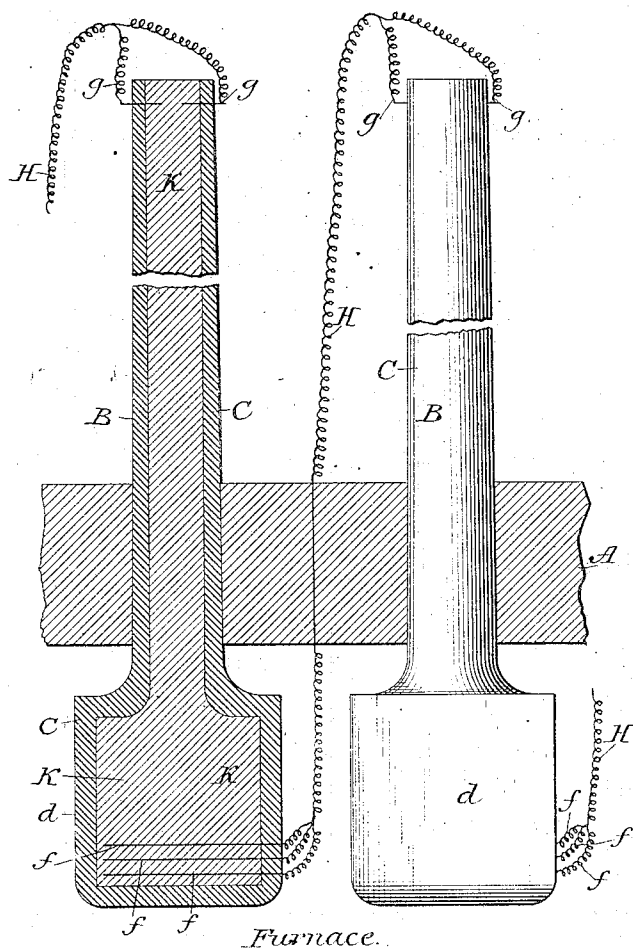


(No Model.)

J. EDELKAMP.
THERMO ELECTRIC BATTERY.

No. 425,568.

Patented Apr. 15, 1890.



Attest:

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UNITED STATES PATENT OFFICE.

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THERMO-ELECTRIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 425,568, dated April 15, 1890.

Application filed January 23, 1890. Serial No. 337,854. (No model.)

To all whom it may concern:

Be it known that I, JOHN EDELKAMP, a resident of New York, in the county of New York and State of New York, have invented certain
5 new and useful Improvements in Thermo-Electric Batteries for Generating Electrical Currents for Lighting, Heating, Electroplating, &c.; and I do hereby declare that the following is a full and exact description thereof,
10 reference being had to the accompanying drawing, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to that form of element for a thermo-electric battery in which
15 the electrodes are formed of metallic alloys, and it has for its object to increase the durability and the efficiency of such an element.

It consists in combining the alloy with a protective outer casing of baked clay sufficiently hard to resist the action of heat and
20 ordinary handling, and which is enlarged at the end to be exposed to the heat of the furnace, all substantially as hereinafter described and claimed.

25 In the accompanying drawing two of my improved elements are depicted as mounted in the wall of a furnace, the one being shown in longitudinal central section and the other in elevation.

30 One of the most serious obstacles encountered in the art of generating electricity by means of heat is found in the frailty and instability of the elements found needful in the construction of a thermal battery and in the
35 destruction thereof incident to their exposure to the high temperature of the furnace.

As the result of continued experiment, I have invented the novel form and construction of such an element, which is illustrated
40 in the drawing, and in which the difficulties are measurably overcome.

A represents the wall of a furnace of any approved form of construction adapted to receive the elements of a thermo-electric battery.

45 B B are the improved elements supported in and by the wall, so that one end of each shall be fully exposed to the heat of the furnace and the opposite end be left projecting outward to such a distance as will permit it
50 to be cooled and kept comparatively cool by extraneous influences.

The elements B B are each constructed of an outer casing C, of fire-clay or other equivalent refractory material, of substantially a uniform thickness throughout and having an
55 enlarged base or bulb *d*, preferably rectangular in form, and an extended cylindrical neck projecting centrally from one side thereof, as shown in the drawing. Through the
60 walls of this casing, near to the opposite extreme ends thereof, a series of electrode-wires *fff* and *g g* are inserted, preferably from opposite sides, to project nearly to the center of
65 the casing, and the several wires thus projecting through the wall into the casing are united at each end and connected to the single
70 conducting-wires H H, by which the circuit is completed. These electrode and conducting wires may be made, as is customary, either of copper or of an alloy of nickel and copper.

The interior of the casing C is completely filled to its extreme outer end with an alloy K, of antimony and zinc; to which, by preference, cadmium has been added; but the composition of said alloy does not constitute a
75 part of my present invention, and I contemplate the use of a filling for the extended inclosing-casing C, of clay or its equivalent, of any suitable material or compound found to be efficient as an electrode.

80 It will be seen that I have not within the casing two distinctive alloys each to represent a separate electrode, for I have found that the two extremities of the element, constructed as described, resolve themselves,
85 when exposed to the action of heat at one end and of a cooler temperature at the other, into a negative and a positive pole, respectively, and that the wires *g g* at the outer cooler end become positive, and those *fff* at the inner
90 heated end negative electrodes, and that the efficiency of an element thus constructed for generating an electrical current is greater than where the element is composed of two alloys. In constructing a pile with these elements the
95 positive electrodes at the outer end of one element are connected by the wire H with the negative electrodes of the next element in the series, substantially as illustrated in the drawing.

100 In the operation of the device the enlarged end of each element is exposed to an intense

heat, while its opposite end is kept comparatively cool, the result being the generation of a current of electricity through the element, which will be conducted by the connecting-wire to the next element in order to enforce the current similarly generated therein. Since the alloy within the casing C is fully protected and inclosed, its fusion or partial fusion within the heated end of the casing, when the battery is in operation, will not impair the efficiency of the circuit or diminish the generation of the current. By the enlargement of the inner end of the element the largest mass of metal is exposed to the action of the heat in the most compact form with improved and beneficial results.

I claim as my invention—

1. The element for thermo-electric batteries constructed, substantially as described, of an outer inclosing-casing of earthenware extending the entire length of the element, in combination with a single metallic compound or alloy filling the same, and electrode-wires in-

roduced through the casing to project into its opposite ends.

2. An element for thermo-electric batteries enlarged at its inner end for exposure to heat and reduced in diameter throughout the remainder of its length, substantially in the manner and for the purpose herein set forth.

3. An element for thermo-electric batteries enlarged at its inner end for exposure to heat and reduced in diameter throughout the remainder of its length, and constructed with an outer casing of refractory material extending its entire length, and a filling of suitable metallic alloy, substantially in the manner and for the purpose herein set forth.

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

JOHN EDELKAMP.

Witnesses:

A. N. JESBERA,
E. M. WATSON.