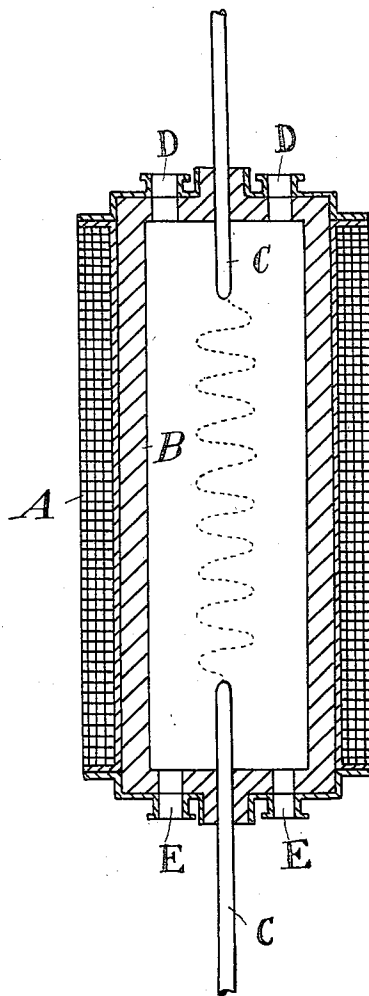


K. BIRKELAND.
ELECTRIC FURNACE.

APPLICATION FILED JAN. 5, 1907.

906,682.

Patented Dec. 15, 1908.



Witnesses

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by *Henry Orth*

Att.

UNITED STATES PATENT OFFICE.

KRISTIAN BIRKELAND, OF CHRISTIANIA, NORWAY.

ELECTRIC FURNACE.

No. 906,682.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed January 5, 1907. Serial No. 351,029.

To all whom it may concern:

Be it known that I, KRISTIAN BIRKELAND, a subject of the King of Norway, residing at Christiania, Norway, have invented certain new and useful Improvements in Electric 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 or figures of reference marked thereon, which form a part of this specification.

In my Norwegian Patent No. 13281 dated March 30, 1904, published September 5, 1904, I have described an electric furnace, in which electrodes are placed axially in a magnetic field and in that way I obtain a dispersed arc flame of a spiral form, which flame rotates around the axis of the electrodes. The electrodes in this furnace were placed close to each other as in my other furnaces. I have now found, that when the electrodes are placed axially as above stated, it is preferable to place them a considerable distance apart from each other, whereby the arc flame will take the shape of a lengthy helical line and rotate very rapidly around the axis of the electrodes.

In the annexed drawing I have shown one form of a furnace of this system in longitudinal section.

The furnace B, which may be composed of an iron casing with removable heads, lined on the inside with fireproof material, may have a cylindrical shape. The electrodes C project through openings in the heads into the furnace and air may be blown into the same through openings D at one end and the products obtained are taken out through openings E at the other end. The field is created by means of a coil A surrounding the furnace casing, supplied by either direct or alternating current.

The arc may be started in any convenient way for instance by moving for a moment

one electrode near to the other; when again separated the flame will take a form as indicated and violently rotate within the furnace, thereby also causing the air to rotate, so that a very intimate contact between the air and the flame and a thorough mixing of the products formed with the surplus of air will take place.

Claims.

1. In an electric furnace for the treatment of gases having their electrode points a distance apart greater than that permitting the automatic formation and restarting of the arc between them and means to distort this arc into a helix.

2. In combination a substantially long electric furnace, electrodes at a considerable distance from one another to produce a long arc and means to distort said long arc into a helix.

3. In an electric furnace for the treatment of gases, a pair of electrodes having normally their points at a considerable distance apart, means to create a magnetic field the axis of which is parallel to the axis of the electrodes, and a furnace chamber having its greatest extension in the direction of the axis of the electrodes thereby producing a helical arc.

4. A tubular electric furnace for the treatment of gases having electrodes projecting axially into the same, means to admit air at one end and means to exhaust products of combustion at the other end, and a field coil surrounding the furnace and extending from end to end thereof to produce a helical arc.

5. The combination with a substantially long electric furnace and electrodes distanced from one another to produce a long arc; of electro-magnetic means to distort said long arc into a helix.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

KRISTIAN BIRKELAND.

Witnesses:

HENRY BORDEWICH,
HARALD BORDEWICH.