No. 768,101. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

FRANK MACOMB WHITALL, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF FIFTY-FIVE ONE-HUNDREDTHS TO SAMUEL R. WHITALL AND JOSEPH R. EDSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

PROCESS OF TREATING AND DISSOLVING WURTZILITE.

SPECIFICATION forming part of Letters Patent No. 768,101, dated August 23, 1904.

Application filed July 25, 1903. Serial No. 167,035. (No specimens.)

To all whom it may concern:

Be it known that I, FRANK MACOMB WHITALL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Processes of Treating and Dissolving Wurtzilite; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

I have discovered that wurtzilite is soluble in dead-oil or "heavy oil," as it is sometimes called, and that when in a plastic mass said mass recovers substantially its original properties, with the exception that it is now soluble in any of the common solvents—such as turpentine, naphtha, gasolene, benzin, &c.—to be used for paints, waterproofing materials, acid-proof materials, insulating materials, and sundry other uses. The solution of the wurtzilite is effected by bringing the materials into intimate contact with dead-oil or heavy oil. Dead-oil or heavy oil, otherwise known as "creosote-oil," is the last run from the distillation of coal-tar. The mass is preferably reduced to a fine condition or pulverized, and the solvent action of the dead-oil or heavy oil is aided by heat.

My invention therefore consists in the mode of making articles of commerce containing wurtzilite, as hereinafter more fully described, and particularly pointed out in the claims.

Wurtzilite is a mineral without any determinate form and would be classed as amorphous. It is never found crystallized. By reflected light it is of a nearly black-brownish color, fracture conchoidal, streak brown; by transmitted light through a thin piece of a dark orange-red, nearly brown. When at the ordinary temperature, it is strong, tough, and requires a sharp heavy blow to break it. When warmed, it is tough and somewhat elastic, not oxidizable, not affected by the strongest acids or any combination of acids, either cold or hot, except by a slight discoloration, not soluble in alkalies or any of the odinary solvents of india-rubber except coal-tar naphtha, which does not entirely dissolve it unless used in very large proportion to the quantity of wurtzilite soluble in petroleum. By distillation it gives off gas and four or five oils, a heavy white oil, a brown oil, a rich yellow golden-colored oil, leaving a thick pasty residue and has about ten per cent. of fixed carbon, showing perhaps a trace of sulfur.

I will now describe my preferred method of treating wurzilite for use for commercial purposes. I first grind wurtzilite to a fineness of a fifty-mesh screen or finer. I then incorporate it with an equal quantity of dead-oil or heavy oil and subject the combined mineral and oil to heat from 500° to 1,000° Fahrenheit. Good results are obtained by using from one gill to one-half pint of the oil to one pound of the ground wurtzilite, and when the parts are used in about these proportions the reduction in the quantity of oil used serves to shorten the time required to evaporate the surplus solvent after the wurtzilite has been dissolved. The grinding and heating is simply to facilitate the solvent action of the oil. The mixture is of course placed in suitable vessels—say kettles of pressed steel or pots of cast-iron or any suitable vessel—of proper size to suit the manufacturer. The vessels after being tightly covered are placed on the furnace or stove, so constructed that when the vessels or kettles are placed therein none of the flames will press up around the sides of the furnace or through openings thereof in which the kettles are to be placed. Any crevice in the furnace should be luted or closed to prevent any flame or spark from coming in contact with the contents of the kettles. When it is desired to dissolve this mineral in large quantities, a suitable furnace of brick of any length desired may be employed, the top of which should be preferably of cast-iron, with openings therein to fit the vessels to be used thereon. The furnace may be provided with a fire-box, doors, flues, and dampers to regulate the heat and draft. Tight-fitting

covers should be provided to place over the openings when one or more of the vessels are removed from the furnace.

After boiling the combined wurtzilite and dead-oil for about one hour and a half a greater portion of the mineral will be dissolved and in a liquid state; but a portion of the solvent will still remain; but as this solvent will not evaporate from other causes than heat the boiling must be continued until the solvent is entirely evaporated off and the product in the kettle becomes a thick sticky stringy mass. I now pour the contents of the kettle upon slabs of stone, marble, steel or into molds of any desired shape and size and of any suitable material. When cold, the product is hard, black, and shiny, resembling wurtzilite in its original state. It breaks with the same fracture, luster, and color and has the same odor when burning. The only apparent difference between wurtzilite in its native state and in my product is the solubility of my product in any of the common solvents of rubber. The solvent can also be removed by use of caustic soda, caustic potash, or other strong alkalies, or by use of strong acids; but this is very expensive and, as a rule, takes too much time. While undergoing treatment, the solvent can be saved for future use by condensation. The product can now readily be dissolved in any of the common solvents—such as turpentine, naphtha, gasolene, benzin, &c.—to be used for paints, varnishes, enamels, lacquers, waterproofing material, acid-proof material, insulating materials, and sundry other uses.

For paints for hot iron, such as smoke-stacks for steamers and locomotives and stoves, &c., it is not necessary to evaporate off the solvent; but it is better to keep the material in a liquid state to be applied to the metal with a brush or other suitable means, as when the metal is heated the solvent evaporates, leaving a beautiful hard glossy enamel which will not come off until the metal becomes red-hot and will protect the material from all moisture and the elements. This paint can be applied to metal while either the metal or the paint is either hot or cold. This paint makes a beautiful enamel for bicycle-frames and all metals which can be baked in an oven under a low heat.

For paints for wookwork and insulation, also for waterproofing materials, varnishes, enamels, and lacquers I simply dissolve the product from my process in turpentine, gasolene, or any suitable solvent and apply it with a brush or in any convenient way. The product dries very rapidly and leaves a beautiful, pliable, hard, tough, and glossy coating. It can be made into paint by any of the common processes. It can be mixed with linseed-oil or any common paint-oil and all common driers, such as litharge or copal varnish, and then placed in cans for future use, first allowing the paint to cool. If litharge is added while the mineral and oil is being heated, the oil will dry rapidly, and the paint will have a fine surface and high luster like a lacquer and will be suitable for painting any very smooth surfaces, such as bottoms of ships, pianos, &c.

A product made under my process does not lose any of the valuable properties of the mineral in its natural state. When allowed to harden, it retains all of the properties of the mineral. It is tough, hard, and somewhat elastic. It breaks with the same fracture, gives the same streak on paper, and burns with the same odor and the same flames as before treatment and when burned gives off the smell of burning india-rubber. The only apparent difference between wurtzilite in its natural state and prepared wurtzilite is the solubility of the latter in the volatile oils, such as naphtha, benzin, gasolene, bisulfid of carbon, ether, or any other solvent of india-rubber.

My process is very simple and inexpensive, and it will be understood that a solution of any desired degree of consistency can be prepared, according to the relative amount of the ingredients used, producing a material with any degree of consistency from that of a liquid to that of a tough plastic mass, from which any excess of the solvent may be driven off or allowed to evaporate without changing any of the characteristics of my prepared wurtzilite, also that any desired state of consistency will be governed by the addition of oils, driers, pigments, &c., which are generally used in paints, varnishes, lacquers, &c.

My prepared wurtzilite may be alloyed with rubber or rubber solution in the solvents mentioned, and they will form a consistent homogeneous mass. This homogeneous mass composed of prepared wurtzilite and rubber in a common solvent is similar to an alloy. It has the properties of both the prepared wurtzilite and the rubber, the prepared wurtzilite becoming more elastic and the rubber more tough than when in the alloy. This homogeneous mass can be used for similar purposes and uses as rubber. In this alloy of prepared wurtzilite and rubber the adulterants of rubber may be used in place of the rubber.

Instead of applying heat to the wurtzilite or prepared wurtzilite after it has been mixed with the oil the oil may be heated before it is mixed with the wurtzilite.

Under my process the solution or compound which is formed by dissolving my product in any of the common solvents for paints, varnishes, enamels, lacquers, &c., may be strained through any suitable straining apparatus, such as a pressure-strainer, to avoid having any small fine particles of undissolved mineral in the paint, &c. Then these articles are completed and ready for use. This will give a very smooth, glossy, and pliable coating to the article upon which the paint is applied.

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

1. The process of dissolving wurtzilite by subjecting it to the solvent action of dead-oil.

2. The process of dissolving wurtzilite in the finer divided or pulverized condition to the solvent action of dead-oil.

3. The process of dissolving wurtzilite by subjecting it to the solvent action of dead-oil in the presence of heat.

4. The process of dissolving wurtzilite in a pulverized or finer divided condition to the solvent action of dead-oil in the presence of heat.

5. The process of treating wurtzilite which consists in dissolving it in dead-oil and then removing the solvent until the mass becomes consistent.

6. A solution of wurtzilite in dead-oil.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK MACOMB WHITALL.

Witnesses:

GEO. A. HUTCHINSON,

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