

(No Model.)

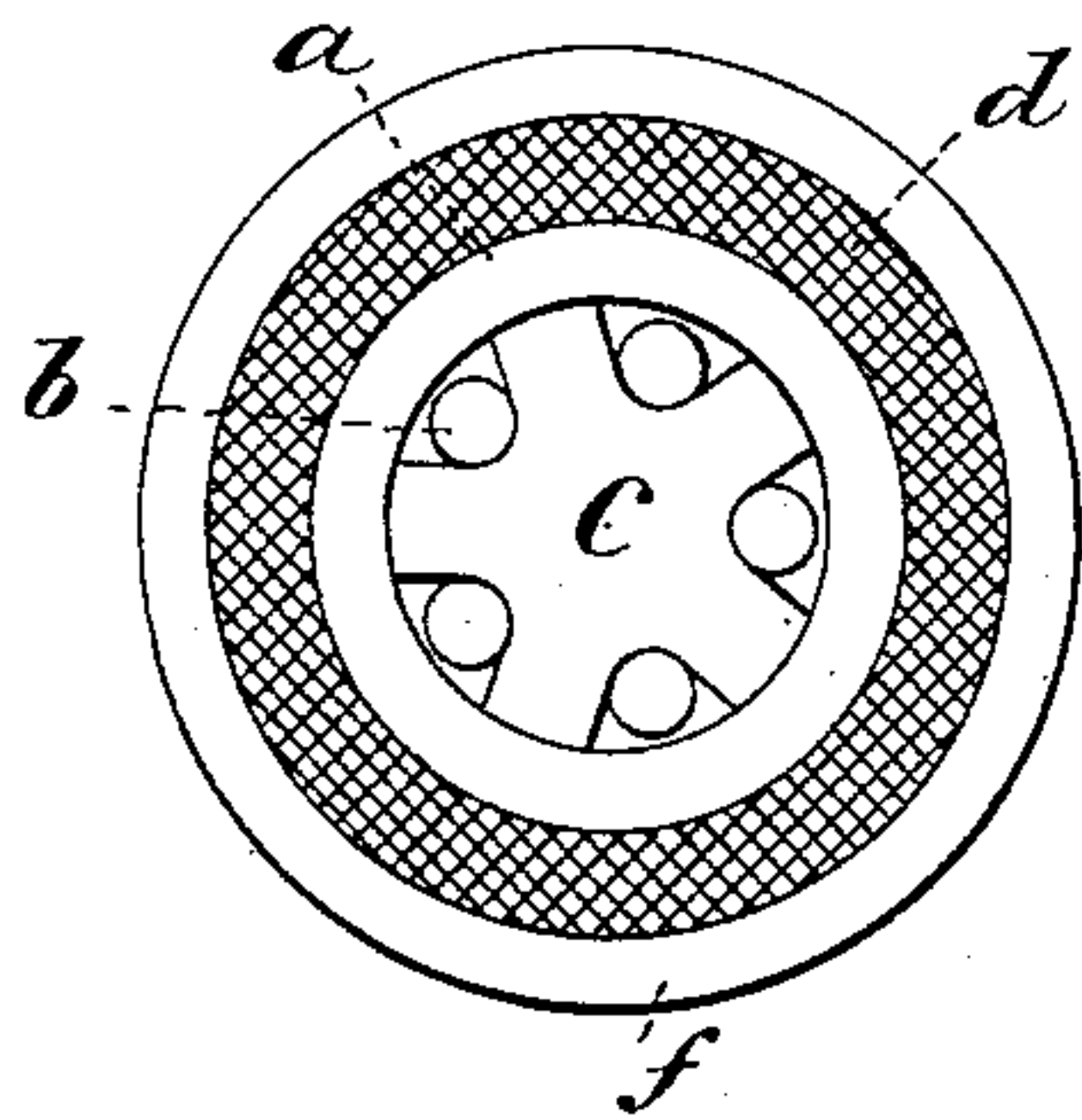
E. FLOTRON & F. B. A. ROYER DE LA BASTIE.

SUBMARINE OR SUBTERRANEAN ELECTRIC CABLE.

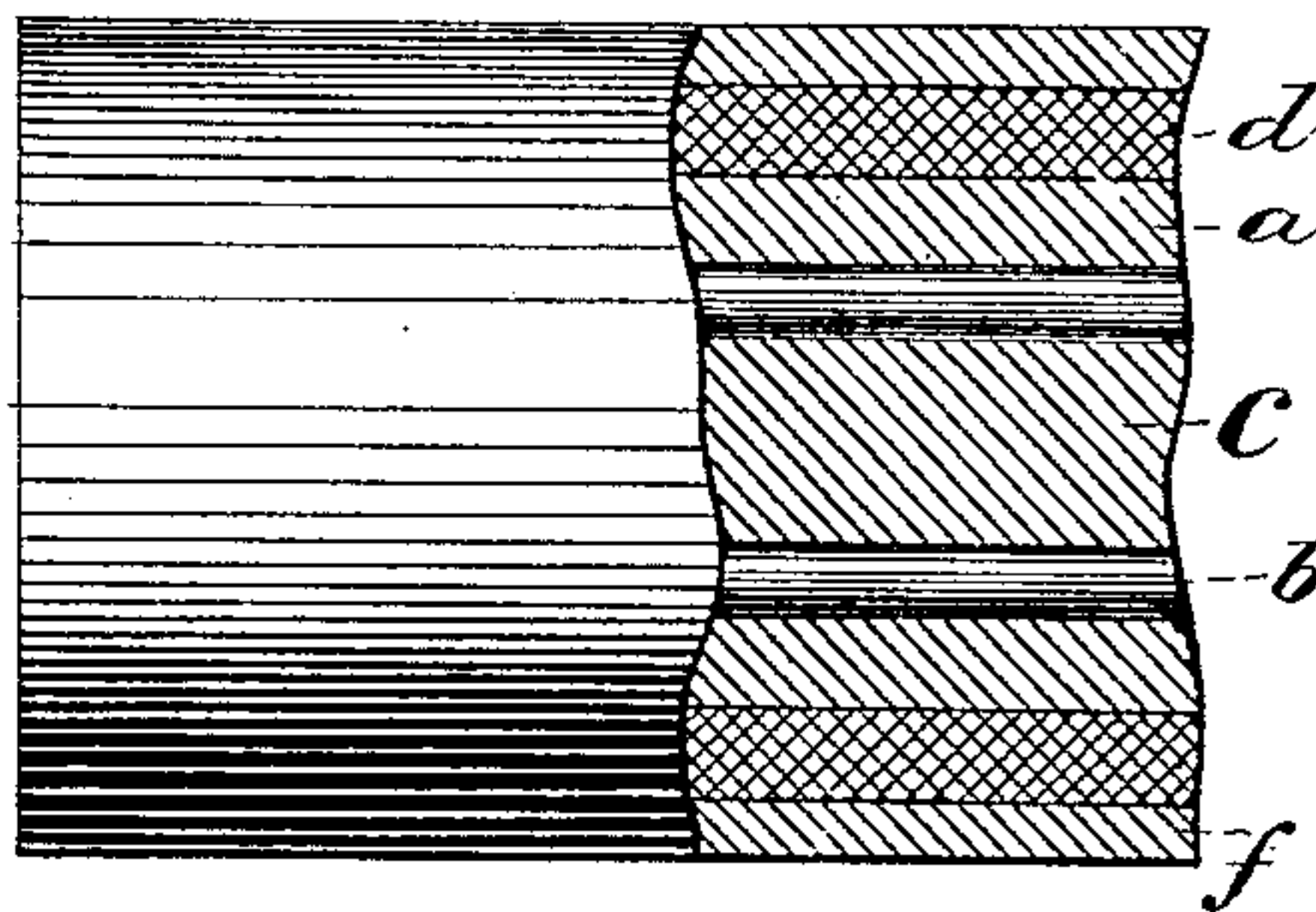
No. 393,823.

Patented Dec. 4, 1888.

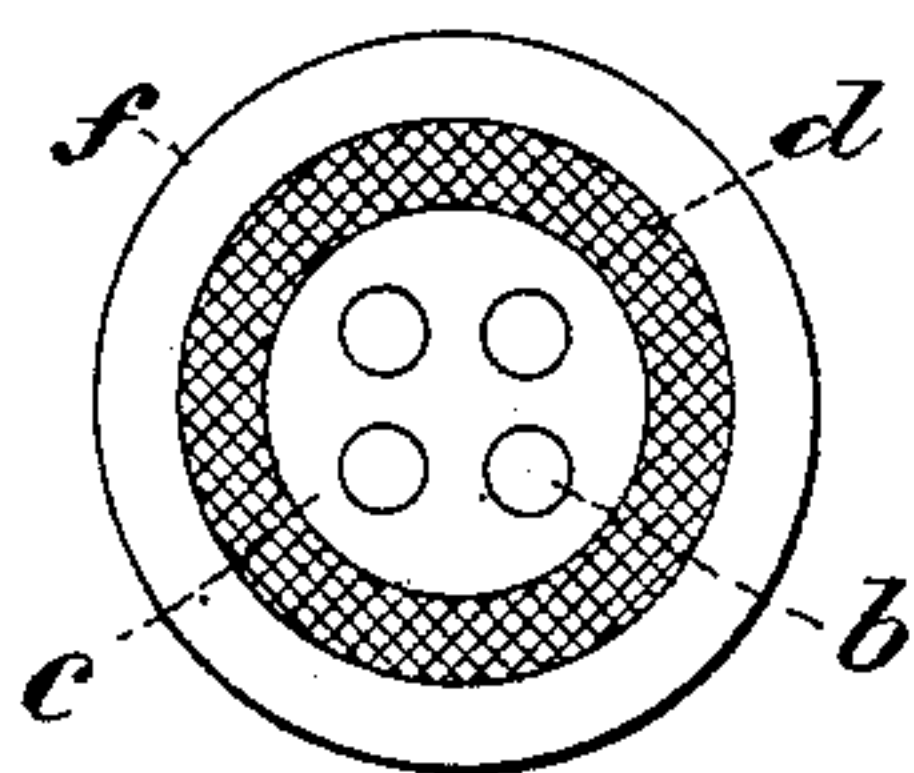
*Fig. 1.*



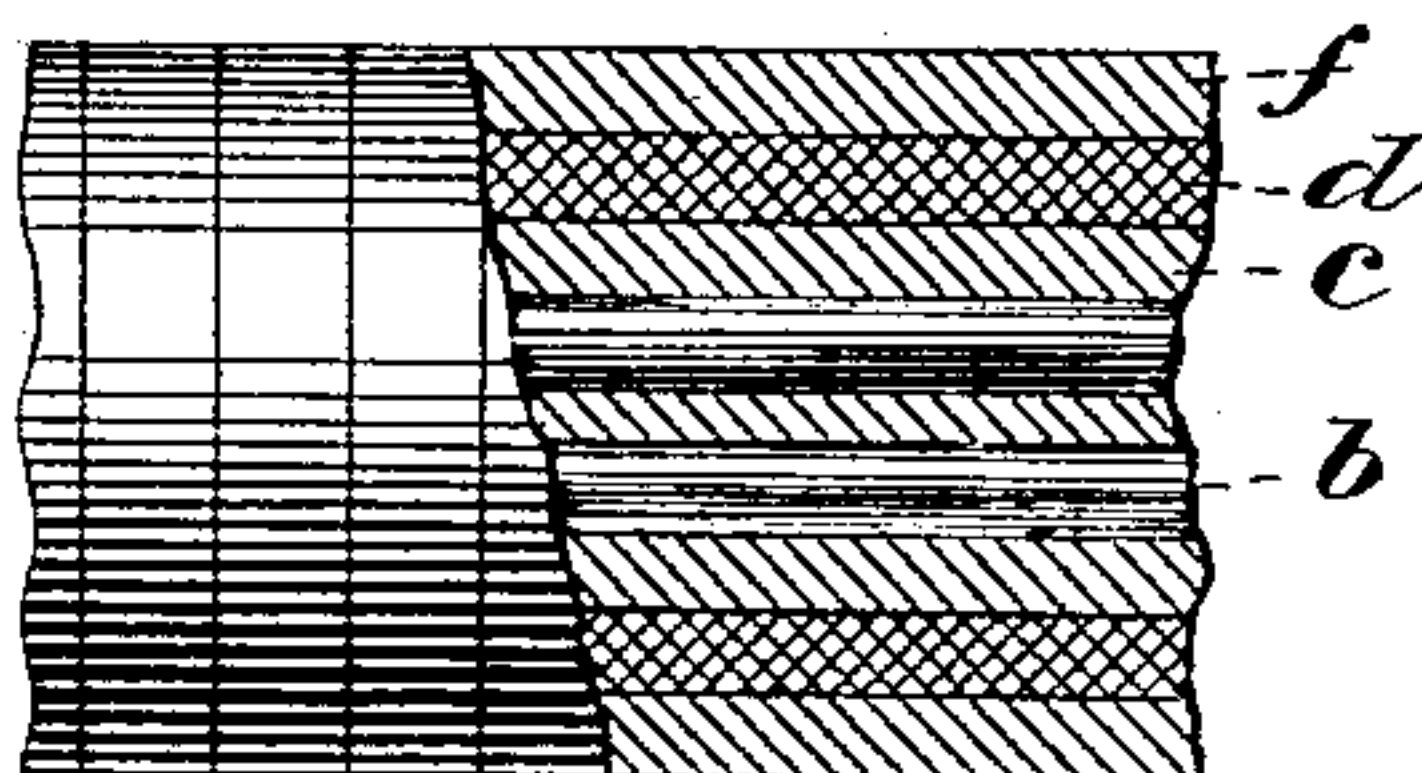
*Fig. 2.*



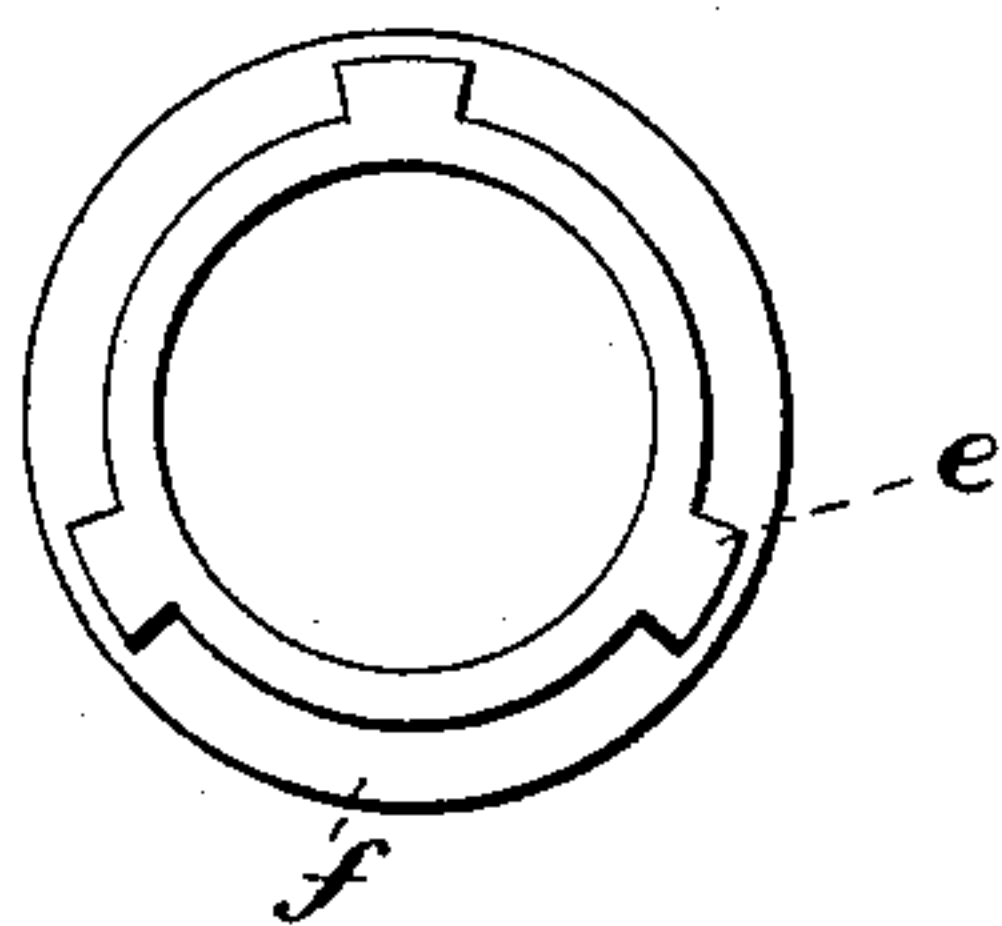
*Fig. 3.*



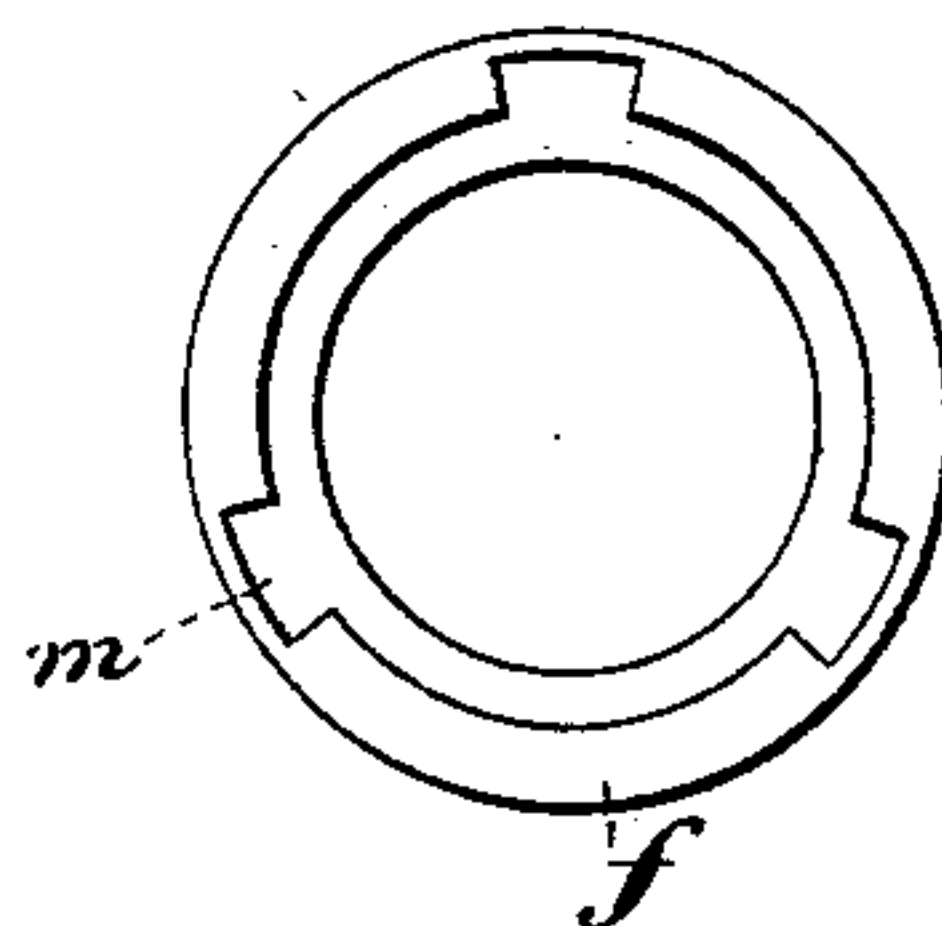
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ELIAS FLOTRON AND FRANÇOIS BARTHÉLEMY ALFRED ROYER DE LA  
BASTIE, OF PARIS, FRANCE.

## SUBMARINE AND SUBTERRANEAN ELECTRIC CABLE.

**SPECIFICATION** forming part of Letters Patent No. 393,823, dated December 4, 1888.

Application filed December 12, 1885. Serial No. 185,457. (No model.) Patented in India January 14, 1884, No. 41; in France April 29, 1885, No. 168,581; in England November 28, 1885, No. 14,633; in Belgium November 28, 1885, No. 71,023; in Portugal December 24, 1885, No. 1,016; in Italy December 31, 1885, XXXVIII, 216; in Austria-Hungary March 18, 1886, No. 48,365 and No. 10,767, and in Spain March 23, 1886, CCXCI, 8,289.

*To all whom it may concern:*

Be it known that we, ELIAS FLOTRON and FRANÇOIS BARTHÉLEMY ALFRED ROYER DE LA BASTIE, of the city of Paris, France, have  
5 invented new and useful Improvements in Submarine and Subterranean Electric Cables, of which the following is a full, clear, and exact description, and for which we have obtained Letters Patent in France, No. 168,581,  
10 for fifteen years, dated April 29, 1885; in England, for fourteen years, dated November 28, 1885, No. 14,633; in Belgium, for fifteen years, dated November 28, 1885, No. 71,023; in Portugal, for fifteen years, dated December 24,  
15 1885, No. 1,016; in Italy, for fifteen years, dated December 31, 1885, No. 216, Vol. 38; in India January 14, 1884, No. 41; in Spain, for ten years, dated March 23, 1886, L. 291, No. 8,289; and in Austria-Hungary, for fifteen  
20 years, dated March 18, 1886, No. 48,365 and No. 10,767.

This invention relates to an improved construction of deep-sea and underground cable for the transmission of electric currents for  
25 telegraphic, telephonic, lighting, and other purposes.

The chief feature of novelty consists in the employment of short rings of toughened glass for separating and insulating the wires as well  
30 as for the external sheathing.

Figure 1 is a cross-section of my improved cable. Fig. 2 is a side view, partly in section, of same. Fig. 3 is a cross-section of a  
35 modification; Fig. 4, a side view, partly in section, of same. Figs. 5 and 6 are end views of the outer glass rings.

The cable is formed, in the first place, of a core, *c*, of toughened or ordinary glass, composed of disks or short lengths or sections of  
40 any suitable dimensions, either star-shaped in cross-section, as in Fig. 1, or perforated for the passage of the wires, as in Fig. 3. Over the star-shaped core, Fig. 1, serving to separate and hold the conducting-wires *b*, is placed  
45 an inner envelope *a*, of glass, in the form of short tubes, rings, or half-rings cemented together and serving to inclose the wires in the

grooves of the core. In Fig. 3 the inner envelope *a* is dispensed with, the perforated core *c* serving both to separate and retain the  
50 wires in position. In either case a water-proof coating of india-rubber, gutta-percha, or a composition of mineral pitch and silica is applied hot upon a serving or packing, *d*, of cotton tapes wound spirally in opposite di-  
55 rections upon the cable; or silk tapes coated with linseed-oil and resin may be employed with advantage.

To protect the cable from the attacks of marine insects, the insulating material is  
60 coated with a poisonous paint composed of a mixture of Prussian blue and turbith, which under the action of sea-water becomes a very powerful poison. The whole is then inclosed in an external sheathing, *f*, which may con-  
65 sist of one, two, or more superposed rings or tube-sections of glass united together by a sort of bayonet-joint formed of tongues *e* on one ring or section entering grooves *m* of the adjoining ring and partially rotated the one  
70 on the other. A cable thus constructed is sufficiently flexible to be coiled and transported without difficulty, and is capable of resisting blows, tension, or pressure.

Although any suitable material—such as  
75 glass, porcelain, or ceramic pastes—may be employed for making the insulating and separating core and the protective sheathings in the manufacture of the cables as herein described, it is preferred to use for the purpose  
80 toughened flint or other glass, the physical and mechanical properties of which permit of obtaining results unattainable with other materials, including ordinary glass.

We claim—

1. A flexible cable consisting of inner  
85 notched or perforated disks of toughened glass, *c*, which hold the conductors and outer short glass rings *a*, substantially as herein shown and described.

2. A flexible cable consisting of inner  
90 notched or perforated disks of toughened glass, *c*, which hold the conductors, short glass rings *a* around the same, flexible packing *d*



around said rings *a*, and outermost short glass rings around said packing, as specified.

3. The flexible cable consisting of short lengths of notched or perforated glass, combined with an outer flexible packing, *d*, and  
5 outermost short pieces of glass, *f*, substantially as herein shown and described.

The foregoing specification of our improvements in submarine and subterranean elec-

tric cables signed by us this 27th day of November, 1885.

ELIAS FLOTRON.

FRANÇOIS BARTHÉLEMY ALFRED

ROYER DE LA BASTIE.

Witnesses:

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