Nov. 27, 1956 H. A. MERRICK 2,772,336

INFRA-RED GENERATOR

Filed July 10, 1953

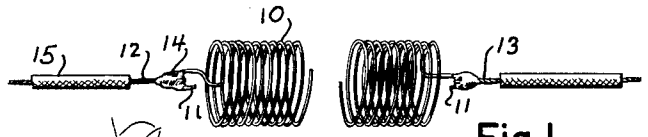


Fig. 1

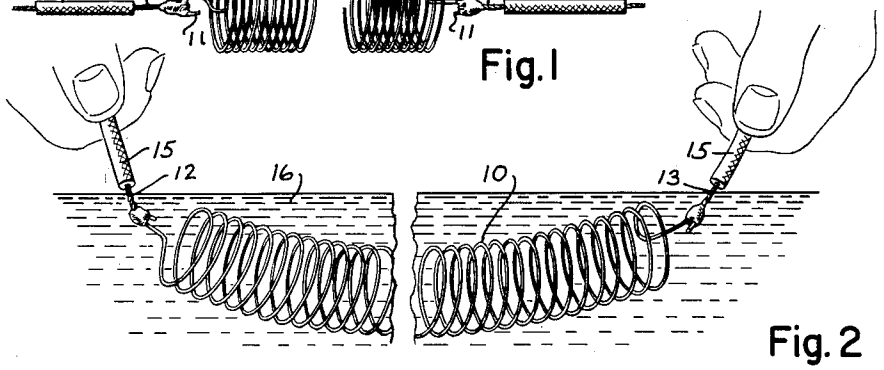


Fig. 2

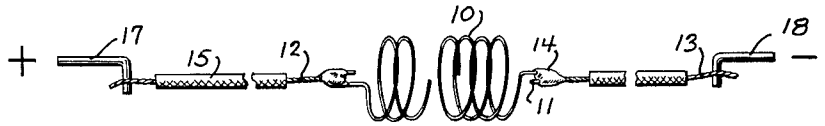


Fig. 3

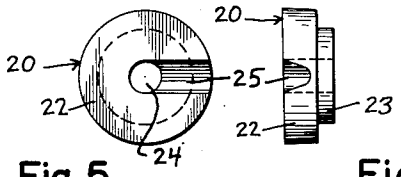


Fig. 5

Fig. 4

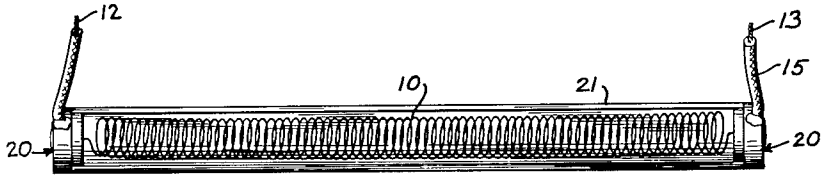


Fig. 6

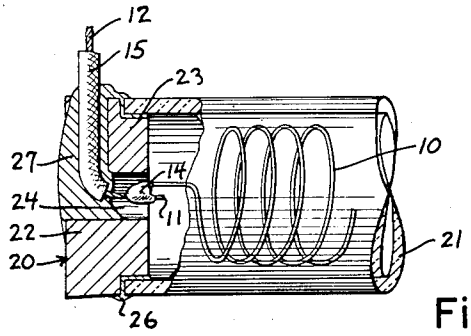


Fig. 7

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INFRA-RED GENERATOR

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Application July 10, 1953, Serial No. 367,227

1 Claim. (Cl. 201—63)

This invention relates to infra-red generators of the type disclosed in United States Patent No. 2,535,268, issued December 26, 1950, and namely, a generator comprising an electrically energized coil of filament wire encased in a glass tube. The coil is peculiarized in that the convolutions of the coil are coated with a jacketing cement permitting the coil, while operating under a condition of high heat transmittal, to safely contact the glass wall of the container without any liability of either the coil failing or the glass disintegrating due to the heat of the coil. In this generator heat waves of two frequencies are created, high-frequency waves emanating from the coated coil and low-frequency waves from the tube. These waves are held to a predetermined constant throughout the length of the generator and will operate to distribute the radiated heat such as to give substantially uniform penetration throughout the entire area to which the heat is directed.

In the aforesaid patent the ends of the glass tube are annealed and closed with stainless steel caps which are internally coated with a sealing cement. The ends of these caps have central openings so that the caps can be fed over the projecting terminals of the coil and onto the annealed ends of the tube. These terminals are then secured to the caps by solder which also serves to seal the openings in the latter. This arrangement requires that the caps be socketed in electrically conductive clips, such as copper fuse clips, thus making a far more expensive installation than would be found if the ends of the coil could have a wire interconnection with the power leads to the heating unit in which the tube is mounted.

Accordingly, it is a principal object of the present invention to provide an inexpensive arrangement whereby the ends of the glass tubes are sealed without requiring a modification of such ends and which permits the terminals of the energized coil to be easily connected to wire extensions. In carrying out this object, the invention further aims to electrically insulate the coil at the ends of the tube and to provide means whereby the generator can be supported at its ends without directly contacting the glass of the tube.

Other more particular objects and advantages will appear and be understood in the course of the following description and claims, the invention consisting in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a fragmentary plan view of an uncoated coil with the wire leads attached.

Fig. 2 illustrates the step of dipping the coil into a bath of a cement coating material.

Fig. 3 shows the manner in which the coating on the coil is dried.

Fig. 4 is a side view of one of my novel end plugs.

Fig. 5 is a front end view of the plug.

Fig. 6 is a side view of a completely assembled generator unit.

Fig. 7 is a fragmentary view of an end portion of the generator assembly and with the respective end plug being shown in vertical section taken longitudinally through the center of the plug.

In forming the energizing coil **10** for the generator, the ends thereof are formed with terminal hooks **11**. Over these hooks are looped the respective ends of nickel wire extensions **12**, **13**, silver solder **14** being used to make permanent connections. These wire leads have asbestos insulating jacets **15**. As disclosed in the aforesaid patent, the wire of the coil **10** is desirably "Nichrome" and is insulated with a jacket of cement such, for example, as "Sauereisen" cement mixed with magnesium oxide in the approximate proportion of 2 to 1. To apply this cement jacket the assembly of Fig. 1 is manually grasped by the asbestos jackets **15** and dipped into a bath **16** of the coating as illustrated in Fig. 2. The free ends of the wire extensions **12**, **13** are then bridged across live terminals **17**, **18** (Fig. 3) to pass current through the coil and thereby heat the same until the coating is dry.

Continuing to the other figures in the drawing, it is seen that I employ round plugs **20** to close the ends of the "Pyrex" glass tube **21** of uniform diameter in which the filament coil is to be housed. These plugs are stepped to provide a capping section **22**, having a diameter corresponding to the outside diameter of the tube **21**, and a shorter plugging section **23** having a diameter slightly less than the inside diameter of the tube. Each plug has a central through-bore **24** and its outer face is radially grooved from this bore as at **25** to a depth exceeding the outer diameter of the asbestos jackets **15**. The material for the end plugs is desirably ceramic or glass so as to be electrical insulators and not susceptible to breakage due to high temperatures.

In assemblying my improved infra-red generator the coated filament coil **10** with the attached asbestos-jacketed wire extensions **12**, **13** is placed in the tube **21** with the said sections extending therebeyond. Cement **26** which is not subject to deterioration from high temperature conditions, such as, for example, "Sauereisen Insalute Adhesive Cement #1 Paste," is applied to the plugs **20** along the underside of each capping section **22** and the circumferential side face of each plugging section **23**. The plugs are then slipped over the wire extensions **12**, **13** to seat the plugging sections in the ends of the tube where they are permanently held by the cement **26** as best shown in Fig. 7.

After the plugs are thus seated, the wire extensions **12**, **13**, which are at this time extending lengthwise out through the plug bores **24**, are bent at right angles to the longitudinal axis of the tube so that they can be seated in the radial grooves by an application of cement **27** which may be the same type as the cement **26** used to bond the plugs to the tube. The cement **27** also covers the mouth of the bores **24** so that the tube is sealed.

The resulting final assembly is shown in Fig. 6 and it will be seen that it can be readily installed in dryers, food warmers, heaters, etc. by socketing the exposed capping sections of the plugs **20** in simple clips, desirably thermally insulated, and connecting the free ends of the wire extensions **12**, **13** to power leads. Since the plugs **20** are electrically non-conductive, and the asbestos insulating jackets **15** for the extensions **12**, **13** are thermal resistant, the clips holding the genertor do not have to be electrically insulated. The Nichrome wire is applicable to the normal operating temperatures below 2,000° F. Wire of other material as, say, tungsten, is necessarily used in those instances where higher operating temperatures are required.

The invention admits to minor changes in the details of construction and it is my invention that the hereto annexed claim be given a scope commensurate with the

broadest interpretation which the employed language fairly permits.

What I claim is:

An infra-red generator comprising a glass tube, ceramic terminal plugs extending by necked-down portions into said tube and having enlarged heads without the tube; said plugs each having a longitudinal bore and a groove in the outer end face of its enlarged head extending laterally from the said bore to the side extremity of the head, a wire coil assembly in the tube and having extensions passing endwise through the said bores and seated in the said grooves, said extensions having asbestos jackets, and cement bonding the plugs to the tube, holding the jacketed extensions in the grooves, and sealing the said bores in the plugs.

References Cited in the file of this patent

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