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UTILIZATION OF TALL OIL

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This invention relates to the utilization of tall oil and, more particularly, to the utilization of tall oil in gel compositions suitable for use as binders in the manufacture of floor or wall coverings, shoe fillers and similar products where a flexible, resilient, and relatively tough composition is desired.

We have unexpectedly discovered that new and useful compositions may be prepared by combining tall oil, a siccative oil and a resin and thereafter oxidizing this mixture to form a gel which is characterized by toughness and resilience. This is especially unexpected in view of the fact that the commonly known siccative oils consist essentially of fatty acid glycerides; whereas, tall oil consists essentially of rosin acids and fatty acids. It has been considered heretofore that the fatty acid glyceride structure was essential to obtain a desirable gel having these properties.

Tall oil is obtained as a by-product in the manufacture of kraft paper by the sulphate process from pine or fir wood and is a mixture of fatty acids, rosin acids, and unsaponifiable materials. The rosin acid fraction is calculated as abietic acid and usually comprises from 35% to 60% by weight of the tall oil. Tall oil also includes from 25% to 50% of fatty acids and from 5% to 25% of unsaponifiable materials. The exact nature of the fatty acid fraction is not fully understood but is usually considered as essentially comprising unsaturated fatty acids containing 18 carbon atoms. A commercially available tall oil comprises approximately 45% rosin acids, 45% fatty acids, and about 10% of sterols, higher alcohols, and other unsaponifiable substances. It is recognized that the percentage of rosin acids, fatty acids, and unsaponifiable materials in tall oil will vary over a relatively wide range, depending upon its degree of refinement, the methods utilized in its recovery, the type of wood employed in the production of the paper, and other variable factors.

While any siccative oil may be employed, a drying oil such as linseed oil containing a relatively high degree of unsaturation and a high percentage of linolenic acid glyceride produces tougher surface covering materials. Rosin is the most extensively used resin though other resins such as copal, kauri gum, congo gum, other naturally-occurring resins, and synthetic resins may be employed singly or in combination.

In order that the invention may be more readily understood, we will describe the same in connection with the manufacture of a binder from tall

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oil, a siccative oil, and a resin to form a gel, suitable for use in the preparation of a floor or wall covering having generallly the flexibility and resilience found in linoleum.

In accordance with our invention, the tall oil, siccative oil, and resin are mechanically oxidized to form a siccative oil-resin-tall oil gel which may be employed advantageously to replace in whole or in part the usual siccative oil-resin gel previously employed in the linoleum and related industries. This mechanical oxidation may be carried out in a Bedford oxidizer of the type commonly employed in the manufacture of linoleum cement. These three ingredients are charged into the oxidizer which is heated and air is introduced during agitation of the ingredients to effect oxidation of the mixture so as to form a cement suitable for the purposes set forth.

The following examples, in which all parts are by weight, are intended to illustrate our invention but not to limit it to the exact proportions or ingredients unless otherwise set forth:

Example I

The following ingredients were charged into a Bedford oxidizer and heated with agitation and oxidation as hereinbefore described:

	Parts
Linseed oil	62.5
Crude tall oil	25.0
Rosin	12.5
Litharge	1.0
Manganese resinate	0.016

The litharge and manganese resinate are driers and promote oxidation and the formation of gel. Other driers may be employed. The crude tall oil may be the commercial product referred to above. A satisfactory product may be produced after about 30 hours of the mechanical oxidation treatment. The mass is thereafter discharged from the Bedford oxidizer and permitted to cool to form a tough, elastic cement.

Example II

A satisfactory linoleum cement was prepared by mechanically oxidizing a mixture of the following ingredients:

	Parts
Linseed oil	60
Rosin	10
Tall oil	30
Litharge	1
Manganese resinate	0.016

The siccative oil-resin-tall oil gel of this example also may be employed to replace in whole or in part the usual siccative oil-resin gel, commonly referred to as "linoleum cement," employed in the manufacture of surface coverings and other compositions.

In both of the foregoing examples, the siccative oil, linseed oil in the specific examples set forth, is combined with the other ingredients, and the mechanical oxidation is thereafter completed. This is an essential feature of our invention, for we have discovered through our research work that raw tall oil cannot be successfully incorporated into an oxidized siccative oil gel. The tall oil must be combined with the other ingredients before oxidation.

In the production of surface covering material similar to linoleum and in the manufacture of other compositions similar to those containing linoleum cement, our siccative oil-resin-tall oil gel may be mixed with fillers and processed in the same manner as linoleum cement is processed. For such materials, we have found it preferable to employ an amount of tall oil not greater than 30% by weight of the total ingredients of the gel. In the production of such binders we prefer that the siccative oil-resin-tall oil gel contain at least about 60% by weight of a siccative oil, at least 10% by weight and not over 30% by weight of tall oil, and that the proportions of these ingredients should be adjusted so that the amount of a siccative oil plus half the amount of tall oil constitutes from 70% to 80% of the total weight of these ingredients and the amount of resin plus half the amount of tall oil constitutes from 20% to 30% of the total weight of these ingredients. Desirable surface covering materials have been formed from linseed oil-rosin-tall oil gel substantially as set forth in the foregoing specific examples in which the linseed oil plus half the amount of tall oil constitutes about 75% by weight of the gel ingredients and the rosin plus half the tall oil constitutes the remaining 25%. Larger amounts of tall oil may be employed depending upon the type of fillers combined with the binder and upon the qualities desired in the final product.

Having described our invention in detail, it is obvious that certain modifications may be made therein and that some features may be employed without others, all without departing from the spirit or scope of our invention as set forth in the appended claims.

We claim:

1. In a method of utilizing tall oil to form a siccative oil-resin-tall oil gel, the step of mechanically oxidizing a siccative oil in the presence of tall oil and a resin, said tall oil being present in an amount equal to at least 10% by weight of the total weight of these gel ingredients.

2. In a method of utilizing tall oil to form a gel, the step of oxidizing linseed oil in the presence of a resin and tall oil, said tall oil being present in an amount equal to at least 10% by weight of the total weight of these gel ingredients.

3. In a method of utilizing tall oil to form a gel, the step of mechanically oxidizing linseed oil in the presence of tall oil and rosin, said tall oil being present in an amount equal to at least 10% by weight of the total weight of these gel ingredients.

4. In a method of producing a surface covering composition characterized by toughness and resilience, the step of mechanically oxidizing about 62.5 parts by weight of linseed oil in the presence of about 25 parts by weight of tall oil and about 12.5 parts by weight of rosin.

5. In a method of producing a surface covering composition characterized by toughness and resilience, the step of mechanically oxidizing about 60 parts by weight of linseed oil in the presence of about 10 parts by weight of rosin and about 30 parts by weight of tall oil.

6. In the method of utilizing tall oil to form a siccative oil-resin-tall oil gel, the step of oxidizing the siccative oil in the presence of the resin and the tall oil, these ingredients being in such proportions that said siccative oil constitutes at least 60% by weight and said resin constitutes at least 10% by weight and said tall oil constitutes from 10% to 30% by weight of the total weight of said ingredients, and said ingredients being in such proportions that the amount of siccative oil plus half the amount of tall oil constitutes from 70% to 80% by weight of these gel ingredients and the amount of resin plus half the amount of tall oil constitutes 30% to 20% by weight of these gel ingredients.

7. In the method of utilizing tall oil to form a linseed oil-rosin-tall oil gel, the step of oxidizing the linseed oil in the presence of the rosin and the tall oil, these ingredients being in such proportions that said linseed oil constitutes at least 60% by weight and said rosin constitutes at least 10% by weight and said tall oil constitutes from 10% to 30% by weight of the total weight of said ingredients, and said ingredients being in such proportions that the amount of siccative oil plus half the amount of tall oil constitutes from 70% to 80% by weight of these gel ingredients and the amount of rosin plus half the amount of tall oil constitutes 30% to 20% by weight of these gel ingredients.

8. In a method of utilizing tall oil to form a siccative oil-rosin-tall oil gel, the step of mechanically oxidizing a siccative oil in the presence of tall oil and rosin, said tall oil being present in an amount equal to at least 10% by weight of the total weight of these gel ingredients.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,306,352	Burrell	Dec. 22, 1942
2,298,078	Wolff	Oct. 6, 1942
2,111,992	Brew	Mar. 22, 1938
2,072,151	Bonney	Mar. 2, 1937
1,985,200	Bonney	Dec. 18, 1934
1,938,532	Patch	Dec. 5, 1933
1,927,540	Bonney	Sept. 19, 1933
1,716,623	Collins	June 11, 1929
2,271,804	Root	Feb. 3, 1942

FOREIGN PATENTS

Number	Country	Date
563,547	Germany	Nov. 7, 1932

OTHER REFERENCES

Lignin Liquor and Its Uses in Protective Coatings #213, Feb. 1942, an address of Alford at the January meeting of the Los Angeles Paint and Varnish Production Club, pages 66, 69, and 70.