UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, ORANGE, NEW JERSEY.

INSULATING COMPOUND.

1,083,354. Specification of Letters Patent. Patented Jan. 6, 1914.

No Drawing. Application filed January 27, 1911. Serial No. 604,926.

To all whom it may concern:

Be it known that I, THOMAS ALVA EDISON, a citizen of the United States, residing at Llewellyn Park, Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Insulating Compounds, of which the following is a description.

My invention relates to insulating compounds and particularly to that class of such compounds adapted to be applied to the exterior surface of the body which is to be insulated and protected.

The object of my invention is to produce an insulating compound which may be easily applied to the body to be protected, and which is tough and flexible even at low temperatures, and which does not become soft and sticky until heated considerably above ordinary temperatures.

I have found that tetrachloronaphthalene has the most powerful tendency to crystallize of any organic substance with which I am acquainted. Moreover, it crystallizes as a felt of needles which are tough and flexible. By the expression, "felt of needles," it is to be understood that I mean needles matted together. I have also found that tetrachloronaphthalene will crystallize when mixed with a large amount of an amphorous substance, such as asphalt. When such a mixture is permitted to crystallize, a large per cent. of the resulting mass is composed of a felt of needles, the interstices of which are filled with asphalt. The resulting mass or compound is, therefore, not porous. These needles render the compound very tough, and, what is of great consequence, the compound is not soft or sticky at a temperature as high as 125° Fahr., and is not brittle at a temperature as low as 30° below zero Fahr. This remarkable property of retaining its toughness at low temperatures is due to the fact that the compound is felted and that the crystals are still flexible at these low temperatures. My improved insulating compound also possesses the valuable property that it is not attacked by acids or alkalis, even when the acids or alkalis are hot.

My improved insulating compound may be prepared by melting together suitable quantities of either crude or pure tetrachloronaphthalene and asphalt. I prefer to use hard Cuban asphalt, but other varieties may be used. I have found that the best results are obtained by combining six parts by weight of substantially pure tetrachloronaphthalene with one part by weight of asphalt. I may also use fourteen parts by weight of crude tetrachloronaphthalene to one part of asphalt. These proportions may be varied within certain limits, and according to the characteristics which are desired in the resulting compound.

In order to apply the insulating compound to articles which are to be coated with it, I preferably dip the articles in the compound while it is in a melted condition, either before it has cooled and solidized, or after it has been reheated, although other methods of applying it may be employed. Upon removing the article from the bath of melted compound, cooling takes place, and the article is found to be coated with a hard and durable insulating and protecting compound. I have found that this substance is particularly adapted for use as an insulating and protecting coating for the exteriors of metal storage battery cans. These cans may be readily coated with it by dipping them in the melted compound. I have found that this process of dipping the cans may be advantageously carried on when the melted liquid has a temperature of about 270 degrees F. The coating serves not only as an insulating covering for the storage battery can, but also protects it from rust and from the action of chemicals which may come in contact with its exterior, such as the electrolytes of acid or alkali storage batteries.

Obviously, my improved insulating compound may be applied to any articles for which an insulating or protective covering is desirable, as for example, trays or containers for storage battery cells, conducting wires, armatures, and armature and other coils.

The term "tetrachloronaphthalene" is a trade designation for a product formed by the chlorination of naphthalene, which crystallizes as a felt of flexible, fibrous crystals. It apparently is a mixture of various chlorin substitution products of naphthalene, probably the tri-, tetra-, and penta- chloronaphthalenes, having substantially the same average composition as tetrachloronaphthalene.

Having now described my invention, what I claim and desire to protect by Letters Patent is as follows:—

1. An insulating compound composed of a felt of tough, flexible, crystalline needles, the interstices of which are filled with a substance to render said compound non-porous, substantially as described.

2. An insulating compound composed of a felt of tough, flexible, crystalline needles, the interstices of which are filled with asphalt to render said compound non-porous, substantially as described.

3. An insulating compound containing tetrachloronaphthalene and a fusible filling substance.

4. An insulating compound containing tetrachloronaphthalene and asphalt.

5. An insulating compound containing tetrachloronaphthalene and asphalt in the proportions by weight of six parts of pure tetrachloronaphthalene to one part of asphalt, substantially as described.

6. An insulating compound composed of a felted mass of tetra-chloro-naphthalene having its interstices filled with a substance to render said compound non-porous, substantially as described.

7. A process of making an insulating compound, which consists in melting together tetrachloronaphthalene and an amorphous substance, substantially as described.

8. A process of making an insulating compound, which consists in melting together tetrachloronaphthalene and asphalt, substantially as described.

9. An insulating compound containing a halogen derivative of naphthalene and asphalt.

10. An insulating compound containing a chlorin derivative of naphthalene and asphalt.

11. The process of making an insulating compound, which consists in melting together a halogen derivative of naphthalene and asphalt, substantially as described.

12. The process of making an insulating compound, which consists in melting together a chlorin derivative of naphthalene and asphalt, substantially as described.

13. An insulating compound composed of a felt of tough, flexible needles crystallized *in situ* in an amorphous substance, substantially as described.

14. An insulating compound composed of a felt of tough, flexible needles crystallized *in situ* in asphalt, substantially as described.

15. The process of making an insulating compound which consists in melting together an amorphous substance, and a substance capable of crystallizing as a felt of tough, flexible needles in said amorphous substance, substantially as described.

16. The process of making an insulating compound which consists in melting together asphalt and a substance capable of crystallizing as a felt of tough, flexible needles in said asphalt, substantially as described.

This specification signed and witnessed this 25th day of January, 1911.

THOMAS A. EDISON.

Witnesses:
DYER SMITH,
ANNA R. KLEHM.

Corrections in Letters Patent No. 1,083,354.

It is hereby certified that in Letters Patent No. 1,083,354, granted January 6, 1914, upon the application of Thomas A. Edison, of Llewellyn Park, Orange, New Jersey, for an improvement in "Insulating Compounds," errors appear in the printed specification requiring correction as follows: Page 1, line 30, for the word "amphorous" read *amorphous;* and same page, line 70, for the word "solidized" read *solidified;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of February, A. D., 1914.

[SEAL.]

J. T. NEWTON,
Acting Commissioner of Patents.