Oct. 11, 1932. F. E. HEATWOLE 1,882,587

MEANS TO IMPROVE CONDUCTIVITY

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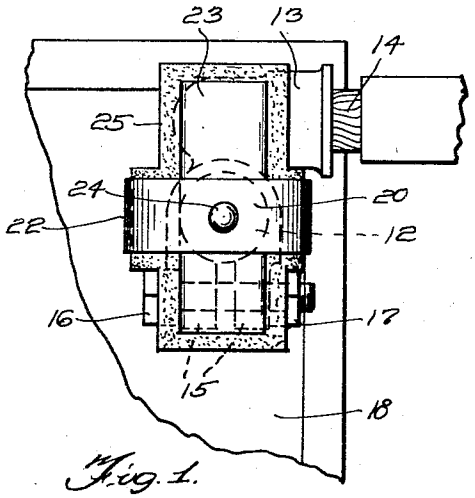


Fig. 1.

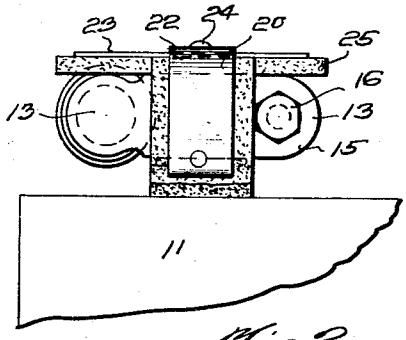


Fig. 2.

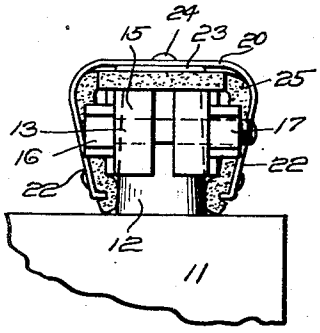


Fig. 3.

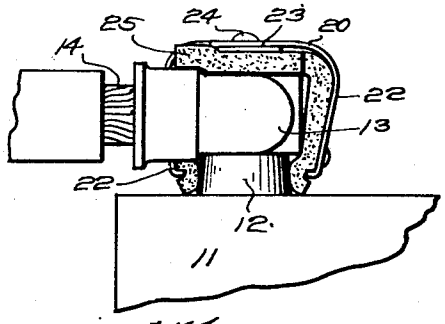


Fig. 4.

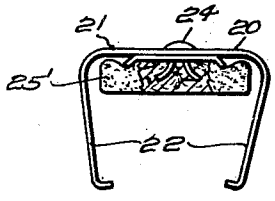


Fig. 5.

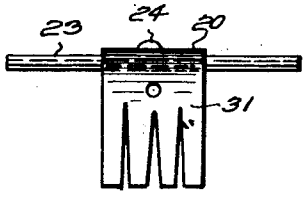


Fig. 6.

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MEANS TO IMPROVE CONDUCTIVITY

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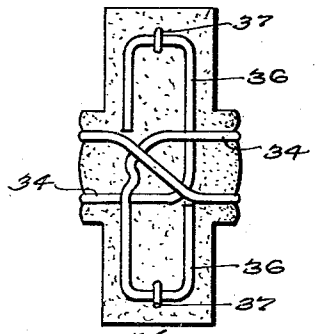


Fig. 7.

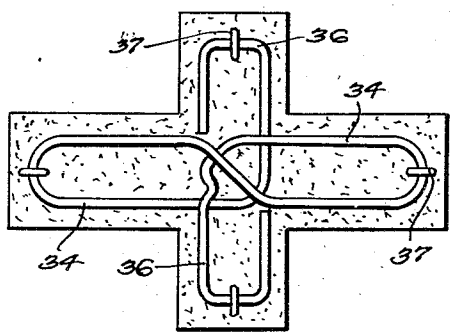


Fig. 8.

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Patented Oct. 11, 1932

1,882,587

UNITED STATES PATENT OFFICE

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MEANS TO IMPROVE CONDUCTIVITY

Application filed January 22, 1931. Serial No. 510,545.

The invention relates to means for preventing corrosion of terminals of electrolytic apparatus, and improving the conductivity of connections at such terminals. It has for an object to present an improved form of clasp-attached pad or wick for terminals, to be impregnated with petroleum jelly or other material which will spread upon the surfaces of the terminal and protect them from moisture. It is an aim to so construct the device that the clasp or parts carried thereby will press all parts of the wick effectively upon and around the terminal. Another special aim is to so arrange the parts that the clasp or other metal parts will be out of contact with the terminal.

Additional objects, advantages and features of invention reside in the construction, arrangement, and combination of parts involved in the embodiment of the invention, a few of many possible forms thereof being illustrated in the accompanying drawings, wherein,

Figure 1 is a top view of one embodiment of the invention,

Figure 2 is a side view from the left of Figure 1,

Figure 3 is an elevation from the right of Figure 2,

Figure 4 is an elevation from the left of Figure 2,

Figure 5 is an end view of the clip without felt at the sides,

Figure 6 is a side view of a modified form of clip,

Figure 7 shows my invention utilizing a clip formed of wire,

Figure 8 is a view of the last named clip in plan with the side arms opened out.

There is illustrated the upper part of a battery 11 of a familiar form, the terminal binding post 12 (of lead) being shown. On this there is engaged a familiar terminal lug or clamp 13 having the end of a cable 14 connected thereto. The top of the post 12 ordinarily stops flush with the top side of the clamp, but in some cases stops below, and in others projects slightly above the clamp. The clamp lies spaced above the top of the cover 18 of the battery cell, the post 12 extending through this cover and having a gummy substance sealing the joint around the post.

In one form, my invention involves the use of a clip 20 of resilient sheet metal, and will not be liable to corrosion, owing to the protective effect of the device itself.

The clip 20 includes a substantially U-shaped central clasp member 21 having arms 22 spaced so as to engage and press against the sides of a clamp 13 when the clip is introduced from above. For this reason the bases of the arms of the clasp are spaced at their bases amply to lie in spaced relation to the clamp, but when disengaged are convergent, so that they require to be sprung apart in order to receive the clamp. A top plate 23 is laid within the bight of the clip and secured by a single rivet 24 so that the plate 23 may pivot on the clip. The plate 23 is of a length equal to that of the clamp 13 and approximately of the same width as the clamp, its longitudinal edges being down-turned slightly for a purpose to be explained. The device may be formed in one piece if desired.

In Figures 1 to 5 the extremities of the arms 22 are inturned abruptly so that when in use the inturned ends are slightly below the clamp 13, and the inturned parts project from the arms 22 about the thickness of the arms 15 of the clamp 13. The rivet 24 also may be utilized to hold within the device a thick body 25 of felt, substantially in the shape of a maltese cross, the two side arms of the felt lying against the arms 22 of the clip, while the other two portions lie under the ends of the plate 23. The side arms of the felt may be secured to the arms 22 to prevent displacement of the felt while being put in place on a terminal. The side portions of the felt extend beyond the ends of the arms 22 so that when the device is engaged on a battery terminal, the lateral extremities of the felt are pressed in and against the post 12. The clip is thus insulated from the terminal, and my appliance serves as a protector against short circuits.

In the use of this appliance, the felt portion is saturated with petroleum jelly or a heavy lubricating oil, after attachment to the

clip, although it may be done before if found advantageous. The complete device is then positioned over the battery terminal with the arms of the clip extending downward and the plate 23 alined with the medial longitudinal line of the clamp 13. One arm 22 and its felt are then presented against one side of the clamp midway of the clamp while the clip-device is pressed toward the other side of the clamp with sufficient force to open the clip and permit the arms of the clip to pass downward on opposite sides of the clamp. The device is then forced downward until the longitudinal felt portion is pressed firmly against the top of the clamp and the top of the binding post 12. The lateral portions of the felt will extend downwardly against respective sides of the clamp, and the extremities of these lateral portions will be pressed against the lower part of the post 12 by the inturned ends of the clip arms 22.

The downturned longitudinal edges of the plate 23 cause the felt to conform and fit to the clamp at the sides, and to distribute the material in the felt to the surfaces of the post and clamp more effectively. With the device in place as described there is a gradual percolation and spreading of the material over the surfaces of the clamp and post 12.

In Figure 5 the clip device is shown as having arms 22 without the felt inwardly thereof, and this will be found sufficient in some instances, although it is thought that for the best results the felt should also extend down the sides of the clip. This device is otherwise constructed the same as the first described form of the invention.

The modification shown in Figure 6 shows the side arms 31 of the clip formed without the inturned lower ends, which may be found desirable. The arms of this clip may also be slitted longitudinally from the extremity a distance, one or more slits being formed so that the inwardly pressing arms may adjust and conform themselves to the contours of the clamp 13.

Figures 7 and 8 illustrate the construction of the clip device from a single piece of wire. In this instance a suitable length of resilient wire is used. One end portion is bent at a point inwardly of its middle to bring the inner and outer parts into parallel relation spaced less than the width of the longitudinal felt portion and forming a loop 34, the middle portion of the wire being bent so as to extend diagonally across the axis of the loop in the same plane, and its other end portion bent to form a second loop 34 oppositely extended in the same plane as the first. The ends of the wire are then bent so as to extend across the axis of the loops in opposite directions, and the extremities bent to form hook-like loops 36 at respective sides. The loops 34 are adapted to form clip arms when bent downward and inward from points spaced more than the width of the clamp.

The extremities of the wire may stop short of the middle portion of the wire, or may be extended and connected to some inner part of the wire in order to give greater strength, to the clip arms. The lateral loops 34 are bent downward as explained, and the length of their outer parts should be greater than the vertical dimension of the clamp where engaged with the post 12, so that by reason of the circular form of the central part of the clamp, it may press outward between the sides of the loops 34 and the lower parts of the loops thereby permitting to swing under the clamp. The felt for use with the wire clip may be a simple oblong quadrangle without parts to extend within and beside the loop arms 34, but is preferably in cross-shape, so that lateral felt portions are provided the same as in the first described form of the device. In the latter case, the bights of the loops 34 will hold the felt material against the post 12 below the clip, as will be understood. The felt may be secured to the wire clip by means of staples 37 at suitable locations, or otherwise.

If desired, the wire element instead of being resilient so as to be retained by resilient compression of the clamp between the loops 34 and 36, may be of pliable manually deformable, non-resilient material, so that it will retain any shape into which it is bent, and the felt would be retained by presentation upon the terminal and bending of the wire under or around parts of the clamp or other terminal parts to be retained by the moderate resistance of the wire to deformation.

If desired, also, the material in the felt may have an intermixture of graphite, or small particles of any metal, which, working into the space between the post 12 and clamp 13 will perfect electrically conductive contact over a wider area, and thus reduce resistance. The small metal particles, if sharp, will effect a bridging of the space between the post and clamp and effect metal-to-metal contacts.

I claim:—

1. A clip device for the purposes described, comprising a resilient wire member having end portions bent inwardly to form loops, the extreme inbent end portions being extended laterally of the medial line of the loops and recurved to form lateral loops, the outer parts of the lateral loops being bent into convergent relation for the purposes described.

2. The structure of claim 1 in which a wick is secured to the clip at the inner side having a portion alined with the first named loops and of a width and length greater than that of the first named loops, the length and width of the loops being proportional to the size and shape of terminal elements to be engaged.

3. The structure of claim 1 in which a cross-shaped flat wick is secured to the inner side of the clip having one member alined with each loop named, each member of the wick being wider and longer than the respective loop, the lengths and widths of the loops being proportional to the sizes and shapes of parts to be engaged.

4. A device for applying corrosion prevention material to battery terminals and the like comprising a substantially U-shaped clasp of resilient material, a plate on the bight of the U-shaped part and projecting at each side thereof, and a wick piece extended beneath said plate and arranged to be held by the plate snugly down upon a terminal engaged by the clasp.

5. A device for applying corrosion preventing materal to battery terminals and the like comprising a substantially U-shaped clasp of resilient material, its extremities being inturned a distance to engage under a battery post clamp or the like, a plate extending transversely of the bight of the U-shaped part, and a cross-shaped wick having two arms laid within those of the clasp and two arms beneath said plate in alinement therewith.

6. The structure of claim 5 in which the wick portions within the clasp project beyond the ends of the arms of the clasp and holds all parts out of contact with the terminal when engaged.

7. The structure of claim 4 in which the wick has portions within and projecting longitudinally of the arms of the clasp, the wick portions being extended sufficiently to hold all parts of the clasp and said plate out of contact with the terminal when engaged.

8. A cap for the terminal posts of storage batteries, an absorbent material carried by the cap and extending therefrom and means carried by the cap for simultaneously securing it to the terminal posts and pressing the extended area of the absorbent material against the posts.

In testimony whereof I affix my signature.

FLOYD E. HEATWOLE.