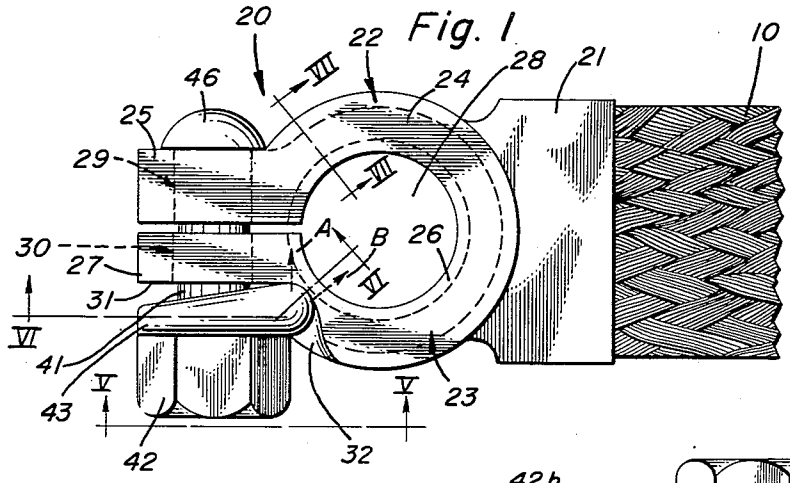
Sept. 17, 1957 J. E. WILSON, JR 2,807,000

CAMMED TERMINAL CLAMP FOR A BATTERY CABLE

Filed Jan. 25, 1956

Fig. 1



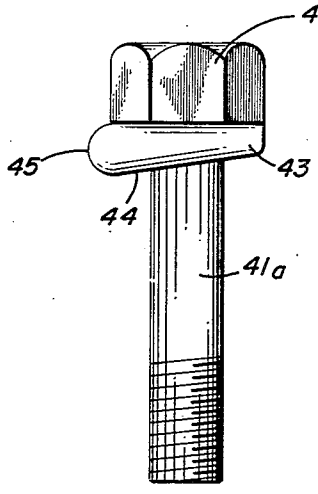


Fig. 2

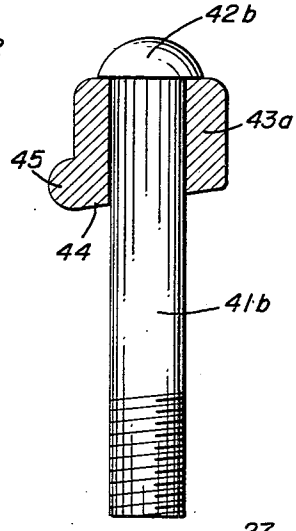


Fig. 3

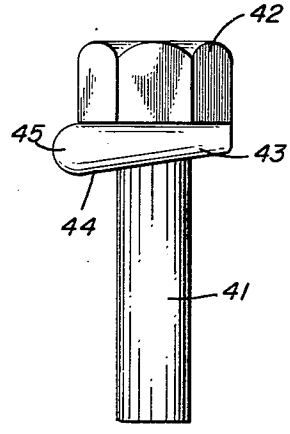


Fig. 4

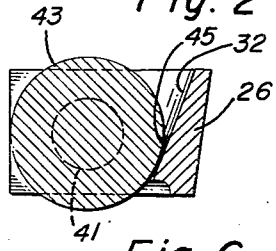


Fig. 6

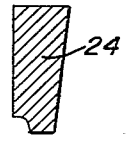


Fig. 7

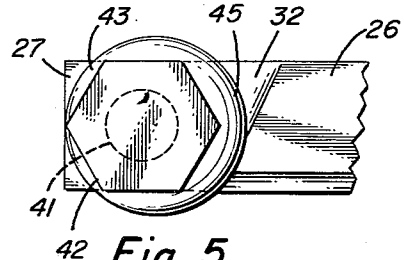


Fig. 5

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CAMMED TERMINAL CLAMP FOR A BATTERY CABLE

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5 Claims. (Cl. 339—236)

This invention relates to a terminal clamp for a battery cable preferably of the type used on automobiles.

Present day terminal clamps for battery cables are constructed of a cast and highly conductive metal such as copper. The clamps are formed of two jaws having clamping portions which clamp about the post of the battery and flanges extending from the free ends of the clamping portions. Heretofore, a conventional bolt with a nut on the end has been used to force the two flanges together for drawing the clamping portions tightly against the battery post. The disadvantage of this type of clamping action is that it requires screwing of the nut on the bolt which usually requires several turns before the jaws are clamped securely on the post.

This clamping operation involving tightening the nut is sometimes annoying and time consuming especially when the battery is located in a position where the nut is difficult to turn. Invariably, the cable or clamp obstructs the tool for turning the nut, making it even more difficult. Frequently, the clamp is not secured sufficiently tight on the battery posts because of the inherent binding and frictional forces on the nut makes it difficult to determine the number of times necessary to tighten the clamp. The only way to determine the tightness is to test whether the clamp can be easily pried from the post with a screw driver or other instrument. This test is not fool proof because in prying the clamp from the post it binds on the post and appears to be secured thereto although in reality the contact between the post and the clamp is not sufficiently tight to give good contact. A loose contact between the clamp and the post is obviously undesirable.

An object of this invention is to provide a terminal clamp having means for quickly securing a clamp to a battery post.

Another object of this invention is to provide a terminal clamp for a battery, the means for tightening such clamp positively assuring a good contact between the clamp and the post.

Still another object of this invention is to provide a terminal clamp for a battery cable, such clamp having means for assuring a positive pressure on the battery post.

A further object of this invention is to provide a cam means for tightening a terminal clamp for a battery, such cam means requiring less than one turn for connecting the clamp on the battery post.

A further object of this invention is to provide a terminal clamp for a battery cable, such clamp having cam means which not only tightens the jaws of the clamp but exerts a pressure on the clamping surface whereby a positive and more tight contact is established between the post and the clamp.

Other objects of this invention will become obvious upon reading the following specifications in conjunction with the accompanied drawings wherein:

Fig. 1 is a plan view of the terminal clamp for a battery cable.

Fig. 2 is a side, elevational view of one form of stud or bolt with cam means for use in the clamp of Fig. 1.

Fig. 3 is a side, elevational view of another stud or bolt with cam means for use in the clamp of Fig. 1.

Fig. 4 is a side, elevational view of still another form of stud or bolt with cam means for use in the clamp of Fig. 1.

Fig. 5 is an end view of the clamp taken along the plane V—V of Fig. 1.

Fig. 6 is a cross sectional view taken along the plane VI—VI of Fig. 1.

Fig. 7 is a cross sectional view taken along the plane VII—VII of Fig. 1.

Briefly this invention is concerned with a terminal clamp for a battery cable. A part of this clamp is of conventional design and includes a pair of opposed jaws adapted to clamp on a battery post. The jaws have a clamping portion defining an opening for a battery post. Opposed spaced flanges are integral with and extend from the clamping portions. The improvement includes a stud or bolt passing through apertures in the flanges, such stud or bolt having cam means for forcing the flanges toward each other thereby causing the clamp to close. In the preferred form of this invention the exterior wall of the clamping portions has a groove in which a working surface of the cam means fits. Upon rotation of the cam means, the cam forces the flanges together and at the same time forces the wall of one of the clamping portions radially inwardly.

Referring to the drawings, Fig. 1 shows a battery cable **10** of the metallic braided type. The cable **10** is secured to the clamp **20** by any suitable means such as a tongue and groove arrangement.

The clamp **20** includes a base **21** secured to the braided cable **10**. Extending from the base **21** are two opposed jaws **22** and **23**. Jaws **22** and **23** are adapted to be clamped about a battery post for connecting the cable **10** to the battery.

Jaw **22** includes a clamping portion **24** and a flange **25** extending therefrom. Jaw **23** includes the clamping portion **26** and the flange **27**. As shown in the drawings the clamping portions **24** and **26** define an opening **28** for receiving a battery post. The flanges **25** and **27** extend from the clamping portions and are opposed and parallel to each other. Thus, when forced towards each other, the flanges effect a clamping action by the clamping portions **24** and **26**. This construction described thus far is conventional and can be fabricated of conventional material.

The flanges **25** and **27** have the apertures **29** and **30**, respectively, for receiving the stud or bolt **41**.

The present day method of forcing the two flanges **25** and **27** together to effect a clamping action by the clamping portions **24** and **26**, is to provide a common bolt having a threaded end with a nut thereon. The bolt and nut are arranged so that when the nut is tightened it forces the two flanges **25** and **27** together.

In accordance with this invention I have provided a cam means for forcing the two flanges together. This cam means, in conjunction with the flanges and also with one of the clamping portions **26**, provides a more positive clamping action, assuring that the clamp is tightly secured to the post and at the same time giving a more positive contact between the clamp and the post.

This cam means includes the post or stud **41** having on one end a hexagonal or other shaped head which is adapted to be gripped by a conventional tool for turning the same. Immediately adjacent the head **42** is the cam portion **43**. The cam portion **43** has a working face **44** inclined at an angle to the surface **31** of flange **27** on which surface the working face **44** normally rides. The cam portion **43** also has a working edge **45** protruding

radially from the post **41**. The working edge **45** extends beyond the marginal edges of head **42**.

Working edge **45** cooperates with a groove **32** formed at the juncture of the flange **27** and the clamping portion **26**. Groove **32** is inclined upwardly (Fig. 6) so that it is deeper at the top than at the bottom. This shape is provided so that the groove will initially receive the working edge **45** but upon further turning of the head **42** and cam **43** the working surface **45** will engage the wall of the groove forcing the clamping portion **26** radially inwardly. At the same time, the working face **44**, which is inclined at an angle to the plane of the flange face **31**, engages another part of the groove. This forces the flanges **25** and **27** toward each other. The exact configuration of groove **32** and of cam portion **43** can be varied in accordance with the exact position of the groove and the cam portion. They can also vary with the size of the flanges **25** and **26** and the position of the stud **41** extending therethrough.

In the broadest aspect of this invention the shape of the cam and its relationship to the jaws of the clamp is such that a force as illustrated by the dotted arrow A (Fig. 1) is exerted on the flanges tending to close the flanges. In the preferred form of this invention the shape of the cam **43** and the arrangement of groove **32** is such that the cam forces the flanges **25** and **27** together and at the same time exerts a force on one of the clamping portions **26** as illustrated by the dotted arrow B (Fig. 1).

The cam means for closing the clamp **20** can take several forms. In Fig. 1 is shown the preferred form described above. The end of the post or stud **41** is peened over at **46**. This peened end **46** can be a threaded end as shown in Fig. 2. Such form may sometimes be desirable because as the head **42** is turned or rotated the nut on the head of the stud **41***a* also tightens resulting in a tighter connection.

Both forms of Figs. 2 and 4 show the cam **43** integral with the stud **41** and head **42**. In a broader aspect of this invention, this is not essential. A separate cam element **43***a* as shown in Fig. 3 can be substituted for the integral cam elements **43**. Cam element **43***a* is shaped like heads **42** so that it can be directly manipulated by any conventional tool. The cam element **43***a* preferably rotates relative to the post **41***b*. In many cases, however, it is prevented from rotating due to the frictional force created at the head **42***b* and at the face **31** of flange **27**. In this particular form, element **43***a* may be made integral with the stud **42***b* in somewhat the same manner as the form of Figs. 2 and 4.

Operation

The operation of this clamp is very simple. It has many advantages over a conventional type terminal clamp. The clamp is first opened by turning or rotating the head **42** with any conventional tool such as a pliers or wrench. This turning movement is in a direction which will disengage the working edge **45** and working face **44** from the walls of the groove **32**. Turning the head in this direction permits the flanges, which are normally biased outwardly due to the inherent resiliency of the metal, to spring outwardly and open the jaws **22** and **23**. Having opened the clamp, the clamp is placed on a battery post so that the opening **28** receives the post. Then by a simple manipulation or turning of the head **42** in the opposite direction, the working face **44** and working edge **45** engage the walls of the groove **32**. The working face **44** forces the flange **27** in a direction as indicated by the dotted arrow A (Fig. 1). At the same time the working edge **45** forces the clamping portion **26** in a direction as indicated by the dotted arrow B. This clamping action is accomplished by less than a complete turn of the head **42**. In fact the shape of the cam **43** and the groove **32** can be made so that an extremely small degree of rotation of head **42** will result in the clamping action. The degree of rotation depends upon the mechanical advantage

desired. The greater the mechanical advantage desired the greater degree of rotation.

It is evident that with the application of forces in directions indicated by arrows A and B, a more positive clamping action on the post results. It should be equally evident that with this mechanism a positive contact between the clamp **22** and the post is assured whereas with a conventional nut and bolt arrangement there is always left some doubt as to whether the nut has been screwed on sufficiently tight to give the required positive contact between the clamp and the post.

This small degree of rotation of the head **42** made possible by this invention makes the connecting operation for the cable **10** quicker and less difficult.

The clamp of this invention is no larger than the standard cable clamp. It can be fabricated in the same way as other clamps. For example the clamp **20** including the jaws **22** and **23** and the base **21** can be cast as an integral unit in the same way as present day cable clamps. The only difference is that the mold for the clamp has to include the groove **32** which has little effect upon the overall cost of manufacture. Since the clamp of this invention is similar to a conventional one, the clamp can fit on any standard cable and it is interchangeable with present day equipment. The clamp does not require any special tools and ordinary pliers will work satisfactorily.

Having described my invention it should be understood that although I have shown preferred embodiments and modifications, these embodiments and modifications can be changed without departure from the spirit of this invention. Therefore all modifications or changes made in the specific clamp shown and described herein shall be considered covered by this invention unless the appended claims expressly state otherwise.

I claim:

1. In a terminal clamp for a battery cable; said clamp having two opposed jaws; said jaws having clamping portions adapted to clamp about a battery post; opposed spaced flanges extending from said clamping portions; the improvement comprising: rotatable cam means having working surfaces adapted to force said flanges and said clamping portions toward each other to cause said jaws to move from an open position to a clamping position on said battery post said working surface including a working edge engaging said clamping portion and forcing the wall of said clamping portion against said post.

2. In a terminal clamp for a battery cable; said clamp having two opposed jaws; said jaws having clamping portions adapted to clamp about a battery post; opposed spaced flanges extending from said clamping portions; aligned apertures in said flanges; a bolt extending through said apertures; the improvement comprising cam means rotatable about the axis of said bolt and having a working face extending axially of said bolt and adapted to force said flanges and clamping portions toward each other; said cam means also having a working edge extending radially of said bolt and adapted to engage one of said clamping portions whereby said clamping portion is additionally forced against said post in a direction at an angle to the axis of said bolt whereby said one clamping portion is forced radially inwardly.

3. In a terminal clamp for a battery cable; said clamp having two opposed jaws; said jaws having clamping portions adapted to clamp about a battery post; opposed spaced flanges extending from said clamping portions; aligned apertures in said flanges; a bolt extending through said apertures; the improvement comprising cam means rotatable about the axis of said bolt and having a working face extending axially of said bolt and adapted to force said flanges and clamping portions toward each other; said working face being shaped to effect, in less than one revolution of said means about the axis of said bolt, the closing of said jaws from open position; said cam means also having a working edge extending radially of said bolt and adapted to engage one of said clamping portions

whereby said clamping portion is additionally forced against said post in a direction at an angle to the axis of said bolt whereby said one clamping portion is forced radially inwardly.

4. A terminal clamp for a battery cable; said clamp having two opposed jaws; said jaws having a pair of arcuate shaped clamping portions adapted to clamp about a battery post; opposed spaced flanges extending from said clamping portions; aligned apertures in said flanges; a stud extending through and rotatable in said apertures; a cam on one end of said stud; said cam having a working face with a protruding portion extending axially of said stud; said cam also having a working edge with a protruding portion extending radially of said bolt; said working face and edge having a cooperative relationship whereby when said stud is rotated said working face forces said flanges toward each other and said working edge forces one of said clamping portions radially inwardly effecting a tight clamping action of said clamp about said post.

5. A terminal clamp for a battery cable; said clamp having two opposed jaws; said jaws having a pair of arcuate shaped clamping portions adapted to clamp about a battery post; opposed spaced flanges extending from said clamping portions; one of said jaws having a groove in the exterior surface thereof in proximity to the juncture of its flange and clamping portion; aligned apertures in said flanges; a stud extending through and rotatable in said apertures; a cam on one end of said stud; said cam having a working face with a protruding portion extending axially of said stud; said cam also having a working edge with a protruding portion extending radially of said bolt; said cam being adapted to enter said groove upon rotation of said stud whereby said working face exerts a force on said jaw in a direction substantially parallel to the axis of said stud and said working edge exerts a force on said jaw in a direction at an angle to the axis of said stud effecting a tight clamping action of said clamp about said post.

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