

(No Model.)

C. A. LIEB.
COMMUTATOR CONNECTION.

No. 516,827.

Patented Mar. 20, 1894.

FIG. 5.

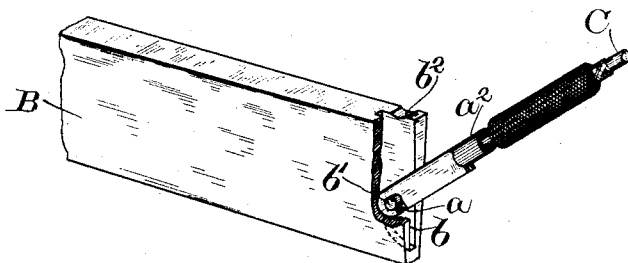


FIG. 4.

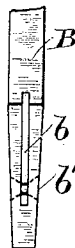


FIG. 6.

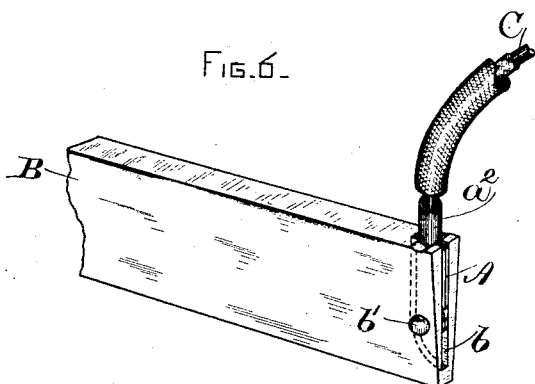


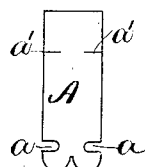
FIG. 2.



FIG. 3.



FIG. 1.



WITNESSES

Allen
H. L. Swann

INVENTOR

Charles A. Lieb.

By *Bentley* *Blodgett*
Atty.

UNITED STATES PATENT OFFICE.

CHARLES A. LIEB, OF NEW YORK, N. Y., ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

COMMUTATOR CONNECTION.

SPECIFICATION forming part of Letters Patent No. 516,827, dated March 20, 1894.

Application filed July 18, 1893. Serial No. 480,805. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. LIEB, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Commutator Connections, of which the following is a specification.

My invention relates to dynamo electric machines, and consists in new and improved means for connecting the coils of an armature to the segments of its commutator. It is necessary in making such connections to secure perfect electrical contact and a considerable degree of mechanical strength as well, while it is desirable to so construct the parts that they can be readily replaced when necessary.

The object of my invention is to provide means whereby these ends may be attained, and further than this the connector which I have devised admits of the use of commutator bars without ears or projections of any kind, so that they can be cut from bars of rolled metal instead of being cast or drop-forged, thereby effecting a considerable saving in cost.

It has been customary to construct commutators of bars having ears or arms at their inner ends, or ends next to the armature, and to connect the leads from the armature coils to these ears by means of screws or solder. In commutators having a large number of segments, however, each segment is extremely thin, and it becomes impossible to tap them for screws of sufficient size to give the necessary strength, while a simple surface soldered connection is always unreliable.

In carrying out my invention, I provide segments consisting of plain bars of rolled metal, slightly thicker at the top than at the bottom so that when assembled they form a cylindrical commutator, and said segments are provided with slots into which connector pieces embracing the leads are adapted to be forced, thereby making a strong mechanical connection and affording perfect electrical contact.

In the accompanying drawings, Figure 1 is a plan view of the connector as it comes from the die. Fig. 2 is a perspective view of the same bent into final shape. Fig. 3 is a verti-

cal cross-section of a modification thereof. Fig. 4 is an end view of a segment projected from Fig. 5. Fig. 5 is a perspective view of a segment and connector showing the method of assembly; and Fig. 6 is a perspective view of a segment with the connector in place.

Referring to Fig. 1 the connector A is a flat piece of thin metal provided with slots a cut in from the sides near the bottom, and opposite to each other so as to form, when the connector is bent into shape, a single slot as shown in Figs. 2 and 3. The material used in making these connectors is preferably phosphor-bronze, hard drawn copper, or other good conducting material possessing considerable elasticity. The said connector may be cut in from the edges at a' , so that the upper portion thereof can be bent into the form of a cup a^2 , Figs. 2, 5 and 6, adapted to fit and surround the armature lead C. The commutator segment B, Figs. 4, 5 and 6, is provided at its inner end with a slot b through which passes, preferably near the bottom, a pin b' best shown in Fig. 5. This pin may be headed in countersunk openings in the segment as shown in Fig. 4, or otherwise suitably fastened. The lead C is then secured to the connector in the cup a^2 , and the lower end of said connector hooked over the pin b' by means of the slots a , as shown in Fig. 5. As shown in Fig. 2, said lower end of the connector A when bent into shape is squeezed flat, so that, while snugly fitting, it can be easily inserted endwise into the slot and hooked over the pin b' by means of the slot a . Above the said slot a , however, the edges of the connector are left somewhat spread apart, and the elasticity of the metal tends to keep them thus spread. Upon the said pin as a pivot, however, the connector can be turned and drawn into the slot, its edges being easily pressed together as they are wedged in, while after the connector is in place the said edges tending to spread apart against the side of the slot prevent the connector from being jarred out under vibration, the result of vibration being rather to force it farther in. The connector is of such thickness that the flattened end portion thereof fits as closely within the slot as is consistent with its ready insertion

therein, and therefore when in place the said connector completely fills the slot pressing against the sides thereof, and affording excellent electrical contact therewith. The pin
 5 b' resisting centrifugal force as the commutator rotates, and the spreading edges of the connector engaging with the walls of the slot as above described, together afford a good connection, yet one which can be readily re-
 10 placed when necessary. If desired, the segment B may be slightly concaved at b^2 , into which concave portion the cup a^2 springs when the connector is in place, thereby affording a still stronger union of the parts. It is
 15 obvious, moreover, that the slot b might be made in the top of the segment rather than the end, and in some cases might thus be rendered more accessible if it became necessary to replace a connector.

20 What I claim as new, and desire to secure by Letters Patent, is—

1. A commutator connection comprising a slotted segment and a connector one end of which is pivotally connected to said segment
 25 within the slot, so that the connector may be drawn into place within the slot by turning it upon its pivotal connection, as set forth.

2. A commutator connection comprising a slotted segment, and a connector having elastic
 30 sides or wings wedged into the slot and retained therein by their tendency to spread apart, as set forth.

3. A commutator connection comprising a slotted segment, a connector having elastic
 35 sides or wings flattened together at one end but spreading at the other end, and a pivotal connection within the slot by which said flattened end is retained while the spreading end is wedged into the slot, as set forth.

40 4. A commutator connection comprising a narrow strip of metal longitudinally bent along the center to form an acute angle and flattened at one end so as to be easily inserted
 45 endwise into a slot in a segment, and a detent in said slot forming a pivot around which said bent strip can be forcibly drawn into the slot, as set forth.

5. A commutator connector comprising a narrow strip of elastic metal longitudinally
 50 bent at an acute angle along the center, and retained in a slotted segment by the spring

pressure of its edges against the walls of the slot, as set forth.

6. A commutator connection comprising a segment having a slot therein, a pin extend- 55
 ing across the said slot, and a separate connector connected to the lead wire and having a hooked portion adapted to engage said pin, said pin forming a pivot around which said
 60 connector is forcibly drawn into the slot, as set forth.

7. A commutator connection comprising a segment having a slot therein, and a U-shaped
 65 connector connected to the lead wire and pivoted in said slot, said connector being adapted to be turned upon its pivot and thereby forced into said slot with the bend of the U inner-
 most, as and for the purpose described.

8. A commutator-connector comprising a thin strip of elastic metal, cut and bent at its
 70 upper portion so as to form a cup in which the lead wire is fastened, and folded at its lower portion so that it can be drawn into a slot in the commutator segment, and a slotted recess at the outer edge of said folded portion,
 75 adapted to fit over and be held by a pin extending across said slot in the commutator segment, substantially as described.

9. A commutator connection comprising a slot in the commutator segment, a pin within
 80 said slot extending from one side to the other thereof, a plate of metal bent at its upper portion to fit and surround the lead wire, and folded flat at its lower portion so as to fit within said slot, and a slotted recess at the
 85 outer edge of said folded portion adapted to be engaged by said pin, substantially as described.

10. In a commutator connection, the combination with a segment consisting of a bar
 90 of rolled copper, of a slot therein, a pin in said slot, and a connector electrically connected to the lead wire and adapted to tightly fit within said slot and engage with said pin, as described.

In testimony whereof I have hereunto set
 95 my hand this 13th day of July, 1893.

CHARLES A. LIEB.

Witnesses:

WESLEY B. SALTER,
 JOSEPH S. BADGER.