product will be obtained; and the provision of a novel form of TiO₂ pigment from which a more light- and heat-stable paint film can be had. Other objects and advantages will be apparent from the ensuing description of my invention.

These and other objects are attained in this invention which comprises improving the color and texture characteristics of a titanium pigment by pulverizing said pigment in the dry state in the presence of a small amount, say, from 0.5% to 6%, based on the weight of the pigment, of an aerogel. In more specific embodiment, the invention comprises mixing with pigment-developed, anhydrous TiO₂ from about 0.1% to 0.9%, by weight, of a substantially white silica or alumina aerogel, and grinding the resulting mixture in a fluid energy type mill until desired smooth-textured pigment fineness results.

In practically adapting the invention, a relatively small amount, usually less than 5% and preferably less than 2%, is used on the weight of the pigment being treated, of a substantially white aerogel is mixed with calcined, pigment-developed TiO₂ prior to subjecting such pigment to dry grinding treatment to improve its texture and fineness properties. Intimate association of the aerogel with the pigment can be conveniently effected through resort to mechanical blending in standard blending or mixing equipment, by passing the comixture through high speed mixers or disintegrators, or, if desired, the pigment and aerogel can be separately fed simultaneously and in the desired proportions to the dry grinding stage of the pigment-producing operation. The resulting pigment and aerogel mixture is then ground or pulverized in conventional pigment grinding equipment, preferably in a fluid energy mill, such as a micronizer, to obtain the pigment texture and fineness desired. As a result, the whiteness properties of the final pigment will be greatly improved with wear upon the milling means itself being advantageously reduced.

Since aerogels of both silica and alumina have been found markedly effective for accomplishing the beneficial results of the invention, such types of pigment treating agents are preferred by me. Thus, from about 0.1% to 2.0% by weight of a silica aerogel having a bulk density of less than about 20 pounds per cubic foot is conveniently added or otherwise incorporated in the TiO₂ pigment and the resultant mixture is then dry ground, as above indicated. In instances where the titanium dioxide pigment comprises a product resulting from the vapor phase oxidation of titanium tetrachloride, in accordance with, for instance, the methods disclosed in U.S. Patents 2,488,439 and 2,488,340, use is preferred of an amount of alumina aerogel not exceeding about 5% by weight as the reactant. It is in its application to pigments from TiO₂ oxidation that the present invention is outstandingly useful and satisfies particular and specific needs. As already noted, such pigments are very difficult to grind in fluid energy mills due to undesired loss of pigment brightness being incurred. This is

ments. The term "aerogel" refers to the particularly voluminous dried gel prepared from a large number of colloidal systems by removing the liquid from a gel under special conditions designed to prevent substantial shrinkage. A gel is a non-fluid system comprising a fluid phase and a solid phase, the solid phase being porous or web-like extending throughout the fluid phase and being formed by the coagulation of colloidal particles. It may be very soft or quite rigid depending upon the concentration and degree of gelation. When the fluid phase is water, the system is called a hydrogel. The fluid may also be an organic liquid. These liquids may be replaced by a gas such as air. When a gel is dried by normal evaporation of the liquid, the gel shrinks to fifty or less per cent of its original volume and the dried microporous product is called a aerogel.

Aerogel, however, is prepared by removing the liquid from a gel under special conditions which substantially prevent a large part of the shrinking encountered in preparing a aerogel. Among useful methods for effecting aerogel preparation, the procedures set forth by Professor F. L. Kistler disclosed in the 1932 publication of the Journal of Physical Chemistry, vol. 36, page 62, can be referred to. According to the disclosure, the gel is placed under a pressure equal to or greater than the critical pressure of the liquid phase, the temperature is raised to or above the critical temperature and the vapor drawn off and replaced by air leaving the solid phase in the form of an aerogel which, in the case of silica, occupied about 80% of the volume of the original gel. An aerogel is characterized also by the fact that when it is reconstituted by the liquid and dried normally a large shrinkage occurs, whereas a aerogel is substantially unchanged in this treatment, it having already undergone this shrinkage in its preparation. The aerogels are further characterized by their low bulk density for example, the ordinary "silica gel" of commerce, which is a highly porous aerogel, has a density of from about 20 to 25 pounds per cubic foot, whereas silica aerogels have bulk densities from five to ten pounds per cubic foot. The bulk density of such aerogels may be varied considerably, that is, it may be increased from the very low range to the rather indefinite range of values between aerogels and aerogels by aging and partial drying of the initial gel. In their application to this invention, aerogels from the white, colorless, or very light-colored members of the species, such as those obtained from the hydroxides of aluminum and silicon, are preferred for use.

To a clearer understanding of the invention, the following specific examples are given. These are merely illustrative and not to be taken as in limitation of the invention:

Example I

One hundred pounds of a TiO₂ pigment produced by the oxidation of TiCl₄, in accordance with the procedures of the patents above referred to, were thoroughly mixed with one pound of a commercial silica aerogel prepared as outlined in the cited Journal of Physical Chemistry article. The resulting mixture was then dry