

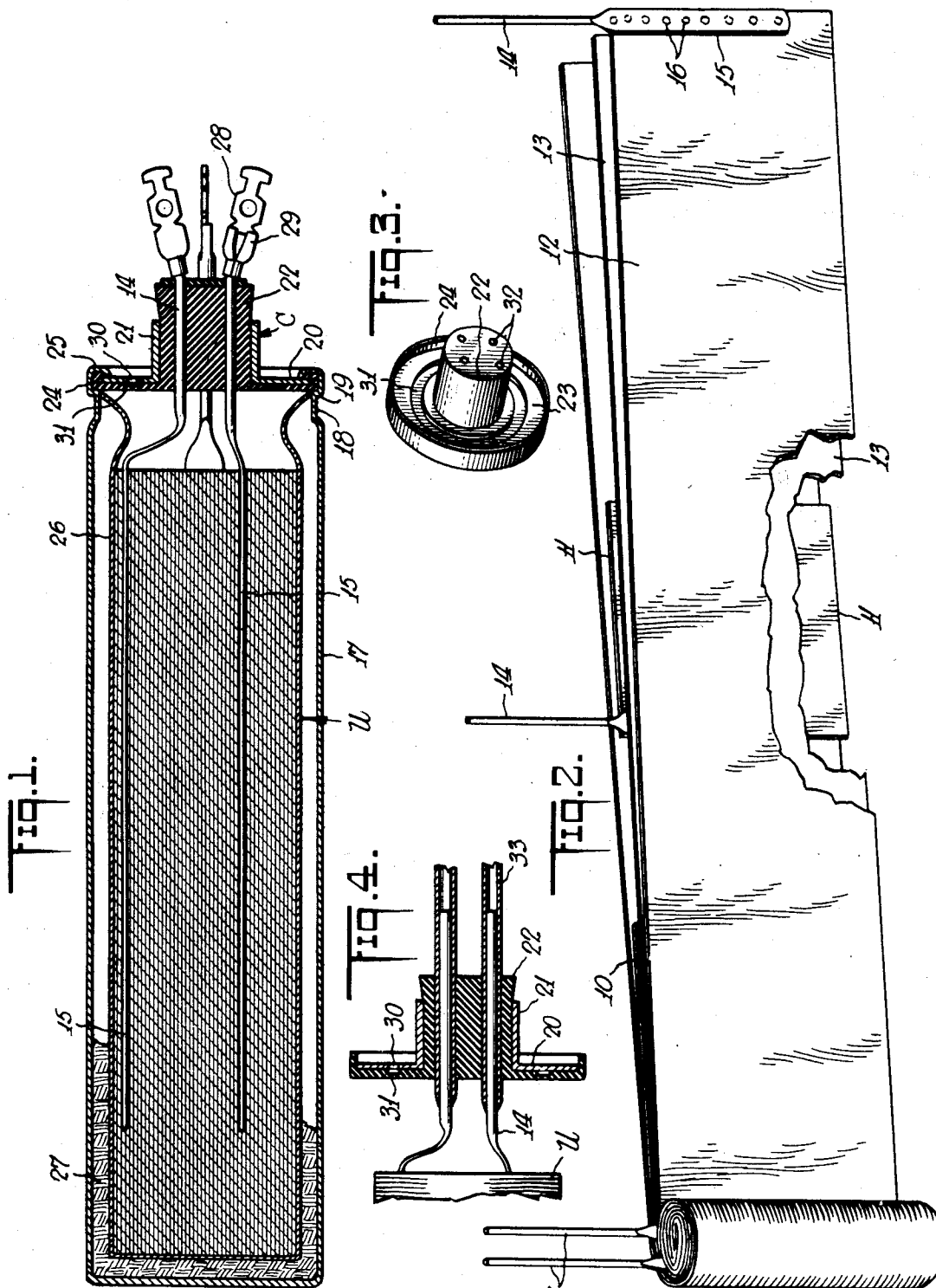
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ELECTRIC CONDENSER TERMINAL STRUCTURE

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ELECTRIC CONDENSER TERMINAL
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3 Claims. (Cl. 175—315)

My present invention relates more especially to multiple wound electric condensers and is shown in an application to such condensers of the so-called dry electrolytic type.

An object of the invention is to provide a condenser of the above type, in which a plurality of terminals of small compass are disposed in closely juxtaposed relation for compactness of construction with assurance of fluid-tightness thereof and yet without any likelihood of short-circuiting.

Another object is to provide a condenser of the above type in which, though the condenser is of thin foil, yet the exposed terminals are of sufficient ruggedness to dispense with the need for delicate manipulation in the assembly thereof.

In general, the invention involves the use of wire terminals for the various electrodes of the multiple wound unit, which electrodes protrude longitudinally through a compressed soft rubber plug lodged in the rigid neck of the can that houses the condensers unit.

One structural feature involves the wire terminals protruding from the several electrodes, each comprising a greatly thinned flattened length of flexible wire extending transversely of the corresponding electrode in direct contact therewith and connected thereto by spot welding, or equivalent means.

The method of assembly is made the subject of a divisional application, Serial No. 405,472 filed August 5, 1941.

In the accompanying drawing in which are shown one or more of various possible embodiments of the several features of the invention,

Fig. 1 is a view in longitudinal cross-section of a completely assembled condenser according to the invention,

Fig. 2 is a fragmentary view of the capacitative unit partially unrolled to reveal the construction of the wire terminal connections,

Fig. 3 is a perspective view of the soft rubber plug member, and

Fig. 4 is a cross-sectional view illustrating the method of assembly of the wire terminals in the condenser unit.

Referring now to the assembly shown in Fig. 1, it comprises a capacitative unit U of the multiple-wound type which in general is well known, the construction of which is illustrated in Fig. 2. This unit involves a plurality of shorter electrode foils, two of which are shown at 10 and 11, arranged in sequence and in mutually spaced relation and a longer electrode foil 12

which is complementary or common to each of the several shorter foils, an interspacer 13 intervening therebetween. In the application to ordinary electrostatic condensers, the interspacer of course would be of di-electric material such as oil or wax paper.

Each of the foils has a wire terminal 14 protruding therefrom. Each of said wire terminals has a portion of the length thereof rolled down to a flat thin flexible ribbon 15, but a few thousandths of an inch thick. The flattened area of the wire terminals is superposed over and in direct engagement with the corresponding electrode foil and extends transversely thereof. It is secured into a unitary structure with said foil by any appropriate means as, for instance, by spot welding as at 16.

In a preferred application to so-called dry electrolytic condensers, the shorter foils 10, 11 etc. are anodes of film-forming metal, preferably aluminum as are also the wire terminals 14, 15. Desirably the cathode 12 also is of aluminum. In such application the interspacer 13 of gauze, paper or the like is impregnated with an appropriate electrolyte of type well known to those skilled in the art and at least all of the shorter foils or alternatively the longer foil, where this serves as the anode, have an insulating film thereon, formed by any of the well known methods, to serve as the di-electric. The unit thus described is rolled together to form the capacitative unit or roll U shown in Fig. 1.

In the assembled condenser of Fig. 1, the unit is lodged in a metal container or can 17 preferably of aluminum, provided with a peripheral groove 18 affording a shoulder 19 near its rim upon which rests the rim of a cover unit C. The latter comprises a metal cover disk 20 with an upstanding central sleeve or neck 21 through which extends a soft rubber plug 22, held under compression thereby. The rubber plug 22 securely embraces the wire ends 14 of the several terminals which protrude therethrough.

Preferably the rubber plug has a thin flexible annular flange 23 in the plane of its lower end to rest upon shoulder 19 of the can, and presenting an upstanding outer rim 24 extending across and projecting above the rim of the cover flange 20. The rim of the can 17 together with the rubber rim 24 are crimped over against metal cover disk 24 as at 25 to complete the assembly.

Where, as is frequently the case, it is desired to assure insulation of the capacitative unit U with respect to the can 17, a sack 26 of insulating material is slipped over the capacitative unit and

its rim is interposed between the flange 23 of the rubber plug and the can, to be clamped in position thereat in the crimping operation previously referred to. If desired, a modicum of wax 27 or of pitch or the like may be introduced between the capacitative unit and the can to retain the same in position against shaking during transportation or in use.

Preferably terminal pieces 28 of more or less conventional construction are crimped as at 29 upon the protruding ends of the respective wire terminals to serve for connecting the condenser in circuit.

In practice, the capacitative unit should be hermetically sealed, which result is accomplished as heretofore described, by the compression of the soft rubber plug with respect to neck 21 and the wire terminals 14, and of the soft rubber rim 24 at 25 with respect to the can rim. To permit escape nevertheless of gas under abnormal pressure within the can, the flange 23 of the rubber plug has an annular greatly thinned area 31 and the flange 20 of the cover has vent holes 30 in registry therewith. The thinned area will puncture for venting at 30 under excessive pressure, thereby to protect the apparatus.

The method of assembly is illustrated in a general way in Fig. 4. The method briefly involves pre-assembling the soft rubber plug 22 into the neck 21 of the cover piece C as shown in Fig. 3, thereby placing the rubber of the plug under considerable radial compression. The rubber plug is provided with a number of longitudinal holes 32 therethrough of small diameter. These holes serve for the accommodation of the wire terminals.

For introducing the wire terminals into said rubber plug, hollow tapered metal tubes 33 are employed, of bore corresponding to the diameter of the wire terminals. These tapered tubes are introduced through the respective holes 32, as shown in Fig. 3, maintaining said holes spread, to afford tunnels into which the respective wire terminals 14 of the pre-assembled capacitative unit U may be readily introduced. Thereupon, the tubes are withdrawn from the rubber plug, and as a consequence, the rubber plug will snugly embrace the several wire terminals for a secure fluid-tight engagement. In the illustrative embodiment shown, four terminals, comprising three anode terminals and one cathode terminal, are accommodated in a rubber plug, whose diameter is but one-half inch. They are mutually spaced from each other by about $\frac{1}{4}$ " and so securely and rigidly embedded in the rubber plug that the possibility of a short-circuit is substantially non-existent.

By the construction set forth, a simple, inexpensive and most compact condenser assembly is afforded, with few parts, readily assembled by easy manipulation, requiring a minimum of direct handling and obviating the likelihood of tearing or breaking the thin delicate foil in the process of assembly.

Though the construction involves a plurality of terminals these are all applied simultaneously without the need for threading, screwing,

or soldering operations and yet assure fluid tight engagement throughout.

It will of course be understood that certain of the structural features disclosed have a wider field of application in apparatus other than electrical condensers, and this is especially true of the assembly method disclosed.

As many changes could be made in the above construction and method and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electric condenser structure comprising a metal can having a rim, a metallic cover therefor having a cylindrical neck, a soft rubber plug in said neck and having a flexible flange at the lower part thereof, crimped at its edge about said cover by the rim of said can, and a capacitative unit within said can, having wire terminals protruding through corresponding ports in said rubber plug, said plug being held under compression about said wire terminals by said neck.
2. A dry electrolytic condenser, comprising a multiple wound capacitative unit, including a series of consecutive spaced anode foils of film forming metal, a single cathode foil of length overlapping each of said anode foils, an electrolyte carrying interspacer, each of said anode foils having a wire terminal of like metal protruding therefrom, each of said terminals having a flexible flattened length thereof, extending transversely of said foil and directly bonded thereto, a wire terminal protruding from the cathode, a solid soft rubber plug having longitudinal ports therethrough, through which the respective wire terminals extend in mutually insulated relation, a metal cap having a neck encircling and compressing said rubber plug into tight engagement with the wire terminals, a metal container for the condenser having a peripheral shoulder near its rim, said rubber plug having a flexible lower rim encircling the rim of said cover, the rim of said container being crimped thereover to complete the assembly.
3. An electric condenser structure comprising a metal can having a rim, a metal cover therefor having a cylindrical neck, a soft rubber plug in said neck and having a flexible flange at the lower part thereof, a capacitative unit within said can having a sack of insulating material thereover, the rim of said sack and of said flexible flange being crimped at the edges thereof against said cover by the rim of said can, said capacitative unit having wire terminals protruding through corresponding ports in said rubber plug, said plug being held under compression about said wire terminals by said neck.

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