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DAVID V. AULT, OF MORTON, PENNSYLVANIA

PROCESS OF PRODUCING A PIGMENT

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My invention relates to an improved pigment, and to the process of preparation thereof.

I have discovered that a gray, clay-like ore, deposits of which are located in the valley of the township of Manheim, county of York, State of Pennsylvania, and more particularly in a certain parcel or tract of land deeded to me by Lydia M. Baugher and recorded in York County, said tract or parcel being bounded as follows: On the east, by a public road running from Lineboro to the road leading from Glenville to Black Rock; on the south by lands of the Baltimore branch of the Western Maryland Railway Company; on the west by land of Lydia M. Baugher; and on the north by a public road leading from Glenville to Black Rock, may be subjected to suitable steps of treatment in order to yield substantially pure and naturally occurring very finely divided sericite capable of being satisfactorily and economically produced and suitable for use as a pigment in the manufacture of paint, rubber and the like. The ore in connection with which I conceived the possibility of developing a pigment is a dark, clay-like substance, naturally moist and capable of easily giving a dark gray smudge when rubbed. While this ore, at least that with which I am familiar, contains a large portion of very finely divided sericite, yet refinement of the ore is necessary in order to obtain sericite in a finely divided form and suitable for incorporation as a base in a suitable vehicle. At first, I sifted or screened the ore and obtained a product which was incorporated as a base in oil. The paint so prepared, while capable of standing up under fairly severe acid and alkali conditions, was, nevertheless, objectionable on account of particles of foreign matter giving a somewhat gritty appearance and interfering with easy application and also on account of physical properties in general inferior to those obtained by the finally developed process hereinafter referred to. I next ground the ore so that all of it was reduced to a very fine powder; and, while this gave a satisfactory base, it was objectionable on account of discolorations, limited range of colors, and lack of purity and the best physical properties.

The process, as finally developed and as now practiced, results in the obtaining of relatively pure sericite very finely divided and of a gray color. To this end, the ore, as mined, is first heated to drive off moisture; the dried ore is then screened in order to remove particles of foreign matter; and the screened material is then subjected to air separation. This series of steps applied to the ore results in the production of a substantially pure finely divided sericite and one having the desired physical properties as a coating material or base in a high degree— very much higher than obtained by my prior method referred to. The division is so fine that all of the sericite is capable of passing through a 200-mesh screen and a large portion may be passed through a 400-mesh screen; the particles, though quite fine, vary in fineness so that voids in a paint containing this pigment are minimized.

The fact that the ore, as mined, with or without the removal of coarse particles of foreign matter by sifting, may be ground in any suitable mill shows that it is different from mica, for the grinding of mica, owing to its crystalline laminated character, is difficult. While mica is classified as soft material, it is one of the most difficult to grind due to its flexible, smooth surfaces, and lack of brittleness. It cannot be crushed but must be shredded, torn and split. When ground dry, the ground material is somewhat coarse and flakey; and such grinding must be done by a hammer mill. To obtain finer grinding, the process of wet grinding has been used, this process usually involving placing a suitable amount of cleaned mica in water in a receptacle and subjecting the material to agitation in order to secure grinding by rubbing of the pieces or particles of mica upon one another. The wet process is necessarily slow and expensive. On the other hand, by subjecting the ore with which I am dealing to the aforesaid steps or treatment, I am able to obtain a substantially pure pigment and one which is more finely divided and of graduated fineness and more suitable for incor-

poration as a base pigment in a vehicle than ground mica.

I produce a sericite which is so finely divided, of such a state of purity and of such specific gravity that it may be incorporated satisfactorily in a vehicle merely by agitation. While I may grind my material into the vehicle, this is not necessary. Also, my improved pigment produces a superior color, the color being a gray capable of being used with a wide range of color pigments to produce different colors.

I find that my improved pigment is relatively chemically inert. This permits of the use of any desired vehicle, regardless of its acidity or alkalinity, without danger of saponification or other chemical action. Boiling acid or alkaline solutions are without effect on paint having the pigment; there is no reaction of the pigment to H_2O, CO_2, SO_2, or H_2S; it has no effect on vehicle oils nor the oxidized products thereof; and it provides a stable coating. After being heated to 2000 degrees F., I find that the material remains inert. It fuses at a high temperature without decomposition. Not only does the pigment have these desirable properties, but it has good hiding and bulking power.

After subjecting the ore to the steps of treatment already referred to, the resulting product is a definite chemical compound. It is a sericite having substantially the following chemical analysis:

Silica	45.76
Alumina	36.20
Water	8.10
Potash	8.08
Oxide of iron	1.56

Traces of magnesia and lime.

This refined material has been authoritatively determined to be sericite, a secondary form of muscovite, one of the families of mica. It is to be understood, of course, that the above analysis applies only to the ore with which I am dealing. There may be other micaceous ores containing a very finely divided mica constituent which may be separated by subjecting the ore to the purification steps in order to produce a pure finely divided mica product suitable for use as a pigment.

Not only is the pigment inert and heat resistant, but it has good electrical characteristics. It is a good insulator; it has high dielectric properties; and it prevents electrolysis of metal work with which it is used. The coating prevents contact of moisture with metal; it prevents the formation of an electrolyte and consequent rusting; and, as the base is inert, no chemical action can take place between it and the vehicle or with the metal covered by the paint. In this connection, if a color other than the natural gray one is desired on metal, I prefer to apply a priming coat including the sericite base without a color pigment and then to apply color coats on the neutral or inert priming coat, as, in this way, the metal is separated from the top coat or coats by the inert priming coat and possible chemical or electrolytic action is avoided. The base provides a point which avoids rust or chemical action; it is not acted upon by strong acid or alkalies; and it endures very high temperatures.

As already pointed out, the treatment steps of drying, screening and air separation are highly important in order to secure a very fine material and one which may be used as a pigment to provide a paint which has a gray or neutral color to which color, pigments may be added to give a wide range of colors. When the refined sericite pigment is incorporated in a suitable vehicle a gray and opaque paint results, one having the desirable physical properties already mentioned, and one which may have its color changed by the addition of suitable color pigments. For example, a light gray may be had by the addition of zinc oxide; green, by the addition of chrome green; and red, by the addition of oxide of iron.

I find that the naturally occurring and refined finely divided sericite pigment may be incorporated with a vehicle merely by agitation and without grinding. Such a pigment has greater covering or bulking power than pigments with which I am familiar; for example, it requires five times as much, by weight, of red lead. Also, after incorporation of my improved pigment in a suitable vehicle, there is relatively less settling out when compared with other bases. Any suitable vehicle may be employed. For ordinary coatings, the vehicle may consist of linseed oil. Chinawood oil may be added to the linseed oil in order to produce a tough, water-shedding elastic film. Cumar gum, or cumarone, may be added to the oil to give resistance to acid, alkalis, and water; and, in order that the gum may be satisfactorily incorporated, I dissolve it in a suitable petroleum spirit to reduce the gravity thereof to substantially that of the vehicle oil whereupon a mixture may be readily effected. Any suitable driers may be employed, for example, magnesium dioxide and litharge are satisfactory. Where high temperatures are encountered, soya oil may be substituted for linseed oil.

From the foregoing, it will be apparent that I produce a pigment by subjecting ore of the character referred to to a mode of treatment consisting in drying the ore and in separating the naturally-occurring sericite from coarse or gritty particles.

What I claim is:

1. The process of manufacturing a pigment from a clay-like material containing sericite in a naturally-occurring, finely-divided condition which consists in drying such

material and in separating the finely-divided sericite from gritty particles.

2. The process of manufacturing a pigment from a clay-like material containing sericite in a naturally-occurring, finely-divided condition which consists in heating the material to dry it, in screening the material, and in separating the finely-divided sericite therefrom.

3. The process of manufacturing a pigment from a clay-like material containing sericite in a naturally-occurring, finely-divided condition which consists in providing such material in a dry state and in removing the finely-divided sericite from foreign matter by air separation.

4. The process of manufacturing a pigment from a clay-like material containing sericite in a naturally-occurring finely-divided condition which consists in heating the material to dry it, in screening the material, and in removing the finely-divided sericite from foreign matter by air separation.

In testimony whereof I affix my signature.

DAVID V. AULT.