Cl. 154

Published June 15, 1943 Serial No. 254,744

ALIEN PROPERTY CUSTODIAN

PROTECTIVE MATERIAL AGAINST WAR GASES AND CHEMICALS AND METHODS OF MAKING THE SAME

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No Drawing. Application filed February 4, 1939

It is known that glycerol affords protection against the action of war gases or chemicals. It has not, however, been possible to apply glycerol to a fabric to obtain a durable protective material. It is also known that cellulose acetate has a protecting action with respect to the said chemical fighting means. All attempts, however, to apply this material to fabrics have not succeeded, because this material cannot be pasted or quilted on to the fabric. Moreover, the drawback of cellulose acetate is that it becomes brittle, if it is dried after having been wet.

Now, it has been found that materials consisting of a core comprising one or more layers of fabric in and/or on and/or between which are applied one or more natural gums and/or permanently water soluble, artificial resins, not capable of being hardened, dissolved or plastified by means of a solution of a bi or more valent alcohol, or of a substitution product of it, or of a mixture of such materials mixable with water and which inner layer is provided at both sides with a waterproof outer layer, are absolutely impervious to all chemical fighting means. The materials dissolved or plastified by means of the said solution, form the medium resistant to the gases. As this medium is water soluble, it must be shut off from the atmosphere by outer layers of waterproof material, because otherwise the material should soon become sticky under influence of moist air.

In order to make the outer layers adhere firmly and durably to the active inner core, it is necessary that between both there is a layer of adsorbing material. These intermediate layers stick as well to the inner core, which is a little sticky, as to the outer layers, so that a united material is obtained.

The solutions or masses to be used can be preserved if desired, as for instance with boric acid, benzoic acid, salicylic acid or such preservatives. For the rest some multivalent alcohols possess also a preserving action. Many alcohols and alcohol mixtures may thus be used. It has been found that satisfactory gas-tight and cheap material can be obtained when gum arabic or tragacant is used in an aqueous solution of glycol and glycerol. Also, with good results, permanently water soluble artificial resins not capable of being hardened can also be used, for which the different kinds known per se can be used.

As waterproof outer layers good results are obtained with layers of rubber, which, for instance, can be applied to the tissue in the form of latex and which afterwards can be vulcanised. It has also been found that the latex can be vulcanised also by treatment with an alcoholic solution of shellac.

The waterproof layer, however, can also be prepared from artificial resins capable of being hardened, which are hardened, when the resin layer has been applied, after which they are waterproofed.

The intermediate layers of adsorbing material which are to be applied between the inner core and the outer layers, may consist of fabric, paper, fibres, wood or cork powder and such material which, as has been described above, sticks firmly to both layers to be connected and forms thus a good connecting medium.

It has furthermore been found that tissues extraordinarily impervious to war gas and extremely flexible can be obtained and that also, if desired, the intermediate layers can be spared, if care is taken, that the quantity of bi and/or more valent alcohols with respect to the quantity of gums and/or artificial resins used is chosen in such a way that, after drying, the mass applied in, on and/or between the layer or layers of fabric comprising the core is present in the form of dry, non-sticky flexible layers.

The optimum proportion for the gums or artificial resins and the said alcohols or their substitutes which is different for the several materials, can be fixed simply for each case by experiments.

It appears that the obtained dry, flexible layers consist of a homogeneous material, possessing extraordinary properties for resisting war gas.

It is not surely known what is taking place when mixing the two said groups of materials in the above-mentioned proportions. It is meant, however, that the alcohols combine with the acids present in the gummy or resinous materials, or that they go in these materials in solid solution.

The last-mentioned homogeneous material is water soluble and is able in this form to apply gas-tight layers to all kinds of objects, which are desired to be protected against war gases.

If, for instance, meat, meat goods, fruits and vegetables are dipped into such a solution, or are coated or sprayed with it, after drying an entirely gas-tight layer is obtained, which layer protects these goods against war gases and which layer, on the other side, can be removed easily by washing with water before consumption.

In a manner known per se films and ribbons can also be made from such solutions, which films and ribbons can serve for packing provi-

sions which cannot be washed with water, such as bread, cake, and so on.

Further, these films can be used as intermediate layers in gas-masks, shoes and such articles.

Further indifferent materials can be incorporated into the protecting material, such as fibres, colouring matters, strengthening means, softeners, and preservatives. By these additions, it is possible to vary highly the properties of the films and ribbons made from the material.

As this particular material is dry and not sticky, it possibly is not necessary to cover a tissue impregnated with this material with outer layers, which lowers considerably the cost price of the gas-tight tissue. This, for instance, is to be used for persons who do not take actively in combatting war gas. On the other side, such a tissue, which is not provided with outer layers, could serve as port sails in ware and store houses for provisions. If, in consequence of a long use the gas-tightness is reduced, such tissues can be redressed again by reimpregnating.

The desinfection can also take place by cleaning by boiling, then by drying and reimpregnating.

If a tissue, provided with two waterproof outer layers, must be prepared, if is preferable also by this material to apply an intermediate layer of adsorbing material between the inner layer and the outer layers. This does not cause a better sticking it is true, but a greater strength of the tissue is obtained. Tissue, paper, fibres, wood or cork powder and such material here also can be used as adsorbing material.

The tissues to be treated according to the invention can be prepared from all known materials, to be worked into material. The choice will depend upon the particular properties which are wanted for the present gas-tight materials. For cheap fabrics, e. g., cotton will be chosen as raw material. For strong fabrics on the other hand, linen or Indian grass are preferable. Fabrics of artificial fibres can also be treated according to the invention.

It appears from the applications given above as examples that, in consequence of the present invention, now it is possible to give a real protection to everything that is desired to be protected against war gases, because the mass can be applied on, between or in anywhere and it can be given any form desired.

Example 1

A cotton fabric is coated at one side with latex, which is vulcanised thereupon. Then an aqueous solution of 35% of gum arabic, to which 10% of glycerol is added, is applied to the other side. With this the fabric is impregnated. Thereupon the excess of solution is removed, the tissue is dried somewhat by bringing it over a warm roll, after which the treated side of the fabric is covered with wood powder and after that is covered with a layer of rubber latex, which is either vulcanised in the known manner or is treated with an alcoholic shellac solution. A very flexible material, which gives absolute protection against chemical fighting means, is obtained, which even resists the action of mustard gas.

Example 2

As in example 1, a cotton fabric first is provided with a vulcanised layer of rubber on one side and thereupon impregnated with the solution mentioned in example 1. Now, a layer of a thickened solution is applied to the treated layer. After drying over a warm roll a new layer of fabric is applied to the last applied layer and after that the outer layer of vulcanised rubber is applied thereupon. A material which is very durable, hard-wearing and impervious to war gases is obtained.

Example 3

A cotton fabric is led through a solution of 40% of tragacant, to which 15% of glycerol is added, thereupon, after passage over a warm roll and after having been covered on both sides with a layer of paper, it is led through a solution of rubber latex and is then vulcanised. In this way a very cheap tissue is obtained, which is absolutely impermeable for all gases.

Example 4

A cotton fabric is treated on one side with a urea methanal artificial resin mass, capable of being hardened which is thereafter hardened.

After that the cotton is impregnated with a solution of 30% of a permanently water soluble artificial resin of the same or of other kind, not capable of being hardened, to which 20% of a mixture of equal quantities by weight of glycol and glycerol has been added. To this prepared layer successively three layers of fabric are applied, which are all treated in the way described, after which finally a thickened solution is applied which is covered with a layer of wood powder. Thereupon a layer of the above-mentioned artificial resin capable of being hardened, is applied to this layer, which resin finally is hardened. A rather thick and very firm tissue is obtained, which is gas-tight and adapted for many purposes, e. g. for airships, gas-tight holders, and so on, particularly for the durable tightening of shelters.

Example 5

100 gr. of tragacant are dissolved in 200 gr. of water with heating at 50–60° C. Thereupon 50 gr. of glycol is added and stirred until a homogeneous liquid is obtained. Then 8 gr. of boric acid is added. The solution thus obtained is used for impregnating and gives a dry and flexible gas-tight layer.

Example 6

120 gr. of gum arabic are dissolved in 250 gr. of water with heating at 60–70° C. After that 45 gr. of glycerol is added and is stirred, until a homogeneous liquid is obtained. After drying of the solution the same result is obtained as with the material according to example 5.

Example 7

A similar result as mentioned in Examples 5 and 6, is obtained by dissolving 50 gr. of permanently water soluble aniline methanal artificial resin not capable of being hardened with heating at 50–60° C. in 100 gr. of water and then adding 30 gr. of propylene glycol. After stirring a homogeneous liquid is again obtained, which can be used for impregnating fabrics and which yields a dry, flexible layer.

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