

UNITED STATES PATENT OFFICE.

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HARD VULCANIZED COMPOUND.

SPECIFICATION forming part of Letters Patent No. 529,730, dated November 27, 1894.

Application filed March 12, 1891. Serial No. 384,825. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM GRISCOM, Jr., of Bound Brook, in the county of Somerset and State of New Jersey, have invented certain new and useful Improvements in Hard Vulcanized Compounds; and I do hereby declare that the following specification is a clear, true, and complete description of my invention.

Hard vulcanized compounds embodying my present invention, are adapted to use as substitutes for hard rubber compounds, in various connections, and especially in the line of insulating plates, and molded forms, for use in electrical apparatus. My novel compounds may be developed in various degrees of hardness and flexibility, are comparatively little affected by ordinary variations in temperature, and when they have been compounded with special reference thereto, they are capable of resisting the action of acids, and alkalies.

In my compounds, the residual product from the distillation of fats, oils, &c., known as candle tar, constitutes the prime adhesive and vulcanizable medium, and I have discovered that it may be combined with sulphur, and developed by vulcanization into an elastic body, and that when combined with other plastic bodies, the candle tar will operate as a ruling medium, in developing an elastic condition in the mass, when properly combined with sulphur, and vulcanized. I have also discovered, that said novel elastic compounds may be developed with solvents into adhesive paint compounds, which, when hardened, will retain or resume an elastic condition, quite closely approximating to that of the original vulcanized elastic compounds. These several features of my invention have been made the subject of applications for Letters Patent, Serial Nos. 384,643, 384,644, and 384,648, filed March 11, 1891.

In the production of the hard vulcanized compounds, which constitute the subject of my present application, I employ my aforesaid novel compounds, any one of which may be combined with solid matter, and compressed under proper temperatures, or the appropriate ingredients of the several compounds may be combined with solid matter and then be molded and vulcanized, in a gen-

eral way after the manner of working hard rubber compounds.

The best results in hard vulcanizable compounds, are secured by me, by the use of that form of candle tar, which is normally soft, ropy and sticky, and is derived from animal fats, oils, &c.; and especially, that animal fat candle tar, which is the residual product of steam distillation, and without the use of acids, &c. Inasmuch however, as I believe I am the first to produce hard vulcanized compounds, containing candle tar, in any of its various forms, I do not limit myself to animal fat candle tar, nor to the residual products of any special mode of distillation.

It will be impracticable, within the appropriate limits of this specification, to afford in detail, more than such disclosures of some of my principal modes of procedure, and the ingredients employed, as will enable the production of my compound in several desirable forms, and be promptly suggestive of many more or less obvious variations, which will involve no substantial departure from my invention.

I will first describe the production of hard but flexible insulating plates, which are backed, or reinforced by one or more layers of paper or cloth. About ninety-five parts of candle tar, and five parts of sulphur are separately melted, and then united and well mixed under a gradually raised temperature to about 345° Fahrenheit. Finely powdered coal or plumbago, with about five per cent. of its weight in lamp black, is well warmed and mixed while dry, and the quantity of this solid matter must be in excess of that which will be required in any one batch of the compound, because the proportion of the solid matter must in each instance be determined by the capacity of the soft compound, to operate as an adhesive medium. The candle tar is not uniform, and inasmuch as it varies with respect to its adhesive capacity, the solid matter is to be gradually added to the adhesive matter, and well triturated or mixed, until the mass is quite stiff, and not specially clingy or adhesive. Meantime, finely powdered sulphur can profitably be added, in quantity seldom if ever exceeding the quantity which

was initially melted and merged with the candle tar. While the compounded mass is still hot, it is placed in suitable well heated molds, smoothly lined with paper, leveled and surmounted with another sheet of paper. Several of the filled molds are piled together and clamped, and the whole is then subjected to a temperature of from 380° to 390° Fahrenheit for from six to twelve hours, and sometimes longer, this depending upon the thickness of the paper, the character of the molds, and the thickness of the molded plates. These plates when cold, on being properly lined or scored, can be readily broken into various desired forms, and they can be worked into any desired shape. A stronger and less expensive plate will be afforded by the use of equal parts of petroleum residuum, and candle tar, and sulphur in the proportions stated, and worked in the manner before described.

In the production of plates of considerable thickness, the use of the previously vulcanized compounds is preferably employed, as, for instance, after either of the two adhesive compounds described, have been slowly raised to say 345° Fahrenheit. It is then rapidly heated up to say 380° or 390° Fahrenheit, and meantime, the mass will foam freely under the evolution of gaseous matter, and when the foaming has subsided the heat is slowly withdrawn, and the mass allowed to cool into an elastic and comparatively solid condition. This elastic vulcanized compound is then cut into small pieces, and mixed within a tight digester with light oil from coal tar, during the application of heat and mechanical agitation. After cooling, the resulting product is an adhesive paint compound, which is used as an adhesive medium with finely divided solid matter as described, the two being in proportions which must of necessity vary, in harmony with the viscosity of the paint compound, and the absorbent, or retaining character of the solid matter, but in this mode of procedure, as in the others, a further addition of powdered sulphur is made at the time of working in the solid matters, and the vulcanization is effected as before described.

In the production of molded articles, well known precautions against adherence to the molds must be employed, such as dusting with foundry facings, or other finely comminuted matter, or a wiping of the surfaces with vaseline, or the use of metal foils, or thin paraffined paper.

In the production of molded articles of considerable bulk, it is sometimes preferable to omit the powdered sulphur in the mass during its final development, and to increase the initial quantity in the melted mass, in which it need seldom exceed ten per cent. of the weight of the mass, and, as a rule, six or eight per cent. will secure highly satisfactory results. It will be readily seen, that the solid matter may be almost indefinitely varied, as to its character, and it is to be understood, that in many cases I employ oxides of lead and zinc, as when special solidity or density is desired, and whiting or chalk barytes, clays, soapstone, and powdered asbestos, and for some purposes paper pulps, both wood and rags.

When designed for use in connections involving exposure to acids, &c., or for service in the open air, my hard vulcanized compounds, should contain animal fat candle tar, as the main or entire adhesive element, and the solid matters combined therewith, should be such as would best resist oxidation and the action of acids.

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

1. A hard vulcanized compound, containing candle tar as a vulcanizable adhesive element, sulphur, and finely divided solid matter, substantially as and for the purposes specified.

2. A hard vulcanized compound, composed of candle tar, sulphur, petroleum residuum, and finely divided solid matter substantially as described.

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Witnesses:

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