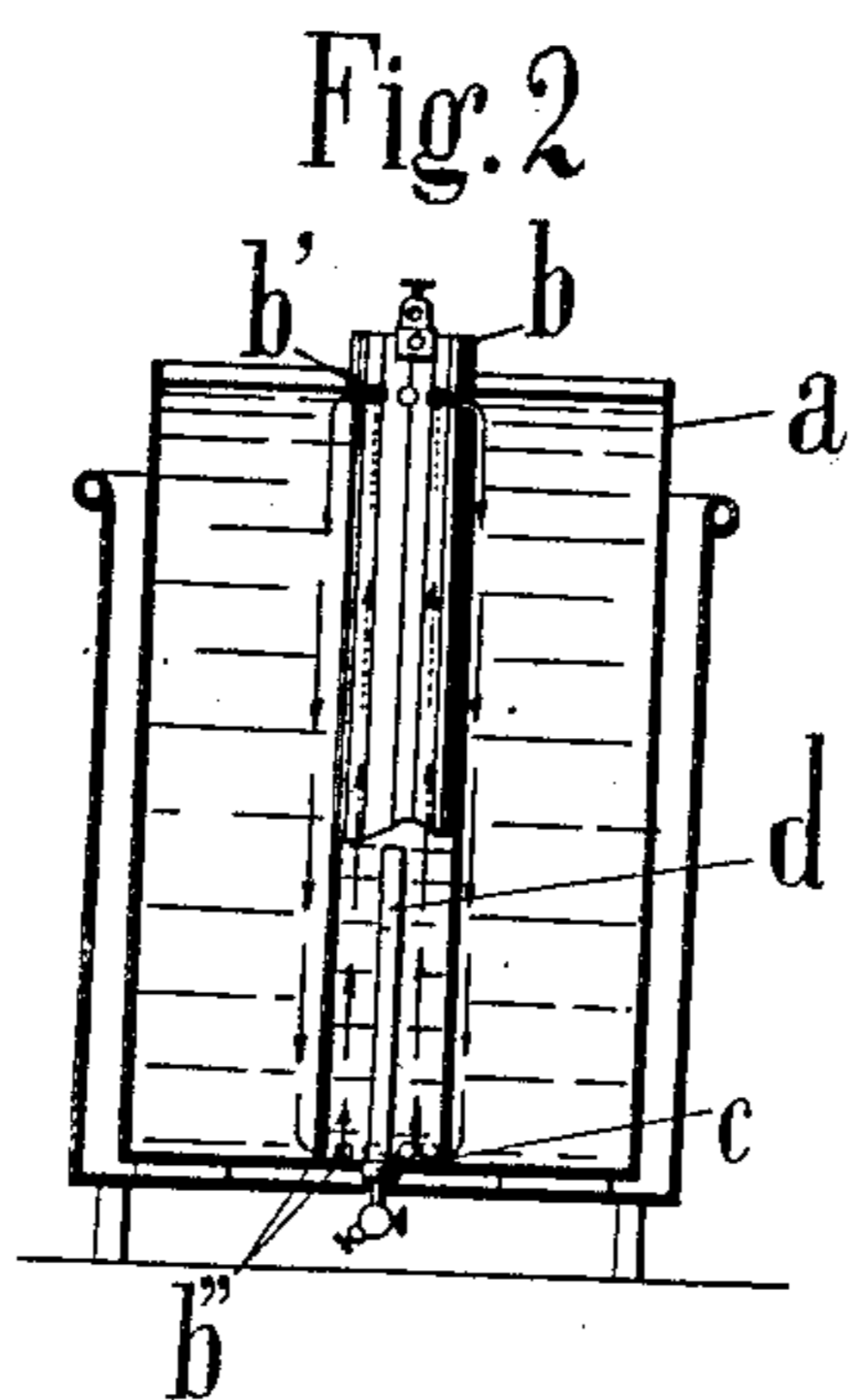
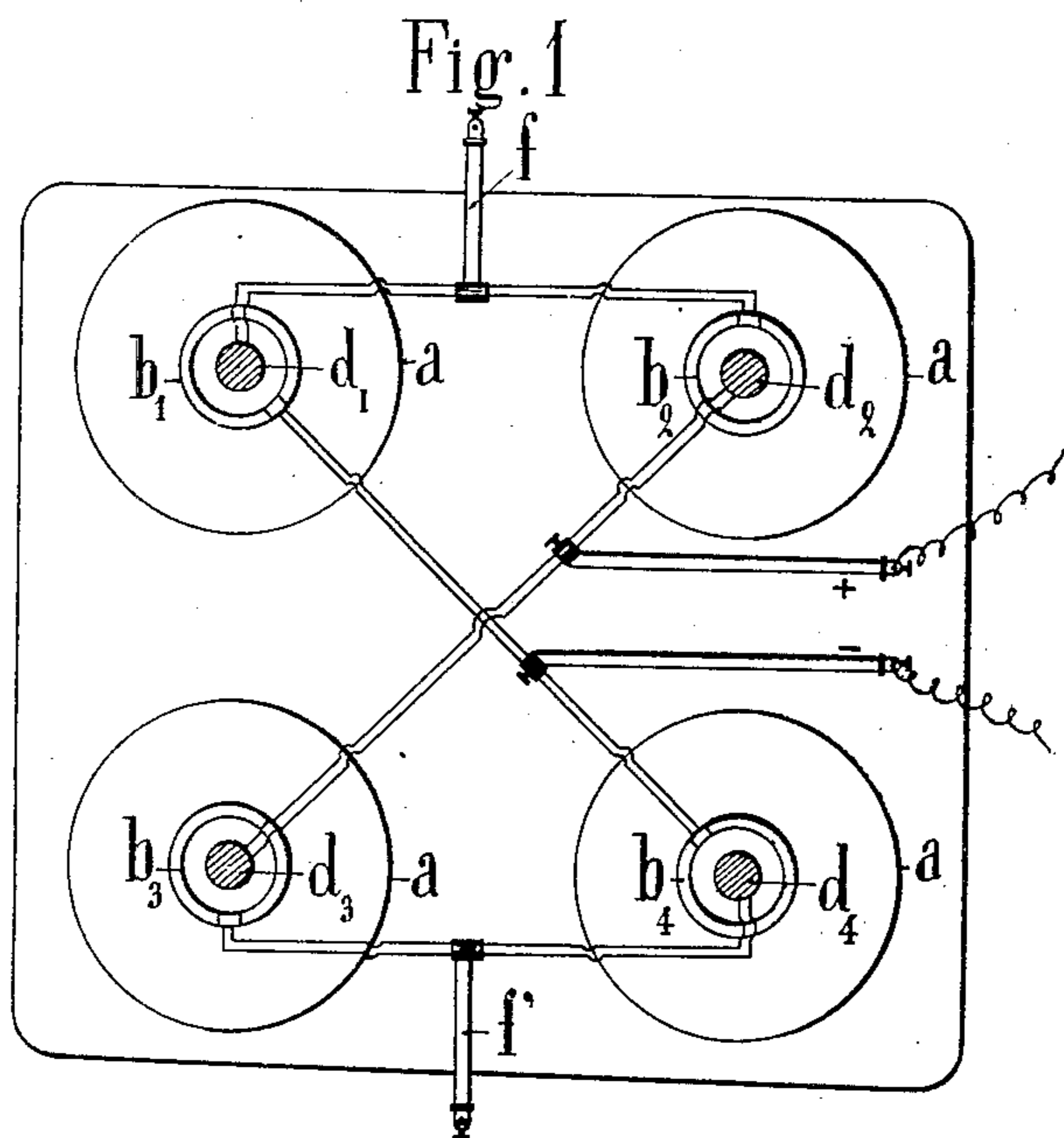


No. 865,093.

O. DE FARIA.
CURRENT TRANSFORMER.
APPLICATION FILED FEB. 4, 1905.

PATENTED SEPT. 3, 1907.



WITNESSES:

Henry J. Suhrbier.

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INVENTOR

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BY

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

OSWALDO DE FARIA, OF PARIS, FRANCE.

CURRENT-TRANSFORMER.

No. 865,093.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed February 4, 1905. Serial No. 244,133.

To all whom it may concern:

Be it known that I, OSWALDO DE FARIA, a citizen of the Republic of Brazil, residing in Paris, France, have invented new and useful Improvements in or Relating to Current-Transformers, which improvements are fully set forth in the following specification.

This invention relates to an electrolytic transformer for rectifying simple alternating or polyphase currents.

The electrolytic transformer according to this invention is illustrated, by way of example, in the accompanying drawing.

Figure 1 shows diagrammatically the transformer in plan. Fig. 2 is an elevation, partly in section, of one of its elements.

The transformer chiefly consists of four vessels *a* of cylindrical shape, made of some insulating material. Each of the vessels receives a circular hollow electrode *b* of very porous carbon. The carbon electrode projects slightly above the top of the vessel *a* and is provided at the top and at the bottom with a horizontal series of perforations or holes *b'*, *b''*. In the center of the bottom of each vessel *a* is a hole closed by a rubber plug *c*, through which passes a metal electrode *d*. This latter electrode is made either of pure aluminium or of an alloy of the following composition.

Aluminium.....	94%
Copper.....	3%
Zinc.....	3%

This electrode reaches to about half of the height of the vessel *a*.

The electric connections are as follows:—The two wires of the line circuit arrive at the apparatus at *f* and *f'*. The wire or post *f* is connected on the one hand to the electrode *d'* of aluminium alloy, and on the other hand to the carbon electrode *b''*. The post *f'* is connected in the same way, on the one hand, to the electrode *d''* of aluminium alloy and on the other hand to the carbon electrode *b'*. Moreover, the carbon electrodes *b'* and *b''* are connected together, and to the center of that connection is connected the wire from which the negative pole is taken. The aluminium alloy electrodes *d'* and *d''* are also connected together, and from the center of that connection starts the wire from which is taken the positive pole.

The electrolytic liquid in this transformer is prepared as follows. Ordinary commercial phosphate of sodium is dissolved in water at a temperature of about 90 degrees, the solution is then left to cool, and poured into the vessels of the transformer, so that in each vessel the top of each aluminium electrode is covered by

the liquid. This having been done, the current from the circuit is admitted, without rectified current (supplied by the apparatus) being utilized. In these conditions, the liquid undergoes a chemical transformation and becomes brownish in color. Commercial phosphate of sodium is transformed by these operations into chemically pure phosphate of sodium of the formula $\text{PO}_4\text{Na}_2\text{H} + 12\text{H}_2\text{O}$.

Instead of phosphate of sodium, phosphate of potassium could be used to which could be added some other phosphates, oxides or dioxides.

By way of example, 250 grams of phosphate of sodium could be used per liter of water.

At the beginning of the working of the apparatus, the level of the electrolytic liquid is slightly below the level of the top holes *b'*. During the working of the apparatus the level of the liquid rises in the vessel *a*, by reason of the heating of the former and then, owing to the holes *b'* and *b''*, a circulation of the liquid takes place, in the direction of the arrows in Fig. 2, owing to the differences of temperature in the various parts of the liquid. Owing to the circulation which is identical with that which takes place in a thermo-siphon, the heating of the electrolytic liquid is greatly retarded, so that the apparatus can work much longer than those already used for the same apparatus.

By way of example, an apparatus containing 16 liters of electrolytic liquid, that is to say four liters per vessel would supply a current of 10 amperes and of 110 volts pressure. For apparatus of greater or smaller capacity, the same proportions would be maintained. Under these conditions it is possible to obtain an efficiency of 85% without heating. For apparatus intended for medicinal purposes or for charging small accumulators, concentration of the liquid can be reduced by about 50%.

The transformer described has the great advantage of being capable of being directly connected in an electrolytic circuit of any kind up to 220 volts, without necessitating the use of a self induction coil, for obtaining complete rectification of the current and without it being necessary to use a "subvolter" for regulating the voltage of the primary circuit.

The apparatus is light, takes up very little space, is easily portable and does not generate any gas.

For apparatus intended for pressure beyond 220 volts, ebonite vessels can be used placed in a container of paraffin having the same height as the vessels and about 5 centimeters in thickness, the whole being placed in a box or casing of insulating material.

The connections must of course be made in accordance with the rules established for high pressures.

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

5 In an electrolytic transformer, a cell comprising a vessel of insulating material, a hollow carbon electrode within said vessel provided at its top and bottom only with horizontal series of perforations, a metallic electrode within said hollow electrode, and an electrolytic liquid contained in said vessel, the circulation of such liquid

through the openings of said hollow electrode being identical with that which is produced in a thermo-siphon. 10

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

OSWALDO DE FARIA.

Witnesses:

EMILE LEDRET,

JOHN BAKER.