

ities of which are arranged to intersect or lap said arms, being connected to the crossing-conductors, a central block, and passages around the block and between the extremities of the conductors, for the passage of the trolley wheel in the desired position. 7th. A switch for suspended conductors, comprising a rib or member for each conductor, said members being supported and connected at their inner extremities, and having said extremities arranged to lap or intersect, so that one flange of the trolley wheel will engage the leaving rib before the other flange becomes disengaged from the entering rib. 8th. A switch for suspended electric conductors, comprising a rib or member for each conductor, each member being formed with an opening or groove to receive the conductor, and with a rib or part extending from the openings or grooves to carry the contact device to the point of divergence. 9th. A switch for suspended electric conductors, comprising a rib or member for each conductor, each member being formed with an opening to receive the extremity of the conductor, and with a rib or part extending from the said openings forming continuations of the conductor to carry the contact device to the point of divergence.

**No. 33,002. Double Suspended Conductor System for Electric Railways.**  
(*Système de conducteurs doubles suspendus pour les chemins de fer électriques.*)

Charles J. Van Depoele, Lynn, Mass., U.S., 3rd December, 1889; 5 years.

*Claim.*—1st. A double suspended conductor system for electric railways, comprising positive and negative conductors following the line of each track, the conductors of one polarity over each track being arranged upon the inner sides thereof, and electrically connected at intervals, the remaining conductors being parallel therewith but nearer to the outer sides of said tracks. 2nd. A double suspended conductor system for electric railways, comprising positive and negative supply-conductors following the line of each track, a branch extending from said main conductors, comprising metallic frogs in electrical connection with said main conductors, branch conductors connected to, but insulated from said frogs, and an upward pressure contact device having a plurality of independent insulated contacts adapted to engage the said supply conductors. 3rd. Switching devices for a double-suspended conductor system, comprising metallic frogs in contact with the main conductors, an insulated crossing for one of said conductors, a branch conductor extending from the frog of one of said conductors and engaging the crossing but insulated therefrom, a continuation of the insulated branch conductor, and an electrical connection uniting the insulated extremities thereof, and a branch conductor extending from, and in electrical connection with, the frog of the other main conductor. 4th. Switching devices for a double-suspended conductor system, comprising metallic frogs connected to the main conductors, branch conductors connected to, but insulated from, said frogs, a crossing for one of said main conductors to which one branch is electrically connected, a continuation of said branch conductor, and a frog upon the next adjacent main conductor to which the said continued branch is electrically connected, and a branch extending from the other main frog to, but insulated from, a crossing upon the next adjacent main conductor, a continuation of said second branch conductor and a frog upon the other main conductor to which said continuation is connected, and electrical connections between the insulated portions of the branch conductor. 5th. A switch and crossing for a double system of duplex suspended conductors, comprising metallic frogs in electrical connection with one set of main conductors, a branch conductor extending from one frog to, and insulated from, a crossing attached to conductors of the opposite polarity and connected thence, but insulated therefrom, by a conductor secured to a crossing of similar polarity, and a frog to an insulating crossing, and thence by a continuation of the branch conductor to a crossing of like polarity, thence to a crossing of opposite polarity from which it is insulated, thence by a continuation of the branch conductor, and an electrical connection between the insulated terminals of the branch conductor. 6th. In a system of double suspended conductors, a switch and crossing for a double duplex line, comprising metallic frogs in contact with the main conductors of one line, an insulated crossing for one of said conductors, a branch conductor extending from the frog of one of said conductors, and engaging the crossing and insulated therefrom, a continuation of the insulated branch conductor and an electrical connection uniting the insulated extremities thereof, a branch conductor extending from, and in electrical connection with the frog of the other main conductor, and two sets of crossings connected with the main conductors of the other main line to which the branch conductors, from the first-mentioned main line, are connected and from which they may be continued. 7th. In a duplex suspended system of conductors, a metallic frog in electrical connection with one of said conductors, a branch conductor connected thereto, and an insulating section between the frog and the branch conductor. 8th. A crossing-plate having a flat metallic surface, a central downward projection for guiding a grooved contact wheel and lateral flanges to prevent lateral displacement of the contact device. 9th. The combination, with a metallic crossing plate, of a main conductor of one polarity connected thereto, and ribs or pieces of insulating material also connected to said plate, and conductors of opposite polarity connected to the extremities of said insulating ribs. 10th. A crossing plate for conductors of opposite polarity, comprising a metallic plate secured to, and in electrical connection with the main conductor, insulating sections secured at opposite ends of the plate, and conductors of opposite polarity secured to the extremities of said insulated section. 11th. A crossing plate comprising a metallic surface to which the main conductor may be attached, insulating sections extending from each end thereof, and connected to terminals of conductors of opposite polarity, a crossing-plate comprising a metallic surface, a central downward projection for guiding a grooved contact wheel thereacross, and terminals extending from each end for connection to their respective conductors. 12th. The combination, with a crossing-plate, of a main conductor connected thereto for crossing at one direction, ribs composed in part of insulating material and connected to said crossing-plates for attach-

ment to conductors of opposite polarity for a crossing of another direction, and protecting roofs extending over the insulated portions of the said insulating ribs. 13th. In a system of suspended conductors, an insulating section and conductors of opposite polarity connected to the extremities thereof, whereby the said section is adapted to convey the contact device between insulated and separated continuous conductors. 14th. In a system of suspended conductors, an insulating section for connecting conductors of opposite polarity, having high tensile strength and composed of a metallic body having an exterior insulating surface. 15th. In a system of suspended conductors, an insulating section, the lower or contact surface of which is discontinuous. 16th. In a system of suspended conductors, an insulating section uniting the extremities of conductors of opposite polarity, and provided with a protecting roof or cover. 17th. In a system of suspended conductors, an insulated section for uniting conductors of opposite polarity having its lower edge made discontinuous by notches or serrations, and provided with a discontinuous metallic wearing surface between the serrations. 18th. In a double-suspended system of electric railway conductors, a contact device comprising a pair of independent upwardly spring-pressed arms, each provided with a contact device at its outer extremity, both said arms being free to swing about a vertical axis, separate insulated connections between the contact devices and a stationary support or base, and a slack and flexible portion between the fixed and movable parts of the said circuit-connections, for permitting said arms to swing upon their vertical axis for reversing. 19th. In a double-suspended conductor system, the combination, with a suitable support mounted upon a car or other vehicle, of a pair of contact carrying arms, vertical and transverse axes sustaining said arms in positions to swing freely about the vertical axis, tension springs pressing said arms independently upward against suspended conductors, and separate flexible conductors extending between the contact devices carried by the arms and connected to fixed terminals of the motor circuit. 20th. In a double-suspended conductor system, the combination, of a pair of arms, vertical and transverse axis for said arms upon which they are mounted at their lower ends, tension-springs for imparting an upward tendency to said arms independently, and self-adjusting and locking connections between the inner ends of said springs, and a support whereby the tension of the springs may be adjusted by moving the arms away from their operative position. 21st. In a double-suspended conductor system, the combination of a block Q mounted upon a vertical pivot, transverse arms, contact-carrying arms hinged thereupon, and tension springs upon the arms, the outer ends of said springs engaging the contact-carrying arms, and their inner ends being held by detent mechanism connected to said springs and engaging detents carried by the block Q.

**No. 33,003. Electric Motor.** (*Moteur électrique.*)

Charles J. Van Depoele, Lynn, Mass., U.S., 3rd December, 1889; 10 years.

*Claim.*—1st. In an electro-dynamic motor, the combination of a field-magnet wound with a separable coil, a switch upon the motor provided with a continuous series of insulated terminals, connections between the portions of the field-magnet coils and part of the terminals of said switch, a series of artificial resistances connected to the remaining terminals of the switch, and a moving terminal, and means for operating the same, whereby any portion of the artificial resistance may be connected in series with the field-magnet coils or cut-out altogether. 2nd. In an electro-dynamic motor, the combination of a continuous series of insulated terminals, a movable contact adapted to engage said terminals successively, a plurality of resistance-coils connected in series and divided into sections, each section connected to a separate terminal of the switch series, and a sectional field-magnet, the parts of which are separately connected to the remaining terminals of the switch, the last coil of the resistance and the first coil of the field-magnet being connected to the same terminal. 3rd. In an electro-dynamic motor, the combination of a field-magnet wound with devisible magnetizing coils, a switch having a series of separated terminals, and connections between the said devisible field-magnet coils and part of said terminals, and a series of artificial resistances connected to other terminals of the said switch, and adapted to be thereby connected in series with the field-magnet coils. 4th. In an electro-dynamic motor, a field-magnet provided with main and auxiliary coils, said coils being wound and connected in two separate portions arranged in multiple relation to each other, connections extending from said multiple arc coils to part at the terminals of a switch, and a series of resistances connected to other terminals of said switch, and arranged to be thereby connected in series with the coils of the field-magnet. 5th. In an electro-dynamic motor, a field-magnet wound with main and auxiliary magnetizing coils, a switch upon said motor comprising a series of separated terminals to part of which the said coils are connected, in electric connection between one of the commutator-brushes and a movable switch-lever, whereby any desired portion of the auxiliary coils may be placed in circuit with the armature or the auxiliary coils entirely cut out, and an adjustable resistance connected to the remaining switch terminals, and arranged to be by said switch combined in whole or in part with the said field-magnet coils. 6th. In an electro-dynamic motor, a field-magnet, provided with main and auxiliary magnetizing coils, a switch located upon the motor and provided with a series of separate terminals to part of which the field-magnet coils are separately connected, a series of resistance-coils connected to other separate terminals of the same switch, a switch-lever for contact with any of said terminals, and an electric connection between one of the commutator-brushes and said switch-lever, whereby all or a part of the resistance together with the field-magnet coils, or the field-magnet coils alone, or any portion thereof, may be placed in circuit with the armature.

**No. 33,004. Electric Locomotive.**  
(*Locomotive électrique.*)

Charles J. Van Depoele, Lynn, Mass., U.S., 3rd December, 1889; 10 years.

*Claim.*—1st. An electric locomotive, comprising a platform or vehicle, a single pair of driving wheels centrally located thereunder,