

(No Model.)

E. T. GREENFIELD.
ARMORED TUBE OR CONDUIT.

No. 552,060.

Patented Dec. 24, 1895.

Fig. 1.

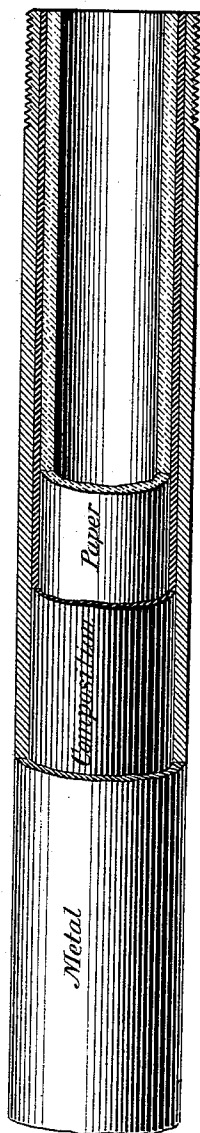
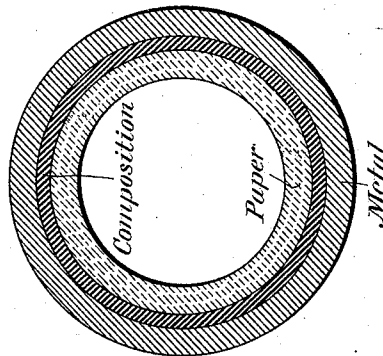


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ARMORED TUBE OR CONDUIT.

SPECIFICATION forming part of Letters Patent No. 552,060, dated December 24, 1895.

Application filed May 16, 1895. Serial No. 549,535. (No model.)

To all whom it may concern:

Be it known that I, EDWIN T. GREENFIELD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have made a new and useful invention in Armored Tubes or Conduits, of which the following is a specification.

My invention is directed particularly to improvements in armored tubes for electrical uses, although the compound tube hereinafter described may be used elsewhere in the arts where such a tube will serve useful ends.

My invention has for its objects, first, the construction of a compound tube having an insulating lining joined to an armor or outer protecting coating or tube of iron or other metal which will protect the inner tube from damage due to exterior attacks of any nature whatever; second, to provide a compound tube having insulating qualities to such an extent as to enable one to use therein bare wires as conductors, thereby cheapening the wiring of electrical systems very materially; third, to construct a compound tube having any and all of the characteristics necessarily attributable to the tube hereinafter described.

My invention will be fully understood by referring to the accompanying drawings, in which—

Figure 1 represents in broken sectional elevation a tube embodying my improvement, Fig. 2 being a cross-sectional view of the same.

Prior to my invention armored tubes had been made by surrounding treated paper and analogous tubes of insulating material with a thin jacket of brass or equivalent material; but such tubes, although affording excellent service, do not always withstand the severe tests put upon them in use, and it was with a view of furnishing a more practical tube for all conditions of service that my present invention was devised.

The drawings illustrate quite clearly my improved armored tube, consisting, first, of an inner tube of paper which has been treated by immersing it in a bath of heated insulating material in substantially the same manner as is indicated in United States Patent granted to myself and Julius Nagel, No. 441,839, December 2, 1890; second, a tubular

armor of iron or equivalent material, and, third, a binding agent or medium, preferably an insulating composition, such as asphalt, which unites the inner tube to its exterior armor.

I construct this armored tube as follows: The armor or outer tube is first heated to preferably a blue heat in an oven or in any preferred manner. Then the inner or treated tube is passed through a vessel containing a quantity of liquid asphalt, kept heated to maintain its heated condition. This inner tube after it passes through the molten asphalt is inserted into one end of the armor-tube, there being sufficient space between the inner diameter of the armor-tube and the exterior diameter of the treated tube to allow the heated liquid asphalt to fill said space. The inner tube is thus forced entirely through the armor-tube and the two are then allowed to cool gradually, thereby causing the cooled asphalt to set or firmly unite the two. To such an extent does this union take place that the two tubes become practically one.

I make no claim to the above-described method or process of uniting two tubes, as this method constitutes the subject-matter of a separate application of even date herewith, bearing Serial No. 549,536.

I do not limit myself to any special binding-agent, such as asphalt, although that agent is preferred. It is obvious that any well-known adhesive agent which will unite the two tubes might be used, and my claims cover generically a compound tube in which the two tubes are adhesively connected by an intervening binding-agent.

I am aware that compound tubes have heretofore been made of iron and glass, porcelain and the like and united in by various methods; but I am not aware that anyone has heretofore made a compound tube having a porous or absorbent inner tube, an iron or metallic armor and an adhesive agent, which alone binds the two together, and my claims are generic as to these features.

Having thus described my invention, what I claim, and desire to secure by patent of the United States, is—

1. As a new article of manufacture, an ar-

mored tube consisting of an inner tube, a metal outer tube or armor and a binding agent or medium which firmly unites them together.

2. As a new article of manufacture, a compound tube consisting of two concentric tubes, one of which acts as an armor for the other in combination with a binding agent or medium which causes said tubes to adhere to each other.
3. As a new article of manufacture, a compound tube consisting of an inner tube of insulating material and an outer tube of metal, said tubes being united adhesively together by a binding agent, such as asphalt.
4. As a new article of manufacture, an armor tube of metal and a prepared paper tube united together adhesively by an intermediate binding agent.
5. As a new article of manufacture, an armor tube of metal, an inner tube of paper treated with insulating material and a thin

layer of adhesive material binding the two together.

6. As a new article of manufacture, an armor tube of iron and an inner tube of treated paper, having an exterior diameter closely approximating the inner diameter of the armor tube and a thin layer of adhesive material which firmly unites the two tubes together.

7. As a new article of manufacture, an armor tube of iron, an inner tube of prepared paper, and a thin stratum or layer of asphalt set or hardened, so as to firmly unite the two tubes together.

In testimony whereof I have hereunto subscribed my name this 14th day of May, 1895.

EDWIN T. GREENFIELD.

Witnesses:

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