

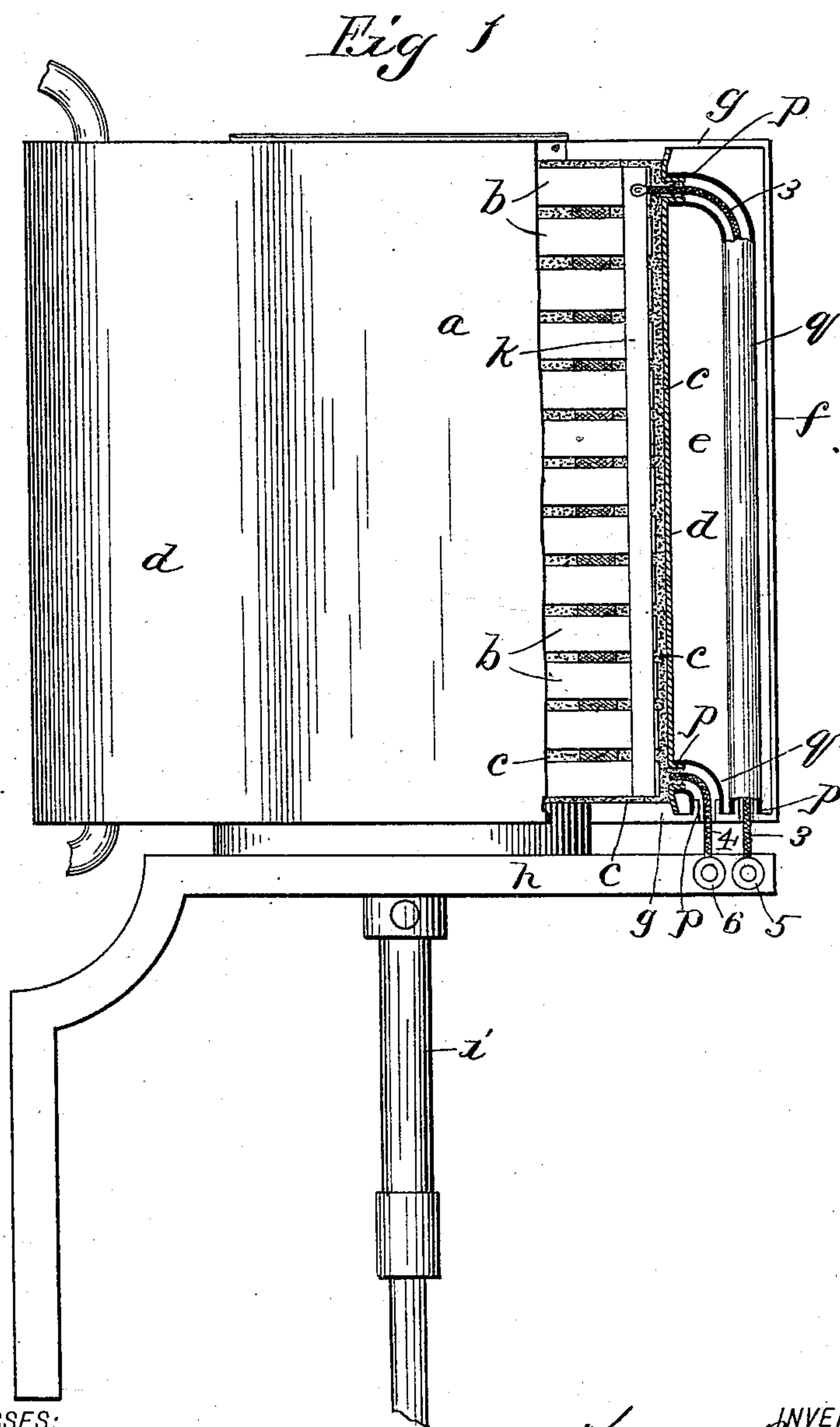
(No Model.)

2 Sheets—Sheet 1.

H. B. COX.  
THERMO-ELECTRIC GENERATOR.

No. 535,488.

Patented Mar. 12, 1895.



WITNESSES:

*C. M. Werle.*  
*Hubert E. Rock*

INVENTOR

*Henry B. Cox*  
BY  
*J. E. Duff*  
ATTORNEY.

(No Model.)

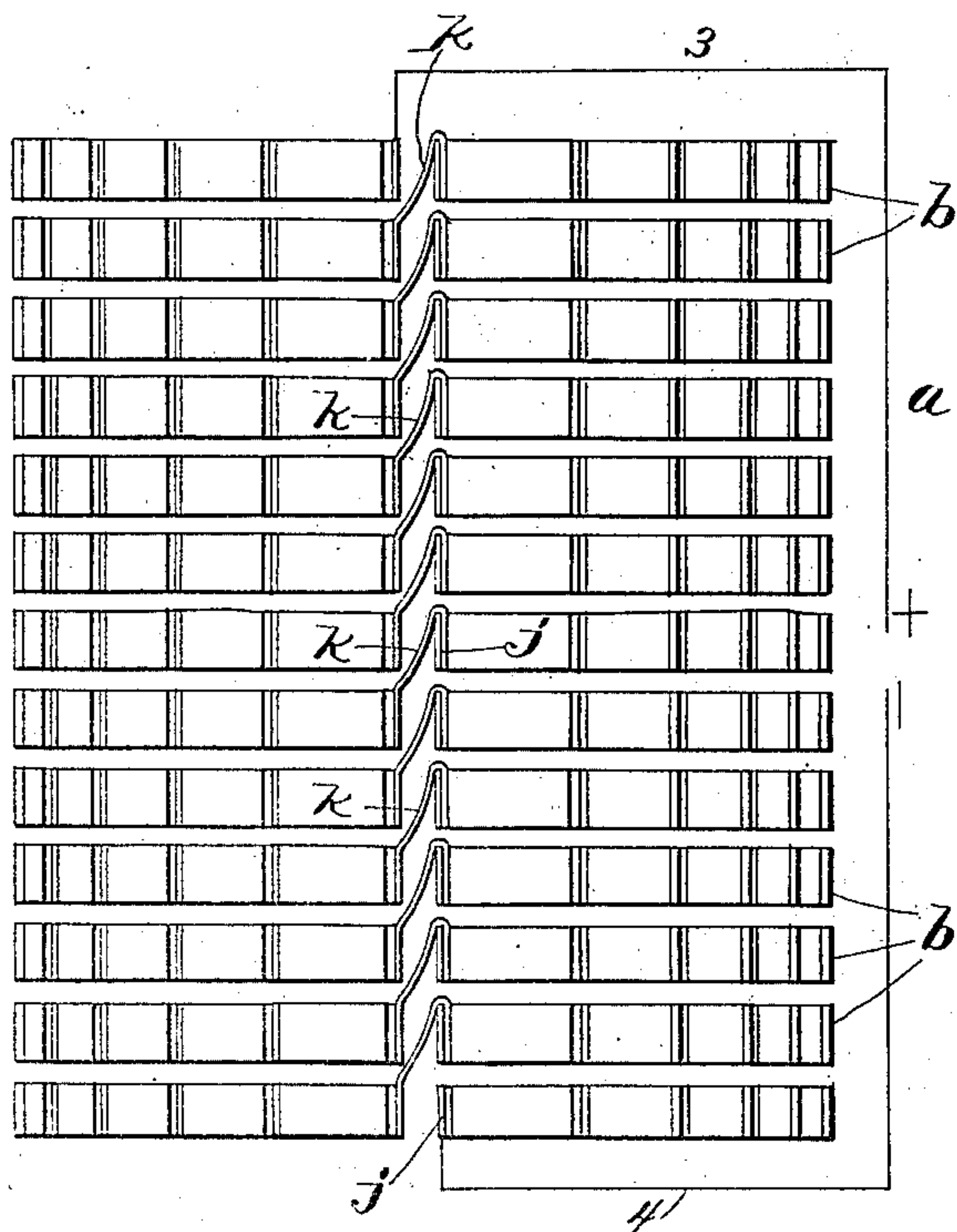
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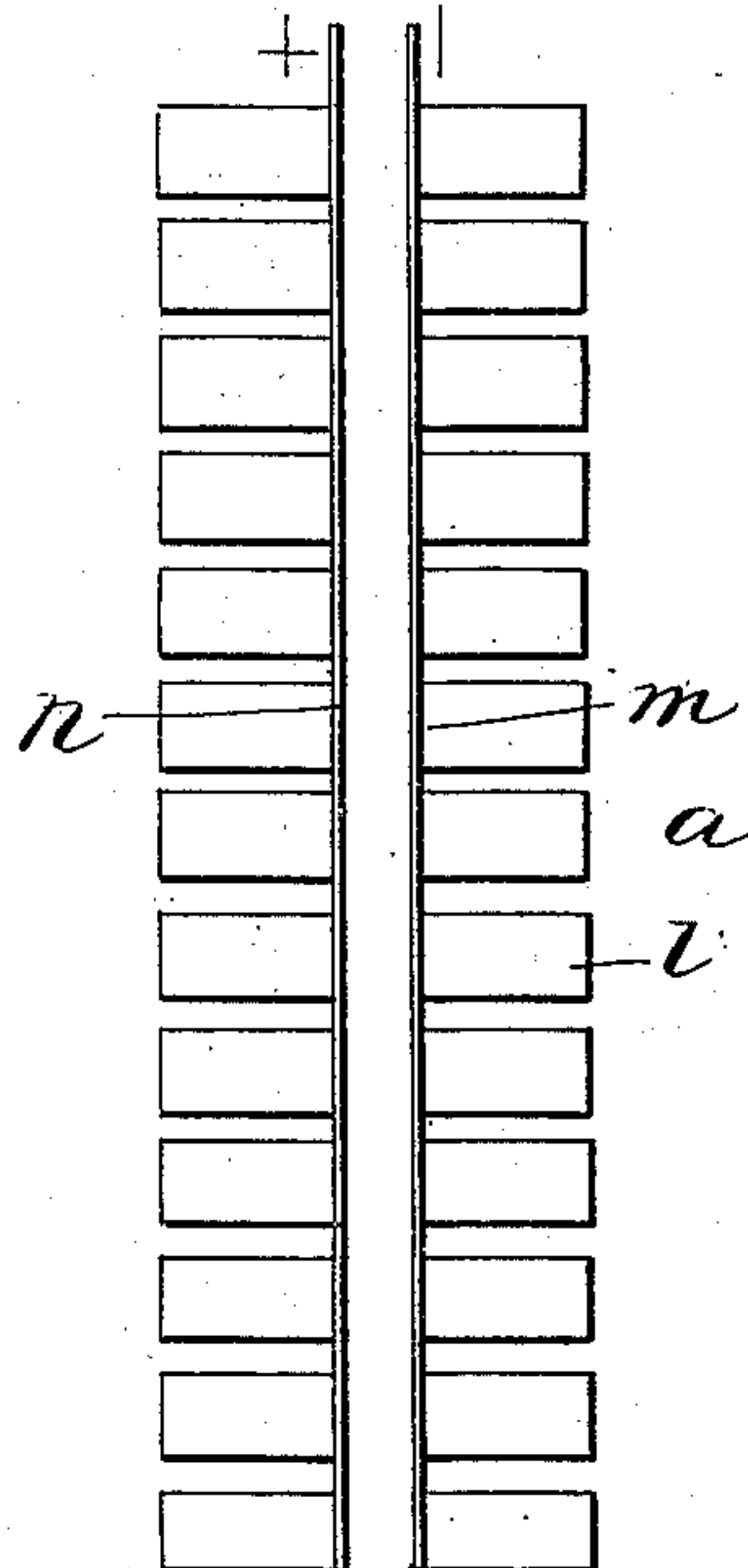
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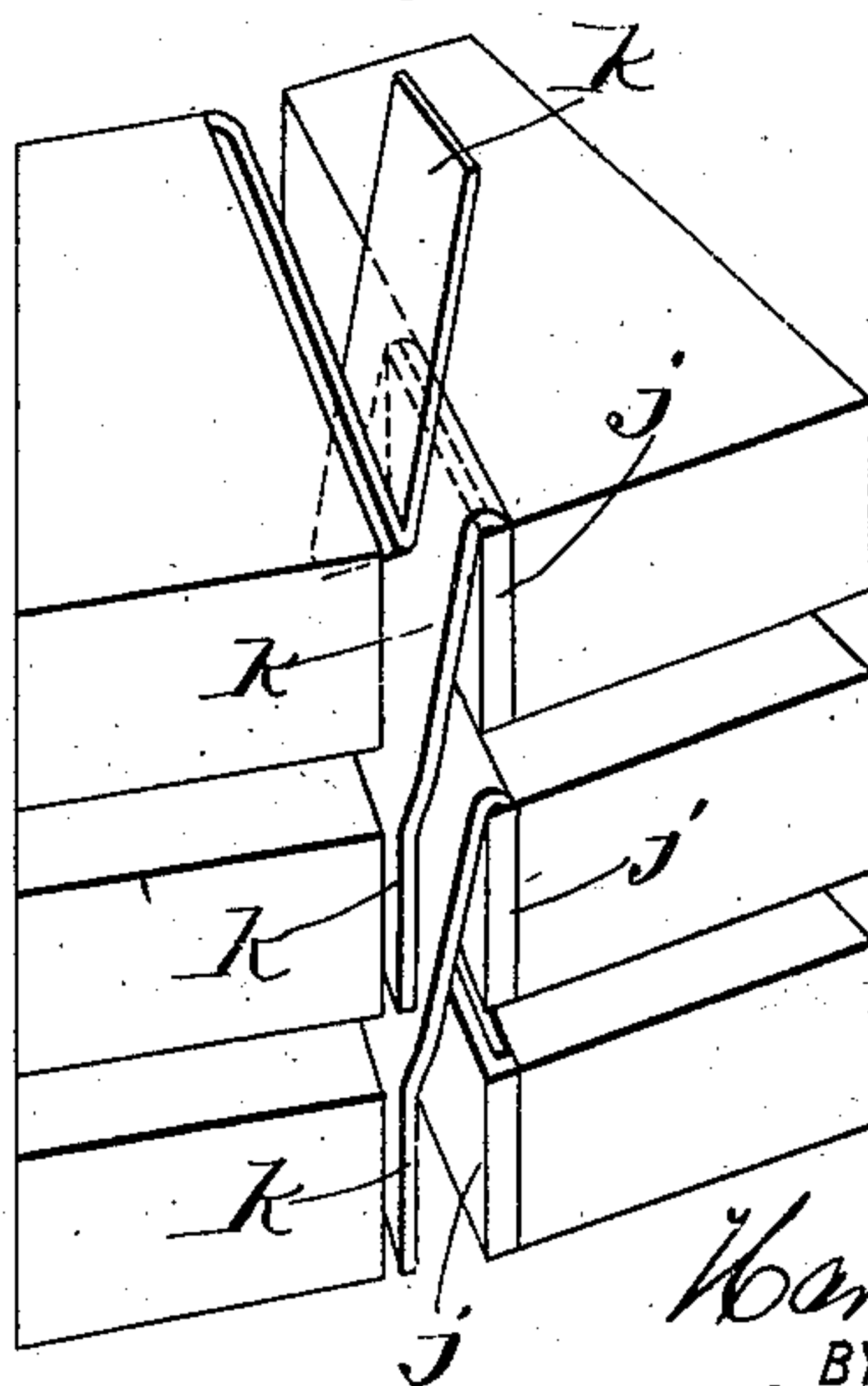
*Fig 2*



*Fig 4*



*Fig 3*



WITNESSES:

*C. M. Wesle*  
*Hubert E. Beck*

INVENTOR

*Harry B. Cox*

BY

*O. E. Duff*

ATTORNEY.



# UNITED STATES PATENT OFFICE.

HARRY BARRINGER COX, OF HARTFORD, CONNECTICUT.

## THERMO-ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 535,488, dated March 12, 1895.

Application filed March 8, 1893. Renewed August 14, 1894. Serial No. 520,328. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY BARRINGER COX, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Thermo-Electric Generators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and numerals of reference marked thereon, which form part of this specification.

15 This invention relates to certain improvements in thermo electric generators.

The object of the invention is to provide an improved mode of constructing the rings or members of a thermo electric pile.

20 A further object of the invention is to provide an improved mode of internally connecting the various rings or sections forming a thermo electric pile, so that the sections will be included in a circuit which can be connected with the take off wires at the exterior of the generator and so that all connections between the various sections or rings composing the pile will be internal and within the pile.

30 A further object of the invention is to provide an improved mode of connecting the take off wires with a thermo electric pile and in insulating said wires.

35 The invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a side elevation of a thermo electric generator partially broken away. Fig. 2 is a diagrammatical view of a thermo electric pile showing a way of connecting the sections of the pile. Fig. 3 is an enlarged view of the ends of several of the sections showing a way of connecting them. Fig. 4 is a diagrammatical view showing a mode of connecting the sections of a pile in multiple.

45 In the drawings the reference letter *a*, indicates a thermo electric pile made up of a series of rings or sections *b*. Each section is made up of a series of thermo couples.

In the construction shown the pile is made

up of a series of rings of connected thermo couples. The rings are laid one on the other and are separated by suitable insulating material. The pile or cylinder thus formed is then preferably coated with some fire proof material such as fire clay or the like and is then baked so as to harden, or vitrify the material and form a hard coating *c*, for the pile covering and protecting the thermo couples. This coating is then preferably provided with an exterior metallic jacket *d*. A water space *e*, is preferably formed around the pile by a casing *f*, secured to the heads *g g*.

65 *h*, indicates a bracket for supporting the generator.

*i*, indicates a supply pipe for a gas burner for heating the interior of the pile.

In connecting the sections of the pile the opposite or positive and negative ends of each section are preferably (although not necessarily) brought near together but are insulated from each other. Corresponding ends of all the sections are provided with the tail pieces, *j*, consisting of conducting strips, each electrically connected with the outer end or face of the large thermo electric member at the end of the section and extending inwardly. The opposite ends of the sections are provided with the head pieces *k*, each electrically connected with the inner face of end member of its section and extending outwardly therefrom between the ends of the section. When the sections of the pile are to be connected in series as shown in Figs. 2 and 3 each head piece *k*, is formed of such length that it can be turned upwardly so that it can be suitably electrically connected by brazing or otherwise with the tail piece of the section immediately above. Each head piece preferably has its upper end looped so that it embraces and forms a more perfect contact with the tail piece. The sections are thus electrically connected with all the connections located within the pile and between the sections thereof.

When the sections are connected in series as just described the circuit extends spirally as it were, through the pile from the end of one section to the opposite end of the section immediately above. Where the sections are thus coupled in series the last tail piece at one end of the pile will form one pole of the generator to which one take off should be con-



nected, and the last head piece at the opposite end of the pile forms the other pole to which the other take off is connected.

The sections can be coupled together in multiple or in any manner or combination desired. In Fig. 4, the sections are shown coupled in multiple wherein all the head pieces are electrically connected in a suitable manner as by a vertical electrical connection *m*, to form one pole of the generator, and all the tail pieces of these sections are electrically connected by a vertical electrical connection *n*, to form the other pole of the generator.

Suitable methods of insulating and conveying the current from the generator are provided.

When the pile is coated with the fireproof material the take off wires 3, 4, project outwardly through the said coating and are also conveyed outwardly through openings in the metallic jacket around the pile. The take off connections from thence pass through the water space and through a head *g*, to the binding posts 4, 5. These take off connections are insulated by any suitable means as close rubber tubes fitted thereon. The holes in the head and metal jacket are formed considerably larger in diameter than the take off wires, and pipe sections *p* are inserted and suitably secured in said holes by brazing or otherwise, and the take off connections pass through said pipes and through tubes *q*, of rubber or like material passing through the water space and fitted on the inner ends of said pipes so as to form tight joints. These devices insulate the take off wires from the water and the metallic parts of the generator. However I do not wish to limit myself to the use of rubber pipe, or to any specific construction or arrangement of pipes as any means can be employed to connect and insulate the take off connections.

It is also evident that various changes might be made in the forms, constructions and arrangements of the parts described without departing from the spirit and scope of my invention, and although I have specifically described my preferred constructions herein it has been done for the sake of clearness, and I do not wish to limit myself to the constructions set forth.

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

1. A thermo electric pile built up of sections of thermo couples and provided with an exterior coating of plastic refractory material, the sections being electrically connected in circuit by internal electrical connections within said coating, substantially as described.

2. A thermo electric pile built up of a series

of rings, the rings being electrically connected within themselves to form a circuit through the pile and provided with an exterior refractory coating vitrified to form a hard covering, substantially as described.

3. A thermo electric pile formed of a series of sections of thermo couples, the sections being connected in circuit by electrical connections located between the end thermo members of the sections so that the connections are internal and within the metallic wall of the pile said metallic pile being coated with plastic material entirely inclosing and covering the metallic elements of the pile, substantially as set forth.

4. The thermo electric generator having the exterior metal jacket and the water space around said jacket provided with the take off wires passing out from the poles of the generator and through said jacket and water space and insulated from the same, substantially as described.

5. The thermo generator having the hardened coating of refractory material, the metallic jacket around the same, and the water space around the jacket, and the take off wires passing from the poles of the generator through said coating and jacket and water space, and means for insulating said take off wires, substantially as described.

6. The thermo electric pile having the exterior coating, the metallic jacket, the end heads surrounded by a casing to form a water space, the tubes extending through said jacket, water space and a head, and the insulated take off wires extending from the poles of the pile and through said tubes, substantially as described.

7. A thermo electric pile having its take off connections connected with head and tail pieces, respectively, from the hot and cold ends of the opposite poles of the pile, substantially as described.

8. A thermo electric pile built up of a series of separate rings, each ring composed of thermo couples of large and small members, the large end members of each ring located one above the other, one end member having a conducting tail piece and the other end member of each ring having the elongated head piece electrically connected with the tail piece of the next adjoining ring, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HARRY BARRINGER COX.

Witnesses:

E. HENRY HYDE, Jr.,

J. L. FENN.