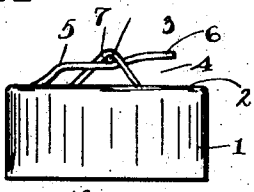
A. H. HAEFELE.

BATTERY TERMINAL.

APPLICATION FILED JAN. 23, 1914.

1,377,126. **Patented May 3, 1921.**

Fig. 1



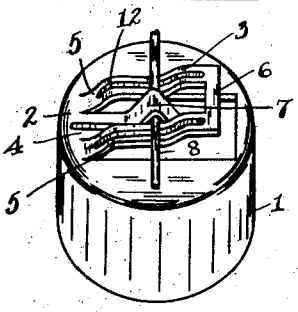
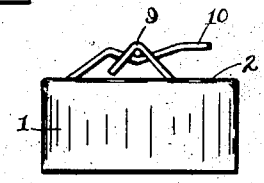


Fig. 2.

Fig. 3.



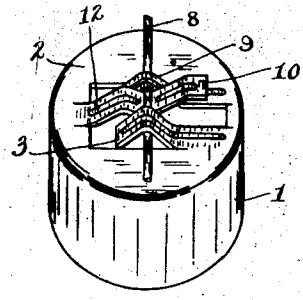


Fig. 4.

Fig. 5

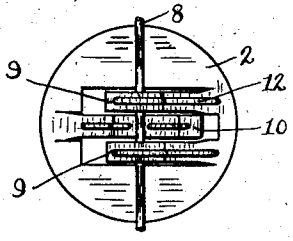


Fig. 6

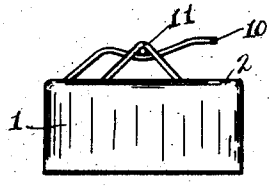


Fig. 7

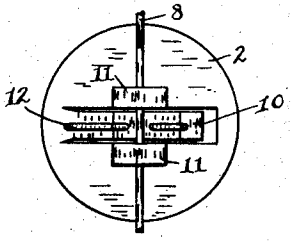
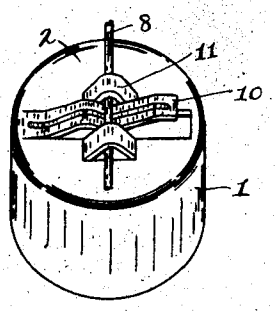


Fig. 8



INVENTOR.

ALBERT H. HAEFELE

BY Ira J. Adams.

ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT H. HAEFELE, OF LAKEWOOD, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL CARBON COMPANY, INC., A CORPORATION OF NEW YORK.

BATTERY-TERMINAL.

1,377,126. Specification of Letters Patent. Patented May 3, 1921.

Application filed January 23, 1914. Serial No. 813,928.

To all whom it may concern:

Be it known that I, ALBERT H. HAEFELE, 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 Battery-Terminals, of which the following is a full, clear, and exact description.

This application relates to that form of an electrical connection commonly known as a "spring clip". These are extensively used for making electrical connections for dry cells, as well as for many other purposes.

It has formerly been the practice to solder, rivet or otherwise fasten a spring clip to the metal cap of a dry cell carbon. The clip and cap are therefore necessarily formed by distinct operations and additional time and labor are required to secure the two together. The voltage of a dry cell is not high and it is important to secure a good electrical connection between the clip and the cap so that there will be no drop in the joint. If the clip is secured to the cap by rivets or screws a high resistance connection frequently results. Even though the connection is in good condition when the cell leaves the factory, the clip is liable to work loose when put in use which causes a useless waste of energy as well as a low terminal voltage of the cell. Soldered connections are liable to loosen on account of corrosion or electrolytic action and in addition are liable to be knocked off by rough handling. It is the object of my invention to overcome these disadvantages.

In the drawings:—

Figure 1 is a side view of one type of clip formed integral with a cap for a carbon electrode.

Fig. 2 is a perspective view of the clip shown in Fig. 1.

Fig. 3 is a side view of a modification.

Fig. 4 is a perspective view of the type shown in Fig. 3.

Fig. 5 is a top view of Fig. 3.

Fig. 6 is a side view of another modification.

Fig. 7 is a top view and Fig. 8 is a perspective view of the modification shown in Fig. 6.

In each of the forms shown in the drawings the cap, which is adapted to be applied to a carbon electrode of a dry cell, consists of a cylindrical side portion 1 and a top portion 2. The cap is preferably punched from brass of such thickness and composition as to be suitably resilient. In Figs. 1 and 2 the clip is formed by making four parallel cuts in the top of the cap, the two outer ones being of equal length and somewhat longer than the two similar inner cuts. By joining the two long cuts perpendicularly by another cut at the end and the shorter cuts similarly at the same end, two members 3 and 4 are formed from the cap. The outer member 3 consists of two similar side pieces 5 joined at the end by the strip 6. The second member 4 is a hook shaped strip located intermediate the sides 5. Both members remain joined to the top of the cap at the side opposite the strip 6. The member 5 of the clip is bent above the top 2 as shown in the drawings so as to permit its being moved downward for the insertion of the conductor. The tongue or hook 4 is bent to form an angular wire engaging portion 7 which projects above the cap and coöperates with the pressure member 3. The exact manner in which the two members are bent or formed is not material, but it is preferable to shape them so that the two pieces coöperate to form a suitable recess for the conductor 8, and it is preferable to stamp the cap and clip in one operation from sheet metal.

The modification shown in Figs. 3 to 5 is formed in much the same manner as that shown in Figs. 1 and 2, by making four parallel cuts and forming movable pressure and stationary tongue members. Instead of joining the two outer strips by a strip 6 as in Figs. 1 and 2, these outer strips are cut loose from the top in the same manner as the tongue 4 and are similarly shaped to form two stationary angular wire engaging members 9. The pressure resisting member 10 is formed from the central member and its free end is opposite to those of the members 9, though obviously all three members may extend in the same direction. The member 10 is bent above the cap and suitably formed so as to form a wire engaging portion.

In Figs. 6 to 8 the pressure member 10 is formed as in Figs. 3 to 5 but the members 11 do not have a free end. The types of caps illustrated in Figs. 3 to 8 inclu-

sive are specifically claimed in divisional applications Ser. No. 18,273 and 18,274, each filed March 31, 1915.

In each of the foregoing cases the operation of the clips is facilitated by forming ridges or depressions 12 in either the pressure or tongue members or in both. This will contract the metal and afford the necessary clearance for free movement and in addition add to the strength.

The improved forms of caps for dry cell carbons have no contact drop in the connection between clip and cap, are more easily made and cannot be jarred loose by rough handling. Such a connection has a distinct advantage over the old type.

Having described my invention what I claim is:

1. In an electric battery, an electrode terminal, having a top and depending skirt, a plurality of spaced members cut from the top, and integral therewith at one end, one or more of the members having a depression adapted to coöperate with the remaining members to detachably retain a conductor.

2. In an electric battery, an electrode terminal having a top and a depending skirt and three adjacent spaced members cut from the top so as to be integral therewith at one end each, the two outside members being integrally connected at their free ends, and the middle member having a hook at one end to retain a conductor in conjunction with the outside members.

3. In an electric battery, an electrode terminal having a top and depending skirt, a plurality of spaced members cut from the top and integral therewith at one end, one or more of the members being bent at a point near the integral end and extending above the top and being bent at a second point to form an angular spring member, the remaining members being bent upward from the top to form an angular wire retaining portion adapted to coöperate with the spring member to detachably retain a conductor.

4. In an electric battery, an electrode terminal having a top and depending skirt, and three parallel members cut from the top so as to be integral therewith at one end each, the two outside members being integrally connected at their free ends, said outside members being bent at a point near the integral ends to extend above the top and bent at a second point to form a spring member, and the intermediate member being bent upward from the top to form an angular wire retaining portion adapted to coöperate with the spring member to detachably retain a conductor.

5. A terminal comprising a top, a flange projecting at an angle from one side of said top, a spring tongue attached to and extending across the other side of said top, and wire-receiving means attached to and projecting above such other side of said top and arranged adjacent to and coöperating with said tongue to hold a conductor therebetween.

6. A one-piece terminal cap comprising a top, a depending circular flange thereon, a spring tongue struck up from and extending across the other or upper side of said top, and wire-receiving means struck up from said upper side of said top adjacent said tongue and adapted to coöperate with the latter to hold a conductor therebetween.

7. A battery terminal cap comprising a top, a circular flange depending from said top, a spring tongue struck up from and extending across the upper side of said top, and a pair of wire-receiving members struck up from said upper side of said top, said members being disposed on opposite sides of said tongue and adapted to cooperate therewith to hold a conductor therebetween, such top, flange, tongue and members being formed from a single piece of metal and integral with one another.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ALBERT H. HAEFELE.

Witnesses:
IRA J. ADAMS,
H. G. GROVER.