No. 712,749. Patented Nov. 4, 1902.

G. H. WHITTINGHAM.

RHEOSTAT.

(Application filed Jan. 21, 1902.)

(No Model.)

Fig. 1.

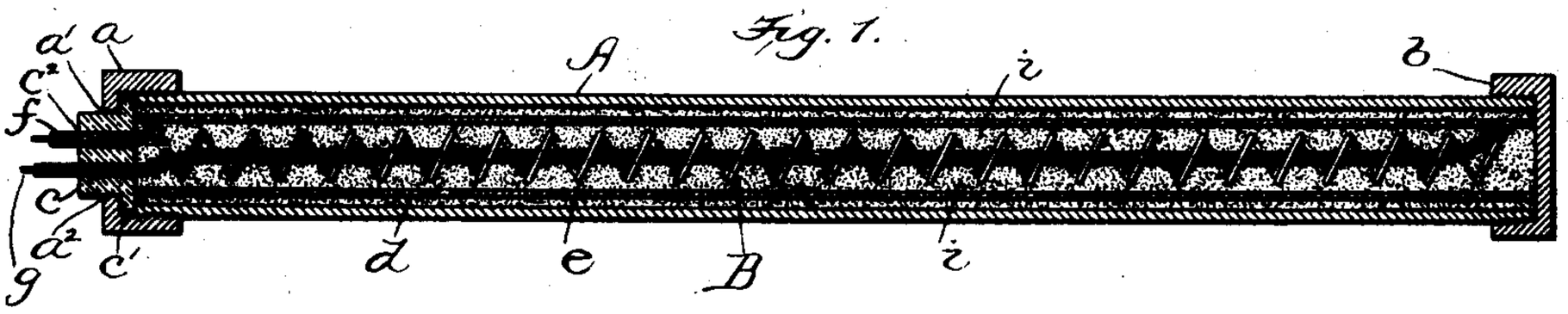


Fig. 2

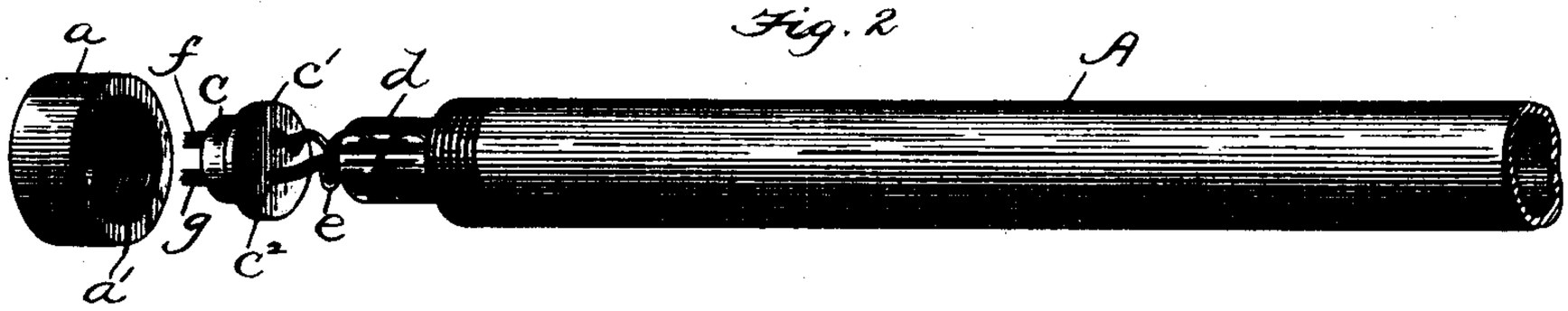


Fig. 3.

Fig. 4.

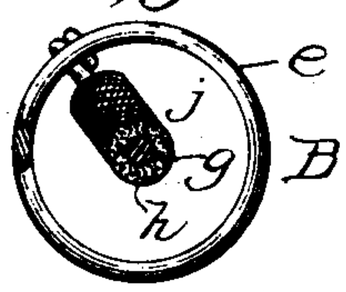
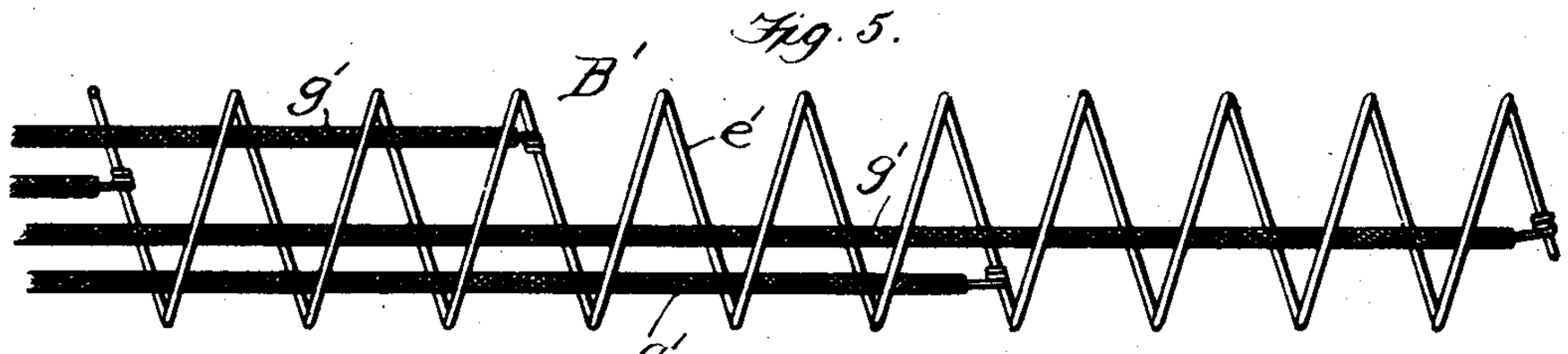


Fig. 5.



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RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 712,749, dated November 4, 1902.

Application filed January 21, 1902. Serial No. 90,618. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. WHITTINGHAM, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

This invention relates to rheostats particularly designed for heating purposes; and its object is to provide a compact construction of rheostat of this character in which the heat generated by the electric current passing through the resistance-wire will be effectively radiated and in which the terminals of the resistance-wire are located at the same end of the rheostat, so that ready access may be had to the parts for the purpose of repairs.

The invention consists in certain constructions, arrangements, and combinations of the parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of the rheostat. Fig. 2 is a perspective view thereof with the several parts partially detached from each other but in juxtaposition. Fig. 3 is a detail view of the resistance device. Fig. 4 is an enlarged cross-section of the same looking from the left to the right of Fig. 3. Fig. 5 is a detail view illustrating a slightly-modified construction of resistance device.

Referring to the drawings, the letter A designates a tubular metal or other suitable radiating jacket provided at one end with a closed cap *b*, screwed or otherwise detachably secured thereon, and at the other end with an open cap or collar *a*, also screwed on, so that ready access may be had to the interior of the jacket at either end. The open cap or collar *a* has an inwardly-extending annular shoulder *a'* surrounding a central aperture a^2, and an insulating-plug *c*, of porcelain or the like, is fitted in said aperture and has an annular flange *c'* interposed between the annular shoulder of said cap and the adjacent edge of the jacket A, whereby it is securely held in place, as shown in Fig. 1. Said insulating-plug is also provided with terminal passages c^2 for the conductors of the resistance-coil, hereinafter described.

The interior of the tubular jacket A is insulated. In this instance the insulation comprises a glass or porcelain open-ended tube *d* within the jacket and preferably of such length that when the insulating-plug *c* is tightly clamped by the screw-cap *a* against the edge of the jacket said plug will abut against one end of said glass tube and press the other end of the tube against the screw-cap *b* at the other end of the jacket. By this arrangement of cap *a*, insulating-plug *c*, and glass tube *d* a simple and effective insulation is formed to prevent any contact between the resistance-coil and the metal radiating-jacket A.

The tubular insulated radiating-jacket A contains a resistance device, one form of which is designated B (see Figs. 1, 2, 3, and 4) and comprising a resistance-wire *e*, wound in spiral form, and two electrical conductors *f g*, one of which is suitably attached to one end of the spiral coil and the other of which is attached to the other end of the spiral coil and is returned through the coil to that end of the latter at which the first-named conductor is attached, and the said two terminals *f g* extend through the insulating-plug *c* to the outside of the jacket A, where they are connected to the supply-circuit in any suitable manner. Thus both terminals are at the same end of the rheostat.

Each of the conductor-wires *f g* is mounted in a tubular sleeve *h*, of fireproof insulating material, such as asbestos, as best seen in Fig. 4, and it should be especially noted said conductors are wires of high conductivity in contradistinction to the resistance-wire *e*. Thus when a current enters by the conductor *f* at the outer or entrance end of the coil *e* the electrical units of said current will be converted into heat units through every convolution of the resistance-coil and coming out of the distant end of the coil will flow freely without resistance through the return-wire *g* of high conductivity.

To rapidly conduct the heat generated by the resistance-coil *e* to the exterior metal jacket A, whence it can be diffused in the atmosphere by radiation, I preferably employ a filler *i*, of clear loose sand, which is packed closely around and within the resistance-coil and also in the space between the glass insulating-tube *d* and the metal walls of the jacket

A. It is to be observed that while the resistance-coil *e* surrounds a tubular insulating-sleeve *h*, through which the return-wire *g* of high electrical conductivity extends, yet, as best seen in Fig. 4, there is a space *j* between said tubular insulator and coil within the glass tube, which space is filled with the heat-conducting filler *i*, whereby the entire surface of the wire of the said resistance-coil is covered by said filler, which would not be the case if the said wire were wound directly on the insulating-sleeve *h*.

To assemble the parts of the rheostat, the closed cap *b* being on one end of the metal tube or jacket A the glass tube *d* is inserted in the other end. The resistance device is then inserted in said glass tube, and the insulating-plug *c* is inserted on the terminals of the two conductors *f g*, and the cap or collar *a* is screwed on the jacket and clamps the insulating-plug *c* in place. The closed cap *b* is then removed and the heat-conducting filler *i* inserted from that end of the jacket and packed therein, after which the said screw-cap *b* is screwed back into place. To obtain access at any time to the resistance device B, it is only necessary to unscrew the cap or collar *a*, and the entire resistance device may then be readily withdrawn.

This invention is manifestly not limited to a resistance device having the single return-wire of high conductivity, as illustrated in Figs. 1, 2, 3, and 4. For instance, as shown in Fig. 5, the resistance device B′ has a plurality of return-wires *g′*, secured to different convolutions of the coil *e′*, with all their terminals passing through an insulating-plug in the manner hereinbefore set forth in respect to the resistance device B. With this arrangement the circuit of the rheostat may be lengthened or shortened, as desired, by any suitable switch device.

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

1. A device of the character described, comprising an insulating-sleeve; a resistance-coil surrounding said sleeve; and an electrical conductor connected to one end of said coil and extending through said coil and through said sleeve, the two terminals of the coil being thereby at the same end of the coil.

2. A device of the character described, comprising an insulating-sleeve; a resistance-coil of wire surrounding said sleeve; and a return-wire of relatively high conductivity connected to said coil and extending through the coil and through the said sleeve, as set forth.

3. The combination of an insulating-sleeve; a resistance-coil surrounding said insulating-sleeve with its convolutions spaced therefrom; and a return-wire of relatively high conductivity connected to said coil and extending therethrough and through said sleeve, as set forth.

4. The combination of a radiating-jacket; a resistance-coil in said jacket; a return wire or conductor connected to said coil and extending therethrough; an insulating-sleeve in which said conductor is mounted, said sleeve being spaced from the convolutions of the coil; and a heat-conducting filler in said jacket and filling the space between the coil and the said sleeve, as set forth.

5. The combination of a radiating-jacket; a cap for one end of said jacket, said cap being provided with an inwardly-extending annular shoulder; an insulating-plug extending through said cap and provided with an annular flange interposed between said annular shoulder and the adjacent edge of said jacket; and a resistance-coil within said jacket and all of whose terminals pass through said plug, as set forth.

6. The combination of a radiating-jacket; a cap or collar for one end of said jacket; an insulating-plug extending through said cap and provided with a plurality of passages; and a resistance-coil within said jacket and having all its terminals passing through the passages of said plug, as set forth.

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

GEORGE H. WHITTINGHAM.

Witnesses:
FREDERICK S. STITT,
CHARLES L. VIETSCH.