No. 640,532. Patented Jan. 2, 1900.

J. N. BYERS.

TERMINAL FOR CABLES.

(Application filed Oct. 4, 1899.)

(No Model.) 2 Sheets—Sheet 1.

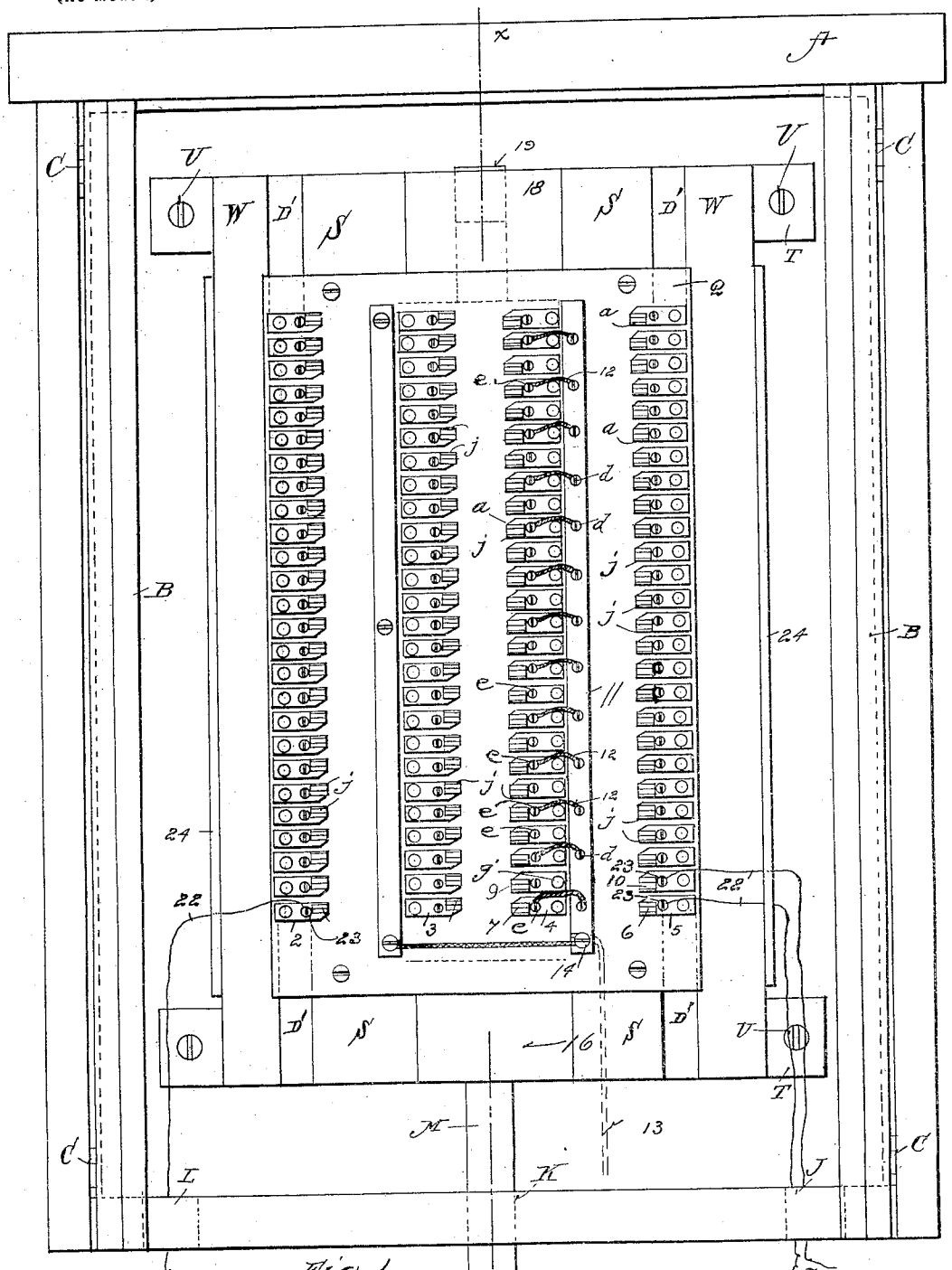


Fig. 1.

Witnesses
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Fig. 2.

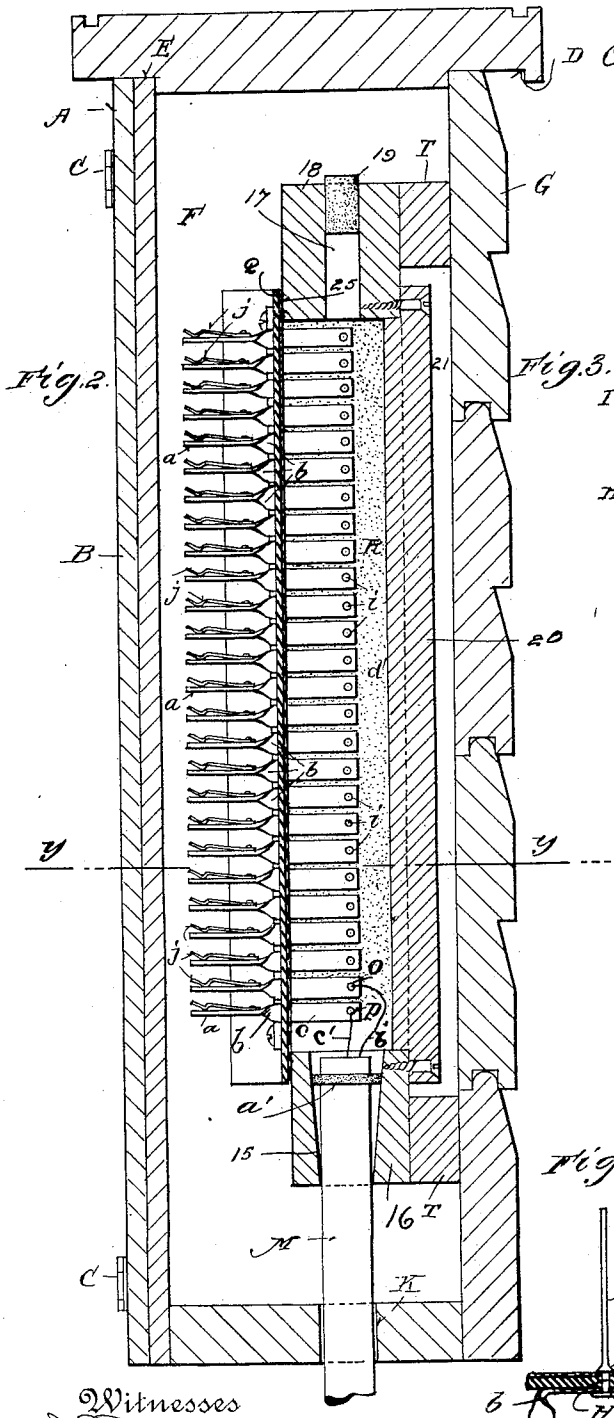


Fig. 3.

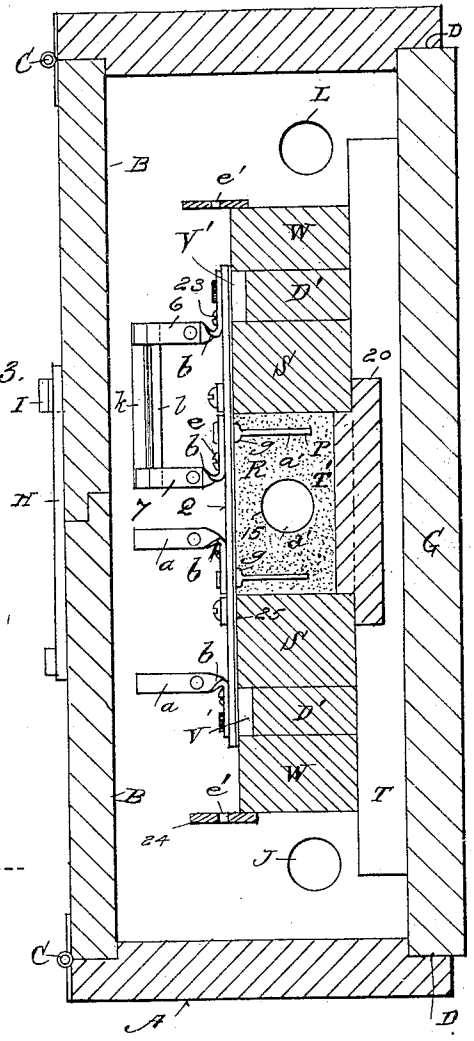


Fig. 4.

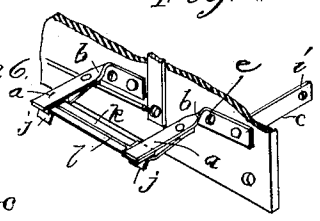


Fig. 5.

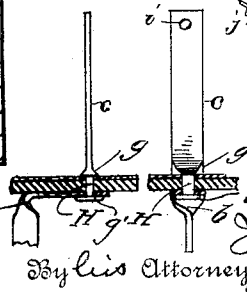


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH N. BYERS, OF URBANA, OHIO.

TERMINAL FOR CABLES.

SPECIFICATION forming part of Letters Patent No. 640,532, dated January 2, 1900.

Application filed October 4, 1899. Serial No. 732,505. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH N. BYERS, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Ohio, have invented certain new and useful Improvements in Terminals for Cables, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in terminals for cables, such as used for telephone and telegraph lines.

The general object of this invention is to provide a construction whereby the cable-wires are connected directly to the terminal points without the intervention of insulated wire and in insulating the terminal points, as also the ends of the cable-wires, from each other, so that there can be no "cross-talk" due to short circuits between adjacent terminals, such insulating material excluding all moisture from ever coming in contact with either the ends of the cable-wires or the terminal points, thereby practically preventing any corrosion of such points.

My invention also relates to an improved construction for holding the fuse-wire, whereby a large portion of the soldering which is now necessary to be done is avoided.

My invention further relates to details of construction and arrangement hereinafter appearing, and particularly pointed out in the claims.

In the accompanying drawings, on which like reference letters and numerals indicate corresponding parts, Figure 1 is a front elevation of a terminal-box, showing the doors open to more clearly illustrate the interior construction; Fig. 2, a longitudinal sectional view on the line *x x* of Fig. 1; Fig. 3, a cross-sectional view on the line *y y* of Fig. 2; Fig. 4, a detail view of a terminal point and also illustrating two of my improved fuse-holding points and showing the manner in which the terminal is connected to one of them, together with a portion of a ground-strip with a ground-wire connected thereto; Fig. 5, a detail view showing an edge view of a preferred form of terminal point and a partial side view of a fuse-holding point and showing the manner of connecting the two together, and Fig. 6 a side view of one of my improved terminal points and showing a partial edge view of a fuse-holding point and the manner in which the two are connected to each other.

Heretofore in constructing cable-terminals the cable-wire has been connected with a pot-head, which was usually carried immediately beneath the terminal-box, and in this pot-head insulated wires were attached to the cable-wires and carried up into the box and fastened to the terminal points. The pot-head was then filled with cable insulation, while the terminal points in the box remained exposed to the action of the air, and as the air at times contains a great deal of humidity its contact with the terminal points and copper wire caused the formation of rust on the terminal points and verdigris on the copper, so that the electricity was more or less impeded in passing through the circuit. Then, again, the fuse-holding points were secured to a base-plate, thus necessitating the use of solder at every joint, while in my invention all this is done away with, as I form the base-plate and fuse-holding points of one piece, so that the only point where it is necessary to solder is where the wire connects with the terminal points and where the terminal points connect with the fuse-holding points.

Referring now to Fig. 1, it will be observed that the letter A represents a suitable box, to which are hinged doors B by means of hinges C. This box has its top rabbeted, as shown at D and E, so that the front portion of the box F, as also the doors B, may fit snugly underneath the top, whereby rain and snow cannot obtain entrance into the box. The back of the box, such as shown at G, is formed of tongue-and-grooved material and is fitted snugly into the rabbeted portion D, thus forming a complete water-tight box. The doors are held closed by means of a pivoted bar H, pivoted to one door and adapted to pass behind a hook I, screwed or otherwise secured to the other door. The bottom of this box is bored out in three places, as shown at J, K, and L. (See Figs. 1, 2, and 3.) The cable, such as illustrated at M, is inserted through the opening K, and the separate strands of wire are secured to their proper terminal points O and P—that is, one wire in a circuit is connected to one of the terminals P, while

the other wire of the same circuit is connected to the terminal point O. These terminal points are secured to a plate Q, formed of gutta-percha or other suitable material, and project within a space R, formed between the parallel bars S, such bars acting as supports for the plate Q. Cross-strips T act to hold them together, one being placed at each end of the parallel bars, as shown in Fig. 1. These strips are adapted to be screwed or otherwise secured to the interior of the back of the box, as shown at U. (See Fig. 1.) Other parallel bars D′ are placed upon the strips T adjacent to the bars S; but from Fig. 3 it will be observed that these bars do not extend flush with the top of the bars S, thus leaving a space between the plate Q and such bars D′, since the plate extends across said bars onto side strips W, such strips having the same thickness as the bars S. The side strips W, as also the bars D′ and S, are held against each other by the strips T or in any other suitable manner.

Upon the plate Q are mounted fuse-holding points, a portion *a* of each of such points being formed of one continuous piece of metal and given a quarter-turn, as illustrated at *b*. The portion *c* of the fuse-holding points is secured to the plate Q by means of the rivet-head *g′* on the head of one of the fuse-holding points O or P and also by the screw *e*, such fuse-holding point being provided with a shoulder *g*, which fits against the under side of the plate Q, and a shank H, extending up through the plate, as also the base of the fuse-holding point, in order that it may be riveted down upon such base to hold the fuse-holding point in place, as above stated. This construction obviates the necessity of soldering beneath the plate Q, except where the cable-wires are secured to the terminal points, which is through the hole *i* in the outer end of each of such points.

To the portion of the fuse-holding points *a*, I rivet or otherwise secure a spring *j*. This spring is for the purpose of permitting a strip of mica *k* and a fuse-wire *l* to be placed in position between the portion *a* and the spring *j*. By referring to Figs. 1 and 3 particularly it will be observed that there are four rows of fuse-holding points, row 2 and row 3 constituting one series, while row 4 and row 5 constitute another series. Thus the fuse-holding points 6 and 7 are adapted to be connected with each other by a fuse-wire, as shown in Fig. 3, thereby completing the line in one line of the circuit, while by connecting the points 9 and 10 the other line of the same circuit is completed. This is where a full metallic circuit is desired and presupposes that the cable-wires are properly connected. Should, however, but a single wire be desired, the fuse-wire-holding point 10 is not used, and so on, alternating the entire length of the row 5. In order to complete the circuit when such fuse-points are not in use, I provide a metallic strip 11, which is parallel to the fuse-holding points 4 and removed from them a short distance. Every other one of these fuse-holding points is connected to this metallic strip by an insulated wire 12, which is held in position by the screws *e* and *d*, the screw *e* being in the base of the fuse-holding point, while the screw *d* is in the metallic strip 11. To one of the outer ends of the metallic strip 11 is connected a ground-wire by means of a screw 14, such ground-wire leading out of the box and down the post, to which the box is adapted to be connected, and into the ground, as indicated by dotted lines at 13. Thus with my invention I have not only provided for a metallic circuit, but also a ground-line circuit and without any change in the instrument, save to remove one of said fuse-wires. This is of great practical importance, as my invention may be used in small towns where there are no electric street-cars, and consequently the single circuit will answer every purpose and will save the expense of a double-line metallic circuit. In some instances the terminal head has a double row of fuse-holding points, as shown in the drawings; but in such cases each set is connected up in the same manner.

In installing my invention in a telephone system it will be understood that the central station is connected by a cable containing a number of wires—say for the sized instrument illustrated in the drawings fifty wires—for operating twenty-five complete circuits. The other end of the cable is carried away from the telephone-exchange as far as may be necessary or convenient, when the end of the cable is inserted through the hole K in the box and into the tapered hole 15 in the block 16, such block being placed between the bars S, as shown in Fig. 1, and the ends of the wires, as shown at *b′* and *c′*, are exposed for a short distance, so that they may be engaged directly with the proper terminal points; but before actually inserting them in such points a rubber ring *a′* is slipped over the end of the cable and is drawn into the tapered hole 15 about the cable, so as to close the opening completely around the cable. After the cable-wires are secured to the terminals in the proper manner cable insulation, as shown at *d′*, is poured through the hole 17 in the block 18, also placed between the bars S after removing the plug 19 from such hole. Consequently the entire space between the bars S and the blocks 16 and 17, as also the plate Q and back 20, (the latter of which is secured in place, as shown in Figs. 2 and 3, before the insulation material is placed therein,) is entirely filled with such insulation material T′, which gradually hardens and prevents cross-talk by the current of electricity passing from one terminal point over to another. This arrangement also prevents the terminal points and wire connections therewith from becoming corroded by the atmosphere, and consequently a less number of amperes may be used, as the connections are per-

fect and will always remain so. This pouring of the insulation material within the chamber R will also fill up the space in the block 16 about the upper end of the cable above the rubber ring *a'*.

That part of the structure into which the cable passes after entering the box and to which the cable-wires are fastened I wish to designate as a "terminal head," as above designated. Beneath the plate Q of this head are formed the passages *v' v'*, as heretofore explained, and which extend the entire length of the head. These passages are for the purpose of permitting air to circulate beneath the outer ends of the plate, so as to keep the wood, of which the bars of the head are constructed, as dry as possible, while between the bars S, V, and W and the back of the box is also formed a space 21 to prevent the accumulation of moisture.

To the outer fuse-holding points the wires, such as shown at 22, are attached by means of binding-screws 23. These wires pass through holes *e'* in a strip of wood or other material 24. These wires pass out of the box through one of the holes L or J and constitute the ordinary spider-wires of a telephone-line.

It will be understood that the under side of the plate Q is covered with a covering 25. This covering is formed of a non-heat-conductor, such as fiber, and is for the purpose of protecting the gutta-percha while the hot insulation material is poured into the chamber R and permits of the insulation material being poured in much hotter, thereby more effectually insulating the exposed wires and the upper end of the cable in the chamber, as also one terminal point from another, than if the insulation material were poured in in a cooler state. In a short time this material sets and becomes very hard, so that it is not affected by the atmosphere.

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

1. In a cable-terminal, the combination with a box having a terminal head mounted therein, of a plate formed of insulating material, forming a portion of said head, terminals carried by said plate and projecting from one side thereof, and fuse-holding points also carried by said head and projecting from the opposite side thereof, said fuse-holding points and said terminal points being connected with each other, said fuse-holding points being formed of one piece of metal with a spring secured thereto, all substantially as shown and described.

2. In a cable-terminal, the combination with a box carrying a terminal head therein, said head being composed of bars and end blocks, a pair of cross-strips for connecting said bars and blocks together, one for each end of said terminal head, and a plate formed of insulating material, adapted to be mounted upon side bars, and carrying terminal points adapted to project within said chamber and be directly connected with cable-wires, a pair of fuse-holding points mounted upon said plate, one of which is directly connected with said terminal point, a fuse-wire for connecting said fuse-holding points together for connecting the circuit in one line, another pair of fuse-holding points one of which is connected to another terminal point, and a second fuse-wire connecting said second set of fuse-holding points for completing the circuit in another line-wire, said line-wires connecting with each other to make a complete electric circuit, substantially as shown and described.

3. In a cable-terminal, the combination with an insulating-plate, of a terminal point having a hole therein at one end and a shoulder near its other end, said latter end adapted to project through said plate and be secured thereto, said shoulder acting as a stop for said terminal point, substantially as shown and described.

4. In a cable-terminal, the combination with a terminal head, of an insulating-plate forming a portion of said head, a pair of terminal points projecting from one side of said plate and fuse-holding points projecting from the other side of said plate, a ground-strip also on said plate, near said fuse-holding points, whereby a spider-line and a ground-line circuit may be maintained.

5. In a cable-terminal, the combination with a terminal head, of an insulated plate mounted thereon and forming a portion of said head, a double row of terminal points projecting from said plate within a chamber in said head, two double rows of fuse-holding points projecting from the other face of said terminal, fuse-wires for connecting the proper terminals together, a pair of ground-strips upon the same face of said insulating-plate as the fuse-holding points and separated from said fuse-holding points, and means for connecting said strip with some of said fuse-holding points to form a ground-line circuit and a metallic circuit as desired.

6. In a cable-terminal, a fuse-holding point having a base and a projecting portion formed of one piece, a spring secured to said projecting portion, said spring and said projecting portion forming a clamp for a fuse-wire and its support, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH N. BYERS.

Witnesses:
B. B. ESTERLINE,
W. M. MCNAIR.