(No Model.)

T. G. HALL.

PYROELECTRIC BATTERY.

No. 494,199. Patented Mar. 28, 1893.

Fig 3.

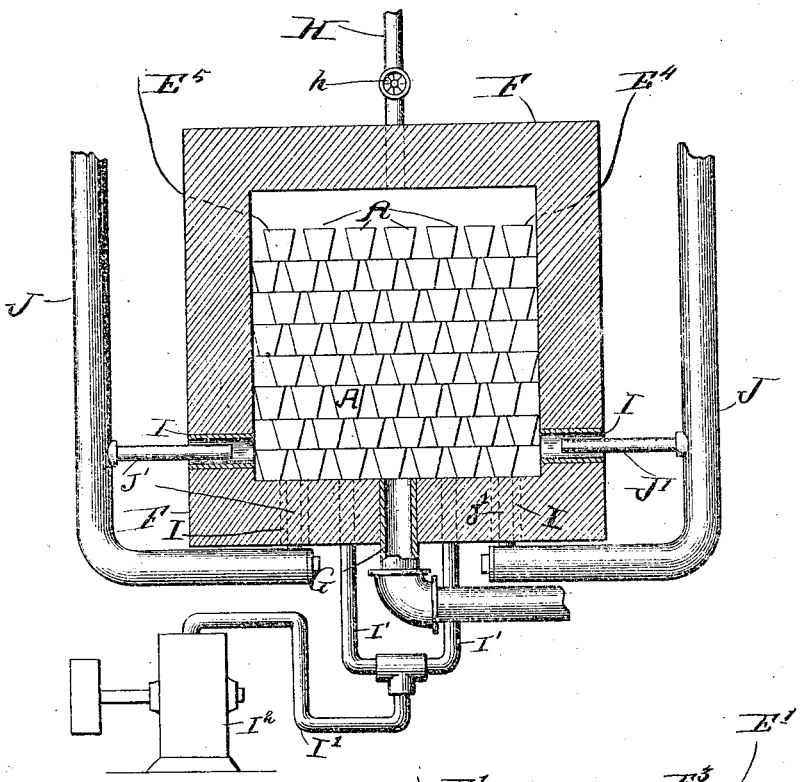


Fig 1

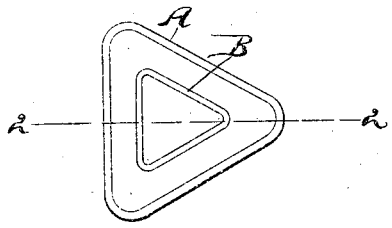
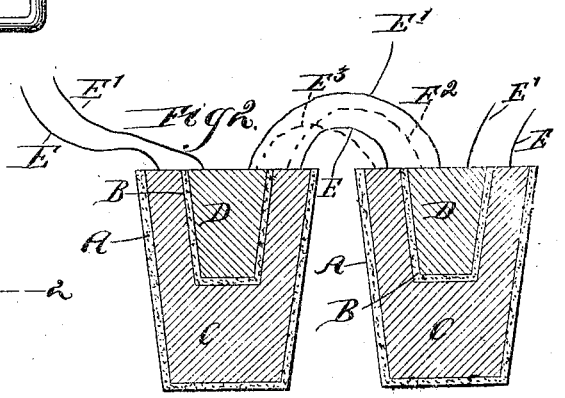


Fig 2.



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UNITED STATES PATENT OFFICE.

THURSTON GORDON HALL, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE HALL CHEMICAL AND GAS COMPANY, OF SAME PLACE.

PYROELECTRIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 494,199, dated March 28, 1893.

Application filed March 8, 1892. Serial No. 424,188. (No model.)

To all whom it may concern:

Be it known that I, THURSTON GORDON HALL, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pyro-electric Batteries and in the Elements Thereof, of which the following, in connection with the drawings accompanying and forming a part thereof, is a full and complete description, sufficient to enable those skilled in the art to make and use the same.

The object of my invention is to obtain an element adapted to form in combination with other like elements a pyro-electric battery.

A further object of my invention is to obtain a pyro-electric battery by means of which electric action can be produced when heat is applied thereto, and by which fluid or other materials adapted to be forced through the battery may be subjected to the electric action generated in the battery while contained therein, and also to obtain a pyro-electric battery from which the current generated therein can be conveyed and applied to any useful and required purpose for which the same is suitable.

In the drawings, Figure 1, is a plan view of an element adapted to be placed in a pyro-electric battery; Fig. 2, a cross-section of two of such elements connected together by electric conductors; and Fig. 3, a cross-section of a pyro-electric battery wherein the elements illustrated in Figs. 1 and 2, are employed as a part thereof.

The same letter of reference is used to indicate a given part where more than one view thereof is shown in the several figures of the drawings.

A, is a porous cup constructed of non-conducting material, as say silica.

B, is a smaller porous cup also constructed of non-conducting material, as silica. I have found a cup well adapted for this purpose is obtainable by using the common sand crucibles well known to chemists.

C, is a mass of metal, as say iron, contained in the cup A and surrounding cup B.

D, is a mass of metal of opposite polarity from the metal C, as say copper.

E, E, are electrical conductors of any suitable material adapted to convey a current of electricity, as say copper electrically each attached at one end to the mass C in cup A, and at the other end thereof to the mass C in a like cup A, as illustrated in Fig. 2, or to the mass D in cup B, as indicated by dotted line lettered E^2, in Fig. 2, according to whether the elements of the battery are to be connected in multiple or in series, in the ordinary way of connecting elements of a battery for voltage or amperage.

E', E', are like electrical conductors each attached at one end to the material D in cup B, and at the other end thereof, to a like mass D in a like cup B, as illustrated in Fig. 2, or to the mass C, in cup A, as indicated by dotted lines lettered E^2 in Fig. 2.

In the pyro-electric battery illustrated in Fig. 3, F, is the casing, constructed by me preferably of fire-brick or other insulating material adapted to withstand the action of heat; G, an inlet pipe through which fluid or other material, may be forced into casing F; H, an outlet pipe; and *h*, a valve therein. I, I, are pipes extending through the casing of the receptacle F; and J, a pipe having thereon branches J', J', extending into the pipes I, I, so that when a current of gas or steam is forced therethrough into the casing F, an induced current of air, or other gas will be produced through pipes I into the receptacle formed by the casing F. Where the air or other gas is designed to be forced into the receptacle formed by the casing F independently of the forcing of the steam or other gas thereinto through the pipes J' J', the pipes I, I, are omitted and such air or other gas is forced through the pipes I' I' by blower I^2 or by other suitable means.

The cups A are shown in elevation in Fig. 3, properly arranged so that when gaseous substances are forced into the receptacle formed by the casing F, through the several pipes I, I, and J', J', or through the pipes I', I', and J', J', and fluid or other substances are forced through pipe G thereinto, the same may extend in the interstices between the cups, to outlet pipe H, and through such outlet from the battery, being subjected to the electrical electro chemical or catalytic action obtaining in the battery, while contained therein.

Where the electric current generated in the

pyro-electric battery upon the admission of steam and air thereinto through the pipes I, I, and J′, J′, or through the pipes I′, I′, and J′, J′, is to be utilized outside of the battery, in the ordinary way of utilizing electric currents generated in an electric battery, the several cups are connected in the manner illustrated in Fig. 2, by electric conductors, preferably copper wire, and wires E^4, E^5, are constructed extending from the battery.

I have not shown the electric conductors E, E′, E^2, E^3, illustrated in Fig. 2, and hereinbefore described, in Fig. 3, wherein the battery is shown, as the manner of connecting the several elements of the battery by such electric conductors is old and the placing of them in Fig. 3, would tend to confuse the essential features of the invention, which consist in the production of the elements and the arrangement thereof in the manner described, and without the employment of wire or other electric conductors other than the fluid contained in the battery, so that the temperature of such elements, or of the battery produced thereby, may be controlled and varied by the admission of heat in the form of steam or gaseous material, through the pipes J′ as hereinbefore described, and thereby a thermo-electric, electro-chemical, catalytic or other action produced.

It will be evident to those skilled in the art of electricity that I do not confine myself to the placing of iron in the cup A and copper in the cup B: as it is immaterial in which cup the iron or the copper is placed: and that it is also immaterial whether, in one of the cups, iron, carbon or other material of opposite electric polarity to the material contained in the other cup be used: and that for such other cup, copper, zinc or any material of opposite electric polarity with material in the first named cup, may be employed.

The hereinbefore described elements consisting of the porous cup A and porous cup B with materials C and D contained therein, respectively, are employed by me in building the pyro-electric battery illustrated in Fig. 3, but I do not confine myself to an element constructed in precisely this manner as it is evident that if one of the porous cups A contain an element such as iron and the next adjacent porous cup A contains an element of opposite electric polarity, such as copper, a pyro-electric battery will be produced thereby: the elements being constructed by me as described, for the reason, principally that a larger quantity of one of the elements thereof, is ordinarily required than of the other, while the cups A should for convenience be of the same size.

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

1. An element of a pyro-electric battery consisting of a porous insulating cup, and a second and smaller porous insulating cup contained in the first named cup, in combination with material contained in one of said cups and material of opposite electric polarity contained in the other of said cups; substantially as described.

2. A pyro-electric battery constructed of elements of opposite electric polarity separated from each other by porous insulating material and arranged so that heated gaseous material can be forced through the series of passages formed by the interstices obtaining in the pyro-electric pile constituting such battery; substantially as described.

3. A pyro electric battery consisting of an insulating casing, a series of elements arranged therein to form a series of passage-ways therethrough, such elements consisting of materials of opposite electric polarity separated from each other, by porous insulating material an inlet and an outlet pipe through such casing, and inlet pipes for heated gaseous material and air extending through such casing, substantially as described.

4. A pyro-electric battery constructed of elements of opposite electric polarity, separated from each other by porous insulating material and arranged so that heated gaseous material can be forced through the series of passages formed by the interstices obtaining in the pyro-electric pile constituting such battery, an insulating casing surrounding the battery, an air and a steam inlet pipe through such casing, and an inlet pipe for fluid or other materials through the casing, and an outlet pipe for such fluid and other materials from the casing whereby air, steam, fluid, and other material can be forced through the interstices obtaining in the battery, and subjected to the electric action thereof while contained therein, substantially as described.

5. A pyro-electric battery consisting of an insulated chamber, a series of elements of opposite electric polarity contained in porous insulating cups and thereby separated from each other and arranged so that heated gaseous material can be forced through the series of passages formed by the interstices extending between the elements, and electric conductors connecting such elements whereby the electric current generated by the battery can be collected and conveyed therefrom; substantially as described.

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