Feb. 27, 1945. P. W. BRUDER 2,370,227

BATTERY TERMINAL CLAMP

Filed Sept. 30, 1943 2 Sheets-Sheet 1

Fig.1.

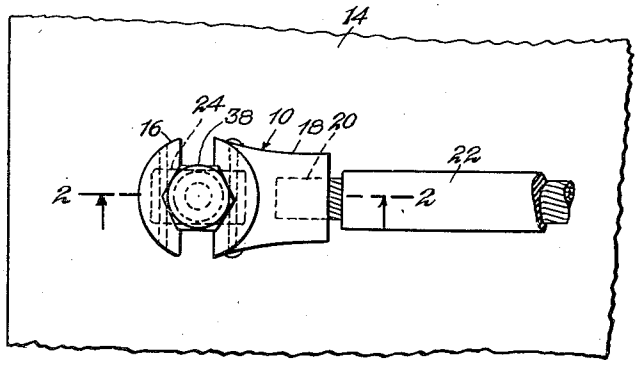


Fig.2.

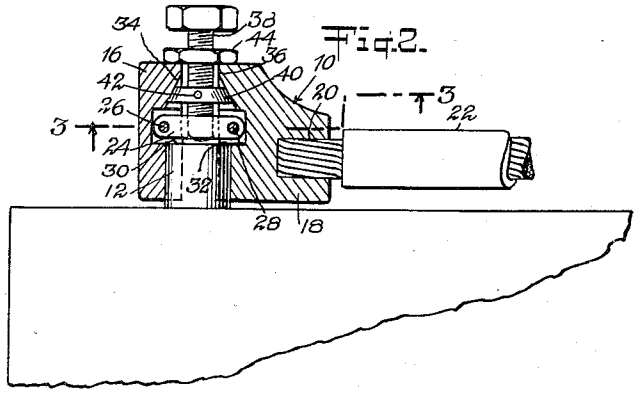


Fig.4.

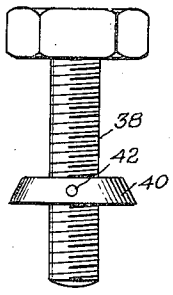


Fig.3.

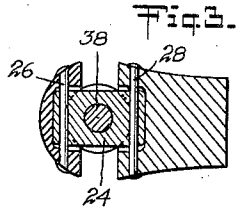
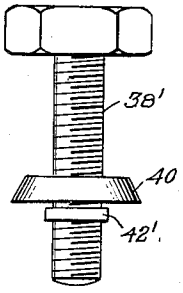


Fig.5.



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Fig. 6.

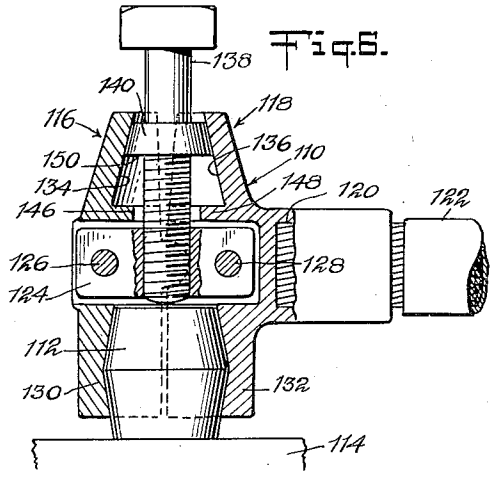


Fig. 7.

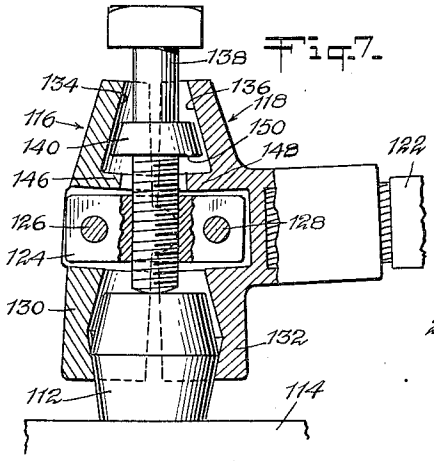


Fig. 8.

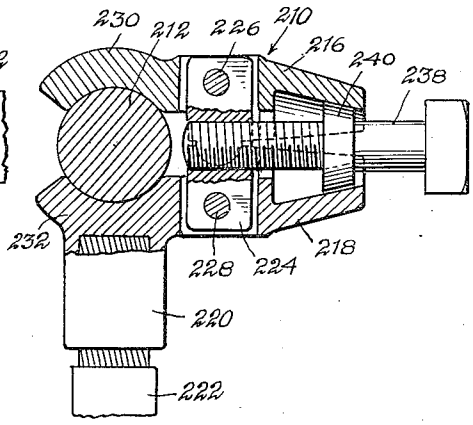
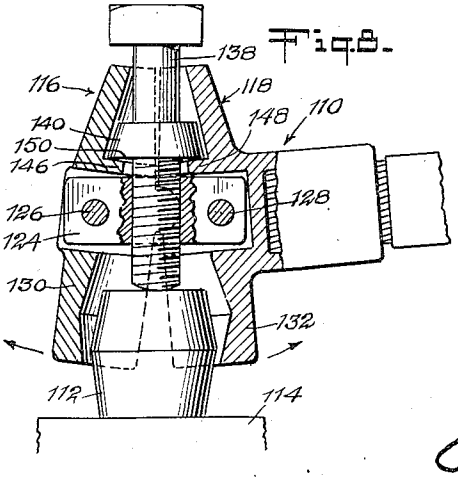


Fig. 8.



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Patented Feb. 27, 1945 2,370,227

UNITED STATES PATENT OFFICE

2,370,227

BATTERY TERMINAL CLAMP

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Application September 30, 1943, Serial No. 504,433

15 Claims. (Cl. 173—259)

This invention relates to an electric terminal clamp and has special reference to an improved clamp for a terminal such as a battery post.

Clamps for storage batteries are difficult to dislodge or remove after some use, because of the corrosion or oxidation that takes place between the post and the clamp which forms an incrusting bond resisting dislodgment or removal of the clamp. To break the corrosion bond, a tool such as a pair of pliers must ordinarily be used, which, however, is ill adapted for the work to be performed. Such terminal clamps may be constructed with means which is operated to effect secure attachment of the clamp to the terminal.

The prime object of my present invention is to provide an electric terminal such as a battery post clamp in which the means for effecting the secure attachment of the clamp to the post is combined with means which is operable for effecting the dislodgment of the clamp from the post and breaking the corrosion bond therebetween.

A more particular object of my invention centers about the provision of an electric terminal such as a battery post clamp wherein the same actuating device may be used for attaching the clamp on the battery post and for dislodging or disengaging the clamp from the post.

A further object of my invention is to provide an electric terminal such as a battery post clamp of the above described type, wherein the operating parts are arranged above the points of corrosion or oxidation.

This application is a continuation-in-part of my application, Serial No. 454,506, filed August 12, 1942, for Battery terminal clamp, and abandoned October 8, 1943.

Other objects and advantages of my invention will become apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a top plan view of my electric terminal clamp showing one of the modifications thereof;

Fig. 2 is a vertical sectional view of the clamp taken in the plane of the line 2—2 of Fig. 1;

Fig. 3 is a horizontal sectional view of the clamp taken in the plane of the line 3—3 of Fig. 2;

Fig. 4 is an enlarged view of the actuating and operating means for the clamp;

Fig. 5 is an enlarged view of a different embodiment of the actuating and operating means of the clamp;

Fig. 6 is a vertical sectional view of a modified form of a clamp showing the same in a first active position;

Fig. 7 is a similar view thereof showing the same in a second active position;

Fig. 8 is a similar view thereof showing the same in a third active position; and

Fig. 9 is a horizontal sectional view of a modified form of the clamp.

Referring now more in detail to the drawings and having reference first to Figs. 1 to 4 thereof, which show one of the embodiments of the invention, a clamp generally designated as 10 is constructed for attachment to a battery terminal such as a post 12 of a battery 14. The clamp 10 comprises a plurality of clamping members movable relatively to each other as, for example, the pair of clamping members 16 and 18, which are movable preferably pivotally with respect to each other. The clamping member 18 may be provided with a socket 20 for connection with an electrical conductor 22, which conductor may be brazed in the socket 20. The clamping members 16 and 18 are movably connected with each other by means of a connecting member such as the plate or bar 24. The ends of the bar 24 are placed in recesses on the inner walls of the clamping members. The clamping member 16 is pivotally connected with one end of the bar 24 by means of the pin 26, and the clamping member 18 is pivotally connected with the other end of the bar 24 by means of a pin 28.

The lower inner oppositely disposed walls 30, 32 of the clamping members 16 and 18 below the connecting bar 24 comprise clamping jaws and are shaped for accommodating therebetween the battery post 12. Usually such battery posts are conically shaped to facilitate dislodgment of the clamp in spite of the fact that such a shape militates against the most efficient clamping action. By reason of the present invention the shape of the battery post may be made cylindrical or even barrel-shaped so that the most efficient clamping engagements may be assured. In the embodiment shown in Figs. 1 to 4, the said jaws 30, 32 of the clamping members, as well as the battery post, are of cylindrical shape. The upper inner oppositely disposed walls 34, 36 of the clamping members 16 and 18 above the connecting bar or plate 24 are of a conical shape for a purpose to be described hereinafter.

The clamp 10 is provided with means for moving the clamping members and particularly its clamping jaws into engagement with the electric terminal or battery post 12. This means comprises an actuating device mounted on the clamp 10 and movable in opposite directions, the said actuating device being provided with means ac-

tive when the actuating device is moved in one of its directions for moving said clamping members and particularly the jaws thereof into clamping engagement with the battery post. In its most simple and preferred form this means comprises a screw 38 which is received into a screw threaded aperture of the connecting plate or bar 24 and which is thereby threadedly rotatable in opposite directions in the clamp, the said screw forming the actuating device. The means which is connected to and operated by this actuating device and which is active when the device is moved in one of its directions for moving the clamping jaws into clamping engagement may be made to comprise in its simplest form a collar 40 secured to the screw 38 by means of a pin 42 or by welding, the said collar being provided with a conical circumference or periphery, the said collar thereby defining a cam member.

Prior to the attachment of the clamp to the battery post, the screw 38 is in an intermediate position, in which the conical surface of the collar or cam 40 is disengaged from the upper inner conical walls 34, 36 of the clamping members. In this position the clamping members 16 and 18 are free to be moved about their pivots so that the clamp may be readily mounted on the battery post with the clamping jaws 30, 32 thereof spread apart. To attach the clamp, the screw 38 is rotated in a direction (as, for example, counterclockwise) to move the same into what may be described as its first active position, in which the collar or cam 40 is lifted so that its conical surface comes into engagement with the upper conical inner walls 34, 36 of the clamping members 16, 18. This engagement of the collar or cam 40 with the inner conical walls of the clamping members causes the clamping members to turn about their pivots 26, 28, whereby the jaws 30, 32 of the clamping members are tightly urged against the battery post 12. The screw 38 may, if desired, be secured in its final position by a lock nut 44.

Upon movement or rotation of the screw 38 in the opposite direction and back, say, to its intermediate position, the cam 40 is disengaged from the clamping members thus releasing said clamping members. The clamping members 16 and 18 would then normally be movable so that the jaws 30, 32 could be moved to spread apart condition were it not for the fact that after some use the jaws are firmly bonded and incrusted to the battery post by the corrosion which has taken place. To dislodge the clamp from the battery post it is necessary to break this incrusting bond. In the clamp of the present invention I provide means which is operated by the actuating screw 38 when moved or rotated in its opposite direction or when moved from its said intermediate position to a second active position, which means is made to engage the end or top of the terminal or battery post and forcibly so as to dislodge the already released clamping members therefrom. This I preferably do by mounting the screw 38 as described so that it acts as a thrust screw. The bottom end of the screw 38 thereby forms the means or the part which engages the battery post 12 during the movement or rotation of the screw 38 into its second active position, this engagement (and the continued rotation of the screw) being effective for pulling the clamp away from the battery post and thereby dislodging or disengaging the clamp therefrom.

In Fig. 5 of the drawings, I illustrate a different embodiment of the actuating means. In this embodiment the collar or cam 40 is loosely arranged on the thrust screw 38' provided with a shoulder 42'. The collar or cam 40 normally rests on the shoulder. If the screw 38' is unscrewed from the connecting member, the shoulder 42' carries the collar upwardly for engagement with the inner conical walls of the clamping members.

In Figs. 6, 7 and 8 of the drawings, I show a modification of the clamp embodying a construction in which the two active positions described in connection with the form of the invention of Figs. 1 to 4 are combined with a third active position, which latter is identified with means for moving the clamping members in a direction out of clamping engagement after the clamping members have been dislodged from the terminal. The structure shown in Figs. 6, 7 and 8 is otherwise substantially the same as that shown in Figs. 1 to 4, and the similar parts are indicated by similar reference numerals prefixed by the numeral 1.

Fig. 6 shows the position the parts of the clamp assume when the actuating device 138 has been moved from an intermediate position to its first active position. The thrust screw 138 has been rotated in a direction to lift the cam 140 and to cause this cam to act against the inner surfaces 134 and 136 of the clamping members 116 and 118, with the result that these clamping members have been caused to turn about their pivots 126 and 128 whereby the jaws 130 and 132 have been brought into tight clamping engagement with the battery post 112. It will be noted that in the form of the invention here illustrated, the battery post has been made barrel-shape and the interior walls of the clamping jaws 130 and 132 have also been correspondingly shaped, this so as to secure a firm interlock between the two. Fig. 7 of the drawings shows the condition that the parts of the clamp assume when the thrust screw 138 is moved or rotated in its opposite direction and to its second active position. The first action that takes place is the disengagement between the cam 140 and the conical surfaces 134 and 136 of the clamping members whereby the clamping members are released. The jaws 130 and 132 are, however, corrosion bonded to the battery post 112. The action that next takes place is the engagement of the bottom end or part of the thrust screw 138 with the top wall of the battery post 112 as clearly shown in Fig. 7 of the drawings. Upon continued rotation of the thrust screw 138 in the same direction, the clamp 110 is forcibly lifted away from the post 112 and the clamping jaws 130, 132 are caused to move after the manner shown in Fig. 7 to become finally dislodged from the post.

In Fig. 8 of the drawings is illustrated the third active position assumed by the parts of the clamp in this modified form of the invention. The clamping members are formed interiorly with the two ledges or flanges 146 and 148 arranged in the path of the cam 140 and adapted to be engaged by the underneath face 150 of this cam. Upon continued rotation of the thrust screw 138 in the direction last described, the cam 140 moves from the position shown in Fig. 7 to that shown in Fig. 8, in which latter position the cam surface 150 engages the ledges or flanges 146 and 148 and exercises a powerful leverage on the clamping members 116 and 118 to move the same about their pivots 126 and 128 in the directions indicated by the arrows in Fig. 8 of the drawings. Thus the clamping members, after the clamp has been forcibly dislodged in an axial direction from the battery post, are caused to move positively in a

direction out of clamping engagement with the post, spreading the same a distance for wide clearance and more easy removal from the electric terminal.

In Fig. 9 of the drawings, I show a still further modification of the invention, this showing the parts arranged for mounting on an electric terminal such as a battery post in a horizontal or transverse direction instead of from a vertical direction. The parts of the clamp shown in this modification are otherwise similar to the clamp parts of Figs. 6 to 8 of the drawings and are designated by similar reference characters prefixed by the numeral 2. As will be seen from an inspection of Fig. 9 of the drawings, the clamp 210 is mountable by being transversely movable with reference to the vertical terminal or post 212. The action of this clamp movable into its three active positions is the same as the clamp of Figs. 6 to 8 of the drawings, with the exception that the bottom end of the thrust screw 238 in its second active position acts upon the side wall instead of the end wall of the post or terminal 212.

The electric terminal clamp of my present invention, the manner of making and using the same in its various modifications, and the advantages thereof will, it is believed, be fully apparent from the above detailed description thereof. It will be further apparent that many changes may be made without departing from the spirit of the invention. For example, the clamping members may be pivotally connected with each other in different ways or may be generally movable with respect to each other. While I have shown two clamping members, it will be apparent that these may be multiplied if desired. While I have shown the operating means for the clamping members and for dislodging the clamp from the terminal as preferably directly connected or even integral with the actuating device, it will be apparent that these may be made in separate parts, arranged, however, to operate as described. Many other modifications may be made without changing the essence of the invention as defined in the following claims.

I claim:

1. An electric terminal clamp comprising in connected combination, a plurality of clamping members movable relatively to each other, an actuating device mounted thereon and movable in opposite directions, means operated by said actuating device active when the actuating device is moved in one of its directions for moving said clamping members into clamping engagement with an electric terminal and active when the actuating device is moved in its opposite direction for releasing such clamping engagement, and means operated by said actuating device when moved in its opposite direction for engaging the said terminal to dislodge the released clamping members therefrom.

2. An electric terminal clamp comprising in connected combination, a plurality of clamping members movable relatively to each other, an actuating device mounted thereon and movable in opposite directions, means operated by said actuating device active when the actuating device is moved in one of its directions for moving said clamping members into clamping engagement with an electric terminal and active when the actuating device is moved in its opposite direction for releasing such clamping engagement without, however, moving said clamping members, means operated by said actuating device when moved in its said opposite direction for engaging the said terminal to dislodge the released clamping members therefrom, and means operated by the actuating device when moved in its said opposite direction for moving the clamping members in a direction out of clamping engagement after the clamping members have been dislodged from the terminal.

3. An electric terminal clamp comprising in connected combination, a pair of clamping members pivotally connected with each other and provided with a pair of clamping jaws, an actuating device mounted on said clamping members rotatable in opposite directions, means operated by said actuating device active when the actuating device is rotated in one of its directions for moving said clamping members to move said jaws into clamping engagement with an electric terminal and active when the actuating device is rotated in its opposite direction for releasing such clamping engagement without, however, moving the clamping members, and means operated by said actuating device when rotated in its said opposite direction for engaging the said terminal to pull the released clamping members away therefrom.

4. An electric terminal clamp comprising in connected combination, a pair of clamping members pivotally connected with each other and provided with a pair of clamping jaws, an actuating device mounted on said clamping members and rotatable in opposite directions, means operated by said actuating device active when the actuating device is rotated in one of its directions for moving said clamping members to move said jaws into clamping engagement with an electric terminal and active when the actuating device is rotated in its opposite direction for releasing such clamping engagement without, however, moving the clamping members, and means operated by said actuating device when rotated in its said opposite direction for first engaging the said terminal to pull the released clamping members away therefrom and for then moving the clamping members to move the clamping jaws in a direction out of clamping engagement.

5. A battery terminal clamp comprising a pair of clamping members for a battery post pivotally connected with each other, means for connecting an electrical conductor to one of said clamping members, and an actuating device connected with said clamping members and operable in one direction away from and in the opposite direction towards said battery post, said actuating device being arranged for turning said clamping members about their pivot upon an operation of said actuating device in one direction so as to urge said clamping members against a battery post and the same actuating device being arranged for engaging said battery post upon an operation of said actuating device in opposite direction so as to dislodge the clamping members therefrom.

6. A battery terminal clamp comprising a pair of clamping members pivotally connected with each other, means for connecting an electrical conductor to one of said clamping members, and actuating means connected with said clamping members, said actuating means being movable from an intermediate position into a first active position and into a second active position, said actuating means being arranged for turning said clamping members about their pivot during a movement into said first active position so as to urge said clamping members against a battery post, and the same actuating means being arranged for engagement with said battery post during a movement into said second active posi-

tion so as to dislodge the clamping members from said battery post.

7. A battery terminal clamp comprising a pair of clamping members, a connecting member provided with an aperture, each of said clamping members being pivoted to said connecting member, means for connecting an electrical conductor to one of said clamping members, a thrust member movably arranged in the aperture of said connecting member, said thrust member being movable from an intermediate position into a first active position and into a second active position, and a cam connected with said thrust member, said cam being arranged on one side of the pivotal connection between the clamping means and the connecting member for engagement with said clamping members during a movement of said thrust member into said first active position so as to turn said clamping members about their pivot for urging same against a battery post, and a portion of said thrust member being arranged on the other side of said pivotal connection for engagement with said battery post during a movement of the thrust member into said second active position so as to dislodge the clamping members from said battery post.

8. A battery terminal clamp comprising a pair of clamping members, a connecting member provided with a screw threaded aperture, each of said clamping members being pivoted to said connecting member, means for connecting an electrical conductor to one of said clamping members, the upper inner oppositely disposed surfaces of said clamping members above said connecting member being of conical shape, the lower inner opposite disposed surfaces of said clamping members below said connecting member being shaped for accommodating therebetween a battery post, a thrust screw threaded into said aperture of said connecting member, said thrust screw being movable from an intermediate position into a first active position and into a second active position, and a cam associated with said thrust screw, said cam being arranged for engagement with said upper inner surfaces of said clamping members during a movement of said thrust screw into said first active position so as to turn said clamping members about their pivot for urging their lower inner surfaces against said battery post, and said thrust screw being arranged for engagement with said battery post during a movement thereof into said second active position so as to dislodge the clamping members from said battery post.

9. A battery terminal clamp comprising a pair of clamping members, a connecting member provided with a screw threaded aperture, each of said clamping members being pivoted to said connecting member, means for connecting an electrical conductor to one of said clamping members, the upper inner oppositely disposed surfaces of said clamping members above said connecting member being of conical shape, the lower inner oppositely disposed surfaces of said clamping members below said connecting member being shaped for accommodating therebetween a battery post, a thrust screw threaded into said aperture of said connecting member, said thrust screw being movable from an intermediate position into a first active position and into a second active position, a shoulder on said thrust screw, and a collar loosely arranged on said thrust screw, said collar having a conical circumference and normally resting on said shoulder, said collar being arranged for engagement of its circumference with said upper conical inner surfaces of said clamping members during a movement of said thrust screw into said first active position so as to turn said clamping members about their pivot for urging their lower inner surfaces against said battery post, and said thrust screw being arranged for engagement with said battery post during a movement thereof into said second active position so as to dislodge the clamping members from said battery post.

10. A battery terminal clamp comprising a pair of clamping members pivotally connected with each other, means for connecting an electrical conductor to one of said clamping members, actuating means connected with said clamping members, said actuating means being movable from an intermediate position into a first active position and into a second active position, and locking means connected with said actuating means for holding same in said first active position, said actuating means being arranged for turning said clamping members about their pivot during a movement into said first active position so as to urge said clamping members against a battery post, and the same actuating means being arranged for engagement with said battery post during a movement into said second active position so as to dislodge the clamping members from said battery post.

11. An electric terminal clamp comprising a pair of clamping members pivotally connected with each other, and an actuating means connected with said clamping members, said actuating means being movable from an intermediate position into a first active position and into a second active position, said actuating means having a part for turning said clamping members about their pivot during a movement into said first active position so as to urge said clamping members against an electric terminal, and the said actuating means having a part for engagement with said electric terminal during a movement into said second active position so as to dislodge the clamping members from said electric terminal.

12. An electric terminal clamp comprising a pair of clamping members pivotally connected with each other, and an actuating means connected with said clamping members, said actuating means being movable from an intermediate position into a first active position and into second and third active positions, said actuating means having a part for turning said clamping members about their pivot during a movement into said first active position so as to urge said clamping members against an electric terminal, and the said actuating means having another part for engagement with said terminal during a movement into said second active position so as to dislodge the clamping members from said electric terminal, and said actuating means having a third part for turning said clamping members about their pivot during the movement into said third active position so as to move the clamping members in a direction out of clamping engagement.

13. The electric terminal clamp of claim 11 in which the actuating means comprises a thrust screw threadedly mounted in the clamp, the part for turning the clamping members comprises a cam on said thrust screw and the part for engaging the terminal comprises the bottom end of said thrust screw.

14. The electric terminal clamp of claim 12 in which the actuating means comprises a thrust

screw threadedly mounted in the clamp, the part for turning the clamping members into clamping engagement comprises one face of a cam on said thrust screw, the part for engaging the terminal comprises the bottom end of the thrust screw and the part for turning the clamping members in a direction out of clamping engagement comprises another face of said cam.

15. An electric terminal clamp comprising in connected combination, a plurality of clamping members movable relatively to each other, an actuating device mounted thereon and movable into different positions, means operated by said actuating device active when the actuating device is moved to one position for moving said clamping members into clamping engagement with an electric terminal and active when the actuating device is moved to another position for releasing such clamping engagement, and means operated by said actuating device when moved to said other position for engaging the said terminal to dislodge the released clamping members therefrom.

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