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PROOFING CELLULOSIC, ANIMAL, AND OTHER SUBSTANCES AGAINST INSECTS, ANIMALS, AND ORGANISMS

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My invention relates to cellulosic, vegetable, animal, metal and other materials.

My invention has for its object, to provide a process for the treatment of materials, whereby they are rendered impervious or resistant to the attacks of insects and other animals, including fresh and salt water species, as well as resistant to the formation or development of spores and organisms, such as fungi, moulds, mildews, rots and the like and also to vegetable growths both of the land and water varieties.

To this end, my invention consists broadly in a process for the treatment of materials, according to which process one or more compounds are deposited on, incorporated with or otherwise applied to the material being treated, the compounds having as a base radical a rare earth metal or a rare element and as an acid radical, a higher organic acid.

My invention further consists in the process for treating materials, protective compounds or compositions, and materials treated thereby, to be hereinafter described.

In carrying my invention into effect, the base radical of the compound or compounds, which I prefer to use, may be a rare earth metal or a rare element, such as, thorium, thallium, cerium, lanthanum, didymium, yttrium, titanium, zirconium or uranium, while the acid radical may be of the fatty, oleic, linoleic, linolenic, clupanodonic, abietic, cocceric, ricinoleic, dioxystearic, japanic, chaulmoogric, resin or gum-acid series.

The material to be treated may be protected by impregnating, covering, incorporating or otherwise applying a protective covering or layer of a compound or compounds of the type indicated above.

The impregnation of the material may be effected by the following, amongst other, methods.

I. Simple impregnation by the compound in a true solution or by a colloidal or quasi-colloidal solution or suspension in an organic solvent.

II. Impregnation by an emulsion of the compound.

III. Depositing the compound or insoluble rare earth metal or rare element soap, by first impregnating the material with a solution of a soluble soap or salt of the organic acid and then treating with a solution of a soluble salt of the rare earth metal or rare element.

IV. Depositing the compound or insoluble rare earth metal or rare element soap, by first impregnating the material with a solution of a soluble salt of the rare earth metal or rare element and then treating with a solution of a soluble soap or salt of the organic acid.

V. Depositing the compound, by first impregnating the material with a carbonate or hydroxide of the rare earth metal or rare element and then treating with the organic acid, or vice versa.

The material may be covered with a protective layer by painting, spraying or otherwise applying the followings:—

1. A solution of the compound in any suitable solvent which will evaporate leaving a thin layer of the protective compound.

2. A water or other emulsion or suspension of the protective compound, which, on evaporation, leaves a deposit of the protective compound.

3. A deposit of the protective compound or insoluble rare earth metal or rare element soap or compound, by first covering or coating the material with a solution of a soluble soap or salt of the organic acid and then treating with a solution of a soluble salt of the rare earth metal or rare element.

4. A deposit of the protective compound or insoluble rare earth metal or rare element soap or compound, by first covering or coating the material with a solution of a soluble salt of the rare earth metal or rare element and then treating with a solution of a soluble soap or salt of the organic acid.

5. A deposit of the protective compound, by first impregnating or mixing the material with a carbonate or hydroxide of the rare earth metal or rare element and then treating with the organic acid, or vice versa.

The compounds or soaps of the higher organic acids with a rare earth metal or rare element may be made by any of the following methods:—

A. Heating or fusing together the proper proportions of organic acid with an oxide,

hydroxide or easily dissociated salt of the rare earth metal or rare element.

B. Precipitation of the compound or insoluble soap by treating a solution of a soluble soap or salt of the organic acid with a solution of a soluble salt of the rare earth metal or rare element, the insoluble compound being then separated by filtration or extraction with an immiscible solvent.

C. Precipitation of the compound or insoluble soap by treating a solution of a soluble salt of the rare earth metal or rare element with a solution of a soluble soap or salt of the organic acid.

Instead of preparing the protective compounds as above described from pure organic acids of the series set forth above, mixtures of these acids or their compounds or salts may be used, using as a source of these organic acids or mixtures of organic acids or compounds, the raw materials in which they occur, such as, oils, fats, waxes, gums or resins.

Further, isomers, polymers, substitution products, oxidation and reduction products, hydration and dehydration products and other chemical modifications of these organic acids or compounds not destroying the acid nature of the product, may be used.

For example:—

(1). Elaidic acid (made by the action of nitrous acid on oleic acid) may be used as the organic acid portion of the protective compound.

(2). The mixed acids or compounds in hydrogenated castor oil may be used as the organic acid portion of the protective compound.

(3). The acids or acid compounds in oxidized or blown tung oil may be used as the organic acid portion of the protective compound.

(4). The acids in chlorinated cotton seed oil or the like may be used as the organic acid portion of the protective compound.

In general, the compounds prepared from the saturated higher fatty acids are relatively insoluble in the ordinary organic solvents, whereas those prepared from the unsaturated higher fatty acids are relatively soluble in the ordinary organic solvents.

Instead of using a single compound as above described, I may, in some cases, use a mixture of two or more of these compounds to form the protective layer or covering or deposit.

My invention may be applied to fabrics, yarns, wood, metal, timber, paper, green or dead vegetable matter, hides, skins, leather, feathers, hair, fur and the like and also to live vegetation and plants, for preserving them and rendering them resistant to attack by insects, worms, molluscs and other animals, including fresh and salt water species as well as fungi, moulds, mildews, rots and the like, and also vegetable growths, including algæ, mosses, lichens, and fresh and salt water vegetation.

My invention may also be applied to stone and other materials used in building construction.

The following are typical examples of the application of my invention:

a. Woollen fabrics may be protected from attack by clothes moths, by impregnating the fabric with a 1% solution of lanthanum stearate in benzol.

b. Woollen fabrics may be protected from attack by clothes moths, by first saturating the fabric with a hot 1½% solution of sodium stearate, then wringing out and drying, thereafter passing through a warm ¼% solution of cerium chloride after which the fabric is passed through warm clear water to remove any excess of the cerium salt.

c. Roofing timbers may be protected from attack by clothes moths, by impregnating the fabric with a ½% solution of thorium oleate in white spirit.

d. Woollen rugs may be protected from attack by carpet beetles or the like, by spraying or dipping with a 5% solution of tatanium abietate.

e. Roofing timbers may be protected from attack by death-watch beetles, by painting with a 5% solution of thorium kaurolate (thorium salt of kauri gum acid) in carbon tetrachloride.

f. Timber may be protected from dry rot by painting with the following mixture:—

	Parts by weight
Gum dammar	40
Cerium tungate	5
Turpentine oil	40
Tetrachlorethane	15

g. In the manufacture of paper wallboard, 1% of mixed rare earth metal carbonates is incorporated with the pulp before the wallboard is made. When finished the wallboard is sprayed with a 10% solution of raw linseed oil in white spirit.

h. Timber piling for immersion in sea water may be protected from attack my marine animals and vegetation by impregnating or painting with the following mixture:

	Pounds
Crude mineral oil	21
Pale gloss oil	36
Benzol	30
Grinding japan	30
Thorium tungate	6
Cerium oleate	6

i. Foliage and flowers of growing roses may be protected from attack by rose leaf roller caterpillars, by spraying with a water emulsion of cerium ricinoleate.

Woollen and other fabrics or yarns when treated with 1/10% to 1% solutions of the compounds herein described are not changed

substantially in their physical characteristics, such as, flexibility, appearance and ability to absorb moisture, so that such fabrics may be worn in contact with the skin without causing irritation or other harmful effect.

Also in the case of example "*d*" given above no substantial change in the absorbent character of the fabric is produced after treatment.

In addition to the protective effect above described, the organic acid rare earth metal or rare element compounds also possess definite insecticidal and fungicidal value, acting in some cases as contact poisons and in other cases as stomach poisons, and for this purpose may be used in solution in organic solvents or in emulsion form in water.

Further these compounds may be used as or in anti-fouling paints and compositions for both timber and metal.

Materials not necessarily of vegetable or animal origin, such as building materials, e. g. plaster, wallboard or asbestos board, which are subject to attack by insects, animals or lower forms of life, and which are frequently attacked by termites, ants and rodents, may also be rendered proof against these pests by treating the materials with protective compounds as set forth above.

A valuable feature of these compounds is their insolubility and hence their resistance to removal by rain or washing.

By means of my invention, materials of the classes indicated above may be effectively protected against attack by insects, animals and other destructive agents or organisms.

In the claims appended hereto, I have used the term "anti-pest" to define a composition which protects materials treated therewith so as to render them resistant to attack by, or repellant to, animals, insects, vegetation and organisms as hereinbefore indicated.

I claim:—

1. An anti-pest composition including a compound having as a base radical rare earth metals and as an acid radical higher organic acids, the compound being concentrated to a degree to prevent interference with the normal absorptive character of the material to which the composition is applied.

2. An anti-pest composition including a compound having as a base radical one of the group comprising thallium, yttrium or titanium, and as an acid radical higher organic acids, said compound being concentrated to a degree to avoid interfering with the absorptive character of the material to which the composition is applied.

3. An anti-pest composition including a compound having as a base radical rare earth metals and as an acid radical fatty acids, said compound being concentrated to a degree to avoid interfering with the absorptive character of the material to which the composition is applied.

4. An anti-pest composition including a compound having as a base radical one of the group comprising thallium, yttrium or titanium, and as an acid radical fatty acids, said compound being concentrated to a degree to avoid interfering with the absorptive character of the material to which the composition is applied.

5. A textile material impregnated with a composition including a compound having as a base radical one of the group comprising thallium, yttrium or titanium and as an acid radical higher organic acids, the composition being applied in such concentration of the compound or compounds as to avoid interfering with the normal absorptive character of the textile material.

6. An anti-pest composition, including a compound having as a base radical, one of the group containing thallium, yttrium or titanium, and as an acid radical higher organic acids.

7. An anti-pest composition, including a compound having as a base radical one of the group comprising thallium, yttrium or titanium, and as an acid radical fatty acids.

In testimony whereof I have signed my name to this specification.

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