(No Model.) 4 Sheets—Sheet 1

F. E. DEGENHARDT.

ELECTRIC RAILWAY APPLIANCE.

No. 457,836. Patented Aug. 18, 1891.

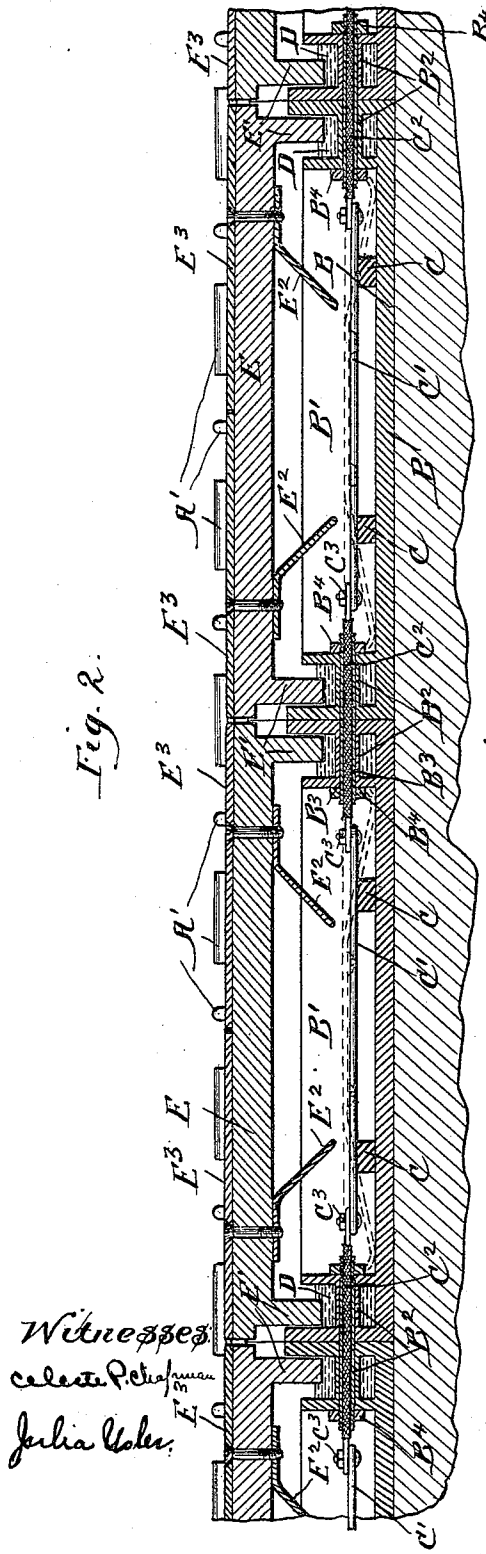


Fig. 2.

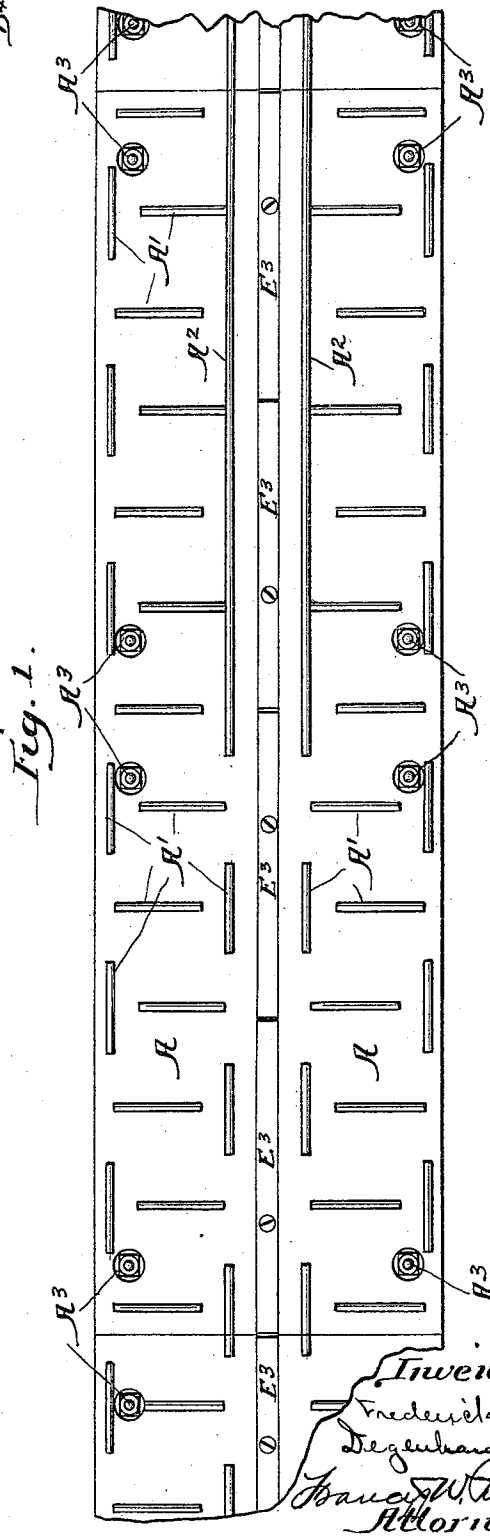


Fig. 1.

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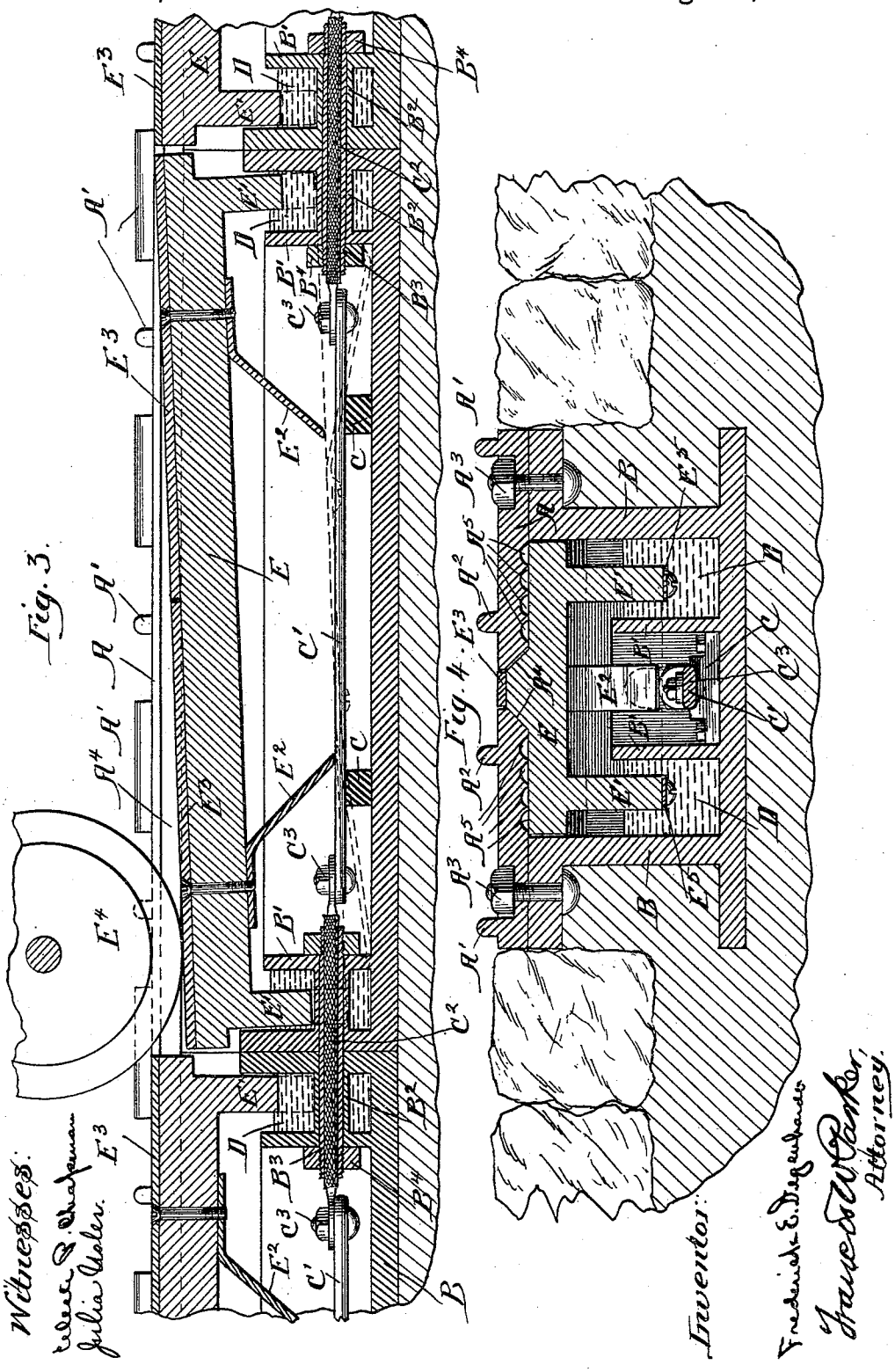


Fig. 3.

Fig. 4.

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Fig. 5.

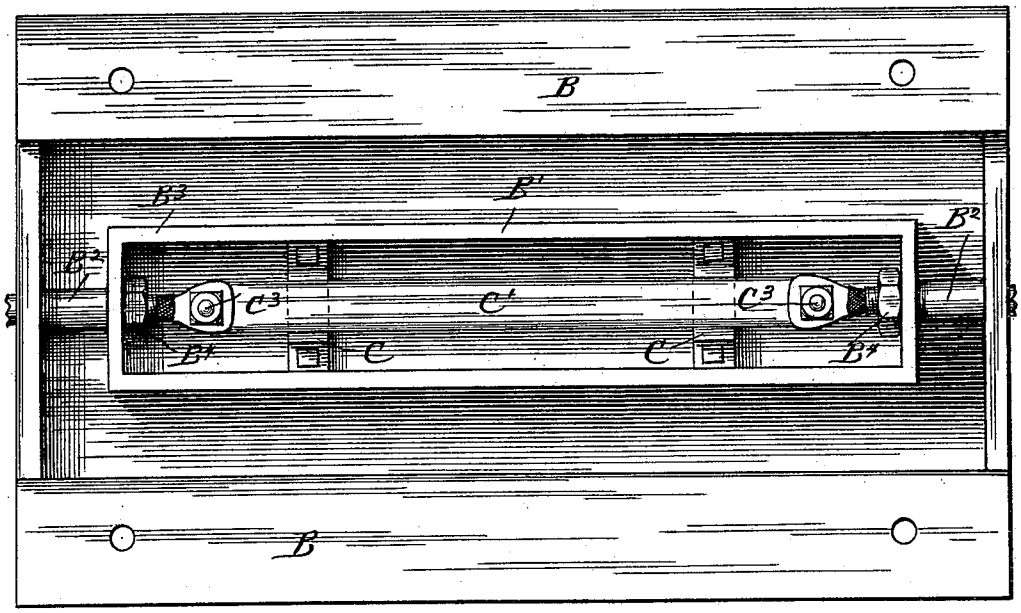
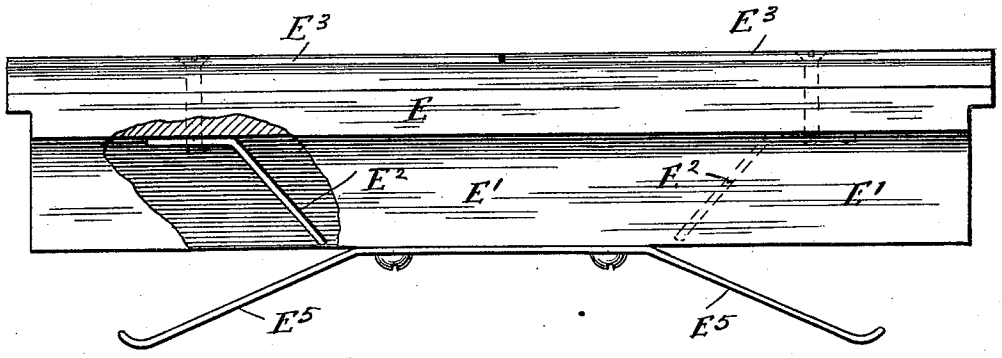


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

F. E. DEGENHARDT.

ELECTRIC RAILWAY APPLIANCE.

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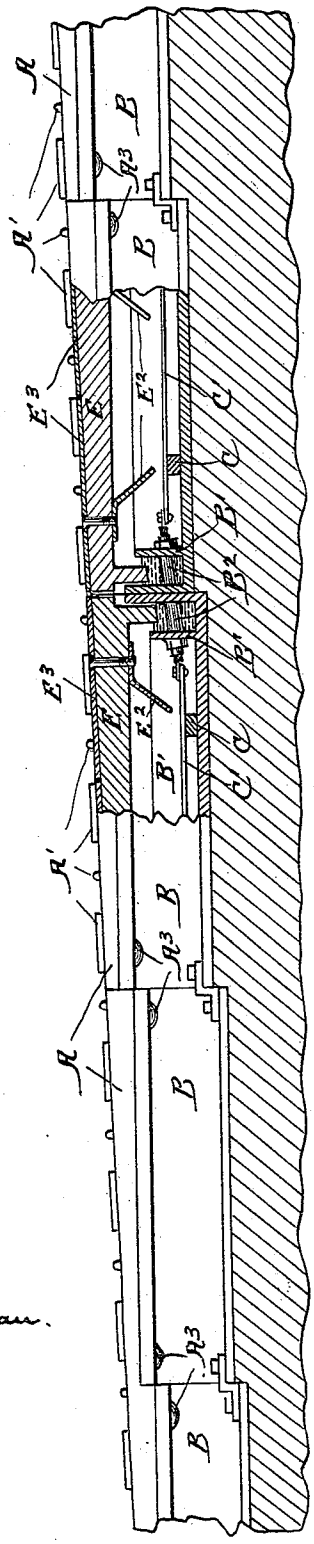


Fig. 7.

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UNITED STATES PATENT OFFICE.

FREDERICK E. DEGENHARDT, OF CHICAGO, ILLINOIS.

ELECTRIC-RAILWAY APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 457,836, dated August 18, 1891.

Application filed October 13, 1890. Serial No. 367,923. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK E. DEGENHARDT, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric-Railway Appliances, of which the following is a full, clear, and exact specification.

My invention relates to electric railways, and particularly to means for supplying the current to the moving car, and has for its object to conduct the current as desired through a fixed concealed conductor to the moving car in an inexpensive and convenient manner.

The present form of my invention is illustrated in the accompanying drawings herein.

Figure 1 is a plan view of the upper fixed cover of the conduit; Fig. 2, a vertical longitudinal section; Fig. 3, an enlarged view of the same with parts in operation; Fig. 4, a cross-section; Fig. 5, a plan view of the inner chamber; Fig. 6, a detail of the movable contactor-carrying cover; Fig. 7, a side view of my apparatus as modified and applied in the case of grades.

Like parts are indicated by the same letter in all the figures.

A A are sections of a cover provided, if desired, with lugs or projections A′ A′, and, if desired, with continuous ledges A^2 A^2, separated from each other by about the width of an ordinary wagon-tire.

A^3 are bolts by which sections of the covering may be secured removably in position. These sections of the covering are beveled away from each other at A^4, as indicated in Fig. 4, and are provided below with corrugations or grooves A^5 A^5, and they are secured upon the side ledges of the main box or portion of the conduit B. The boxes B B are preferably placed contiguous to each other end to end, and each is provided, preferably, with an interior box or rising ledge B′, whereby an inner air-chamber space is formed with an exterior fluid-channel thereabout formed between the walls of the portions B and B′. At each end of such box is formed a tubular portion B^2, whereby an aperture is created connecting the interior of the box B′ with the exterior. These apertures in adjacent boxes will register when all are in position, so that the interiors of the successive boxes B′ B′ are connected. Through the aperture thus connecting this interior is placed a pipe B^3, provided at each end with a packing-nut B^4, whereby the connection is made so that the interiors of the adjacent and successive boxes are securely connected so as to form a continuous conduit without exterior connection except above the boxes.

In each of the boxes B′ B′ is placed an insulated block C, on which rests—one in each box—a short conductor-section C′, preferably bare throughout its length.

In each of the pipes B^3 is placed a short section of conductor C^2, the same being preferably insulated, as shown. The adjacent ends of the insulated sections C^2 and bare section C′ are removably connected, as at C^3, and in such manner as that they may have a certain amount of motion one upon the other, as may be found desirable or necessary. This connected conductor formed of such sections is not at any point fixedly held, but is capable of such lateral or bending motion as occasion may require of it. It might of course be fixedly held at points, if desired.

D is a body of fluid in the fluid-channel.

E is a movable cover for the boxes, provided with a depending edge E′, adapted to descend into the fluid-chamber and carrying the inner contactors E^2 E^2, adapted to engage with the inner conductor-section C′. Connected with these contactors through the body of the movable cover are the contactor-sections E^3 E^3, insulated from each other and adapted to be successively engaged by the trolley-roller E^4. Each cover is supported elastically upon springs E^5, so that when freed from the pressure of the trolley such cover will rise to its normal position, as indicated in Figs. 1 and 2, and will thus free its contactors E^2 E^2 from the conductor-section C′.

By reference to Fig. 3 it will be observed that the sections E^3 E^3 of the exterior contactors as they are successively depressed are freed from electrical contact with the fixed covering or sections A A, since they are forced downward by the trolley a considerable distance below the commencement of the bevel on such sections A A. My invention is concerned with the conduit of conductor, and hence I do not dwell upon the trolley and its structure in this case, but would prefer to

employ a double trolley with suitable track-clearing apparatus.

In Fig. 7 it will be observed that the tubular connection between the adjacent boxes is placed at an angle the length of each box, so as to permit them to be placed one above another for use in grades. In this event covers both fixed and movable will be proportionately increased in diameter and thickness toward one end, so as to present an appearance of an inclined plane, thus connecting that cover to the adjacent section.

The use and operation of my invention are as follows: The fixed exterior cover is preferably of metal and provided with lugs or projections, whereby it is adapted to serve as a pavement, and it may also be provided with continuous ridges or ledges on opposite sides of the slot, the ridges of the two sections separated so as to form a tire-track. They are secured in suitable sections upon the boxes which form the sections of the conduit. These covers are suitably removable, being secured by screws or bolts. They are disposed so as to leave a narrow slot between them and are beveled away on the under side of their contiguous edges, as shown. They are in electrical contact with the ground or earth, and their lower surfaces are provided, preferably, with corrugations or grooves which are designed to receive all gravel, dirt, or dust which from time to time may enter from the slot, and thus prevent the same from interfering with the operation of the apparatus, at least until a large quantity has collected. In this event the fixed covers may be removed and the parts cleaned.

The conduit proper is composed of a series of boxes, above which the fixed covers are placed. Said boxes may be made about thirty-six inches in length. Within each box is formed an inner box or chamber, about which is the sealing-fluid channel of such box. In each box and at each end is formed a tubular part, which part registers with the similar part of the next box when in position, thus making connection between the interior chambers of adjacent boxes. Within such tubular part is placed a short pipe firmly secured in position by a tight packing-nut at each end within such chambers. Within this pipe is placed a short section of preferably insulated conductor-wire, the ends of which are removably connected with the conducting-sections, which lie within the inner chambers on the insulating-blocks. Thus it is easy to remove any section of the conductor and replace it, as occasionally required. Above each box and beneath the fixed upper cover is a movable cover or side for such chamber in a box-shaped form, or having depending edges which enter the fluid-chamber and lie, preferably, considerably beneath the surface of the fluid therein. Each of these covers is supported on springs and provided with interior contactors, so that when depressed it will make one or more contacts with the conductor within the chamber and when cleared will free such contactors. Each movable cover carries two contactors within the chamber and also two sections of contacting-surface exposed or above. Such contactors or contacting-surface may be made in various ways, and I have shown the upper contactors composed of two insulated sections adapted to lie in and thus almost fill the slot between the portions of the fixed cover. This contact-surface or exterior contactor will usually be in electrical contact with the fixed cover and hence with the ground. If one end be depressed by the approach of the trolley, the other end will still be in contact. Hence the importance of insulated sections, so that when one is depressed it is free from contact with the fixed cover. As the trolley approaches, the other condition will be reversed. The ends of the depending portions of the movable cover are slotted to permit them to pass the cylindrical portion within the fluid-channel. The device is especially designed for use with a trolley-roller, the central or inner portion of which has a projecting rim to engage the exterior or exposed contactor or surface, while the sides are insulated. As the trolley of the car above moves along it engages and depresses one end of such movable covers thus bringing one interior contactor in engagement with the conductor in the chamber, and thus leading the current from the conductor to the trolley and the motor of the car. As the trolley moves on, it successively makes connection with the conductor-sections in like manner. A double trolley is preferable, for by it arcs are avoided. If water should have entered through the slot, it will not be able to penetrate the fluid seal, which should be of fluid heavier than water, and hence will not enter the inner chamber. Moreover, the action of the car in depressing the movable cover would compress the fluid within the chamber and force the fluid in the fluid-channel toward the slot, and thus expel the water lying between the two covers and within the fluid-channel. This same operation would also carry dirt and dust away from the inner chamber. This same action would result even though the fluid seal be not composed of fluid heavier than water, for the device operates as a sort of force-pump and forces extraneous fluids or matters away from the passage, which otherwise would lead into the apparatus. The successive sections are disconnected and any section can be easily removed or any part thereof be easily taken out. The fluid seal interposed between the chamber in which the exposed conductor lies and the exterior atmosphere is one of the important features of this invention and the way in which the same is utilized. If the fluid in the fluid-channel overflows into the inner chamber, no serious result will follow, as the contact can still be made and the current be taken through the conductor within the box, even when such conductor is surrounded with the kind of

fluid supposed to be used. This fluid might be some kind of crude petroleum. The slot and these connecting-passages are conceived of as conduit-passages, and one or more passages connecting the interior of couductor-chamber with the exterior chamber, but so disposed as to hold a fluid seal.

I claim—

1. The combination of an electrical conductor with a series of chambers through which it successively passes, said chambers made air-tight by a fluid seal and contactors disposed along such conductors and adapted to engage the same within such chambers when depressed, and an exterior contact-surface connected with such contactors and adapted to be engaged by a conductor connected with a moving motor.

2. The combination of an electrical conductor with a series of chambers through which it successively passes, each composed of oppositely-faced receptacles, the lower containing sealing-fluid, beneath the surface of which the edges of the upper project, and movable contactors adapted to engage such electrical conductor within the chambers and to be engaged exterior to such chambers by a conductor from a moving motor.

3. The combination of an electrical conductor with a series of chambers through which it successively passes, each of said chambers composed of oppositely-faced boxes, the lower having a fluid-channel with a sealing-fluid therein, the upper resting with its edges in such channel and beneath the surface of the fluid, and movable contactors adapted to engage such electrical conductor within the chambers and to be engaged exterior to such chambers by a conductor from a moving motor.

4. The combination of an electrical conductor with a series of chambers through which it successively passes, said chambers provided with a fluid seal, which is interposed between the chambers and the exterior atmosphere, and a contactor adapted to make connection from the conductor within the chamber to a conductor from an exterior moving motor.

5. The combination of an electrical conductor with a series of chambers through which it successively passes, said chambers containing an elastic fluid, like air, for example, and provided with a fluid seal interposed between such chambers and the atmospheric air, and a contactor adapted to make connection from the conductor within the chamber to a conductor from an exterior moving motor.

6. The combination of an electrical conductor with a series of chambers through which it successively passes, said chambers containing an elastic fluid, like air, for example, and provided with a fluid seal interposed between them and the atmospheric air and a movable cover for each of said chambers, and a contactor adapted to make connection from the conductor within the chamber to a conductor from an exterior moving motor.

7. The combination of an electrical conductor with a series of chambers through which it successively passes, each of said chambers provided with a movable cover and passage-way leading to the exterior atmosphere, with a fluid seal in such passage-way, and a contactor adapted to make connection from the conductor within the chamber to a conductor from an exterior moving motor.

8. The combination of an electrical conductor with a series of chambers through which it successively passes, each of said chambers provided with a fluid seal interposed between the same and the exterior atmosphere, said seal consisting of a fluid heavier than water, and a contactor adapted to make connection from the conductor within the chamber to a conductor from an exterior moving motor.

9. The combination of an electrical contactor with a series of separate open chambers through which it successively passes, each of said chambers provided with a movable cover, and a contactor connected with said cover and adapted to engage such conductor within the chamber, a contact-plate on such cover adapted to be engaged by a conductor for a moving motor.

10. The combination of an electrical conductor with a series of chambers through which it successively passes, each of said chambers provided with a movable cover, a contactor controlled by said cover and adapted to engage such conductor within the chamber, and a fluid seal interposed between the interior of such chambers and the exterior atmosphere.

11. The combination of an electrical conductor with a series of chambers through which it successively passes, each of said chambers provided with a movable cover, and a contactor controlled by said cover and adapted to engage such conductor within the chamber, said cover provided with a depending box-shaped portion and said chamber provided with a fluid-channel which receives such depending portion of the cover.

12. The combination of an electrical conductor with a series of chambers through which it passes, each of said chambers provided with a movable cover and a contactor controlled by said cover and adapted to engage such conductor within the chamber, said chamber provided with a depending box-shaped portion and said chamber provided with a fluid-channel which receives such depending portion of the cover, and a fluid seal within such channel and above the edge of such box-shaped portion.

13. The combination of an electrical conductor with a series of chambers through which it passes, each of said chambers provided with a movable cover, a contactor controlled by said cover and adapted to en-

gage such conductor within the chamber, said chamber provided with a depending box-shaped portion and said chamber provided with a fluid-channel which receives such depending portion of the cover, and a fluid seal within such channel and above the edge of such box-shaped portion, such seal composed of fluid heavier than water.

14. The combination of an electrical conductor with a series of separate and open chambers through which it passes, each of said separate and open chambers provided with a movable cover, and a contactor connected with said cover and adapted to engage such conductor within the chamber, said cover normally supported at a position where the contactors are free from the conductor.

15. The combination of an electrical conductor with a series of open boxes through which it passes, and a series of short passage-ways leading from box to box, through which it also passes.

16. As a conduit for electrical conductors, a series of boxes provided with holes, one at each end, to register with a corresponding hole in the next box, and a series of connecting-tubes which pass through such holes and connect the interior of the boxes, such short connecting-tubes provided with a secure backing at each end within the box, so that the boxes are connected with each other, but are fluid-tight, so as to make a continuous fluid-tight way consisting of successive boxes and connecting-channels.

17. The combination of an electrical conductor with a series of separate and open chambers through which it passes, each of said separate and open chambers provided with an elastically-supported cover, and contactors within such chamber controlled by the cover and adapted to form connection between the exterior of the cover and the conductor within the chamber.

18. The combination of an electrical conductor with a series of separate and open chambers through which it passes, each of said separate and open chambers provided with an elastically-supported cover, and contactors within such chamber controlled by the cover, adapted to form connection between the exterior of the cover and the conductor within the chamber, the exterior of said cover divided into insulated sections.

19. The combination of an electrical conductor in a conduit with the movable part disposed along such conduit and carrying contactors adapted to engage a conductor in the conduit, and a fixed cover in electrical connection with the ground, said exterior contactor of the movable part divided in sections adapted each to be disengaged from electrical contact with the fixed cover when its corresponding interior contactor is in contact with the conductor.

20. The combination of an electrical conductor in a conduit with a movable conductor, a series of movable contacting carrying parts between them, and a fluid seal for the points of connection between the body of conduit and said movable parts.

21. The combination of a concealed electrical conductor with exposed contactors adapted to engage therewith, a movable conductor adapted to move along such exposed contactors and successively bring them in contact with the conductor, said contactors containing movable parts, which form parts of the walls of the conduit for the concealed conductor, said concealed electrical conductor protected by a fluid seal.

22. The combination of an electrical conductor with a series of chambers through which it successively passes, a series of movable contactors disposed along such conductor and projecting into such chambers and adapted to be moved against such conductor by the pressure of the moving conductor, said first-mentioned electrical conductor protected by a fluid seal.

23. In an electrical conduit, the combination of successive open fluid-tight boxes with fluid-seal passages thereabout, and a concealed conductor passing through such boxes, said boxes arranged so that their bottoms are parallel but successively at different elevations.

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