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2,871,135

METHOD FOR PRODUCING DRYING OILS AND THE OIL SO PRODUCED

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6 Claims. (Cl. 106—252)

This invention has for its objects a method for producing drying oils and the oil so made.

Many methods are known for producing drying oils and for the improvement of such drying oils.

Apart from the use of metallic driers which only act as catalysts during the drying process the object of all known methods is not only to accelerate the drying, but also to improve the film properties of the oil. In all known processes this effect is attained by encroaching on the chemical structure of the glyceride molecule. A few examples of these methods are.

(1) Producing of standoils by boiling drying oils with or without the use of vacuum,

(2) Conjugation of the isolated double bonds according to different methods,

(3) Accumulation of glycerides with more unsaturated fatty acids by selective extraction or by other methods,

(4) Transformation of non-drying castor oil into a drying oil with conjugated double bonds,

(5) Removal of saturated glycerides by a splitting process, removing the saturated acids and re-esterfying the unsaturated acids by means of polyalcohols, etc.

The object of these processes is to achieve one or several of the following improvements:

(a) Acceleration of the drying process,

(b) Avoiding after-stickiness of the films,

(c) Improving the water-and weather resistance, etc.

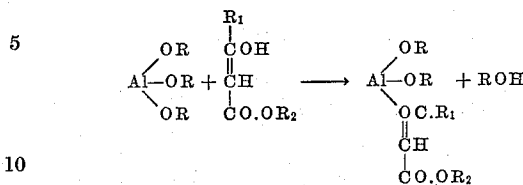
The methods mentioned require expensive equipments, a great consumption of energy and chemicals, and they involve very complicated and expensive processes.

It is also known to improve drying oils by mixing them with organic Al-compounds, for instance aluminumalcoholates but these compounds cause a poor stability of the mixture.

The inventor has found, that additional improvements can be attained by mixing a natural drying or natural non drying oil of vegetable or animalic origin with a synthetic oil, produced by condensation of one or more fatty acids with an organic aluminium compound in enolic form, i. e. a compound in which Al is partly linked to oxygen of an enolic group, for instance according to the U. S. patent application of Kurt Hans Reisinger, Serial No. 258,539 filed November 27, 1951, which became abandoned on or about January 10, 1957, or its continuation-in-part-application Ser. No. 600,729 that was filed June 30, 1956. The last named patent application corresponds to British Patent No. 761,536, complete specification published November 14, 1956. As

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found in the patent one mole of the aluminum-alcoholate reacts with one mole of the enalic compound according to the equation:



The enolized aluminum-alcoholate then reacts with 2 moles of a fatty acid thus forming a drying oil the constitution of which is explained by the replacement of the 2 moles alcohol by 2 moles fatty acids while the enolic compound remains in its place bonded to the aluminum via the O-bridge.

The mixture of the natural and the synthetic oils is carried out either at room temperature or at an elevated temperature. Mixing may be effected by agitating or stirring until the components are intimately mixed and from a homogenous composition. Driers such as lead-, cobalt- and/or manganese salts, and/or pigments, may be added in known manner.

The action of the addition of the synthetic oils, for instance on linseed oil and other drying natural oils consists in a considerable acceleration of the drying process of the oils so that the duration of this process may be reduced to about 1/5-1/6 of the drying time of the original drying oils used in the mixture. Thus the non drying oils will be converted into drying oils having shorter drying times than boiled linseed oil. In addition to this advantage, there are also obtained important improvements of the film properties. The water and weather resistance of the oil is considerably improved by the addition of said synthetic oil. The films obtained from linseed oil and other drying oils swell in water and are spoiled after a few days. The films of expensive isomerized linseed oils are dim already after having been exposed to the influence of water for one day. The films produced by oils according to the present invention remain clear even after having been exposed to water for months and they do not swell in water. The pigmentation properties, the adhesion, the flexibility etc. are excellent.

The oil composition according to the invention is compatible with all other raw materials conventionally used in producing lacquers and varnishes.

Certain valuable properties of the oils and their films can be attained by changing the ratio between the quantities of the natural oil and the synthetic oil. Among these properties which are attained the range of viscosity of the oils which are produced may vary from a low viscosity oil like the known natural oils to the viscosity of standoils. As an entirely new property for drying oils of this kind can be mentioned, that all films of oils produced according to the present invention are repellent to fungi.

The following table gives a survey on the possibilities and the most important properties of different oils within the scope of the invention.

	Drying Time for a film with a thickness of 40 μ		After stickiness	Water-resistance	Yellowing	Attack of fungi
	At 20° C., hours	At 100° C., hours				
Raw Linseed Oil, siccated	24	2	weeks	very poor	deep	attacks.
<i>Raw Linseed Oil, with synthetic oil</i>	4-5	1/2-1	no	excellent	feeble	repellent.
<i>Raw Linseed Oil, with synthetic oil and pigment</i>	3 1/2-4 1/2	1/2-1	no	do	no	Do.
Raw Linseed Oil, isomerized	10-12		feeble	poor	feeble	attacks.
Boiled Linseed Oil	13-24		2-4 days	very poor	deep	Do.
<i>Boiled Linseed Oil, with synthetic Oil</i>	3-4 1/2		no	do	feeble	repellent.
<i>Boiled Linseed Oil, with synthetic oil and pigment</i>	3-4		no	do	no	Do.
Raw China Wood Oil:						
Raw China Wood Oil, siccated	not film forming					
<i>Raw China Wood Oil, with synthetic oil</i>	1/2-1		no	not investigated	no	Do.
Raw Soybean Oil:						
Raw Soybean Oil, siccated	non drying					
<i>Raw Soybean Oil, with synthetic oil</i>	4-5	1/2-2 1/2	feeble	excellent	no	Do.
<i>Raw Soybean Oil, with synthetic oil and pigment</i>	4-4 1/2	1/2-2 1/2	no	do	no	Do.
Raw Herring Oil:						
Raw Herring Oil, siccated	non drying					
<i>Raw Herring Oil, with synthetic oil</i>	7-8 1/2	1/2-2 1/2	feeble	do	no	Do.
<i>Raw Herring Oil, with synthetic oil and pigment</i>	7-8	1/2-2 1/2	no	do	no	Do.
Solexol treated Herring Oil (Iodine Number 220):						
Solexol treated Herring Oil (Iodine Number 220), siccated	non drying					
<i>Solexol treated Herring Oil (Iodine Number 220), with synthetic oil</i>	6	1	no	do	no	Do.
<i>Solexol treated Herring Oil (Iodine Number 220), with synthetic oil and pigment</i>	5 1/2-6	about 1	no	do	no	Do.
Raw Cottonseed Oil:						
Raw Cottonseed Oil, siccated	non drying					
<i>Raw Cottonseed Oil, with synthetic Oil</i>	8-9	1-2 1/2	feeble	do	no	Do.
Raw Whale Oil:						
Raw Whale Oil, siccated	non drying					
<i>Raw Whale Oil, with synthetic oil</i>	7-9	1-2 1/2	feeble	do	no	Do.
<i>Raw Whale Oil, with synthetic oil and pigment</i>	7-8 1/2	about 1	no	do	no	Do.

The italicized compositions include, according to the invention, a mixture of the respective oil with synthetic oils produced by a condensation improved properties in all respects.

Examples

In the following examples all drying times are measured in hours for a film of 40 μ at 20° C., and the viscosity is measured in DIN-seconds. The organic aluminium compound consists of an enolic compound, the enolic component of which is i. e. aceto-acetic ester, malonic diethyl ester or acetonylacetone. Any of these compounds may be used in the different examples.

(1) 75 kgs. boiled linseed oil are mixed at room temperature with 25 kgs. of a synthetic oil which has been produced by condensation of coconut fatty acids with an organic aluminium compound of the kind specified above. The drying time of the mixture was found to be 3 3/4 hours and the viscosity 25 sec.

(2) 60 kgs. boiled linseed oil is mixed, at 55° C., with 40 kgs. of a synthetic oil, produced by condensation of whale oil fatty acids with an organic aluminium compound of the kind specified above. The drying time of the composition is 4 1/2 hours and the viscosity 30 sec.

(3) 50 kgs. raw linseed oil are mixed, at room temperature with 50 kgs. of a synthetic oil, produced by condensation of whale oil fatty acids with an organic aluminium compound of the kind specified above. The drying time of the mixture was found to be 3 1/2 hours and the viscosity 50 sec.

(4) 60 kgs. raw linseed oil are mixed, at 100° C., with 40 kgs. of a synthetic oil, produced by condensation of stearic acid with an organic aluminium compound of the kind specified above. The drying time of the mixture was 4 1/2 hours and the viscosity 65 sec.

(5) 75 kgs. dehydrated castor oil are mixed, at 50-60° C., with 25 kgs. of a synthetic oil, produced by condensation of herring fatty acids with an organic aluminium compound of the kind specified above. The drying time of the mixture is 3 1/2 hours and the viscosity 200 sec.

(6) 80 kgs. raw soybean oil are mixed, at 75° C., with 20 kgs. of a synthetic oil, produced by condensation of coconut fatty acid with an organic aluminium compound of the kind specified above. The drying time of the mixture is 4 1/2 hours and the viscosity 80 sec.

(7) 50 kgs. raw whale oil are mixed, at room temperature, with 50 kgs. of a synthetic oil, produced by condensation of the residue from the distillation of fishoil fatty acids with an organic aluminium compound of the kind specified above. The drying time of the mixture is 8 hours and the viscosity 70 sec.

(8) 90 kgs. cottonseed oil are mixed, at 40-50° C., with 10 kgs. of a synthetic oil, produced by condensation of linseed acid with an organic aluminium compound of the kind specified above. The drying time of the mixture is 8 hours and the viscosity 100 sec.

(9) 50 kgs. raw herring oil are mixed at room temperature with 50 kgs. of a synthetic oil, produced by condensation of talloil with an organic aluminium compound of the kind specified above. The drying time of the mixture is 7 1/2 hours and the viscosity 95 sec.

(10) 60 kgs. raw codliver oil are mixed, at room temperature, with 40 kgs. of a synthetic oil, produced by condensation of take-offs from the distillation of hydrogenated fatty acids with an organic aluminium compound of the kind specified above. The drying time of the mixture is 8 hours and the viscosity 110 sec.

(11) 60 kgs. raw Chinese wood oil are mixed at room temperature, with 50 kgs. of a synthetic oil, produced by condensation of cottonseed acid with an organic aluminium compound of the kind specified above. The drying time of the mixture is 1/2 hour and the viscosity 160 sec.

(12) 40 kgs. raw Chinese wood oil are mixed at 50° C. with 60 kgs. of a synthetic oil, produced by condensation of whale oil fatty acid with an organic aluminium compound of the kind specified above. The drying time of the mixture is less than 1/2 hour and the viscosity 230 sec.

In all examples the synthetic oil is produced in the manner described in one of the aforesaid U. S. patent applications Serial No. 258,539 now abandoned or Serial No. 600,729 and Serial No. 258,539.

I claim:

1. A method of producing improved drying oils comprising the steps of condensing two moles of a fatty acid selected from the group consisting of unsaturated

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higher fatty acids and mixtures of unsaturated higher fatty acids with one mole of an organic aluminum compound in which two valences of the aluminum are bonded to alcohols while one valence of the aluminum is bonded to oxygen of an enolic compound selected from the group consisting of acetoacetic ester, malonic diethyl ester and acetyl acetone to form a synthetic oil and mixing it with a higher fatty acid triglyceride.

2. A method as recited in claim 1 wherein said glyceride is a drying oil.

3. A method as recited in claim 1 wherein said mixing is carried out at room temperature.

4. A method as recited in claim 1 wherein a drier is added to the mixture.

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5. A method as recited in claim 1 wherein pigment is added to the mixture.

6. A drying oil comprising a mixture of glyceride of a higher fatty acid and a synthetic oil obtained by condensing two moles of a fatty acid selected from the group consisting of unsaturated higher fatty acids and mixtures of unsaturated higher fatty acids with saturated higher fatty acids with one mole of an aluminum compound prepared by reacting one mole of aluminum alcoholate and one mole of an enolic compound selected from the group consisting of acetoacetic ester, malonic diethyl ester and acetyl acetone.

No references cited.