(No Model.)

O. N. TURNER.

COMMUTATOR CONNECTOR.

No. 516,853. Patented Mar. 20, 1894.

FIG. 1.

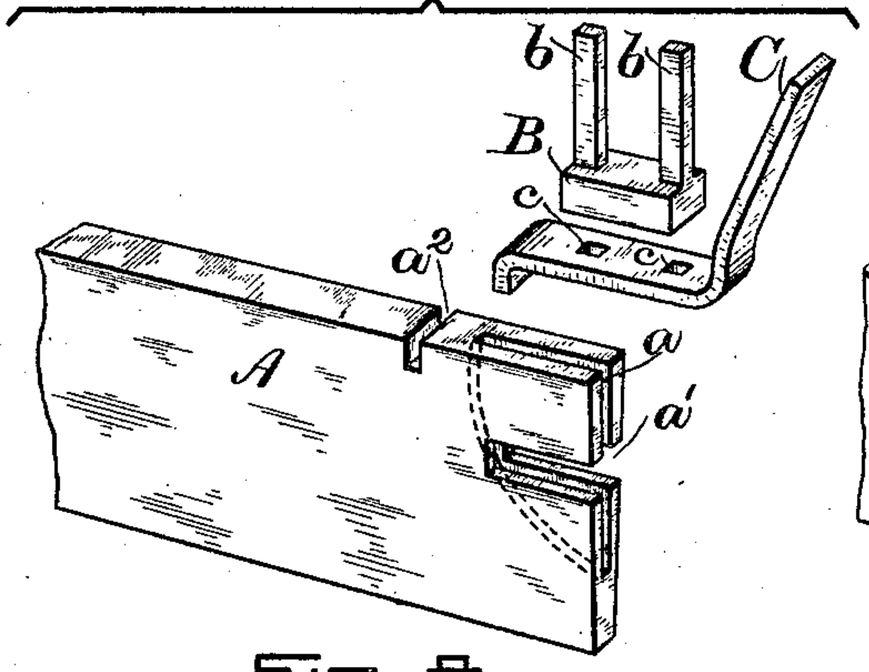


FIG. 2.

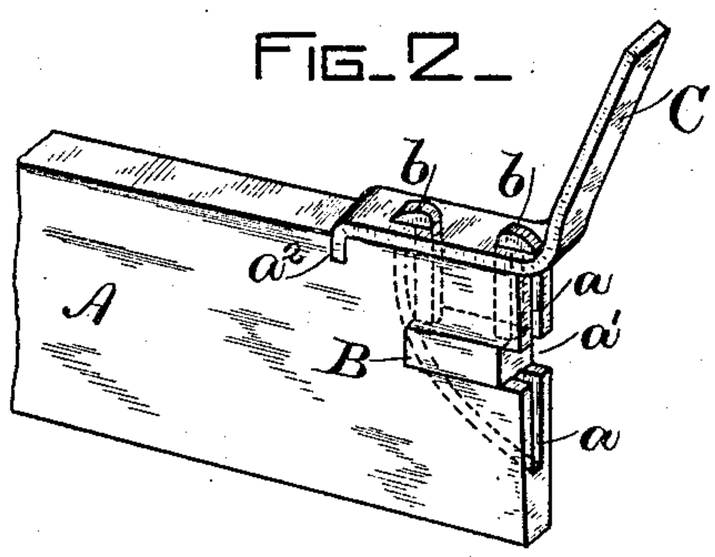
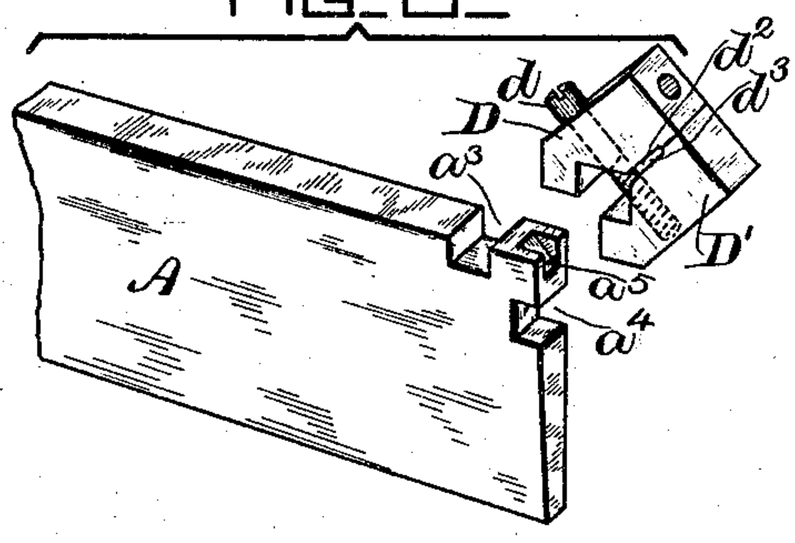


FIG. 8.



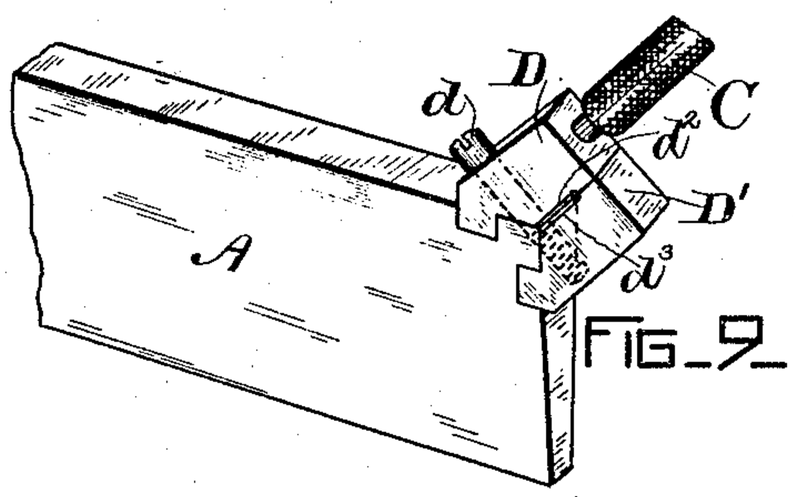


FIG. 9.

FIG. 3.

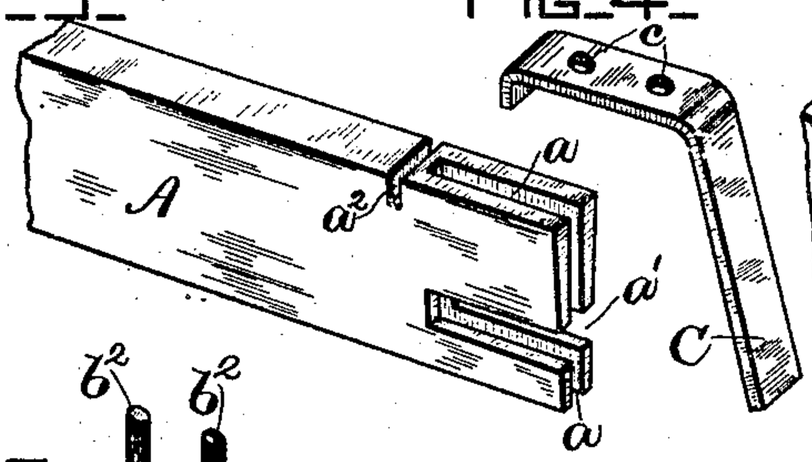


FIG. 4.

FIG. 7.

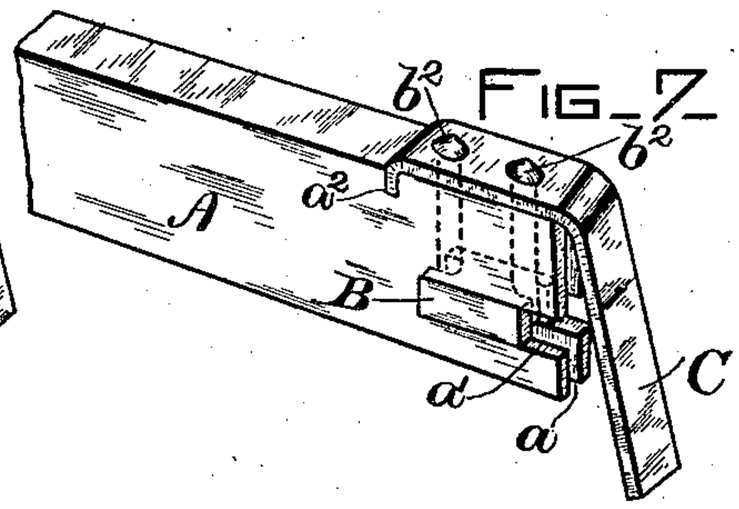
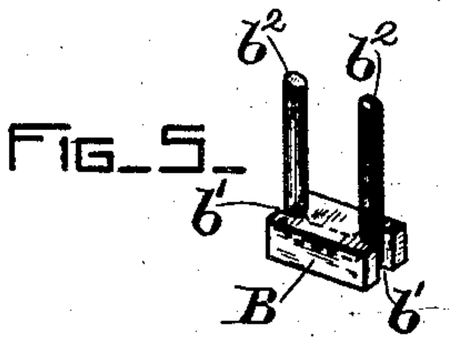


FIG. 5.



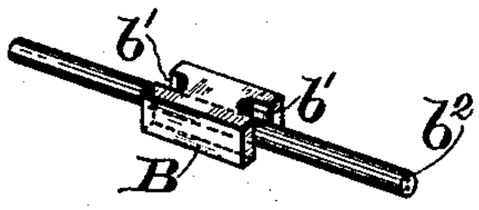


FIG. 6.

WITNESSES

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Ora N. Turner

by Bentley & Blodgett

Attys

UNITED STATES PATENT OFFICE.

ORA N. TURNER, OF LYNN, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

COMMUTATOR-CONNECTOR.

SPECIFICATION forming part of Letters Patent No. 516,853, dated March 20, 1894.

Application filed June 14, 1893. Serial No. 477,541. (No model.)

To all whom it may concern:

Be it known that I, ORA N. TURNER, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Commutator-Connectors, of which the following is a specification.

My invention relates to dynamo electric machinery, its object being to provide a readily removable connecting-device between the lead-wires from the armature coils and the commutator segments. It is especially adapted for use in large machines where it is the practice to build up commutators of a large number of extremely thin segments. In commutators of this character it is entirely impractical to secure the lead-wire to the segment by means of screws, for a screw large enough to afford the necessary strength of union would require a tap out of all proportion to the size of the segment. A soldered joint is undesirable because it is deficient in strength, while if the armature connector is inserted into an opening made therefor and then soldered, it is extremely difficult of removal without injury to the segment. The use of solder is objectionable also because of its low melting point and the consequent liability to spoil the connection if the machine becomes heated. It has been customary, moreover, to facilitate the making of such direct connections by casting or drop-forging the segment with an angularly projecting lug or arm at the end thereof, to which lug the lead-wire is connected. Through my invention, however, the need of this lug or arm is obviated, rendering it possible to make the segments of rolled copper cut in suitable lengths from bars thereof.

In carrying out my invention, I provide commutator segments of suitable length and at the inner end thereof I mill narrow slots or cuts adapted to receive and hold in place removable fastening pieces or devices, substantially as hereinafter set forth, which are in turn strongly connected to the lead-wires and in good electrical contact therewith. I furthermore provide a clamping device affording a comparatively large surface adapted to bear against the segment and firmly pressed against the same so as to afford an electrical connection of a high order of efficiency.

In the accompanying drawings, in which like letters represent like parts, Figure 1 is a perspective view of a slotted segment, connector and clamping piece, respectively. Fig. 2 is a perspective view of the same parts assembled. Figs. 3, 4, 5 and 6 are details in perspective showing a slight modification of the connector shown in Fig. 1. Fig. 7 is a perspective view of the same assembled; and Figs. 8 and 9 are perspective views of a different form of connector, unassembled and assembled, respectively.

Referring to Fig. 1, the segment A has a vertical cut or slit a, milled in the upper portion of the end thereof, and extending from the surface of the segment inward a desired distance. A horizontal slit a', transverse to the slit a is also milled in the said segment, a short distance below the top thereof. A block B having upward projections b is adapted to fit and slide into the slit a', while the projections b are of such size and length as to fit the slit a and project therefrom above the top of the segment. An additional slit a^2 is milled out across the top of the segment a little beyond the inner end of the slit a. The armature connector C which may either be a separate piece attached to the armature coil, or a flattened portion of the end of the wire which forms such coil, is bent at right angles at its inner end and provided with holes c adapted to fit the projections b. This connector is placed in position on the upper surface of the segment, as shown in Fig. 2, with the bent portion at its inner end fitting into the slit a^2 and the holes c, fitting over the projections b. The said projections are then headed over, as shown in Fig. 2, thus strongly uniting the parts. When it becomes necessary to renew a connector the headed portions of the projections b can be chipped off, or otherwise removed, the block slipped out and a new one inserted. The construction shown in Figs. 3, 4, 5, 6 and 7 is substantially the same, except that the block B instead of having projections, as b, integral therewith, is provided at its ends with slits b' and longitudinally bored through the center to receive a wire b^2, the ends of which are bent at

right angles as shown in Fig. 5, and take the place of the projections *b* as shown in Fig. 7. In this arrangement the same block can be used repeatedly, it being necessary to renew the wire b^2 only.

Another form of my invention is shown in Figs. 8 and 9, where transversal slits a^3 and a^4 in the top and end respectively of the segment A are adapted to be gripped by a clamp consisting of two parts D and D′ drawn together by a screw *d*. The lead wire can be secured to either portion of the clamp in any suitable manner. The upper edge of the end of the segment, between the slits a^3 and a^4, is provided with a slit a^5 cut diagonally, through which the screw *d* passes from one portion of the clamp to the other, and fitting tightly therein prevents any lateral displacement of the clamp. The portions D and D′ of the clamp are respectively recessed at d^2 and d^3, so that the full pressure of the clamping screw is brought to bear on the segment and not mutually taken up by the two parts of the clamp themselves.

By means of the devices herein set forth a strong mechanical union is afforded between the lead-wire and segment resisting centrifugal force and the jarring and vibration of the commutator when in motion. The connectors, moreover, can be removed and renewed at slight expense without in any way injuring or disturbing the segment, which, when once prepared for the reception of the clamping-portion, requires no further attention. In other words, the connectors set forth herein are entirely independent, so far as removable or working parts are concerned, of the segment; and while only a surface contact is afforded for the conduction of electricity, the surfaces thus in contact are of such extent and the pressure forcing them together is so great that the conductivity between them is practically perfect.

The main feature by which the arrangement shown in Figs. 1, 3 and 7 is distinguished from prior methods of making the armature connections is in the fact that the segments are milled so as to form a slit open at the surface of the segment through which the fastening pieces B, or such other fastening devices as may be used, may be readily slipped into or removed from place, and when in place may be relied upon to securely hold the armature connections without screws or solder, while in the customary practice heretofore the segments have merely been tapped to receive a screw for holding the parts in place.

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

1. A commutator-connection comprising a segment milled to form one member of a clamp, a conductor in electrical contact with the surface of said segment and adapted to form the other member of said clamp, and a fastening device whereby said segment and conductor are held in clamping position, as set forth.

2. A commutator comprising substantially rectangular segments, slits cut therein, fastening-pieces fitting said slits and engaged thereby, and armature connections electrically and mechanically connected to said segments by means of said slits and fastening pieces, as set forth.

3. A commutator connection comprising a flat conducting-piece electrically connected to the lead-wire and adapted to engage with the surface of the commutator segment, a slit in said segment engaged by a bent portion of said conducting piece whereby longitudinal movement thereof with relation to the segment is prevented, and a fastening piece fitting and adapted to slide into a horizontal slit in the segment, said piece having projections extending upward through a vertical slit in the segment, and holes in the conducting piece, said projections being flattened or riveted upon said conducting piece after assembly, whereby the parts are securely fixed with relation to one another, substantially as described.

4. In a commutator connection, a removable fastening piece comprising a block B adapted to fit a suitable retaining slit therefor in a segment of the commutator, a wire b^2 removably fastened to said block and extending through another slit in the segment to the surface of said commutator, and an armature connection C held in firm contact with the segment by the ends of said wires passing through it and headed thereon, as set forth.

In testimony whereof I have hereunto set my hand this 12th day of June, 1893.

ORA N. TURNER.

Witnesses:
JOHN W. GIBBONEY,
BENJAMIN B. HULL.