

# ALIEN PROPERTY CUSTODIAN

## METHOD OF MANUFACTURING PRODUCTS FROM RUBBER AND PRODUCTS OBTAINED THROUGH SAID METHOD

André Chomette, Neuilly-sur-Seine, and Robert Thiollet, Paris, France; vested in the Alien Property Custodian

No Drawing. Application filed May 15, 1940

The rubber industry makes use, at the present time, of certain organic products in order to accelerate vulcanization or in order to improve the preservation of vulcanized rubber articles.

These products, which belong to various chemical species, comprise, in particular, compounds in the composition of which amine groups are present. Such products quickly assume intensive greyish or brownish colorations when they are exposed to the combined actions of air and light.

As they are soluble in rubber, these products have a tendency to diffuse in the vulcanized mixtures, while forming on their surface a highly coloured layer. This coloration is not visible in the case of mixtures of black or dark colour, but it makes it wholly impossible to make use of certain accelerators and anti-oxygen bodies in the case of white or light coloured rubber mixtures.

It is easy to select non-colouring accelerators. Thiurames, thiazoles and dithiocarbamates do not produce any modification of the shade of the objects subjected to the sun light.

On the contrary, the most efficient antioxygen bodies, such as phenyl-naphthylamines or aldol-naphthylamines, produce an intensive brown coloration, when they are subjected to the same conditions.

It has already been endeavoured to reduce this drawback by preparing anti-oxygen bodies which are little soluble in rubber and more stable against the action of light. These products diffuse but very slowly toward the surface and, accordingly, their coloration is much less intensive. For instance, it has already been suggested to make use of phenol function products, which are less soluble in rubber than amine derivatives, and assume a lesser coloration under the action of light, for instance parahydroxyphenyl, beta-naphthol, methylene di-beta-naphthol, and so on.

However, even when making use of anti-oxygen bodies of this kind, the coloration of the objects subjected to the action of light is still considerable. Ultra-violet rays considerably increase the formation of this coloration.

If, on the surface of a vulcanized mixture containing an anti-oxygen, there is applied a film of a transparent substance capable of stopping ultra-violet rays, it is found that the brown colouring takes place much more slowly at the places where the film is applied.

However, it would be little efficacious to protect the rubber objects by coating them with a film opaque to ultra-violet rays. This film would most probably be quickly eliminated, especially when the problem is to protect cushions or mats intended to undergo friction of other objects or mechanical stresses.

The object of the present invention is to pro-

vide a method of producing rubber articles which avoids the above drawbacks.

According to the essential feature of the present invention, we incorporate, into mixtures consisting chiefly of rubber, substances capable of stopping ultra-violet rays. These substances constitute a screen which is opaque to the rays in question and which, therefore, opposes the development of the colouring due to the presence, in rubber, of some auxiliary products.

We have obtained a great number of mixtures of the kind above referred to by incorporating thereinto various substances which are opaque to ultra-violet rays, and we have determined the proportions of said substances to be utilized in order to obtain a satisfactory protection against the action of light.

We have found that the substances with which the most satisfactory results are obtained are the following: urea, thio-urea, their products of condensation with aldehydes, their substitution derivatives and their salts, such for instance as urea benzoate, or the like.

Other substances which permit of obtaining a satisfactory result are artificial plastic matters, such as glycerol-phthalic resins, and formophenol resins which do not themselves produce a coloration of rubber, such substances producing a good protection.

It suffices to employ from 0.5 to 10 per cent of these matters, with reference to the weight of the mixture, for obtaining a highly satisfactory protection.

In order to facilitate the dispersion of the protective matters, it may be advantageous to incorporate them into the rubber mass at the same time as a dispersing body or after having dissolved them in a suitable solvent.

We also consider the formation of artificial resins "in situ." In this way we obtain an intimate mixing of the plastic matter and of the rubber mass of the article.

### Example 1

The following mixtures are prepared for comparison purposes:

	A	B
Crepe.....	100	100
Zinc oxide.....	100	100
Sulphur.....	2	2
Zinc ethylphenyl dithiocarbamate.....	1	1
Phenyl-beta-naphthylamine.....	1	1
Glycerol-phthalic resin.....	0	5

The vulcanized mixtures are exposed to the action of sun light.

After three days of action, mixture A has assumed a high coloured brown shade, while mixture B is of light shade.

*Example 2*

The following mixtures are prepared for comparison purposes:

	A	B
Crepe.....	100	100
Zinc oxide.....	100	100
Sulphur.....	2	2
Zinc ethylphenyldithiocarbamate.....	1	1
Methylene-di-betanaphtol.....	1	1
Aqueous solution of dimethylolurea of 50 per cent.....	0	8

In the course of the vulcanization operation dimethylolurea condenses into a plastic matter 15

which is perfectly well dispersed in the whole mass of the mixture.

After several days of exposition of the products to the action, the sample obtained with mixture B is not coloured, while the same obtained with mixture A has become a pinkish grey.

The method according to the invention which permits of avoiding coloration of objects under the influence of light applies to the protection of the objects manufactured from coagulated rubber or latex, from artificial elastic matters similar to rubber, or from their aqueous dispersions.

ANDRÉ CHOMETTE.  
ROBERT THOLLET.