

UNITED STATES PATENT OFFICE

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PROCESS FOR MODIFYING B. A.-TYPE WOOL
TO IMPART HARSHNESS AND LOW LUS-
TER THERETOStuart E. Swanson, Suffield, Conn., assignor to
Bigelow-Sanford Carpet Co., Inc., Thompson-
ville, Conn., a corporation of MassachusettsNo Drawing. Application July 16, 1949,
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3 Claims. (Cl. 8-95)

1

The present invention relates to the treat-
ment of wool, to improve the physical prop-
erties of the wool and more particularly to a treat-
ment which will enhance the harshness of the
wool while at the same time decreasing its lustre.

In the manufacture of pile fabric floor cover-
ing by the established operations peculiar to this
field, including the carding, spinning, dyeing,
etc., of the fiber, it is necessary that the wool
have a certain harshness of texture. In addition,
the wool in the pile tufts of the completed prod-
uct should have a low degree of lustre.

B. A.-type wool, is so deficient in harshness
that it has not been possible to process it into
carpets or rugs by the established procedure and
with the equipment presently installed in carpet
manufacturing plants, which procedure and
equipment operate successfully with the conven-
tional, harsher, carpet wools. Because of the
soft, slippery, silk-like nature of the B. A.-type
wool fibers, great care and constant attention
must be exercised throughout the processing of
the wool and the yarn and the weaving thereof.
The resulting product is in a sense a hand-made
article and commercial production by the es-
tablished practice is not feasible.

It is an object of the present invention to pro-
vide a process for harshening and delustering
B. A.-type wools thereby to extend their use in
the manufacture of pile fabric floor coverings.

By the present invention I provide a process
for so modifying these B. A.-type wools that the
harshness of the fiber is increased to such an
extent that the modified wool may be manu-
factured into pile fabric floor covering on a
commercial scale by the conventional procedure
and apparatus with only normal attention dur-
ing the processing. It is possible to manufac-
ture on a commercial basis pile fabric floor cov-
erings consisting entirely of B. A.-type wools
modified by my process. The treatment of my
invention also decreases the lustre of the wool.

I have discovered that by treating these soft,
silk-like, lustrous, slipper B. A.-type wools with
an acid aqueous suspension of titanium dioxide,
preferably in a bath containing the titanium di-
oxide, the fibers of these wools are rendered
harsher so that they may be handled by the
methods conventional in the carpet manufac-
turing industry, in which methods the harsher
conventional carpet wools are used. Also, at the
same time, the lustre of said fibers, which is un-
desirable in conventional domestic rugs and car-
pets, is decreased.

2

The following is given as an example of my
process:

A batch of raw B. A. wool stock weighing about
900 pounds is immersed in a treating bath com-
prising about 4,000 gallons of cold water con-
taining 6¾ pounds of titanium dioxide suspend-
ed therein and adjusted to a pH of 3-5 with sul-
furic acid. Heat is applied to the bath while the
liquor is being circulated through the wool and
the bath brought to the boil and maintained at
the boiling point for about 5 minutes. There-
after, the wool is rinsed in running tap water,
removed from the bath and dried. The result-
ing modified wool can be processed into pile fab-
ric floor covering by the conventional procedures
employed with the usual carpet wools with no
more than normal care and attention.

The treating bath, I have found, gives best
results when its pH is 3 to 5, and accordingly I
may include in the treating bath an acid such as
sulfuric acid or an acidic salt such as sodium
bisulfate in an amount sufficient to bring the
pH into this range.

I prefer that the treating bath be kept at the
boil during the treatment, as in the foregoing
example, and that the wool be kept in the bath
at or near the boil for a period of approximately
5 to 15 minutes. However, satisfactory modifi-
cation of the wool may be obtained at lower
temperatures by allowing the wool to remain
standing in the bath for correspondingly longer
periods of time. In this case, the titanium di-
oxide may be incorporated in the bath in the
same proportion used with the boiling bath.

Conveniently, the wool may be subjected to the
treatment of this invention concurrently with
acid dyeing of the wool. The following example
illustrates treatment of the wool in this way.

Preliminary to the acid dyeing operation I
add to the bath of cold dye liquor about ¾%
of titanium dioxide, based on the weight of the
wool. The wool, preferably, in raw stock form,
is then immersed in the acid dye-bath and sub-
jected to the normal dyeing operation, in which
the bath is brought to the boil and the wool
exposed to the action of the hot titanium dioxide
and during which operation the wool will absorb
substantially the entire titanium dioxide content
of the bath. The titanium dioxide used in the
present invention is compatible with all acid
dyes.

I have found that the proportion of titanium
dioxide present in the treating liquid may be
varied, depending upon the degree of modifica-
tion to be imparted to the wool and upon the

temperature of the treatment, and I prefer to include in the bath amounts of titanium dioxide ranging from about $\frac{1}{2}\%$ up to about 10%, by weight of the wool to be treated, preferably about $\frac{3}{4}\%$, when the mode of treatment employed is a standing bath as described above.

Another mode of treatment is to treat the wool with the titanium dioxide as a continuous operation in a moving stream of treating liquid. Thus the wool may be treated as it is subjected to the rinsing operation which normally follows the scouring operation in the preparation of wool fibers for use in pile fabric floor coverings. This procedure is particularly useful with wools which are not to be dyed but are to be manufactured into yarn of their natural color. In many cases the rinsing following the scouring operation is carried out with water at a temperature of about 140°-160° F. The titanium dioxide content of the rinse bath should approximate $\frac{1}{2}\%$ to 8%, preferably about $\frac{3}{4}\%$, of the weight of the wool. The wool is passed through the rinsing tank in a continuous operation and the titanium dioxide therefore must be continually supplied to the tank to maintain the desired concentration therein. For this purpose any appropriate, constant-rate feeding means may be employed.

The treatment of the present invention when applied to the B. A.-type wools serves to convert a wool which can be used only in minor proportions, if at all, for the manufacture of pile fabric floor coverings, into a wool which can be used substantially in the same way as the conventional carpet wools. Wool treated by my process may be spun into yarn which may then be woven as the pile of pile fabric floor coverings, notwithstanding the fact that the original stock was largely or entirely a B. A.-type wool which inherently is incapable of being processed on the conventional carpet manufacturing apparatus. Such pile has a coarse harsh texture and a lack of lustre far different from the texture and lustre of untreated B. A.-type wools and comparable with the texture and lack of lustre of the conventional carpet wools.

Raw B. A.-type wool stock modified by my process may be mixed with conventional carpet wools in all proportions to give a wool mixture suitable for use in forming the pile of pile fabric floor coverings.

By the term "B. A.-type wool" as used herein, I mean wool having the characteristics of "B. A. wool" as regards its soft, slippery nature, its lustre and its lack of harshness and fullness as contrasted with the conventional carpet wools. I use the term "B. A. wool" in its ordinary meaning in the trade, i. e., wool from the Lincoln-type sheep as grown in South America. The

"B. A.-type" wools available today consist primarily of B. A. wool and wool from the Lincoln sheep as grown in New Zealand.

Although the above specific examples of my process, given by way of illustration and not of limitation, relate to procedures in which the wool is immersed in a bath of the treating liquid, it is not intended thereby to exclude other ways of wetting the wool with the treating solution, such as by sprinkling, spraying, etc.

This application is a continuation-in-part of my copending application Serial No. 1,910, filed January 12, 1948, now abandoned, for "Modification of Wool to Impart Harshness and Low Lustre Thereeto."

I claim:

1. The process for imparting to B. A.-type wool the properties of harshness requisite for conversion of the wool by standard procedures into pile fabric floor covering, and for decreasing its lustre, which consists essentially in wetting the wool with an acid aqueous dispersion of $\frac{1}{2}\%$ to 10% of the weight of the wool of titanium dioxide.

2. The process for imparting to B. A.-type wool the property of harshness, requisite for conversion of the wool by standard procedures into pile fabric floor covering, and for decreasing its lustre, which comprises immersing the wool for approximately 5 to 15 minutes in a boiling aqueous bath, at a pH of 3 to 5 and consisting essentially of an aqueous suspension of $\frac{1}{2}\%$ to 10% of the weight of the wool of titanium dioxide.

3. The process as in claim 2 in which lower than boiling temperatures and longer periods of time are used.

STUART E. SWANSON.

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