April 7, 1942. S E GIBBS 2,278,986

BATTERY CONNECTOR

Filed Dec. 13, 1939

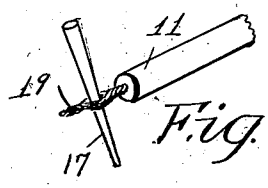


Fig. 7.

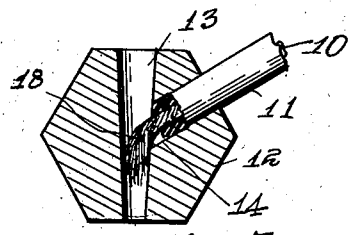


Fig. 3.

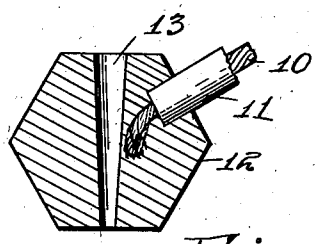


Fig. 6.

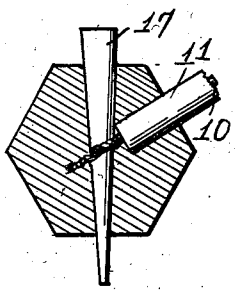


Fig. 8.

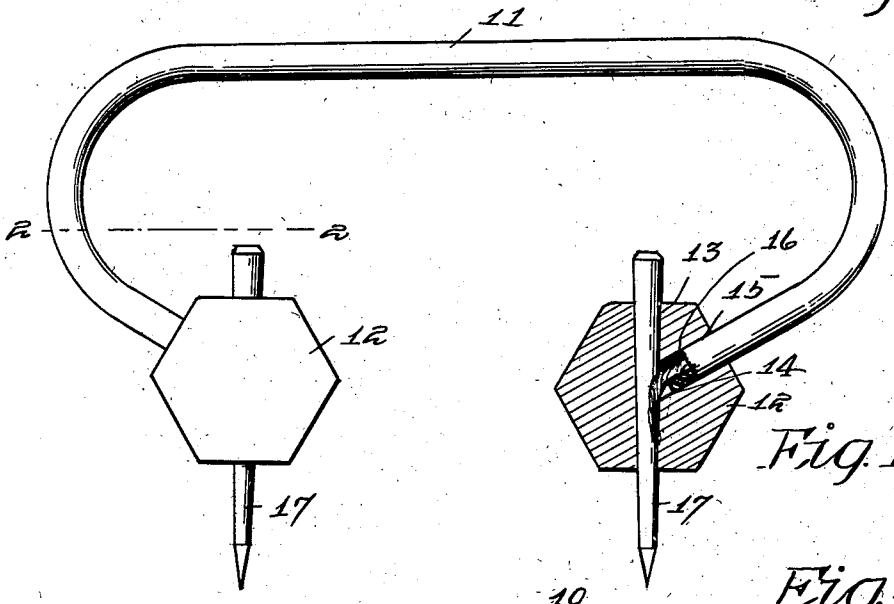


Fig. 1.

Fig. 4.

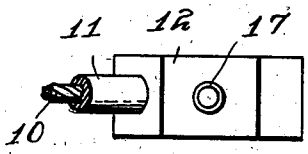


Fig. 2.

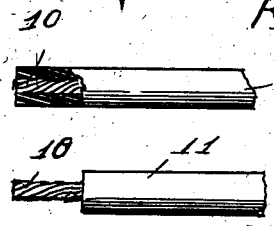


Fig. 5

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BATTERY CONNECTOR

S E Gibbs, Corydon, Iowa

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1 Claim. (Cl. 173—259)

This invention relates to improvements in battery connections of the type having a flexible insulated conductor with suitable bodies or terminal heads at each end which are adapted to being connected to the battery terminals or posts.

The object of my invention is to provide an improved battery connector, including sharpened pins, adapted to be driven into the terminal posts of storage batteries, and so constructed that the pins may be quickly and easily replaced in the heads when the points are corroded or broken.

A further object is to provide in a battery connector having a head and a drive pin at each end, improved means for securing the conductor in said head to eliminate bad contacts, and in turn to eliminate heating.

A further object of my invention is to provide in a battery connector employing an insulated conductor and suitable terminal heads at each end, means for keeping the entire length of conductor covered, in spite of any tendency of its insulator to shrink with age or to be pulled away from the terminal ends, if the wire is pulled or jerked in the removal or handling of the connector.

My invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim, and illustrated in the accompanying drawing, in which:

Figure 1 illustrates a typical design of my improved battery connector showing the supporting heads and pins in side elevation, one of the heads being shown in section to show the manner in which the conductor and pin are mounted therein;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 shows the manner in which the conductor and insulator are placed in a head before the pin is applied, said head being in section;

Figure 4 shows one end of the electric conductor and its insulator before it is placed in the head;

Figure 5 illustrates the manner in which the end of the insulator is pushed back on the end of the conductor before the conductor is applied to the head;

Figure 6 illustrates a head in section and the modified manner in which the conductor may be applied to the head;

Figure 7 illustrates a modified form showing the manner in which the pin and conductor may be assembled before the head is cast or formed about them;

Figure 8 illustrates how the pin, after having the head cast or formed about it, may be forced further into the head to create a perfect contact between the pin and head, the pin and conductor, or the pin, head and conductor.

My improved battery connector comprises a flexible electric conductor 10 which is preferably made of twisted copper wire and provided with an insulator 11, said insulator being made preferably of yieldable material, such as rubber, having a certain amount of elasticity, yet capable of being slipped endwise of the conductor wherein the free end of the insulator may be moved inwardly from the end of the conductor, for the purpose hereinafter made clear.

The connector also includes a pair of terminal heads 12 which are preferably made of lead and each provided with a tapering hole 13, the hole 13 including a branch opening 14. I have provided for each of the heads 12 a tapered pin 17 adapted to fit the corresponding hole 13. The heads 12 are preferably formed or cast with said holes 13 and 14, after which the ends of the insulator 11 are pushed inwardly from its ends, as indicated in Figure 5, causing the insulation to be compressed. The exposed portion 18 of the conductor is then inserted through the opening 14 and extended into the opening 13 in the manner as illustrated in Figure 3, with the ends of the insulator within the opening 14. The pins 17 are then placed in the openings 13 and forced therein until they provide a snug fit, causing the inwardly extending portion 18 of the conductor to be wedged firmly between the pin 17 and body 12, thus providing means for firmly connecting the conductor 10 to the pin 17, and for firmly securing said conductor in the heads 12.

The pins 17 may be easily removed from the heads, if so desired, by simply tapping the pointed ends, and the pins may be easily replaced when the exposed portions or points of the pins become broken, dulled or ruined by corrosion.

When the pins are removed, the conductor is released from the heads and can be easily removed for repair or replacement.

Figure 3 illustrates the construction when the head is made separately and the other parts assembled therein at a later date. A variation of this process of production is suggested in Figures 7 and 8 wherein the conductor and pin are first assembled together and placed in a mould where the head is cast or formed about them;

Figure 7 illustrates a method of assembling the

pin and conductor wherein the pins are pushed through the end of the conductor which protrudes beyond its insulation before the head is formed thereon, the object being to hold the pin and conductor together and in contact with each other while the head is being cast or formed about them. Wrapping the conductor portion 19 around the pin, or any other suitable method of holding them together, can be used to accomplish the same purpose;

Figure 8 illustrates the above modified form after the head has been cast or formed about the pin and conductors in such a position that the pin may afterwards be forced further through the head, thereby wedging the pin and conductor more securely together and in the head, thus avoiding the usual difficulties, late referred to, in forming the head of the pin;

In Figure 6 I have illustrated another slightly modified form wherein the free end of the conductor and the adjoining end of the insulator are formed in the head at the time the head is cast, by simply inserting the free end of the conductor into the mould from which the head is cast.

Thus, it will be seen that I have provided an improved battery connector in which the sharpened pins may be easily and quickly attached and detached, and when attached the pins may be firmly forced in the head so as to make perfect contact between the pins and the head of the conductor.

One of the advantages of my device lies in the fact that the wedging action between the pin and head produces a perfect fit between them to prevent creeping of acids between the pin and head, which often causes destructive corrosion.

A further advantage of my device lies in the manner in which the ends of the insulator are under compression, thereby resisting any tendency of the insulator to shrink with age or be pulled away from the head when the wire is jerked in removing or handling the connector, thus preventing acid from reaching the conductor around the ends of the insulator. I am well aware that battery connectors have been provided with metallic heads and sharpened pins adapted to be driven into battery posts or terminals, but so far as I am aware, no portion of the pin in the head has been tapered. I have found by actual experience that it is impossible to cast a pin in a head and have a perfect fit, because the lead, ordinarily used for heads in this type of connector, cools first on its outer surfaces where it contacts the mould. This tends to make the point of greatest shrinkage around the pin. The usual way of removing pin type connectors from a battery terminal or post is by twisting. The conventional pin type connector therefore, must have pins with flattened sections, bent ends or other deformations so they will not turn in the supporting head when it is twisted. In my invention the tapered hole and pin provide means whereby as the pin is forced to its final position the supporting body will be slightly expanded, resulting in a perfectly tight fit between the pin and body. Although the tapered pin applied in this manner will never loosen in ordinary service, it can be quickly and easily driven back through the head when corrosion or breakage of the exposed portion of the pin makes replacement desirable.

Another advantage of my invention is to maintain a perfect contact between the conductor and pin. In the conventional pin type connector the looseness of the pin in the supporting head, due to shrinkage of the lead when cast, permits slight movement between the pin and conductor. The usual result of such looseness is a poor connection between the pin and conductor, which wastes power, damages charger bolts, and causes heating severe enough in some cases to burn the hands of the users.

My invention provides for the end of the conductor to be wedged between the pin and its supporting body tightly enough and in such firm contact with the pin that in actual usage, increased resistance at this point has not occurred. The efficiency of the connector, therefore, remains unimpaired.

None of the prior art or devices to my knowledge are so constructed that the sharpened pins may be easily and quickly removed and new pins substituted. Heretofore, whenever the pins became damaged it has been necessary to install a complete connector, while with my device it is only necessary to knock out the pins and substitute new ones, at a comparatively small cost; and, so far as I am aware, in none of these battery connectors are the ends of the insulator first moved inwardly from their ends to compress the body portion before inserting the bare portion of the conductor in the head, and fixing the same therein to permit the ends of the insulator to engage a portion of the head to form a tight joint between the head and the insulator. In the drawing I have illustrated the ends of the insulator being entered in the branch openings, with the end of the insulator against the pin. It will be seen that if the insulation is under compression, the ends of the insulation will be expanded or swelled diametrically, resulting in a tight fit between the outer surface of the inwardly extended end of the insulator.

It will further be seen that the ends of the insulator might be supported against the outer face of a head in which no socket is formed, and at the same time function to seal the end of the insulator and the head to prevent acid from reaching the conductor.

I claim as my invention:

A battery connector, comprising a pair of terminal heads, each having a tapered opening between two opposite faces and a branch opening connected therewith, an electric conductor, an insulator covering said conductor between said terminal heads, formed of flexible and compressible material contracted longitudinally, with the ends of said insulation yieldably held against the adjoining faces of said terminals, with the ends of said conductor projecting through said branch openings and terminating in said tapered openings, a tapered pin for each of said openings wedging the ends of said conductors therein, the ends of said pins projecting laterally from their respective terminal heads, one end of each pin being pointed.

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