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METHOD OF IMPROVING STORAGE CHARACTERISTICS OF WAX AND PRODUCT THEREOF

Edward Effron, Cincinnati, Ohio, assignor to Esso Research and Engineering Company, a corporation of Delaware

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This invention relates to a method for improving storage characteristics of wax, and more particularly to a method for materially decreasing or preventing the tendency of wax slabs to stick together and become deformed when they are stored in an atmosphere of relatively high temperature. The invention also relates to an improved wax composition having superior properties with regard to storage and shape-retaining characteristics.

It is found convenient to store wax, such as petroleum wax which is used for the coating of paper or the like, in the form of slabs after the wax has been processed and prior to packaging it for shipment to the consumer who uses it in coating. Often these wax slabs are stored by piling them one on top of another. During the summer, air temperatures in the storage depot often rise to between 90° F. and 100° F. Under such conditions, it has been found that the wax slabs tend to become soft and stick together, even though the temperatures of the ambient air are not as high as the so-called "blocking point" of the wax. The term "blocking point" as used herein refers to the minimum temperature at which wax coated papers will stick together sufficiently to permanently injure the surface film of wax. In addition to sticking, the wax slabs, when piled on top of one another, also become deformed due to the weight of the slabs above them. Such sticking and deformation is undesirable in that it prevents the wax from being shipped in slabs of predetermined size and shape and also makes handling more difficult. The providing of apparatus for cooling the storage area has been suggested, but such a step is expensive and inconvenient and for those reasons undesirable.

It is an object of the present invention, therefore, to provide a method of treating wax whereby the tendency to stick to adjacent bodies of wax at relatively high temperatures will be substantially diminished or eliminated entirely.

It is another object of the invention to provide a method of treating wax bodies to increase their shape-retaining tendencies when stored in atmospheres of relatively high temperature.

It is a further object of the invention to provide an improved wax product which will have superior storage characteristics at elevated temperatures.

These and other objects, which will be in part apparent and in part specifically pointed out herein, are accomplished by coating the wax slab to be stored with a thin layer of a narrow cut wax having a melting point similar to the melting point of the wax slab and a blocking point higher than that of the wax making up the slab. The coating of narrow cut wax is preferably quite thin, being in the order of 1/32 of an inch thickness.

The base wax to be coated may be any wax having a tendency to soften at elevated temperatures, but is preferably a crystalline paraffin petroleum wax of the type produced by the chilling of petroleum distillates in conjunction with the addition of wax precipitating agents such as ketones or liquid propane. The method of the

present invention is especially applicable to those petroleum waxes which are particularly useful in the coating of paper board and the like, which waxes have a melting point below about 150° F. These waxes are generally denominated as crystalline waxes to distinguish them from the higher melting point microcrystalline waxes. However, it will be understood that although it is the treatment of such waxes that forms the most preferred aspect of the invention, the treatment of mixed waxes, that is, crystalline waxes containing minor proportions of microcrystalline wax, is also contemplated. In practice such waxes are often stored in relatively thin slabs which may be from 1/4 of an inch to 6 inches in thickness.

Turning now to the so-called "narrow cut wax" with which the crystalline wax is coated, it should be understood that the term "narrow cut wax" as used herein refers to a highly refined wax having a melting point and blocking point which are relatively close together. The blocking point will naturally always be somewhat lower than the melting point, even for the most highly refined waxes. It is preferred, however, to use waxes having a blocking point not more than 2°–6° F. below the melting point. Such narrow cut waxes have a boiling point spread of 20°–80° F., whereas the usual paraffin waxes have a boiling range of 125°–175° F. In selecting such a wax for coating, it is necessary that the blocking point of the coating wax be greater than the blocking point of the base wax. It has also been found desirable in selecting the coating wax to provide a coating wax which in addition to being a narrow cut wax has a melting point similar to that of the base wax. By "similar" it is meant that the melting point of the coating wax should be not more than about 10° higher or lower than that of the base wax, and preferably not more than 5° higher or lower.

The method of application of the coating wax to the base wax may be any of those means commonly used in the prior art. That means the coating can be applied by dipping, spraying, or brushing, or the like. The amount of coating wax used need not be very great, and in general a coating of from about 1/64 of an inch to about 1/16 of an inch should be employed, with a thickness of about 1/32 of an inch being most preferable. The coating wax may be applied with the base wax at any temperature between about 40° F. and about 100° F., the temperature of the base wax during application having little or no effect on the properties of the coated wax.

It has been found that in order to prevent the wax slabs from undesirable cohesion, it is sufficient to apply the coating wax only to the faces of the slabs which are in contact with other wax slabs. However, in order to prevent deformation of the slabs from occurring while they are carrying a load of other wax slabs and are exposed to air at a temperature of between 90° F. and 100° F., it is desirable to apply the coating also to the edges of the slabs, i. e., those surfaces which are not in contact with other wax surfaces.

As an example of the present invention a number of tests were made in coating slabs of a typical dairy wax. This wax had the following specifications:

Melting point	129°–131° F.
Blocking point	85°–88° F.
Oil content	0.5% (maximum).
Saybolt color	+30 (minimum).
Kinematic viscosity at 210° F	3.65–3.80 centistokes.
Solubility in methyl ethyl ketone by weight at 70° F	24%.

This wax was cut into slabs 3½ x 3 x ⅜ inches. Some of these slabs were coated with 1/32 of an inch coating of a narrow cut wax having a melting point of 120° F. and a blocking point of 118° F. The slabs were then ar-

ranged in pairs with one on top of the other, and each pair was loaded with a weight of 1500 grams. Each pair of slabs was placed in a forced draft oven and was kept there for approximately 16 hours at varying temperatures between 90° F. and 100° F. Some of the pairs of slabs were uncoated, some were coated only on the faces in contact with one another, and still others were coated on all sides and edges with the coating wax. The results of these tests are summarized in Table I below:

Table I

Type of Coating	Oven Temp., ° F.	Observation	
		Sticking	Deformation
Uncoated	90	Moderate	None.
	95	Impossible to separate.	Severe.
	100	do	Do.
Coating on face of slabs only	90	None	None.
	95	Slight	Moderate.
	100	Moderate	Severe
Slabs coated on all sides	90	None	None.
	95	Slight	Do.

The above results illustrate that while sticking properties are greatly improved by coating the wax slabs on the faces only, the deformation characteristics at the elevated storage temperatures are best when the wax is coated not only on the faces of the slabs but also on the exposed edges.

While there have been described specific examples of the invention, it will be understood that the invention is not limited thereto, but that it includes that range of reasonable equivalents which will suggest themselves to those skilled in the art. The invention is not to be limited, therefore, except by the scope of the appended claims.

What is claimed is:

1. The method of improving the storage characteristics of wax slabs of crystalline petroleum wax at temperatures between 90° F. and 100° F. which comprises coating the said slabs with a layer of wax having a melting point between about 10° F. higher and 10° F. lower than the melting point of the wax slabs, a blocking point greater than that of the slab wax and not more than 2° to 6° F. lower than its own melting point and a boiling point spread of 20° to 80° F.

2. The method of improving the storage characteristics of wax slabs of crystalline petroleum wax when said slabs are stacked face to face comprising coating the faces of said slabs with a layer of wax from about 1/64 of an inch to about 1/16 of an inch in thickness, said layer of wax having a melting point between about 10° F. higher and 10° F. lower than the melting point of the wax slabs, a blocking point greater than that of the slab wax and not more than 2° to 6° F. lower than its own melting point and a boiling point spread of 20° to 80° F.

3. An improved wax slab having superior storage characteristics at temperatures between about 90° F. and 100° F. comprising a slab of crystalline petroleum wax coated with a layer of a wax having a melting point between about 10° F. higher and 10° F. lower than the melting point of the wax slabs, a blocking point greater than that of the slab wax and not more than 2° to 6° F. lower than its own melting point and a boiling point spread of 20° to 80° F.

4. An improved wax slab having superior storage characteristics at temperatures between about 90° F. and 100° F. comprising a slab of crystalline petroleum wax having a melting point between 129° and 131° F. and a blocking point between 85° and 88° F. and coated with a layer of wax having a melting point of 120° F. and a blocking point of 118° F.

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