E. SCHWARTZ.
RESISTANCE ELEMENT.
APPLICATION FILED JUNE 18, 1918.

1,281,218. Patented Oct. 8, 1918.

Fig. 1.

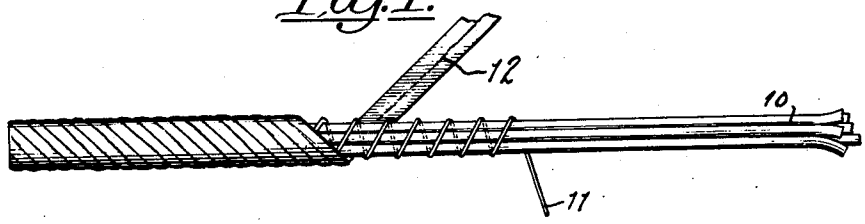



Fig. 2.

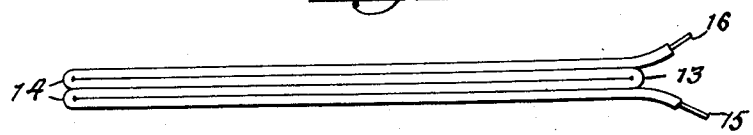



Fig. 3.

Fig. 4.

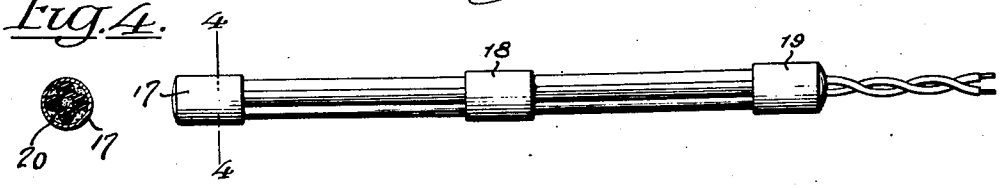
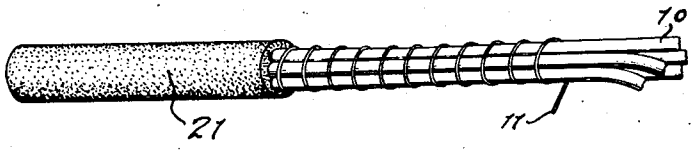



Fig. 5.




Inventor:
Edward Schwartz
By his Attorneys,
Howson and Howson

106-84 1281218

XR

# UNITED STATES PATENT OFFICE.

EDWARD SCHWARTZ, OF NEW YORK, N. Y., ASSIGNOR TO MANHATTAN ELECTRICAL SUPPLY COMPANY, INC., OF JERSEY CITY, NEW JERSEY, A CORPORATION OF MASSACHUSETTS.

## RESISTANCE ELEMENT.

1,281,218. Specification of Letters Patent. Patented Oct. 8, 1918.

Application filed June 18, 1918. Serial No. 240,637.

*To all whom it may concern:*

Be it known that I, EDWARD SCHWARTZ, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Resistance Elements, of which the following is a specification.

My invention relates to resistance elements and particularly to resistance elements adapted to be used in such toilet utensils as hair curlers, drying combs, etc., in which a compact heating unit of moderate capacity is required, and the object of my invention is to provide an element of this type which can be manufactured rapidly and inexpensively, while, at the same time, affording, in the finished product, an efficient unit capable of giving satisfactory service and of such durability of construction that it can withstand, without danger of injury, the careless or rough handling which utensils of this type are apt to receive.

In the accompanying drawing,

Figure 1 is a broken side elevation illustrating a resistance element embodying my invention in one form;

Fig. 2 is a side elevation of a section cut from a length of the resistance element and folded to shape;

Fig. 3 is a side elevation of a completed unit showing the holding ferrules applied thereto;

Fig. 4 is a section on the line 4—4, Fig. 3; and

Fig. 5 is a broken side elevation showing a modified construction.

In the form illustrated in Figs. 1 to 4, the present heating unit comprises a soft core 10 of insulating material such as strands of asbestos fiber, upon which is spirally wound the resistance wire 11. By reason of the fact that the insulating core 10 is of yielding material and the wire 11 is wound thereon under slight tension, the coil is slightly pressed into the surface of the core, which thus has the mechanical effect of spacing the spires of the coil apart and preventing the short-circuit thereof. For utensils of the present type, it is sufficient to use a wire of such size and character that it affords a resistance of 400 to 600 ohms per foot. Outside the resistance coil is wound, under slight tension, strands 12 of insulating material, such as strips of asbestos like that used for the core. This wrapping serves to press the coil into the core and hold the spires thereof spaced apart. The wrapping is then coated with a heat-transmitting insulating cement, such as that hereinafter described, and the whole compressed in any suitable way to produce a compacted resistance element of uniform diameter and character. An element of this construction may be manufactured in continuous lengths and then cut into sections of the desired size for the individual units.

In Fig. 2 I have shown such a section cut to the desired length and folded back upon itself at 13, the thus folded length being further folded at 14 to afford a four-strand unit. The bared ends 15 and 16 of the resistance wire afford terminals which may be connected to the ends of the lead-wires (not shown).

After the section has been bent to the form shown in Fig. 2, producing the several strands, brass ferrules 17, 18, and 19 are slipped thereover, one at each end of the unit and one in the middle, which serve not only to keep the strands in position and thus form them into a unit, but to form radiating conductors which aid in transmitting the heat of the unit to the tool casing. These ferrules are held in position in any suitable way, preferably by cement 20.

The unit thus formed is baked at a temperature sufficiently high to remove not only all moisture which may be present in the cement or in the asbestos, but also any combustible material, such as cotton or other textile fibers, which are ordinarily associated with the asbestos. This is highly desirable since the presence of the cotton in the finished unit renders the latter objectionable if placed in the utensil without prior baking, by reason of the fact that the heat of the resistance wires, when the utensil is in use, scorches the cotton and causes the latter to give off an odor, which is not only unpleasant but a source of alarm to the user. After the unit has been completely dried and deodorized, it is ready for use, and the lead-wires may be connected to the terminals 15 and 16 of the resistance.

In the modified construction shown in Fig. 5 I have substituted for the insulating wrapping 12 an outer casing of insulating cement

21. This cement preferably comprises about equal parts of (1) alundum, (2) asbestos powder, and (3) a 16 to 18 per cent. solution of waterglass. This mixture forms a plastic which may be applied by dipping and is then pressed in and evenly distributed over the surface by any suitable means. This may be satisfactorily accomplished by hand, or by drawing through a pliable die or by rolling.

Instead of a cement of the type just described, I may use a thin paste or binder of silica or pulverized mica or a mixture thereof, and this silica-cement may be forced into the interior of the resistance element by rolling the latter between plates having a definite minimum spacing to impart a uniform diameter to the product. After baking, the surface is rather hard and looks somewhat like enamel or glaze, but is nevertheless sufficiently flexible.

A unit of the present type has not only the advantage of being readily and economically made, but it possesses the important characteristic that it will withstand, without injury, shocks such as it would receive when the utensil in which it is inserted is dropped on the floor or thrown on the dressing table as is frequently the case with hair curlers, heated combs, etc. In this respect it is much superior to resistance elements wound on rigid porcelain or lava cores which frequently break in use. Moreover, it is flexible and can be bent, if necessary, during its introduction into the tool, or it may occupy a curved position in the tool.

Various modifications will readily occur to those skilled in the art which do not depart from what I claim as my invention.

I claim:

1. A resistance element of the type described comprising a core of soft insulating material, a coil of resistance wire wound thereon, a covering of insulating material pressed on said coil and serving, with the soft core, to maintain the spires of said coil spaced apart, a length thus formed being bent back upon itself to form a plurality of strands, means for holding said strands together at spaced intervals to form a unit, said unit being baked to remove contained moisture and combustible material, and being flexible.

2. A resistance element of the type described comprising a core of soft insulating material, a coil of resistance wire wound thereon, a covering of insulating material pressed on said coil and serving, with the soft core, to maintain the spires of said coil spaced apart, a length thus formed being bent back upon itself to afford a plurality of strands, spaced metallic ferrules incasing said strands to form a unit and assist in the radiation of the heat of the coil, said unit being baked to remove contained moisture and combustible material, and being flexible.

3. A resistance element of the type described comprising a core of soft insulating material, a coil of resistance wire wound thereon, a covering of insulating material pressed on said coil and serving, with the soft core, to maintain the spires of said coil spaced apart, said covering comprising a plastic mixture of alundum, powdered asbestos, and alkali silicate, said unit being baked to remove contained moisture and combustible material, and being flexible.

In testimony whereof I have signed my name to this specification.

EDWARD SCHWARTZ.