

T. E. MURRAY.

METHOD OF AND MEANS FOR COOLING ELECTRICAL CONDUCTORS WHEN INCLOSED IN  
CONDUITS OF CONCRETE OR THE LIKE.

APPLICATION FILED JAN. 28, 1921.

1,399,309.

Patented Dec. 6, 1921.

2 SHEETS—SHEET 1.

Fig: 1.

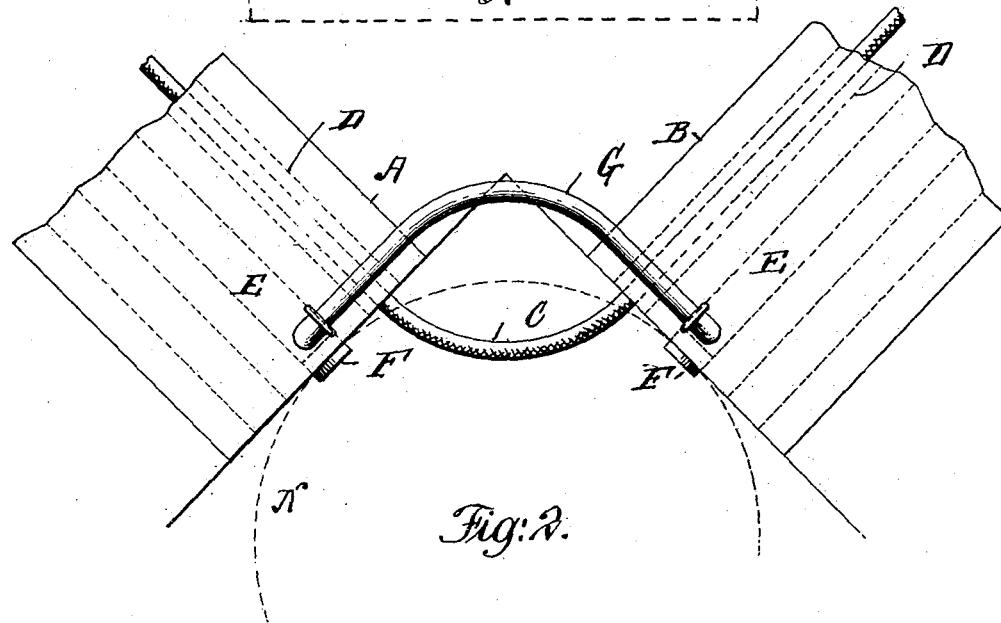
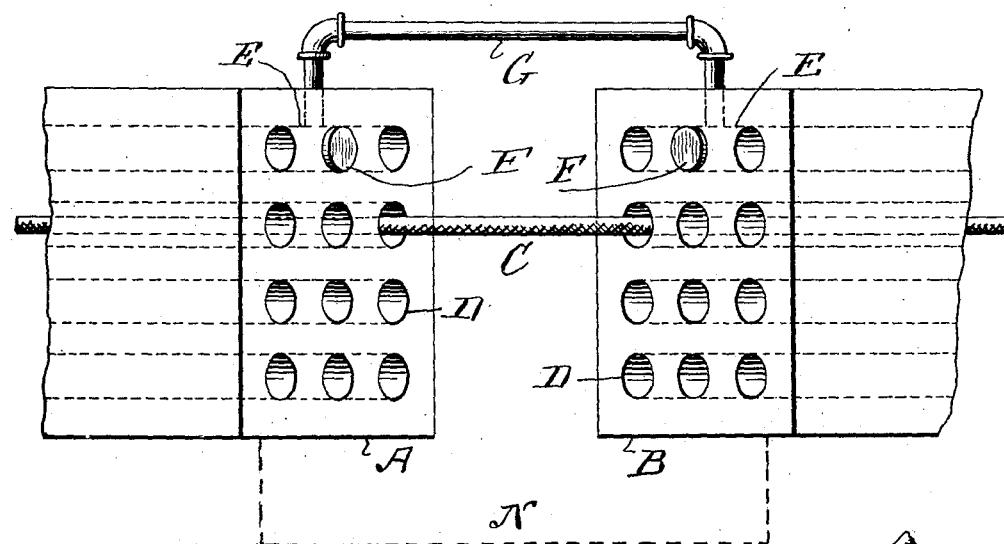


Fig: 2.

Inventor  
Thomas E. Murray  
By his Attorney Carl Benjamin

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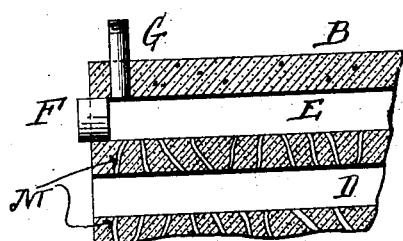
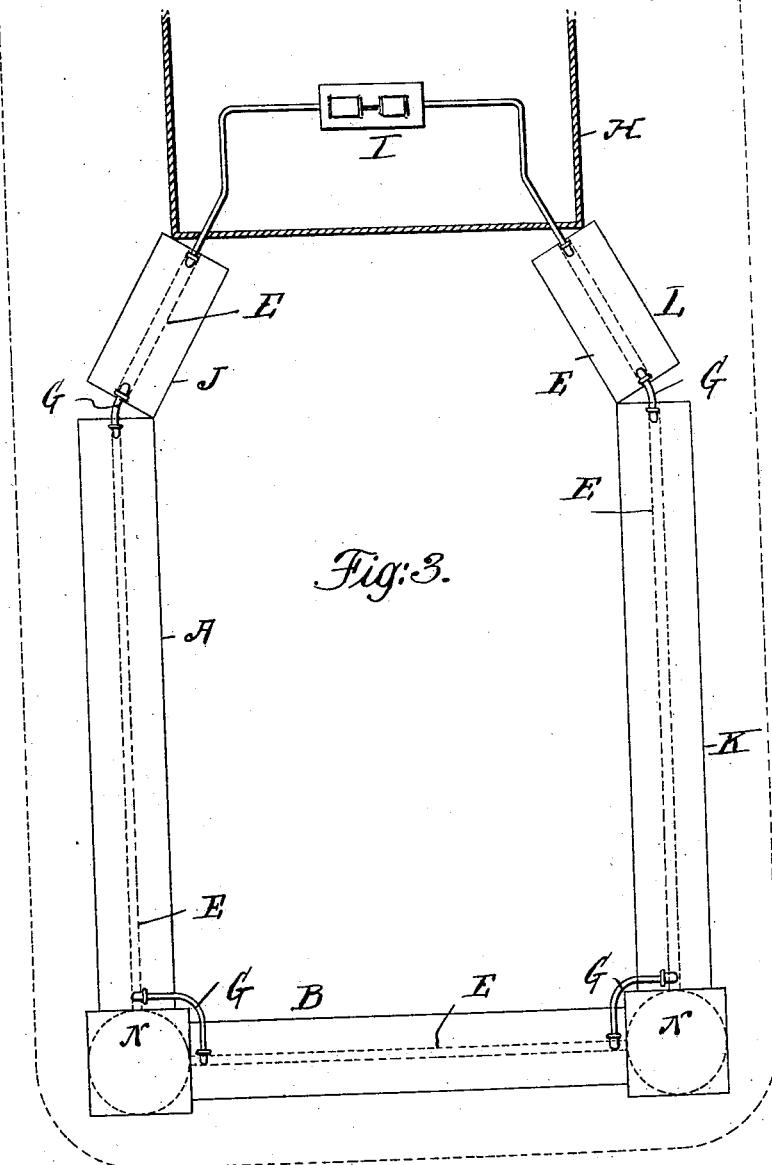


Fig:4.

By his Attorney

Thomas E. Murray  
Inventor  
Park Dayawan

# UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF BROOKLYN, NEW YORK.

## METHOD OF AND MEANS FOR COOLING ELECTRICAL CONDUCTORS WHEN INCLOSED IN CONDUITS OF CONCRETE OR THE LIKE.

1,399,309.

Specification of Letters Patent.

Patented Dec. 6, 1921.

Application filed January 28, 1921. Serial No. 440,821.

*To all whom it may concern:*

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State 5 of New York, have invented a certain new and useful Improvement in Methods of and Means for Cooling Electrical Conductors When Inclosed in Conduits of Concrete or the like, of which the following is 10 a specification.

The invention is a method of cooling electrical conductors when inclosed in conduits of concrete or the like, and a means for carrying said method into practical effect. 15 I have found that where electrical conductors—especially cables conveying heavy currents—are carried in underground conduits of concrete or like material they are apt to become overheated, with consequent impairment. In order to keep said conductors cool, I make the material of the conduit sufficiently pervious to permit a cooling liquid to seep through it, and so pass to the earth.

20 In the accompanying drawings I show my invention embodied in a multiple conduit in which are formed, by molding, a plurality of ducts for the conductors. Figure 1 is a perspective view of the ends of two adjacent conduits, showing one conductor in place and also the connecting pipe for liquid circulation from one conduit to the other. Fig. 2 is a plan view of the same. Fig. 3 is a plan view of the system for circulating 25 a liquid from a central station through a plurality of successive conduits and back to the station again. Fig. 4 is a vertical section of a portion of the end of one of the conduits, showing the liquid circulating duct, 30 and indicating the pervious character of the concrete.

Similar letters of reference indicate like parts.

A and B are multiple conduits formed of 45 concrete or the like and molded upon suitable cores, substantially for example, as set forth in my pending application Serial No. 396,956, filed July 17, 1920. I make the concrete pervious to liquid by any suitable 50 means, such as by mixing dry ashes or sawdust with it, or injecting air under pressure while the concrete mass is still liquid and before the molding operation. The electric conductors or cables, one of which is shown 55 in place at C, are disposed in any desired

number of the ducts D and pass continuously from one conduit to the next, as shown in Figs. 1 and 2. One duct E in the upper tier of ducts in each conduit is reserved for the liquid circulation. The ends 60 of said ducts E in the two adjacent conduits A, B are closed by plugs F, and communication between said ducts E is established by a pipe G.

In Fig. 3, H represents a station in which 65 there is a pump I which delivers water through the ducts E of the several conduits; so that the circulation proceeds from said pump through the water ducts E of the conduits J, A, B, K, L and their connecting 70 pipes G, and so back to said pump. By reason of the pervious character of the material of the conduits, as indicated at M, Fig. 4, the water circulating in ducts E is forced or seeps by gravity through the mass 75 of said conduits, so into the ducts D and down through said mass, finally escaping into the earth or accumulating in the manholes N between the conduits and thence passing to the earth. The water may be 80 artificially cooled in any suitable way before it is delivered into the ducts E. In warm weather it will tend to cool itself by evaporation from the surfaces of the conduits. I may use more than one duct in each conduit for liquid circulation, if desired, and instead of water I may use any suitable non-congealable liquid previously cooled—avoiding, of course, such liquids as will form 85 solid deposits in the pervious concrete. 90

The invention is especially applicable to power and lighting conduits in hot climates or in localities where they run near to steam heating distribution pipes, or where some exigency requires that they shall be laid 95 close to the surface and so be but little protected from the sun.

I claim:

1. The method of cooling an electrical conductor disposed in a conduit of concrete, 100 which consists in making said conduit of material pervious to liquid flow and causing said liquid to circulate through a duct in said conduit and to and through the portion of said conduit inclosing said conductor.

2. The method of cooling a plurality of electrical conductors disposed in a multiple conduit of concrete, which consists in making 105 said conduit of material pervious to 110

liquid flow, and then causing said liquid to circulate through a duct in the upper portion of said conduit and to pass by gravity through the portion of said conduit inclosing said conductors.

5 3. A multiple conduit of molded concrete pervious to liquid and having a plurality of ducts, and means for circulating a liquid through one of said ducts.

10 4. A plurality of conduits of molded concrete pervious to liquid, each conduit having a plurality of ducts, and means for circulating liquid through a corresponding duct in each of said conduits successively.

15 5. A plurality of conduits of molded concrete pervious to liquid and disposed successively, each conduit having a plurality of ducts, means for connecting together a

duct in each of said conduits, and means for circulating liquid through said connected ducts and said connecting means.

20 6. Two multiple conduits of molded concrete pervious to liquid and disposed end to end with a gap between them, each conduit having a plurality of ducts, one duct 25 in each conduit being closed at the contiguous ends of said conduits, and a pipe extending across said gap and connecting said ducts.

25 In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS E. MURRAY.

Witnesses:

GERTRUDE T. PORTER,  
MAY T. MCGARRY.