T. ZIMMERMAN.

COMMUTATOR CONNECTOR.

APPLICATION FILED AUG. 23, 1916. RENEWED MAR. 18, 1920.

1,357,016. **Patented Oct. 26, 1920.**

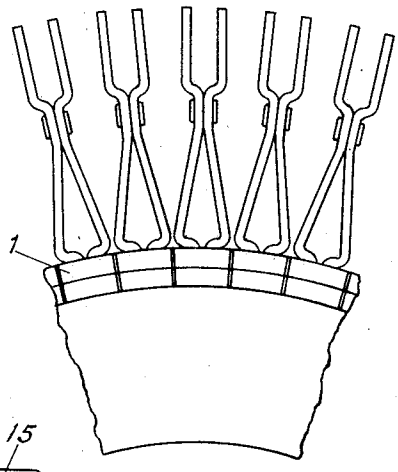


Fig 1.

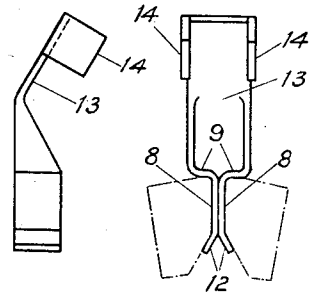


Fig 6. Fig 5.

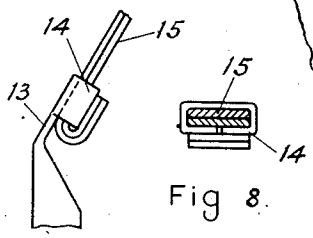


Fig 8.

Fig 7.

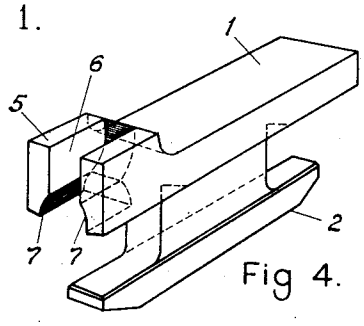


Fig 4.

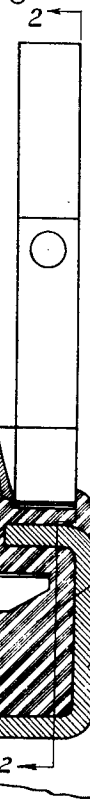


Fig 3.

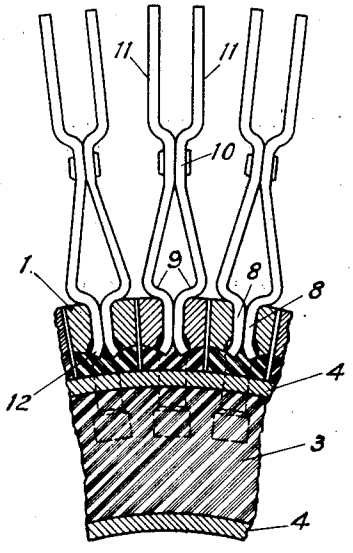
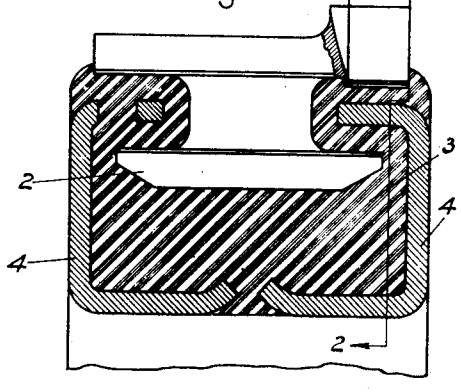


Fig 2.



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UNITED STATES PATENT OFFICE.

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COMMUTATOR-CONNECTOR.

1,357,016. Specification of Letters Patent. Patented Oct. 26, 1920.

Continuation in part of application Serial No. 61,060, filed November 12, 1915. This application filed August 23, 1916, Serial No. 116,539. Renewed March 18, 1920. Serial No. 367,001.

To all whom it may concern:

Be it known that I, THOMAS ZIMMERMAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Commutator-Connectors, of which the following is a specification.

The present invention relates to commutator connectors.

In dynamo-electric machines in which the armature revolves at a high rate, some means should be provided for securely fastening the armature leads to their respective commutator bars. The present invention relates to such means. This application is a continuation as to common subject-matter of my application Serial No. 61,060, filed November 12, 1915, dynamo-electric machines.

One of the objects of the present invention is to provide connecting means adapted to be securely fastened to the commutator bars and which will firmly resist the effects of centrifugal force or any laterally directed force, due for instance to rotation of the armature.

Another object is to provide connecting means of simple construction, which may be easily assembled in the dynamo-electric machine and which are cheap to manufacture.

A further object is to provide connecting means which will hold the armature leads in mechanical and electrical connection with the commutator bars even without solder.

A still further object is to provide connecting means having the functions referred to above, which connecting means shall consist of a single piece of metal.

Further objects will appear as the description proceeds.

Referring now to the drawings:—

Figure 1 is a fragmentary view illustrating one type of commutator connector according to the present invention, mounted on a commutator.

Fig. 2 is a sectional view, taken on the line 2, 2 of Fig. 3, illustrating the means by which the connector is fastened to the commutator.

Fig. 3 is a view partly in section, showing at another angle the means by which the connector is secured to the commutator bars.

Fig. 4 is a perspective view of a commutator bar.

Fig. 5 is a view in elevation, illustrating another form of commutator connector according to the present invention.

Fig. 6 is a side view of the connector illustrated in Fig. 5.

Figs. 7 and 8 are two views illustrating the manner in which the connector illustrated in Figs. 5 and 6 may be connected to the armature leads.

Referring first to Figs. 1–4, a commutator is illustrated having bars 1, 1. The commutator illustrated is of the external type, wherein the brushes rest on the external periphery of the commutator. The invention is equally adaptable to the internal type of commutator. Each bar is provided with a depending foot portion 2, adapted to be embedded in the insulating material 3 of the commutator whereby said bars will be held in their proper places. Reinforcing rings 4, 4, will be preferably provided to coöperate with the foot portions to withstand the effects of centrifugal force, due to high speeds of rotation. The insulating material 3 should preferably be bakelite or similar material which will not soften appreciably at the temperatures to which it will be subjected in service. The bars 1, 1, will be separated by strips of mica or other suitable insulating material.

Each bar is provided with a head portion 5 which will be provided with a slot 6 arranged along the longitudinal axis of the bar. The bottom portion of the head 5, as viewed in Fig. 4, will be milled or slotted to provide shoulders 7, 7, adjacent the slot 6.

Each connector, as illustrated in Figs. 1, 2 and 3, consists of two strips of conducting metal, preferably copper, securely riveted together. As shown, two shank portions 8, 8, lie in close proximity to one another. At the tops of the shanks the strips separate, providing shoulders 9, 9, lying at substantially right angles to the shanks 8, 8. From the shoulders 9, 9, the strips converge to the vicinity of the point 10 where they are riveted together. Above the point 10, the strips again separate to provide a pair of clasps 11, 11, adapted to inclose an armature lead.

In assembling a connector in a commutator bar, the shanks 8, 8, will be inserted into the slot 6. The bottom portions of the shanks will then be separated by a suitable tool to provide feet 12, 12. These feet 12, 12, will engage the shoulders 7, 7, to prevent outward movement of the connector. The commutator bars with the connectors attached will now be arranged in a suitable mold with the reinforcing rings 4, 4, the mica insulating strips and the proper amount of bakelite. Heat and pressure will be applied and the bakelite will harden to rigidly unite the members into a commutator, holding the bars in place relative to one another and holding the connectors in place in the bars.

The shanks 8, 8, may be soldered in the head 5 of the commutator bars and after the commutator is assembled in the dynamo-electric machine, the clasps 11, 11, will be folded over upon and soldered to the armature leads. The feet 12, 12, abutting against the shoulders 7, 7, will effectually resist the effects of centrifugal force, while the shoulders 9, 9, will effectually resist any tendency to lateral bending of the connectors. The configuration of the shoulders 7, 7, may be varied as desired, it being only necessary that the shoulders 7, 7, present an obstruction to the passage of feet 12, 12.

The connector illustrated in Figs. 5 to 8 has the advantage that it is formed out of a single piece of metal and presents a different arrangement of clasps for securing the armature leads. This form of connector also has a pair of shanks 8, 8, adapted to have feet 12, 12, formed thereon, as in the form disclosed in Figs. 1, 2 and 3. The metal is also formed to provide shoulders 9, 9. Above the shoulders 9, 9, is the neck portion 13. Extending from both sides of the neck portion are clasps 14, 14 adapted to embrace and hold the armature leads, indicated by the numeral 15 in Figs. 7 and 8. The neck portion 13 may be bent at the proper angle to coincide with said leads 15.

The connector disclosed in Figs. 5 to 8 will be assembled in the commutator in the same manner as the connector disclosed in Figs. 1 to 4. In joining a connector to an armature lead, the clasps 14, 14 will be folded over on said lead, the lead being then folded back over the clasps. The joint may then be soldered. It will be apparent that a good mechanical and electrical connection is secured between the commutator and the armature windings, even in the absence of solder, the advantage being that if the solder should melt at the high temperatures sometimes developed in dynamo-electric machines, still the connections would hold in place, avoiding the danger of wrecking the machine.

The embodiments of the present invention described herein have been selected merely for the purpose of illustration. It is desired to cover in this case all modifications that fall within the scope of the invention as defined by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In combination, in a commutator, a commutator bar having a slot in one end and shoulders adjacent to said slot, a connector mounted in said slot having projecting portions engaging said shoulders, and material of the nature of bakelite for holding said bar in place in said commutator and for holding said connector in place in said bar.

2. In combination, in a commutator, a commutator bar having a slot in one end and a shoulder adjacent to said slot, a connector mounted in said slot having a projecting portion engaging said shoulder, and material of the nature of bakelite for holding said bar in place in said commutator and for holding said connector in place in said bar.

3. A connector for connecting a commutator bar to an armature lead of a dynamo-electric machine comprising a conducting member provided at one end with shanks having outstanding feet and off-set shoulders and at the other end with clasps, said shoulders and feet snugly engaging said bar whereby said shoulders prevent bending of said connector.

4. In combination, an armature lead and a commutator connector having clasp members folded over on said lead, the lead being folded back over the folds of said clasp members.

5. A connector for connecting a commutator bar to an armature lead of a dynamo-electric machine comprising a metallic member provided with shanks having outstanding feet and off-set shoulders, said shoulders and feet snugly engaging said bar whereby said shoulders prevent bending of said connector.

6. In combination, a commutator bar having a slot in one end and shoulders adjacent said slot, and a connector mounted in said slot, said connector having projecting portions engaging said shoulders, and means to prevent lateral bending of said connector.

7. In combination with a commutator bar, a connector mounted in a slot in said bar, said connector having shoulder portions to prevent lateral bending of said connector.

8. In combination with a commutator bar, a connector mounted in a slot in said bar, said connector having shoulder portions adapted to engage said bar to prevent lateral bending of said connector.

9. In combination with a commutator bar, a connector mounted in a slot in said bar, said connector having shoulder portions and foot portions, said shoulder portions and foot portions being adapted to engage said

bar to prevent longitudinal movement of said connector and to prevent lateral bending thereof.

10. A commutator connector comprising a single piece of metal swaged to provide a pair of abutting shanks with outstanding feet and a pair of reinforced shoulders at the opposite ends of said shanks from said feet, a neck portion lying in a plane normal to the plane of said shanks and wings on said neck portion adapted to hold an armature lead.

In witness whereof I have hereunto subscribed my name.

THOMAS ZIMMERMAN.