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CLIP JAWS

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Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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CLIP JAWS.

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To all whom it may concern:

Be it known that I, HERBERT E. WALKER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Clip Jaws; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to storage battery and other current carrying clips and refers more specifically to improvements in the clamping jaws by which the clip is engaged with and held on an electrical conducting member that constitutes a part of the path for the charging current.

Among the objects of the invention is to produce clip jaws for clips of this and analogous uses that are so constructed as to reliably and effectively grasp a current conducting member of a charging set or the terminals of a battery, with the parts of the jaws so arranged as to be fitted to grasp and afford a good electrical connection to the clip regardless of the shape of the current conducting element to which the clip is to be fixed and regardless of the angle at which the clip approaches said conducting element so that thereby the clip becomes, so to speak, a universal clip. Thus the clip may be readily clipped on and produce a good connection between it and a battery post or a bus-bar of a so-called constant potential charging apparatus at any angle of approach required by the relative positions of the batteries to be charged and the bus-bar rack of the charging apparatus.

A further object of the invention is to produce a more adaptable construction of the jaws which will better adapt the jaws to the post of a regular storage battery, or to different angles of connection to a bus-bar of a charging apparatus or like current conductive element.

Another object of the invention is to otherwise improve clips for these and like purposes, and the invention consists in the elements and combination of elements shown in the drawings and described in the specification, and is pointed out in the appended claims.

In the drawings:

Figure 1 is a diagrammatic view illustrating the use of my novel clip.

Figure 2 is a side view of the jaw end of the clip.

Figure 3 is a cross section on the line 3—3 of Figure 2.

Figure 4 is an end view of the jaws of the clip.

Figure 5 is a perspective view of one of the elements of the universal jaw.

Figure 6 shows another way of attaching the clip to a bus-bar.

Figure 7 is a modification of one of the jaw heads.

Figure 8 is a further modification thereof.

The general structure of the clip is like that shown in my prior application for United States Letters Patent Serial Number 578,552, filed July 31st, 1922, it embracing two spring jaw members 10—10 disposed at an acute angle to each other, each bearing a jaw head designated as a whole by 11 on which plural teeth, disposed at an angle to each other, are carried or formed, as hereinafter described. One of said spring members 10 is formed to provide an integral terminal 12 for the conductor cable, and the other spring member terminates short of said terminal 12 and is folded back on itself to constitute a V-shaped jaw member spacing device 14, the two members being fixed together by a rivet 15. In respect of the connection and spacing of the jaw members, however, they constitute in themselves no part of the invention and may be otherwise made. The said jaw members are cut away back of the jaw heads to produce narrower cross members 16 so arranged that the jaw heads 11 at the terminals of the arms 16 are opposite each other and may be made the full width of the spring jaw members.

The jaw heads 11 each include a flat member 17 integral with one of said arms and is turned inwardly at its extreme end margin towards the mating jaw member, and both said jaws are formed to produce holding and contact teeth 17', 18. Said inturned tooth portions of the jaws are generally similar to the construction shown in my aforesaid application wherein both jaws are formed with closely spaced serrations or teeth, with the exception however that in the

present construction only one of the jaws has such closely spaced teeth, while the mating jaw has the two longer teeth 18 which are spaced by a deep recess 21. This construction provides means whereby the jaws may properly engage a flat plate, as will be evident, or may engage a rounded battery post 22 of a storage battery B; with the contact such as to produce a good electrical connection between said jaws and the post, as shown at the bottom of Figure 1. The elongated teeth 18, spaced by the recess 21 enables the jaw bearing them to grasp a post or like part in such manner as to be braced thereon to prevent the clip falling or tilting sidewise in a way to short circuit the battery or to otherwise interfere with the circuit in which the clip is included. This detail may be applied to simple jaws having but one pair of coacting teeth. Said recess 21 is also made to serve another purpose as will hereinafter appear.

In addition to the jaw structure described, said jaw heads are formed or provided with auxiliary jaw elements designated as a whole by 23 and best shown in Figure 5. They are arranged at their side margins with mating teeth 24 that are disposed at right angles to the teeth of the main jaw members 17. Each of said auxiliary jaw elements 23 comprises a rectangular flat plate 25, shown best in Figure 5, which is plain on its side margins and is turned inwardly at its end margins to form the teeth 24. Said plates 23 are fitted to the inner sides of the main jaws just back of the teeth of said main jaws, and are fixed to the latter by rivets 26. The teeth 24 of said auxiliary jaw members are preferably spaced a distance apart so as to provide between them recesses 24' to engage over a conducting post to which the clip is attached.

As herein shown, said auxiliary jaw elements also afford means to engage over the bus-bar 27 supported on the rack 28 of a charging apparatus, such for instance as that kind known as a constant potential charging apparatus. By arranging the mating teeth of the auxiliary jaws at right angles to the teeth of the main jaws, the said clip may be readily engaged over a conducting member, as the bus-bar 27, and can be presented to said bus-bar at varying angles to the axis of said bar, as will be apparent from an inspection of Figures 1 and 6, and as required by the relative positions of the battery and bus-bar. The spaces 24' between the teeth of the auxiliary jaws are substantially deep so as to engage over bus-bars of different diameters and cross sections and secure a good current path between said parts, even though the angle between the clip and that of the bus-bar be considerably varied. The angle of the clip to the bus-bar may be a right or oblique angle.

The angle between said parts may be made still greater if the clip be made to engage the bus-bar in the manner shown in Figure 6, wherein the bus-bar extends diagonally through one of the recesses 24' of one auxiliary jaw and through the recess 21 of one of the main jaws. Thus the deep recess 21 of one of the main jaws becomes an important factor in presenting the clip at an extreme angle to the bus-bar. Moreover, the two sets of teeth of the main and auxiliary jaws enable said jaws to be clipped over other irregularly shaped conducting elements to constitute good current path between the clip and said elements.

While the plural sets of teeth at each jaw member are formed on separate parts, it is within the scope of the appended claims to form all of the teeth of each jaw on one member 28, as shown in Figure 7, wherein similar teeth bear like reference characters heretofore used.

In Figure 8 is shown a modification of Figure 7 wherein the auxiliary teeth 29 of each jaw are produced by cutting and forming the metal of the plate 30 between its side edges to provide an instanding lug 31 at the ends of which are formed the teeth 29 and between which teeth is formed a recess 32.

The elements of the battery and the rack are shown in a fragmentary and diagrammatic way to illustrate the adaptation of my improved clip thereto and to indicate other conducting elements to which the clip may be applied. It has not been thought necessary therefore to fully illustrate the charging apparatus and battery. These parts may, of course, assume widely different constructions.

I claim:

1. A storage battery clip including two jaws each having two sets of mating teeth, the mating teeth of one set being spaced by a deep recess, and the last mentioned teeth being disposed in a plane at an angle to that of the other set of teeth.
2. A storage battery clip including two jaws having mating teeth at their ends and having other mating teeth at their sides, the side teeth of each jaw being spaced to provide between them a deep recess.
3. A storage battery clip comprising spring jaw members and two jaws having integral mating teeth, the teeth of at least one jaw being spaced to provide between them a deep recess.
4. A storage battery clip including two jaws having main mating teeth at their ends and having auxiliary mating teeth at their sides, the main teeth of one jaw being spaced to provide between them a deep recess, said auxiliary teeth being widely spaced to provide between them a like recess.
5. A clip comprising spring jaw members

and jaws carried by the free ends of said members, said jaw members being associated with means to press the jaws toward each other, each of said jaws having two sets
5 of mating teeth disposed in planes at an angle to each other.

6. A storage battery clip including jaws comprising sets of coacting, inwardly turned teeth, the teeth of one set being closely

spaced and short and the teeth of the other 10 set being longer and spaced by a deep recess in their jaw, said recess being opposed to the shorter teeth.

In witness whereof I claim the foregoing as my invention, I hereunto append my 15 signature this 27th day of September, 1922.

HERBERT E. WALKER.