June 2, 1936. T. J. J. A. MANDERS 2,042,540

ELECTRICAL DEVICE

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Fig 1

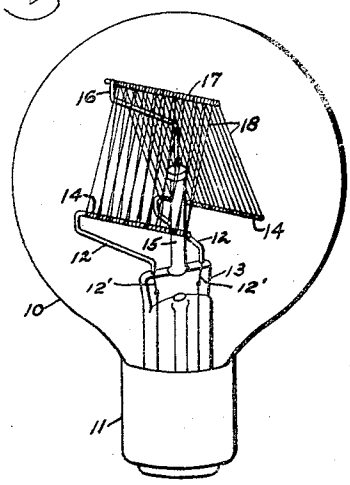


Fig 2

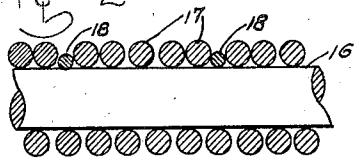


Fig 3

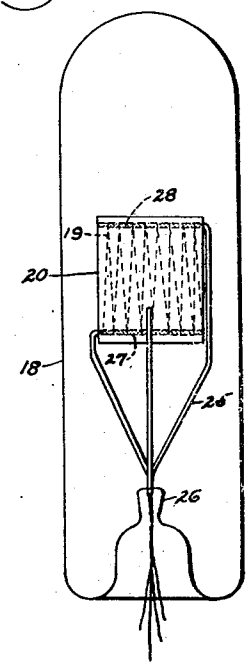
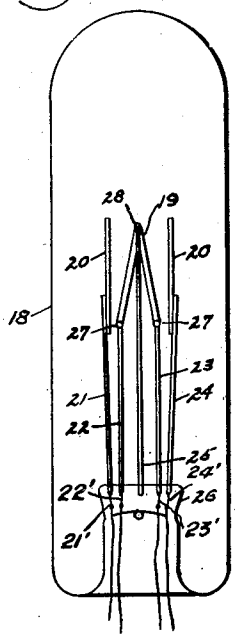


Fig 4



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Fig 5

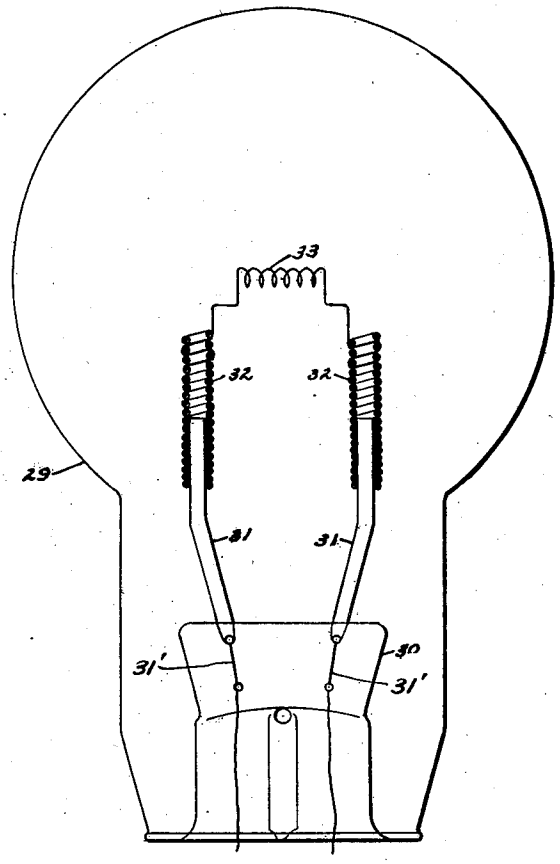
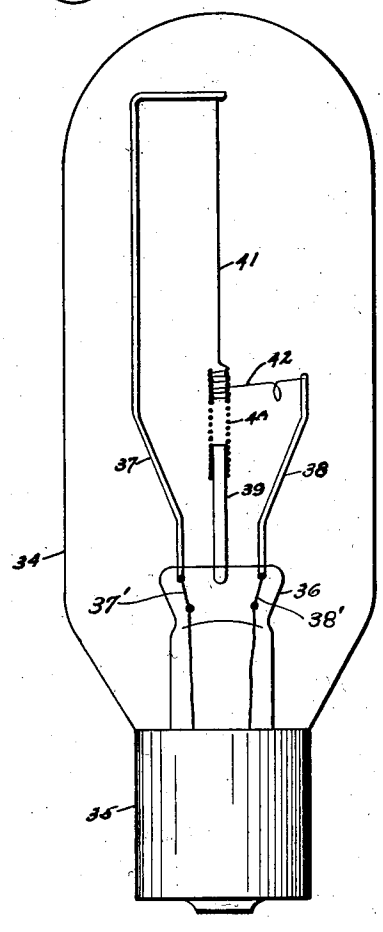


Fig 6



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Patented June 2, 1936 2,042,540

UNITED STATES PATENT OFFICE

2,042,540

ELECTRICAL DEVICE

Theodorus Josephus Jacobus Alphonsus Manders, Eindhoven, Netherlands, assignor to General Electric Company, a corporation of New York

Application June 26, 1931, Serial No. 547,154
In the Netherlands July 21, 1930

4 Claims. (Cl. 176—26)

My invention relates to electrical devices comprising one or more filaments and more particularly to means and methods for attaching said filaments to leading-in or supporting wires.

Filament wires are frequently welded to supporting wires or, in the case of heating elements, the wires are wound in indentations formed in the insulating supporting material. A welded joint is not sufficiently resilient to shocks and vibrations and when the wires are placed in indentations in a supporting member they may become detached when the wire expands during heating. My invention obviates these disadvantages by clamping the filament or filaments at one or more points between windings of one or more supporting springs. Said springs may be supported wholly or in part on a leading-in or supporting wire or mandrel. Various other features and advantages of my invention will appear from the following description of species thereof.

In the drawings Fig. 1 is a perspective view of an incandescent electric lamp; Fig. 2 is a detailed view showing the method of supporting the filament of Fig. 1; Figs. 3 and 4 are elevations of an electron discharge tube; Fig. 5 is an elevation of an incandescent electric lamp showing a variation of the means of attaching the filament; and Fig. 6 is an elevation of a single straight line filament lamp.

Referring to Fig. 1, the lamp comprises a bulb 10 with base 11. Each U-shaped support wires 12 has an end embedded in a stem press 13 and electrically connected to a lead wire 12'. A helical spring 14 is slipped over the upper leg of each of said wires 12. The stem press 13 supports a glass rod 15 which carries a filament support wire 16 having a doubled-over end on which is slipped a helical spring 17. The filament 18 is supported on the support wires 12 and the support wire 16 and is clamped between windings of the helical springs 14 and 17 as shown more clearly in Fig. 2.

In Figs. 3 and 4, the electron discharge tube comprises a bulb 18 which contains a cathode 19 and anodes 20. Support wires 21, 22, 23, 24 and 25 each has an end embedded in a stem press 26, the support wires 21, 22, 23, 24 being electrically connected to lead wires 21', 22', 23', 24' respectively Helical springs 27 are slipped over the doubled-over ends of each of the support wires 22 and 23 and another helical springs 28 in slipped onto the doubled-over end of the support wire 25. The cathode wire 19 is supported on the support wires 22 and 23 and the support wire 25 is clamped between windings of the helical springs 27, 28 in a similar manner to that illustrated in Fig. 2.

In Figs. 5 and 6 the helical springs are shown as held for a part of their length on supporting wires or mandrels. The incandescent electric lamp of Fig. 5 comprises a bulb 29 containing a stem press 30 with support wires 31 each having an end embedded in said stem press and electrically connected to leads 31'. Each of the helical springs 32 is slipped over the end of each of the support wires 31 for a part of its length and the ends of filament 33 are clamped between turns of said springs 32 as shown in the drawings.

The incandescent electric lamp of Fig. 6 comprises a bulb 34 with base 35 containing a stem press 36 in which is embedded an end of each of the support wires 37, 38 and 39, the support wires 37 and 38 being electrically connected to lead wires 37' and 38' respectively. A helical spring 40 is slipped for part of its length over the supporting wire 39. The filament 41 is fastened to the support wire 37 at its upper end while the lower end is clamped between windings of the helical spring 40. A wire 42 is fastened at one end to the support wire 38 while the other end is clamped between windings of the helical spring 40 in the same manner as the filament 41 is clamped. This arrangement assures a good contact between filament and inner lead wires and also provides resiliency for resisting shock and vibration.

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

1. In an electrical device comprising a bulb, the combination of a plurality of support wires sealed in said bulb, a pair of leads electrically connected to a pair of said support wires, a helical spring of conductive material surrounding at least a portion of one of said wires, and an incandescible filament electrically connected to said leads and adapted to become incandescent during the operation of said device and having a portion thereof clamped between adjacent turns of said spring.

2. In an electrical device comprising a bulb, the combination of a plurality of support wires sealed in said bulb, a pair of leads electrically connected to a pair of said support wires, a helical spring of conductive material surrounding at least a portion of each of said wires, and a incandescible filament electrically connected to said leads and adapted to become incandescent during the operation of said device and having a portion thereof clamped between adjacent turns of each of said springs.

3. In an electrical device comprising a bulb, the combination of a filament support in said bulb, a pair of leads, a helical spring extend-

ing over said support and an incandescible filament electrically connected to said leads and adapted to become incandescent during the operation of said device and having a portion thereof clamped between adjacent turns of said spring.

4. In an electrical device, the combination of a vitreous bulb having sealed therein a pair of leading-in conductors, a pair of conductive supports each electrically connected to said leading-in wires and extending into said bulb, a conductive helical spring having a portion thereof fitting over at least one of said supports and an incandescible filament adapted to become incandescent during the operation of said device extending between said supports and having at least one end portion thereof clamped between adjacent turns of said spring.

THEODORUS JOSEPHUS JACOBUS ALPHONSUS MANDERS.