C. W. HAZELETT.

STORAGE BATTERY TERMINAL.

APPLICATION FILED NOV. 3, 1916.

1,338,130. **Patented Apr. 27, 1920.**

Fig. 1

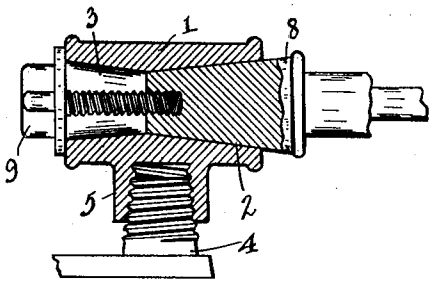


Fig. 3

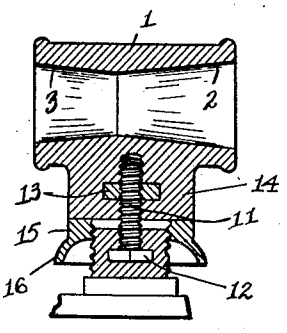


Fig. 2

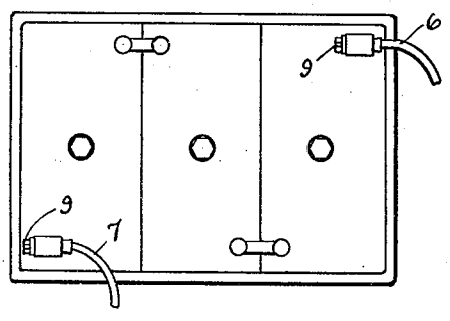


Fig. 4

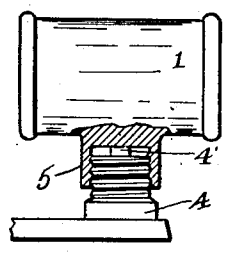


Fig. 6

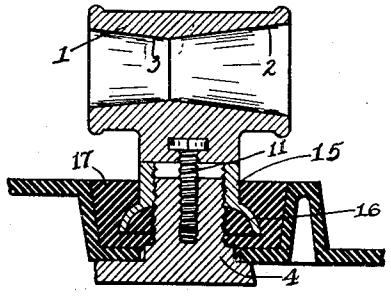
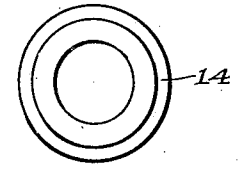


Fig. 5



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STORAGE-BATTERY TERMINAL.

1,338,130. Specification of Letters Patent. Patented Apr. 27, 1920.

Application filed November 3, 1916. Serial No. 129,343.

To all whom it may concern:

Be it known that I, CLARENCE W. HAZELETT, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Storage-Battery Terminals, of which the following is a full, clear, and exact description.

This invention relates to connections for storage battery terminals.

As is well known, a storage battery of the portable kind consists of a plurality of individual cells contained usually in rubber jars which are held in a box of wood or some other appropriate material. While my improvement can be used to connect adjacent cells together, it is particularly adapted for use with the terminals of the battery connected to flexible cables, and it will be described, by way of example, in such connection.

Referring to the drawings:

Figure 1 is a sectional view of a connector or terminal embodying my invention.

Fig. 2 is a plan of a battery assembly embodying the improved form of terminal.

Fig. 3 is a sectional elevation of a preferred form of connector which is a variation from that shown in Fig. 1.

Fig. 4 is an elevation of a modification.

Fig. 5 is a top view of the protecting nut shown in Figs. 3 and 6.

Fig. 6 is a section of a modified form.

Referring to Fig. 1, my improved form of terminal consists of a sleeve member 1 which is pierced by a hole having the form of a frustum of a cone. While the invention is not limited to this construction, I prefer to form such hole into two frustums 2 and 2, with the larger bases at the outside. Preferably one of the conical recesses, Fig. 3 for example, is of smaller altitude than the other. This is to permit its being used either as a positive or a negative terminal on those cells having the two terminals of different sized cones.

To permit the terminal being rotated into any position, I secure it to the plate post 4 in such a way that the vertical axis of the post passes through the horizontal axis of the sleeve portion 1 as shown clearly in Figs. 1 and 2. To accomplish this result I form a depending portion 5 on the sleeve and thread this with threads of coarse pitch onto post 4 which has threads of similar pitch, the post 4 preferably being tapered to make a yielding connection.

Assuming that the connection is to be used on a battery having the negative terminal 6 (Fig. 2) with a smaller cone than that of the positive terminal 7, and having the cables leaving the battery in the direction indicated in Fig. 2, then to assemble the connection on the positive post the terminal will be screwed down onto the tapered post 4 until it is tight enough to form a good connection, and then it will be swung further, if necessary, in the arc of a circle to bring the large cone 2 facing toward the right in Fig. 2. This additional movement is permitted since the portion 5 and plate post 4 are tapered as shown in Fig. 1 and are made of hard lead which is more or less pliable. When the right position has been secured for the terminal connection, the end 8 of the cable 7 (Figs. 1 and 2) is placed in the socket of the connector and is clamped tightly in position by a screw 9 as clearly shown in Fig. 1.

To assemble the improved form of connection on the negative post, it will be turned down on the plate post 4 until it faces with the small portion 3 toward the right in Fig. 2 and is tight enough to make a good electrical connection. The negative terminal is then assembled in the way previously described.

Instead of tapering the portion 5 on post 4 to permit adjusting the sleeve member to suit the cable position, I may form a small button 4′ on top of the post. This being smaller than the post, will compress without stripping the threads and thus give the adjustability desired. This button could of course be formed on the sleeve member or it can be a separate piece placed on top of the post just before the connector is screwed on.

It will be seen from the previous description that my connection is universal in regards to its being capable of receiving either the negative or the positive cable end, and can be turned in any direction without interfering with the battery box or vehicle tray. This is due to the fact that the center of the plate post passes substantially through the center of the sleeve connection, or is symmetrical thereto, whereas in prior types the axes do not have this relation.

In practice it will of course be understood

that the screw 9 will be formed of some material such as brass having a non-corrodible coating such as a plating of hard lead.

While the connection previously described sets forth my invention broadly and is adapted to be used without further modification, I nevertheless prefer the form shown in Fig. 3. In this case the plate post has a right hand screw 11, preferably brass, with a head 12 cast therein. The sleeve member 1 has a brass nut 13 cast in the projection 14, the nut and projection being drilled and threaded to receive the screw 11. While it is possible to have enough friction between the screw and sleeve member to enable the connector to be held rigidly in any position, it would not make a neat looking connection and furthermore, would expose the brass screw to the corroding action of the electrolyte. I therefore prefer to thread the plate post 4 exteriorly with left hand threads of coarse pitch, and fit thereon a protecting nut 15. After the connector has been screwed into position in the plate post and is properly alined in respect to either of the cable connections 7 or 6, I screw upward the nut 15 until it firmly abuts against the bottom portion of the connector sleeve. This nut not only protects the internal brass screw and gives a better looking connection, but it also locks the connection in any desired position on the plate post.

By forming right hand threads on the screw member and left hand threads on the adjusting and protecting nut, I secure a connection that requires the use of only one wrench or pair of pliers. If both of these were of similar thread, *i. e.*, both right handed or both left handed, then it would be necessary to hold the sleeve member 1 while tightening the adjusting nut 5 or vice versa. With my improvement however, the sleeve member can be rotated to the desired position and then the adjusting nut can be screwed up tightly against the sleeve member without holding the latter, as it cannot rotate in the same direction without meeting an increased frictional resistance. In a similar manner the sleeve member can be tightened without holding the nut 5.

The cable 6 will be connected in such a way as to tend to rotate the sleeve counter clockwise and this will prevent the connection coming loose. Also, if desired, a prick punch may be used to jam the nut and sleeve together at one or more points to prevent loosening.

While the adjusting and protecting nut 15 may be of any shape, I prefer to make it with a depending skirt 16 which flares outwardly sufficiently to permit pitch or analogous material 17 to flow around it in such a way as to prevent acid from creeping up the terminal.

The modification shown in Fig. 3 may have a plain socket connection adapted to fit one type of terminal only, but I prefer to make the hole as shown, of double conical contour to receive either a negative or a positive connector.

In Fig. 6 I have shown a modification which differs from that shown in Fig. 3 by virtue of its having the screw cast in the sleeve member instead of in the post.

It will be understood from the description of my improvement that the connector is a universal one, permitting of the attachment of either a positive or a negative terminal and allowing the cable to be attached from any direction. The connection is also a neat one and to all appearances is an integral casting with the plate post. The latter is an important advantage, as the average owner of a portable storage battery is incompetent to take the battery apart and do any repair work. The advantage of the burned-on connection is due to the fact that it is of such nature that the average user cannot remove it. With my type of connection the service station or repair men can very readily remove the terminal without the use of a blow torch, giving the advantage of the burned-on connection with none of its disadvantages. When the repairs are made with my improvement, the connection can be screwed back into position and still have the appearance of a burned-on or integrally cast connection.

With the connector, cable terminal and screw proportioned as I have shown them in the drawings, it is impossible to fit the negative terminal in the negative socket and therefore when the cable direction is fixed, as in almost all automobile arrangements, it is impossible to remove the battery and replace it in the wrong position.

Having described my invention, what I claim is:

1. In storage batteries, a threaded plate post, an adapter having a double conical sleeve member for receiving a cable connection and a threaded portion secured to said member and adapted to co-act with the threads on the post, the axis of said post intersecting the axis of the sleeve at its center, whereby the adapter is symmetrically arranged in respect to the post and can be rotated thereon within a circle of minimum radius.

2. In storage batteries, a threaded plate post, an adapter having a double conical sleeve member, a cable terminal having a screw threaded portion, said terminal having a tapered end adapted to be fitted into either opening of the double conical sleeve, means coöperating with the threaded portion of the cable terminal to fasten said terminal in either end of the sleeve, and a threaded portion secured to said sleeve member adapted to co-act with the threads of

the post, the axis of said post intersecting the axis of the sleeve at its center, whereby the adapter is symmetrically arranged in respect to the post and can be rotated thereon within a circle of minimum radius.

3. In storage batteries, a plate post having an outer and an inner threaded portion, an adapter having a sleeve member for receiving a cable connection and a threaded member adapted to co-act with said inner threaded portion, and a nut threaded on the outer portion of said plate post and adapted to abut against the lower part of said sleeve.

4. In storage batteries, a plate post having a threaded exterior and a threaded projection, an adapter having a sleeve member for receiving a cable connection and a threaded hole adapted to receive said projection, and a nut threaded on the exterior of said plate post and adapted to abut against the lower part of said adapter.

5. In storage batteries, a plate post having a threaded exterior and a screw projection, an adapter having a sleeve member for receiving a cable connection and a nut adapted to receive said screw projection, said sleeve having a negative and a positive terminal socket and a second nut threaded on the exterior of said plate post.

6. In storage batteries, a plate post having a threaded exterior and a projecting screw cast therein, an adapter having a sleeve member for receiving a cable connection and a nut cast therein adapted to receive said screw, and a second nut threaded on the exterior of said plate post and adapted to abut against the lower part of said sleeve, said second mentioned nut having an outwardly flaring skirt adapted to be surrounded by sealing material.

7. In storage batteries, a connector having a threaded portion, a plate post having threads adapted to co-act with said portion to screw the connector and post together, said post having an exterior threaded portion, one of said portions having right hand threads and the other portion left hand threads, and a nut adapted to screw onto said exterior portion.

8. In storage batteries, a connector having a member with right hand threads, a plate post having a projection adapted to screw into said member and having left hand threads on its exterior, and a nut adapted to screw on said exterior and to form a self locking adjustable shoulder for said connector.

In testimony whereof, I hereunto affix my signature.

C. W. HAZELETT.