

UNITED STATES PATENT OFFICE.

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PYROXYLIN COMPOUND.

SPECIFICATION forming part of Letters Patent No. 609,475, dated August 23, 1898.

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To all whom it may concern:

Be it known that I, JOHN H. STEVENS, of the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Pyroxylin Compounds, of which improvements the following is a specification.

Pyroxylin or nitrated cellulose is liable to spontaneous decomposition, especially when impure or imperfectly freed from the acid remaining after the treatment of cotton or paper or other cellulose fiber in the nitrating-bath. This has led inventors to adopt the use of antacid or preserving substances in pyroxylin mixtures. The office of the preserver is to take up the free acid developed by the decomposing pyroxylin and by its presence prevent or minimize the tendency to further decomposition.

The discovery of the successful antacids used by the art has involved considerable study and experiment, because many substances which might be supposed to work are found to be deficient or useless. Some substances which are well-known neutralizers of acids are incompatible with pyroxylin and its solutions and really hasten decomposition instead of preventing or retarding it.

So many different effects are required because of the many different uses and applications of these compounds that the operator needs a large range of antacids from which to select the one best suited to his purpose. Hence any increase in the number of useful preserving substances is a welcome aid to the operator.

It is the object of the present invention to furnish the art with a new class of substances to be used in connection with pyroxylin or its compounds to prevent or retard acid decomposition. This new group consists of the salts of camphoric acid. This acid and its salts are so well known to chemists as to require no special description either as to their chemical and physical characteristics or to the modes of manufacture.

Among the various salts of camphoric acid available I prefer to use sodium camphorate, especially because of its solubility in or com-

patibility with the usual solvents of pyroxylin, such as alcohol and wood-spirit.

In practice I proceed as follows: In treating pyroxylin which is to be used or sold in a dry state unmixed with solvents I moisten the pyroxylin with a solution of sodium camphorate. This solution can be aqueous or otherwise so long as it does not have a substantial solvent effect on the pyroxylin. On drying the pyroxylin the sodium camphorate is left in close contact with every part of the pyroxylin and preserves it against acid decomposition. Warm water is best when water is used, as sodium camphorate is only sparingly soluble in water. Fibrous pyroxylin, however, as is well known, will not stand the effect of heat and time as well as if the pyroxylin is protected by means of solvents. Sodium camphorate therefore does not lessen the danger from fire or explosion in transporting or storing dry pyroxylin. The antacid salt simply has the effect of preventing or delaying for a long time the usual acid decomposition which makes the pyroxylin dangerous to keep in a dry state, especially in masses, where, through lack of surface exposure, the heat caused by decomposition is apt to accumulate and produce serious results.

In treating pyroxylin compounds made with solvents I preferably dissolve the sodium camphorate in wood-spirit or in grain-alcohol and use this solution as part of the liquid solvent, although I can add the camphorate to dissolved masses in a finely-powdered condition and rely on the masticating operation to effect a thorough incorporation. It is best, however, to use solutions of the sodium camphorate whenever possible, for solutions penetrate better, and thus bring every particle of the pyroxylin into contact with the preserving substance. In compounds made by dissolving pyroxylin in acetone—smokeless powder, for instance—I recommend the use of a wood-spirit solution of the preserving salt.

Sodium camphorate is useful in forming thin transparent sheets, which are so much used for decorative purposes. I have also successfully used the potassium camphorate and calcium camphorate. My experiments

demonstrate that all the salts formed by neutralizing basic substances, such as the metals, with camphoric acid possess more or less antacid power in connection with pyroxylin; but
5 I prefer the sodium salt, especially because of its transparent effects. The other camphorate salts are more or less inclined to clouded effects and should be confined to non-transparent compounds.

10 Sodium camphorate is especially applicable to protecting against decomposition compounds made to imitate tortoise-shell, jet, and yellow amber. One per cent., by weight, of this salt to the pyroxylin is a good proportion. Less than this gives weaker antacid
15 power, while more of the salt imparts a yellow color and adhesive properties under heat. I would not recommend the use of more than two per cent. unless other properties of the
20 sodium camphorate are desired.

As a rule the salts of camphoric acid are feeble in their preserving effect in proportion to their insolubility. Hence for the salts of camphoric acid other than the camphorate of
25 sodium, which I find is soluble in the usual alcoholic ingredients, I would recommend the use of two per cent. and in finely-powdered condition.

Pyroxylin compounds, as is well known,
30 embrace pyroxylin itself and its solutions, whether liquid, pasty, or solid. They are used for varnishes, lacquers, waterproofing solutions, and in stiff or hard masses for rolling, stuffing, molding, and carving. Explosive
35 compounds are used in gunnery and

blasting in the shape of fibrous guncotton and smokeless or other powders.

I have no explanation to offer for the antacid power residing in bases already saturated with an acid. I find, however, that this power
40 depends to a considerable extent upon the nature of the acid radical in the salt and that the presence of this acid radical, even when used in combination with other acid radicals
45 to form salts, gives antacid power at least proportionate to its presence in the salt. To illustrate the effect of the nature of the acid radical, I can say that while sodium camphorate possesses preserving power in pyroxylin compounds sodium phosphate has
50 little or no antacid effect. Hence my invention includes the salts of camphoric acid in pyroxylin compounds, whether the salts are simple, compound, mixed, or combined chemically with other substances.
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Having fully instructed the operator in my invention, what I claim, and desire to secure by Letters Patent, is—

1. A new composition of matter consisting of pyroxylin and a salt of camphoric acid,
60 substantially as described.

2. A new composition of matter consisting of pyroxylin, a solvent of the same, and a salt of camphoric acid, substantially as described.

3. A new composition of matter containing
65 pyroxylin and sodium camphorate.

JOHN H. STEVENS.

Witnesses:

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