July 14, 1936. R. M. C. GREENIDGE 2,047,731

INDUCTIVE DEVICE

Filed March 2, 1934

FIG. 1

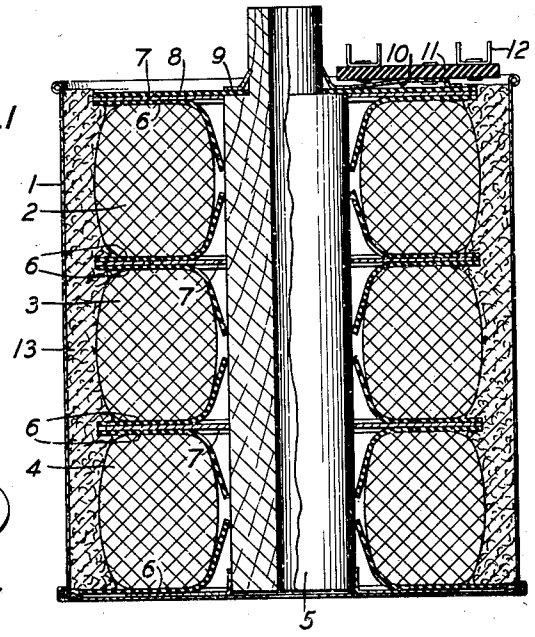
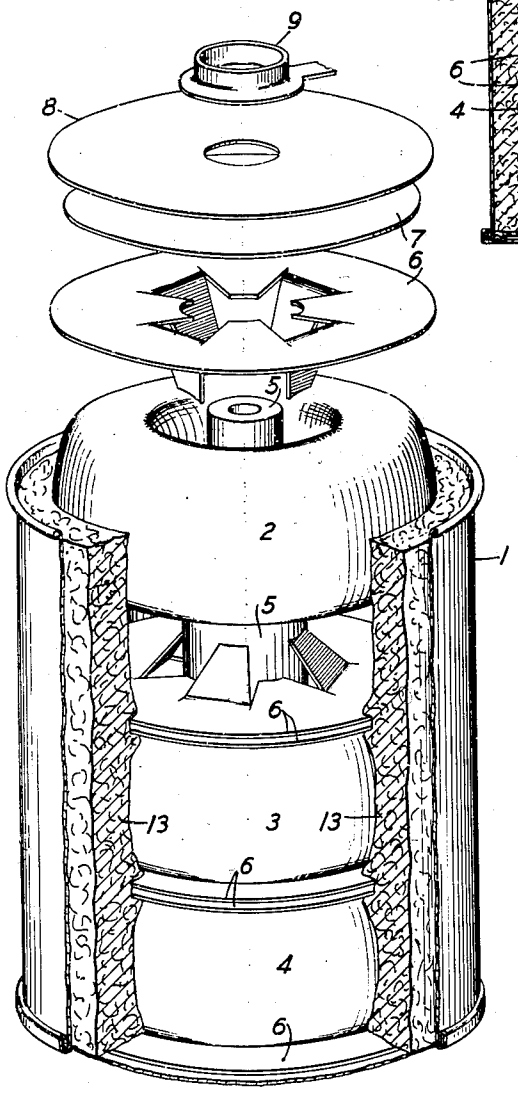



FIG. 2

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## INDUCTIVE DEVICE

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7 Claims. (Cl. 178—46)

This invention relates to inductive devices and more especially to the encasing or potting of such devices.

Inductive devices known as loading coils are very extensively used in the telephone art to load lines whereby transmission is improved. The individual coils are usually inserted in the lines at one point and the coils housed in a single member known as a loading coil case. It has been found very advantageous to be able to quickly and with little disturbance to other coils, remove individual coil from the case either for replacement or adjustment. One manner of accomplishing this has been to mount the coils horizontally in the cases and make them accessible through openings in the side of the case. That is, the practice is to pot three coils in one container which constitutes a unit and these units are mounted horizontally. The space in the cases not occupied by the units or their supports is filled with gas or air under pressure.

Under high temperatures the impregnating or insulating compound of the units becomes plastic and subject to cold flow and is likely to leak out of the container into the case. The loss of this compound may cause a shift in the position of the coils which in turn may cause a change in the characteristic of the unit due to a change in the dielectric from a compound to air or gas. The disadvantages incident to such conditions are well known.

The present invention has as an object an improved encased inductive device.

A related object is an impregnated inductive device from which the impregnating compound will not leak, even when in a plastic state.

A specific object is a loading coil unit in which the impregnating compound may become plastic but from which the impregnating compound will not leak, even when the unit is mounted horizontally.

These objects are attained by utilizing the capillary action of cotton batting. The coils, after being mounted, are wrapped in cotton batting and then inserted in the container. The impregnating compound is then introduced. With such an arrangement the compound will be retained in the container under extreme adverse conditions.

The invention will be better understood from the following detailed description and attached drawing forming a part thereof in which

Fig. 1 shows in partial section an assembled loading coil unit; and

Fig. 2 shows in partial section the container with certain of the elements partly removed therefrom to more clearly illustrate relation of the parts.

The container 1 is preferably a metal cylinder having a base which is liquid tight. The toroidal coils 2, 3 and 4 are mounted on a spindle 5 provided near its upper end with a shoulder as shown. This spindle is preferably a wooden cylinder but may be of any suitable material and shape.

Mounted on either side of coils 2, 3 and 4 are centering washers 6 provided with projecting tabs which press against the spindle to hold the coils in position. These washers are preferably of hemp-wood pulp insulation of sufficient thickness and strength to hold the coils in position. As shown, these washers are mounted relative to each coil so that the tabs project toward each other within the enclosure formed by the coil. Between the insulating washers are placed metallic washers 7.

Upon the topmost insulating washer 6 is placed one of the close-fitting metallic washers 7 and upon this is placed an insulating washer 8 which, however, is not provided with the projecting tabs. A metallic washer 9 shown only in Fig. 1 is staked to the spindle as shown. This washer may be provided with extension pieces 10 to which may be riveted a plate of insulating material 11 upon which are mounted terminals 12.

The coils, spindle and washers are first assembled and then wrapped in cotton batting, a layer of which is indicated at 13. In order to facilitate the insertion of this assembly into the container, a piece of wrapping paper may be wrapped around the cotton batting. This paper may be left in the container or withdrawn as desired.

After the coils, etc., are placed in the container, the unit is subjected to a process of heat and vacuum to eliminate any moisture that may be present. The unit is then impregnated with an insulating compound.

When in use the unit may be subjected to temperatures at which the insulating compound alone would flow freely and hence would leak from the container. Due to the capillary action of the cotton batting the composite insulating compound is retained in the container remaining stiff or rigid under such conditions even when the container is mounted in a horizontal position.

It is to be understood that various details of the construction as described may be modified within the scope and spirit of the invention which

is to be limited only as defined in the appended claims.

What is claimed is:

1. In combination a container means for protecting and insulating electrical apparatus, fibrous material within the container having dielectric characteristics and the characteristic of capillary action and fluid insulating material surrounding and supporting the electrical apparatus and retained in place by the material of capillary characteristics.

2. An inductive device comprising inductance coils of toroidal form, a spindle for mounting the coils, a metallic container for said coils open on a vertical face, fluid insulating means for the coils protecting the coils from the container and its surroundings, cotton batting used as a dielectric surrounding the coils in the container and retaining the fluid material sealing the container.

3. A container for irregularly shaped elements, the container being partially open on a vertical face, an element in the container, fluid dielectric surrounding said element and fibrous material packed around said element in the fluid to prevent escape of the fluid insulation from the open portion of the vertical wall.

4. A container for loading coils which are to be mounted to be ready for access for repair or adjustment, consisting of a cylindrical container constructed to rest on its side with a vertical wall partially open, coils mounted along its horizontal axis, a semi-fluid dielectric filling the space between the coils and the container and a fibrous material furnishing mechanical stability to the dielectric material and preventing loss of material through the opening in the vertical wall of the cylinder.

5. In combination with a telephone loading unit comprising a plurality of toroidal coils mounted on a spindle passing through the central opening in the coils, a container enclosing said coils and spindle and adapted to lie on its side with one end open, the space between the side walls of said container and the coils being filled with cotton batting impregnated with an insulating material that is capable of flowing at working temperatures, the capillary action of the cotton batting preventing the insulating material from flowing out of the open end of said container.

6. An electrical device consisting of irregularly shaped electrical elements the location of which, relative to one another, is critical, a container for the elements, a substantially uniform layer of fibrous material packed around the elements to center them in the container in predetermined relative positions and a plasticizable material binding and stiffening the fibrous material to reliably center the elements in the container in predetermined relative positions.

7. A container, irregularly shaped elements therein, fibrous means fitting around said elements and a stiffening binder consisting of a fluid compound of stable characteristics at any working temperature and adapted on warming to permit ready manipulation and removal of elements subsequent to any extended period of use.

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