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BATTERY TERMINAL CLAMP

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4 Claims. (Cl. 173—259)

The present invention relates to improvements in battery terminal clamps, and has for an object to greatly simplify and facilitate the operation of attaching and detaching storage battery terminals.

Another object of the invention is to provide a clamp of separate and separable sections adapted to be interlockingly united upon a storage battery terminal for the purpose of effecting electrical contact between the battery terminal and the cable; such sections being provided with interlocking lost-motion parts which cooperate with a threaded bolt for applying constrictive pressure about the interlocking lugs as a fulcrum to bind the lower portions of the sections upon the battery terminal.

A still further object of the invention is to provide, in a battery clamp, separable sections so united that complete separation from one another may take place in an axial direction with respect to the battery terminal, and to equip the sections with roughened, corrugated or other irregular surfaces to bite into the battery terminal to avoid such separating axial movement when the clamp is bound upon the terminal.

The invention has for a further object to provide a clamp of an expansive nature which will admit of the same automatically accommodating itself to battery terminals of various diameters without impairing its holding and conductive qualities.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawing, wherein like symbols refer to like or corresponding parts throughout the several views—

Figure 1 is a fragmentary perspective view of a storage battery and terminal thereof, with the two parts of the improved clamp shown in disassembled relation.

Figure 2 is a fragmentary perspective view showing the sections of the clamp assembled in binding relation upon the battery terminal.

Figure 3 is a top plan view of the assembled parts of Figure 2.

Figure 4 is a side elevation, with a portion of the cable broken away, showing the clamp in binding position on the battery terminal.

Figure 5 is a vertical section taken on the line 5—5 in Figure 3, and

Figure 6 is a side elevation similar to Figure 4 showing the clamp sections in an intermediate phase of their application to the battery terminal.

Referring more particularly to the drawing, 10 designates a storage battery, such as of the type found in automobiles, and 11 represents the upwardly tapered frusto-conical battery terminal 11 to which the improved clamp is to be applied.

A form of cable is shown at 12, the same being affixed to one section 13 of the improved clamp. The other companion section is indicated at 14, the two sections being internally grooved or rounded or formed partially cylindrical in order to conform to the external surface configuration of the frusto-conical battery terminal 11.

The clamp sections 13 and 14 are separate and separable and are temporarily interlocked by the use of mutual and complementary lugs 15 and 16 which are provided in pairs at opposite diametric points and substantially intermediate the height of the two sections, the contacting portions of the lugs forming a fulcrum on which the two sections 13 and 14 may rock. This rocking action may be roughly conducted manually in the initial application of the clamp to the terminal 11 but in the last analysis is achieved with great force by a screw bolt 17 which is threaded through a tapped opening in the upper portion of one of the sections 14.

The lugs 15 and 16 are composed of substantially parallel arms which extend out in opposite directions and at different elevations from the mutual sections 13 and 14 so as to overlap at their free end portions through substantial arcuate distances. Such free ends are formed with heads 18 and 19 extending toward one another and adapted to interlock in the manner indicated in Figure 2. In other words the heads 18 and 19 are disposed in the path of one another in a circumferential or arcuate sense and they therefore act as stops engaging one another to prevent dismemberment of the clamp in the set position thereof, except by an upward axial movement of the member 13 with respect to the axis of the battery terminal 11; but such axial movement of both clamp members 13 and 14 is avoided by the pressure of the lower portions of the clamp members upon the terminal 11 and also preferably by the corrugations or roughened areas 20 and 21. These corrugations or roughened areas consist of high and low points with the high points sharpened to bite into the material of the battery terminal 11 which is generally made of a soft metal.

As noted from Figure 6, the circumferential width of heads 18 and 19 is substantially less than the circumferential distance between the inner faces of the heads and the adjacent radial edges

of the sections by which they are carried so that the heads will have loose play and enable such heads and lugs to accommodate themselves to terminals 11 having a variety of different diameters or to different portions of the same terminal which varies in diameter on account of its taper.

The edges 22 and 23 of the heads 18 and 19 are rounded and cooperate with rounded surfaces 24 and 25 of the arms to form ball and socket joints of a loose character with a substantial amount of play therein to enable the sections 13 and 14 to be self adjusting without losing the interlocking character of the connection.

The sections 13 and 14 including the lugs may be constructed of manganese bronze, or other suitable material. Either member may be soldered or otherwise attached to a cable 12 and either member may be fitted with the stud screw or bolt 17. The sections of the clamp 13 and 14 fit perpendicularly or substantially so on opposite sides of the storage battery terminal 11. The interlocking lugs are adjusted, tightened and made firm to the battery terminal 11 by means of the stud screw or bolt 17.

The corrugations 20 and 21 on the lower portions of the clamp members bite into the battery post 11 for the purpose not only of keeping the clamp from slipping off the post but also for forming good electrical contact.

The interlocking arms and heads may be approximately $\frac{1}{4}$ " square to insure maximum strength. They are also made so that they come down over the battery post so they cannot come apart in service.

The bolt 17 is disposed above the top of the terminal 11 in easy reach of a wrench whereby there is no danger of the wrench slipping off and breaking the battery top. After placing the device on the post 11 the wrench may be used to turn the bolt 17 to either tighten or loosen the clamp. When loosened the parts 13 and 14 may be separated to facilitate cleaning or replacing.

It will be appreciated that the curvatures 22, 23 and 24, 25 mutually cooperate to bind in interlocking relation no matter whether the sections 13 and 14 are close together or farther apart as the angularity of the sections 13 and 14 about the lug fulcrum changes in accordance with varying diameters in the battery terminal 11 to be gripped.

The circumferential widths of the heads 18 and 19 is such that these heads may be engaged with the arms close to the edges of the sections and then when the sections are drawn radially away from one another a substantial radial movement is permitted before the heads engage one another and arrest any further movement of the two sections apart. Thus in the first instance the lower corrugated portions of the sections engaging the battery terminal constitute the fulcrums about which the sections move radially apart when pulled out by hand or by the pressure of the screw. As soon as the heads engage the fulcrum shifts to the engaging heads, that is to the intermediate portion of the sections and further operation of the screw then causes the sections to rock about the lugs thus squeezing the lower portions of the sections upon the battery terminal. The terms lower portions of the sections and upper portions of the sections are employed with reference to the diametric fulcrum line provided between adjacent heads 18 and 19 at opposite sides of the sections.

Flat opposed faces 26 and 27 of the heads engage in the interlocked position of the lugs; these

faces coming flush together throughout their entire areas when the two sections 13 and 14 are vertical, as shown in Figure 4.

The rear curved faces 28 and 29 of the heads and section edges are so relatively shaped as to automatically move the sections in opposite directions when the sections are backed radially away from one another whereby to cause opening of the hook-like lugs.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. A battery terminal clamp comprising part-cylindrical clamp sections, mutual and complementary lugs projecting in pairs from opposite diametric points and substantially intermediate the height of the two sections, the contacting portions of the lugs forming a fulcrum on which the two sections may rock, the portions of the sections below the lugs engaging the battery terminal, means engaged with the portions of the sections above the lugs for rotating the sections about the lugs, said pairs of lugs each comprising substantially horizontal parallel arms extending out in opposite directions and at different elevations from the mutual sections and overlapping at their free end portions through substantial arcuate distances, heads on such free ends extending toward one another and adapted to interlock, the circumferential widths of said heads being substantially less than the circumferential distance between the inner faces of the heads and the adjacent radial edges of the sections, the mutual engaging faces of the heads and arms being rounded to form ball and socket joints of a loose character, the near interengaging faces of the heads being substantially flat in a substantially vertical line when the sections are rocked into a truly cylindrical relation with one another, the far faces of the heads and the opposite edges of the sections being rounded to cause riding of the heads axially apart as the sections are collapsed toward one another.

2. A battery terminal clamp comprising part-cylindrical sections, pairs of lugs at opposite diametric points on the sections, each pair comprising two arms and heads carried thereby, the arms being relatively offset and overlapped, the heads projecting toward one another from the free end portions of the arms, the mutually opposed faces of the heads and arms being curved, and the mutually opposed faces of the section edges and heads being curved, the meeting faces of the heads being flat, the widths of the heads being less than the distance between the heads and adjacent edges of the sections, and means carried by one section and having free engagement with the other section to cause the sections to lever.

3. A battery terminal clamp comprising separate and independent unconnected sections having means at their lower portions to engage the battery terminal and act as fulcrums for initial levering of the sections away from one another, unconnected means on the intermediate portions of the sections initially unengaged and spaced apart and moved into interlocking and fulcrum engagement by the initial levering and means carried by one section and having free engagement with the other section above said unconnected means to cause the sections to lever about

the unconnected means when engaged and squeeze the lower portions of the sections on the terminal.

4. A clamp for engagement with a battery terminal comprising separate unconnected sections, each of said sections having lugs disposed at diametrically opposite points on the section, the lugs each comprising an arm and a head carried thereby, the arms of one section being offset and in overlapping relation relative to the arms of the other section, the heads projecting toward one another from the free end portions of the arms,

5 the width of each head having less than the distance between the adjacent head and the adjacent edges of the section, and means spaced a substantial distance above the lugs and engaging with the portions of the sections above the lugs for rotating the sections about the lugs, said means being disposed above the top of the terminal and said lugs being engaged at a point below the top of the terminal when the clamp is
10 in its operative position on the terminal.

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