C. F. BRUSH.
Magneto-Electric Machine.

No. 203,412. Patented May 7, 1878.

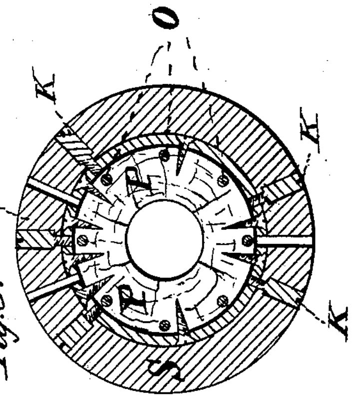

Fig. 3.

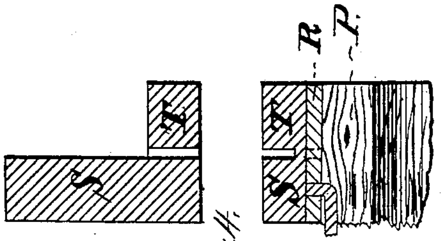

Fig. 4.

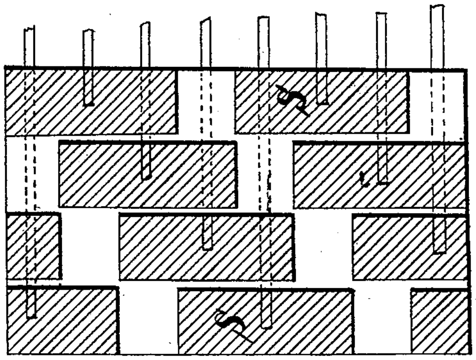

Fig. 2.

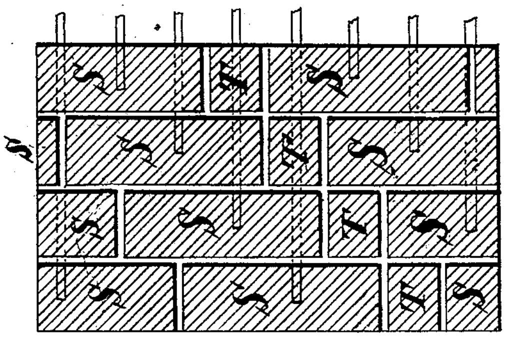

Fig. 1.

Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES F. BRUSH, OF CLEVELAND, OHIO.

IMPROVEMENT IN MAGNETO-ELECTRIC MACHINES.

Specification forming part of Letters Patent No. **203,412**, dated May 7, 1878; application filed March 23, 1878.

To all whom it may concern:

Be it known that I, CHARLES F. BRUSH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Commutators for Electric Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to dynamo-electric machines, or apparatus for the conversion of mechanical into electrical energy; and it consists of improvements in the construction of the commutator. In short, the commutator about to be specified is an improvement, in point of mechanical construction, simplicity, durability, and facility of repair, over the commutator shown in United States Patent No. 189,997, granted to me April 24, 1877; and inasmuch as the essential characteristics and principles of operation of my present invention and of the commutator specified in the above-named patent are the same, I shall refer, for a full understanding of my present device, to said patent, instead of here entering into any more specific description than is required to point out the mechanical differences between it and my formerly-patented device.

In the drawings, Figure 1 is a developed view of my present commutator. Fig. 2 is a copy, for purpose of convenient comparison with my present commutator, of Fig. 7 of the drawings of my said Patent No. 189,997, which shows a developed view of my said former commutator. Fig. 3 is a view, in cross-section, of the device shown developed in Fig. 1. Fig. 4 shows a detached portion of my present device as developed and in end elevation.

As in my said prior patent, so here, S S represent the conducting plates or segments of the commutator, that connect with the different bobbins on the armature, on the same plans as set forth in my said prior patent. T T are insulating-segments intervening between the ends of the conducting-segments S. R represents separate metallic plates or sub-segments, to which are attached the wearing-segments S T. P is a hub or cylinder, of wood or any suitable non-conducting material, which serves as a carrier and as means of attachment to the entire commutator, and is made of suitable length, style, and dimensions to suit this object. O O are the bobbin-wires, that connect between the armature and commutator-segments in the same manner as shown in my said former patent.

It will first be noticed that I have dispensed with one-half of my original number of insulating-segments T, (corresponding to the insulating-spaces in said prior patent,) for the sufficient reason that I have found them to be practically unnecessary, as it is obvious that when the brush or plate F (see said original patent) is insulated from a pair of segments, S, by a segment, T, the electric circuit through the corresponding bobbin or bobbins on the armature is just as effectually interrupted as if the other brush, F, was also insulated from the segments S.

In my present device the insulating-segments T are composed of the same metal (preferably copper, on account of its durability and good conducting quality) as the segments S; but, being insulated from the pair of segments between whose ends it is located, a segment, T, performs the function of an insulating material as far as its particular pair of segments is concerned.

I prefer to make the insulating-segments T of the same material as the segments S, both for the sake of facility of construction and to insure a uniformity of wear over the entire face of the commutator.

It will next be observed (in Fig. 4) that any insulating-segment T may, if desired, be united to the side and form a part of an adjoining segment, S. Such a union will obviously not interfere with the function of a segment, T, as an insulator, so far as concerns the pair of segments S between whose ends it is placed. Such a construction I prefer simply for the purpose of securing the segments S T more firmly in proper position.

Beneath the segments S T are the bases or sub-segments R, corresponding in fashion and location to the segments S T above them.

The sub-segments R are secured to the hub P by suitable screws, or the like, substantially as shown in Fig. 3 of the drawings; and to said sub-segments R are attached the bobbin-wires O, in any suitable manner to insure good electrical connections, as shown in Fig. 4.

The segments S are secured to the sub-segments R by peculiarly-shaped screws K, as shown in Fig. 3. It will be seen that the bearing portion of the heads of these screws is near the lower side of the segments S, while the heads above their bearing portion are cylindrically elongated until they reach the outer surface of the commutator, with whose face they are evenly dressed and finished.

By this peculiar construction of screws K, the segments S T may be worn nearly through and still be firmly held in position, while an even surface in the location of said screws will be presented.

By providing the sub-segments R and detachably affixing thereto the segments S T, it will readily appear that, when worn or damaged, the said segments S T may be easily renewed without any disturbance of the sub-segments and their wire connections with the armature of the machine.

I desire it to be understood that the insulators T need not of necessity be metallic. They may be of any other suitable non-conducting substance, or, if desirable, be mere spaces, exposing the hub P in case the segments S are thin.

It will be apparent that the space separating the ends of the segments S opposite to the insulators T is merely for the purpose of insulating the segments S from each other, and not from the brush or plate F, and is, therefore, not intended, in any manner, to perform the function of the insulators T.

What I claim is—

1. A commutator-cylinder consisting of an insulating hub or body, to which are attached sub-segments, placed in proper electrical connection with the general machine in which the commutator is employed, and wearing-segments detachably attached to said sub-segments, substantially as shown.

2. The combination of sub-segments R, wearing-segments S or T, and screws K, substantially as shown.

3. A commutator having metallic insulating-segments T, substantially as shown.

4. A commutator having metallic insulating-segments T attached to and forming part of the adjoining conducting-segments S, substantially as shown.

5. A commutator having two conducting-segments, S, two opposing ends of which said segments are separated by an intervening insulator, T, the other ends of said segments, while insulated from each other, being closely associated, and not provided with an insulator, T, or its equivalent, substantially as shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES F. BRUSH.

Witnesses:
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LEVERETT L. LEGGETT.