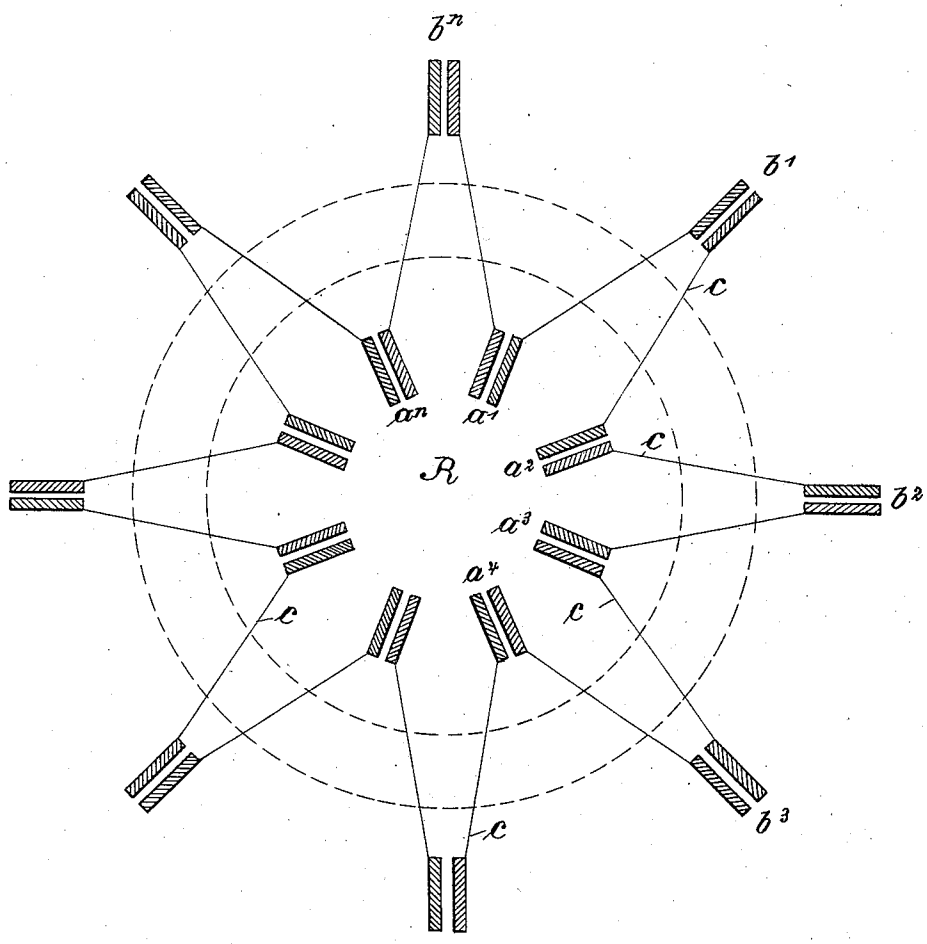
No. 650,062. Patented May 22, 1900.

L. GOTTSCHO.

THERMO-ELECTRIC PILE.

(Application filed Dec. 19, 1899.)

(No Model.)



Witnesses:
Carl Ruder
Sigmund Wintner

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Atty

UNITED STATES PATENT OFFICE.

LUCIAN GOTTSCHO, OF CHARLOTTENBURG, GERMANY.

THERMO-ELECTRIC PILE.

SPECIFICATION forming part of Letters Patent No. 650,062, dated May 22, 1900.

Application filed December 19, 1899. Serial No. 740,929. (No model.)

To all whom it may concern:

Be it known that I, LUCIAN GOTTSCHO, doctor of philosophy, a subject of the Emperor of Germany, residing at Charlottenburg, near Berlin, Empire of Germany, have invented new and useful Improvements in Thermo-Electric Piles, of which the following is a description.

The present invention relates to improvements in thermo-electric piles; and one of its principal objects is to prevent as far as possible heat from being given off from the warm joints or points of juncture of the metals forming the pile. In order to attain this object an intermediate conductor is inserted between the warm and cold joints, and the cross-section of the said conductor is reduced as far as possible, having due regard to the exterior current strength. Furthermore, according to the present invention a heat-retaining mass or partition is provided which incloses the warm joints only and separates them from the exterior space, in which the cold joints are arranged.

In order to render the present specification easily intelligible, reference is had to the accompanying diagram.

The joints of the two metals—for instance, bismuth and antimony—which are arranged in the heated room or space R are designated by $a'\ a^2\ a^n$, while the corresponding cold joints $b'\ b^2\ b^n$ (which may be of similar metals) are arranged outside the room or chamber R and kept at a lower temperature.

The hot joints $a'\ a^n$ are connected, by means of intermediate conductors c, with the corresponding cold parts $b'\ b^n$. The bismuth plate of the joint a' and the antimony plate of a^n are the poles of the battery, formed so that the antimony plate of a' is connected to the antimony of the joint b' and that of a^2 to that of b^2, &c., by means of metallic conductors, which may, if desired, be of wire. Further connections c are arranged from the bismuth of joint b' to that of joint a^2 and from the bismuth of joint b^2 to that of a^3, &c. Thus a thermo-electric pile is attained which is distinctly different from those hitherto known and in use. The great loss of heat hitherto noticeable and which was caused by the transmission of heat by the metal connecting the joints is very considerably diminished in that the cross-section q of the intermediate conductor c, which is in the present case determined exclusively by the amount of current necessary in the exterior circuit, is very considerably reduced. Since the heated joints a' to a^n are arranged in a heated chamber R, which is practically thermally insulated as far as the exterior is concerned, the loss of heat by transmission and radiation is practically obviated. In addition to these facts the apparatus has constructional advantages. Since the arrangement of the warm joints a' a^n is entirely independent of the cold joints, these points being connected by comparatively-thin wires or the like, the size of the contacting surfaces at the joints is in no way limited, and thus other materials than those hitherto employed for the outer members of the thermo-electric field of tension may be used, such materials being of an extremely-sensitive nature as regards the working and strain of the same.

The possibility of increasing the size of the points of contact may, under circumstances, obviate the necessity of special cooling-surfaces. Thus the cold joint may be of such dimensions that the heating of the same, per superficial area, would be quite insignificant. This heating, as is well known, results from the so-called "Peltier" effect from the "Joules" heat generated and from the heat transmitted directly from the hot joints, the whole heat being distributed over the entire surface. The main idea and object of the device forming the present invention is to utilize the heat as far as possible in an undisturbed condition or statically, and thus to considerably increase the effect attained by the conversion of heat into electricity.

I claim as my invention—

In a thermo-electric pile, the combination of a heat-retaining diaphragm or wall to inclose the heated joints only and a series of conductors of relatively-small cross-section to connect these with the cold joints in the manner and for the purpose substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

LUCIAN GOTTSCHO.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.