

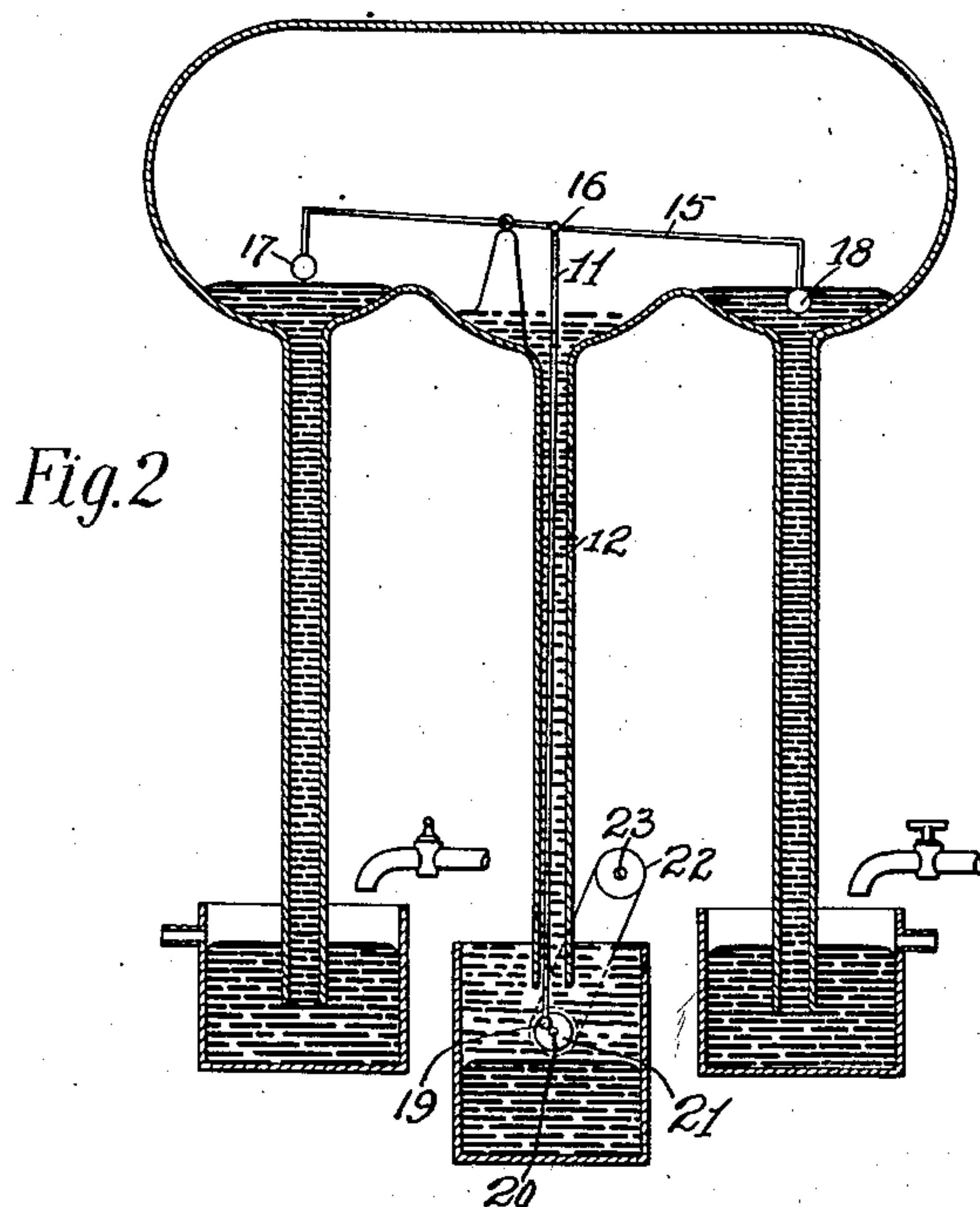
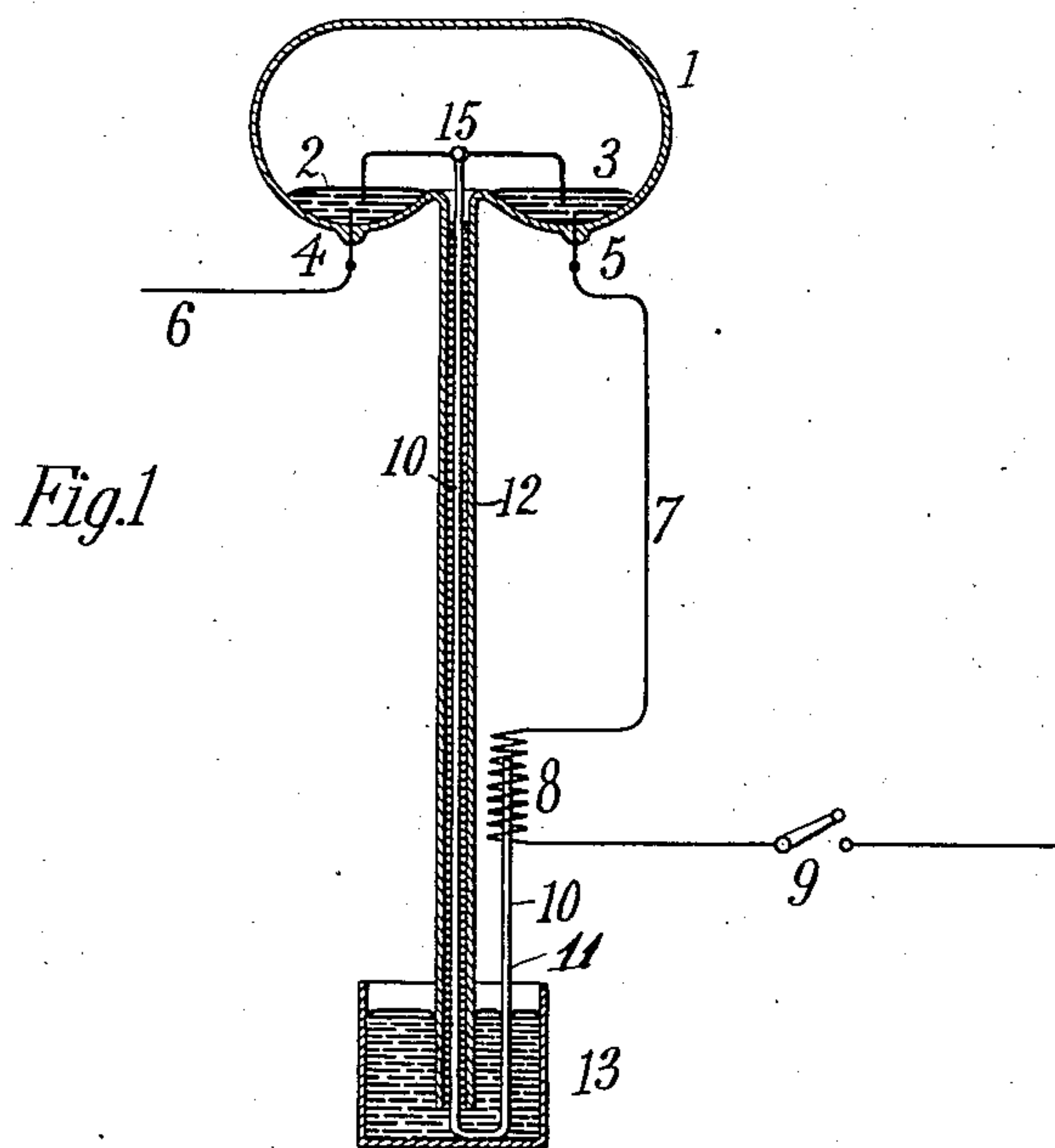
No. 896,243.

PATENTED AUG. 18, 1908.

M. VON RECKLINGHAUSEN.

GAS OR VAPOR ELECTRIC APPARATUS.

APPLICATION FILED FEB. 20, 1903. RENEWED FEB. 19, 1907.



Witnesses:

W. H. Capel
Thomas H. Brown, Jr.

Inventor

Max von Recklinghausen
by Charles A. Tamm - Atty

UNITED STATES PATENT OFFICE.

MAX VON RECKLINGHAUSEN, OF NEW YORK, N. Y., ASSIGNOR TO COOPER HEWITT ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

GAS OR VAPOR ELECTRIC APPARATUS.

No. 896,243.

Specification of Letters Patent.

Patented Aug. 18, 1908.

Application filed February 20, 1903, Serial No. 144,202. Renewed February 19, 1907. Serial No. 358,216.

To all whom it may concern:

Be it known that I, MAX VON RECKLINGHAUSEN, a subject of the Emperor of Germany, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas or Vapor Electric Apparatus, of which the following is a specification.

In operating vapor electric apparatus in which a conducting gas or vapor is inclosed within a suitable container and provided with electrodes, it has been found advantageous to cause certain mechanical operations to take place within the body of the container. For example, it has been proposed to cause a circulation of a liquid through the containing vessel for the purpose of regulating the purity, density and temperature of the conducting gas or vapor. Another instance in point is that wherein a mechanical separation of a positive and a negative electrode is caused in the container for the purpose of creating a condition suited for starting the device into operation. It is to be understood that the container must be kept gas tight; otherwise the normal conditions of operations would be seriously disturbed. Hitherto, the mechanical movement thus desired to be accomplished, and other movements within the container, have been produced by force acting from the outside of the wall of the container, without the direct transmission of the force through the walls.

The present invention relates broadly to devices for producing the movement of a part or parts within the container for any purpose by transmitting motion from the outside to the inside of a sealed container without destroying the integrity of the seal.

Secondarily, the invention relates specifically to such devices as may perform the function of creating what I may call a starting condition inside the container.

In order to illustrate the broader aspects of the invention, I have shown not only means for starting the apparatus but also means for creating a pumping effect within the container for causing an artificial circulation of the liquid constituting in the present instance the electrodes of the apparatus.

The first named device embodies specifically the starting means which constitute the

secondary object of the invention. In respect to such secondary object it may be said that it has been proposed to provide in the first instance a conducting path, say of metal, through the apparatus, independently of the conducting gas or vapor, and to set the device into operation by breaking the continuity of the said path inside the container, either automatically, as by the use of a magnet or solenoid, or mechanically, as by shaking or tilting the apparatus and thereby causing the desired interruption of continuity. It is found that the sparking which follows the rupture of the metallic path inside the container is sufficient to create the condition necessary for starting the device, after which the operation will continue between the main electrodes.

In speaking of metal as constituting the original circuit within the container, I do not wish to exclude any suitable conducting material. For convenience, however, I refer to the circuit to be ruptured as a metallic circuit. Other means have also been devised for creating a local passage of electric current at one of the main electrodes and thereby starting the operation.

Considered with relation to its secondary object, the present invention is designed to provide means for starting an apparatus of this class by acting directly upon the circuit rupturing devices as by means of a magnet affecting a core or armature located outside the container and in direct mechanical connection with the circuit rupturing apparatus. The same effects can be produced by hand without the intervention of the magnet or solenoid, if preferred. The transmission of movement through the wall of the container may, however, be utilized to accomplish other results besides those pertaining to the operation of a starting device, and this action will be described in the present application as a feature of the broad invention.

In the drawing Figure 1 illustrates diagrammatically certain circuits and apparatus adapted to carry out the invention both in its broad and specific form, and Fig. 2 is a section of an apparatus embodying a separate species of the same invention.

Referring to Fig. 1, the container is shown at 1, and the electrodes thereof at 2 and 3. In this instance the electrodes may be as-

sumed to be of mercury, although any other suitable conducting fluid may be used in place of mercury, or one of the electrodes may be a solid conductor, say, of iron. Lead-wires 4 and 5, are connected to the electrodes 2 and 3, respectively, and are also joined to circuit wires 6 and 7 connected with any suitable source of electrical supply. In the conductor, 7, I interpose a solenoid, 8, and a switch 9. The core, 10, of the solenoid is connected with or forms a part of a rod, 11, which is bent, as shown, and carried up through a tube, 12, forming an extension of the container 1. The tube 12 is bent at the bottom and terminates inside a vessel, 13, containing mercury. At its upper end, 15, the rod 10 is formed into a T-shape in the present instance, and the ends of the T are adapted to dip into the mercury of the electrodes 2 and 3, thus completing an electrical connection between the said electrodes. The parts are represented in the position which they are to occupy when the main circuit, 6 and 7, is open. On the closing of the switch, 9, a circuit through the apparatus is completed by way of the electrode 3, the head 15, and the electrode 2. When the circuit is thus completed, the solenoid 8 becomes energized and lifts the core 10 sufficiently to break contact between the head of the rod and the electrodes 2 and 3, in consequence of which a spark is formed at each point of rupture and the necessary condition is produced for starting the apparatus into operation. The current then continues to flow through the apparatus, say from the electrode 3 to the electrode 2, in the usual manner.

I have illustrated a very simple form of starting apparatus, but it is evident that the same principle may be applied to the more complex types.

In Fig. 2 the principle above set forth is applied to the operation of an overflow or pumping apparatus which may be operated continuously or intermittently as desired. The head 15 of the rod 11 is here pivoted at 16 inside the container and carries at its opposite ends flanges 17 and 18 which may be dipped alternately into the mercury electrodes 2 and 3. When this dipping process takes place, any excess of mercury will be caused to overflow into the tube 12, producing a pumping operation. The lower end of the rod 11 is connected to an eccentric 19 on a shaft 20, which is connected by a bolt 21 with a pulley 22 on the metal shaft 23. The last named shaft may be operated by any suitable motor, or the motor can be dispensed with and a crank may be applied to the shaft 20, permitting the reciprocation of the rod 11 by hand.

Any suitable means may be provided for replenishing and cooling the mercury constituting the electrodes, but it has only been

thought necessary to illustrate the pumping device operating on the principle of the present invention.

The mercury in its descent carries with it a certain amount of vapor in the container, acting on the principle of a Sprengel pump.

Mercury is herein mentioned as the material of the electrodes, although any suitable conducting fluid may be substituted for the mercury, and one or more of the electrodes may be formed of solid material, such as iron.

I claim as my invention:

1. The combination with a gas or vapor electric apparatus comprising an hermetically sealed container, electrodes therein, and an intervening gas or vapor, of a continuous conductor through the apparatus independent of the conducting gas or vapor therein, and means for interrupting the continuity of the said conductor for starting the apparatus, such means being connected directly with a movable part of the conductor.

2. The combination with a gas or vapor electric apparatus comprising an hermetically sealed container, electrodes therein, and an intervening gas or vapor, of a conductor passing through the apparatus independent of the conducting gas or vapor therein, means for interrupting said conductor, such means being provided with an extension running to a point outside the container, and means for causing an interruption of the conductor by moving the said extension.

3. The combination with a gas or vapor electric apparatus comprising an hermetically sealed container, electrodes therein, and an intervening gas or vapor, of a conductor passing through the apparatus independent of the conducting gas or vapor, an extension of the apparatus, and a suitable seal therefor, in combination with means for interrupting said conductor, said means being provided with a shank passing through said extension, and operating means for said shank outside the body of the apparatus.

4. The combination with a gas or vapor electric apparatus comprising an hermetically sealed container, electrodes therein, and an intervening gas or vapor, of a conductor passing through the apparatus independent of the conducting gas or vapor, an extension of the apparatus, and a suitable seal therefor, in combination with circuit rupturing means provided with a shank passing through the said extension to a point outside the said apparatus.

5. In a gas or vapor electric apparatus, a gas tight container, devices within the same subject to mechanical movement, mechanical connections from the said devices to the exterior of the container, and means for operating the said mechanical connections without disturbing the gas tight condition of the container.

6. In a gas or vapor electric apparatus, a

gas-tight container, an extension thereof, a liquid seal closing the said extension, and means passing through the said extension for causing mechanical motion within the container without destroying the seal.

7. In a gas or vapor electric apparatus, a gas-tight container provided with an opening, a seal for the said opening, a movable device within the container, and means for actuating the movable device, such means passing

through the opening without destroying the seal.

Signed at New York, in the county of New York, and State of New York, this 14th day of February A. D. 1903.

MAX VON RECKLINGHAUSEN.

Witnesses:

WM. H. CAPEL,

GEORGE H. STOCKBRIDGE.