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BATTERY TERMINAL CLAMP

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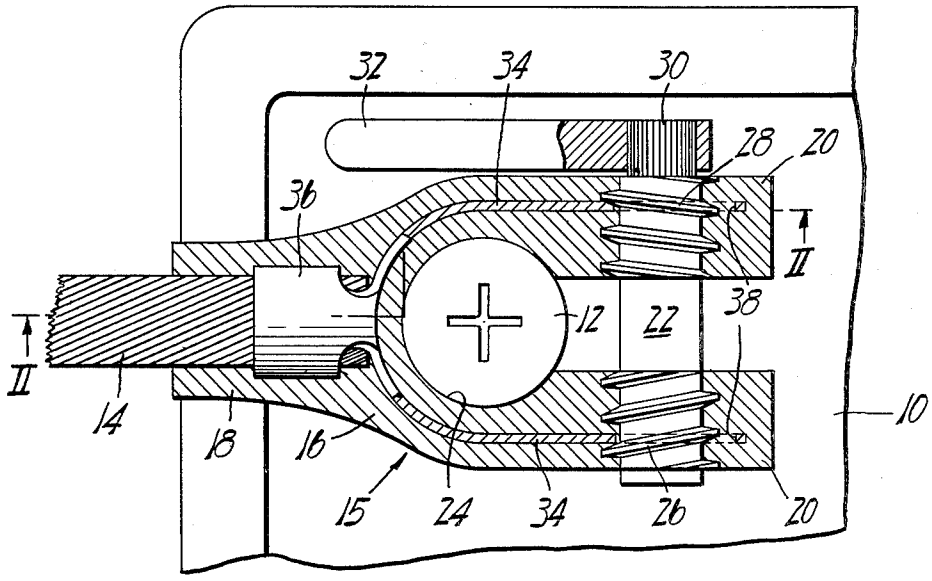


Fig. 1.

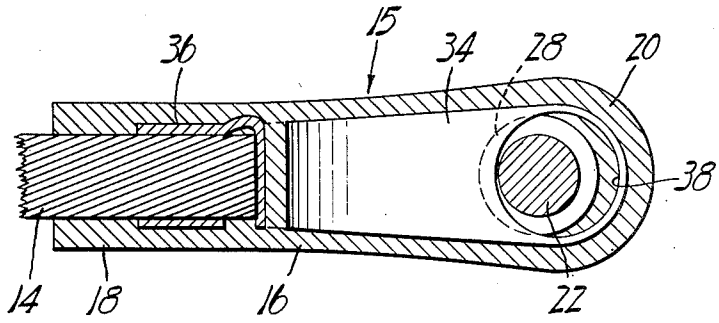


Fig. 2.

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BATTERY TERMINAL CLAMP

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5 Claims. (Cl. 173—259)

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This invention relates to battery cable clamp devices, and has for one of its objects the provision of a novel and improved clamp device of the type which is operable to be more quickly and easily clamped and unclamped relative to a battery post for attachment or removal therefrom.

Another object of the invention is to provide a clamp device as aforesaid which employs a clamping screw of opposite thread type, and which is of improved construction whereby the actuating screw is geared in improved manner to the lug portions of the clamp device which straddle the battery post.

Another object of the invention is to provide an improved clamp device as aforesaid which embodies structural reinforcement means functioning also as screw engagement means, so as to provide a clamping device of improved structural strength.

Other objects of the invention will appear in the specification hereinafter.

In the drawing, Fig. 1 is a fragmentary top plan view of a storage battery and terminal post having mounted thereon a cable clamp device of the invention; the clamp device being shown in horizontal section; and,

Fig. 2 is a fragmentary section taken along line II—II of Fig. 1.

In the drawing a storage battery is indicated fragmentarily at 10 as mounting a terminal post 12 of the conventional circular shape, and a conductor cable for connection to the post 12 is indicated at 14. The cable clamp device is illustrated generally at 15 as comprising a bifurcated yoke member 16 having a shank portion 18 enclosing the end of the cable 14 and a pair of parallel lug portions 20—20 straddling the battery post 12 and extending therebeyond in substantially parallel relation to receive the actuating screw member 22. As is well known in the battery terminal art, the cable clamp yoke piece 16 is preferably molded of lead metal and is circularly socketed as indicated at 24 for optimum electrical contact and connection with the lead post 12 of the battery.

The screw member 22 is provided with oppositely pitched thread portions 26—28 at opposite ends thereof and in the regions of its mounting within the lug portions 20—20 of the yoke member; and as is also well known in the art, the screw member 22 is preferably formed of steel or some other relatively strong metal and preferably galvanized or otherwise plated so as to be of maximum strength against the possibility of stripping of the threads of the crew during operation thereof. As indicated at 30, one end of the screw is arranged to extend beyond the clamp device to enable the screw to be gripped by some suitable tool for rotating the latter. Thus, the end portion 30 of the screw member may be simply squared or otherwise shaped so as to readily receive an adjustable wrench or other such tool for manipulation of the screw; or, as shown in the drawing, the end portion 30 may be serrated and a lever 32 having a similarly serrated bore portion may be slip-fitted on the serrated end of the screw, so that no separate tool will be required to operate the device.

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Thus, whereas Fig. 1 illustrates the cable clamp device in mounted position upon the post 12, it will be understood that simple rotation of the handle 32 will cause the screw to rotate in such manner as to force the two lug portions 20—20 of the clamp device to move apart; thus freeing the clamp device from the battery post 12. Thus, the clamp device may with utmost ease and convenience be quickly released from the battery post without need of bungling attempts at fitting some tool to the device for release of the clamping action. Furthermore, it will be appreciated that inasmuch as the thread portions 26—28 on the screw device are of oppositely directed form, a minimum degree of rotation of the screw 22 will result in sufficient spreading displacement of the lug portions 20—20 to completely free the clamp device from the battery post. Similarly, in connection with cable attachment operations, the clamp device in spread-apart form may be simply slip fitted downwardly upon the terminal post 12, and then a flip of the handle 32 in the opposite direction will cause the screw device to draw the lug portions 20—20 inwardly toward one another so as to firmly clamp the device upon the battery post in response to a minimum degree of rotation of the screw. Inasmuch as the handle member 32 may be freely slip-fitted off and on the serrated end portion of the screw, it will be appreciated that the device is readily adjustable to take care of dimensional differences in the yoke construction and in the size of the battery posts to be connected.

Whereas it is well known that lead metal is greatly to be preferred in the construction of the yoke portions of such clamp devices because of the superior electrical connections and resistance to corrosion thereby provided, it is also a fact that lead metal in itself is relatively soft and malleable and therefore not inherently suited to take any substantial forces in bending or in shear. Con-

sequently battery terminal clamp devices which are constructed solely of lead metal tend to plastically deform at the extending lug portions thereof whenever a locking bolt or the like is applied thereto for the purposes of drawing the lug ends inwardly to clamp the device upon the battery post. Also, any lead metal screw thread formations are inherently weak and lacking in adequate resistance to stripping in a battery clamp device because of the weakness of lead metal to resist forces in shear. Hence, it will be appreciated that any cable clamp device of the nature referred to hereinabove which would employ a reversely threaded screw member as in the case of the drawing would not be practicable if it relied solely upon the formation of screw threads within the lead lug portions. Therefore, it is a particular feature and advantage of the present invention that the yoke and lug portions of the clamp device of the invention is internally reinforced by means of a wish-bone shaped metal "backbone" element which functions to reinforce the lug portions of the clamp device against plastic deformation and bending and which at the same time reinforces the screw thread formations within the lug members and protects the screw thread structures of the lug elements against stripping. At the same time, the novel arrangement of the invention facilitates ease of initial assembly and manufacture of the clamp device as will be explained hereinafter, and thus the clamp device of the invention may be easily manufactured in accord with most economical manufacturing procedures.

More specifically, as shown in the drawing, the novel reinforcing device of the invention is illustrated to comprise a spring steel member of generally "wishbone" shape having a pair of leg portions 34—34 which are embedded in the leg portions 20—20 of the clamp device; the leg portions 34—34 uniting and terminating in a collar portion 36 which is embedded in the shank portion 18 of the clamp device and encircles the extreme end of the cable 14. Adjacent their outer ends the leg portions 34—34 are bored in alignment as indicated at 38—38 to diameters suitable to receive the thread portions 26—28 of the screw member in freely sliding relation therethrough during initial assembly of the device.

Thus, to manufacture the clamp of the invention, the backbone member is first slip fitted at its collar portion 36 over the end of the cable 14, and the collar portion is then swaged inwardly against the cable so as to firmly connect thereon. The cable and backbone unit is then placed in a suitable mold for pouring of the lead metal to enclose the backbone member; the screw 22 being first slip fitted endwise through the openings 38—38 in the legs 34—34. Then, the screw member 22 is moved rearwardly in the backbone member, or toward the left as viewed in Figs. 1, 2, into the position thereof shown in Fig. 1 so that the screw formations 26—28 engage in geared relation with the rear edges of the apertures 38—38 through the leg portions 34—34. Then, molten lead is poured into the mold so as to complete the molded clamp structure to the shape as indicated in the drawing with the backbone member and the screw member both mounted therein. Thus, it will be appreciated that the screw member may now be rotated as explained hereinabove, and that the geared connection between the steel screw threads and the steel backbone member will take the shear loads which would otherwise be imposed upon the molded lead lug structures so as to prevent stripping of the lead threads. Also it will be appreciated that the spring steel leg portions 34—34 will reinforce the lead lug portions 20—20 against plastic deformations thereof incidental to applications of the cable device to a battery terminal and will in effect provide the latter with resilient characteristics tending to maintain their normal shapes in improved manner.

To facilitate the lead molding process and operation of the device, I prefer to coat the screw parts 26—28 with some suitable lubricant or "parting" material prior to the lead pouring operation, so as to prevent the lead from sticking to the screw parts in such manner as would interfere with easy rotation of the screw for clamp adjustment purposes. For example, an oil or grease or graphite base substance may be employed for such purpose.

Whereas the handle 32 is shown in the drawing as being detachable from the screw 22, it may of course be permanently fixed thereto if preferred so that there is assurance that the handle will be at all times in readiness for operation as for example in event it is necessary to quickly disconnect the cable from the battery in case of a short circuit condition.

It will of course be appreciated that whereas only one specific form of the invention has been shown and illustrated in detail, the invention is not so limited and that various changes may be made therein without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. A cable clamp for connection to a battery post, said clamp comprising a lead metal body of split form adapted to straddle a battery post and including a pair of lugs projecting therefrom with aligned screwthreaded apertures therethrough, ferrous metal insert means imbedded in each of said lugs, a screw extending transversely through said lugs and having oppositely threaded portions mounted in screw threaded relation therein, said insert means being apertured to diameters greater than the diameter of the threaded portions of said screw and on centers offset from the centers of the screwthreaded apertures through said lugs, said screw extending through said insert means eccentrically of the apertures therethrough and thereby disposed in geared relation with edge portions thereof.

2. A cable clamp for connection to a battery post, said clamp comprising a lead metal body of bifurcated form adapted to straddle a battery post and including a pair of lug portions projecting therebeyond with aligned screwthreaded apertures therethrough, a fork shaped spring metal insert means imbedded in said body, a screw extending transversely through said lug portions and having oppositely screw threaded portions thereof mounted in screw threaded relation in said lug portions, said insert means being apertured in the regions of said lug portions to diameters greater than the diameter of the threaded portion of said screw and on centers offset from the centers of the screwthreaded apertures through said lugs, said screw extending through said insert means eccentrically of the apertures therethrough and thereby disposed in geared relation with edge portions thereof.

3. A cable clamp for connection to a battery post, said clamp comprising a lead metal body of fork form adapted to straddle a battery post and including a pair of lug portions projecting

therebeyond with aligned screwthreaded apertures therethrough, spring metal insert means of fork shape imbedded in said body and including opposite leg portions disposed within said lug portions, a screw mounted to extend between and transversely through said lug portions and having oppositely screw threaded portions thereof mounted in screw threaded relation therein, said insert leg portions being apertured to diameters greater than the diameter of the threaded portions of said screw and on centers offset from the centers of the screwthreaded apertures through said lugs, said screw extending through said insert leg apertures eccentrically of the apertures therethrough and thereby disposed in geared relation with edge portions thereof.

4. A cable clamp for connection to a battery post, said clamp comprising a soft metal body of bifurcated form adapted to straddle a battery post and including a pair of lug portions projecting therebeyond with aligned screwthreaded apertures therethrough, a fork shaped hard metal insert imbedded in said body, a screw extending transversely through said lug portions and having oppositely screw threaded portions thereof mounted in screw threaded relation in said lug portions, said insert being apertured in the regions of said lug portions to a diameter greater than the diameter of the threaded portions of said screw and on centers offset from the centers of the screwthreaded apertures through said lugs, said screw extending through said insert and eccentrically of the apertures therethrough and thereby disposed in geared relation with edge portions thereof, said screw being serrated at an extending end portion thereof, and a handle

adapted to slip fit upon said screw serrated end portion

5. A cable clamp for connection to a battery post, said clamp comprising a soft metal body of fork form adapted to straddle a battery post and including a pair of lug portions projecting therebeyond with aligned screwthreaded apertures therethrough, hard metal insert means of fork shape imbedded in said body and including opposite leg portions disposed within said lug portions, a screw mounted to extend between and transversely through said lug portions and having oppositely screw threaded portions thereof mounted in screw threaded relation therein, said insert leg portions being apertured to diameters greater than the diameter of the threaded portions of said screw and on center offset from the centers of the screw threaded apertures through said lugs, said screw extending through said insert leg apertures and eccentrically of the apertures therethrough and thereby disposed in geared relation with edge portions thereof, and an operating handle attached to one end of said screw for actuation thereof.

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