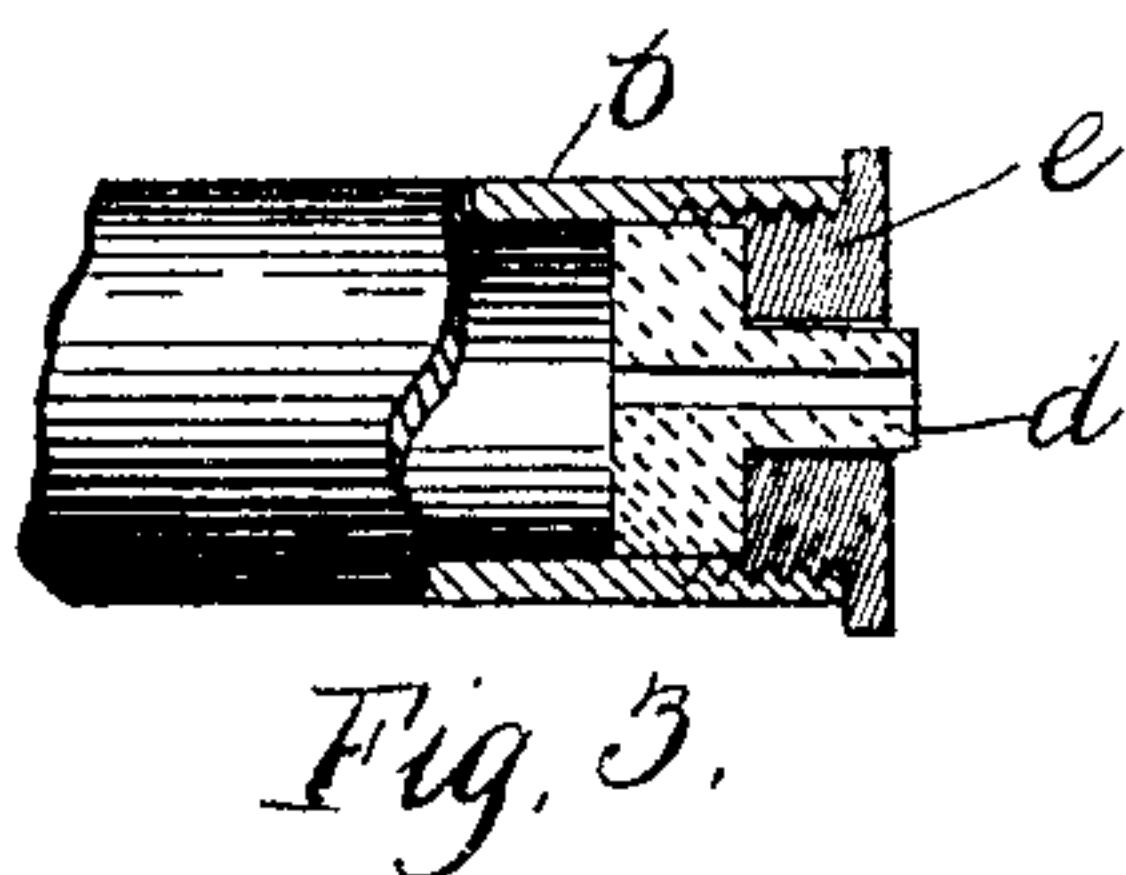
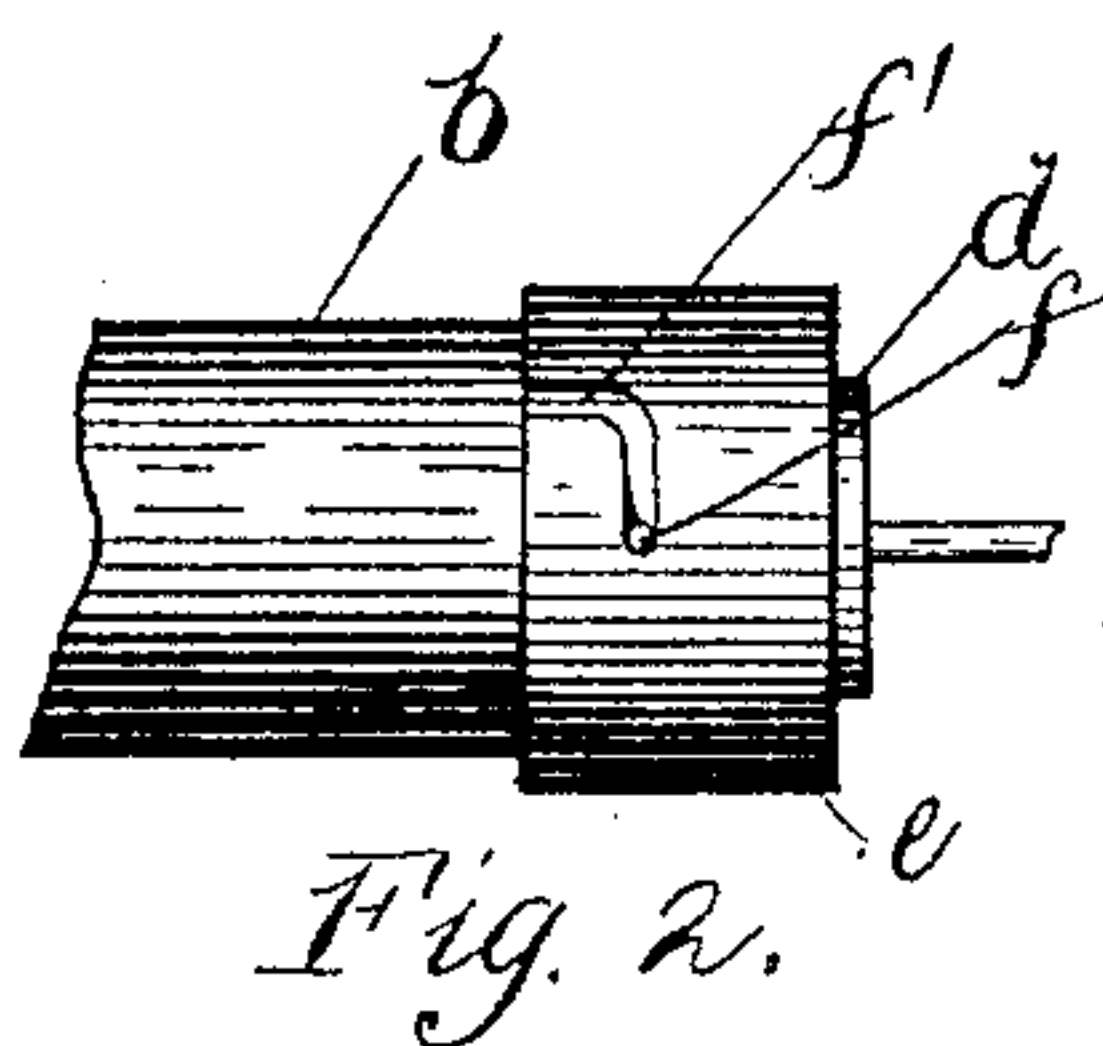
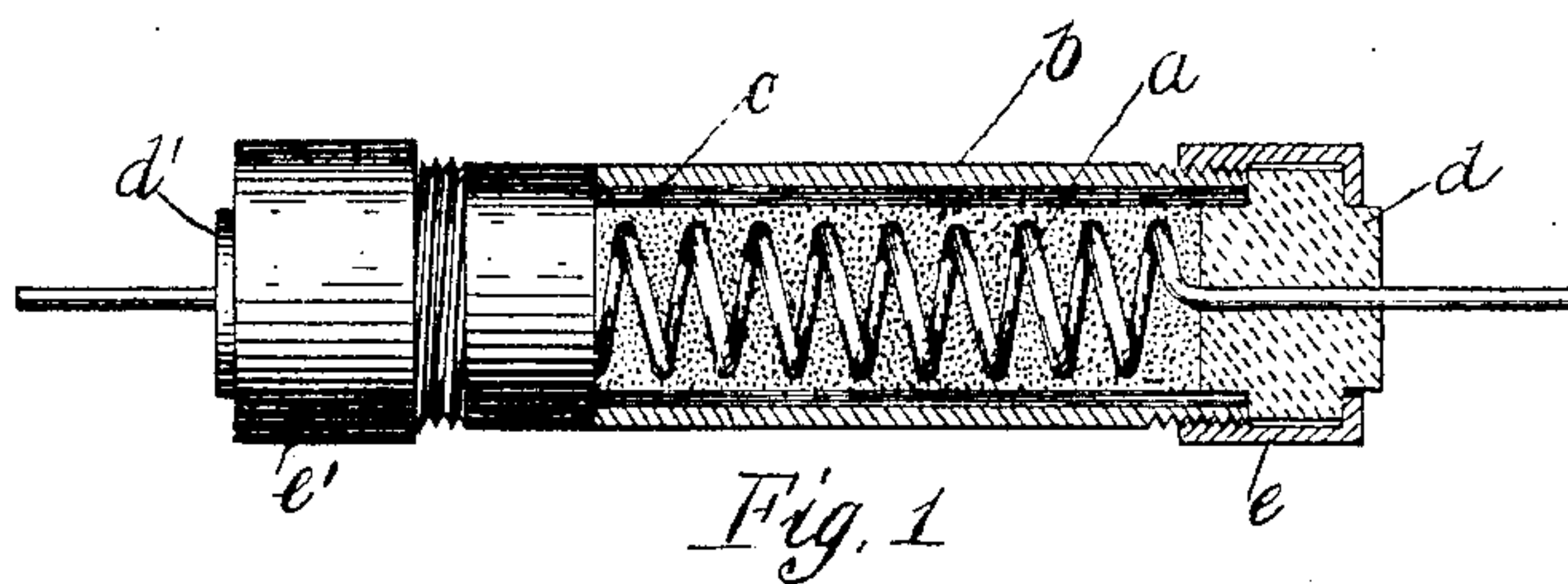


(No Model.)

J. NEBEL.
ELECTRICAL RESISTANCE COIL.

No. 581,170.

Patented Apr. 20, 1897.



Witnesses:
Dr. Hitt C. Tanner,
W. Clyde Jones.

Inventor:
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Attorneys.

UNITED STATES PATENT OFFICE.

JOHN NEBEL, OF LONDON, ENGLAND, ASSIGNOR TO THE SIEMENS & HALSKE
ELECTRIC COMPANY OF AMERICA, OF CHICAGO, ILLINOIS.

ELECTRICAL RESISTANCE-COIL.

SPECIFICATION forming part of Letters Patent No. 581,170, dated April 20, 1897.

Application filed June 12, 1895. Serial No. 552,518. (No model.) Patented in England November 29, 1892, No. 21,782.

To all whom it may concern:

Be it known that I, JOHN NEBEL, a citizen of the German Empire, residing at 74 Woodland Terrace, Old Charlton, London, in the
5 county of Kent, England, have invented new and useful Improvements in Electrical Resistance-Coils, (Case No. 54,) of which the following is a specification.

The subject-matter of this application has
10 been patented in England under date of November 29, 1892, No. 21,782.

My invention relates to a rheostat or resistance-coil, and its object is to provide a form of rheostat that will be simple and strong
15 in construction.

In accordance with my invention I provide a rheostat comprising a tube of conducting material within which is placed the resistance-coil, an insulating material, such as
20 sand, being packed within the tube and about the coil, the granular material serving to insulate the coil and to conduct the heat arising therefrom to the tube, from whence it may be readily radiated.

I will describe my invention by reference
25 to the accompanying drawings, in which—

Figure 1 is a view, partially in section, of the rheostat embodying my invention. Fig. 2 is a partial view of a modification thereof.
30 Fig. 3 is a partial sectional view of a further modification.

Like letters refer to like parts in the several figures.

The electrical conductor or resistance-coil
35 *a* is supported within a tube or casing *b*, which may be made of metal or other material adapted to conduct and radiate heat. The tubing is lined internally with a layer *c* of insulating material, as enamel or asbestos,
40 and plugs *d d'*, of insulating material, are provided in the ends of the tube through which the conductor is adapted to pass, the plugs being made of slate, ceramic material, or other suitable insulator. In Fig. 1 the
45 tube is illustrated as provided upon its ends with screw-threads, upon which caps *e e'* are adapted to be screwed to secure the plugs *d*

d' in position and to seal the ends of the tube. In Fig. 2 a pin *f* is provided upon the tube, with which the bayonet-slot *f'*, provided upon
50 the cap *e*, is adapted to engage, whereby the cap is held in position. In Fig. 3 the tube is shown as provided with internal threads with which the threads upon the cap *e* are adapted to engage, the cap being provided with a bore
55 through which the plug *d* is adapted to pass. Within the tube and surrounding the coil *a* is placed granular insulating material, which may be sand or any other granular material possessing insulating properties and capable
60 of conducting heat. The heat generated by the passage of the current through the coil is conducted through the granular material to the tube *b*, from the surface of which it is radiated.

It will be observed that the surface of the
65 tube *b* is considerably greater than the surface of the coil *a*, so that by this construction the radiating-surface of the rheostat is greatly increased.

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

1. The combination with the tube or casing of heat-conducting material, of a resistance-
75 coil supported therein, and insulating granular material within said tube and surrounding said coil.

2. An electrical resistance-coil consisting of a wire helix of low conductivity embedded
80 in insulating granular material within a metal tube lined with insulating material and closed at the ends by insulating-plugs through which the wire passes, substantially as described.

3. In a rheostat, the combination of a heat-radiating casing, a resistance-wire within the casing, and loose sand packed within the casing and separating the resistance-wire from the casing, substantially as described.
85

4. In a rheostat, the combination with the coiled resistance-wire, of a heat-radiating casing therefor, means for sustaining the coil within the casing, and a filler within the cas-
90

ing consisting of clear loose sand surrounding the resistance-coil, as described.

5 In a rheostat, the combination of a tubular heat-radiating case, screw-caps closing each end of the tubular case, a resistance-wire within the case, insulating-bushing in each cap through which connection is made with the resistance-wire, and loose sand

packed within the case around the resistance-wire.

In testimony whereof I have affixed my signature in the presence of two witnesses.

JOHN NEBEL.

Witnesses:

GEO. P. SIMPSON,
THOMAS LAKE.