

Battery terminal post clamp

The present invention relates to a battery terminal post clamp with a quick-coupling device for its connection to a storage battery terminal post.

The clamp according to the invention is primarily intended to be connected to a cylindrical or truncated conical post commonly existing on storage batteries and includes, to this purpose, two parts movable in relation to each other, said parts having co-operating portions, preferably in the shape of substantially axially halved cylinders or truncated cones which together in the active position of the clamp clasp the post under the influence of a force contracting the parts and being achieved by a toggle joint or overcentre mechanism connected to both parts.

Battery terminal post clamps of this and similar kinds are disclosed in a.o. US-A-1 491 056, US-A-1 930 772, US-A-1 943 190, US-A-2 185 419, US-A-2 257 013, US-A-3 324 266 and SE-A-129 178.

US-A-1 491 056 discloses a battery connector clamp comprising two opposed members pivoted to each other. Each of said members is formed at one end with a jaw such that the jaws are confronting each other. One of said members extends beyond the pivotal point and is formed to embrace a cable. Both of said members have longitudinally extending confronting recesses, and a cam having a handle is disposed in said recesses. When the handle is shifted into a position parallel to one of said members the cam acts to force the jaws together and when shifted in the opposite direction the cam permits the jaws to be open.

US-A-1 930 772 discloses an electrical cable terminal or connector particularly adaptable to storage batteries as used on automobiles. The connector has a pair of battery terminal post engaging jaws, one of which has the cable secured thereto. Pins extend from opposite sides of one of the jaws, and a substantially U-shaped resilient member having coiled ends is rotatably mounted on the pins. A locking member comprising a sleeve portion is rotatably mounted on said resilient member opposite to said pins. A handle portion extends from one side of the sleeve portion, and a wedge shaped ridge extends from the opposite side of the sleeve portion. This device is locked to a terminal post by rotating the resilient member to enclose both jaws and causing the sleeve to lie adjacent the back of the other of the jaws. The handle is then rotated downward towards the post to cause said ridge to frictionally force the other jaw downward on the tapering post to tightly lock the jaws on the post.

US-A-1 943 190 discloses a clamp for connecting a conductor to the terminal post of a storage battery. This clamp comprises a connector mounted upon the end of the

conductor and terminating in a curved saddle member disposable against one side of the battery terminal post. A complimentary clamping member is disposed against the opposite side of the post, and a lever is pivoted upon the connector. A yoke embraces and is permanently pivotally connected with said complimentary clamping member. The yoke is also pivotally engaged with the lever intermediate the ends thereof. The lever has a portion engageable with the connector for maintaining a non-aligned relation between the pivots in the clamping position of the clamp.

US-A-2 185 419 discloses a battery post clamp having substantially U-shaped co-operating parts the legs of which overlap each other such that the legs of one part terminate within the curved bottom portion of the other part. The parts are controlled by a yoke having arms, portions of which are inwardly bent to form fingers carrying cam disks eccentric thereto. The fingers and cam disks engage the legs of the two parts in the overlap area such that actuation of the yoke in one direction brings the parts together to clamp a terminal post. The parts are kept together and guided solely by the fingers and cam disks.

US-A-2 257 013 discloses a battery terminal comprising a bifurcated body member, providing a crotch-portion between the arms thereof for engagement with one side of a battery post. A block is guided for sliding movement between the arms for clamping engagement with the opposite side of the post. Another block is pivotally mounted between the arms, and a spherically conformed cam having a threaded shank is threadably mounted in the pivoted block in transverse relation to the pivotal axis thereof for adjustment towards and away from the slidable block. The spherical surface of the cam is in eccentric relation to the pivotal axis of said pivoted block and arranged to have infinitely adjustable slidable wedging engagement with the adjacent surface of the slidable block.

US-A-3 324 266 discloses a clamp-on battery post switch comprising a body adapted to engage over a post of a vehicle storage battery and including parts of electrical insulating material engaging said post and holding the body against sliding movement relative to the post. A block of electrical conducting material is slidably mounted in the body and has a part adapted to be secured to a battery cable clamp. Link and lever means is connected to the block and to the body so as to be swingably movable relative to the body for slidably moving the block into and out of engagement with the post for making or breaking, respectively, an electrical connection between the post and cable clamp.

SE-A-129 178, finally, discloses a post connector comprising a substantially U-shaped

resilient wire member, along the arms of which is slidably guided by a yoke. A cam surface of an operating lever engages the yoke and the arms of the wire member engage the lever eccentrically in relation to the cam surface. Upon actuation of the lever a battery terminal post is clamped between a portion of the wire member bridging its arms and the slidable yoke.

What particularly distinguishes the present invention over the art referred to above, will be apparent from the appended claims.

The invention will be described more in detail below with reference to the attached drawings, wherein

Fig. 1 is a side-view showing a post clamp according to the invention in a closed position.

Fig. 2 is a section taken along the line II—II of fig. 1 but excluding the operating lever of the overcentre mechanism,

Fig. 3 is a longitudinal section through the post clamp taken along the line III—III of fig. 2,

Fig. 4 is a side-view of the post clamp in an open position,

Fig. 5 is a longitudinal section similar to that according to fig. 3 but showing the clamp in an open position,

Fig. 6 is a view seen from the left in fig. 1 showing the post clamp in a closed position, the operating lever for the sake of clarity being shown partly broken away,

Fig. 7 is a view similar to that according to fig. 1 showing another embodiment of the battery post clamp according to the invention and

Fig. 8 is a section taken along the line VIII—VIII of fig. 7 corresponding to the one according to fig. 2 through the post according to fig. 1.

The battery post clamp according to the invention includes a first part 1 and a relative thereto movable second part 2, which two parts preferably are punched and bent sheet metal details. Part 1 comprises a cylindrical connection portion 3 for a non-shown battery cable. The connection portion 3 has a longitudinal slit 4 and is adapted to be clamped around a cable for electric connection thereto through plastic deformation or contraction by for example a hose-clamp. In its end opposite the connection portion 3 part 1, seen from above (Fig. 2), is substantially U-shaped with an arcuately curved bottom portion 5 and two mutually parallel straight legs 6 and 7 extending from the bottom portion 5. In the embodiment shown the bottom portion 5 consists essentially of a semicircle arch, from which the legs 6 and 7 tangentially extend.

In the transition from the bottom portion 5 the legs 6 and 7 are provided with vertical slots 8 and 9, respectively, from which the center portions of the legs — vertically counted — are pressed out so that longitudinal guide recesses 10 and 11, respectively, have been formed, which recesses are open backwardly through the slots 8 and 9, respectively, in the direction

towards the connection portion 3. The guide recesses 10, 11 and the slots 8, 9 have a substantially rectangular shape and a somewhat greater height (Figs 3, 5 and 6) and width (Figs 2 and 6) than the co-operative parts of part 2, as will be described below. The guide recesses 10 and 11 are defined upwards by substantially plane guide surfaces 12 and 13, respectively, and downwards by likewise substantially plane guide surfaces 14 and 15, respectively. Outwardly the guide recesses are defined by the pressed out portions 16 and 17, respectively, of the legs 6 and 7.

Seen from above also part 2 is substantially U-shaped with an arcuately curved bottom portion 18, which in the shown embodiment is somewhat smaller than a semicircle arch, but has the same curve radius as the bottom portion 5 of part 1. The bottom portion 18 has a height corresponding to the height of bottom portion 5 of part 1 and its legs 6 and 7. From the center area of the bottom portion 18 — vertically counted — two mutually parallel legs 21 and 22 extend via an outwardly angled transition portion 19 and 20, respectively, which legs extend within the guide recesses 10 and 11, respectively, and through the slots 8 and 9, respectively.

The parts 1 and 2, thus, are movable relative to each other under mutual guidance by, on one hand, the guide recesses 10, 11 and the slots 8, 9, and, on the other hand, the legs 21, 22.

In order to control this movement the battery post clamp according to the invention is provided with a mechanism coupled between the parts 1 and 2, which mechanism consists of a U-shaped operating lever 23 (Fig. 2), a substantially U-shaped link 24 connected to the operating lever 23 and to part 1, as well as a shaft 25 connecting the operating lever 23 and part 2.

The operating lever 23, which for example is a detail manufactured from bent sheet, is provided with a web portion 26 and two parallel legs 27 and 28 which extend outside the legs 6 and 7 of part 1. Adjacent their free end portions the legs 27 and 28 have holes 29 and 30, respectively, in which engage the end portions of the shaft 25 which is furthermore introduced through holes 31 and 32 adjacent to the free end portions of the legs 21 and 22, respectively, of part 2. The operating lever 23, thus, is pivotable around the shaft 25.

The link 24, which has circular cross section, is provided with a portion 33 which is parallel to the shaft 25 and is mounted in holes 4 and 35 adjacent to the free end portions of the legs 6 and 7, respectively, of part 1. From the portion 33 two parallel legs 36 and 37 extend outside the legs 27 and 28, respectively, of the lever 23 and engage from the outside by means of inwardly turned end portions 38 and 39, respectively, in holes 40 and 41, respectively, in the legs 27 and 28, respectively, of the lever 23.

The holes 31 and 32 of part 2 are arranged at

the same height as the holes 34 and 35 in part 1 which means that the shaft 25 and the portion 33 of the link 24 are located in the very same horizontal plane. The holes 40 and 41 in the legs 27 and 28, respectively, of the lever 23 are so located, however, that the inwardly turned end portions 38 and 39 of the link 24 are located somewhat below this plane in the closed position of the clamp according to Fig. 1 and pass through the same plane when closing the clamp, i.e. when the operating lever 23 is brought from the position shown in Fig. 4, where the clamp is open, to the position shown in Fig. 1. As is apparent, the distance between the shaft 25 and the link portion 33 is increased during this closing movement, which means that the free end portions of the legs 21, 22 of part 2 are brought away from the free end portions of the legs 6, 7 of part 1, while simultaneously the curved portion 18 of part 2 is brought towards the curved portion 5 of part 1. The smallest distance between the curved portions 18 and 5 — and thereby the greatest clamping force — is of course achieved when the inwardly turned end portions 38 and 39 of the legs 27 and 28, respectively, of the link 24 pass through the common plan of the shaft 25 and the link portion 33, i.e. the dead-point position of the operating mechanism.

In the closed position according to Fig. 1, in which the legs 27 and 28 of the operating lever 23 rest against the outer portions of the link portion 33, the operating lever is kept in the closed position, i.e. with the inwardly turned end portions 38 and 39 of the link 24 below the dead-point position, by the tension in the various parts of the clamp.

To enable the mounting of the link 24 the blank of part 1 is provided with slots 42 and 43 extending from the free end portions of the legs 6 and 7, respectively, to the holes 34 and 35, respectively, as well as slots 44, 45 and 46, 47, respectively, extending a bit upwards and downwards, respectively, from the holes 34 and 35. By the presence of these slots the material can be bent out so that a sufficient passage is formed for the introduction of the link portion 33 into the holes 34 and 35, whereafter the bent out flaps again are bent inwards to the position shown in the drawings.

Another embodiment of the invention is shown in Figs 7 and 8, wherein corresponding details have been given the same reference numerals as in Figs 1—6. The embodiment according to Figs 7 and 8 corresponds mechanically to the one earlier described. The difference consists in that cable connection is made to a substantially T-shaped connecting tongue 48 integral with part 2, said tongue 48 in its free end having a transverse portion 49. This portion is provided with three holes through which extend three screws 50, 51 and 52 having respective nuts, said screws also extending through a loose plate 53. With this arrangement one, two or more cables can be

connected to the clamp by being introduced between the plate 53 and the portion 49 and between the screws 50 and 51 and/or screws 51 and 52, whereafter the screws are tightened so that the cable/cables are clamped between the portion 49 and the plate 53.

The embodiment according to Figs 7 and 8 also brings about the advantage that the tongue 48 is easily bent (e.g. upwardly according to Fig. 7), which facilitates the mounting of the clamp on terminal posts of certain battery types as well as cable connection in confined spaces.

A handle means of suitable shape and suitable material, e.g. plastic, is preferably arranged on the operating lever 23.

Claims

1. Battery terminal post clamp with a quick-coupling device for its connection to a battery terminal post, including a first substantially U-shaped part (1) having a bottom portion (5) and parallel legs (6, 7) extending therefrom, and a second likewise substantially U-shaped part (2) having a bottom portion (18) and parallel legs (21, 22) extending therefrom, said bottom portions (5, 18) of said first and second parts (1, 2) being complementary shaped so as to substantially conform to the shape of the battery terminal post in an operative position of the clamp, while said legs (6, 7 and 21, 22, respectively) of said two parts are mutually parallel, said two parts (1, 2) being adapted to be displaced relative to each other to and from said operative position by means of an overcenter device (23, 24, 25) connected to said two parts, characterized in that the first part (1) has openings (8, 9) in the transition areas from its bottom portion (5) to its legs (6, 7), the legs (21, 22) of the second part (2) extending through said openings, said overcentre device (23, 24, 25) being connected to the legs (6, 7) of said first part (1) outside of the bottom portion (18) of said second part (2) and being connected to the legs (21, 22) of said second part (2) outside the bottom portion (5) of said first part (1), so that the legs of said first and second parts are removed from each other when the bottom portions (5, 18) are brought closer to each other in the operative position of the clamp.

2. Battery terminal post clamp according to claim 1, characterized in that the legs (6, 7) of said first part (1) are formed with guide recesses (10, 11) running in the longitudinal direction of the legs, said recesses ending in said openings (8, 9), and the legs (21, 22) of said second part (2) being guided along said recesses at relative movement of said two parts.

3. Battery terminal post clamp according to claims 1 or 2, characterized in that the overcentre mechanism consists of a substantially U-shaped operating lever (23) having two parallel legs (27, 28) extending outside said two parts (1, 2), a shaft (25), by means of which the legs (27, 28) of the operating lever (23) adjacent

the same height as the holes 34 and 35 in part 1 which means that the shaft 25 and the portion 33 of the link 24 are located in the very same horizontal plane. The holes 40 and 41 in the legs 27 and 28, respectively, of the lever 23 are so located, however, that the inwardly turned end portions 38 and 39 of the link 24 are located somewhat below this plane in the closed position of the clamp according to Fig. 1 and pass through the same plane when closing the clamp, i.e. when the operating lever 23 is brought from the position shown in Fig. 4, where the clamp is open, to the position shown in Fig. 1. As is apparent, the distance between the shaft 25 and the link portion 33 is increased during this closing movement, which means that the free end portions of the legs 21, 22 of part 2 are brought away from the free end portions of the legs 6, 7 of part 1, while simultaneously the curved portion 18 of part 2 is brought towards the curved portion 5 of part 1. The smallest distance between the curved portions 18 and 5 — and thereby the greatest clamping force — is of course achieved when the inwardly turned end portions 38 and 39 of the legs 27 and 28, respectively, of the link 24 pass through the common plan of the shaft 25 and the link portion 33, i.e. the dead-point position of the operating mechanism.

In the closed position according to Fig. 1, in which the legs 27 and 28 of the operating lever 23 rest against the outer portions of the link portion 33, the operating lever is kept in the closed position, i.e. with the inwardly turned end portions 38 and 39 of the link 24 below the dead-point position, by the tension in the various parts of the clamp.

To enable the mounting of the link 24 the blank of part 1 is provided with slots 42 and 43 extending from the free end portions of the legs 6 and 7, respectively, to the holes 34 and 35, respectively, as well as slots 44, 45 and 46, 47, respectively, extending a bit upwards and downwards, respectively, from the holes 34 and 35. By the presence of these slots the material can be bent out so that a sufficient passage is formed for the introduction of the link portion 33 into the holes 34 and 35, whereafter the bent out flaps again are bent inwards to the position shown in the drawings.

Another embodiment of the invention is shown in Figs 7 and 8, wherein corresponding details have been given the same reference numerals as in Figs 1—6. The embodiment according to Figs 7 and 8 corresponds mechanically to the one earlier described. The difference consists in that cable connection is made to a substantially T-shaped connecting tongue 48 integral with part 2, said tongue 48 in its free end having a transverse portion 49. This portion is provided with three holes through which extend three screws 50, 51 and 52 having respective nuts, said screws also extending through a loose plate 53. With this arrangement one, two or more cables can be

connected to the clamp by being introduced between the plate 53 and the portion 49 and between the screws 50 and 51 and/or screws 51 and 52, whereafter the screws are tightened so that the cable/cables are clamped between the portion 49 and the plate 53.

The embodiment according to Figs 7 and 8 also brings about the advantage that the tongue 48 is easily bent (e.g. upwardly according to Fig. 7), which facilitates the mounting of the clamp on terminal posts of certain battery types as well as cable connection in confined spaces.

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2. Battery terminal post clamp according to claim 1, characterized in that the legs (6, 7) of said first part (1) are formed with guide recesses (10, 11) running in the longitudinal direction of the legs, said recesses ending in said openings (8, 9), and the legs (21, 22) of said second part (2) being guided along said recesses at relative movement of said two parts.

3. Battery terminal post clamp according to claims 1 or 2, characterized in that the overcentre mechanism consists of a substantially U-shaped operating lever (23) having two parallel legs (27, 28) extending outside said two parts (1, 2), a shaft (25), by means of which the legs (27, 28) of the operating lever (23) adjacent



their ends are pivotably mounted in the legs (21, 22) of one of the parts (2) adjacent the ends thereof, and a substantially U-shaped link (24) having a portion (33) parallel to said shaft (25), said portion 33 being pivotably mounted in the legs (6, 7) of the other part (1) adjacent the ends thereof, and having two legs (36, 37) extending from said portion (33), the ends (38, 39) of said legs of said link being turned inwardly and parallel to said shaft (25) and engage in the legs (27, 28) of the operating lever at a greater distance from the ends of the last said legs than does the shaft (25).

Revendications

1. Cosse de serrage pour bornes d'accumulateurs comportant un dispositif de couplage rapide pour sa connexion à une borne d'accumulateurs, comportant une première pièce sensiblement en U (1) ayant une partie de base (5) et des branches parallèles (6, 7) partant de celle-ci, et une seconde pièce aussi sensiblement en U (2) ayant une partie de base (18) et des branches parallèles (21, 22) partant de celle-ci, lesdites parties de base (5, 18) desdites première et seconde pièces (1, 2) étant de formes complémentaires de façon à épouser sensiblement la forme de la borne d'accumulateurs dans une position active de la cosse de serrage, tandis que lesdites branches (6, 7 et 21, 22 respectivement) des deux susdites pièces sont parallèles entre elles, les deux susdites pièces (1, 2) étant agencées pour être déplacées l'une par rapport à l'autre pour prendre et quitter ladite position active au moyen d'un dispositif à franchissement de point mort (23, 24, 25) relié aux deux susdites pièces, caractérisé en ce que la première pièce (1) a des trous (8, 9) dans les zones de transition entre sa partie de base (5) et ses branches (6, 7), les branches (21, 22) de la seconde pièce (2) s'étendent à travers lesdits trous, ledit dispositif à franchissement de point mort (23, 24, 25) étant relié aux branches (6, 7) de ladite première pièce (1) à l'extérieur de la partie de base (18) de ladite seconde pièce (2) et étant relié aux branches (21, 22) de ladite seconde pièce (2) à l'extérieur de la partie de base (5) de ladite première pièce (1), de sorte que les branches desdites première et seconde pièces sont retirées l'une de l'autre quand les parties de fond (5, 18) sont rapprochées l'une de l'autre dans la position active de la borne de serrage.

2. Cosse de serrage pour bornes d'accumulateurs selon la revendication 1, caractérisée en ce que les branches (6, 7) de ladite première pièce (1) présentent des évidements de guidage (10, 11) allant dans la direction longitudinale des branches, lesdits évidements se terminant par lesdits trous (8, 9), et les branches (21, 22) de ladite seconde pièce (2) étant guidées le long desdits évidements lors d'un mouvement relatif des deux susdites pièces.

3. Cosse de serrage pour bornes d'accumu-

lateurs selon les revendications 1 ou 2, caractérisée en ce que le mécanisme à franchissement de point mort est composé d'un levier de manoeuvre sensiblement en U (23) ayant deux branches parallèles (27, 28) s'étendant à l'extérieur des deux susdites pièces (1, 2), un axe (25), au moyen duquel les branches (27, 28) du levier de manoeuvre (23) sont articulés près de leurs extrémités dans les branches (21, 22) de l'une des pièces (2) près des extrémités de celles-ci, et une tringle sensiblement en U (24) ayant un tronçon (33) parallèle audit axe (25), ledit tronçon (33) étant articulé dans les branches (6, 7) de l'autre pièce (1) près des extrémités de celles-ci, et ayant deux branches (36, 37) s'étendant à partir dudit tronçon (33), les extrémités (38, 39) desdites branches de ladite tringle étant tournées vers l'intérieur et parallèles audit axe (25) et engagées dans les branches (27, 28) du levier de manoeuvre à une plus grande distance des extrémités des dernières susdites branches que l'axe (25).

Patentansprüche

1. Polklemme für Batterien mit einer Schnellkupplungsvorrichtung zu ihrer Verbindung mit einem Batteriepol mit einem ersten, im wesentlichen U-förmigen Teil (1), der einen Bodenabschnitt (5) und davon ausgehende parallele Schenkel (6, 7) aufweist, und mit einem zweiten in ähnlicher Weise im wesentlichen U-förmigen Teil (2), der einen Bodenabschnitt (18) und davon ausgehende parallele Schenkel (21, 22) aufweist, wobei die Bodenabschnitte (5, 18) der ersten und zweiten Teile (1, 2) so komplementär gestaltet sind, daß sie in einer Betriebsstellung der Klemme im wesentlichen konform zur Gestalt des Batteriepol sind, während die Schenkel (6, 7 bzw. 21, 22) der beiden Teile zueinander parallel und die beiden Teile mittels einer mit ihnen verbundenen, überzentrisch wirkenden Einrichtung (23, 24, 25) relativ zueinander in und außer Betriebsstellung verschiebbar sind, dadurch gekennzeichnet, daß der erste Teil (1) in den Übergangsbereichen seines Bodenabschnitts (5) in seine Schenkel (6, 7) Öffnungen (8, 9) hat, durch welche die Schenkel (21, 22) des zweiten Teils (2) hindurch verlaufen, und daß die überzentrisch wirkende Einrichtung (23, 24, 25) außerhalb des Bodenabschnitts (18) des zweiten Teils (2) mit den Schenkeln (6), des ersten Teils (1) und außerhalb des Bodenabschnitts (5) des ersten Teils (1) mit den Schenkeln (21, 22) des zweiten Teils (2) verbunden ist, so daß die Schenkel des ersten und zweiten Teils voneinander entfernt werden, wenn die Bodenabschnitte in der Betriebsstellung der Klemme näher aneinander herangebracht werden.

2. Polklemme nach Anspruch 1, dadurch gekennzeichnet, daß die Schenkel (6, 7) der ersten Teils (1) mit Führungsaussparungen (10, 11) versehen sind, die in Längsrichtung der Schenkel verlaufen und in den Öffnungen (8, 9)



enden, und daß die Schenkel (21, 22) des zweiten Teils (2) bei Relativbewegung der beiden Teile entlang dieser Aussparungen geführt sind.

3. Polklemme nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Überzentermechanismus aus einem im wesentlichen U-förmigen Betätigungshebel (23) mit zwei parallelen, außerhalb der beiden Teile (1, 2) verlaufenden Schenkeln (27, 28), einer Achse (25), mittels welcher die Schenkel (27, 28) des Betätigungshebels (23) nahe ihrer Enden schwenkbar in den Schenkeln (21, 22) einer der Teile (2) nahe deren Enden befestigt sind, und

einem im wesentlichen U-förmigen Verbindungsglied (24), das einen Abschnitt (33) parallel zur Achse (25) aufweist, besteht, wobei der Abschnitt (33) schwenkbar in den Schenkeln (6, 7) des anderen Teils (1) nahe deren Enden befestigt ist, und daß von diesem Abschnitt (33) zwei Schenkel (36, 37) des Verbindungsgliedes ausgehen, deren Enden (38, 39) nach einwärts gebogen und parallel zur Achse (25) sind sowie in die Schenkel (27, 28) des Betätigungshebels in einem größeren Abstand von den Enden der letztgenannten Schenkel eingreifen als die Achse (25).

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