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J. K. SCHAEFER

3,389,368

BATTERY TERMINAL CONNECTOR

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FIG. 1.

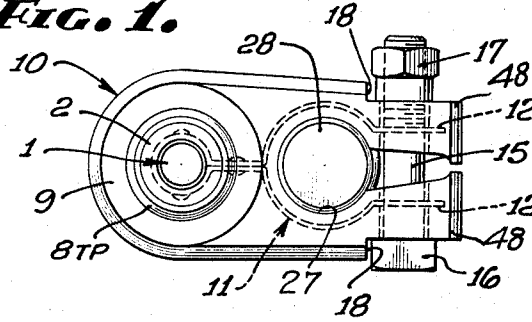


FIG. 2.

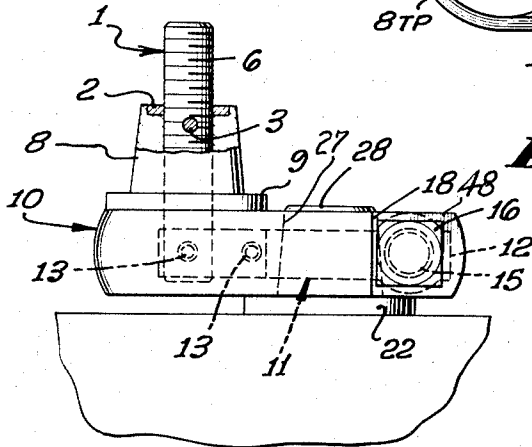


FIG. 3.

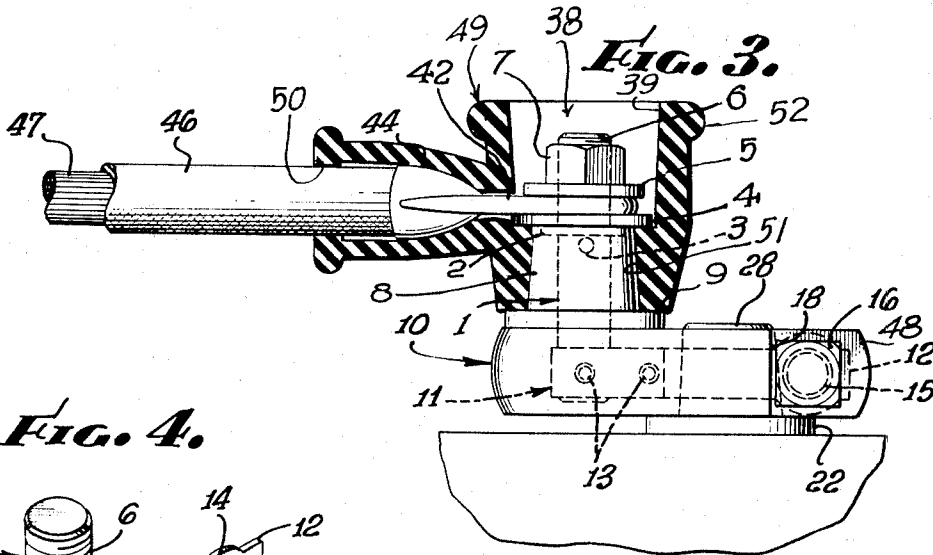
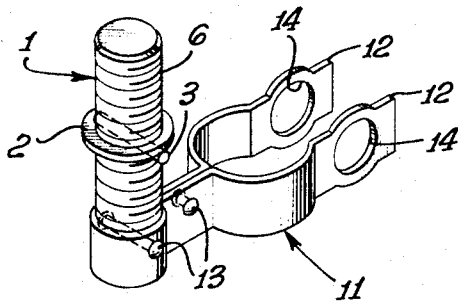


FIG. 4.



INVENTOR
JOSEPH K. SCHAEFER
 BY *Lyons & Lyons*
 ATTORNEYS

1

3,389,368

BATTERY TERMINAL CONNECTOR
Joseph K. Schaefer, 2107 N. Beachwood Drive,
Hollywood, Calif. 90028
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9 Claims. (Cl. 339-116)

The present invention relates generally to an electrical connection and particularly to a battery terminal connector having an improved terminal post portion. This invention is an improvement over the invention disclosed in my copending application entitled, "Isolated Electrical Terminal Connection," filed in the United States Patent Office on Nov. 3, 1967, Ser. No. 685,229.

The purpose of the present invention is to provide an improved die-cast terminal post to be clamped to a standard battery terminal having the capability of being interchangeably usable with a battery cable having a standard SAE split clamp or a cable lug which is either soldered or mechanically crimped onto the battery cable.

The present invention provides a connector having a tapered terminal post with a threaded steel stud embedded therein and offers the user a quick method of providing an electrical connection to a storage battery without the requirement of a permanent threaded steel stud. This eliminates the necessity of special processes generally necessary where it is desirable to obtain a strictly waterproof electrical connection as required by applicant's waterproof electrical connection.

The principal object of the present invention is to provide a means for making a semi-isolated connection to a battery terminal post by adapting to the standard battery terminal post a split clamp of conventional design having a threaded stud.

Another object of the invention is to provide a means for attaching to a battery terminal post a battery cable having a cable lug thereon.

Another object of the present invention is to provide an easy and temporary means for adapting a standard storage battery for use with a terminal connector of the type described in applicant's co-pending application filed Aug. 10, 1964, Ser. No. 388,368.

A further object of the present invention is to provide a connector having improved electrical contact between the cable and the battery over that obtained with the ordinary lead to lead contact.

A still further object of the invention is to provide an electrical connection assembly with which a rapid and non-destructive connection and disconnection can be made.

Still another objective of the invention is to provide an electrical connector which can be connected and disconnected without the aid of special tools.

These and other objects and advantages of the invention will become apparent from the following detailed description, taken with the accompanying drawings, wherein:

FIGURE 1 is a top view of the connector clamped to a standard battery terminal post.

FIGURE 2 is a side view of the connector.

FIGURE 3 is a side view of the connector showing an isolating sheath housing mounted thereon.

FIGURE 4 is an isometric view of the steel fastening stud attached to the steel insert before it is cast in the lead connector body.

Referring now to FIGURES 1, 2 and 3, a standard battery terminal post is shown at 28 having a slight taper therein in accordance with the specifications of the Society of Automotive Engineers, which dictate the height, diameter and taper for such terminal posts. A split terminal clamp 10 is secured to terminal post 28. The clamp 10 is of generally rectangular configuration having a vertical,

2

generally circular aperture 27, of which the vertical cross section is frusto-conical to conform to the taper of the post 28. Aperture 27 is open at one side forming the two clamping arms 48 of the split clamp 10. A threaded fastener 15 extends through apertures in said clamping arms. The clamp 10 rests upon boss ring 22 and is tightly attached to post 28 by compressing the arms 48 toward one another by tightening nut 17 on fastener 15. A head 16 may be provided on fastener 15 if desired, and the abutment of head 16 against shoulder 18 eliminates the necessity of two wrenches to tighten nut 17.

To be cast within the body of the clamp 10 is a reinforcing element 11 which includes a pair of extension arms 12 having apertures 14 arranged to align with the apertures in clamp arms 48, and to receive the fastener 15. The opposite end of element 11 is formed in the shape of a circular eye, in which is mounted a vertical stud 1. As shown in FIGURE 4, element 11 can be of one or two pieces. It is fastened to stud 1 by the use of pins or rivets 13 projecting through the eye and the stud. Additional rivets 13 may be used to fasten element 11 together. Spot welding or similar processes may be used in place of rivets 13.

At a distance below the top of stud 1, there is positioned a shoulder washer 2 secured by a cross pin 3 to which it is welded or otherwise attached. The entire structure shown in FIGURE 4 is then cast in lead to form the split clamp body 10. A standard-type terminal post 8 is cast about stud 1 at a height wherein washer 2 is flush with the upper surface thereof. The threaded portion 6 of stud 1 extends above terminal post 8.

As shown in FIGURE 3, a battery cable 47 may be attached to the tapered post 8 through the use of the threaded stud 6. Cable 47 has a cable fitting 44 with a cable lug 42, best attached to the threaded stud 6 by placing a compression washer 4 underneath the cable lug 42 and a washer 5 above the lug 42. The nut 7 brings the entire assembly into tight electrical and mechanical contact and will effect an improved electrical connection.

A semi-isolated connection may be obtained with the use of a flexible housing 49. Housing 49 consists of a flexible sheath having either two or three openings therein. The opening designated 50 is provided for the side entry of battery cable 47, and has a diameter sufficient to form a tightly sealing relationship with the battery cable insulation 46.

The second opening in housing 49 is the tapered bore 51 in the bottom of the housing. The taper of bore 51 is made to conform to that of SAE standard terminal posts, but may be of slightly less diameter to accord a close fit on post 8. A moisture-tight seal is created in bore 51 when housing 49 is inserted over post 8 and in contact with the annular post boss 9. When nut 7 is tightened on threaded stud 6, the seal is completed by slight compression of housing 49.

A third opening in housing 49 may be desired, as shown in FIGURE 3, to allow access to the interior thereof. The access bore 38 has slightly tapering inner wall surfaces 39 and an annular outer portion 52. A sealing plug (not shown) may be inserted into bore 38; and to form a tight seal with walls 39, a tapered plug is desirable. Such a sealing plug will allow quick access to the electrical connection while maintaining moisture-proof conditions inside the housing 49. Since the walls 39 are resilient, frequent removal and insertion of the plug will have relatively no effect upon the sealing properties of the housing. An equally effective sealing cap (also not shown) may be used which will snap over the annular portion 52.

As stated, the housing 49 provides only a semi-isolated connection in that the clamp 10 and terminal post 28 are still exposed. Lead is used for the clamp body, the same as for the terminal post, because of lead's greater resist-

ance to corrosion from the acid fumes. Isolation of the stud portion 6, cable lug 42 and other parts used therewith, avoids the necessity of the use of lead for these parts, thereby allowing the use of material of better durability, strength and electrical conductivity, while maintaining a corrosion free connection.

The primary purpose of the reinforcing element 11 is to add strength to the lead terminal clamp 10 and to retain the circular shape of the post-receiving bore. When ordinary split terminal clamps are fastened tightly, the post-receiving bore is frequently squeezed to a non-circular shape due to the malleability of the lead. This becomes a serious problem when such clamps are disconnected a number of times. The result is a poor electrical contact with the terminal post. Another important function of the reinforcing element 11 is the formation of an electrical path of higher conductivity than that of the ordinary lead clamp. The lug 42, stud 1, and element 11 may be steel or brass and, thus, a high conductivity path is provided from cable 47 to post 28 with only a small amount of lead material interposed between post 28 and element 11.

While the preferred embodiments of the invention have been illustrated and described, the invention is not intended to be limited to those specific details, and it is the aim of the appended claims to cover all such changes and modifications as fall within the true scope and spirit of this invention.

I claim:

1. A battery terminal connector comprising a cast split clamp body, a reinforcing element cast within said clamp body, a threaded stud affixed to said reinforcing element, a shoulder washer permanently affixed to said threaded stud, a tapered post cast on said split clamp body, said shoulder washer positioned along the length of said stud so as to be aligned flush with the top of said tapered post.

2. A battery terminal connector comprising a split clamp body, means for tightening said clamp around a battery terminal post, a tapered post formed integrally with said clamp body opposite said tightening means, a threaded stud embedded in said tapered post, a shoulder washer so positioned on said threaded stud as to be flush with the top of said tapered post, a reinforcing element cast in said split clamp and affixed to said threaded stud, said reinforcing element extending substantially the length of said clamp body and surrounding said battery terminal to provide an improved electrical connection between said threaded stud and said battery terminal post.

3. A battery terminal connector comprising a clamp body having a pair of clamp arms, means for tightening said clamp around a standard battery terminal post, said tightening means operative to compress the arms of said clamp body, a reinforcing element within said clamp body, said reinforcing element having a pair of extension arms having circular apertures near one end adapted to receive said tightening means therein, said reinforcing element having a circular eye at its opposite end, a threaded stud attached in said circular eye, a tapered post formed integrally with the clamp body, a shoulder washer on said threaded stud, said shoulder washer so positioned as to align flush with the top of said tapered post, said reinforcing element extending substantially the length of said clamp body and around said battery terminal to provide an improved electrical connection between said threaded stud and said battery terminal post.

4. A battery terminal connector comprising a split clamp body and a tapered post, means for tightening said clamp body around a battery terminal post, a reinforcing element cast within said clamp body and including a pair of circular apertures at one end adapted to receive said tightening means, said reinforcing element having a circular eye at its opposite end, a threaded stud attached in said circular eye, said threaded stud projecting above the tapered post on the split clamp body and having a shoulder washer affixed thereto, said shoulder washer

being so positioned as to be flush with the upper surface of said tapered post, said reinforcing element extending substantially the length of said clamp body and around said battery terminal to provide an electrical connection between said threaded stud and said battery terminal post.

5. A battery terminal connector comprising a cast split clamp body, means for tightening said clamp to a battery terminal post, a terminal post and a threaded stud connector means mounted upon said clamp body; a resilient non-conducting terminal housing adapted to surround said threaded stud connector means, said housing having an opening to permit the entry of a battery cable therein but adapted to form a seal at said opening between said cable and said housing; said housing having a second opening to permit the entry of said threaded connector means and said terminal post therein but adapted to form a seal at said opening between said terminal post and said housing; said threaded stud connector means being adapted to receive a battery cable lug thereon to fasten said cable to said clamp, said threaded stud connector means operative to compress a portion of said resilient housing to complete the seal about said terminal.

6. A battery terminal connector comprising a split clamp body, means for tightening said clamp around a battery terminal post, a tapered post formed integrally with said clamp body opposite said tightening means, a threaded stud embedded in said tapered post, said threaded stud carrying a shoulder washer thereon, said shoulder washer so positioned on said threaded stud as to be flush with the top of said tapered post, a reinforcing element cast in said split clamp and affixed to said threaded stud, said reinforcing element extending substantially the length of said clamp body and surrounding said battery terminal to provide an improved electrical connection between said threaded stud and said battery terminal post; a resilient, non-conducting terminal housing adapted to surround said tapered post and said threaded stud, said housing having an opening to permit the entry of a battery cable therein but adapted to form a seal at said opening between said cable and said housing; said housing having a second opening to permit the entry of said tapered post and stud therein but adapted to form a seal at said opening between said tapered post, said clamp body and said housing; aforesaid battery cable having a lug thereon adapted to fasten to said threaded stud, said threaded stud having means operative to compress a portion of said resilient housing to complete the seal about said terminal.

7. A battery terminal connector comprising a clamp body having a pair of clamp arms, means for tightening said clamp around a standard battery terminal post, said tightening means operative to compress the arms of said clamp body, a reinforcing element within said clamp body, said reinforcing element having a pair of extension arms having circular apertures near one end adapted to receive said tightening means therein, said reinforcing element having a circular eye at its opposite end, a threaded stud attached in said circular eye, a tapered post formed integrally with the clamp body, a shoulder washer on said threaded stud, said shoulder washer so positioned as to align flush with the top of said tapered post, said reinforcing element extending substantially the length of said clamp body and around said battery terminal to provide an improved electrical connection between said threaded stud and said battery terminal post; a resilient, non-conducting terminal housing adapted to surround said tapered post and said threaded stud, said housing having an opening to permit the entry of a battery cable therein but adapted to form a seal at said opening between said cable and said housing; said housing having a second opening to permit the entry of said tapered post and stud therein but adapted to form a seal at said opening between said tapered post, said clamp body and said housing; aforesaid battery cable having a lug thereon adapted to fasten to said threaded stud, said threaded stud having means operative to compress a portion of said

5

resilient housing to complete the seal about said terminal.

8. A battery terminal connector comprising a cast split clamp body, means for tightening said clamp to a battery terminal post, a terminal post and a threaded stud connector means mounted upon said clamp body; a resilient non-conducting terminal housing adapted to surround said threaded stud connector means, said housing having an opening to permit the entry of a battery cable therein but adapted to form a seal at said opening between said cable and said housing; said housing having a second opening to permit the entry of said threaded stud connector means therein but adapted to form a seal at said opening between said connector and said housing; a third opening in said housing adapted to permit access to said threaded stud connector means; aforesaid battery cable having a lug thereon adapted to fasten to said threaded connector, said threaded stud connector means operative to compress a portion of said resilient housing to complete the seal about said terminal.

9. A battery terminal connector comprising a clamp body having a pair of clamp arms, means for tightening said clamp around a standard battery terminal post, said tightening means operative to compress the arms of said clamp body, a reinforcing element within said clamp body, said reinforcing element having a pair of extension arms having circular apertures near one end adapted to receive said tightening means therein; said reinforcing element having a circular eye at its opposite end, a threaded stud attached in said circular eye, a tapered post formed integrally with the clamp body, a shoulder washer on said threaded stud, said shoulder washer so positioned as to align flush with the top of said tapered post, said

6

reinforcing element extending substantially the length of said clamp body and around said battery terminal to provide an improved electrical connection between said threaded stud and said battery terminal post; a resilient, non-conducting terminal housing adapted to surround said tapered post and said threaded stud, said housing having an opening to permit the entry of a battery cable therein but adapted to form a seal at said opening between said cable and said housing; said housing having a second opening to permit the entry of said tapered post and stud therein but adapted to form a seal at said opening between said tapered post, said clamp body and said housing; a third opening in said housing adapted to permit access to said threaded stud; aforesaid battery cable having a lug thereon adapted to fasten to said threaded stud, said threaded stud having means operative to compress a portion of said resilient housing to complete the seal about said terminal.

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RICHARD E. MOORE, *Primary Examiner*.

A. S. TRASK, *Examiner*.