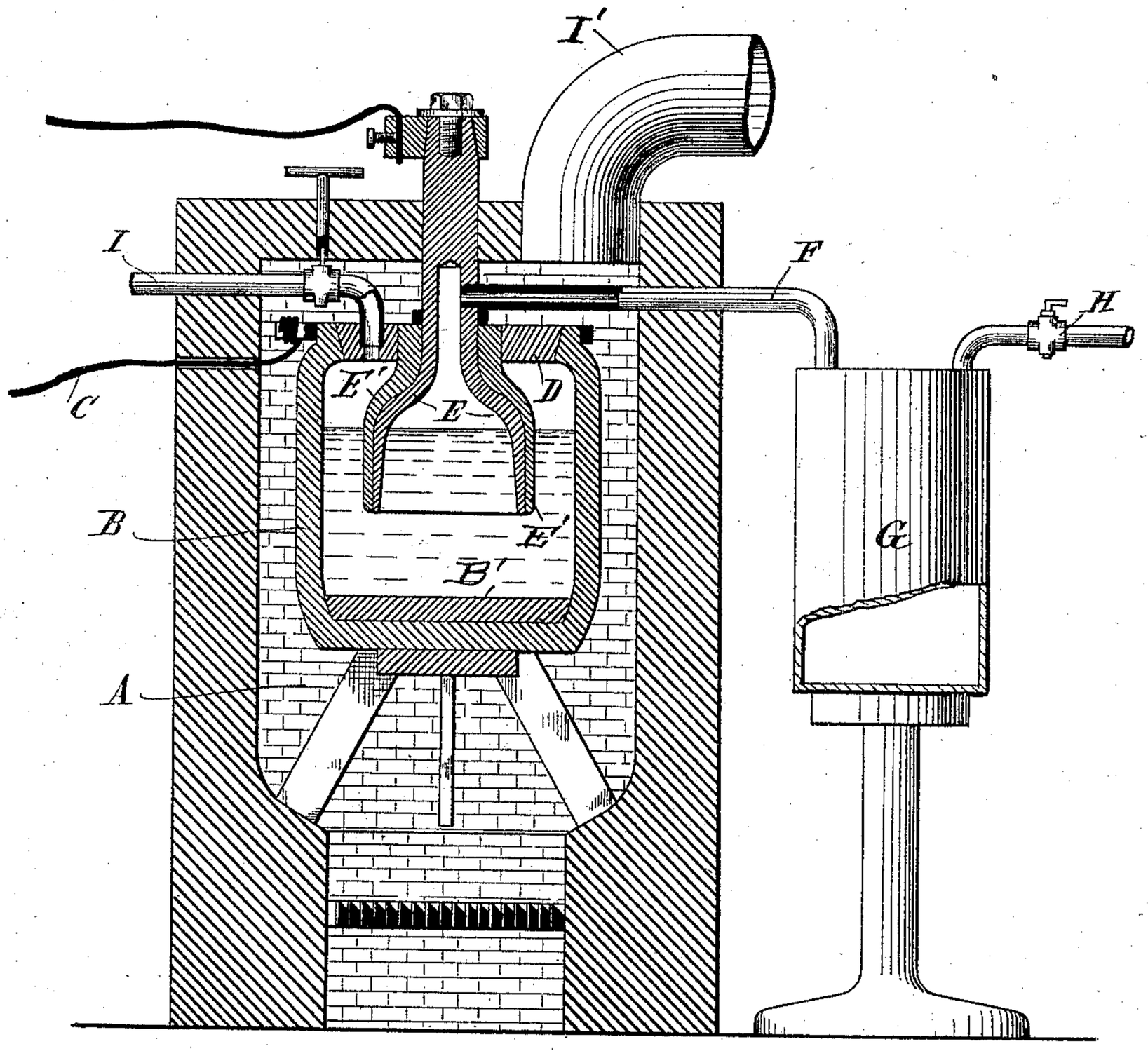
(No Model.)

G. O. RENNERFELT.

ELECTROLYTIC APPARATUS.

No. 495,600. Patented Apr. 18, 1893.



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UNITED STATES PATENT OFFICE.

GUSTAF OTTO RENNERFELT, OF STOCKHOLM, SWEDEN.

ELECTROLYTIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 495,600, dated April 18, 1893.

Application filed September 30, 1890. Serial No. 366,781. (No model.) Patented in Sweden January 8, 1889, No. 2,155.

To all whom it may concern:

Be it known that I, GUSTAF OTTO RENNERFELT, a subject of the King of Sweden and Norway, residing at Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Electrolytic Apparatus, (for which I have obtained Letters Patent in Sweden, No. 2,155, dated January 8, 1889;) and I hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to means for removing at the decomposition of melted haloid salts and other metal combinations by means of electrolysis, the metal set free at the cathode from the electrolytic vessel.

The essential feature of this invention consists of the peculiar form of the cathode entering the electrolytic vessel which cathode is in the form of a casing, funnel or pipe, to provide a cathode compartment which is so arranged, that the part passing down in the molten salt composition has its inner surface acting as the decomposing cathode, whereby the metal set free at the cathode will be inclosed in the cathode or the cathode compartment formed thereby and can be removed from this closed compartment in pure condition out of the electrolytic vessel by creating suction or a rarefaction of air in the outlet pipe for the metal, of which the compartment inclosed by the cathode constitutes a part.

In the annexed drawing is shown an example of how the apparatus can be arranged.

The electrolytic vessel B arranged in a suitable furnace A and having a bottom disk B′ is in conductive communication with an electric generator by means of a conductor C, and the wall of this vessel forms the anode of the electrolytic apparatus. The cathode of the apparatus is passed down through the cover D of the vessel made of non-conducting material, and is also connected with the electric source. The lower part of this cathode is enlarged to a clock casing, funnel or such like formation, and its outer surface is coated with a non-conducting material, forming a sleeve or outer wall E′ in order that only the inner surface of it will be active at the electrolyzing, thus forming what I term a cathode compartment, that is, a compartment the interior of which acts as a cathode. From the hollow part of the cathode E a pipe F extends to a closed vessel G for accumulating the metal set free, and from this vessel a pipe H extends to a suitable apparatus for the rarefaction of the air in the pipe F and in the vessel G in order to create the suction. For this purpose an injector, an air pump, a fan-blower or any other apparatus may be used, if only such a powerful suction can be attained that the metal is led off from the hollow part of the cathode through the pipe F. The salt introduced in the vessel B for being decomposed and heated to fusion completes the shutting off of the cathode compartment during the electrolyzing. Gases formed during the electrolyzing are conducted off through the pipe I from the vessel B, while the products of combustion are conveyed from the furnace through the flue I′.

It is well known to me that when producing steel and other metals, a siphon pipe or pipe conduit in which rarefaction of air is effected, has been used for carrying off molten metal from furnaces or crucibles, but those pipes reach down to the bottom of the furnace or crucible or extend out from the bottom or near to the same, hence I do not claim this. In the present invention the metal is on the contrary, not only taken or carried off from the surface of the metal-bath, by means of rarefaction of the air in the pipe conduit leading from the same, but also by means of a hollow cathode which forms a cathode compartment in an electrolytic apparatus.

What I claim as my invention is—

1. In combination, in an electrolytic apparatus the electrolytic vessel, the cathode extending into the same said cathode having a cavity and the suction pipe communicating therewith, substantially as described.

2. In combination, in an electrolytic apparatus, the electrolytic vessel, the cathode extending down into the same and into the upper part thereof and having a downwardly opening cavity and the suction pipe com-

munication with said cavity, substantially as described.

3. In combination, in an electrolytic apparatus, the electrolytic vessel, the cathode extending into the same, said cathode having a cavity, the interior of said cathode being of conducting material and the exterior of non-conducting material, the same forming a cathode compartment and the suction pipe connecting with the interior of the cathode, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GUSTAF OTTO RENNERFELT.

Witnesses:

NERE A. ELFWING,

ERNST SVANQVIST.