Aug. 17, 1937. J. K. SPRAGUE 2,090,360

ELECTRICAL CONDENSER

Filed June 28, 1932

Fig. 1.

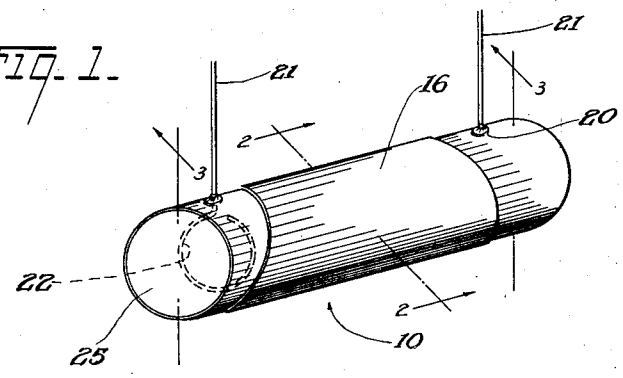


Fig. 2.

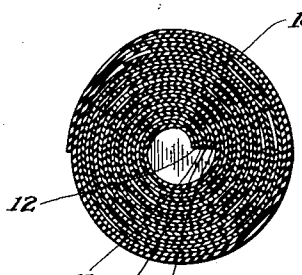


Fig. 3.

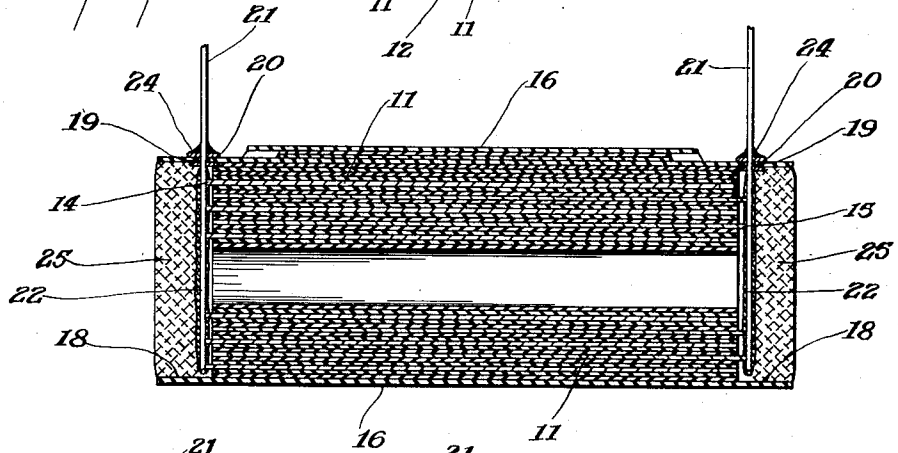
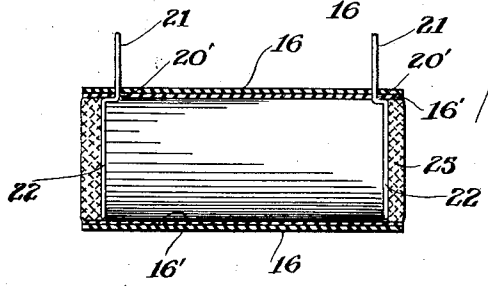


Fig. 4.



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ELECTRICAL CONDENSER

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3 Claims. (Cl. 175—41)

My invention relates to the construction of electric condensers and to a method and means for providing connections between the metal foils and the outer terminals of the condenser.

In condensers of the types most generally used there are provided two metal foils separated from each other by layers of insulating material; the metal foils and the insulating layers being wound together into a compact roll of cylindrical or rectangular shape. For electrical connection with the metal foils there are to be provided leading-out or terminal wires and while a great number of constructions have been suggested and used for this connection, these constructions are either not fully satisfactory or are complicated and expensive.

The object of the present invention is therefore to provide an efficient electrical connection between the metal foils of the condenser and the terminal leads, which is simple and easy to manufacture.

Another object is to provide means to mechanically strengthen the whole condenser assembly, which means at the same time assist to maintain proper electrical connection between the terminals and their respective foils.

A still further object is to provide means, whereby the terminals of the condenser are reenforced at the point of egress from the condenser assembly and are mechanically connected to the assembly independently of their connection with their respective foils.

A further object of the invention is to relieve the connecting point between the terminals and the metal foils from any mechanical stress which may be exerted on the free end of the terminal.

A further object of the invention is to provide a novel construction for a compact electrical condenser.

Further objects will appear as the description progresses.

My invention will be explained on hand of impregnated paper condensers, but it should be well understood that it is not limited to such condensers.

In the drawing forming part of this specification:

Figure 1 is a perspective view of a condenser embodying my invention.

Fig. 2 is an enlarged sectional view taken on a vertical plane through the lines 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view taken on a vertical plane through the lines 3—3 of Fig. 1.

Fig. 4 shows another construction of a condenser of my invention, with a different method of securing the terminal wires to the condenser.

The condenser 10 illustrated in the drawing, comprises two strips 11—11 of aluminum or other suitable metal foil having interposed one or more layers of paper or other insulating material 12—12 (two layers being shown in the drawing). The insulating layers are preferably impregnated with a suitable di-electric material, for instance paraffin. The metal foils with the interposed insulating layers are wound into a roll.

The metal foils 11—11 are displaced with respect to their corresponding edges (see Fig. 3) so that the outer edge of one foil extends beyond the insulating strips to the left as at 14, and the outer edge of the other foil extends similarly to the right as at 15. There is thus provided at each end of the condenser an uninsulated edge of each of the foils. While the sheets of the insulating layers 12—12 are wider than the foils forming the condenser, they do not extend beyond the edges 14 and 15, but the several sheets 12—12 align with each other edge for edge.

The outside terminals of the condenser are formed of wires 21—21 which may be for instance copper wires or tin-coated copper wires and are cut to convenient lengths. The wires 21—21 are shaped at one end to form circular loops 22—22 (see Figs. 1 and 3). These loops are connected to the edges 14 and 15 respectively by means of soldering 23—23. Thereby the loop surrounds the projecting edges 14 and 15 respectively, which together with the solder fill out the whole loop thereby contacting with the terminal wires 21—21 on a large area.

The condenser roll is then surrounded by a wrapper 16, preferably of thin fibre or other similar insulating material, which forms a strong protective outer shell for the condenser. The width of the wrapper 16 exceeds that of the condenser roll and forms on each end thereof hollow tubular extensions 18—18.

The extensions 18—18 surround the loops 22—22; holes 19—19 being provided in the wrapper through which the terminal wires 21—21 pass.

The tubular extension 18—18 is filled out with a suitable compound 25 in plastic or molten state, which upon hardening, substantially contribute to the mechanical strengthening of the condenser and also seals the condenser against moisture. Furthermore, the compound 25 also greatly strengthens the connection between the metal foils 11—11 and the loops 22—22.

On the outer side of the wrapper 16 and surrounding the wires 21—21 are provided eyelets 20—20 which are pressed against the wrapper 16 and the compound 25 and the wires 21—21 are soldered to the eyelets at the point of egress 24—24, whereby mechanical connection of great strength is established between the terminal wires 21—21 and the condenser assembly.

It should be noted that any mechanical stress or pull exerted on the wires 21—21 will be taken up by the whole condenser assembly at the point 24 without any stress being transmitted to the soldered contact between the foils 11—11 and the loops 22—22.

Another form of relieving the joints between the wires 21—21 and the foils from mechanical stress, consists of the provision of an auxiliary wrapper 16', as shown in Fig. 4. The wrapper 16' surrounds the condenser proper and is provided near to each end with small holes 20'—20', through which the wires 21—21 are passed. The holes 20'—20' are placed inwardly of the connections between the loops 22—22 and the respective foils of the condenser, whereby the wires 21—21 are bent inwardly and securely held by said auxiliary wrapper, after which they pass through the main wrapper 16, which is then wound and sealed about the condenser assembly.

From the foregoing it should be noted that my invention provides for an inexpensive, simple and compact condenser construction of great mechanical strength. Furthermore, it provides for a reliable connection between the metal foils and the outside terminals, which connection is altogether relieved of mechanical stress exerted on the free end of the terminal wire, and at the same time provides for a reliable low resistance electrical contact between the metal foil and the terminal wire.

While I have disclosed my invention in connection with paper impregnated condensers of the non-inductively wound type, it should be well understood that my invention is also applicable to other type condensers, for instance, dry electrolytic condensers, without departing from the spirit of my invention. I wish, therefore, my claims to be construed as broadly as permissible in view of the prior art.

What I now claim as new and desire to secure by Letters Patent is:

1. An electrical condenser comprising two metal foils and interposed layers of insulating material, wound to form a roll, said metal foils being displaced in respect to their corresponding edges, each metal foil extending with one edge beyond the insulating layers on opposite sides thereof, and terminal wires having looped ends soldered to the extending ends of the metal foils, and a wrapper of insulating material surrounding said roll and said looped ends, holes on said wrapper for the egress of the free ends of said wires, and eyelets surrounding said wires, said eyelets being soldered to said terminal wire and being in intimate contact with said wrapper.

2. An electrical condenser comprising two metal foils and interposed layers of insulating material wound together to form a roll, said metal foils having edges extending beyond the insulating layers, terminal wires soldered to said extending edges, and a wrapper surrounding said condenser roll and provided with holes for the passage of said wires, and means to fasten said wires to the wrapper at their points of egress.

3. An electrical condenser comprising two metal foils and interposed layers of insulating material wound to form a roll, each metal foil extending with one edge beyond the insulating layers, and terminal wires having looped ends soldered to the extending ends of the foils, a wrapper surrounding said roll and extending beyond its two ends, a compound hardened in situ in said extensions and pressing against said loops, holes in said wrapper for the passage of the terminal wires and eyelets surrounding said wires at their point of egress from the wrapper, said eyelets being in intimate contact with said wrapper and pressing against said compound and being soldered to said wires.

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