

UNITED STATES PATENT OFFICE.

HENRY A. CLARK, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN TREATMENT OF LINSEED-OIL.

Specification forming part of Letters Patent No. **184,341**, dated November 14, 1876; application filed October 23, 1876.

To all whom it may concern:

Be it known that I, HENRY A. CLARK, of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improved Treatment of Linseed-Oil, &c., with Sulphur, of which the following is a specification:

This invention relates to the treatment of vegetable oils, more particularly linseed-oil, with sulphur, for the purpose of rendering the oil more suitable for use as a coating for cloths, which will be water-proof, flexible, and elastic, and unaffected by either heat or cold.

To this end the invention consists in subjecting the oil, either in its raw state or in a partially-cooked state, (preferably in its raw state,) to the action of sulphur heated to such a degree as to be vaporized or generated into a gas.

In carrying out my invention I take one hundred (100) parts, by weight, of the vegetable oil which is to be treated—as, for instance, linseed-oil—and from five (5) to ten (10) parts, by weight, of sulphur, and place the two together in a kettle or other suitable vessel, and then subject the whole to a heat of five hundred and sixty degrees (560°) Fahrenheit, for from five (5) to six (6) hours, or until the oil has become reduced or changed to the consistency and character hereinafter described.

Subjecting oil and sulphur to heat, as above stated, not only cooks the oil as it would be cooked were it only simply boiled, as ordinarily, of itself, but, as the sulphur is raised to the degree of heat stated, and continued at such heat, it is vaporized or generated into a gas, which chemically unites with the component parts of the oil, and thus acts thereon, so as to wholly change and substantially to remove the oily, greasy, and rank nature or character of the oil, and otherwise to reduce it to a gummy and an elastic condition, which greatly resembles india-rubber, and this product, like india-rubber, is flexible and elastic, and so, as a coating to cloth, is water-proof, and practically unaccompanied, in appearance, odor, or nature, with any of the rank, or oily, or greasy characteristics which belong to the oil, either when in its natural state, or when cooked by boiling, as heretofore.

In treating the oil with sulphur, as above

described, the oil, as it is so cooked, thickens, becomes stringy and elastic, and, finally, if cooked a sufficient length of time, so thickens that it cannot be stirred, strung, dipped, or poured, and at no time in such a cooking of the oil does the oil, or said product thereof, burn or char, as oil or its product, if cooked without sulphur to the extent described, would do, even with most careful watching; but the oil or said product thereof, from the presence of the sulphur, because of said chemical union of it with the oil, seems to be, and is, most perfectly protected against burning or charring.

In using my improved product from linseed-oil, &c., by treating it with sulphur, as described, to coat cloths, I prefer to add lamp-black, to give it a greater body and consistency for filling the interstices of the cloth, or to add other materials which will secure the same results—as, for instance, chalk, whiting, or pigments of any kind; and obviously the material to be so used will depend upon the color which it is desired the coating should have.

It is preferable, before applying my said improved product to cloth, to reduce it with benzine or other solvents, benzine being preferable, because it evaporates most quickly, as it makes it easier and better to apply, and it may be applied in various ways—as, for instance, with a scraper or a brush, or with rolls, substantially as practiced in the manufacture of india-rubber-coated goods.

After coating the goods, as described, they are to be dried, and a simple exposure of the coating to the sun's rays is sufficient, although it may be dried with artificial heat in a room or chamber; but whether the coating be dried by the sun's rays or by artificial heat, it does not seem to be changed in any substantial or perceptible degree as to its characteristics hereinbefore described. If dried with the sun's rays the glossy look of the coating seems to be deadened or removed, whereas if dried by artificial heat the glossy look is heightened, and for this reason it is preferred to dry the coating by exposure to the sun's rays.

If desired, my improved product may be washed with an alkali, such as sal-soda, either before or after mixing benzine with it, and if

so, it is brought to a still closer resemblance to india rubber in its appearance and feeling, thus showing to a still greater degree the changes herein specified, which are brought about in the nature and character of the oil from its treatment with sulphur, as herein described.

The addition of the alkali also serves to impart a softer and more velvety feeling to the product, and to obliterate all traces, however slight, of an oily or greasy nature which may be left in the product.

This invention may be applied to vegetable oils other than linseed. The proportions of oil and sulphur may be varied from those given, as also the degree of heat and the time of cooking; but in all cases the sulphur must be vaporized, or otherwise there will be no chemical union of it with the component parts of the oil, and consequently such change in the oil as has been described.

The proportions of linseed-oil and sulphur, and the degree of heat and time of cooking herein specified, produce most satisfactory results.

Litharge, if added to the oil before it is treated with sulphur, as described, increases the drying qualities; but, in lieu of litharge, other drying material may be used. Litharge, however, is not necessary, nor has it in any appreciable degree any connection or relation to the effect herein described of the sulphur on the oil.

In lieu of subjecting the oil to the vapors of sulphur, by placing the oil and sulphur together in a kettle, as described, obviously it may be so subjected in other ways—as, for instance, by placing the oil and sulphur in separate vessels, and passing the vapors of the sulphur through and into the oil; but the method described is convenient and practicable, and unaccompanied with any complicated and extensive apparatus.

I am aware that heretofore sulphur and boiled linseed-oil have been mixed or combined. This invention is not in mixing sulphur and linseed-oil, whether boiled or raw, but in the manner of mixing through a vaporization of the sulphur, or the generation of it into a gas, whereby it is made to chemically unite and combine with the oil, with the results stated, and I am not aware that such results were ever before secured.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The process herein described of sulphurizing vegetable oils, which consists in heating the oil in contact with sulphur to that degree at which the sulphur is vaporized, in which condition the sulphur reacts upon the oil to vulcanize it, substantially as described.

HENRY A. CLARK.

Witnesses:

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