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MATERIALS RESISTANT TO POISONOUS GASES

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This invention relates to materials resistant to poisonous gases such as war gases and more particularly to mustard gas (dichlorodiethylsulfide).

The invention comprises methods of producing such resistive materials and of making materials resistant to such gases.

It is an object of the invention to provide materials for clothes and similar purposes which comprise a protective substance which renders this material resistive to war gases.

It is another object of the invention to make walls for protecting rooms or other protective means resistive to war gases.

Other objects of the invention will appear as the specification proceeds.

According to the invention materials designed for protecting purposes are tightened or sealed by means of an elastic artificial substance which may contain filling materials and other additions. One or several layers of these substances are applied to this end on a suitable support. A great number of substances, with which one or either side of a support should be coated, have already been proposed for the production of materials capable of protecting from poisonous gases. For the manufacture of clothes resistive to such gases only substances can be used which possess a satisfactory suppleness and elasticity, while the material must not be too heavy and, as a rule, should not exceed 700 gs. per square meter. An elastic material which is often employed for this purpose is rubber, which, however, offers a satisfactory protecting action only during short time. A great number of substitutes and conversion products of rubber have also been proposed for this purpose, but really satisfactory results have not been attained as yet.

It has now been found that a very effective protection against poisonous gases can be obtained by applying to a support a mixture of an elastic artificial substance, which is practically resistant to filling materials which oxidise mustard gas or decompose or convert it in another manner, and of such a filling material capable of converting mustard gas. Peroxides such as lead dioxide (PbO_2) or other oxidising compounds may be used as such filling materials.

Besides these filling materials, which cause a conversion of mustard gas, other filling materials may also be added, for instance talcum or kieselguhr or other substances capable of influencing the properties of the material such as plastifiers, drying oils, resins, artificial resins, asphalt, resin soaps, glycerol and the like.

As elastic artificial substance resistant to the action of filling materials which attack mustard gas, such as peroxides, various polymerisation products resembling rubber may be employed. As examples may be mentioned polyisobutylene nitriles, polyethylene chlorides and the like. Polymerisation products of isobutylene, for instance the product known under the trade mark "Oppanol" of the I. G. Farbenindustrie A.-G., and of related hydrocarbons, such as polyalkenes or polytenes, have been found to be particularly suitable.

The combination of for instance polyisobutylene with lead dioxide appeared to give extraordinarily favorable results as protecting agent against poisonous gases and a very extended protecting duration.

The mixture of the elastic artificial substance and the filling material capable of converting mustard gas, for instance a mixture of polyisobutylene with lead dioxide, is particularly suitable for the manufacture of gas-proof clothes. To this end a layer of the mixture is applied to a support, for instance a textile material. Even a thin coat secures a satisfactory protection from poisonous gases, more particularly from mustard gas, during many hours. The protecting duration increases with the thickness of the coat.

Between the support and the protecting layer and, if desired, as a covering layer upon the protecting layer there may be arranged one or several layers of a different material. The rear side of the support, for instance the textile fabric, to which the protecting mixture is applied, and, if desired, the rear side of the textile fabric or other material with which the protecting layer is covered, may also be provided, for instance coated, with an elastic material, such as rubber, or an elastic color or varnish layer.

The protecting layer may be arranged on different supports. Apart from textile materials supports of rubber, leather, paper, reinforced paper and the like may be used. The materials for adjoining layers must be chosen so that they do not influence each other in an obnoxious manner. If the mixture according to the invention and another elastic substance, such as rubber or products of condensation or polymerization of organic compounds, are employed in adjoining layers, it may be useful to arrange an intermediate layer which consists of a mixture of the materials of these two layers.

The product according to the invention is not only suitable for the production of a material having the form of sheets or breadths, as is the

case with tissues, but it can advantageously also be applied to other purposes, for instance to the production of rooms which afford protection from poisonous gases by tightening the gas-pervious parts of the walls of such rooms with the material according to the invention.

The material may preferably be applied in the form of a dispersion in a liquid, e. g. benzine. The liquid is vaporized after a layer of such a dispersion has been deposited. The mixture may in dependency on its consistency be applied or deposited in any way which is usual for the appliance of such layers; it may for instance be applied by spreading, ironing, calendering, rubbing in and the like. These operations may be carried out once or several times.

Example

For gasproofing the following mixture gave good results:

	kgs.
Polyisobutylene (Oppanol)	7500
PbO_2	1500
Magnesium oxide (magnesia usta)	1500
Kieselguhr	3750

The procedure is as follows:

Start polyisobutylene on a warm mill, approximately 50° C, and mill at friction speed, approximately six minutes, adding kieselguhr. Mill until the material is smooth on rollers, add magnesium oxide and as last ingredient add lead dioxide. Sheet out in thin sheets and soak in benzene during one night. Run in hoppers the next day, adding benzene, until a smooth satisfactory cement is obtained. This cement is spread on a fabric of suitable strength in very thin layers, taking care that the machine is hot enough to evaporate the benzene.

Care should be taken to run thin layers, deposit approximately 10 grams per square meter, since polyisobutylene retains liquid and is slow-drying.

After running until enough weight is obtained, dust with French chalk and spread a number of coats on the reverse side.

This side afterwards dust with French chalk.

Materials which are coated with the product according to the invention or the gasproof clothing made in accordance with the invention may, if spoiled with a poisonous gas, satisfactorily be cleaned by boiling without their long protecting duration being affected.

Various changes may be made in the details disclosed in the foregoing specification without departing from the invention or sacrificing the advantages thereof.

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