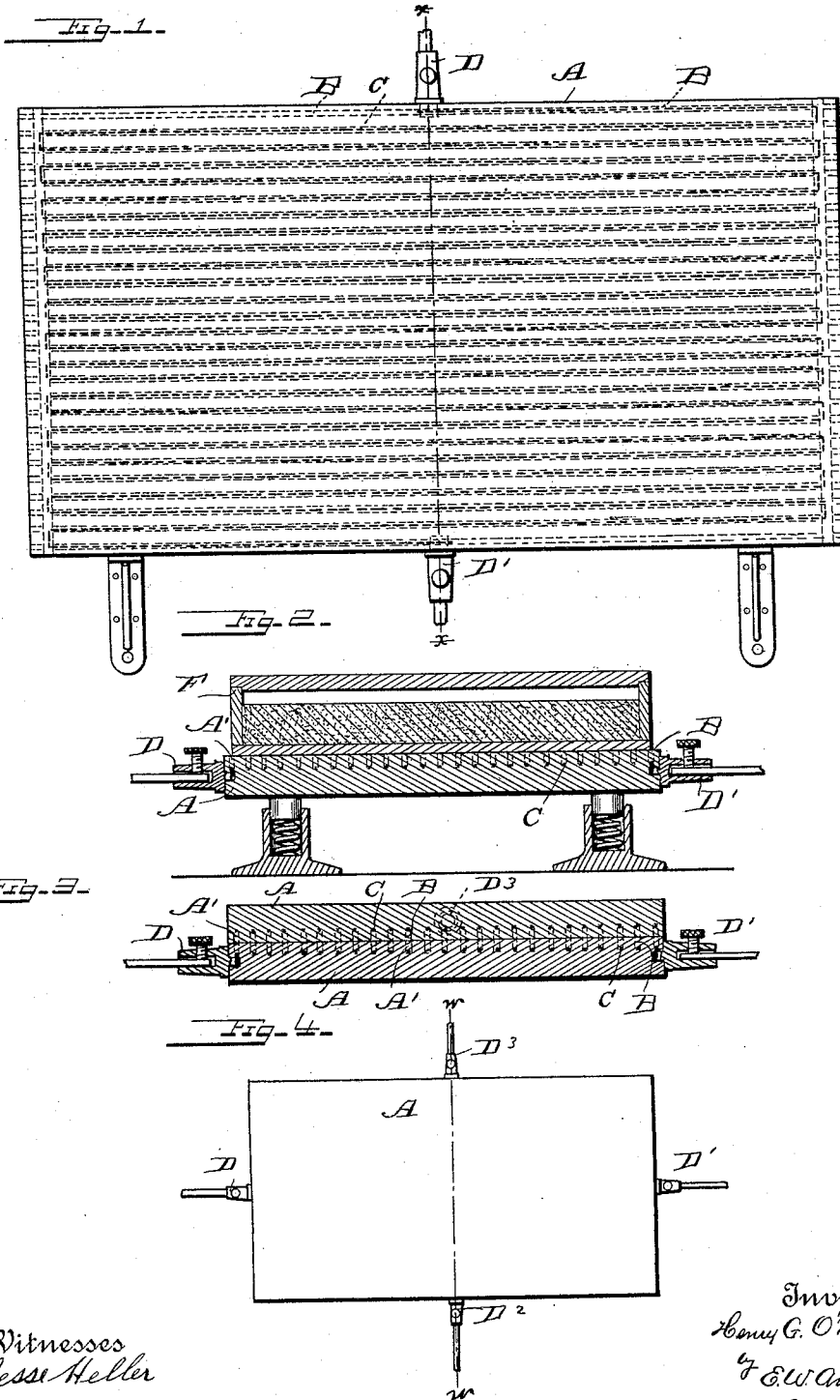


(No Model.)

H. G. O'NEILL.
ELECTRICAL HEATER.

No. 485,424.

Patented Nov. 1, 1892.



Witnesses
Jesse Heller
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UNITED STATES PATENT OFFICE.

HENRY GIBSON O'NEILL, OF LOUISVILLE, KENTUCKY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE STANDARD ELECTRIC HEAT, LIGHT, AND POWER COMPANY, OF MAINE.

ELECTRICAL HEATER.

SPECIFICATION forming part of Letters Patent No. 485,424, dated November 1, 1892.

Application filed February 2, 1892. Serial No. 420,126. (No model.)

To all whom it may concern:

Be it known that I, HENRY GIBSON O'NEILL, a citizen of Great Britain, and a resident of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Electrical Heaters; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of a plan view of this invention provided with bracket-supports. Fig. 2 is a section of the same provided with spring-supports. Fig. 3 is a sectional view on the line *ww*. Fig. 4 is a plan view.

This invention has relation to electric heaters or apparatus by which electric energy is converted into that of heat, and it is designed to provide a simple, durable, and efficient means of generating, storing and distributing the latter, all as hereinafter set forth.

The apparatus illustrated in explanation of this invention consists of a body of steatite A, having furrows, grooves, or depressions B, in which are located a continuous wire or electrically-connected wires C of high electrical resistance, said wire or wires having, preferably for the purpose, a small cross-sectional area.

D and D' are the terminals of this inlaid or embedded wire.

When it is desired to produce heat principally by radiation, I prefer to provide the heating-body A with a plain surface; but when the heat is designed to be distributed mainly by convection, the body A should be perforated at intervals to provide for the passage of air, which, ascending through the perforations, carries the heat with it. Sometimes instead of having all the wire or wires of the heater in electrical connection I employ two or more separate resistance-wires, each having a separate electrical supply, so that by the employment of a device for breaking and

closing the circuit for each wire the heat may be regulated.

The grooves or depressions of the heater-body A, when provided with the resistance wire or wires or designed to be closed or sealed either by connecting to the grooved surface of said body an upper body or cap-section, having its inner surface ribbed or grooved to correspond with the wire-inlaid surface of the lower body, or by filling in the grooves or depressions of the latter after the wire has been laid therein with a suitable cement A', which is preferably composed of powdered soapstone, made into a paste with the silicates of lime and soda, or of lime, soda, and potash. The wire or wires in the heater are designed to be in this manner sealed and protected from oxidizing influences, while they are at the same time electrically insulated, except at the terminal points or contacts. The wire which I employ in preference for this purpose is composed of six parts of nickel and three and one-half parts of zinc, with which is combined eight parts of a composition consisting of ninety-two per cent. of copper, seven per cent. of tin, and a quarter of one per cent. of silicon. This wire is practically infusible and of great electrical resistance. The heater may be attached where desired by suitable brackets or arms and may be protected by an outer case or jacket of metal, either plain or perforated, as may be desired. When used in cars or vehicles, in order to guard from any injury which might result from jarring or jolting the heaters may be supported or hung upon springs or elastic bearings. In the body of this heater it will be observed that I have provided a substance which is an excellent heat-conductor and which will therefore rapidly take from the fine wire embedded therein the heat generated therein through the resistance of said wire to the passage of the electric current, thus relieving said wire immediately of excess of heat, so that the danger of melting or fusion is reduced to a minimum. At the same time the soapstone holds the heat diffused throughout its body and gives it off by radiation or convection in a steady and equable manner.

In order to store heat for the purpose of economy in the use of the electrical current, when desirable, I propose to apply to the heater-body A an attachment of the following character: I provide a vessel or box F, which is placed upon or attached to the heater-body A, said box being charged with acetate of soda. When the heater is raised by the action of the current to the temperature of sufficient degree, the acetate of soda becomes liquefied, and will give out a great amount of heat for several hours, even when the electric current has been cut off from the heater. Using such storage-heaters I am enabled to turn on the electric current in an intermittent manner, so as to utilize the same current in different places at different times for efficient heating purposes. Instead of the acetate of soda I may use any other salt which possesses calorific properties during the process of crystallization from a state of liquefaction produced by heating, my object being to economize in the use of the electric current whereby such heating is effected. I am aware that the use of chemicals for the production of heat is not broadly new, but my invention contemplates the combination herein described, whereby the heating function of the chemical is conveniently and economically utilized in conjunction with that of the electrically-excited heater, rendering the use of such salts practical and efficient in obtaining heat without employing steam, hot water, or stoves. In order to obviate casual short circuit, the electric wires and connections are thoroughly insulated. When the supply-current is of low voltage, the wires or electric conductors in the heater-body may be made of greater cross-sectional area, so that they will have less resistance, their resistance being, however, high as compared with that of the supply-wire. In some cases I may use a heater-body of soapstone sealing, in on the same the resistance-wires with any suitable enamel or glaze being a non-conductor of electricity, such as a cement composed of one hundred and thirty parts of flint glass, twenty and one-half parts of boracic acid, and twelve parts of carbonate of soda. The expansion of this cement by heat is practically *nil*, and it will not

crack or break when used upon the steatite, as it will when employed upon a metal having the property of expansion under the action of heat.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In electric-heating apparatus, the steatite heater-body having grooves or depressions, and a high-resistance wire or wires seated in said grooves or depressions and sealed and insulated therein except at their terminals, and a non-conducting cement of steatite composition for effecting such sealing and insulation, substantially as specified.

2. In apparatus for the conversion of electric energy into heat, the combination, with the steatite body and its spring-supports, of the high-resistance wires embedded in said body and a non-conducting cement for effecting the sealing and insulation of said wires, substantially as specified.

3. In apparatus for the conversion of electric energy into heat, the combination, with the heater-body of steatite, of the wires of high resistance seated therein and having proper terminals, and the inclosing composition of powdered steatite and an alkaline silicate or silicates, substantially as specified.

4. In an electrical heater, the combination, with a steatite heater-body and resistance-wires, of a non-conducting cement whereby said wires are attached to said heater-body and covered for purposes of insulation and anti-oxidation, substantially as specified.

5. In electric-heating apparatus, the steatite heater-body having grooves or depressions, and a high-resistance wire or wires sealed and insulated therein except at their terminals, a non-conducting cement of steatite composition for effecting such sealing and insulation, and a heat-storing attachment in connection with said steatite body, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY GIBSON O'NEILL.

Witnesses:

PHILIP C. MASI,

GEO. M. ANDERSON.