

plate at one end being separated from the armature through its outer portion, and the remaining plate being open at its centre and separated from the armature through its central portion. 2nd. In an electric machine, a rotating armature having one or more axial openings, in combination with end plates, one of said plates having an opening to the armature openings through its central portion, and the other having an opening to the armature openings from its outer edge, substantially as described. 3rd. In an electric machine, the combination, with a rotating armature having axial openings through it, of an end plate covering the openings and radiating ribs on the inner surface of said plate forming with said plate radial continuations of said openings. 4th. In an electric machine, the combination, with a revolving armature-core and coils of wire applied thereto, of a sheet of mica or other insulating material between the wire and the core, and an insulating coating surrounding the coils, substantially as described. 5th. An armature for electric machines cylindrical in form, having lugs of non-magnetic material upon its outer surface, and clips or plates of non-magnetic material at the ends of said lugs, and wire wound around said clips and across the face of the armature filling the spaces between the lugs, substantially as described. 6th. An armature for electric machines, composed of thin sheets of soft iron magnetically separated from each other, end-plates of soft-iron clamping said sheets together, and rings of fibre or other non-magnetic material surrounding the said plates and flush with the periphery of the armature, substantially as described. 7th. In an electric machine, a cylindrical armature having its coils wound upon its face and down upon its ends, overhanging clips at the ends for holding the coils in position constructed in two portions, the overhanging portions being removable after the coils are in position, and plates of non-conducting material covering the wire upon the ends of the armature. 8th. An armature for electric machines constructed of thin plates of soft-iron placed side by side, each plate being constructed with ventilating holes, substantially as described, the holes in adjacent plates being of different sizes. 9th. In an electric machine, an armature-core constructed with axial ventilating openings having end plates constructed with corresponding openings of less cross-section. 10th. The combination, substantially as hereinbefore set forth, with the armature of an electric generator, of a frame for the field-magnet consisting of two castings bolted together and cores of wrought iron bolted to said castings and forming a cylinder around said armature.

No. 27,962. Armature of Electric Machines.

(*Armure de machine électrique.*)

The Westinghouse Electric Company, Pittsburgh, (assignee of Oliver B. Shallenberger, Rochester, Penn., U.S., 10th November, 1887; 5 years.

Claim.—1st. In an electric generator, the combination, with the field magnets, of an armature having its alternate coils wound in opposite directions, and the outer end of each coil connected with the inner of the succeeding coil. 2nd. In an electric generator, an armature having its alternate coils wound in reverse directions, and the inner ends of each coil connected with the outer end of the succeeding coil throughout the entire series of armature coils or any portion of such series. 3rd. In an electric generator, a series of armature coils, the alternate coils being wound in reverse directions, and the inner end of each coil connected with the outer end of the succeeding coil, conductors leading from points directly opposite each other in the length of the continuous conductor forming the said series of armature coils, and collecting plates with which said conductors are electrically connected. 4th. In an electric generator, an armature wound with two series of coils arranged in multiple arc, the terminals delivering like currents from each series being united at points approximately diametrically opposite each other upon the armature, substantially as described. 5th. In an electric generator, the combination, with a multiple field-magnet and its polar projections, of an armature revolving within said field-magnet having its conductor formed with coils upon its periphery of greater breadth than said polar projections, substantially as described.

No. 27,963. Commutator for Electric Machines. (*Commutateur de machine électrique.*)

The Westinghouse Electric Company, Pittsburgh, (assignee of Oliver B. Shallenberger, Rochester, Penn., U.S., 10th November, 1887; 5 years.

Claim.—1st. The combination, with the collecting rings of an alternate-current generator, of contact-rings receiving a portion of the current therefrom, a rectifying commutator having its plates or sections connected alternately with the respective contact rings, and contact brushes receiving a continuous current from the commutator. 2nd. The combination, with the shaft and collecting rings, of an electric generator, said shaft having a shoulder formed upon it of a commutator clamped against said shoulder and two contact-rings secured to the respective sides of said commutator. 3rd. The combination of a rectifying commutator, the shaft of an electric machine carrying the same, two contact-rings respectively placed upon opposite sides of the commutator flanges formed upon said rings adjacent to said commutator, and screws for clamping and connecting the respective flanges to the alternate plates of the commutator. 4th. The combination, with the shaft of an electric generator, of two contact-rings, a commutator, contact-brushes for said ring and commutator, and a support carrying all of said brushes which is adjustable in its angular position with reference to said shaft.

No. 27,964. Electric Converter and Box for Same. (*Inducteur et enveloppe d'inducteur électrique.*)

The Westinghouse Electric Company, Pittsburgh, (assignee of William Stanley, Jr., Great Barrington, Mass., Henry M. Byllesby, Pittsburgh, Albert Schmid, Allegheny, and Oliver B. Shallenberger, Rochester, Penn., U.S., 10th November, 1887; 5 years.

Claim.—1st. A core composed of E-shaped plates, electrically and magnetically separated from each other, and symmetrically disposed about a coiled conductor, as set forth. 2nd. The combination, with a coiled conductor, of a mass of soft iron composed of detached plates, each plate being provided with three projecting tongues, one situated within and the other without the coil, as set forth. 3rd. The combination of the primary and secondary coils of a converter, and a core composed of thin flexible plates of soft iron, each formed with two holes, the metal about each hole being cut open for receiving the coils, substantially as described. 4th. Metal plates for forming cores for electric converters, constructed with two openings, the metal around each opening being cut apart. 5th. An electric converter consisting of the primary and secondary coils, and a series of soft iron plates, having holes for receiving the respective sides of the coils, the metal surrounding the holes being cut apart upon opposite sides in the alternate plates. 6th. An electric converter consisting of primary and secondary coils having a core composed of thin plates of soft iron, each plate having two holes, the metal about each hole being cut open for receiving the coils and non-magnetic material between alternate plates. 7th. A core for electric converters consisting of thin plates of soft iron, each having two openings and each two plates being magnetically separated from the adjacent plates but in magnetic contact with each other. 8th. An electric converter consisting of primary and secondary coils, and a core of soft iron plates, each constructed with two openings for receiving the coils, the metal about each opening being cut through, and the central tongues thus formed inserted within said coils from opposite sides and sheets of non-magnetic material between the alternate plates. 9th. The combination, with the primary and secondary coils, of a converter separately wound and covered with insulating material, of plates of non-conducting material between said coils, strips of non-conducting material extending along the sides of the coils, and a core of soft iron surrounding the coils leaving air-spaces between said strips. 10th. In an electric converter, the combination, with the primary and secondary coils separately wound, of plates of insulating material between the coils, and strips of insulating material extending along the sides of the coils and separating the same from the surrounding core, substantially as described. 11th. The combination, in an electric converter, of a core built up of plates or sheets of soft iron, magnetically insulated from each other, and having rectangular openings, primary and secondary coils within said openings, and strips of insulating substance separating the coils from the core, substantially as described. 12th. The combination, with the core of an electric converter, of primary and secondary coils therefor separately wound and covered with separate insulation, substantially as described. 13th. In an electric converter primary and secondary coils separately wound, and a covering of insulating material applied to each coil independently of the other, substantially as described. 14th. The combination of the primary and secondary coils of an electric converter, said coils being separately wound and separately insulated and placed side by side and a core of soft iron to which the coils are applied. 15th. A converter-box constructed in two sections, the one provided with means for securing it to supports, and the other having two separate compartments for receiving the primary and secondary circuit controlling devices. 16th. A converter box constructed in two parts, the one being provided with separate compartments formed by lateral webs, non-conducting plates within said compartments and circuit-controlling devices carried upon said plates. 17th. The combination, with a box for containing an electric converter, of two independent compartments integral therewith for receiving the primary and secondary terminals respectively, non-conducting plates with said compartments, independent circuit-controlling devices for the respective primary and the respective secondary conductors carried by said plates, and non-conducting plates between the respective circuit-controlling devices in each compartment. 18th. The combination, with a box for containing an electric converter, of independent compartments integral therewith for containing the primary and secondary circuit, controlling devices, transparent plates closing said compartments, and protecting discs outside said plates. 19th. The combination, with an electric converter of supports for the primary and secondary conductors respectively, and a box containing the converter secured at one end to the support of the primary conductors, and at the other end to the support of the secondary conductors. 20th. The combination, with an electric converter of supports for the primary and secondary conductors respectively, a box containing the converter secured at one end to the support of the primary conductors, and at the other end to the support of the secondary conductors, a compartment for receiving the terminals, of the primary coils, of the converter, a second compartment for receiving the terminals of the secondary coils, of the converter, and openings at the bottom of the respective compartments for receiving conductors leading to the primary and secondary coils respectively.

No. 27,965. Box for Electric Converter.

(*Enveloppe d'inducteur électrique.*)

The Westinghouse Electric Company (assignee of George Westinghouse, Jr.), Pittsburgh, Penn., U. S., 10th November, 1887; 5 years.

Claim.—1st. The combination of primary and secondary conductors, a core of soft iron plates, circular in form, each plate having two openings for receiving the coils, the metal about each opening being cut apart, substantially as described, and a cylindrical enclosing case for the same. 2nd. An electric converter, consisting of primary and secondary coils, a core of circular soft iron plates or discs, and an enclosing tube of soft iron. 3rd. An electric converter, consisting of primary and secondary coils, a core of soft iron cylindrical in form and composed of thin plates, in combination with a lamp-post of iron having a cylindrical opening containing the same and in magnetic connection therewith. 4th. An electric converter, consisting of primary and secondary coils, and a core composed of soft iron plates, and a solid back piece common to all the plates. 5th. An electric converter, consisting of primary and secondary coils, and a core, consisting of laminæ of soft iron, magnetically separated through the greater portion of their surfaces and magnetically united at their edges. 6th. An electric converter, consisting of the combination of