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WAX COATED PAPER

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This invention relates to an improvement in the manufacture of wax coated papers and specifically to papers which are coated with paraffin wax in which the melting point of the wax employed lies between 120° F. and 145° F. An object of the invention is to improve the appearance of wax coated papers, especially with respect to gloss and transparency. Another object of the invention is to improve the sealing properties of the wax coated papers. Other objects will be apparent from the following description of the invention.

In the coating of paper with paraffin wax, it is common practice to pass the paper through a bath of melted paraffin and regulate the amount of paraffin allowed to remain on the paper by suitable wipers and rollers. The temperature of the wax bath also has an effect in determining the amount of wax remaining on the paper. In general, there are two kinds of waxed paper known to the trade: one called "dry waxed paper"; and the other "wax coated paper." The wax coated paper usually contains about 50% more wax than the dry waxed paper which does not contain sufficient wax to present a glossy surface. This invention is concerned more particularly with the waxed papers of the coated type. The amount of wax in a dry waxed paper may be ordinarily about 5 to 8 pounds per ream of 20 pound weight, whereas the wax coated paper will usually contain from 10 to 14 pounds of wax for the same amount of paper.

We have discovered that wax coated paper is greatly improved by incorporating in the wax before applying it to the paper a relatively small amount of a material which will hereinafter be referred to as a "wax condensation product." This wax condensation product is produced by the condensation of paraffin wax with aromatic material, especially aromatic compounds such as benzene, toluene, xylene, naphthalene, anthracene, anthracene residues, diphenyl, etc. Wax condensation products of the type herein employed are described in U. S. Patent 1,963,917, filed January 18, 1933. The method of manufacturing the wax condensation products may be varied considerably, it being essential that the wax be activated by chlorination or other treatment such as dehydrogenation, and thereafter condensed with the aromatic material in the presence of a suitable catalyst of the Friedel-Kraft type such as anhydrous aluminum chloride or other active metal halides such as anhydrous zinc chloride, boron trifluoride, or aluminum-sodium chloride.

As an example of one method of making the wax condensation products employed in our process, paraffin wax having a melting point of 126°–130° F. may be heated with chlorine in a glass lined vessel until the amount of chlorine absorbed by the wax reaches 10 to 15%. The resulting chlorinated wax may then be mixed with about 10% of its weight of naphthalene and to the melted mixture at a temperature of 150 to 400° F. there is added with vigorous agitation 5 to 10% of anhydrous aluminum chloride. The reaction proceeds rapidly and within 30 minutes the reaction is substantially complete. The reaction mixture is then washed with water and neutralized, a hydrocarbon diluent being added at this stage to facilitate handling the heavy condensation products. A suitable diluent may be naphtha, kerosene or other light hydrocarbon oil. After neutralization it is preferred to remove the diluent by distillation, leaving the wax condensation product in a form suitable for adding to the paper coating composition. If desired, melted paraffin wax may be used as the diluent, in which case it is added immediately after the completion of the condensation reaction. When washing and neutralizing the product in this case it is necessary to keep the temperature of the product above the melting point of the wax at all times to maintain it in liquid condition. When using paraffin wax as a diluent, 1 to 5 volumes of wax may conveniently be employed and the step of removing the diluent may be omitted, the wax-containing product being added directly to the paper coating composition. We may also prepare our wax condensation product from a less highly chlorinated wax, e. g., wax containing only 5% chlorine, in which case the unchlorinated wax passes through the condensation reaction unchanged and appears in the final wax coating composition.

In an alternative method of making the wax condensation products, the aromatic material, for example, naphthalene or toluene, may be mixed with the aluminum chloride catalyst and the chlorinated paraffin added gradually with efficient agitation. The color of the product by either method may be improved by filtration through fuller's earth.

In preparing our wax coating composition we may add from ½% to 25% of wax condensation product to the paraffin wax employed for coating the paper, although we prefer to employ from 2 to 10% for most purposes. It is sufficient to thoroughly mix the wax condensation products with the melted paraffin wax. In a typical coating operation we have employed a composition prepared by mixing 5% of the wax condensation product with refined paraffin wax having a melt-

ing point of 130 to 132° F. In another operation we employed paraffin wax containing 2% of the above described wax condensation product. The paper to which the above coating composition was applied was a typical wood pulp paper such as is commonly used for the wrapping of bread and other food products. The coated paper was carefully compared with paper coated with the same kind of paraffin wax as used in the coating composition of this invention but without the addition of the wax condensation product. The comparison showed a very distinct improvement in the gloss and "feel" of the improved wax paper and the transparency was also considerably greater. The coating was firmer and showed less tendency to be removed by scraping. The paper was also more readily sealed by the application of heat, giving a more uniform and stronger seal than in the case of the paper coated with paraffin wax alone.

Although we have described our invention in respect to specific applications thereof, it should be understood that the scope of the invention will be determined by the following claims construed as broadly as the prior art will permit.

We claim:

1. The improvement in wax coated papers comprising a sheet of paper impregnated with paraffin wax containing a relatively small proportion of a condensation product of chlorinated paraffin and an aromatic hydrocarbon.

2. The improvement in wax coated papers comprising a sheet of paper impregnated with paraffin wax containing from ½% to 25% of a condensation product of chlorinated paraffin and an aromatic hydrocarbon.

3. The improvement in wax coated papers comprising a sheet of paper impregnated with paraffin wax containing from 2% to 10% of a condensation product of chlorinated paraffin and an aromatic hydrocarbon.

4. The improvement in coating compositions for wax coated papers comprising paraffin wax having a melting point within the range of from 120 to 145° F., incorporated with from ½% to 10% of a condensation product of chlorinated paraffin and an aromatic hydrocarbon.

5. An improved waxed paper characterized by a high gloss and high transparency, comprising a sheet of paper impregnated with paraffin wax incorporated with 2% to 5% of a condensation product of chlorinated paraffin and an aromatic hydrocarbon.

6. The process of increasing the transparency and gloss of waxed paper, comprising incorporating in the paraffin wax before application to said paper a condensation product of chlorinated paraffin wax and an aromatic hydrocarbon.

7. The process of increasing the transparency and gloss of waxed paper, comprising incorporating in the paraffin wax before application to said paper a condensation product of chlorinated paraffin wax and naphthalene.

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