Aug. 20, 1935. C. F. RANEY 2,012,108

RESISTANT MATERIAL

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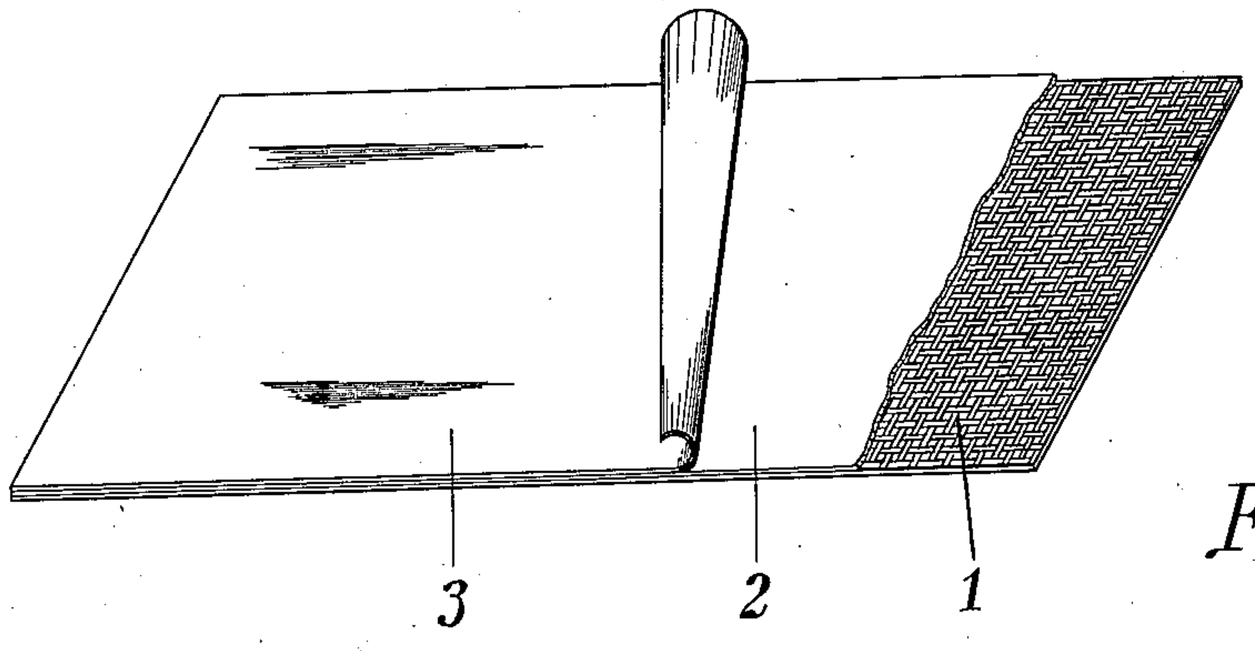

Fig. 2

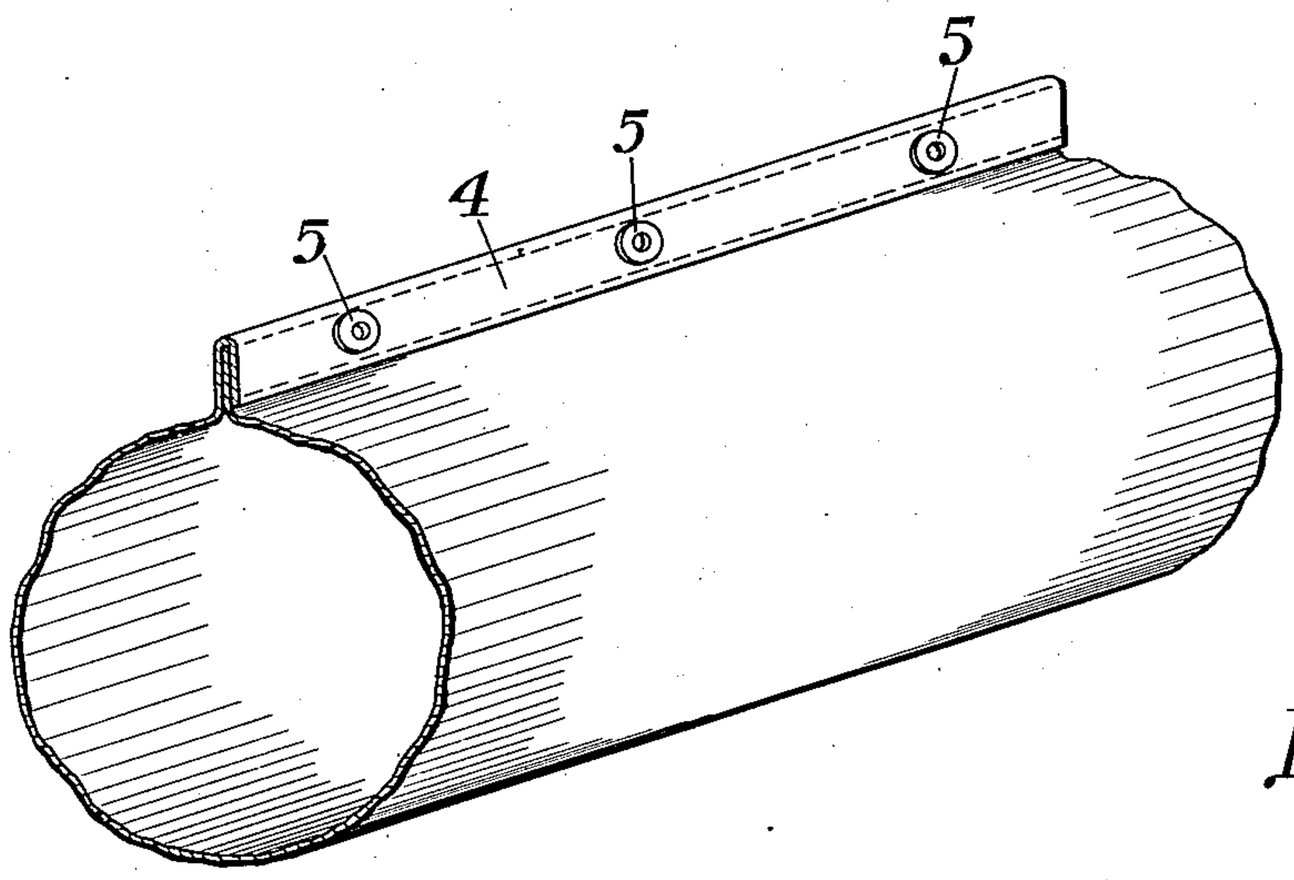

Fig. 1

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RESISTANT MATERIAL

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3 Claims. (Cl. 137—90)

This invention relates to resistant material, and more particularly to such material adapted for use in mine ventilating tubing, brattice cloth, shaft lining, et cetera, where substantially air and liquid impervious sheet material resistant to the action of acid waters, fungus, and underground conditions in general is desired.

Fabrics fairly suitable for such purposes have long been known. These fabrics have usually been coated and impregnated with rubber or similar compositions to render the fabric practically impervious to air, and have also been treated to resist the deteriorating action of fungus, and the like. Abraham U. S. Patent 1,432,585, patented October 17, 1922, discloses flexible, air impervious, coated and impregnated fabric suitable for use in mine ventilating tubing, brattice cloth, and the like. McDermott and Funk U. S. Patent 1,779,258, patented October 31, 1930, discloses an improved material of this type wherein the fabric is impregnated with a fungicide before being coated in order to get greater resistance to fungus. These materials are also frequently impregnated with various fire retardant substances to decrease their combustibility. Although the materials heretofore used for this purpose have been fairly satisfactory, they have a relatively short life in hard usage, as a rule not much more than two years, and are open to considerable improvement.

An object of the present invention is the preparation of flexible, resistant material which possesses longer wearing characteristics than the material heretofore used. A further object is the preparation of flexible mine ventilating tubing material which is impervious to air and gas. Further objects of the invention will be apparent from the description given hereinafter.

The above objects are accomplished according to the present invention by uniting to one face of a fibrous sheet a layer of metal foil. The material prepared in this way may then be made into a tube in any manner well known to the art.

In the accompanying drawing, Fig. 1 shows a perspective view of a section of mine ventilating tubing made according to the present invention and Fig. 2 shows a perspective view of a piece of resistant material embodied in the present invention.

Referring to the drawing, reference numeral 1 designates a fibrous sheet, usually a woven fabric of the nature of duck, 2 a film of adhesive and 3 a layer of thin copper foil. As shown in Fig. 1, the material is made into a tube by sewing together the lateral edges so that the copper foil 3 forms the inner face of the tube. The material is sewn together to form a projecting seam 4 in which are disposed at intervals the eyelets 5 by which the tubing may be supported from hooks or similar means. As is well known in the art, ventilating tubing may be made up in various ways and it is to be understood that the present invention is by no means limited to the particular construction illustrated.

The following example is given to show one specific embodiment of the present invention:

Example 1.—Electrolytically deposited copper foil 0.001'' thick is coated on its backside with an adhesive having the following composition:

	Parts by weight
Stearin pitch (melting point 200° F.)	100
Rubber	25
Xylol solvent	125

The adhesive is applied hot to the copper foil and the solvent removed by heating for approximately two hours at 250° F.

Duck containing 4% zinc salicylate as a fungicide and impregnated with rubber cement to render it water proof is also coated with the above adhesive and thoroughly dried. The adhesive coated surfaces of copper foil and duck are then combined together by passing between steel rolls heated to a temperature of 200–225° F. and exerting sufficient pressure to cause thorough adhesion. The material thus prepared is then made into mine ventilating tubing by sewing the material with the copper foil forming the inner face. If desired, the tubing may be made with reinforcing rings as described in Evans U. S. Patent 1,802,414, patented April 28, 1931, although this is not essential. The tubing is formed with the copper foil inside to take advantage of the smooth surface which offers less resistance to air flow.

It will be understood that the above example is merely illustrative and may be varied widely within the scope of this invention. Copper foil is to be preferred, but other metal foil may be used, such as aluminum, brass, iron, and the like. The duck may be replaced with almost any type of woven fabric of sufficient strength, or a heavy paper or other felted fibrous material. The fibrous material may be impregnated or saturated with rubber, asphalt, resins, or the like, although an untreated fibrous sheet may be used. Obviously, it is preferable to treat the fibrous sheet with resistant materials such as fungicides and rubber compositions.

The metal foil may be combined to the fabric by numerous suitable adhesives, such as rubber,

cement, glue, asphalt, resins, and the like, or it may be combined to the fabric by sewing or even by the use of light rivets. The invention includes within its scope metal foil united to a fibrous sheet by any means and the above means have been given merely to show the best method apparent to applicant.

The above example illustrates the manufacture of mine ventilating tubing in which the copper foil forms the inner face. Where conditions are not particularly conducive to strong corrosion from mine water, and the like, it is advantageous to form the tubing with the copper foil inside to diminish resistance to air flow. However, the copper foil stands corrosive conditions much better than a coated fabric and, consequently, where the tubing is to be used under extremely corrosive conditions, it is advantageous to make the tubing with the copper foil on the outside to protect the coated fabric. Obviously, the tubing material can be made with metal foil applied to both faces of the fabric, if desired.

The invention has been described with respect to the manufacture of mine ventilating tubing, but the resistant material may likewise be used with great advantage as brattice cloth, shaft lining, wrapping for air and water pipe lines, and other uses where gas resistant and corrosion resistant materials are necessary. The great resistance to corrosion makes this material highly suitable for use in wrapping around air and water pipe lines.

An advantage of the present invention is that it provides a material of great resistance to the deteriorating conditions met in mines and other underground work. A particular advantage of this material lies in its use in mine ventilating tubing because the material possesses approximately the same flexibility as a coated fabric with a resistance to leakage of air which has only been obtained heretofore with rigid sheet metal pipe. The material with the copper foil forming the inner face of the tubing also presents a smooth inner surface, which greatly reduces its resistance to air flow. A further advantage is that mine ventilating tubing made of this material can be suspended without the use of reinforcing rings, thus more nearly approximating the characteristics of a rigid or metal pipe lining without having the disadvantages inherent in such construction.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. An air-impervious mine ventilating tubing comprising a flexible sheeted material having a relatively thin walled facing of water-resistant fungus-resistant fabric material, another facing of flexible air-and-water impervious metal foil, and an intermediate layer of thermoplastic water-resistant material adherently combined with said facings and protected from fungus infection on one side by said impervious metal foil.

2. An air-impervious mine ventilating tubing comprising a flexible sheeted material having a relatively thin walled facing of water-resistant fungus-resistant fabric material, another facing of flexible air-and-water impervious metal foil, and an intermediate layer of rubber adherently combined with said layers and protected from fungus infection by said impervious metal foil.

3. An air-impervious mine ventilating tubing comprising a flexible sheeted material having a relatively thin walled facing of water-resistant fungus-resistant fabric material, another facing of air-and-water impervious metal foil, and an intermediate layer of rubber adherently vulcanized to said layers and protected from fungus infection by said layers.

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