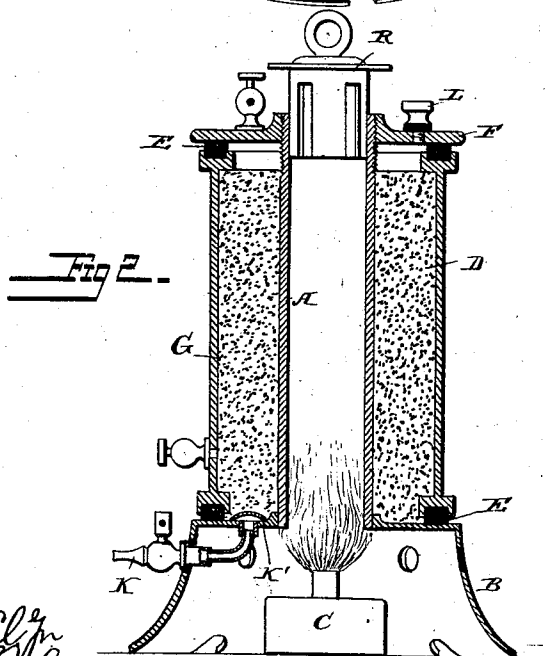
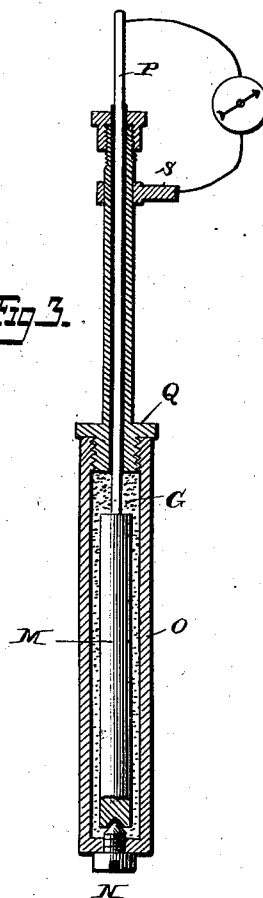
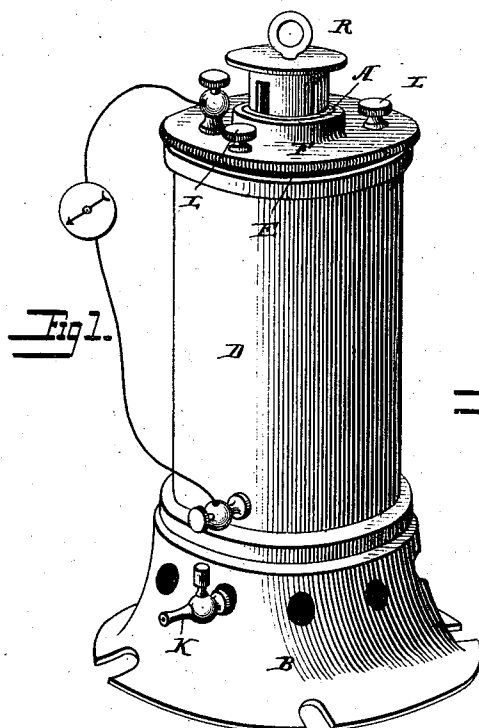


(No Model.)

E. G. ACHESON.  
THERMO ELECTRIC GENERATOR.

No. 375,242.

Patented Dec. 20, 1887.



Attest:

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Inventor:

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Foster & Freeman  
attys*

# UNITED STATES PATENT OFFICE.

EDWARD G. ACHESON, OF PITTSBURG, PENNSYLVANIA.

## THERMO-ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 375,242, dated December 20, 1887.

Application filed August 27, 1887. Serial No. 248,076. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD G. ACHESON, a citizen of the United States, residing at Pittsburg, Allegheny county, Pennsylvania, have invented certain new and useful Improvements in Thermo-Electric Generators, of which the following is a specification.

My invention relates to thermo-electric generators; and it has for its object to provide means whereby currents of electricity may be generated to a practical extent by the direct conversion of heat into such currents; and my invention consists in the methods and means, substantially as hereinafter described, whereby these results are obtained.

Referring to the accompanying drawings, Figure 1 is a perspective view of an embodiment of my invention. Fig. 2 is a vertical section of the same. Fig. 3 is a vertical section of another form.

The body of the generator consists of two concentric cylinders, and in Fig. 2 I have shown an inner hollow cylinder, A, secured to a suitable base, B, so formed as to receive a suitable source of heat, as a lamp, C, so that the said cylinder may be heated to any desired degree. Surrounding said cylinder and concentric thereto is another and outer cylinder, D, also supported upon the base B, but insulated therefrom in any suitable manner, and I have shown a ring of rubber or asbestos, E, adapted to fit into the recessed or grooved bottom end of said cylinder. Upon this cylinder D rests a cap-piece, F, which is separated therefrom by insulating material, such as before described, and this cap-piece is secured to the inner cylinder, A, in any desired manner, as by being screwed thereon, as shown, and serves to secure the outer cylinder to the base.

Loosely fitting the interior of the cylinder A is a heat-regulator, shown as a slotted plug, R, which may be inserted into the cylinder more or less to control the draft and heat applied thereto. The space between the two cylinders is filled with material, G, capable of liberating oxygen when subjected to heat, and I prefer for this purpose to use bioxide of manganese in the form of powder or a mixture of bioxide of manganese and chlorate of potash.

In some instances I may supply the interior

of the generator with a gas of any desired kind—as oxygen—and for this purpose I apply an inlet-cock, K, which is shown connected to the chamber between the cylinder, and a cap-piece, K', with side perforations is placed over the inlet to allow the gas to flow and to prevent the inlet becoming foul from the powder, and to regulate the flow of gas I provide one or more vent-cocks, L, in the cap-piece, which may be used to control the passage of the gas through the powdered material. These vent-cocks are arranged in different parts of the cap, so that the flow of gas may be properly distributed through the powdered material in a manner well understood. Suitable binding-posts are attached to the cylinders, as indicated.

In Fig. 3 I have shown another embodiment of the invention in which the inner cylinder, M, is solid and is supported upon the tip of a screw, N, passing through the bottom of the outer cylinder, O, suitable insulating material being interposed between the support and the cylinder.

In order to get good connection with the inner cylinder, I secure a rod, P, to its end, and this extends upward through the cap-piece Q, which in this instance is extended upward to some extent for convenience, and this rod is insulated from the cap-piece by mica or otherwise. This cap-piece also serves to hold the cylinders in proper relation to each other and supports a projection, S, to which one terminal of the line-circuit can be attached, the other being secured to the end of the rod P.

The space between the cylinders, which are insulated from each other, as above indicated, is filled with some material capable of giving off oxygen when heated, and the heat is applied to this form of battery upon the outside, as by immersing it in a sand bath or other source of heat.

My invention will be understood from the above to be not limited to any particular details of construction, as they may be varied by those skilled in the art without departing from the principles thereof, nor is it limited to the use of the materials named, or to the particular gas specified, as other materials which give off gases when subjected to the action of heat, which gas surrounds or envelops the par-

titles from which it is produced, and is capable of converting the heat energy into electric energy, may be used; nor is it necessary that the chamber or space between the cylinders or bodies be inclosed; nor that cylinders should be used, as it is only necessary to place the powered material between two conducting surfaces, one of which may be heated. As an equivalent to the gas-producing powder, I may use some conducting material in a comminuted condition, and inject the gas into the chamber, the gas acting to envelop the particles of the powder in such a manner that the heat rays will be forced to pass through the gas, so that the conversion may take place.

In using the invention the size of the chamber may be regulated in accordance with the desired electro-motive force of the resulting conversion. If the cylinders are so close together that there is practically but one layer of particles separating the cylinders, the heat radiated or conducted from the heated cylinder would have to pass through but two films of gas and the converted current would have an electro-motive force proportioned to the number of changes of mediums through which it passes. If, however, the distance between the cylinders is greater, a large number of gas films would be interposed in the path of the heat and the electro-motive force of the converted current would be correspondingly greater.

What I claim is—

1. The method, substantially as described, of converting heat energy into electric energy, which consists in causing heat to pass through one or more films of gas included in an electric circuit.

2. The method, substantially as described, of converting heat energy into electric energy, which consists in heating a gas-producing material and causing heat to pass through such heated material included in an electric circuit.

3. The method, substantially as described, of converting heat energy into electric energy, which consists in heating a material which

produces oxygen gas and passing heat through such gas included in an electric circuit.

4. The combination, in a converter of heat into electric energy, of two surfaces of conducting material, one of which is heated, and a gas-producing material between the plates, substantially as described.

5. The combination, in a converter of heat into electric energy, of two plates connected in an electric circuit, and a gas-producing material interposed between the plates in the electric circuit, substantially as described.

6. The combination, in a converter of heat into electric energy, of two concentric cylinders of conducting material and powdered gas-producing material interposed between the cylinders, substantially as described.

7. The combination, with a base and two conducting cylinders mounted thereon and insulated from each other, of bixide of manganese, or equivalent, included in the circuit between the cylinders, substantially as described.

8. The combination, with two conducting surfaces, one of which is heated, of a mixture of bixide of manganese and chlorate of potash interposed between the surfaces and all included in an electric circuit, substantially as described.

9. The combination, with a base, of two concentric cylinders mounted thereon and insulated from each other, means for applying heat to one of the cylinders, a cap-piece connecting said cylinders, a gas-cock communicating with the space between the cylinders, vent-cocks in the cap, and finely-divided conducting material between the cylinders, substantially as described.

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

EDWARD G. ACHESON.

Witnesses:

J. S. BARKER,  
F. L. FREEMAN.