

UNITED STATES PATENT OFFICE

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MATERIAL FOR MINE-VENTILATING TUBING OR THE LIKE AND PROCESS FOR PRODUCING THE SAME

No Drawing.

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The present invention relates to an improved material for mine-ventilating tubing, or the like, and process of producing the same, and particularly a material adapted to meet the severe conditions of use to which such tubing is subjected in mines. The most serious condition encountered is the destructive effect of fungous growth, and while many attempts have been made in the past to provide a tubing material treated to resist fungus, these materials have, for various reasons, been unsatisfactory and it has been found that even under the very best conditions the fungous growth will attack it after about seven or eight months use and rapid deterioration will set in. Fungus resisting coatings have heretofore been employed, which, however, merely provided a superficial resistant to fungous growth and any deterioration or break in the coating would expose the fabric itself to the growth. This was particularly due to the fact that fungicides have heretofore been mixed in a coating which was more or less dense in order to enable it to be applied by pressure in a coating machine, and which, therefore, when applied would not thoroughly impregnate or saturate the fabric base, so that a substantial portion of the latter remained unprotected. The base material from which these coatings have heretofore been made was usually of such a nature as to be easily attacked by the fungous growth, and the manner of mixing in the fungicide merely rendered the coating resistant to the growth but did not prevent it, as portions of the coating would remain unaffected by the fungicide and the fungus would attack these portions and work through the coating to the fabric. It is proposed in the present invention to provide a material in which a fabric base is so treated as to be entirely and inherently resistant to fungous growth, and to this end I propose to saturate the fabric by immersion to the complete point of saturation in a liquid bath in which a fungicide has been converted into liquid form.

I further propose to provide such material which will be air-tight, water-proof, unaffected by great changes in temperature,

will not crack or break when folded or flexed, and having a surface adapted to reduce air friction and resist corrosion, and for this purpose I provide a fungicide saturated fabric base with a superficial protecting coating.

The base material used in carrying out the invention may be any suitable flexible fabric, as cotton, jute, or wool, preferably in the nature of a duck or drill of a suitable weight, a satisfactory weight for the conditions under which such material is used being from six to sixteen ounces per square yard, depending upon the particular requirements. Fabric in its commercial form contains a certain amount of hygroscopic moisture, this moisture being disposed in the interstices between the minute fibres or cells, and with this moisture present it is impossible to completely saturate the material. I therefore first prepare the material for saturation by thoroughly drying it either in a drying oven, or other suitable drying means, to completely extract the moisture. Cotton, for instance, heated to 100 degrees, loses its natural hygroscopic moisture. The material is then treated with the fungicide by immersing it until it has reached a maximum state of saturation and is thereupon allowed to dry. The fungicide may be either insoluble in water, a suitable fungicide of this nature being dinitrophenol, or it may, if desired, be of a soluble nature, as for instance, sodium formate. In any case the immersion consists of the fungicide and its proper solvent, the solvent for dinitrophenol for instance, being alcohol, the immersion being of suitable consistency to permit it to completely saturate the material, and also being so proportioned as to strength of the fungicide as to render the material completely resistant to fungous growth without breaking down, burning, or otherwise affecting the structure of the fabric base. In using a fungicide which is soluble in water, it is desirable to protect it against the action of moisture, and for this purpose the saturated material is subjected to a protective bath, as oil, a suitable oil for this purpose being pine tar oil or paraffine. This oil bath may also be employed with the insoluble

fungicide for the purpose of avoiding any possible breaking down of the fungicide, as for instance, when the material may come into contact with destructive chemicals.

5 The fabric thus produced is entirely and inherently resistant to fungous growth, but for the purpose of meeting the other conditions that are present in its use in mines, I further render the same air-tight and water-
10 proof, and for this purpose it is treated with a suitable coating substance having the properties of flexibility and imperviousness to air and water, a satisfactory substance for this purpose being commercial pyroxylin solution, or rubber. This coating may be applied
15 either by painting, spraying, dipping, or by any other standard coating processes. Pyroxylin solution also has the advantage of completely closing about threads sewed
20 through the fabric, whereas other coatings retain the needle perforation in its original size, which is larger than the thread diameter.

As a final step, the material is dusted or painted with a suitable surfacing substance,
25 as aluminum dust, to reduce air friction and resist corrosion.

I have described a preferred and satisfactory embodiment of the invention, but it is obvious that changes may be made therein,
30 within the spirit and scope thereof, as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. As a new article of manufacture, mine ventilating tubing material comprising a dehydrated fabric base impregnated with a fungicide, and having a fungicide retaining coating.

40 2. As a new article of manufacture, mine ventilating tubing material comprising a fabric base impregnated with a fungicide, and a fungicide retaining oil coating said fabric.

3. As a new article of manufacture, mine
45 ventilating tubing material comprising a dehydrated fabric base impregnated with a fungicide, and a flexible coating impervious to air and water.

4. As a new article of manufacture, mine
50 ventilating tubing material comprising a fabric base impregnated with a fungicide, a fungicide retaining coating, and a further coating of flexible material impervious to air and water.

55 5. As a new article of manufacture, mine ventilating tubing material comprising a fabric base impregnated with a fungicide, a flexible coating of material impervious to air and water, and a surfacing coating for said
60 flexible coating adapted to reduce air friction.

6. As a new article of manufacture, mine ventilating tubing comprising a fabric base, impregnated with a fungicide, and a flexible pyroxylin coating.

7. The method of producing mine venti-

lating tubing material which comprises dehydrating a fabric base, immersing said fabric base in a fungicide until substantially saturated, drying said material, and applying a protective finishing coating.

8. The method of producing mine ventilating tubing material which comprises dehydrating a fabric base, immersing said fabric base in a fungicide until it is substantially saturated, drying said material, immersing
75 said dry material in a fungicide retaining liquid and coating said material with a substance impervious to air and water.

9. The method of producing mine ventilating tubing material which comprises heating
80 a fabric base to remove its hygroscopic moisture, impregnating said dehydrated material with a fungicide to its substantial limit of saturation, drying said material, immersing said dry material in a fungicide retaining
85 liquid, and coating said material with a flexible substance impervious to air and water.

Signed at Bridgeport, county of Fairfield, and State of Connecticut, this 20th day of June, 1927.

WILLIAM HOOPER EVANS.