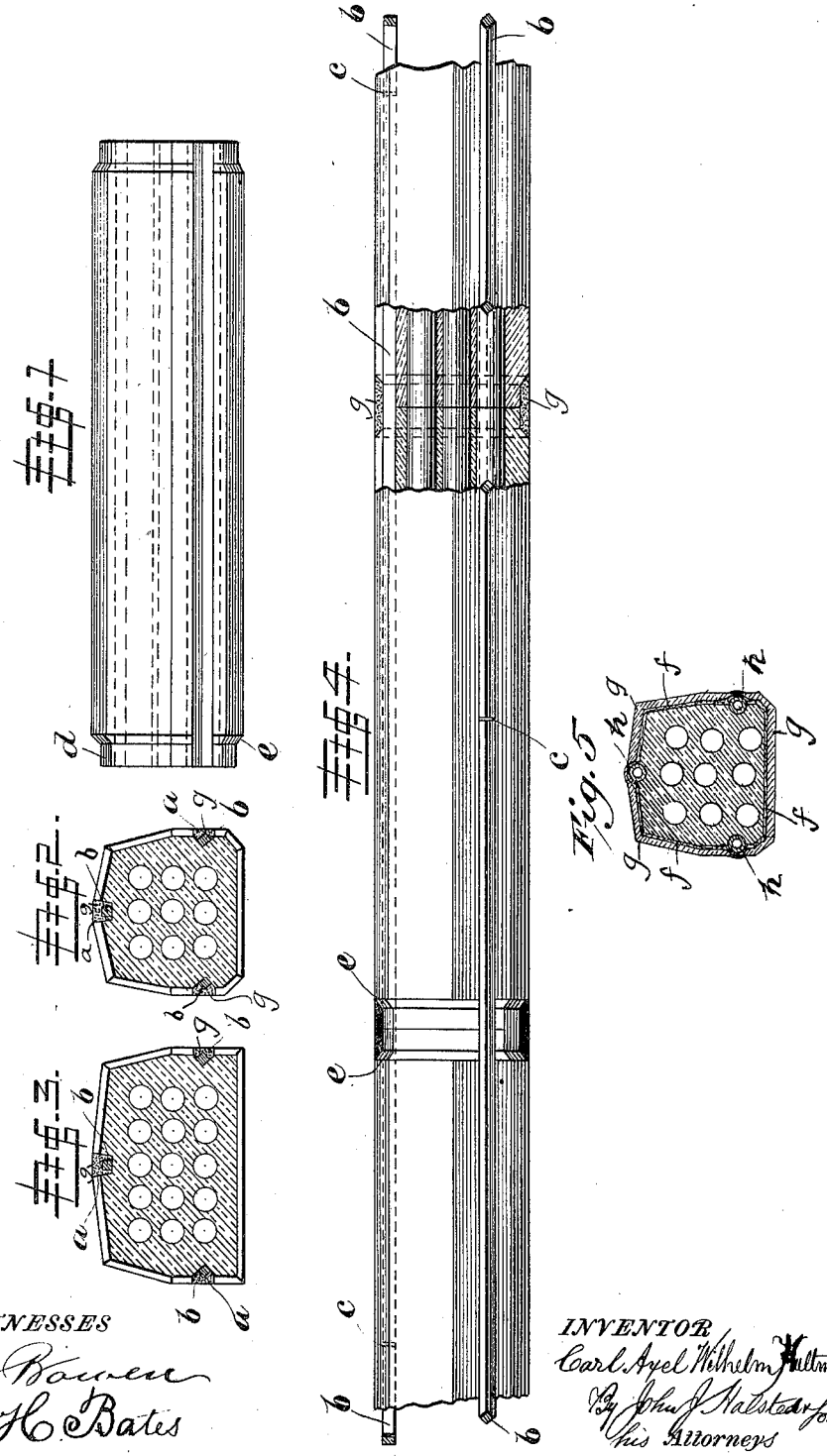
(No Model.)

# C. A. W. HULTMAN.

## UNDERGROUND CONDUIT FOR ELECTRIC CABLES.

No. 470,329. Patented Mar. 8, 1892.

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# UNITED STATES PATENT OFFICE.

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## UNDERGROUND CONDUIT FOR ELECTRIC CABLES.

SPECIFICATION forming part of Letters Patent No. 470,329, dated March 8, 1892.

Application filed June 9, 1891. Serial No. 395,737. (No model.)

*To all whom it may concern:*

Be it known that I, CARL AXEL WILHELM HULTMAN, a subject of the King of Sweden, residing at Stockholm, Sweden, have invented certain new and useful Improvements in Underground Conduits for Electric Cables or Wires; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

All conduits for underground electric wires, by which the cables pass through pipes or longitudinal passages in blocks of cement or other similar material placed after each other, have always proved not to be so practical as was desired for the reason that the separate blocks, by settling or heaving of the surrounding earth mass, have easily yielded relatively to each other, whereby it has been impossible to draw in the cables. Conducts or conduits made in accordance with this system have, moreover, proved very fragile, so that cracking at the joints ensues, and, as a consequence, the tightness is affected and the efficiency of the conduit is materially impaired.

My invention is designed to remove these existing defects, and the different means which I have devised to this end are shown in detail in the accompanying drawings, in which—

Figure 1 represents an elevation of my improved cement block. Figs. 2 and 3 are cross-sections, respectively, of the same in two different sizes, the former being designed for nine and the latter for fifteen cables. Fig. 4 represents in elevation part of a conduit composed of such blocks having my improvements applied thereto, a portion being broken away to show the interior. Fig. 5 represents a modification in cross-section.

It will be observed of the sectional views, Figs. 2 and 3, that the exterior faces of the cement blocks are provided lengthwise with rectangular or nearly rectangular grooves *a*. In these grooves are inserted iron bars *b*, smaller than the grooves in their section. The bars are cut off in lengths, so as to allow the joints between them (shown at *c c*) to get their place at a suitable distance from the joints of the cement blocks, and preferably in the middle between two joints of the blocks, and it is also preferred that the bars be so disposed or placed that on each block there shall be only one joint of the bars. The vacant space left in the grooves after the insertion of the bars therein, and the space above the latter, may be filled in with cement in order to hold the bars as firmly as if they were originally founded or cast in with the blocks. In order to get the two sections in proper position, the reduced and beveled or partially-tapered adjacent ends *d e* of any two blocks must be carefully adjusted straight in line one with another, without positively abutting or being in actual contact one against the other, but so as to allow a distance between the bevels *e* of, say, one (1) centimeter. These joints between the blocks may be covered and filled in the following way: Around the reduced ends *d* of the blocks and covering the space (of one centimeter) between the respective bevels *e e*, may be wrapped a piece of hempen cloth *f*, (see Fig. 5,) soaked in melted asphaltum, and whereby the material used in jointing may be prevented from dropping in between the blocks and closing or shutting up the pipes. The annular groove formed by the two adjacent reduced ends *d d*, and consequently around the joint of the blocks and around the cloth *f*, may now be filled with cement or asphaltum, as indicated at *g* in Fig. 4.

The asphaltum fillings afford considerable advantage over other packing materials known to me, for the reason that they allow compressing and expanding of the filling without cracking of the same. For this reason a certain lengthwise expansion of the blocks can take effect without any risk or fear that crackings affecting the tightness of the joints would arise. As the lengthwise expansion of the blocks, however, is inconsiderable, it is not necessary to fill all joints with the asphaltum; but it is generally quite enough if alternate ones or every third one be filled with this material and the rest of the joints with cement. This system for underground conduits has consequently the great advantage of being

flexible, and by turning or bending the bars in the desired form the conduits can be placed in any required curves.

Instead of bars tubes *h*, of iron or other metal, may be employed, as shown in Fig. 5. The bars or tubes can of course also be founded or embodied in the very blocks themselves in the process of fabricating the blocks, instead of being afterward placed in grooves in the exterior faces of the same.

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

1. As a means for strengthening and holding in place cement or other blocks employed as conduits for underground electric cables or wires, metallic bars or tubes combined with such blocks and lodged in the exterior longitudinal grooves therein, larger in cross-section than such bar or tube, and secured therein by a suitable cementing material, all substantially as set forth.

2. In combination with the conduit-block for electric cables or wires, metallic bars or tubes lodged in exterior longitudinal grooves in said block, and the adjacents ends of the sections of such blocks wrapped with cloth prepared with melted asphaltum, as described, and said cloth and block ends covered with cement or some flexible compound, all as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL AXEL WILHELM HULTMAN.

Witnesses:

AXEL GEORGII,

TH. WAWRINSKY.