was dry ground at the same rate and in the
same machine. The following results were ob-
tained from the two grinding operations:

<table>
<thead>
<tr>
<th></th>
<th>Bright-</th>
<th>p. m.</th>
<th>Tinting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated TiO₂</td>
<td>25</td>
<td>256</td>
<td>130</td>
</tr>
<tr>
<td>Treated TiO₂</td>
<td>25</td>
<td>256</td>
<td>130</td>
</tr>
</tbody>
</table>

The brightness values given were obtained
visually by comparing pigments rubbed to a paste
in oil. The usual arbitrary scale of values runs
from about 8 to 20, 16 being of excellent
whiteness and suitable for commercial use. One
point on this scale is based on the least per-
cceptible difference noticeable to the average
trained person. The minus 35 value for the
untreated sample was estimated from a set of
temporary standards made by concentrating
standard pigment and to show the relative im-
provement arising from the present invention.
While pigments with a brightness value of 8
are considered poor. Parallel experiments us-
ing commercial "alica gel" of the xerogel class
showed no significant preservation of pig-
ment brightness during grinding. The tinting
strength values given were obtained from the
tests described on page 3 of U. S. Patent 2,445,004.

Example II

A titanium dioxide pigment similar to that
used in Example I was mixed with 0.8% of its
weight of an alumina aerogel and fed through an
"R" stainless steel "micronizer" at 9 kg pounds per
hour. Subsequently the same preservation of
brightness was obtained as compared with an
untreated control. In addition, a marked re-
sistance to discoloration on baking at high
temperatures was found to result when the
ground alumina aerogel-treated pigment was
used in a normal baking enamel formulation.

While use in preferred aerogels of aluminas and
alumina, other aerogels or mixtures thereof be-
longing to the class derived from the substan-
tially white, water-insoluble, hydrous oxides can
also be employed. The specific elements, the
hydrous oxides of which are utilisable herein,
include, in addition to silicon and aluminum,
titanium, zirconium, magnesium, zinc, cadmi-
im, lead, antimony, bismuth, and the like.
Aerogels being in the dry form are usually con-
sidered as comprising the anhydrous oxides of
the elements mentioned. However, as is known
in the case of aerogels, considerable water may
be present, either adsorbed or chemically com-
bined. This water may be present in the aerogels
herein used as long as the amount thereof is not
great enough to cause substantial shrinkage on
normal drying, e. g., in a warming oven. Again,
while the aerogels contemplated for use herein
comprise those prepared by the above-mentioned
method of Kistler, if desired other known and
available methods of preparing this class of ma-
terials can be resorted to, since the invention,
obviously, is not restricted to any method of
preparing the aerogels.

The pigments to which this invention applies
comprise the second class of aerogels which
such as calcium carbonate, calcium sulfate,
barium sulfate, or siliceous materials, and the
like. The TiO₂ may be either in the anatase or rutile crystalline form and may result from
the hydrolysis or oxidation processes referred to.
While TiO₂ pigments, either alone or ex-
tended, are particularly contemplated for treat-
ment herein, other forms of titanium pigments,
including the various titanates, are also con-
templated for treatment, with advantageous
beneficial effects.

It will also be understood that although the
invention is especially useful in the dry grinding
of pigments in fluid energy or jet types of mills,
such as those described in Perry's Chemical En-
gineers' handbook, 3d edition, pp. 1145-47, in
order to overcome the pigment quality impairment
and excessive mill wear particularly experienced
in such types of milling equipment, it has general
application to other common types of pigment
milling means, including ball mills, pebble mills,
rud mills, etc., consisting of a rotatable shell con-
taining a large number of loose, tumbling, grind-
ing elements, as well as other forms of milling
means in which reduction of pigment particle size
can be effected.

The treatment of aqueous slurries of titanium
dioxide pigments with alumina hydrate to prevent
undesirable paint film characteristics such as bak-
ing discoloration, excessive weathering rate, and
darkening on exposure to light, is already known
(U. S. Pat. 2,445,004). This treatment, however,
is limited to wet pigment preparations since, as
the patentee points out, the dry addition of
alumina does not give the patentee's results, as
when alumina is precipitated in the aqueous pig-
ment slurry. It has now been found that by using
alumina in the aerogel form as herein contem-
plated and subjecting the pigment mixture to dry
grinding, new and unexpected benefits are real-
ized. Thus, not only is impairment in pigment
brightness overcome, and a noticeable increase in
tinting strength obtained, but a new, simplified
method of rendering titanium dioxide-containing
pigments more light and heat-stable in paint films
is provided. An unexpected advantage lies in the
fact that the use of an aerogel minimizes abra-
sion and erosion of metal parts in fluid energy
mills. This is doubly advantageous in that not
only is the mill protected, but the color of the
white pigments being ground is preserved. These
results are quite unexpected, especially in con-
nection with the alumina aerogels. It is therefore
difficult to propose a theory in explanation of the
action of this new class of agents. Their behavior
may be related to their very low bulk density
which negates very thin-walled capillary struc-
ture. These fragile walls may, during grinding,
leave onto the pigment and perhaps also onto the
mill surfaces and thus achieve the interesting ef-
fects herein accomplished. Another explanation
might be that the aerogels are more chemically
active than, for example, aerogels, and are able
to attach to the surfaces by chemical bonds of
perhaps a secondary nature. While proof of these
theories is presently unavailable, it is positively
evident that the beneficial effects obtained
herein by grinding the presence of aerogels can-
not be had by substituting aerogels therein.