

(No Model.)

2 Sheets—Sheet 1.

J. C. HENRY:
ELECTRIC MOTOR.

No. 518,033.

Patented Apr. 10, 1894.

Fig. V-

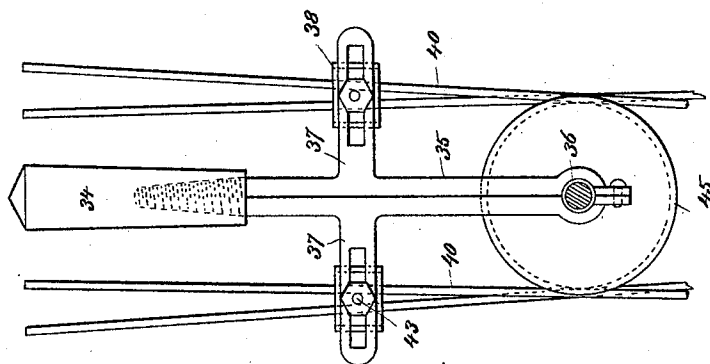


Fig. III-

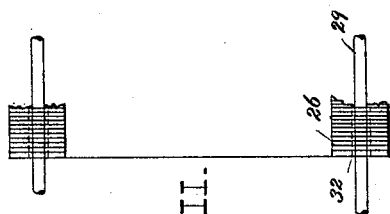


Fig. VI-

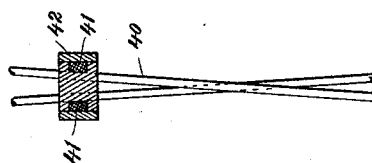


Fig. II-



Fig. IX-

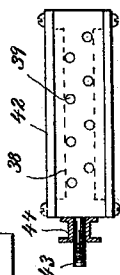


Fig. VII-

Fig. VIII-

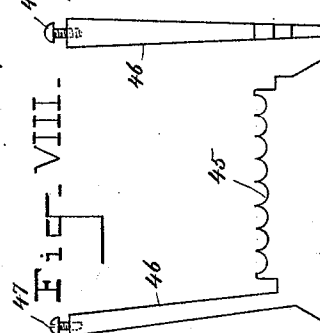


Fig. IV-

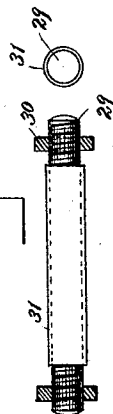
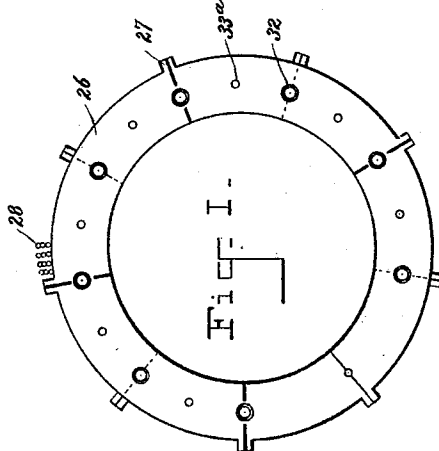


Fig. I-



Witnesses

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(No Model.)

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Fig. X.

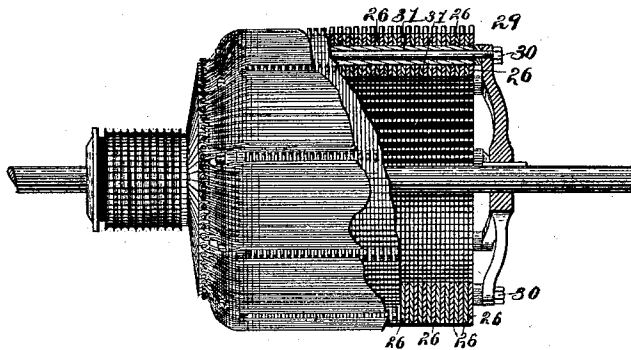
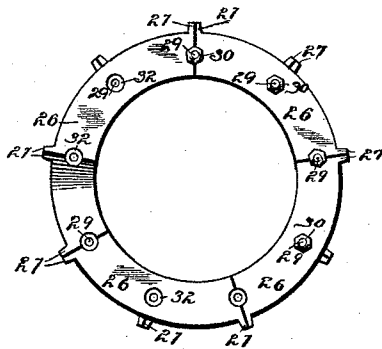


Fig. XI.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

JOHN C. HENRY, OF NEW YORK, N. Y.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 518,033, dated April 10, 1894.

Original application filed September 27, 1889, Serial No. 325,244. Divided and this application filed August 19, 1890. Serial No. 362,459. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. HENRY, 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 Electric Motors, of which the following is a specification.

The present application is a division of my application, Serial No. 325,244, filed September 27, 1889.

My improved motors are especially intended for electric railway work, and I will first fully describe them with reference to the accompanying drawings, and then point out in the claims the novel features.

In said drawings, Figure I, is a side view of the core of the motor-armature. Fig. II, is a similar view of one of the plates of said core detached. Fig. III, is a partial edge view of said core. Fig. IV, is a side and end view of one of the tie-bolts of the armature core. Fig. V, is an end view of the motor commutator, brushes and brush-holder. Fig. VI, is a sectional detail view of the brush-holder. Fig. VII, is a top view thereof, with brushes removed. Fig. VIII, is a side view of one commutator-plate or segment. Fig. IX, is an end view thereof. Fig. X is a side elevation, of the armature partly in section. Fig. XI is an end view of the armature ring.

The improvements relate to the armature, commutator and commutator brushes of a motor. In the armature, the peculiarity lies in the way of building up the core. The core is made of a large number of very thin, soft iron plates 26, having the form of annular segments such as shown in Fig. II, which can be stamped out without much loss of material. Each plate consists of an annular segment equal to two-ninths of a circle, so that four and a half segments will make a complete circle. Thus, when I build up the core in layers, the last segment or plate of each layer will overlap or project for half its length over the first plate and so begin the succeeding layer. Thus the several layers form consecutively a continuous spiral. All the joints of every layer being overlapped by the segments of layers on each side of it, all danger of spreading of the core at the joints when

the armature is in motion is prevented. The several segments are sufficiently insulated from adjacent ones both at sides and ends, to effectually break up, the local currents therein. At each end of each segment 26, is a half tooth 27, and these half teeth when the core is built up as shown in Fig. I, form, with the abutting half-teeth on the consecutive segments, polar-projections between which the armature-bobbins 28, are wound. The number and arrangement of these annular segments are such as to present an odd number of core-projections or teeth, so as, when the armature is wound, to present a like number of bobbins. It will be seen that the described arrangement provides nine of these core-projections, and a corresponding number of bobbins. Each bobbin is by this construction separated by a free air space from the bobbins on each side of it and their heating is thus lessened. When built up as described, the core is clamped by metallic tie bolts 29, and nuts 30, (shown to a larger scale in Fig. IV,) to the spiders which are mounted on the armature shaft. It is necessary to insulate these bolts from the core segments, but any ordinary soft insulating will not act well, as the plates will embed in it. To avoid this very grave defect, each tie-bolt is completely enameled with a silicious vitreous glaze 31, thus insulating the metallic portions of the said tie-bolts from the core segments in a permanent manner when they are placed in the holes 32. Additional holes 33^a, being provided in the core-segments, into these holes are driven wooden dowel pins when the core is built up. This further stiffens the core, without involving local magnetic action.

The improvements in the commutator, and the brushes, are illustrated in Figs. V to IX.

Referring now to Fig. V, it will be seen that the brush-holder has a handle 34, which screws into a taper screw of the divided rocker-arm, 35. By this means, and a clamp screw or bolt at its lower end the rocker-arm is held on the bearing of armature-shaft 36. The divided rocker-arm has slotted cross arms 37, in which are adjusted the brush-holders proper 38. These are metal blocks, having a

number of holes 39, "staggered" as shown in Fig. VII, so as to receive and properly hold to the commutator, the brushes 40, preferably rods of hard, drawn copper wire. The brushes are held tight by soft rubber blocks 41, Fig. VI pressed in by screwed plates 42. The supporting studs 43, of holder 38, have insulation at 44, Fig. VII to receive the wire brushes 40. The commutator is circumferentially fluted or grooved as shown at 45, Fig. VIII, and consists of a whirl of mutually insulated copper segments, which segments are insulated from but attached to and revolve with the armature-shaft.

The present illustration of my invention is susceptible of various modifications, for example: The circumferential length of the segments may be such as to make each lamination to consist of three and a half or of five and a half plates (instead of four and a half plates, as in the present illustration) for an armature of seven or eleven bobbins respectively. Small helical springs may be used instead of the rubber blocks 41.

My improvements, while designed especially to be applied to electric motors, are applicable to dynamo-electric machines generally.

Figs. VIII and IX, show one of the segments of the commutator. Each segment has an arm 46, with screws 47, to connect it to terminal of an armature bobbin.

Having thus described my invention, the following is what I claim as new thereof and desire to secure by Letters Patent:

1. A laminated armature core composed of segments having circumferential projections, the segments being arranged to break joints whereby the projection on each segment will lie opposite an open space on the adjacent segment on each side of it.

2. A spirally arranged laminated armature-core composed of a series of thin annular mutually insulated segments, whose circumferential length is such that each convolution con-

sists of a whole number of plates, plus a half plate.

3. A spirally arranged armature-core composed of abutting and insulated segments having, at their abutting joints, half teeth that constitute staggered polar projections which separate the armature-bobbins; as set forth.

4. A spirally arranged armature-core composed of abutting and insulated annular segments, in combination with transfixing or clamping tie-bolts coated with vitreous enamel adapted to bind the segments together and connect them to the spider.

5. An armature-core for an odd number of bobbins composed of a series of flat annular segments, the circumferential length of each of which is represented by a fraction whose denominator is the number of bobbins, and whose numerator is 2, said segments abutting so as to present a series of mutually insulated laminations in a continuous spiral, their abutting ends having half-teeth forming polar extensions and being insulated from one another, so as to form joints, the joints of the first, third and fifth, &c., laminations being midway between those of the intervening laminations so as to overlap or "break joints;" substantially as and for the purpose set forth.

6. The combination in a brush-holder of the divided arm 35, supporting the brushes, having tapered screw above and handle screwed thereon.

7. The combination of a block or brush-holder having a number of holes or seats and a socket opening into the same, a series of commutator-brushes which occupy said holes or seats, and springs or cushions in said sockets which bear on the sides of all of said brushes and means for adjustable pressure of said springs into their sockets.

JOHN C. HENRY.

Witnesses:

T. R. MORGAN, Jr.,
W. H. MORGAN.