stirrers or plows *i* which are of any approved construction and preferably so made that they can be readily attached and detached from the arms. The shafts E and F have also coupled thereto arms H′, the outer ends of which engage with the shields and are provided adjacent thereto with rollers *h h* which travel in the lower troughs *e e* and support said shields.

The ends of the semi-annular furnace are closed by doors H^2 which are hinged at their upper ends to permit the stirrers to swing them open in entering and leaving the furnace.

It will be noted that the stirrers of the upper hearth travel over the same in an opposite direction from those which travel over the lower hearth, and that the stirrers pass beyond the furnaces so that during the operation of roasting ores they are one-half of the time exposed to the atmospheric influences so that the metal of which the plows and shafts are made will be permitted to cool and will therefore last much longer than when constantly exposed to the heat, and should the plows or arms become injured by the heat they can be readily removed and new ones quickly supplied without withdrawing the fires from the furnace.

In practice the heat passes into the hearths from the furnace and the ore to be treated is fed into a hopper K carried by the upper hearth through the hopper K and opening K′ and is carried by the upper set of stirrers or plows to the other end of the hearth where it falls through an opening into the lower hearth and is moved by the other stirrers or plows to the outlet opening which is located to one side of the furnace.

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

1. A semi-annular ore-roasting furnace having an inner wall with horizontal openings and water-troughs above and below said openings, combined with a central rotary shaft having arms which carry stirrers, and a shield or continuous door the edges of which lie in said water troughs, substantially as shown.

2. A semi-annular ore-roasting furnace the inner wall of which is provided with a horizontal opening and water troughs, one located above the other below the horizontal opening stirrers connected to horizontal arms, and a continuous door or shield the upper and lower edges of which lie in the water troughs and move therein, said shield being carried by the arms to which the stirrers are connected, substantially as shown, and for the purpose set forth.

3. A semi-annular ore-roasting furnace the inner wall of which is provided with a continuous horizontal slot or opening, troughs one located above the other below the horizontal slot or opening, stirrers carrying a shield or door the upper end of which is bent to enter the upper trough, the lower end or edge entering the lower trough, and a supporting wheel carried by an arm which projects from the driving-shaft and travels in the lower trough, substantially as shown, and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY C. RUDGE.

Witnesses:
THOMAS CHARLTON,
BRINTON GREGORY.