(No Model.) 2 Sheets—Sheet 1.

H. F. PARSHALL.

COMMUTATOR FOR ELECTRO MAGNETIC MACHINES.

No. 480,739. Patented Aug. 16, 1892.

Fig. 1.

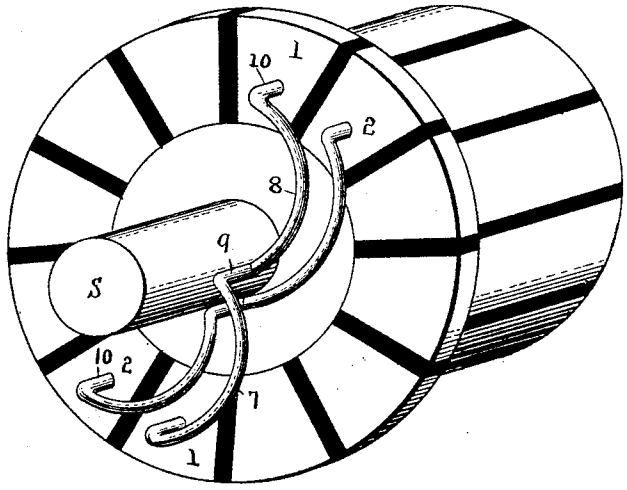
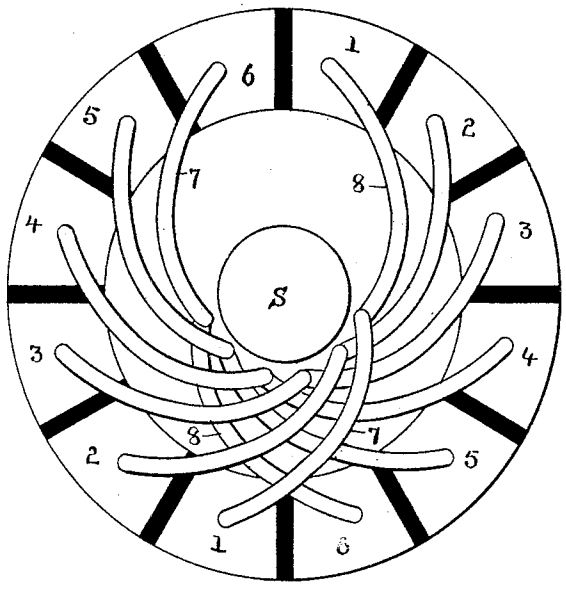


Fig. 2.



Witnesses
Morris A. Clark.
M. F. Oberlé

Inventor
H. F. Parshall.
By his Attorneys
Dyer & Seely.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

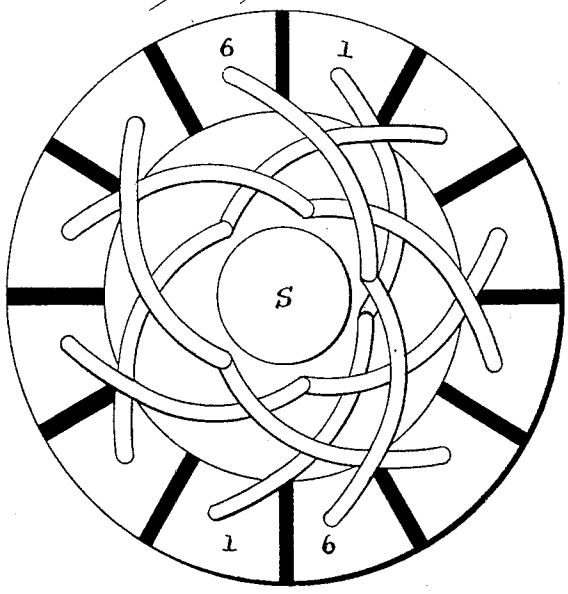
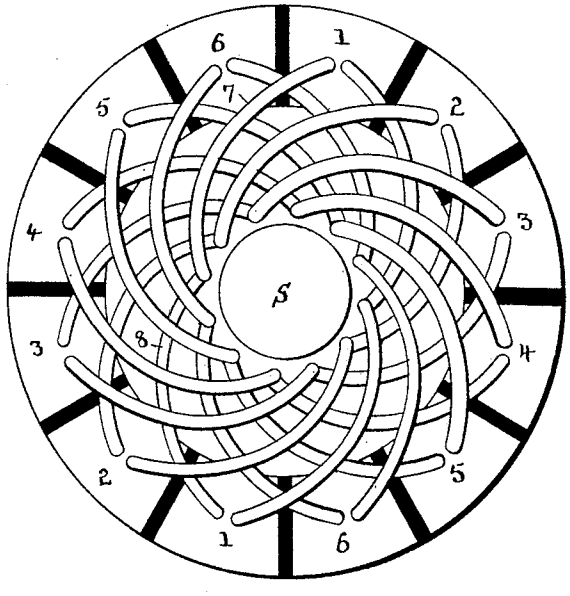


Fig. 4.



Witnesses
Norris A Clark
H. F. Oberly

Inventor
H. F. Parshall.
By his Attorneys
Dyer & Seely.

UNITED STATES PATENT OFFICE.

HORACE F. PARSHALL, OF SCHENECTADY, ASSIGNOR TO THE EDISON GENERAL ELECTRIC COMPANY, OF NEW YORK, N. Y.

COMMUTATOR FOR ELECTRO-MAGNETIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 480,739, dated August 16, 1892.

Application filed December 11, 1891. Serial No. 414,718. (No model.)

To all whom it may concern:

Be it known that I, HORACE FIELD PARSHALL, a citizen of the United States, residing at Schenectady in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Commutators for Electro-Magnetic Machines, of which the following is a specification.

My present invention relates to commutators for dynamo-electric machines and electric motors of the multipolar type; and the main object is to provide an improved construction whereby the use of a multiplicity of commutator-brushes is avoided.

A further object is to provide a simple arrangement of connections exterior to the armature of the machine and forming a part of the commutator for cross-connecting the armature-coils, so that only two or other small number of brushes are needed, and to so arrange the cross-conductors that there shall be no danger of accidental short circuits between them and so that they shall not occupy a large amount of space.

In the accompanying drawings, Figure 1 is perspective view of the improved commutator and connections, a part only of said connections being shown in place. Figs. 2, 3, and 4 are end views of commutators, showing different ways in which the connecting conductors may be arranged.

Heretofore it has been proposed to cross-connect the armature-coils for the purpose of reducing the number of commutator-brushes employed and for other purposes; but such connections have, as a rule, been confined to the armature itself, and have been objectionable owing to the danger of cross-connections or short circuits between the crossing wires, the insulating coverings of which rested directly in contact. By the present invention these objections are overcome.

In the drawings, S is an armature-shaft adapted to support an armature of suitable construction for use in connection with a four-pole or other multiple-pole dynamo or motor. On the shaft is a commutator-cylinder made up of several insulated sections 11, 2 2, &c., twelve segments or bars being shown.

According to the present invention I connect the segments in pairs by means of cranked or bent conductors, preferably of the form shown in Fig. 1. Each of said conductors which is of sufficient size to be quite rigid is bent to form two curved sections 7 8, said sections being in two parallel planes and being connected by a section 9. The two ends of the conductors are bent at a right angle, as indicated at 10. One end is inserted in a hole in one segment or bar and the opposite end in a similar hole in the diametrically-opposite bar. It will be seen that as the successive cross-conductors are put in place the sections 8 of the conductors will occupy one plane and the sections 7 a different plane, and that the conductors will cross near the shaft without being in contact with each other. Consequently there is no danger of wearing away their insulations at the point of crossing and creating a short circuit, and if the conductors are made sufficiently rigid, so that they will not be easily bent so as to come together, they may in some cases be left uninsulated.

In Fig. 2 the segments are all shown connected in pairs, one half of the connecting conductors curving in one direction and the other half curving in the opposite direction, these conductors crossing, as already described, without contact, and the curved sections of the several conductors occupying different but parallel planes.

In Fig. 3 the segments are connected by similar conductors; but said conductors are put in place in a slightly different order, as will be clear from the drawings. With this arrangement the conductors will occupy more than two planes. In putting the cross-conductors into place the cranked ends 10 will be inserted different distances, so as to keep the curved sections in different planes where they cross each other.

In Fig. 4 the arrangement of Fig. 2 is duplicated—that is to say, two conductors extend between each pairs of segments instead of one, as in Fig. 2; but the same form and arrangement of conductors is employed. As already indicated, this mode of cross-connecting the segments of the commutator is much safer than the old mode of cross-connecting the coils of the armature itself, and it will be seen that the space occupied by the connecting conductors need only be equal to twice

the thickness of one of the conductors, plus the space required between the wires and the space between the commutator and wires. The connecting or cross conductors need not be of just the form shown; but they should be suitably cranked and bent to allow them to cross in different planes and should be stiff enough to retain their shape.

What I claim is—

1. The combination of a commutator-cylinder having several segments or bars and several conductors joining the same in groups, said conductors crossing each other without metallic contact and occupying parallel planes fewer in number than the number of conductors, whereby the space occupied thereby in the direction of the length of the armature-shaft is reduced, substantially as described.

2. In a commutator-cylinder adapted for use with multipolar dynamos or motors, the combination of the commutator segments or bars and conductors connecting separate segments, each of said conductors having sections in separate and substantially parallel planes, each conductor having sections substantially at right angles to the parallel sections, substantially as described.

3. In a commutator-cylinder adapted for use with multipolar dynamos or motors, the combination of the commutator segments or bars and conductors connecting separate segments, said conductors having sections one-half of which lie in one plane and one-half of which in another plane, whereby the conductors can be crossed without contact, substantially as described.

4. The combination, with the segments of a commutator-cylinder, of conductors for connecting them in pairs, each of said conductors having two bent sections in different planes, a section connecting the same, and bent ends or extensions connected to the segments, substantially as described.

This specification signed and witnessed this 7th day of December, 1891.

HORACE F. PARSHALL.

Witnesses:

FRED. A. PHELPS, Jr.,

JOSEPH INSULL.