No. 630,501. Patented Aug. 8, 1899.

# E. T. GREENFIELD.

## METALLIC CONDUIT FOR ELECTRIC WIRES.

(Application filed Dec. 12, 1898.)

(No Model.)

Fig. 1.

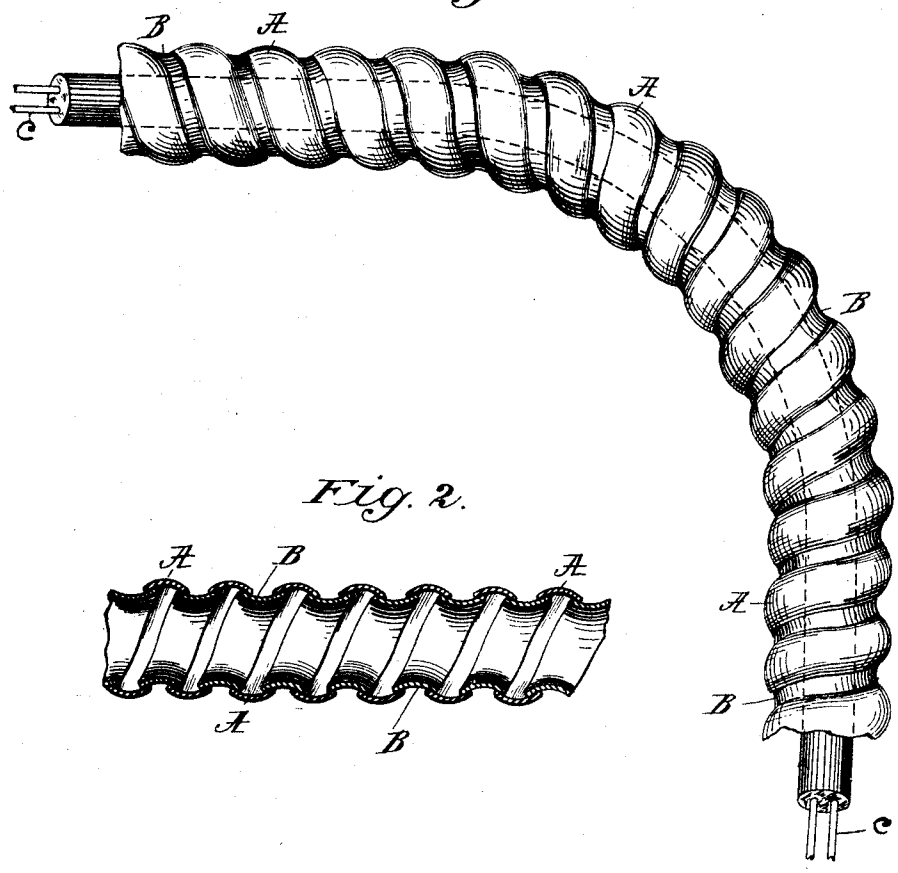
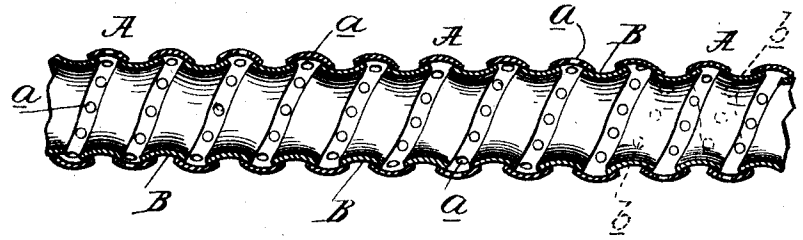



Fig. 2.




Fig. 3.




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# UNITED STATES PATENT OFFICE.

EDWIN T. GREENFIELD, OF NEW YORK, N. Y.

## METALLIC CONDUIT FOR ELECTRIC WIRES.

SPECIFICATION forming part of Letters Patent No. 630,501, dated August 8, 1899.

Application filed December 12, 1898. Serial No. 698,973. (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 Metallic Conduits for Electric Wires, of which the following is a specification.

As heretofore used metallic conduits for containing electric wires have been made air-tight and water-tight, and particularly where the interiors of such conduits have been lined with an insulating substance, the object being to prevent the oxidation of the pipe and injury to or deterioration of the insulating-lining. The use of such conduits has been attended with certain practical difficulties—namely, changes of temperature have produced internal sweating of unlined conduits, and as no means were provided for the ventilation of the same the moisture injuriously affected the insulation of the wires and caused the oxidation of the pipe; but the most serious difficulty was that the presence of the moisture was liable to produce a short circuit between the electric wires themselves or between the wires and the metal pipe. When this occurred with currents of large amperage, the gases which were developed by the heat produced by the short circuits would expand until the conduit would burst. This rupture usually occurred at the heated spot, and the hot metal and burning particles of insulating material were scattered through the surrounding space or apartment and were liable to produce a destructive fire. This danger is insidious, since the short circuit is liable to take place in the walls of unoccupied rooms or when concealed in remote places, so that the resulting fire has an opportunity to gather headway before it is detected. My invention is particularly designed to guard against these dangers; and it consists in a metallic conduit vented radially in all directions throughout its length, so as to permit the free circulation of the atmosphere to its interior and to provide an outlet for the gases generated by a short circuit, so that they cannot collect in sufficient volume to create an explosion. As a result of this construction the chances of fire from a short circuit between the electric wires in the conduit or between the wires and the conduit itself are greatly reduced, for while the metal may become highly heated, so that in certain positions it might set fire to adjacent woodwork, yet the process would be relatively slow and the fact and location of the short circuit would be disclosed by the smoke coming through the vents in all directions. The ventilation of the conduit also secures immunity from oxidation, for in case moisture should collect in the interior it is speedily dissipated by the circulation of the air therethrough, and in this way the chief cause of short-circuiting is avoided, as well as the oxidation of the pipe and of the insulation of the wires.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevational view of a piece of flexible metallic conduit embodying my invention and inclosing or surrounding two insulated wires. Fig. 2 is a longitudinal sectional view of a piece of said conduit, and Fig. 3 is a longitudinal sectional view of a modified construction of the invention.

The particular construction illustrated by the drawings is for the purpose of securing the flexibility which is desired for conduits used for interior wiring and is composed of two strips of metal A and B, which are transversely curved in opposite directions and wound spirally together, with their curves converging, so that the edges of one shall overlap the edges of the other. The conduit so made will have spaces or openings between the edges of the strips A B, whereby a circulation of air is permitted radially in all directions throughout the length of the conduit, and the collection of gases under pressure in the interior of the conduit is impossible.

In Fig. 3 I show a modified construction of the invention, in which one of the strips A is perforated with small holes *a*. The same thing may be done with the strip B, if desired, as shown by broken lines *b*.

In a prior patent, No. 593,842, granted to me on the 16th day of November, 1897, I have shown, described, and claimed a flexible armored conduit-tube consisting of a flexible lining and two or more metallic armor-strips spirally wound thereon and curved in opposite directions, in combination with a spirally-wound strip of flexible insulating material

located between the convolutions of the armor. The specific structure of the present invention, consisting, as it does, of two spirally-wound strips A and B, which are transversely curved in opposite directions, differs from that disclosed in the above-mentioned patent in that there is no flexible lining nor any flexible strip of insulating material between said windings. In other words, the essence of the present invention consists in the construction of a conduit of metal only and of such a nature that it will be ventilated radially in all directions, so as to freely permit of the circulation of atmospheric air, smoke, and kindred gases and still afford to the inclosed electric wire or wires a perfect armor or protection.

The purpose of my invention being stated, it is obvious that its result can be accomplished in many ways by the ordinary mechanic—as, for instance, by corrugating the edges of one of the strips—and therefore I do not desire to limit myself to any particular manner of venting the conduit, nor do I limit myself to a flexible conduit, but claim the venting whether with a flexible or rigid conduit, nor do I limit myself to any particular arrangement of the vent-openings, except that they shall be so located with relation to the axis of the conduit that ventilation will at all times be effected radially on opposite sides of the inclosed electric wire or wires. In Fig. 1 I show two insulated electric wires *c c* extending through the vented conduit.

I am aware that heretofore a conduit for electric wires has been devised having a row of vents or openings only in one side thereof for the purpose of admitting air under pressure to the interior of the conduit, and I make no claim hereinafter broad enough to include such a structure, my most generic claim being directed to a conduit provided with vents on opposite sides or so located radially with relation to the axis thereof that in the event of an explosion therein the explosive gases will be forced therethrough in opposite directions and in such manner that moisture will not accumulate in the conduit itself, as hereinbefore specified.

What I claim as my invention is—

1. A pipe or conduit for electric wires vented radially in all directions throughout its length, substantially as and for the purposes described.

2. A flexible conduit for electric wires, composed of flexible metallic strips wound spirally together, with venting-openings between their engaging edges, substantially as and for the purposes described.

3. A flexible pipe or conduit composed of flexible metallic strips and provided with venting-openings throughout its length, substantially as and for the purposes described.

4. The combination of a conduit vented radially in all directions throughout its length, with an electric wire or wires extending through the same, substantially as and for the purposes described.

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