

(No Model.)

T. G. TURNER.

ELECTRIC CABLE.

No. 306,037.

Patented Sept. 30, 1884.

Fig. 1

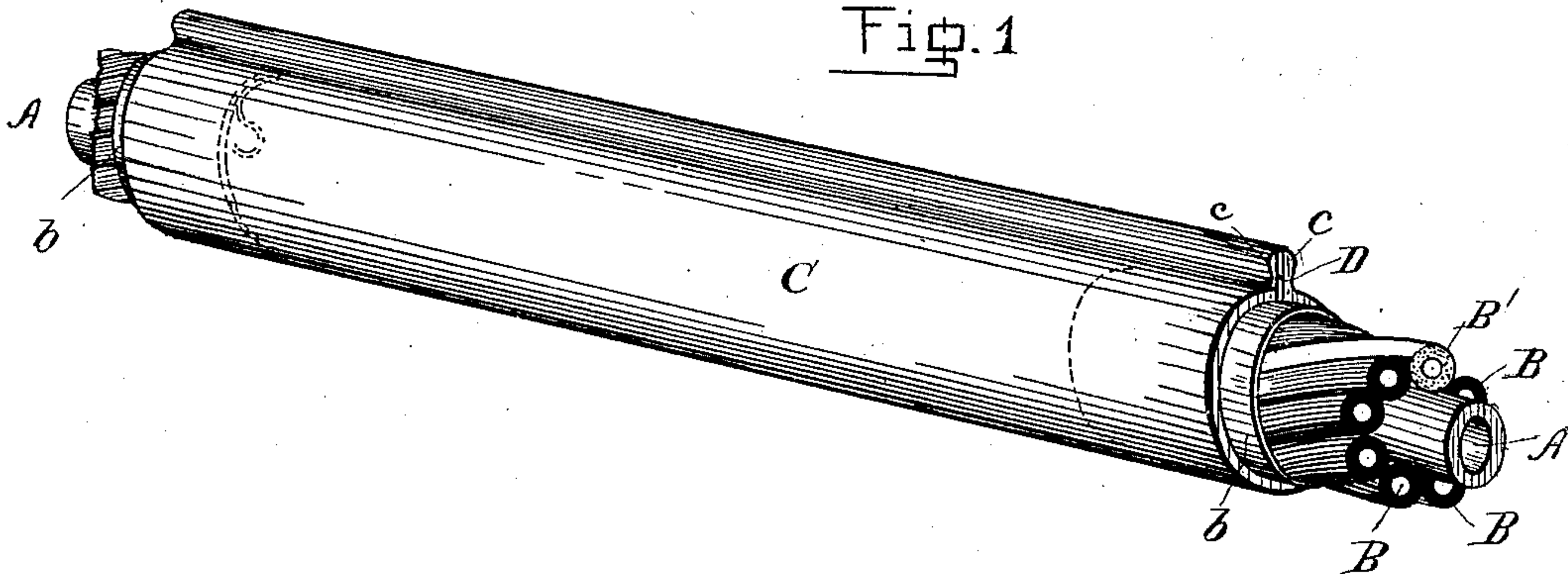


Fig. 2

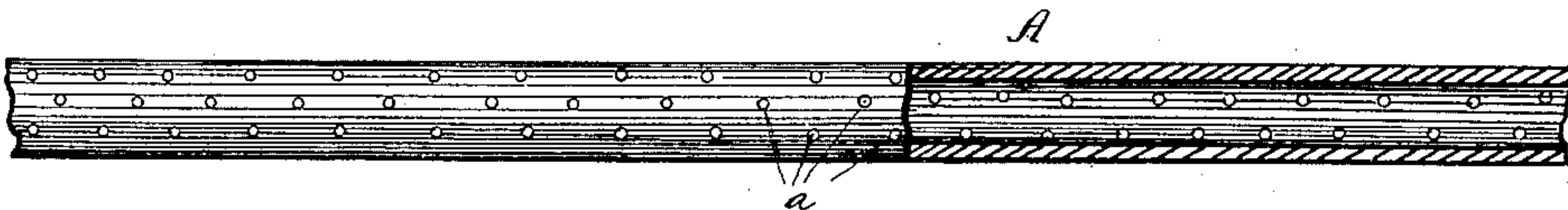


Fig. 3

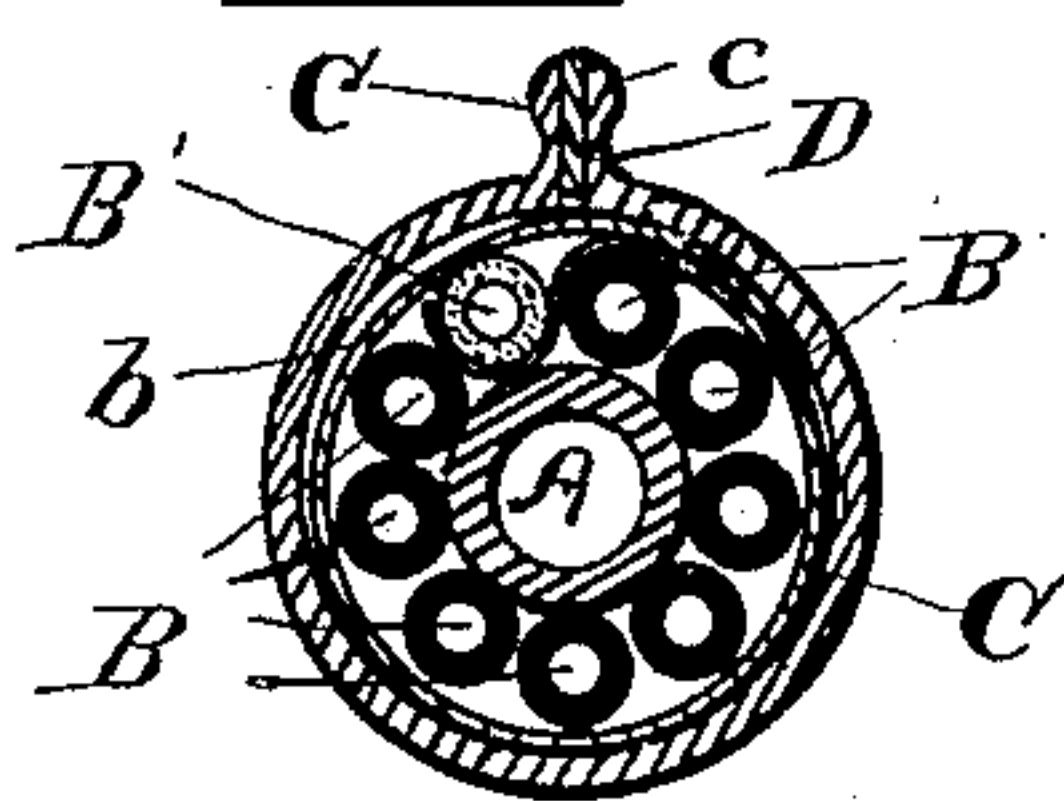
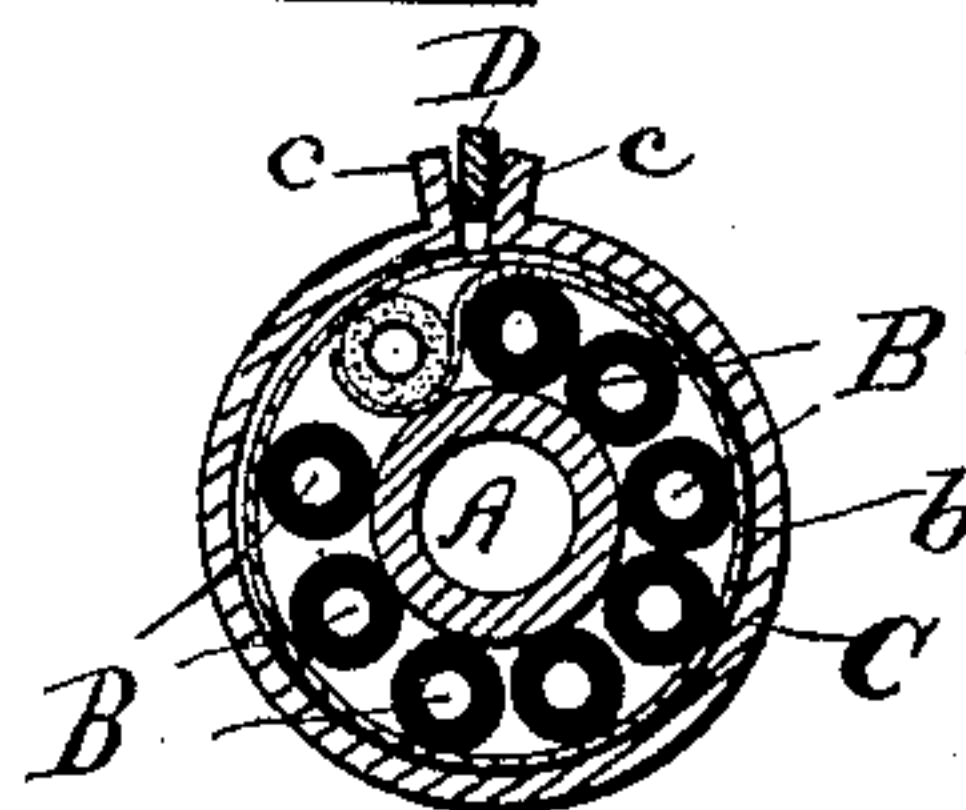


Fig. 4



WITNESSES:

*E. D. Walker*

*Chas H. Baker*

INVENTOR.

*Thomas G. Turner*  
by his attorney

*Carleton*



# UNITED STATES PATENT OFFICE.

THOMAS G. TURNER, OF NEW YORK, N. Y.

## ELECTRIC CABLE.

SPECIFICATION forming part of Letters Patent No. 306,037, dated September 30, 1884.

Application filed February 29, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS G. TURNER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Cables; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of electric cables in which the conductors are laid concentrically around a core, and inclosed in a protecting sheath or armor.

The objects of the invention are, first, to so construct the armor that it may be opened at any point without rupture of the metal of which it is composed to afford access to any one or more of the conductors of the cable, and again closed and sealed; second, to so arrange the individual wires or conductors of the cable with relation to an indicator and to each other that any one of said conductors may be readily found; third, to so arrange the conductors and indicator with relation to the joint or seam of the armor that the indicator and each of said conductors will pass said seam once in a given distance; fourth, to establish contact between the core and armor to lessen the effect of induced current; also, to provide a core which will yield slightly upon the contraction of the surrounding conductors; also, to provide means by which the interstices between the conductors may be filled with a material which will repel moisture, and, finally, minor objects relating to the laying or use of a cable, which objects will more fully appear hereinafter.

The invention consists in certain novel parts and combinations, which will be claimed in the clauses at the close of this specification.

In the accompanying drawings, Figure 1 is a perspective view of my improved cable. Fig. 2 is an elevation, partly in section, of the preferred form of core. Figs. 3 and 4 are details of the cable in cross-section.

The core A of my cable is a tube or pipe of lead, having, preferably, numerous perforations, *a*, in its walls for the double purpose of rendering the core more sensitive to lateral pressure, and of affording means by which hot paraffine or other equivalent substance may

be forced into the interstices between the respective conductors surrounding the core. Around this core A is grouped a number of independent insulated conductors, B, one of the conductors, B', differing from the others of the group, so that it may be readily distinguished and serve as a guide or indicator, so that any one of the conductors of the group may be known from the position it bears with relation to said indicator. The difference between the indicator B' and the other conductors of the cable may consist in a difference in the insulating material, or in the color of said material, the main object being to make it readily distinguishable from the other conductors of the group. The conductors B and B' having been laid closely about the core A, I apply a binder or binders *b*, to hold them in a fixed position with relation to each other during the application of the armor C. The binder or binders *b* may be of insulating material—such as kerite-tape—or of non-insulating material, as is found most convenient; or, as it is desirable to place the core A in metallic contact with the armor C, I contemplate in some instances forming the binders of short strips of lead, one end of which is placed between any two of the conductors B and in contact with the core, while the free end of the strip is wrapped around the grouped conductors so that the armor, when applied, will be in contact with it. These lead binders can be quickly and cheaply applied at suitable intervals during the construction of the cable. In the event of using other than the lead binders the indicator-conductor B' may be one having a metallic armor, while the conductors B may be provided with any ordinary insulation without armor, it being understood, of course, that in this instance the binder be so disposed as to permit the indicator B' to come in contact with the armor C, thus establishing contact between said armor and the core A. The armor C is composed of a ribbon of lead of such width that when the ribbon is folded around the grouped wires or conductors a surplus of metal will be left at the meeting edges, which surplus is bent out to form the radial projections *c*. A key, D, of soft metal or solder, is interposed between these projections, and melted to unite them and form a tight joint. This key should



be made of a metal or composition fusible at a comparatively low temperature, in order that it may be melted without affecting the lead armor, as it will be sometimes necessary to  
 5 open the seam formed by the key and projections *c*, to connect branch-wires, or for other purposes, and again close said seam when the connection has been made.

I prefer to lay the conductors spirally upon  
 10 the core with a pitch of, say, one turn in three feet, as by this means I am enabled to bring each wire of the group across the seam of the armor in a given distance, so that upon opening the seam all the wires will be exposed  
 15 to view, and the required one selected (its position with relation to the indicator being known) and the branch connection made.

It will be seen that the cable herein described is very simple and can be cheaply constructed.  
 20

It is my purpose to construct the cable at the trench or ditch as it is required; and which may be briefly described as consisting of a platform provided at its front end with  
 25 standards between which is mounted a drum carrying the core. Near this drum, and between it and the rear of the platform, is a revolving head having a central aperture to permit of the passage of the core, and provided  
 30 on its rear face with brackets adapted to support spools on which the respective conductors are wound. Another drum carrying the lead ribbon which is to form the armor is arranged in rear of and preferably below the revolving head, and at a short distance from  
 35 this drum is a guide having an aperture for the passage of the core carrying its group of conductors, and another aperture so formed as to fold the lead ribbon around the grouped  
 40 conductors and bend the surplus metal out to form the radial projections *c*. The key *D* may be laid between these projections by hand or by suitable guides as the folded armor leaves the folding-die, and a nozzle is arranged to direct a blast of heat upon the key  
 45 to fuse it. Feeding rolls and guides should be provided at suitable points, and the revolving head should be connected by gears or band and pulleys with the drum carrying the  
 50 core, in order that the speed at which said head revolves be proportioned to the weight at which the core is fed.

The lead binders can be quickly and cheaply applied by hand as the conductors are laid  
 55 upon the core. When the conductors upon any one of spools becomes exhausted, its end is spliced to the end of the conductor of a new spool, and the empty spool removed from its supporting-brackets and replaced by the new  
 60 one without stopping the machine.

As the conductors can be spliced at any point during the construction of the cable, I

avoid the necessity of splicing two sections of cable, (which is always necessary in laying long lines of shop-made cable,) and also avoid  
 65 any possible injury to the armor or insulating-coatings of the conductors resulting from the coiling and uncoiling of shop-made sections.

As I intend filing a separate application or applications covering the mechanism for constructing this cable, a full description of this  
 70 mechanism is here deemed unnecessary.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a cable, the combination of the flexible core, a group of insulated conductors surrounding said core, (one of which is an indicator,) and an armor having a longitudinal seam, substantially as set forth.  
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2. In a cable, the combination of the flexible core, a spirally-disposed group of insulated conductors surrounding said core, (one of which is an indicator,) and an armor having a longitudinal seam, substantially as set forth.  
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3. In a cable, the combination of the perforated tubular core, a group of insulated conductors surrounding said core, an armor inclosing said conductors, and metallic binders arranged at intervals and connecting the core  
 85 with the armor, substantially as set forth.

4. In a cable, the combination of the tubular core, a spirally-disposed group of insulated conductors surrounding said core, (one of which is an indicator,) and an armor consisting of a ribbon of metal folded around said  
 90 conductors and having its longitudinal edges united by solder, substantially as set forth.

5. In a cable, the combination of the tubular core, a spirally-disposed group of insulated conductors surrounding said core, (one of which is an indicator,) and an armor consisting of a ribbon of metal folded around the conductors, and having the outwardly-projecting surplus of metal at its edges united by  
 100 solder interposed between them, substantially as set forth.

6. The improvement in the art of forming continuous cables which consists in feeding a group of insulated conductors, (one of which is an indicator,) each from a separate spool spirally upon a core splicing the individual conductors as the respective spools become exhausted, folding a ribbon of metal longitudinally upon the conductors as they are laid  
 110 upon the core, and uniting the meeting edges of the ribbon by solder to form a longitudinal seam, substantially as set forth.

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

THOMAS G. TURNER.

Witnesses:

C. A. NEALE,

W. M. HANNAY.

It is hereby certified that in Letters Patent No. 306,037, granted September 30, 1884, to Thomas G. Turner, of New York, New York, for an improvement in "Electric Cables," errors appear in the printed specification requiring correction, as follows: At the end of line 22, page 2, the words, *for this purpose I have devised a portable machine*, should be inserted, and in line 51, same page, the word "weight" should read *rate*; and that the Letters Patent should be read with these corrections therein to make it conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 14th day of October, A. D. 1884.

[SEAL.]

M. L. JOSLYN,  
*Acting Secretary of the Interior.*

Countersigned:

R. G. DYRENFORTH,  
*Acting Commissioner of Patents.*