

UNITED STATES PATENT OFFICE

2,233,172

COATED PAPER

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No Drawing. Original application December 16,
1936, Serial No. 116,233. Divided and this ap-
plication September 25, 1940, Serial No. 358,312

4 Claims. (Cl. 91-68)

This invention relates to the method of coat-
ing paper and packaging materials with hydro-
carbon products such as paraffin wax, petrola-
tum, and refined oils.

When paraffin wax, petrolatum, refined oils,
or white oils are used to coat or impregnate
paper and packaging materials it has been found
that these hydrocarbon products deteriorate rap-
idly and form undesirable odors resembling a
rancid odor. Consequently, the utility of the
paper as a means for wrapping food products is
greatly impaired. Even though antioxidants
may have been added to the oil or wax prior to
its impregnation in the paper, it has been found
that the thus treated paper still has the tendency
to develop rancid odors in relatively short pe-
riods of time.

One of the objects of my invention is to pre-
pare a paper or packaging material, of the cellu-
losic type, coated with paraffin wax, petrolatum,
or refined mineral oils which may be used to
wrap food products such as bread, butter, lard
and the like. Papers prepared in accordance
with my process may be stored for long periods
of time without forming rancid odors. Conse-
quently the food products or materials encased
with the coated paper will not become contami-
nated with undesirable odors which result from
the deterioration of the oil or wax in the paper.

I have discovered that paper is a pro-oxidant
for paraffin waxes and refined mineral oils and
that when such oils or waxes are used to coat
or impregnate paper, their stability is quickly
impaired. For example, a paraffin wax, petro-
latum, or refined mineral oil which can be stored
at room temperature for as long as several years
before becoming rancid, will become rancid in
as little as two or three months when stored as
waxed, petrolatum-impregnated, or oiled paper.
Furthermore, when paraffin waxes and refined
oils containing a small percent of antioxidants
are used to impregnate paper, it has been found
that the wax or oil developed rancid odor in a
much shorter time than the same wax or oil
before its impregnation in the paper.

I have discovered that by impregnating or cov-
ering the surface of paper with an antioxidant
prior to the application of paraffin wax, petro-
latum, refined wax, or a refined oil that the cata-
lytic effect of the paper upon the coating will be
greatly retarded. In carrying out my invention,
the paper is impregnated with an antioxidant
before adding the paraffin wax or oil coating.
This operation may be performed in many ways,
for example, the paper is passed through an

aqueous solution of the antioxidant and then
permitted to dry. The thus treated paper is
then passed through a bath of molten paraffin
wax or refined oil in order to apply the coating.
By this means, the interface between the paper
and wax or paper and oil contains an antioxidant
which destroys the pro-oxidant effect of the
paper upon the hydrocarbon material.

The antioxidants may be applied to the paper
in any suitable manner, for example, when the
paper is made in the conventional type of process
a water bath containing the antioxidant may be
placed between the paper presses and the dry-
ing rolls. If desired, a solution of the antioxi-
dant may be sprayed onto the paper at any point
in its process of manufacture providing precau-
tions are taken to prevent substantial amounts of
the antioxidants from being washed out of the
finished product. The antioxidant may also be
applied to the paper in the vapor phase; the
paper being passed through a chamber contain-
ing steam and the vapor of the antioxidant to
be used, e. g., beta-naphthol. In drying paper
that has been impregnated with the antioxidant,
precaution should be taken not to overheat the
paper during the drying operation. Excessive
heating during the drying operation may partly
destroy the effectiveness of the antioxidant.

In the event that the particular antioxidant
to be used is not sufficiently soluble in water to
prepare concentrated solutions, the paper may
be soaked in a saturated aqueous solution or
suspension of the antioxidant. Also volatile
solvents may be used for the antioxidants, name-
ly, ether, alcohol and the like, or emulsified so-
lutions of the antioxidant. In preparing a paper
impregnated with catechol, I have found that
by soaking the paper in a 0.1% aqueous solution
of catechol for about 15 minutes, a sufficient
amount of the antioxidant will diffuse into the
paper to destroy the pro-oxidant effect of the
paper upon the hydrocarbon coating to be applied.
Solutions containing various amounts of the anti-
oxidants, for example 1% to 0.001%, may be
employed in order to impregnate the paper and
particularly the surface of the paper with the
desired antioxidant. Also, solutions containing
an admixture of the hereinafter mentioned anti-
oxidants may also be employed.

The paraffin waxes having various melting
points may be used to impregnate papers and
package materials in accordance with my in-
vention. Waxes having melting points from
122-124, 130-132 and 135-138° F., are examples
of waxes that may be used. Refined oils, for

example white oils, having Saybolt viscosities at 100° F. ranging from 75 to 150 seconds, are generally used. Petrolatums may also be used. Waxes having higher and lower melting points than those given above as well as refined oils having higher and lower viscosities than those given above may also be used. My invention is not limited, however, to waxes, petrolatums and oils having the above physical properties.

- 10 Examples of the antioxidants which may be employed in my process are the classes of alkyl phenols, poly-hydroxy benzene compounds, naphthols, aromatic amines and aminophenols. Examples of the alkyl phenols are tri-butyl phenol, 15 tertiary butyl phenol, tertiary alkyl phenols generally and octyl phenol. Examples of the poly-hydroxy benzenes and derivatives are hydroquinone, pyrogallol, catechol, alkylated di-hydroxy benzene such as 1:2-di-methyl-3:6-di-20 hydroxy benzene, 1:2-di-methyl-4:5-di-hydroxy benzene, 1:3-di-ethyl-2:5-di-hydroxy benzene, tertiary butyl catechol, ethyl pyrogallol, alkoxy hydroxy benzenes such as methoxy hydroquinone, pyrogallol-1-methyl ether, ethoxy catechol and 25 the like. Examples of the naphthols are alpha naphthol, beta naphthol, 1:2-di-hydroxy naphthalene and 1:4-di-hydroxy naphthalene. Examples of the aromatic amines are alpha naphthylamine, phenyl alpha naphthylamine, alkyl 30 alpha naphthylamines such as the methyl and ethyl derivatives, polyamines such as para phenylene di-amine. Examples of the aminophenols are ortho-aminophenol, para-aminophenol, alkyl substituted aminophenols such as 35 dimethyl para-aminophenol, di-butyl aminophenol, and di-ethyl aminocresol, aryl aminophenols such as phenyl-aminophenol, and aralkyl aminophenols such as benzyl aminophenol and the like.
- 40 The foregoing specification and examples will serve to define the scope of my invention and make its advantages apparent to those skilled in

the art to which it pertains. The specific antioxidants mentioned are given for illustrative purposes and are not intended to restrict the scope of the invention. It will be evident that the invention is not limited to the specific hydrocarbon 5 coating materials herein described.

This application is a division of Serial No. 116,233, filed December 16, 1936.

I claim:

1. A process of making a flexible sheet packaging material comprising first applying to the sheet 10 packaging material a surfacing of an antioxidant which is spread over the entire surface thereof and then applying a non-antioxygenic water repellent coating material, said antioxidant being 15 selected from the group consisting of monohydric phenols and naphthols.
2. A process of making a flexible sheet packaging material comprising first applying to the sheet packaging material a surfacing of an antioxidant 20 which is spread over the entire surface thereof and then applying a non-antioxygenic water repellent coating material, said antioxidant being an alkyl phenol.
3. A process of making a flexible sheet packaging material comprising first applying to the sheet 25 packaging material a surfacing of an antioxidant which is spread over the entire surface thereof and then applying a non-antioxygenic water repellent coating material, said antioxidant being an amino phenol.
4. The method of preparing a hydrocarbon coated paper which is stable against oxidation 30 which comprises impregnating the paper surface with a small amount of an antioxidant selected from the group consisting of monohydric phenols and naphthols and then coating the thus treated 35 paper with a hydrocarbon containing material selected from the group consisting of paraffin wax, petrolatum and refined oil.

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