UNITED STATES PATENT OFFICE.

CARLETON ELLIS, OF MONTCLAIR, NEW JERSEY.

PROCESS OF THICKENING OILS.

1,179,414. Specification of Letters Patent. Patented Apr. 18, 1916.

No Drawing. Application filed October 4, 1913. Serial No. 793,334.

To all whom it may concern:

Be it known that I, CARLETON ELLIS, a citizen of the United States, and a resident of Montclair, in the county of Essex and State of New Jersey, have invented a certain new and useful Process of Thickening Oils, of which the following is a specification.

This invention relates to the process of making a plastic material in particular to plastic products and the like derived by incorporation of viscous or solid oil material obtained by exposure of oil preferably in thick layers to ultra-violet radiation of an intense character; such substances preferably carrying filling material, coloring agents, etc., to produce plastic bodies of various descriptions.

The exposure of oils such as linseed, Chinese wood, corn, cotton, perilla, rape, castor, peanut, mustard and other vegetable oils, or marine animal oils, whale oils, fish oils and various animal oils such as lard and tallow oils and fats; also resin and resin oils to ultra-violet radiation causes profound changes which on account of most of the oils containing unsaturated fatty acids causes a marked increase in viscosity giving viscous liquid and solid products, the latter often being of an elastic character or even brittle. By adjusting the duration of exposure a wide range of consistencies may be secured. By mixing oils of these characteristics the resulting products are more or less varied in character according to the nature of the raw material.

Ultra-violet radiation such as that derived from a mercury quartz light is supposed to have but little penetrating action. When light of this character is used to sterilize milk, it is necessary to treat the milk in the form of films of extreme thinness as the ultra-violet rays will not penetrate. When oils are exposed in thin layers to such a radiation especially in the presence of air a great deal of oxidation takes place and the character of the oil seems to partake of the nature of boiled oil due to the presence of oxidized fats more than it does in the case of an oil which is exposed to light in the absence of air. When exposed without substantial contact with air, polymerization and other changes take place and an improved product results which seems to have greater viscosity or corresponding iodin number or greater elasticity and rubber like qualities than oils which have been more or less slowly oxidized. It is possible to accomplish these results by treating thin films of the oily material in the presence of an inert atmosphere or one which is substantially free from oxygen, and I find that I may also attain this end and without expensive apparatus simply by exposing the oil in a thick layer or body to the ultra-violet radiation. By thick layers I mean something more than a mere film and may work with layers an inch or more in thickness. Under these circumstances even if some free oxygen is present in the atmosphere in the treating vessel, the amount of oxidation actually taking place is reduced to a minimum, as only the upper surface of the layer is in contact with the atmosphere present in the treating vessel, and usually a very thin but tough elastic film quickly forms over the surface sealing the product away from the air. Through this film the ultra-violet rays seemingly penetrate with great ease and even a dark product such as crude cottonseed oil is solidified to a soft stringy material of great elasticity on exposure in thick layers. From corn or cottonseed oil by suitable regulation of the exposure products of approximately the viscosity of castor oil may be prepared and used as castor oil substitutes, or by further action very elastic solids are obtained some of which may be drawn out into strands of unexpected stretching qualities and elasticity. Others produce transparent masses of great tenacity and remarkable cementing properties. These substances when incorporated with fillers, etc., give products akin to linoleum, lincrusta, artificial leather and the like, or solid articles suitable for making billiard balls, tool handles and other similar articles. The exposure of oil to light in this manner causes in some cases a bleaching and in other cases a darkening of the oil, and while, for example, crude cottonseed oil is considerably bleached, some kinds of whale oil darken to a remarkable degree. By such exposure the polymerization or

other changes which progress cause a gradual reduction in the iodin number. A mixture of equal parts of resin oil and corn oil exposed until very thick but flowable, and incorporated with 15% more or less of lampblack or other coloring material and a few per cent. of soap affords a printer's ink which does not creep so that it may be used on fine book work to advantage. When light-treated to a solid state an excellent tire filling is secured which may be molded into cylindrical masses and packed into a casing of an ordinary tire to take the place of the air filled inner tube. Or the solid and viscous products may be vulcanized with sulfur to form rubber substitutes or factice. The ultra-violet radiation reduces the iodin number and enables vulcanization to be carried on with a much less amount of sulfur than would be required by the original oil and of the same measure of solidity. Besides the products are often much more elastic than that which is secured by the vulcanization of boiled oils. As an illustration, a mixture of castor and corn oil which, after treatment with ultra-violet light, is mixed with 10% more or less of sulfur and with the addition of litharge, whiting, fiber, etc., if desired, or other material and is heated to a vulcanizing temperature. Sulfur chlorid may be used as a vulcanizing agent in solution of carbon bisulfid. The light-treated oil may be mixed with raw rubber and vulcanized as, for example, 2 parts of light-treated oil; 3 parts of rubber and sulfur in sufficient quantity with fillers, etc., is incorporated and vulcanized to make a rubber plastic. Three parts of light-treated oil, 7 parts of linoleum stock (oxidized linseed oil and resin) with cork meal and filler in sufficient quantity make a linoleum basis. The linoleum stock may be replaced in a large part or entirely by the light-treated oil. Lincrusta may be made in a similar manner and suitably colored by the incorporation of mineral colors. The light-treated oil may be used to advantage in making oilcloth as it is less likely to rot the fiber than oxidized oil.

In waterproofing fabrics Chinese wood oil may be light-treated in thick layers to render it of greater consistency than cloth which is impregnated with this oil, passed through squeeze rollers and moved slowly through a zone of ultra-violet light in order to solidify the oil on the fibers of the fabric. Degras or wool grease may be light-treated affording products useful in lubricants and for other purposes. Thickened but not solid oils are useful in lubricants and when the polymerization is not carried too far they do not separate from mineral oil mixtures as is often the case with ordinary blown oils, also they do not seem to decompose as readily at high temperature as some of the blown oils. When incorporated with leather fiber, wood dust, etc., and pressed between and on layers of fabrics suitable artificial leather products are obtained. The light-treated oil may be used in leather finishes or as an addition to pyroxylin. For this purpose light-treated castor oil is to be recommended. Palm oil may be light-treated rendering it useful in soaps. The oils treated to a highly viscous or solid state afford good qualities of soap when saponified with 20% or so of caustic alkali. In exposing to light the oil preferably should be in a dry atmosphere and fumes which may be formed by the action of light should be removed as fast as formed which may be done by passing through the apparatus or over the surface of the oil a current of air or any suitable gas. The fumes appear to impede the rays of ultra-violet light which are particularly effective for the operation.

Certain modifications of the process herein described are claimed in my copending application 788,811, filed September 8, 1913.

What I claim is:

1. The process of thickening fatty oils which comprises exposing a fatty oil in thick layers and in the absence of oxygen to a source of ultra-violet light.

2. The process of making thickened oil which comprises exposing a fatty oil in thick layers and in the substantial absence of oxidizing gases to a powerful source of ultra-violet light.

3. The process of making thickened fatty material which comprises exposing a body of fatty oil to ultra-violet light while preventing substantial contact of oxygen with the oily material.

4. A process of making a basis for plastics comprising exposing a deep body of fatty oil, under conditions capable of causing oxidation of any considerable quantities of the entire amount of oil, to the action of ultra-violet light whereby a plastic mass is formed without the substantial oxidation of the fatty material.

5. A process of making a basis for plastics and the like which comprises exposing a layer of fatty oil to the action of ultra-violet light and in removing the fumes formed during such exposure by passing over the surface of the oil a current of a non-oxidizing gas.

6. A process for making a thickened fatty oil material adapted for use as plastics and the like which comprises exposing a deep body of fatty oil material without substantial access of air to the action of a powerful ultra-violet light and in collecting the exposed product.

7. A process of treating fatty oils, which comprises subjecting a relatively deep body of the oil to the action of ultra-violet light, the major portion of the body of oil being

maintained out of contact with oxidizing agents.

8. A process of treating non-transparent oily material, which comprises subjecting a deep layer thereof to the action of ultra-violet-light.

Signed at Montclair in the county of Essex and State of New Jersey this 22nd day of September, A. D. 1913.

CARLETON ELLIS.

Witnesses:
B. M. ELLIS,
F. CORBETT.