This application relates to a process of bleaching and more particularly of bleaching ester type waxes and oils.

The process is especially adapted for the bleaching of beeswax and by its use it is possible to obtain a product of satisfactory lightness of color without considerable cost and without destroying the valuable properties of the beeswax. 

Beeswax bleached by this new process is very similar to sunbleached beeswax; furthermore, this new process can be very well combined with sun-bleaching, thereby considerably reducing the time needed for bleaching such waxes by the action of the sun alone.

Thus, it is an object of the present invention to provide a new method of bleaching ester type waxes and oils, particularly for bleaching beeswax which process is simple and inexpensive and adapted to reduce the time needed for sun-bleaching substantially.

It is a further object of the present invention to produce chemically bleached beeswax having substantially the same properties as sun-bleached beeswax.

It is still another object of this invention to provide a chemical bleaching process which is well adapted to be combined with sun-bleaching of beeswax.

With the above objects in view, the present invention mainly consists in bleaching ester type waxes and oils with chlorine dioxide, for instance by intimately mixing the wax in molten condition with one or more substances adapted to create, during this mixing, chlorine dioxide. This can be accomplished by adding sodium chloride to the wax or oil to be bleached and stirring said mixture until the desired bleaching effect is obtained; the chlorine dioxide necessary for bleaching can also be produced by mixing the wax or oil to be bleached in molten state with a small amount of a salt of chloric acid, e.g., sodium or potassium chlorate, and an organic polybasic acid, e.g., oxalic acid, and stirring this mixture. The salt of chloric acid reacts with the organic polybasic acid, forming chlorine dioxide which has a bleaching effect on the treated wax or oil.

The new process can be carried out in various ways. Preferred embodiments of the same will be described below in detail:

1. Crude dark-colored beeswax is melted after having been previously clarified in known way. To this molten wax, a small amount of an aqueous sodium chlorite solution is added and this solution is intimately mixed with the molten wax by stirring for about 20 to 30 minutes, until the desired bleaching effect is obtained. It should be noted that this mixing period should be as short as possible, as otherwise the wax takes on a brownish color.

After the desired bleaching effect has been obtained, it is advisable to wash the bleached wax thoroughly with steam by blowing the same into the molten wax. It is also advisable to treat the thus partly cleaned wax with an acid, preferably phosphoric or oxalic acid, destroying thereby the emulsion formed during the bleaching process by reaction of the sodium chlorite with the free acids of the wax. Although addition of this phosphoric acid has the advantage of destroying the emulsion formed during bleaching, it sometimes causes darkening of the bleached wax through development of chlorine. In order to avoid this effect, it is herewith proposed to add, before the acid treatment, a very small amount of sodium thiosulphate which binds the chlorine developed during the acid treatment, thereby preventing darkening of the wax.

After the above described acid treatment, the bleached wax is left to settle and washed again with steam and a sodium thiosulphate solution until all traces of chlorine and chlorine dioxide are removed. Thereafter, the thus treated wax may be exposed to the action of the sun and further bleached, if desired.

It is possible to obtain white wax by the above treatment alone; but there is always the danger that the bleached wax acquires a brownish color due to excess addition of bleaching chemicals. Therefore, it is often preferable to bleach the wax by the above described chemical process only partly and to expose the thus semi-bleached wax to the action of the sun. This combined chemical and sun-bleaching has proved especially advantageous.

Although the proportions of the ingredients used for the above described new bleaching process may be varied to a considerable extent, certain relations have been found to be particularly advantageous. Thus, if a thousand parts of beeswax have to be bleached, it is preferable to add for bleaching to the molten, purified crude wax from about four to eight parts of sodium chlorite dissolved in about eight to twenty-four parts of warm water. The wax bleached by this solution is thereafter treated with about one part of sodium thiosulphate and then mixed with about five parts of phosphoric acid diluted in water. The amount of steam used for cleaning depends only on the cleaning effect required, i.e., as much steam must be used as necessary to remove entirely from the wax all chlorine and chlorine dioxide traces.

2. The chlorine dioxide needed for bleaching purposes can not only be formed by adding of sodium chlorite as described above, but also by intimately mixing the beeswax in molten state with a small amount of a salt of a chloric acid and an organic polybasic acid. As salts for this purpose may be added chlorates of alkali metals and alkaline earth metals, preferably sodium.
chlorate or potassium chlorate; as organic poly
basic acids may be used, for instance oxalic acid,
citric acid, tartaric acid, maleic acid, fumaric
acid and acetic acid.

This process is preferably carried out by melt-
ing the crude beeswax after preliminary clean-
ing, heating it to a temperature not exceeding
165° F. and adding to this molten beeswax sodium
chlorate or potassium chlorate or both of these
chlorates, a small amount of water and oxalic
acid. Thereafter, this mixture is thoroughly
mixed and stirred until the desired bleaching
effect is obtained. It should be noted that for
this bleaching process only a very small amount,
practically only traces, of water are needed.

Thus it is often possible even to omit addition of
water entirely as the water present in the mixture
is sufficient to create the necessary reaction,
namely to form the chlorine dioxide needed for
the bleaching process. Also this process can be
combined with consecutive sunbleaching of the
wax.

While we have illustrated and described the
invention as embodied in processes for the bleach-
ing of ester type waxes and oils, especially of
beeswax, we do not intend to be limited to the
details shown, since various modifications and
structural changes may be made without depart-
ing in any way from the spirit of our invention.

What we claim as new and desire to secure by
Letters Patent is:

1. The process of bleaching ester-type wax
comprising the steps of melting said wax; adding
to said molten wax a small amount of an aqueous
sodium chlorite solution thus obtaining an un-
acidified wax-sodium chlorite mixture; stirring
said unacidified wax-sodium chlorite mixture
until said wax is bleached to the desired extent;
and treating the thus bleached wax with an acid,
thereby destroying the emulsion formed during
bleaching.

2. The process of bleaching ester-type oil com-
prising the steps of adding to said oil a small
amount of an aqueous sodium chlorite solution
thus obtaining an unacidified oil-sodium chlorite
mixture; stirring said unacidified oil-sodium chlorite
mixture until said oil is bleached to the
desired extent; washing the thus bleached oil
with steam; and mixing said bleached and
washed oil with phosphoric acid, thereby destroy-
ing the emulsion formed during bleaching.

3. In the process of bleaching beeswax, the
steps of heating one thousand parts of said wax
until the same is molten; adding to said molten
wax about four to eight parts of sodium chlorite
dissolved in about eight to twenty-four parts of
water thus obtaining an unacidified wax-sodium
chlorite mixture; stirring said unacidified wax-
sodium chlorite mixture until the wax is bleached
to the desired extent; washing the thus bleached
wax with steam; and finally washing it again with
steam until all traces of sodium chlorite are removed.

4. The process of bleaching ester-type wax,
comprising the steps of melting said wax; adding
to said molten wax a small amount of an aqueous
sodium chlorite solution thus obtaining an un-
acidified wax-sodium chlorite mixture; stirring
said unacidified wax-sodium chlorite mixture until
sodium chlorite is removed.

5. The process of bleaching ester-type oil,
comprising the steps of adding to said oil a small
amount of an aqueous sodium chlorite solution
thus forming an unacidified oil-sodium chlorite
mixture; stirring said unacidified oil-sodium chlorite
mixture until said oil is bleached to the
desired extent; washing the thus bleached oil
with steam; and mixing the thus obtained bleached
and washed oil with phosphoric acid, thereby destroying the emulsion
formed during bleaching.

6. The process of bleaching beeswax, the
steps of heating one thousand parts of said wax
until the same is molten; adding to said molten
wax about four to eight parts of sodium chlorite
dissolved in about eight to twenty-four parts of
water thus obtaining an unacidified wax-sodium
chlorite mixture; stirring said unacidified wax-
sodium chlorite mixture until the wax is bleached
to the desired extent; washing the thus bleached
wax with steam; and adding about one part of sodium
chlorite thereby destroying substantially all
the sodium chlorite not consumed during said
bleaching and said washing; intimately mixing
the thus bleached and washed molten wax with
about five parts of phosphoric acid; and finally
washing it again with steam until all traces of
sodium chlorite are removed.

7. The process of bleaching a substance se-
lected from the group consisting of ester-type
waxes and ester-type oils comprising the steps of
melting said substance; adding to said molten
substance a small amount of an aqueous sodium
chlorite solution so as to obtain an unacidified
mixture of said substance and said sodium chlo-
rite and to bleach said substance to the desired
extent; and treating the thus bleached substance
with an acid, thereby destroying the emulsion
formed during bleaching.

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**ERNEST ZERNER.**

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