No. 736,020. PATENTED AUG. 11, 1903.

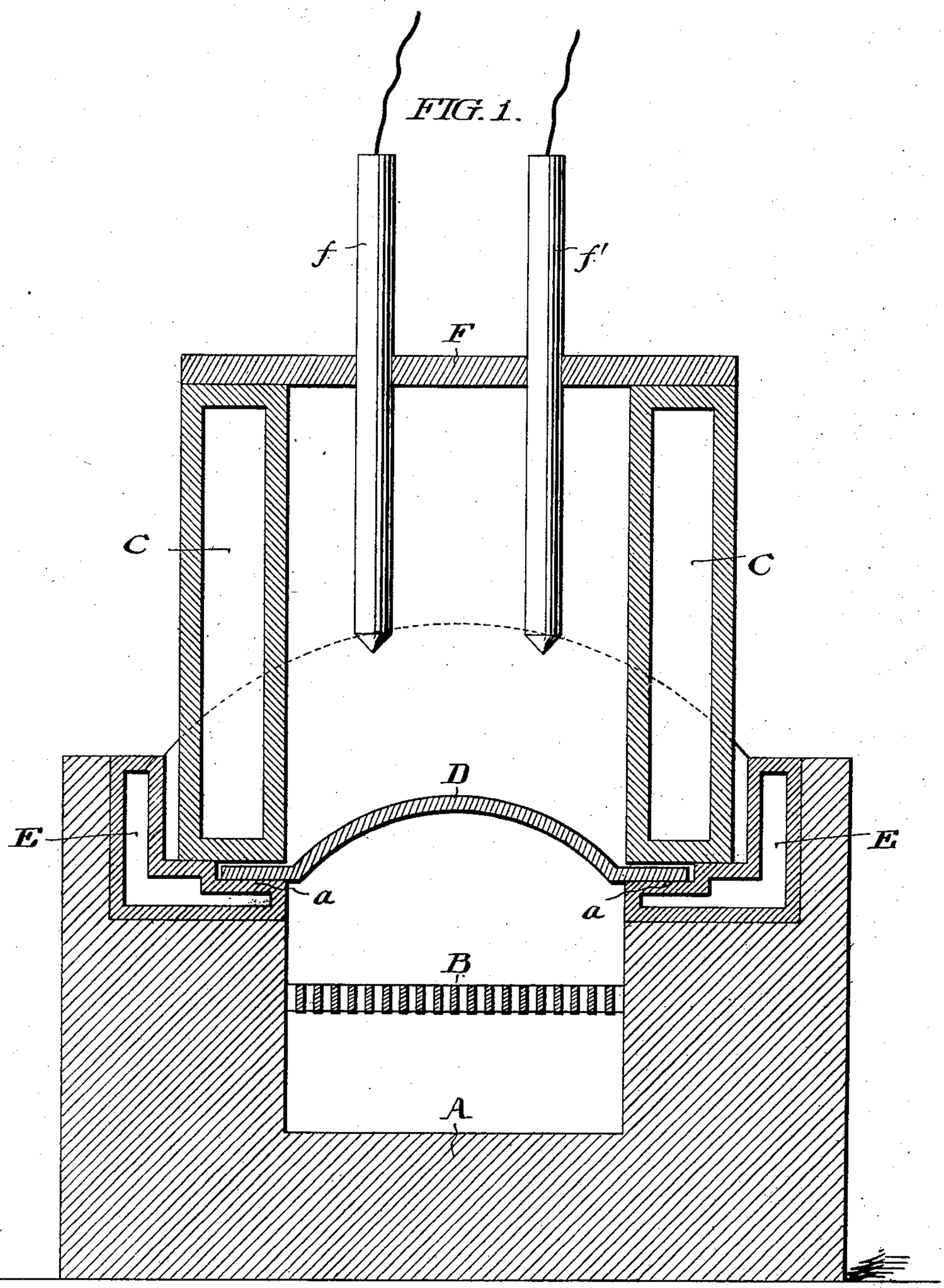
C. W. ROEPPER.

APPARATUS FOR THE ELECTROLYSIS OF FUSED SUBSTANCES.

APPLICATION FILED SEPT. 27, 1898.

NO MODEL. 3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

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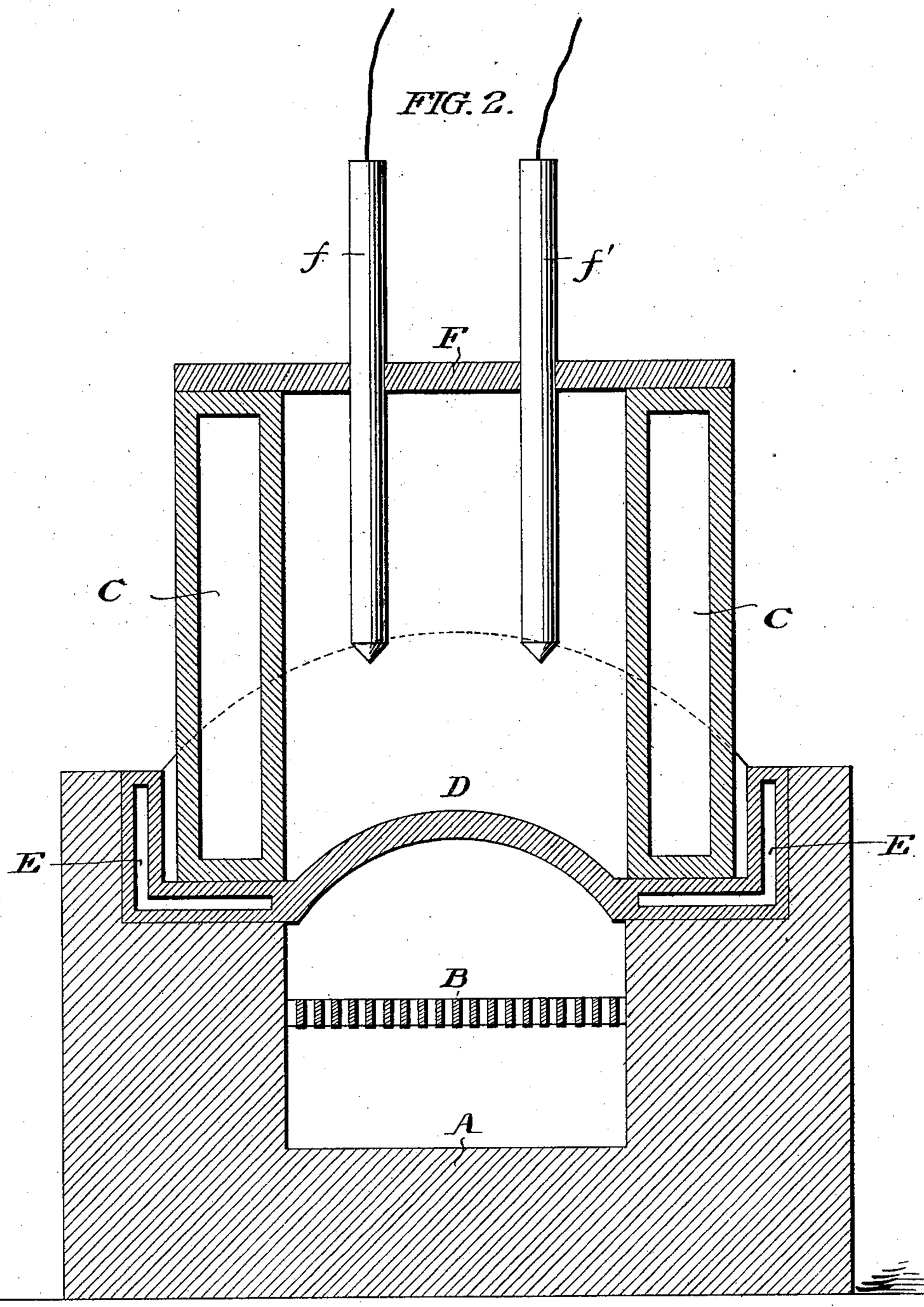
NO MODEL. 3 SHEETS—SHEET 2.

FIG. 2.



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NO MODEL 3 SHEETS—SHEET 3.

FIG. 3.

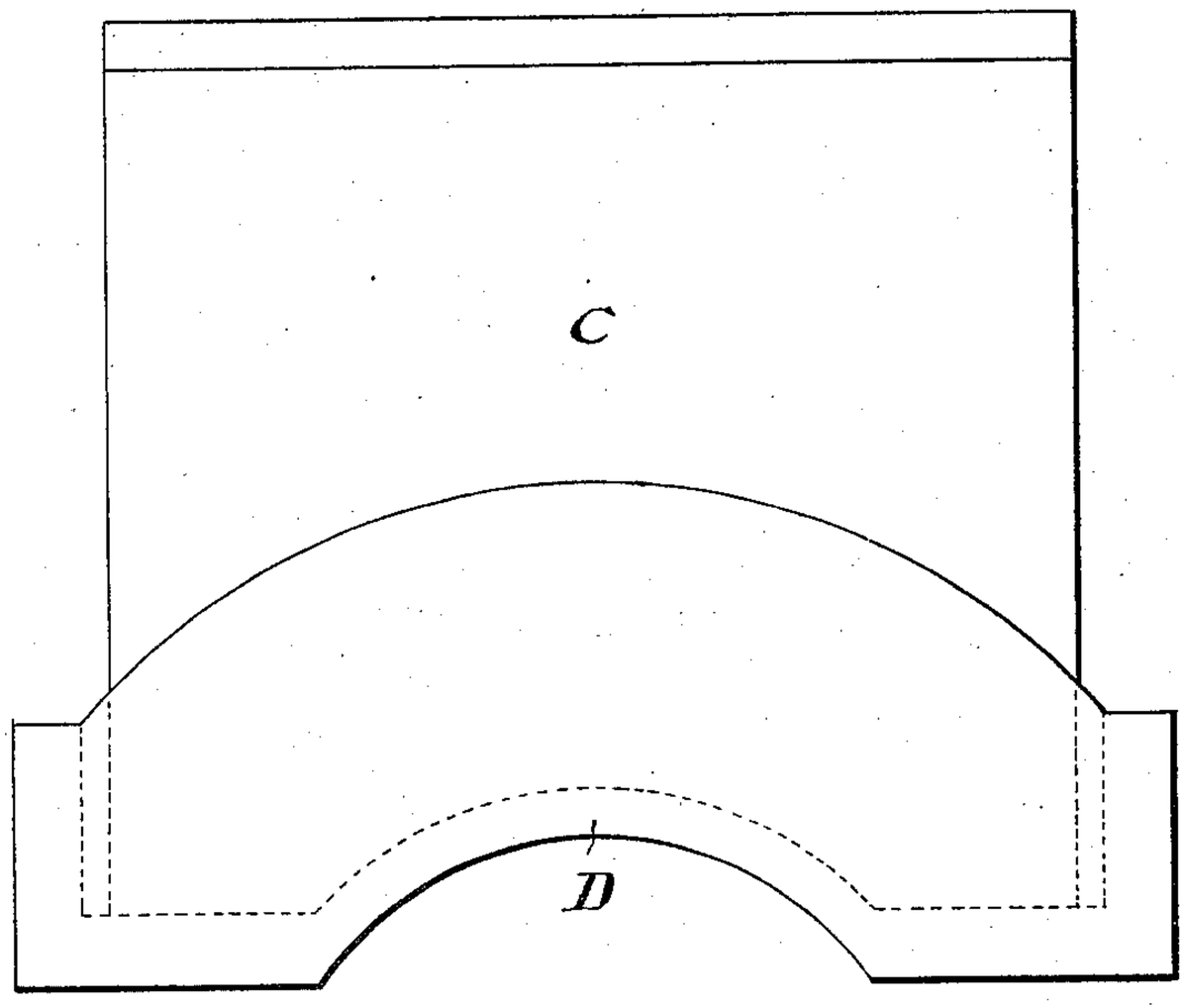


FIG. 4.

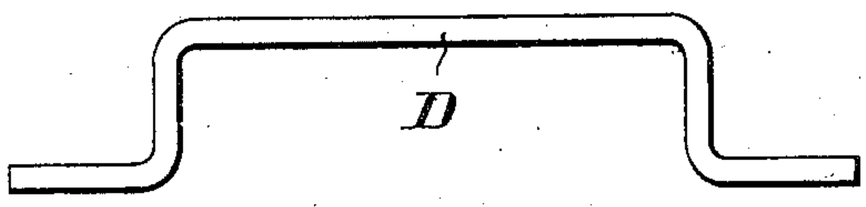
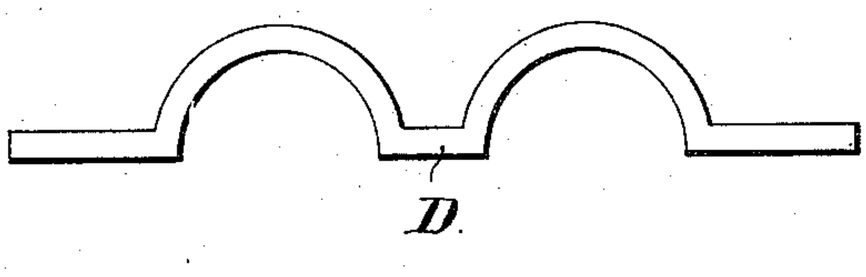


FIG. 5.



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UNITED STATES PATENT OFFICE.

CHARLES W. ROEPPER, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR THE ELECTROLYSIS OF FUSED SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 736,020, dated August 11, 1903.

Application filed September 27, 1898. Serial No. 691,980. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. ROEPPER, residing in Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Electrolysis of Fused Substances, of which the following is a specification, reference being had to the accompanying drawings.

In apparatus for fused bath electrolysis constant difficulty has been experienced by reason of the destruction of the vessel in which the fusion is accomplished. The destructive influences are twofold—the external in shape of the highly-heated products of combustion and the internal in shape of the fused contents of the vessel—which either in itself or by reason of one or more of the products set free by the electrolysis is apt to powerfully attack the containing vessel.

My invention consists in so constructing a fusion vessel that its heating-plate may be readily and cheaply replaced as often as it is destroyed. The heating-plate is usually at the bottom, and it is here that the two destructive influences referred to are most active, both separately and in combination. Furthermore, the other sides of a vessel of this sort are capable of being protected by cooling-spaces or by reason of their extreme thickness. The bottom or heating plate can neither be so protected by cooling-spaces nor can it be made too thick, as through it the heat must be conducted from the source of heat to the contents of the vessel; hence the economy which results from my construction which admits of the ready and cheap replacement of the heating-plate when destroyed without interfering with the rest of the vessel.

In the accompanying drawings, Figure 1 represents an embodiment of my invention in vertical section. Fig. 2 represents another slightly-different embodiment in similar section. Fig. 3 is an end elevation of the fusion vessel and recessed cooling-jacket of the apparatus of both Figs. 1 and 2. Figs. 4 and 5 show differing shapes of the removable heating-plate D, Fig. 1.

In Fig. 1, A represents the hearth and side walls of a fire-box arranged to form a supporting structure for a fusion vessel for the practice of electrolysis. B is a series of grate-bars within the fire-box. C C are the sides of a fusion vessel, which in this case is a rectangular metal box, the lower edges of these sides resting and fitting on top of the side walls of the fire-box. The top of the walls of the fire-box are recessed for this purpose, and it is desirable that the fit within this recess should be loose in order to leave abundant space for the free expansion and contraction of the sides. The bottom of the fusion vessel is formed of a comparatively thin arched metal heating-plate D, which lies directly over the fire-box, presenting its concavity thereto, while its convex surfaces arch up into the fusion vessel. This bottom heating-plate is supported upon its edges, which project between the lower edges of the sides and the top of the recessed portion of the supporting structure which has been spoken of, which is correspondingly cut away at *a* to receive it. The entire recessed portion of the supporting structure is fitted with a cooling-jacket E, preferably of iron, with a cooling-space in its interior. F is the top of the fusion vessel, through which depend electrodes *f f'*, dipping into the contents of the fusion vessel.

The construction shown in Fig. 2 differs from that in Fig. 1 in the respect that the heating-plate D instead of resting separately upon the recessed support provided for it is made integral with the cooled metal jacket which fits into this recessed portion, in which case obviously the removal of the plate for renewal or repair necessitates removal at the same time of the accompanying parts which have been referred to.

As seen in Fig. 3, the ends of the fusion vessel conform in shape to the arch of the heating-plate.

Figs. 4 and 5 are alternative forms for the removable heating-plate. In Fig. 4 instead of a flat arch the section of the plate presents a nearly rectangular upwardly-projecting center. The upward projection may be very much greater than shown in both cases. In Fig. 5 a double-arched construction is shown.

I have not in the drawings thought it necessary to illustrate nor in the specification to describe in detail either the heating or the electrolytic apparatus, as my invention appertains specifically to the construction of

the fusion vessel itself, with special reference to the removable heating-plate. In practice as often as this heating-plate burns through or shows signs of weakness it is removed and a new plate substituted. The old plate may be either discarded or repaired. The construction of the apparatus renders this substitution a very simple matter, interfering very little with the continuity of the electrolytic process. The heating-plates being of iron, steel, or other suitable material are very cheap and their renewal therefore a matter of small expense.

It is to understood that in the claims by the expression "heating-plate" I refer to a plate which forms that portion of the wall of the fusion vessel through which the heat is communicated, whether it be at the bottom, top, or sides of the vessel.

Having thus described my invention, I claim—

1. In an apparatus for the electrolysis of fused substances, the combination of a fusion vessel; a supporting structure provided with recessed portions, which support and receive the sides of the fusion vessel; and a removable heating-plate the edges of which are held between the sides of the fusion vessel and the corresponding recessed portions of the supporting structure, substantially as described.

2. In an apparatus for the electrolysis of fused substances, a fusion vessel the sides of which are provided with cooling-spaces; a supporting structure provided with recessed portions which support and receive the sides of the fusion vessel; and a removable heating-plate the edges of which are held between the sides of the fusion vessel and the corresponding recessed portions of the supporting structure, substantially as described.

3. In an apparatus for the electrolysis of fused substances, a fusion vessel the sides of which are provided with cooling-spaces; a supporting structure provided with recessed portions which support and receive the sides of the fusion vessel, the recessed portions being provided with cooling-spaces; and a removable heating-plate at the bottom of the fusion vessel, the edges of which are held between the sides of the fusion vessel and the corresponding recessed portions of the supporting structure, substantially as described.

CHARLES W. ROEPPER.

Witnesses:
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E. REESE.