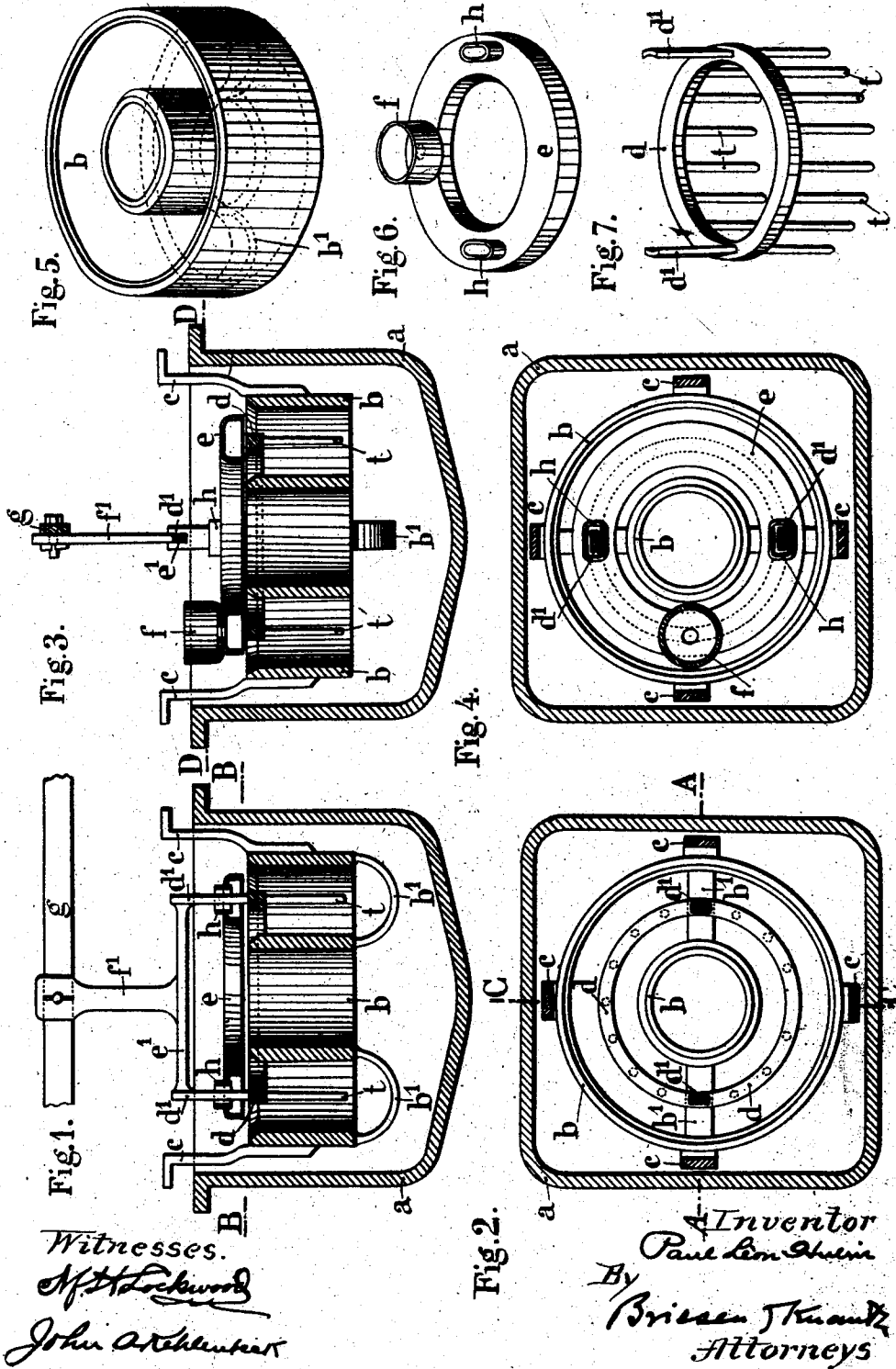


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 APPARATUS FOR CARRYING OUT THE ELECTROLYTIC PRODUCTION OF SODIUM.
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978,888.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CARRYING OUT THE ELECTROLYTIC PRODUCTION OF SODIUM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PAUL LÉON HULIN, of 6 Rue Félix Poulat, Grenoble, Isère, Republic of France, engineer, have invented an
5 Apparatus for Carrying Out the Electrolytic Production of Sodium, of which the following is a full, clear, and exact description.

The present invention has for its object
10 an apparatus particularly applicable for the electrolytic decomposition of fused caustic soda for the production of sodium, but which may also be employed to decompose other alkalies.

15 This apparatus is characterized essentially by the combination of an anode, constituted by two cylinders concentrically disposed, one inside and the other outside the cathode; a cathode surrounded by concentrically dis-
20 posed parts of the anode and an annular sodium collector in the form of an inverted U-shaped member disposed over the cathode, this arrangement permitting the high concentration of the electrolytic action on the
25 cathode at the same time as a diffusion of the electrolytic action on the anode.

This apparatus is shown by way of example in the accompanying drawings, in which—

30 Figure 1 is a vertical section of the apparatus on line A—A Fig. 2; Fig. 2 is a horizontal section on line B—B Fig. 1. Fig. 3 is a section on line C—C Fig. 2. Fig. 4 is a section on line D—D Fig. 3. Fig. 5 shows separately, in perspective the anode. Fig. 6
35 is a similar view of the collector or separator. Fig. 7 shows the cathode.

As may be seen from the drawings, the apparatus comprises a cast iron vat *a* preferably square, but which may be made of iron or steel and in any other shape; this vat contains the fused caustic soda. The iron or steel anode *b*, is placed within the vat and is constituted essentially of two
45 concentric cylinders connected by two conductor arms such as *b*¹ which render said cylinders mechanically and electrically integral. The anode is suspended in the vat containing fused soda by two supporting
50 arms *c* *c* which lead in the current of positive polarity.

The cathode *d* is constituted by a metal ring, which may be a simple copper cylinder; it may for example be formed by a narrow
55 band below which are hung rods *t* spaced as

shown in Fig. 7. This cathode is provided with two vertical arms *d*¹ which are joined by a horizontal arm *c*¹ on which is mounted the central stem *f*¹. This stem is fixed at its upper extremity to a suitable support such
60 as *g* by means of a cotter pin or the like which is essentially removable in such manner that the cathode may be readily disconnected. The negative current is led in by the support *g*. The arms *d*¹ can of course be
65 prolonged up to the cross bar *g* and be directly fixed thereto in the same way as is shown with regard to the stem *f*¹.

The characteristic feature of the preceding arrangement is the disposition of the
70 cathode between two cylinders which constitute the anode *b* and which entirely surround the sides of the cathode.

The collector or separator *e*, that is to say the part in which the sodium collects, is of
75 iron or steel and has the form of an annulus, with turned down edges. It constitutes an inverted tray and in section is similar to a pump cup-leather.

Three openings are provided in the top of
80 the collector. One of these openings is in communication with a cup *f* integral with the collector ring wherein collects all the sodium generated by the cathode and which has risen up to and been retained beneath
85 the collector ring. Sleeves or liners narrower than the collector ring are passed through the two other openings and are adapted to form an air-tight joint therewith. These sleeves extend a few centimeters
90 below the inside and a little above the outside as shown in Figs. 1 and 6. The arms *d*¹ which support the cathode and lead in the current pass through these two sleeves without making contact with said collector.
95

The annular sodium collector *e* is supported by iron legs independently of the cathode with which it is not in contact, said legs resting on a cover which is disposed on the vat, insulators being provided for insu-
100 lating the current carrying parts.

These details, which have no distinctive features, are not shown in the drawings for the sake of clearness. The other parts, accessory details and arrangements, heat retaining covering, electric heater, current con-
105 ductors and the like may be of any suitable form.

The novel element of this invention consists in the combination of a circular anode
110

composed of two cylinders of different diameters disposed concentrically around the cathode; a cathode thus surrounded both inside and outside and an annular sodium collector in the form of a cup leather permitting the high concentration of the electrolytic action on the cathode and at the same time the diffusion of the electrolytic action on the anode.

10 The pump cup-shaped collector rapidly effects the collection of the sodium globules in a reduced space and thus helps to diminish the losses which are brought about by the redissolving of the metal in the fused electrolyte.

15 By means of the combination claimed a large output of sodium, a long life for the anode and an apparatus which for its size is more powerful than those as hitherto constructed, is obtained.

20 On all these points the invention constitutes therefore an important improvement. The invention is moreover independent of the shapes, sizes and detail arrangements of the different parts which constitute and are accessory to the apparatus. The anode and the cathode may be either square, rectangular or oval in plan without departing from the spirit of the invention.

30 Claims:

1. In an apparatus for carrying out the electrolytic production of sodium, a circular anode formed by two electrically connected concentric cylinders and a cathode disposed
35 between the two cylinders.

2. In an apparatus for carrying out the electrolytic production of sodium, a circular anode formed by two electrically connected concentric cylinders, and a cathode disposed
40 between the two cylinders comprising a ring from which are suspended vertical rods.

3. In an apparatus for carrying out the electrolytic production of sodium, a circular anode formed by two concentric cylinders

and cross-bars arranged between these cylinders and placed at the lower extremity of the same.

4. In an apparatus for carrying out the electrolytic production of sodium, an anode formed by two concentric cylinders, a cathode disposed between the two cylinders, and a collector having the shape of a circular tray arranged above the cathode.

5. In an apparatus for carrying out the electrolytic production of sodium, an anode formed by two concentric cylinders, a cathode disposed between the two cylinders, a collector having the shape of a circular tray arranged above the cathode and sleeves in this collector for the passage of the conductors carrying the cathode.

6. In an apparatus for carrying out the electrolytic production of sodium, an anode formed by two concentric cylinders, a circular cathode between these cylinders, a circular collector placed above the cathode, sleeves in this collector, and suspension rods, for the cathode, passing in the sleeves of the collector without touching the same.

7. In an apparatus for carrying out the electrolytic production of sodium, an anode formed by two concentric cylinders, a circular cathode between these cylinders, a circular collector placed above the cathode, sleeves in this collector and suspension rods, for said cathode, passing in the sleeves of the collector, without touching the same and connected together to a common support easily dismantlable.

The foregoing specification of my apparatus for carrying out the electrolytic production of sodium, signed by me this 19th day of March 1910.

PAUL LÉON HULIN.

Witnesses.

H. C. COXE,
R. EHRIOT.