

No. 716,978.

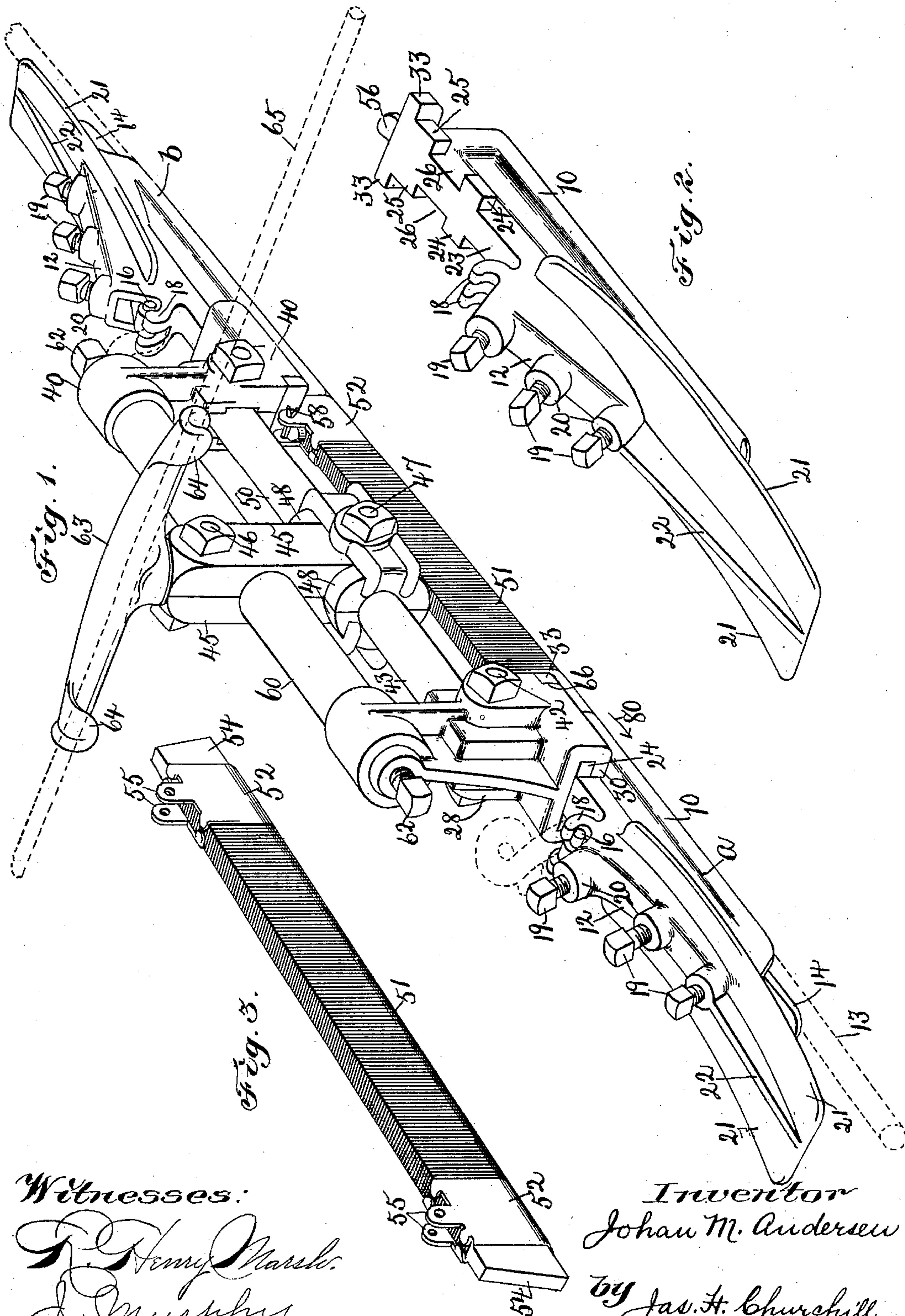
Patented Dec. 30, 1902.

J. M. ANDERSEN.
SECTION INSULATOR.

(Application filed Aug. 25, 1902.)

(No Model.)

2 Sheets—Sheet 1.



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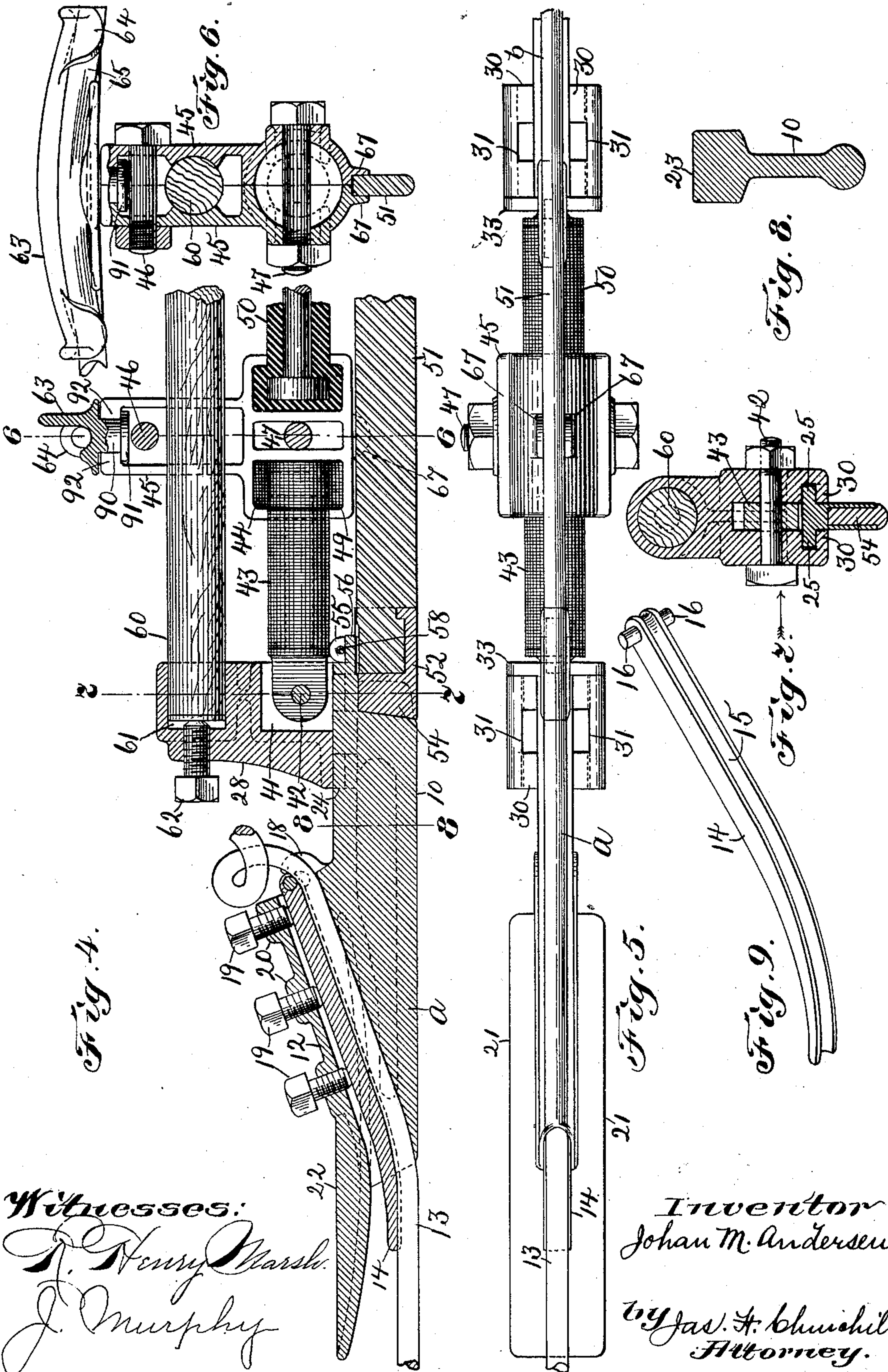
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UNITED STATES PATENT OFFICE.

JOHAN M. ANDERSEN, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ALBERT ANDERSON, OF BOSTON, MASSACHUSETTS.

SECTION-INSULATOR.

SPECIFICATION forming part of Letters Patent No. 716,978, dated December 30, 1902.

Application filed August 25, 1902. Serial No. 120,904. (No model.)

To all whom it may concern:

Be it known that I, JOHAN M. ANDERSEN, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Section-Insulators, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

10 This invention relates to an insulating-support for electric conductors, and more particularly for the trolley-wire of an overhead electric-railway system.

The invention has for its object to provide 15 a simple and inexpensive yet highly-efficient insulating-support of that class known as "section-insulators," by means of which the trolley-line is separated into sections which are insulated from one another.

20 One feature of the present invention consists in a novel construction of line-terminal whereby all the terminals may be made or cast from a single pattern and are therefore interchangeable, thereby materially reducing 25 the cost in this respect, and the said terminals are of such construction, as will be described, as to enable them to be readily connected with and disconnected from the other parts of the support in a substantially short 30 time.

Another feature consists in a novel means for securing the trolley-wire to the terminal, as will be described.

35 These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a perspective view of a trolley-line section-insulator embodying this invention; Fig. 2, a perspective, on an enlarged 40 scale, of one of the line-terminals; Fig. 3, a detail to be referred to; Fig. 4, a detail in longitudinal section of one of the line-terminals and a portion of the insulators; Fig. 5, an under side view of the section-insulator, one end being broken away; Fig. 6, a transverse section on the line 6 6, Fig. 4; Fig. 7, a transverse section on the line 7 7, Fig. 4; Fig. 8, a transverse section on the line 8 8, Fig. 4; and Fig. 9, a detail to be referred to.

50 Referring to Fig. 1, *a b* represent the line-terminals of a section-insulator embodying

this invention, the said terminals being of like construction, and therefore a detail description of one is deemed sufficient.

Referring to Figs. 2 and 4, the line-terminal *a* consists of a casting of brass or other 55 suitable metal or metals provided with a body portion 10, which is substantially straight on its under surface and is provided at its forward end with an upwardly and rearwardly 60 extended hollow portion 12, into which the end of the trolley-wire 13 is designed to be passed and which contains a clamping device, herein shown as a finger or bar 14, (see Fig. 9,) which is preferably provided on its under 65 side with a longitudinal groove 15, adapted to embrace the upper portion of the trolley-wire, the said clamping finger or bar being provided at its rear end with pivot-pins 16, adapted to engage suitable sockets formed by the 70 ears 18 on the rear of the hollow portion 12. The clamping finger or bar 14 is held in firm engagement with the trolley-wire 13 by screws 19, herein shown as three in number, which extend through suitable bosses 20, formed on 75 the upper surface of the hollow portion of the casting and engage the clamping-finger between its ends for a purpose as will be described. The casting is provided with laterally-extended flanges 21, which are curved at 80 their front and preferably at their rear ends, and the said flanges are reinforced by the central web 22. The body portion of the casting has its upper face 23 (see Fig. 2) made substantially straight, and the said body portion at its 85 rear end is provided with one or more laterally-projecting lugs 24 25, which are preferably separated from each other by suitable spaces 26. The laterally-projecting lugs 24 25 cooperate with and engage a casting 28, 90 which may be termed a "head-piece" and which casting is provided at its bottom with inwardly-extended flanges 30, forming a substantially T-shaped slot, in the horizontal portion of which the lugs 24 25 are adapted to be 95 moved longitudinally, the rear or body portion 10 of the terminal being extended through the vertical portion of the said slot and confined against lateral movement by the said flanges 30, upon which the lugs 24 25 rest 100 when the terminal is in its operative position. The flanges 30 are provided with recessed or

notched portions 31 (see Fig. 5) of a length substantially equal to the length of the lugs 24 and through which the lugs 24 are adapted to be passed when the line-terminal is attached to or disconnected from the head-piece. When the lugs 24 are passed through the notches 31, the lugs 25 are carried up at the rear of the bottom portion of the head-piece, and when the lugs 24 have been inserted far enough to clear the upper surface of the flanges 30 the terminal piece is drawn forward and the lugs 24 25 are brought over and rest upon the flanges 30 of the head-piece. The forward movement of the line-terminal may be limited by the end lugs or cross-bars 33, which are adapted to engage the rear wall of the head-piece, as represented in Figs. 1, 4, and 5. The line-terminal *b* is a duplicate of the line-terminal *a* and is secured in a similar manner to a duplicate head-piece 40, and the two head-pieces are mechanically connected together, but are electrically separated from one another, as will now be described. The head-piece 28 is provided with a socket 41, in which is secured, as by a bolt 42, the end of the insulator 43, which may be of any usual or suitable construction and which has its other end enlarged to form a head 44 and fitted within a center piece 45, which for simplicity of construction is made of duplicate parts, which are fastened together by suitable bolts 46 47. The two parts of the center piece are provided at their lower ends with bosses 48, semicircular in form and cooperating when fastened together to form a socket or chamber 49, in which the head 44 of the insulator is confined. The head-piece 40 is connected in a similar manner to the center piece 45 by the insulator 50. The terminals *a b* are connected by a bridge 51, of insulating material, provided at its opposite ends with metallic pieces 52, constituting auxiliary terminals, which cooperate with the line-terminals *a b* to prevent wearing away of the latter by sparks which may be formed when the trolley-wheel leaves the terminal 52 and runs onto the bridge-piece 51. The auxiliary terminals 52 may and preferably will be made as castings, each having a nose-piece 54, (see Fig. 4,) which extends into the slotted rear portion of the line-terminal. The auxiliary terminals are provided with lugs or ears 55, which project upward and straddle a rearwardly-extended projection 56 on the line-terminal, the said auxiliary terminals and the insulating-bar or bridge-piece being secured to the line-terminals by cotter-pins or other suitable devices 58, extended through the said lugs and resting upon the projection 56. (See Fig. 4.) The head-pieces 28 40 may also be separated by a bar or piece 60, of wood or other suitable insulating material, which extends through the center piece and into suitable sockets 61 in the said head-pieces and which may be engaged at its opposite ends by the screws 62. The center piece 45 may have revolvably secured to it a cross-bar 63, pro-

vided with overturned lugs or ears 64 for engagement with the span or other supporting-wire 65. It will thus be seen that the line-terminals *a b* are duplicates and interchangeable, thereby enabling all the terminals to be made from a single pattern and also avoiding the necessity of carrying different sets or patterns of line-terminals. The clamping-finger 14 is made substantially curved to conform to the substantially curved form of the groove in the terminal through which the trolley-wire is extended, as represented in Fig. 4, and by such construction an extended and firm bearing or engagement of the clamping-finger with the trolley-wire may be obtained, thereby not only enabling the trolley-wire to be firmly secured to the line-terminal, but also preventing or reducing to a minimum the tendency of the trolley-wire to crystallize under the influence of vibration at the point of firm support. In other words, the bearing of the finger beyond the point of firm support, which in this case is the first screw, acts to distribute the vibration over a considerable length of the trolley-wire and avoids concentration of the vibration at one particular point.

It will be observed by reference to Figs. 1 and 4 that the under side of the section-insulator is in a substantially straight line, which is substantially flush with the under side of the trolley-wire. It is to be observed, further, that the line-terminals when secured to their head-pieces are automatically locked against disengagement by the strain placed upon the trolley-wire. These terminals can be connected with and disconnected from the head-pieces in a substantially short time, it being only necessary to place the lugs or ears 24 in line with the recesses 31 and then pass said lugs up into the said recesses until they clear the supporting-flanges 30, after which the terminal is moved forward or in the direction indicated by the arrow 80 until the lugs 24 pass wholly or partially out of line with the recesses 31 and rest upon the flanges 30, at which time the lugs 25 are entered into the horizontal portion of the T-shaped slot in the head-piece and rest upon the portion of the flanges 30 at the rear of the recesses 31. The line-terminal may be moved forward or in the direction indicated by the arrow 80 until the cross-bar 33 engages the rear portion of the head-piece, which latter, as shown in Fig. 1, is provided with a recess or notch 66 for the reception of said cross-bar, so that the rear surface of the cross-bar 33 may be flush or substantially flush with the rear surface of the head-piece.

The insulating bridge-piece or bar 51 may be confined against lateral movement by lugs or ears 67, (see Figs. 5 and 6,) one on each part or half of the center piece.

The cross-bar 63 is provided at its center with a depending stud 90, provided with a flange or head 91, which is adapted to be engaged by the inwardly-projecting flanges 92

on the duplicate parts of the center piece 45, so as to firmly secure the cross-bar 63 to the center piece, yet permit the cross-bar to be revolved freely in order to enable it to be readily adjusted to the supporting span-wire.

By making the line-terminals detachable from their head-pieces it will be seen that the main portion of the section-insulator may be secured in place to the span-wire and the trolley-wire can be fastened to the line-terminal on the construction-wagon, and after it has been firmly secured to the line-terminal the latter may then be readily connected with the head-piece of the section-insulator, it being only necessary, as above described, to practically hook the terminal onto the head-piece.

I prefer to use the center piece; but I do not desire to limit myself in this respect, as the section-insulator can be made without the center piece, in which case the head-pieces are separated by a continuous insulator.

I claim—

1. In an insulator of the class described, the combination with line-terminals, of head-pieces to which said line-terminals are detachably secured, a center piece interposed between said head-pieces, insulators connecting said center piece with said head-pieces, a non-conducting piece interposed between said head-pieces and provided with auxiliary terminals coöperating with said line-terminals, and means for securing said non-conducting piece in operative position, substantially as described.

2. In an insulator of the class described, the combination with line-terminals, each provided with an upwardly-inclined hollow portion, a finger or bar extended through said hollow portion and provided with means for retaining it in said hollow portion, and a plurality of clamping devices extended through said hollow portion and engaging said clamping-finger, of head-pieces to which said line-terminals are detachably secured, a center piece between said head-pieces, insulators connecting said center piece with said head-pieces, and a non-conducting piece or bar interposed between said line-terminals and provided with auxiliary terminals coöperating with said line-terminals, substantially as described.

3. In an insulator of the class described, the combination with line-terminals provided with slots at their rear end and with projections, of a non-conducting piece or bar provided at its opposite ends with metallic pieces extended into the slotted rear portions of said line-terminals, lugs or ears on said auxiliary terminals straddling or embracing the projections on the line-terminals, and means for engaging said lugs or ears above the projections on the line-terminals, substantially as described.

4. In an insulator of the class described, the

combination with a line-terminal provided with laterally-extended lugs or ears, of a head-piece provided on its under side with a substantially T-shaped slot, the bottom walls of the horizontal part of said slot having notches or recesses through which the lugs or ears on the line-terminal are adapted to pass when said terminal is connected with or disconnected from said head-piece, substantially as described.

5. In an insulator of the class described, the combination with line-terminals, of a center piece composed of duplicate parts fitted together, and means for securing said parts together, and insulators connecting said center piece with said line-terminals, substantially as described.

6. In an insulator of the class described, the combination with line-terminals, of a center piece composed of duplicate parts, each having substantially semicircular bosses at its ends which coöperate to form chambers when said parts are fitted together, means to secure said parts together, and insulators connecting said line-terminals and provided with heads located within the said chambers, substantially as described.

7. In an insulator of the class described, the combination with a line-terminal comprising a substantially straight rear portion having laterally-extended lugs, of a head-piece having inturned flanges forming a substantially T-shaped slot, said flanges having notches or recesses for the passage into said slot of the laterally-extended lugs on said line-terminal, substantially as described.

8. In an insulator of the class described, the combination with a line-terminal provided with an upwardly-inclined hollow portion having lugs or ears at its rear end, of a clamping-finger inserted into said hollow portion and provided at its rear end with pins or projections to engage said lugs or ears, and clamping-screws inserted through the said hollow portion and adapted to engage the clamping-finger therein, substantially as described.

9. In an insulator of the class described, the combination with a line-terminal provided with an upwardly and rearwardly inclined hollow portion through which the conductor is adapted to be passed, a clamping-finger extended into said hollow portion, means for retaining said finger in said hollow portion, and means for forcing said finger into engagement with said conductor, substantially as described.

10. In an insulator of the class described, the combination with a line-terminal provided with a substantially straight rear portion having at its upper edge two sets of laterally-extended lugs or ears separated from each other, and provided with a cross-bar extended beyond said lugs or ears, of a head-piece provided at its bottom with inturned flanges forming a substantially T-shaped slot, said flanges having notches or recesses for the pas-

sage of one set of the laterally-extended lugs into the said T-shaped slot, substantially as described.

11. In an insulator of the class described, the combination with line-terminals, of head-pieces to which said line-terminals are detachably secured, a center piece interposed between said head-pieces, and insulators connecting said center piece with said head-pieces, substantially as described.

12. In an insulator of the class described, the combination with a line-terminal, of a head-piece for supporting said terminal, one of said parts having laterally-extended lugs or ears, and the other of said parts having a slot for the reception of said lugs or ears and provided with flanges which engage said lugs or ears by longitudinal movement of one part with relation to the other, substantially as described.

13. In an insulator of the class described, the combination with a line-terminal, of a head-piece or support to which said line-terminal is adapted to be secured, and interlocking means on said terminal and head-piece, adapted to be engaged with and disengaged from each other by movement of one part with relation to the other, substantially as described.

14. In an insulator of the class described, the combination with a center piece composed of separate parts having inwardly-extended flanges, of a cross-bar provided with a depending stud having a head or flange, and means for securing together the parts of the center piece with their inwardly-extended flanges in engagement with the head on the cross-bar, substantially as described.

15. The combination with a line-terminal provided with a slot, groove or channel, of a conductor or wire extended into said slot, groove or channel, a clamping device having an extended engagement with said conductor, and means in engagement with the clamping device intermediate of its ends to force said clamping device into firm engagement with the conductor or wire between the ends of the said clamping device, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHAN M. ANDERSEN.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.