

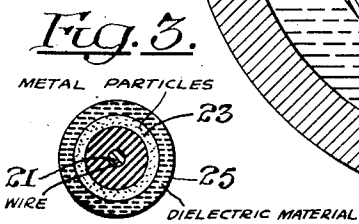
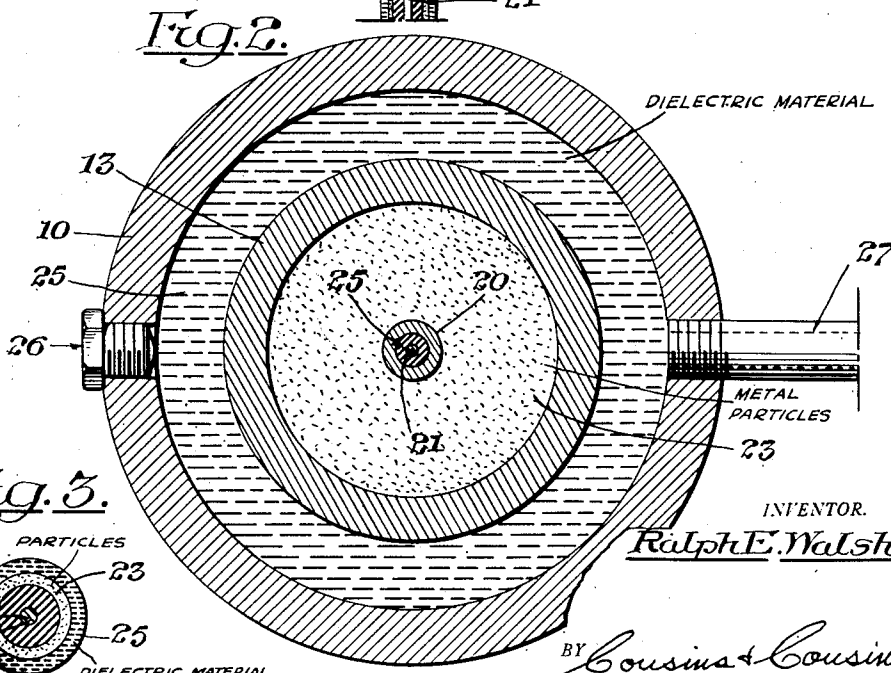
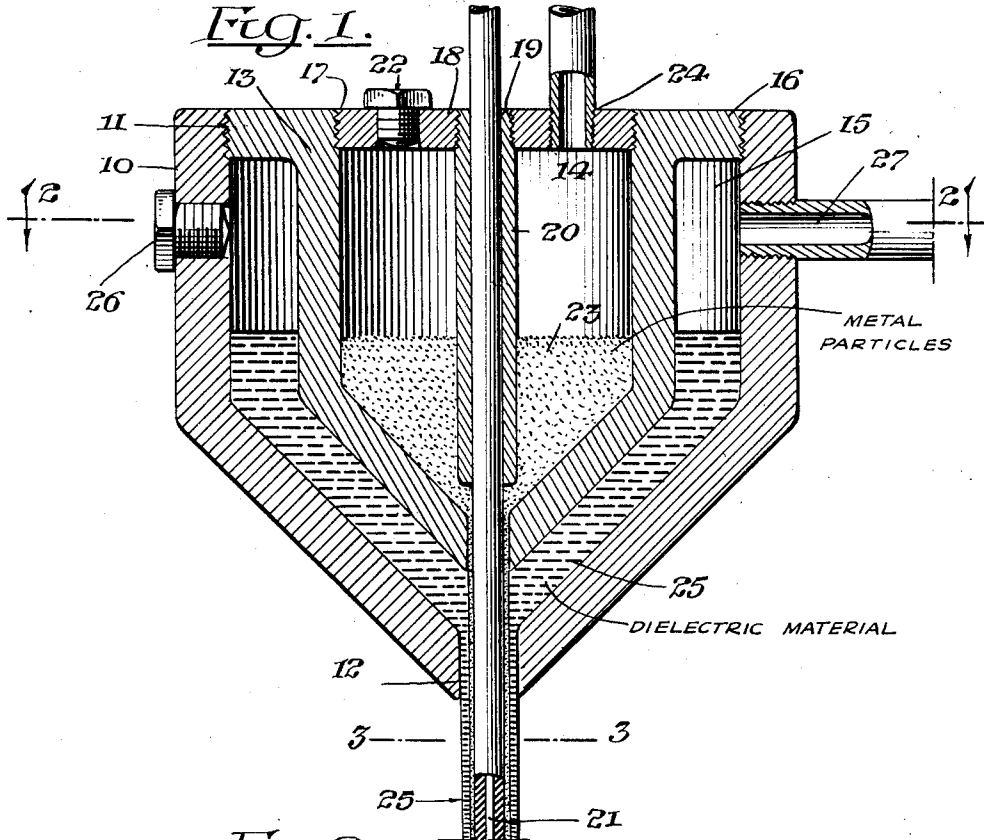
May 22, 1951

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2,553,690

METHOD OF FORMING SHIELDED CONDUCTORS

Filed Feb. 21, 1946



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2,553,690

METHOD OF FORMING SHIELDED
CONDUCTORS

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Application February 21, 1946, Serial No. 649,300

4 Claims. (Cl. 18-13)

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This invention relates to the method of making shielded cables such as are commonly used in air-plane and similar structures to prevent electrical interference with the reception or transmission of radio signals.

An object of this invention is to provide for the inexpensive construction of relatively light weight shielded cables.

Another object of this invention is to provide a method of forming shielded cables of any required cross-section, area and length.

Another object of the invention is to cover an insulated wire with metallic particles and thereafter apply a coating of dielectric thereto by extrusion.

A further object of this invention is to provide a method of forming shielded cables having the desired properties requisite for the conditions under which they are to operate.

A feature of this invention is the simplicity of its construction and the uniformity of result.

These objects are accomplished by the novel construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming part hereof, is illustrated one embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is a fractional schematic sectional view of the apparatus in use.

Figure 2 is a transverse sectional view taken on line 2-2 of Figure 1.

Figure 3 is a transverse sectional view of the shielded cable, taken on line 3-3 of Figure 1.

Referring to Figure 1 of the drawings, the apparatus will be seen to comprise a funnel-shaped hopper 10 having a large internally threaded upper opening 11 and a small orifice 12 at the bottom thereof. Said hopper 10 is of a sufficiently thick walled construction to withstand the internal pressures set up during the operation of the device.

A partitioning hopper 13, smaller than but of substantially the same shape as the outer hopper 10, is positioned within said outer hopper 10 and divides the space therein into two chambers 14, 15.

A threaded flange 16 integral with the larger opening of the partitioning hopper 13 engages the internal threads 11 of the outer hopper 10 to form an airtight union. Internal threads 17 cut in the larger opening of the partitioning hopper 13 receive a cover plate 18. The cover

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plate 18 provides an airtight seal for the upper opening of the partitioning hopper 13.

Three internally threaded holes bored in the cover plate 18 give ingress to the inner chamber 14. The central hole 19 supports and positions a guide tube 20 through which the insulated wire 21 is fed. Said guide tube 20 extends from the cover plate 18 into the inner chamber 14, but ends short of the sloping inner walls of the partitioning hopper 13.

A port is provided in the cover plate 18 through which the supply of metallic particles 23 may be replenished. A threaded plug 22 seals this port while the apparatus is in use. Said plug 22 prevents the escape of compressed air which enters the inner chamber 14 through a port in the cover plate 18 by way of a tube 24. This air pressure is used to urge the metal into the insulation of the wire 21.

The outer chamber 15 constitutes a reservoir from which a plastic cable covering is extruded. A port is provided in the wall of the outer chamber 15 through which the said chamber 15 may be refilled with plastic 25, as needed. A threaded plug 26 seals this port, while the plastic is being extruded through the small orifice 12 by means of compressed air. The compressed air enters the outer chamber 15 by way of a tube 27 which is threaded into a port in the chamber wall.

The operation of this invention becomes apparent from an examination of the attached drawings. When the continuously fed insulated wire 21 leaves the end of the guide tube 20 the compressed air entering the chamber 14 through the port 24 forces the metal particles 23 into the wire's dielectric covering. Said covering is of sufficient permeability to receive the metallic particles 23 into the surface thereof. As the insulated wire 21 passes through the small aperture at the bottom of the partitioning hopper 13 more pressure is applied to the metal particles 23. The small aperture acts as a die to constrictably force the particles 23 into the dielectric covering of the wire 21 and into intimate contact with one another, and also to regulate the amount of flow.

A plastic covering 25 is next applied over the metalized insulated wire 21. This is accomplished as the wire 21 passes through the outer chamber 15 and leaves the hopper 10. Compressed air entering through the opening 26 in the hopper 10 urges the plastic 25 therein around the metalized insulated wire 21. The constricting orifice 12 at the bottom of the hopper 10 regulates the shape and thickness of the extruded plastic covering 25.

The finished cable, as shown in Figure 3, is

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composed of the insulated wire 21 around which is located the metallic particles 23 and the whole encased in a plastic sheath 25.

The amount of compressed air entering the inner chamber 14 and the outer chamber 15 is carefully controlled by valves (not shown) to prevent the pressure on the plastic 25 in the hopper 10 from being forced upward into the inner chamber 14. It is desirable, moreover, that said pressures remain constant once the proper adjustments have been made.

The invention as described is extremely adaptable in its use, inasmuch as the nature of the metallic particles 23 may be changed when desired. It is possible, therefore, when using this device, to place a mixture of metal particles, having distinct electrical characteristics to satisfy particular requirements, in the inner chamber 14. Thus the particles 23 may be non-magnetic but of high electrical conductivity as, for example, powdered copper, aluminum or silver, or any desired mixture of such metals. Where it is proposed to shield against long-range frequencies the powdered metal 23 placed in the inner chamber 14 may be a combination of one or more non-magnetic metals and a paramagnetic metal of high permeability, such as iron or nickel.

It is also possible, by using this invention, to change the nature of the plastic covering 25 of the cable. Although the plastic must be soft and capable of extrusion it may be any synthetic plastic resin such as vinyl or polystyrene.

It is important in the fabrication of this shielded cable that the metal particles 23 form a layer of sufficient thickness to completely attenuate the electrical energy radiated by the wire 21. In this manner a path of low resistance will be provided along the cable through which said radiations will be conducted.

Another form of this invention operates without the ports covered by the threaded plugs 22, 26. In this embodiment of the invention the metallic particles 23 and the dielectric plastic 25 are introduced into their respective hoppers through the ports provided for their air lines 24, 27.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States, is:

1. A method of forming a flexible radio shielded cable consisting of continuously passing an insulated wire through a funnel shaped hopper, said hopper having metal particles therein, forcing a portion of the metal particles into the insulation of the wire as it passes through the restricted part of the hopper so as to press said particles into intimate contact with one another and thereafter applying a dielectric covering around said particles of metal.

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2. A method of forming a flexible radio shielded cable consisting of continuously passing an insulated wire through a multi-chambered funnel shaped hopper, said hopper having metal particles therein, forcing a portion of the metal particles into the insulation of the wire as it passes through the restricted part of the hopper so as to press said particles into intimate contact with one another and thereafter applying a dielectric covering around said particles of metal.

3. A method of forming a flexible radio shielded cable consisting of continuously passing an insulated wire through a multi-chambered funnel shaped hopper, said hopper having metal particles therein, introducing compressed air into said hopper chambers, thereby forcing a portion of the metal particles into the insulation of the wire as it passes through the restricted part of the hopper so as to press said particles into intimate contact with one another and thereafter applying a dielectric covering around said particles of metal.

4. The method forming a flexible radio shielded cable comprising the steps of continuously passing an insulated wire through a multi-chambered hopper, introducing a supply of metal particles into said hopper, thereafter introducing compressed air into the chamber so as to force the metal particles into the insulation of said wire, introducing a supply of dielectric material into a second chamber and thereafter applying compressed air to said second chamber in the hopper, thereby causing the said dielectric to cover the particles of metal upon the wire.

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