

cable, having a solid body of soft ductile metal, or metallic alloy, inclosing the insulated conducting wires, each in its appropriate passage through the body, such wires being arranged in close proximity at intervals around the solid core or centre of the body with a series of strengthening wires inclosed within the soft metal body, such strengthening wires being arranged at intervals around the conducting wires, substantially as set forth. 5th. An electric cable, having a body A, of soft ductile metal or alloy, inclosing three insulated conducting wires c, each in its appropriate passage through the body, such wires being placed in triangular relationship, and in close proximity around the solid metal centre a, with a series of strengthening wires e, inclosed in the body of soft metal, such strengthening wires being double the number of conducting wires c, and arranged around the latter wires, on either side of radial lines produced through the conducting wires, substantially as and for the purposes set forth.

No. 21,232. Electric Cable. (*Câble Electrique.*)

Richard S. Waring, Pittsburgh, Penn., U.S., 12th March, 1885; 15 years.

Claim.—1st. An electric cable, having an integral homogenous body or covering of lead, with insulated wires, inclosed in separate passages therethrough, such wires being arranged in two rows, the adjacent wires of the two rows being in closer proximity than the adjacent wires of either row, substantially as set forth. 2nd. An electric cable, having an integral homogenous body of metal covering, with insulated wires inclosed in separate passages therethrough, such wires being arranged in two rows, the adjacent wires of the two rows being in closer proximity than the adjacent wires in either row, and the wires of one row alternating in order of position with those of the other row, substantially as set forth. 3rd. An electric cable, having a body or protective covering of soft ductile metal, or equivalent alloy, with tubular passages therethrough, inclosing insulated conducting wires, such wires being arranged in pairs of rows, the two rows composing a pair being in closer proximity than successive pairs, substantially as set forth. 4th. An electric cable, having a body of soft ductile metal or alloy, with passages therethrough, inclosing insulated conducting wires, such wires being arranged in pairs of rows, the two rows composing a pair being in closer proximity than successive pairs, and the adjacent wires taken across the two rows of a pair being in closer proximity than adjacent wires taken in the same row, substantially as set forth. 5th. An electric cable, having a body of soft ductile material or alloy, with passages therethrough, inclosing insulated conducting wires, such wires being arranged in pairs of rows, the two rows composing a pair being in closer proximity than successive pairs, and the wires in rows of each pair alternating in order of position with those of the other row of the pair, substantially as set forth. 6th. An electric cable, having, a body A, of soft ductile metal or alloy, with passages therethrough inclosing insulated conducting wires c, e, such wires being arranged in pairs of parallel rows, the two rows of a pair being in closer proximity than the adjacent rows of successive pairs, the wires c, in one row of a pair alternating in order of positions with the wires e, of the companion row of the pair, and the wires in the adjacent rows of successive pairs, having the same order of succession and occurrence, substantially as set forth. 7th. An electric cable having a body of soft ductile metal or alloy, with passages therethrough inclosing insulated conducting wires, such wires being arranged in pairs of rows, the two rows of a pair being in closer proximity than successive pairs, the individual wires in the two rows of a pair alternating in order of succession, and the adjacent wires taken in different rows of a pair being in closer proximity than adjacent wires taken in the same row, substantially as set forth.

No. 21,233. Electric Cable. (*Câble Electrique.*)

Richard S. Waring, Pittsburgh, Pa., U.S., 12th March, 1885; 15 years.

Claim.—1st. The method of forming electric cables, which consists in twisting together one central, and a series of surrounding insulated electric conductors, for a short distance, interchanging in position the central or core conductor, and one of the outside conductors, so as to bring the central conductor into the outer series, and repeating these steps at suitable intervals throughout the entire length of the cable, substantially as set forth. 2nd. The method of forming electric cables, which consists in twisting together one central, and a series of surrounding insulated electric conductors, for a short distance, interchanging in position the central or core conductor and one of the outside conductors, so as to bring the central conductor into the outer series, repeating these steps at suitable intervals throughout the entire length of the cable, and inclosing the prepared cable within a metallic sheath, substantially as set forth. 3rd. An electric cable having a central, and a series of surrounding insulated conductors twisted together, each surrounding conductor in turn forming the centre or core of the cable, substantially as set forth. 4th. An electric cable having a central, and a series of surrounding insulated conductors twisted together, each surrounding conductor in turn forming the centre or core of the cable, in combination with a suitable metallic covering or sheath, substantially as set forth.

No. 21,234. Electric Cable. (*Câble Electrique.*)

Richard S. Waring, Pittsburgh, Pa., U.S., 12th March, 1885; 15 years.

Claim.—1st. An electric cable, having a body of soft ductile metal or metallic alloy, inclosing insulated conducting wires, each in its appropriate passage through the body, such wires being arranged in distinct groups at intervals around a central group, the distance between adjacent wires of a group being less than the distance between the successive groups composing such outer circle, substantially as set forth. 2nd. An electric cable, having a body of soft ductile metal or metallic alloy, inclosing insulated conducting wires, each in its appropriate passage through the body, such wires being arranged in distinct groups in circular order around a central group, the central group being composed of wires arranged in circular order around a common center, the wires of such circle occurring in the radial lines of the surrounding groups, substantially as set forth. 3rd. An elec-

tric cable, having a body of soft ductile metal or alloy, inclosing insulated conducting wires in separate passages therethrough, such wires, being arranged in distinct groups around a central group, the outer group being composed of three wires each, the distance between such wires being less than the distance between successive groups, substantially as set forth. 4th. An electric cable, having a body of soft ductile metal or alloy, inclosing insulated conducting wires in separate passages therethrough, such wires being arranged in distinct groups, arranged in circular order around a central group, with grooves made longitudinally in the exterior surface of the body between the groups composing the outer circle, substantially as set forth.

No. 21,235. Repairing Defects in the Conductors of Lead Cables. (*Mode de réparer les Accidents dans les Conducteurs des Câbles de Plomb.*)

Richard S. Waring, Pittsburgh, Penn., U.S., 12th March, 1885; 15 years.

Claim.—1st. The method herein described, which consists in uncovering one of the conductors of a lead-covered electric cable, having two or more conductors inclosed in separate passages in the lead covering, severing the conductor, electrically uniting the severed ends, covering said union with insulating material, and re-covering the union with lead, substantially as set forth. 2nd. The method, herein described, of repairing the conductors of a lead covered electric cable, having two or more conductors inclosed in separate passages in the lead covering, which consists in uncovering one of said conductors, removing the defective part of said conductor, electrically uniting the severed ends of said conductor, covering said union with insulating material, and re-covering the union and exposed parts of the conductor with lead, substantially as set forth. 3rd. The method, herein described, of repairing the conductors of a lead covered electric cable, having two or more conductors inclosed in separate passages in the lead covering, which consists in removing the lead covering from around one of said conductors, removing the defective part of the conductor, electrically uniting the severed ends by any suitable coupling, covering said coupling and exposed parts of the conductor with insulating material, re-covering the insulated coupling and conductor with a piece of lead, and sliding said piece of lead to the body of the cable, substantially as set forth. 4th. In a lead covered electric cable, having two or more conductors inclosed in separate passages in the lead covering, one of whose conductors is so severed that the severed ends will not meet the combination of the spiral coupling c, in which the severed ends of the conductor are soldered, the insulating covering d, and the flap e, securely soldered over the coupling, substantially as set forth.

No. 21,236. Making Joint Connections in Electric Cables. (*Manière de faire les Entures des Câbles Electriques.*)

Richard S. Waring, Pittsburgh, Pa., U.S., 12th March, 1885; 15 years.

Claim.—1st. The method, herein described, of making branch or loop connections in lead-covered electric cables, consisting in removing the metal covering of, and exposing the wire at, the side of the cable body, severing such wire and connecting its ends by metallic contact with the exposed ends of the wires of a branching cable, re-covering the exposed wire surfaces with insulating material, and, finally, inclosing the wire connection thus made in a plumber's wiped-joint of solder, making solid union thereby between the side of the main cable and the branching cable, substantially as set forth. 2nd. A cable, having a soft metal body inclosing insulated conducting wire therein, having one or more such wires severed and exposed at the side of the cable, in combination with branching cable C, the same being metal covered and having its wires connected electrically with the exposed ends of the severed wire, or wires of the main cable, insulating covering i, and a plumber's wipe E, of solder inclosing the connected wire ends, and making solid connection between the metal covering of the branching cable, and the side of the main cable, substantially as set forth. 3rd. A cable A, having a soft metal body inclosing insulated conducting wires therein, with one or more such wires, exposed and severed at the side of the cable, in combination with metal-covered cable C, having its wire ends connected with the exposed wire ends of cable A, an insulating covering i, and a metal-covering e, for each wire connection, and a plumber's wipe E, of solder inclosing such wire connections and making a solid union between the metal covering of the branching cable and the side of the main cable, substantially as set forth.

No. 21,237. Mandrel for Cable Presses.

(*Mandrin pour Presses de Câbles.*)

Richard S. Waring, Pittsburgh, Pa., U.S., 12th March, 1885; 15 years.

Claim.—1st. A mandrel C for a cable press, having a tapered body with separate wire passages therethrough, and longitudinal grooves a, extending between the lines of wire passages to the point, and having shallow cuts or channels e in the end connecting the grooves between the openings of the wire passages, substantially as set forth. 2nd. A tapering mandrel C for a cable press, having three wire passages therethrough emerging at the point in close proximity, and in positions corresponding to the angles of a triangle, with longitudinal grooves e, extending along the exterior surface of the mandrel between wire passages to the point, and cuts or channels e, crossing the point between the passage opening, substantially as set forth.

No. 21,238. Mandrel for Cable Presses.

(*Mandrin pour Presses de Câbles.*)

Richard S. Waring, Pittsburgh, Pa., U.S., 12th March, 1885; 5 years.

Claim.—1st. A mandrel for a cable press, having separate passages therethrough for insulated conducting and for strengthening wires, such passages terminating at the point in tubular nipples, the nipples