

CHEMICAL FORMATION CONTAINER

The present invention relates to an improvement in or relating to chemical formation containers for containing the lead wire terminals of electrolytic capacitors.

In a known arrangement (Fig. 7), a lead wire terminal 14 comprises a lead wire 13 and an aluminum wire 12 welded thereto, which aluminum wire 12 has a flattened section 11. It is necessary that an oxide coating is formed on the aluminum wire 12 as far as the joint between the aluminum wire 12 and the lead wire 13. In the chemical formation for that purpose use is made of a lead wire holder 36 having a plurality of lead wire terminals 14 inserted in its terminal-insertion holes 35.

The lead wire terminals 14 can be inserted in the holes of the lead wire holder 36 until their flattened sections 11 have been caught by the hole entrances of the lead wire holder 36, thus putting the ends of the flattened sections 11 of the lead wire terminals 14 in alignment on same level. Then, the lead wires 13 are pinched between the recess 37 of the lead wire holder 36 and the conductive brush of a pushing unit 38, which is connected to the positive terminal of an associated electric source 39. Another electrode which is connected to the negative terminal of the electric source 39 is immersed in the chemical formation liquid 41.

The conductive brush of the pushing unit 38, however, is liable to make poor contact with lead wires 13, thus disadvantageously causing incomplete chemical formation on the flattened sections 12 of such lead wires 13, causing appearance of electric sparks between lead wires 13 and the conductive brush, or causing the falling-off of lead wires 13 from the lead wire holder 36 because of insufficient pushing force applied to such lead wires. Also, disadvantageously the inserting of lead wires deep in the holes is a tedious work.

In an attempt to solve these problems use of a cup-like container of non-magnetic material is proposed (Japanese Patent Application Public Disclosure No.4-24,852). As shown in Fig.8, a plurality of lead wire terminals 14 are put in the cup-like container 42, and a magnet electrode member 43 is applied to the bottom of the cup-like container 42 to attract the lead wire terminals 14 to the bottom of the cuplike container 42. Then, the cup-like container 42 is turned upside down, and the flattened sections 11 of the lead wire terminals 14 thus suspended, are soaked in a chemical formation liquid.

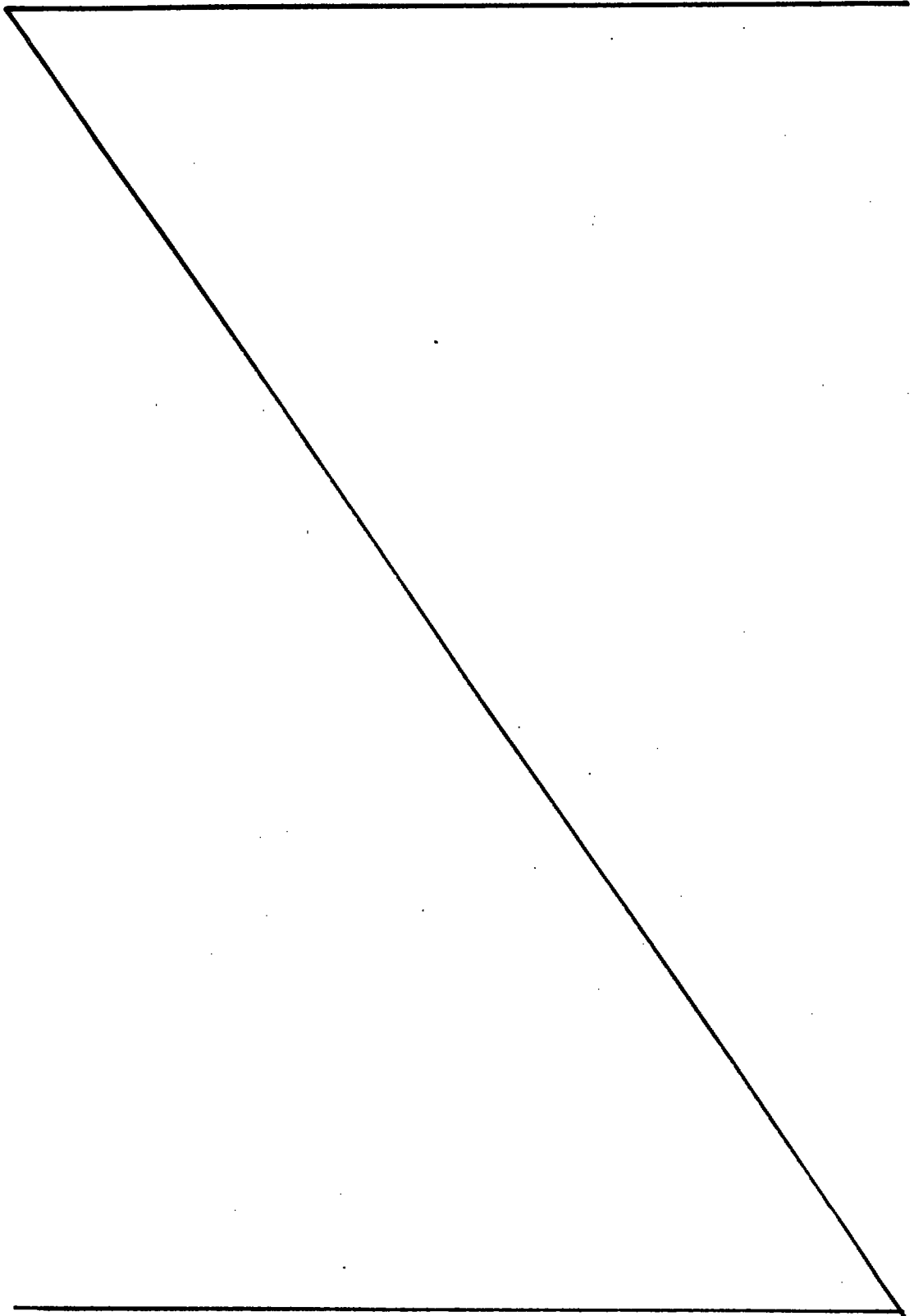
As described earlier, the lead wire terminal 14 comprises a thin lead wire 13 and a wide-flattened aluminum wire 12. Even if a plurality of lead wire terminals 14 are packed in the cup-like container 42 with their flattened sections put close to each other, the lead wires 13 of the lead wire terminals 14 cannot be close to each other, leaving relatively large intervals therebetween. Selected lead wire terminals 14 can be inclined among the other upright lead wire terminals in the cup-like container 42, as indicated at "A" in Fig.8. In this case the flattened section 11 of the inclined lead wire terminal 14 cannot be soaked in the liquid, and therefore, no chemical formation can be effected on the flattened section 11 of the inclined lead wire terminal 14.

In accordance with the present invention, a chemical formation container for containing the lead wire terminals of electrolytic capacitors, comprises a cylindrical container of non-magnetic material opening on its upper side, and a funnel-like baffle fitted in the cylindrical container with its reduced diameter end facing towards the bottom of the cylindrical container, whereby in use a magnetic force can be applied to the lead wire terminals through the non-magnetic bottom of the container to attract the lead wire terminals to the bottom of the container.

The present invention provides a cuplike container for use in chemical formation of lead wire terminals of

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electrolytic capacitors, preventing undesired inclination of lead wire terminals in the cup-like container to cause the disordering of the flattened sections of the lead wire



terminals in the container, thus preventing incomplete chemical formation of lead wire terminals.

Preferably, the bottom of the cylindrical container has drain apertures, and the baffle has notches made in the circumference of its reduced diameter end, the funnel-like baffle being fitted in the cylindrical container so that the drain apertures are around the reduced diameter end of the funnel like baffle, thereby permitting the draining of liquid from the inside to the outside of the cylindrical container through the notches and drain apertures.

In this case wash water can flow through the notches of the funnel-like baffle to be drained from the drain apertures of the bottom of the container without removing the lead wire terminals from the container, and therefore the handling is facilitated. The drain apertures in the bottom of the container are covered by the funnel-like baffle, and therefore, no lead wire terminals can pass through such drain apertures.

The funnel-like baffle may be fitted in said cylindrical container with its upper opening end of increased diameter fitted to the inner circumference of said cylindrical container and with its lower opening end of reduced diameter put on the bottom of said cylindrical container.

In this case, the funnel-like baffle is tightly fitted in the container, leaving no gap therebetween to allow the lead wire terminal to get in between the funnel-like baffle and the container. The lower opening end of the funnel-like baffle is laid on the bottom of the container, and therefore the magnetic force can be applied directly to the lead wire terminals through the non-magnetic bottom of the container to attract these lead wire terminals, and accordingly these lead wire terminals can be held steadily.

The funnel-like baffle may have an annular flange integrally connected to its upper opening end of increased diameter, said annular flange being fitted to the inner circumference of said cylindrical container.

The funnel-like baffle is press-fitted in the cylindrical container with its flange tightly fitted in the upper opening end of the cylindrical container. Thus, a chemical formation container of same size if equipped with such a flanged-funnel-like baffle can be used in subjecting lead wire terminals of decreased diameter to chemical formation. Cylindrical containers of same size can be used irrespective of the diameter of lead wire terminals to be subjected to the chemical formation, provided that brimless or flanged baffles are used to meet relatively large- or small-sized lead wire terminals, and compatible use of cylindrical containers of one and same size is advantageous to transportation and handling of containers because of no necessity of different handlings required for different sizes of containers.

Typically, the funnel-like baffle has a bottom plate integrally connected to its lower opening end of reduced diameter, thus giving a dish-like shape. This has the effect of increasing the strength of the baffle, and therefore, the baffle cannot be deformed when it is press-fitted in the cylindrical container, thus causing no gap to appear between the baffle and the cylindrical container, which gap would be caused by deformation of the baffle.

Preferably, the funnel-like baffle is made of aluminum so that containers can be made at a reduced manufacturing cost, and accordingly such containers may be disposable.

As the chemical formation container has a funnel-like baffle fitted therein, a plurality of lead wire terminals will be smoothly guided by the tapering wall of the funnel-like baffle so that these lead wire terminals may be converged and collected together, thus preventing inclination of selected lead wire terminals among the other upright lead wire terminals as is the case with the conventional cup-like container shown in Fig.8, and assuring that the aluminum flattened sections of the lead wire terminals are kept on same level, thereby permitting

all lead wire terminals to be soaked in a chemical formation liquid on same level, and eliminating the possibility of providing faulty lead wire terminals and accordingly improving the quality of chemical formation on the lead wire terminals.

Some examples of chemical formation containers according to the present invention are shown in accompanying drawings, in which:-

Fig.1 is an exploded view of a chemical formation container according to one embodiment of the present invention;

Fig.2 is a perspective view of a modification of funnel-like baffle;

Fig.3 is a sectional view of the chemical formation container of Fig.1, showing the manner in which the container is used;

Fig.4 is a sectional view of a chemical formation container using the funnel-like baffle of Fig.2;

Fig.5 is a sectional view of a chemical formation container using another modification of baffle;

Fig.6 shows, in section, the manner in which lead wire terminals are subjected to the chemical formation with the aid of the containers according to the present invention;

Fig.7 shows, in section, the manner in which lead wire terminals are subjected to the chemical formation with the aid of a conventional lead wire holder; and

Fig.8 shows, in section, the manner in which a conventional container is used, containing a plurality of lead wire terminals.

Referring to Fig.1, a chemical formation container 1 for containing the lead wire terminals of electrolytic capacitors according to one embodiment of the present invention comprises a cylindrical container 2 and a funnel-like baffle 3 to be press-fitted in the cylindrical container 2. The cylindrical container 2 is made of aluminum of non-magnetic material, and its flat bottom 4 has a plurality of drain apertures 5.

The baffle 3 has a funnel-like shape, and is made of aluminum of non-magnetic material. Its upper opening has a diameter equal to the inner diameter of the cylindrical container 2, and its lower opening circumference 6 has a plurality of notches 7. The funnel-like baffle 3 is press-fitted in the cylindrical container 2 to provide a chemical formation container 1.

As seen from Fig.3, a plurality of lead wire terminals 14 are put in the chemical formation container 1. Each lead wire terminal 14 comprises an aluminum wire 12 having a flattened section 11 and a lead wire 13 welded to the aluminum wire 12. These lead wire terminals 14 are put in the chemical formation container 1 with their lead wires 13 on the bottom of the container 1 and with their flattened sections 11 up above the container 1.

Referring to Fig.6, a set of such chemical formation containers 1 each having a plurality of lead wire terminals therein are turned upside down to be put on an elongated magnet electrode 21. Then, the magnet electrode 21 is connected to the positive polarity of an associated electric source 22. The lead wire terminals are attracted to the bottom of every container 1 by the magnet electrode 21, and therefore, these lead wire electrodes cannot fall off from each container 1. The lead wire ends of all lead wire electrodes 14 are attracted to the bottom of each container 1, and therefore, the flattened sections 11 are alligned on the same level.

All aluminum terminals 12 are soaked in a chemical formation liquid 24 in a vessel 23. The negative polarity of the electric source 22 is connected to the chemical formation liquid 24, and therefore, the soaked flattened sections 11 of the lead wire terminals 14 are subjected to chemical formation. These flattened sections 12 are alligned on the same level, and therefore, the flattened sections 12 are chemical-formed upto the same level. An associated mount 25 has screws 26 at its opposite ends, and the level on which the flattened sections 12 of the lead wire

terminals 14 are soaked in the chemical formation liquid 24 can be adjusted by driving these screws 26.

As may be understood from the above, a lot of lead wire terminals 14 can be subjected to chemical formation at an increased efficiency, and attraction of lead wire terminals 14 to the magnet electrode 21 assures that all lead wire terminals are arranged in good order, guaranteed free of incomplete contact and irregular holding, which may be causes for incomplete chemical formation.

The funnel-like baffle 3 is press-fitted in the cylindrical container 2, and therefore, a plurality of lead wire terminals 13 when put in the cylindrical container 2 may be smoothly guided along the tapering wall of the funnel-like baffle 3 so that these lead wire terminals are converged and collected together. Therefore, there can be no situation such as described in the conventional cylindrical container, in which situation one or more lead wire terminals are liable to be inclined between the other upright lead wire terminals in the cylindrical container, thus preventing all the lead wire terminals from being aligned on same level as seen from Fig.8. The funnel-like baffle 3 fitted in the cylindrical container according to the present invention assures that all the lead wire terminals can be aligned on same level, thereby permitting these lead wire terminals to be soaked in a chemical formation liquid on same level, assuring chemical formation of their flattened sections 14 upto desired level.

The wash water which flows in the cylindrical container 2 at the rinsing step will drain outside through the notches 7 of the lower circumference of the funnel-like baffle 3 and the drain apertures 5 of the bottom 4 of the cylindrical container 2. Thus, the rinsing can be performed without the necessity of removing the lead wire terminals 13. In the course of rinsing no lead wire terminals can pass through drain apertures 5 because the funnel-like baffle 3 covers such drain apertures 5.

The funnel-like baffle 3 is press-fitted in the cylindrical container 2, and therefore, the baffle 3 can be fixed to the container 2 without using any adhesive. Accordingly the assembling of the parts into a chemical formation container is facilitated. The upper circumference of the funnel-like baffle 3 is tightly fitted in the inner wall of the cylindrical container 2, leaving no gap to allow lead wire terminals to get in. The funnel-like baffle shape opens on its bottom side, permitting the lead wire terminals 14 to stand directly on the bottom 4 of the cylindrical container 2, and therefore, the magnet electrode 21 can apply its attractive magnetic force to the ends of these lead wire terminals 13 through the bottom 4 of the cylindrical container 2. Accordingly, all the lead wire terminals can be held steadily.

There are lead wire terminals of different sizes to meet different types of electrolytic capacitors. In case that lead wire terminals of reduced diameter are subjected to the chemical formation process, a funnel-like baffle having an annular spacer 31 integrally connected to its upper circumference may be advantageously used in place of the brimless funnel-like baffle described above. Cylindrical containers of same size can be used to contain lead wire terminals of different sizes simply by changing brimless baffles for flanged baffles or vice versa. This permits general use of cylindrical containers of one and same size for containing lead wire terminals of different sizes, and the compatible use of same size of cylindrical containers is advantageous from the point of manufacturing and handling view.

The whole of chemical formation container 1 is made of aluminum, and it can be made at a reduced cost, compared with materials other than aluminum. Accordingly such aluminum chemical formation containers 1 are appropriate for mass consumption. However, cylindrical containers 2 can be made of non-magnetic materials other than aluminum. Funnel-like baffles 3 or 32 need not be electrically

conductive so as to provide electric passages during chemical formation, and therefore, they may be made of plastic or any other dielectric materials.

Fig.5 shows a modification of baffle 51 in the form of dish, which is composed of a funnel-like baffle having a bottom 52 integrally connected to its lower circumference. In this case the funnel-like shape is enforced with its bottom plate 52, thereby preventing deformation of the baffle 51 when press-fitted in the cylindrical container 2. Such gap as would be caused by deformation of the baffle press-fitted in the cylindrical container cannot appear between the baffle 51 and the inner wall of the cylindrical container 2, and therefore, there is no fear for allowing lead wire terminals to fall in such undesired gaps between the baffle and the cylindrical container.

In this particular embodiment the chemical formation container 1 has a baffle 3 and drain apertures 5, but it may have only a baffle 3.

As may be understood from the above, a chemical formation container according to the present invention has a funnel-like baffle press-fitted in its cylindrical container, and therefore, a plurality of lead wire terminals can be smoothly guided along the tapering wall of the funnel-like baffle to be converged and collected together, thereby guaranteed free of the disordering of the lead wire terminals as may be caused in the conventional cylindrical container of Fig.8, and putting the flattened aluminum sections of all lead wire terminals in good alignment on same level, thus permitting the soaking of these lead wire terminals upto desired level in the chemical formation liquid with the result that incomplete chemical formation cannot be caused, providing few faulty products.

The notched funnel-like baffle covers the drain apertures of the bottom of the cylindrical container while communicating the inside of the funnel-like baffle to the inside of the cylindrical container through the notches of

the funnel-like baffle, thus permitting the draining of wash water out of the cylindrical container through the notches of the funnel-like baffle and the drain apertures of the cylindrical container at the rinsing step without the necessity of removing the lead wire terminals from the container. Thus, the necessary rinsing can be performed well with the lead wire terminals remaining in good order in the container. The drain apertures are covered by the funnellike baffle, and therefore, there is no fear for permitting lead wire terminals to pass through such drain apertures.

**CLAIMS**

1. A chemical formation container for containing the lead wire terminals of electrolytic capacitors comprising a cylindrical container of non-magnetic material opening on its upper side, and a funnel-like baffle fitted in the cylindrical container with its reduced diameter end facing towards the bottom of the cylindrical container, whereby in use a magnetic force can be applied to the lead wire terminals through the non-magnetic bottom of the container to attract the lead wire terminals to the bottom of the container.
2. A chemical formation container according to claim 1, wherein the bottom of the cylindrical container has drain apertures, and the baffle has notches made in the circumference of its reduced diameter end, the funnel-like baffle being fitted in the cylindrical container so that the drain apertures are around the reduced diameter end of the funnel-like baffle, thereby permitting the draining of liquid from the inside to the outside of the cylindrical container through the notches and drain apertures.
3. A chemical formation container according to claim 1 or claim 2 wherein the funnel-like baffle is fitted in the cylindrical container with its upper opening end of increased diameter fitted to the inner circumference of the cylindrical container and with its lower opening end of reduced diameter put on the bottom of the cylindrical container.
4. A chemical formation container according to any of the preceding claims wherein the funnel-like baffle has an annular flange integrally connected to its upper opening end of increased diameter, the annular flange being fitted to the inner circumference of the cylindrical container.
5. A chemical formation container according to any of the preceding claims wherein the funnel-like baffle has a bottom plate integrally connected to its lower opening end of reduced diameter, thus giving a dish-like shape.



6. A chemical formation container according to any of the preceding claims wherein the funnel-like baffle is made of aluminum.
7. A chemical formation container for containing the lead wire terminals of electrolytic capacitors substantially as hereinbefore described with reference to any of the examples shown in Figs. 1 to 6 of the accompanying drawings.