(No Model.)

2 Sheets—Sheet 1.

C. E. LOTH.

UNDERGROUND ELECTRIC CONDUIT.

No. 437,126. Patented Sept. 23, 1890.

Fig. 1.

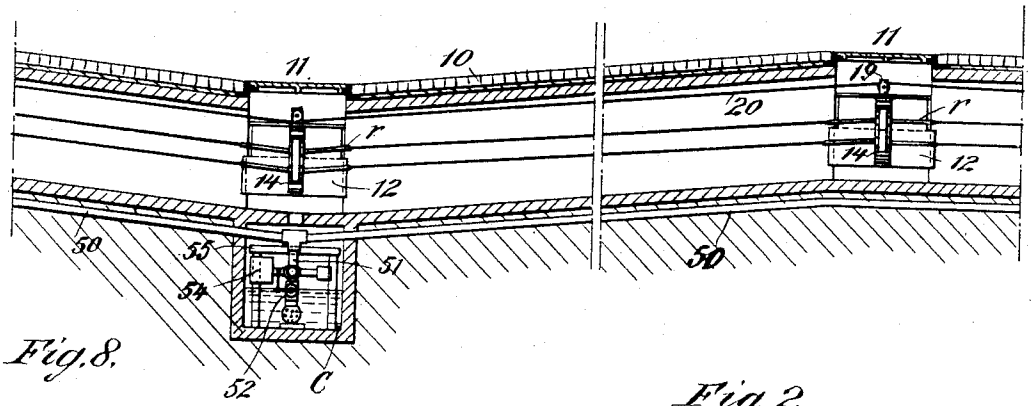


Fig. 8.

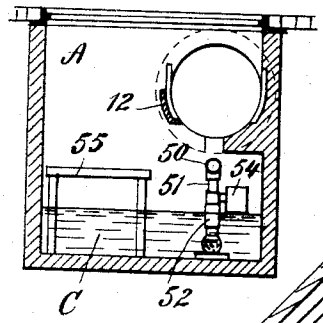
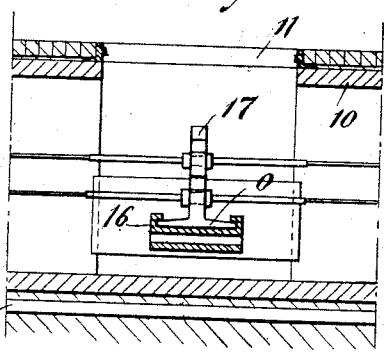


Fig. 2.

Fig. 4.

Fig. 3.

Fig. 5.



WITNESSES:

Donn Twitchell

C. Sedgwick

INVENTOR:

C. E. Loth

BY

Munn & Co

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

C. E. LOTH.

UNDERGROUND ELECTRIC CONDUIT.

No. 437,126. Patented Sept. 23, 1890.

Fig. 6.

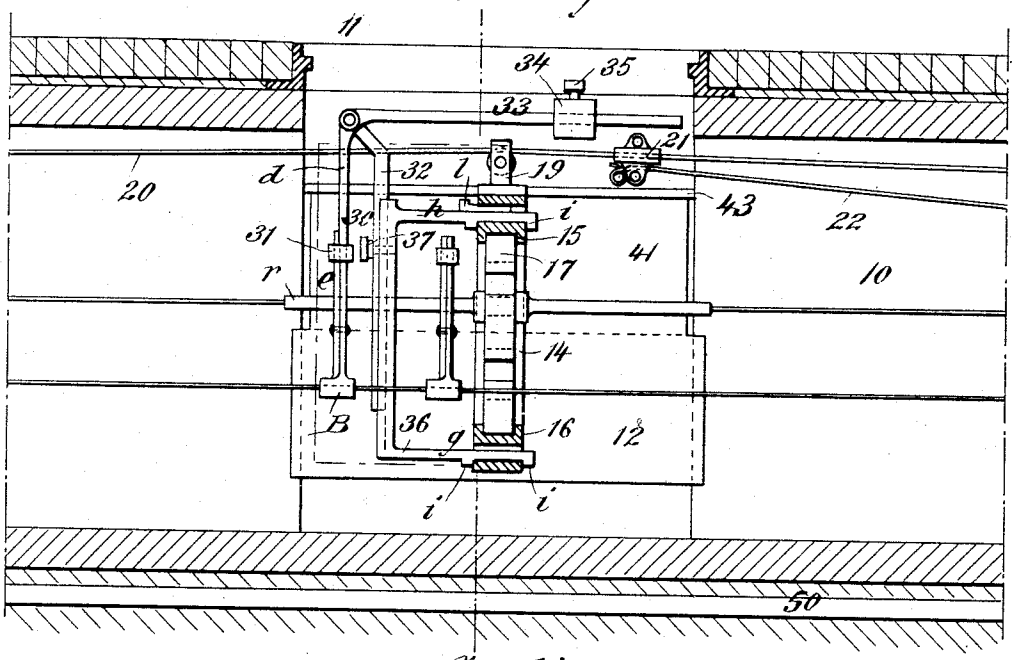
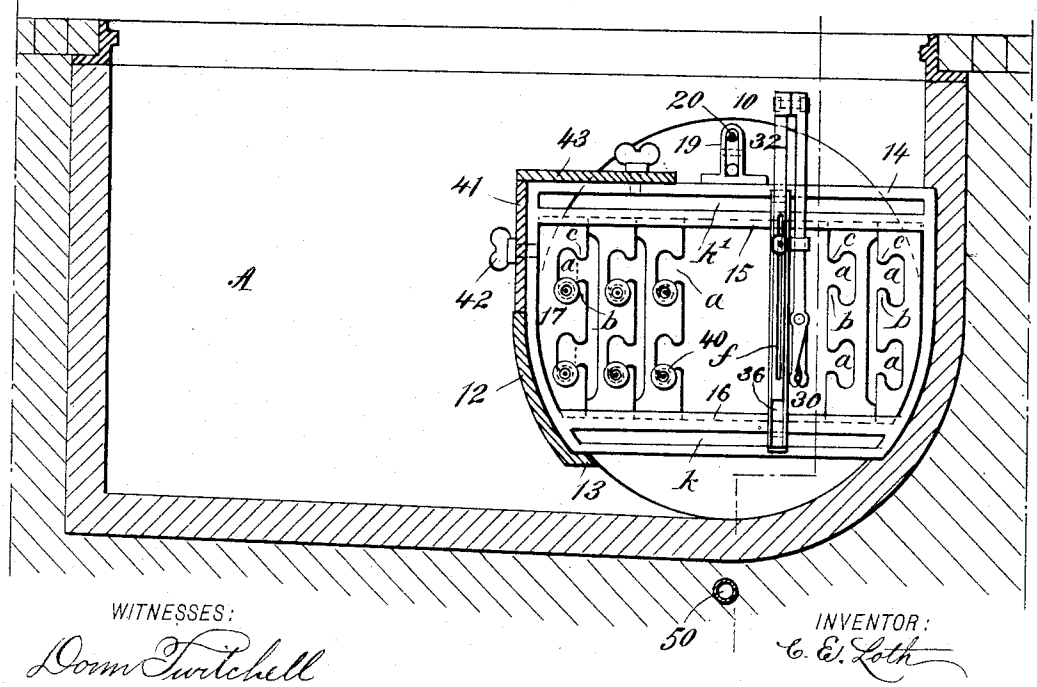


Fig. 7.



WITNESSES:

Dom Twitchell

C. Sedgwick

INVENTOR:

C. E. Loth

BY

Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON D. C.

UNITED STATES PATENT OFFICE.

CHARLES EDWARD LOTH, OF TROY, NEW YORK.

UNDERGROUND ELECTRIC CONDUIT.

SPECIFICATION forming part of Letters Patent No. 437,126, dated September 23, 1890.

Application filed December 17, 1889. Serial No. 334,013. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD LOTH, of Troy, in the county of Rensselaer and State of New York, have invented a new and Improved Electric-Wire Conduit, of which the following is a full, clear, and exact description.

This invention relates to the laying of electric wires, the main objects of the invention being to provide for the laying of the wires in a manner such that it will be possible to dispense with insulating-covers except at or in close proximity to the points of support; to provide for the gathering and removal of all water which would otherwise collect in the conduit; to provide for the imparting of a uniform and proper tension to the wires; to provide for the drawing of the wires from point to point within the conduit; to protect linemen from injurious shocks while at work, and, finally, to provide for ventilating the conduit to avoid explosions of sewer-gas.

To the ends above named the invention consists of certain novel constructions, arrangements, and combinations of elements which will be hereinafter fully explained, and specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a central longitudinal sectional view of a portion of a conduit embodying my invention. Fig. 2 is a sectional plan view of a portion of said conduit. Fig. 3 is an enlarged sectional plan view illustrating a portion of the support and the insulated section of the wire. Fig. 4 is a cross-sectional view of the sectional button applied to the wire at the point of its suspension. Fig. 5 is a sectional detail view of a modified arrangement for carrying the wire-supporting brackets. Fig. 6 is an enlarged sectional view illustrating the tension-regulating device. Fig. 7 is a cross-sectional view on line $x\ x$ of Fig. 6; and Fig. 8 is a cross-sectional view, the view being given to illustrate the arrangement of one of the water-pits.

In the drawings above referred to, 10 represents the subway or viaduct, which is preferably built up of masonry, and at certain predetermined intervals there are man-holes 11, which extend laterally from the main conduit opening, as shown at A. Between the walls of the lateral extensions of the man-holes I arrange metal plates 12, formed with horizontal flanges 13, said plates and the flanges formed thereon serving as supports for racks 14, that extend at right angles across the conduit, the extending ends of the racks being built into the conduit-walls, as shown best in Fig. 7.

The racks 14 are formed with upper ways 15 and lower ways 16, and in these ways the upper and lower ends of standards or brackets 17 ride. These standards or brackets 17 are each formed with recesses a that are preferably shaped as represented in Fig. 7—that is, with a contracted opening that is overlapped by projections b and c. In order that the brackets or standards may be readily adjusted to place within the rack 14, I cut away a portion of one of the flanges of said rack, preferably one of the flanges forming the lower way 16, this cut-away portion being closed by a strip or bar 18, that is bolted to place, as represented in Fig. 3, after all of the brackets or standards have been inserted.

In order that the wires may be readily drawn from man-hole to man-hole, I mount sheaves 19 above the racks 14, and over or under these sheaves I pass a rope 20, in connection with which there is arranged a clamp 21, such clamp being arranged to engage the rope 20 and to engage one end of a wire, as 22. (See Fig. 6.) In this way the wire may be drawn from man-hole to man-hole and the attendant at a man-hole that is reached by the leading end of the wire has simply to disengage the clamp from the rope 20, pass it through the rack 14 adjacent to the standard or bracket that is to support the wire, and then readjust the clamp 21 to the rope upon the opposite side of the rack. In this way the wire may be drawn throughout the length of the conduit.

As before stated, it is desirable that a proper and uniform tension be imparted to all of the wires within the conduit, and to this end I provide a clamp 30, consisting of two pivotally-united jaws which may be adjusted to

the wire that is to be tested and held to place in contact with the wire by a sleeve 31, which slides upon the main arm *d* of the clamp and engages the upper end of the clamp-arm *e*. The arm *d* is pivotally connected to an adjustable standard 32, and is made integral with or rigidly connected to a lever-arm 33, upon which there is adjustably mounted a weight 34, which weight may be held to the lever 33 in any desired position by a set or binding screw 35. The standard 32 is held to a frame 36 by means of a set-screw 37, said set-screw passing through a slot *f*, that is formed in the standard. The frame 36 is provided with arms *g* and *h*, each of said arms being formed with downwardly-extending projections *i*, that are placed so as to fit closely upon either side of the rack 14, which rack is formed with slots *k* and *k'*, that are adapted to receive the ends of the arms *g* and *h*, the frame being securely held to the rack after having been placed in position by a wedge-shaped key *l*, that is driven to place, as represented in Fig. 6.

In operation the jaws B of clamp 30 are applied to the wire, and the strain upon the wire being relaxed, the tension is determined by the position of the weight 34 on the arm 33, a proper tension being secured when such arm is in a horizontal position. In this way it will be seen that a uniform tension may be imparted to each wire within the conduit, so that all wires will run in parallel lines, and hence the necessity of insulating the wires between the man-holes is overcome in cases where supporting-points *a a* are practically far enough apart. At the man-holes, however, it is necessary that all wires be insulated, as otherwise the linemen would be in danger of receiving injurious shocks. To this end, and in order that the wires may be held under the desired strain or tension, I apply to each wire a flanged retaining device 40, such retaining device being made either in sections *m* and *m'*, that are soldered or otherwise secured together after having been applied to the wires in proper position, or may be made in one piece with open slot and pinched together over the wire (after the wire has been roughened in places where so necessary) and thus held by friction. After the retaining device 40 has been applied, the wire upon either side thereof is wound with insulating material *r*, such material being carried over the retaining device, as represented best in Fig. 3, and the wire having been so insulated is slipped into one of the recesses *a* formed, as above stated, in the standards or brackets 17.

In order that the person of the lineman or attendant may be protected from live wires within the conduit at times when he is operating upon any of the wires within the conduit, I provide a shield 41, that is held to the rack 14 by a set-screw 42, this shield being by preference a board and resting directly upon the plate 12, a similar shield 43 being arranged so that it may be secured to the top of the bracket, as shown.

It is well known that the accumulation of water within the conduits is a source of constant trouble and annoyance, and to overcome this difficulty I build my conduits upon inclined lines, as represented in Fig. 1, and at the point where two inclines meet I connect to sewer or other drainage, if so practicable; if not, I locate a pit, as C. As many of these pits C will come will come within the practicable lift of a suitable suction-pump, I connect by a pipe 50, having branch pipes 51, leading downward into the pits, and connecting said pipes 50 to a suction-pump located at a suitable station. In the branch pipes 51, I locate an automatic valve 52, that is controlled by a large float 54, partly counterbalanced by a weight of smaller size, as shown in Fig. 1, the arrangement being such that after the water has been drawn down to a certain predetermined point in any one of the pits C the weight of the larger float 54 will carry it down and the valve will be closed, so that the suction of the pump applied to pipe 50 will not be interfered with at any other of the pits. Thus as long as the pump is kept at work the water in any of the pits will never rise above a certain point, and be positively kept from backing up into the conduit.

In order that a large quantity of water may be held by each pit, and for the purpose of getting at the valves, I prefer to extend said pits laterally and to mount therein benches or platforms 55, upon which the linemen may stand.

In Fig. 5 I illustrate a construction wherein the upper cross-bar of the rack 14 is dispensed with, the standards or brackets 17 in this case being formed with bases *o*, as shown.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the transverse rack having longitudinally-extending ways 16 on its upper face, of a vertical wire-supporting bracket 17, having a base O mounted in said ways, substantially as set forth.

2. The combination, with a rack having longitudinally-extending bracket-receiving ways and a longitudinally-extending slot, of a support secured at one end in said slot, and a swinging tension-lever mounted on said support, substantially as set forth.

3. The combination, with a series of electric wires, of retaining attachments held thereon, insulating material that is applied to said retaining devices and to the wires for a short distance at either side of said devices, the main portions of the wires being free from insulating material, and wire-supporting brackets, substantially as described.

4. The combination, with a conduit formed with man-holes having lateral extensions A, of plates 12, built into the walls of such extensions, racks 14, that are supported by said

plates, and brackets or standards carried by said racks, substantially as described.

5. The combination, with a conduit formed with man-holes having lateral extensions A, of plates 12, that are built into the walls of such extensions, racks 14, supported by the plates, brackets or standards that are adjustably supported by the racks, and a shield 41, held to the racks, substantially as described.

6. The combination, with a conduit formed with man-holes having lateral extensions A, of plates 12, that are built into the walls of such extensions, racks 14, supported by the plates, brackets or standards that are adjustably supported by the racks, and shields 41 and 43, held to the racks, substantially as described.

7. The combination, with a conduit having drip-pits for collecting drainage-water, of a suction-pump pipe 50, extending to several pits and having branch pipes entering said pits, and a separate and independent automatically opening and closing valve in each one of said branch pipes opened and closed by the rise and fall of the water, whereby when one pit is emptied the suction will be correspondingly increased in the others, substantially as set forth.

8. The combination, with a conduit, of wire-supporting devices arranged in connection therewith, a clamp, a means for supporting the clamp, and a weighted lever arranged in connection with the clamp, substantially as described.

9. The combination, with a conduit arranged with wire-supporting devices, of a clamp, a clamp-supporting device, a lever connected to the clamp, and a weight that is adjustably mounted on the lever, substantially as described.

10. The combination, with a conduit having drip-pits for collecting drainage-water, of a suction-pump pipe extending to several pits and having branch pipes entering said pits, a valve in each branch pipe provided with an arm, and a float connected with said arm to positively throw it in two directions and thereby open or close the valve according to the rise or fall of the water, substantially as set forth.

CHARLES EDWARD LOTH.

Witnesses:
EDWARD W. LOTH,
DAVID BLOCK.