

July 10, 1928.

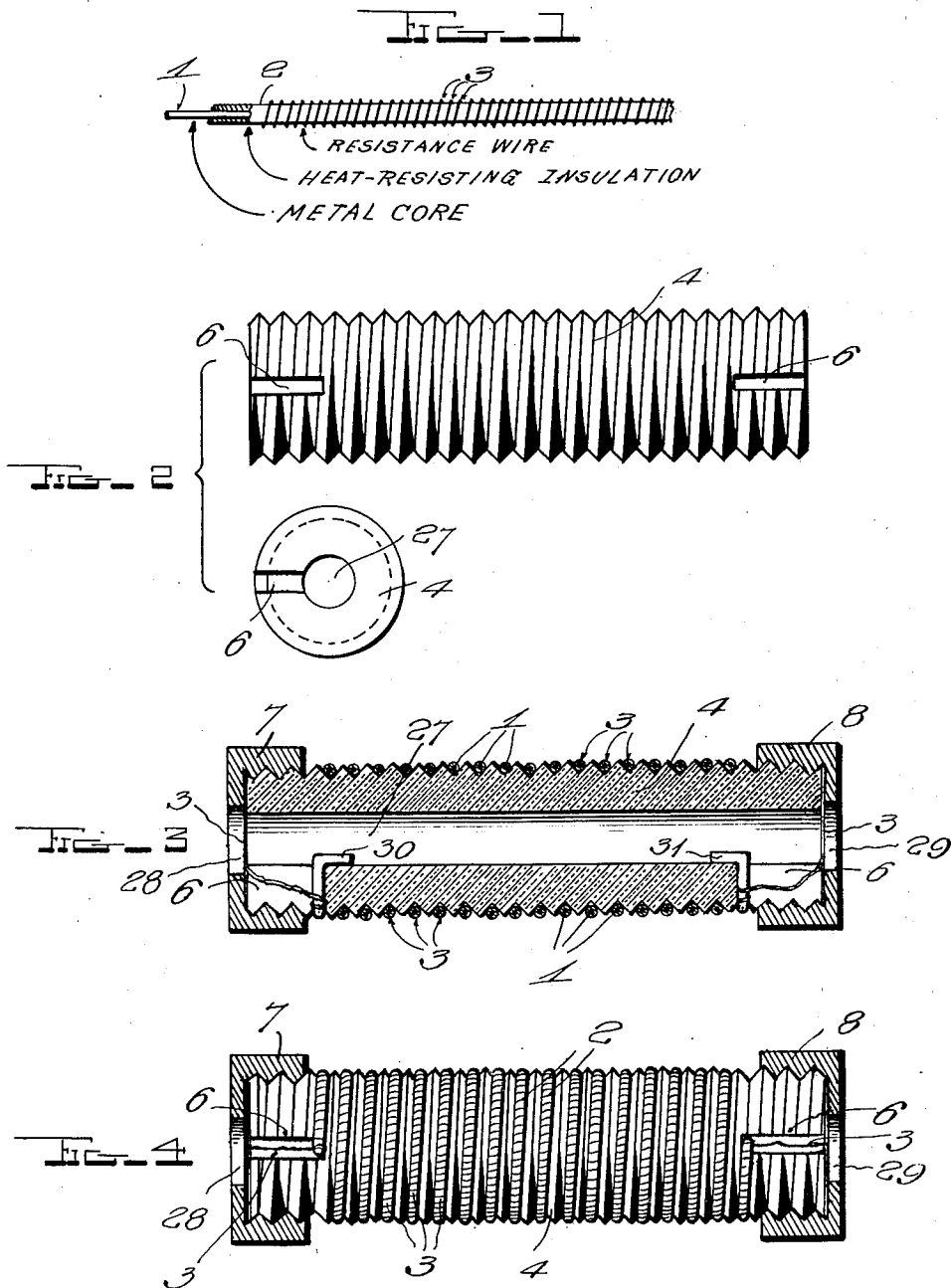
1,676,869

H. G. RICHTER

RESISTANCE UNIT AND RHEOSTAT

Filed Jan. 28, 1927

2 Sheets-Sheet 1



INVENTOR.

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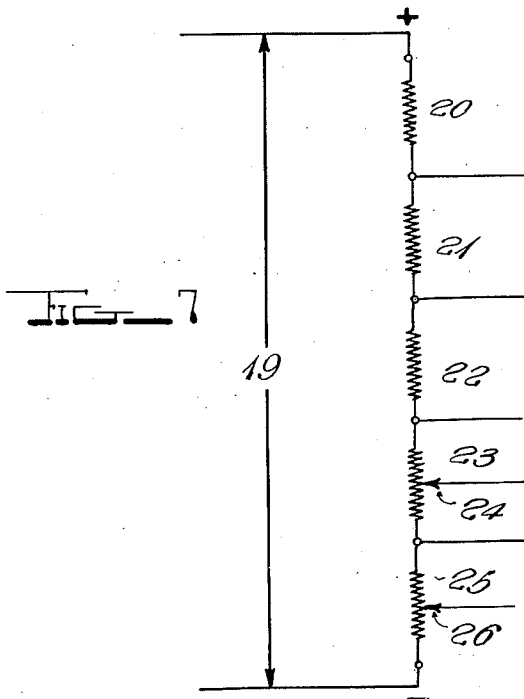
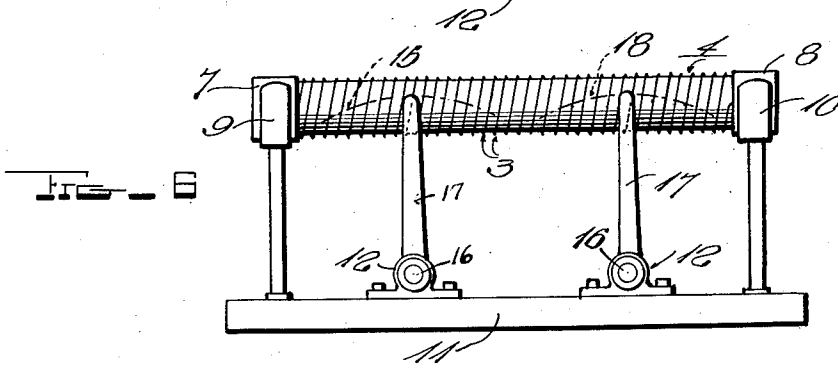
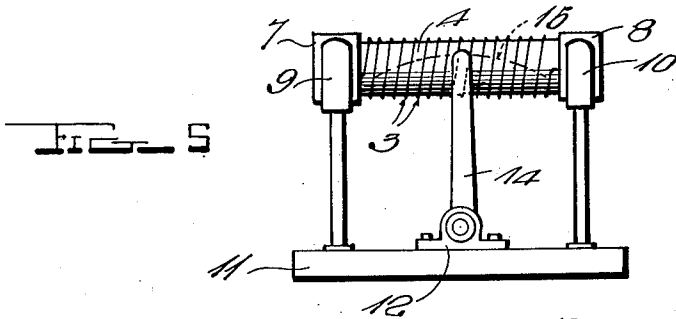
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

HENRY G. RICHTER, OF ROSELLE PARK, NEW JERSEY, ASSIGNOR TO ELECTRAD, INC.,
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RESISTANCE UNIT AND RHEOSTAT.

Application filed January 28, 1927. Serial No. 164,233.

My invention relates broadly to electrical resistance units and more particularly to a compact construction of electrical resistor which may be manufactured and assembled inexpensively on a quantity production basis.

One of the objects of my invention is to provide an electrical resistor having a minimum number of parts capable of being mounted within a small physical space and yet provide for a relatively high resistance.

Another object of my invention is to provide a resistance unit formed upon a screw threaded base member upon opposite ends of which I provide screw threaded cap members for forming terminals for the opposite ends of the resistance unit which is constituted by a wire spirally wound upon the screw threaded body portion with the ends gripped by the cap members forming the electrical terminals.

My invention will be more fully understood from the specification hereinafter following by reference to the accompanying drawings wherein:

Figure 1 illustrates the resistance member; Fig. 2 shows the insulated screw threaded supporting body which carries the resistance, illustrating the body portion in side and end elevation; Fig. 3 shows an assembly cross-sectional view of the resistance unit; Fig. 4 is an assembly view with parts of the screw threaded caps broken away to show the method of connection between the caps and the resistance member; Fig. 5 illustrates one of the applications of the resistance unit of my invention arranged to have its value readily controlled; Fig. 6 shows a modified form of the resistance unit of my invention with means for varying the effective value of different sections of the unit; and Fig. 7 is a wiring diagram showing the electrical circuit through the resistance units of my invention.

The resistance unit of my invention has been designed with a view of providing a number of mechanical and electrical advantages over constructions of resistors heretofore available in the art. Among the mechanical advantages of the resistance unit of my invention I may mention its ease of manufacture, the stability and sturdiness of the completed unit, and the ease of adaptability of the resistor to fixed or variable combina-

tions of the electrical circuits. Among the electrical advantages possessed by the resistor of my invention I may mention the compact size of the resistor for high resistance and the characteristic of high power dissipation due to novel heat radiation incurred by supporting the resistance wire exposed to the air.

Referring to the drawings in detail, reference character 1 designates a metal core on which the resistance element is supported. Reference character 2 represents a heat resisting strip or coating of insulation material which may be, for example, enamel on the metal core 1, and over this insulated envelope or tube I wind a resistance wire with its convolutions spaced one from another.

A heat resisting body structure which is machined or molded from insulating material is represented in Fig. 2 as consisting of a cylindrical body having V-shaped threads cut or molded therein. The body portion may be tubular in shape with a longitudinal bore extending therethrough and slots at opposite ends of the member and in one side of the body portion. In the V-shaped threads the resistance element is spirally wound as represented at 3, the wire member being freely exposed to air. The opposite ends of the member are provided with screw threaded caps which abut with the free ends of the resistance wire which are bent over and interlocked in the threads as represented in Figs. 3 and 4. The same screw threads which provide supports and separators for the resistance wire, also provide means for supporting the terminal cap members 7 and 8. In special cases, however, it may be advantageous to use a different thread gauge for the caps.

In Fig. 5 I have illustrated the adaptability of the resistor of my invention to a mounting in which the effective value of the resistance may be controlled. The mounting is shown consisting of a base member carrying a journal for a switch member. Suitable supports, such as resilient clip members 9 and 10 are carried by the base and the resistor may be slipped into the clips with the terminal caps 7 and 8 thereof engaging the clips. Inasmuch as the resistance wire 3 is non-insulated and freely exposed to the air, the switch arm may

sweep over and contact with the convolutions of the resistance wire 3 in a path which I have represented at 15.

In adapting the resistance element to various types of apparatus it becomes desirable at times to provide for the variation of the effective resistance over a plurality of sections of the resistance. I have shown an arrangement of this kind in Fig. 6 where an additional switch 17 is shown pivotally mounted at 16 and arranged to sweep over the convolutions of the resistor in the path represented at 18. Taps may be provided wherever it may be desirable so that different effective resistance paths may be derived from the entire resistance element.

In Fig. 7 I have shown diagrammatically the adaptability of the resistor construction of my invention in providing a plurality of fixed and variable resistance paths. The resistor connected across circuit 19 may have a plurality of fixed sections 20, 21 and 22, and a plurality of sections 23 and 25, the effective value of resistance in which may be varied, as represented by variable contact members 24 and 26.

From the foregoing explanation it will be understood that the resistor of my invention comprises a minimum number of parts. This facilitates manufacture and production and considerably reduces manufacturing costs. The resistance element is supported in position upon the screw threaded member by bending the ends of the element into slots 5 and 6 and then electrical connections established by the metallic caps 7 and 8 with the resistance wire. By reason of the complete exposure of the resistance wire to the air and the fact that no insulation is provided on the wire, higher efficiency may be obtained and greater electrical power can be dissipated.

It will be understood that while I have described my invention in certain preferred embodiments, that modifications may be made and that no limitations upon the invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A resistor comprising a screw threaded insulated cylindrical member, a resistance member comprising a metallic core, an insu-

lated envelope thereon, and a resistance wire spirally wound thereover, said resistance member being wound in the screw threads of said cylindrical member and terminating short of the ends of said member, conductive internally threaded cap members arranged to be secured over the ends of said cylindrical member for gripping the ends of said resistance wire and establishing electrical connection therewith.

2. A resistor comprising an insulated cylindrical body structure having screw threads cut thereon, a resistance element comprising a metallic core, a heat-resisting envelope of insulating material wound over said metallic core, and a resistance wire spirally wound over said heat-resisting insulation material, said resistance element being spirally wound in the screw threads of said insulated cylindrical body, terminals on opposite ends of said body structure for gripping the ends of said resistance wire and establishing connection between opposite ends thereof and said terminals.

3. A variable resistor comprising a screw threaded body member of insulated material, an insulated member having a spirally wound resistance wire thereon, said insulated member and resistance wire being wound in said screw threads, metallic cap members engaging the ends of said screw threaded body member and connected with the opposite ends of said resistance wire, and a slidable contact member arranged to engage with the convolutions of said spirally wound resistance wire for effectively including a predetermined amount of said resistance in an external circuit.

4. A variable resistor comprising a screw threaded body member of insulated material, an insulated member having a spirally wound resistance wire thereon, said insulated member and resistance wire being wound in said screw threads, metallic cap members engaging the ends of said screw threaded body member and connected with the opposite ends of said resistance wire, said resistance wire being divided into a plurality of sections with independently adjustable means for slidably engaging selected portions of said sections for effectively including predetermined amounts of said resistance in external circuits.

HENRY G. RICHTER.