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PROCESS OF PRODUCING AXMINSTER PILE FABRIC

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Our invention relates to an Axminster pile fabric, carpet or rug, and to the process of producing the same. The object is to produce such a fabric in which the pile tufts are abnormally twisted and yet form a pile, which fully covers the backing fabric and has the soft texture required in Axminster pile floor coverings, and in which the twist in the tuft legs is permanent, i. e., unaffected by wetting, as in washing and shampooing.

So far as we are aware, all attempts made heretofore to produce an Axminster fabric with such a pile have not been successful due principally to the difficulties of feeding hard twisted yarn through the tubes of an Axminster loom and of laying the ends uniformly against the reed.

Our invention is concerned with the treatment of hard twisted, set, and kinky wool yarns to straighten them out so that they may be woven in an Axminster loom without such difficulties, and with the treatment of the Axminster woven fabric to produce a soft texture pile of twisted, swollen tuft legs which effectively cover and conceal the backing fabric.

The hard twisted, set, kinky wool yarn may be produced by any suitable process but we prefer the following as producing a yarn which is best adapted to our treatments above outlined. The wool, with or without other fibers, is dyed in the raw stock, processed and spun into strands in the usual way. The strands, which may have from two to five turns per inch, are twisted abnormally, i. e., about ten turns to the inch and reeled into skeins. The skeins are removed from the reels, whereupon the abnormal twist in the yarn causes it to coil upon itself and form kinks. The twist is set by immersing the skeins of yarn, relieved of tension, in water, with or without a wetting agent, and, after excess water is centrifugally removed, the skeins are subjected to steam, preferably at about 260° F., for about 30 minutes in a closed chamber in which the pressure is maintained at about 15 pounds per square inch above atmospheric. The resulting wool yarn is hard twisted, set, and kinky, and in this condition could not be employed, as pile yarn, in an Axminster loom.

In carrying out our process we first apply sufficient tension to the yarn to straighten out the kinks and wind the yarn in such straightened condition on spools preferably having perforated cores. We prefer to wind the yarn in a dry state as we have found that it has then higher tensile strength and the winding may be accomplished more efficiently. But the yarn may be wound wet

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if desired. The yarn on the spools is under a strain which, if the tension were relaxed, would cause the yarn to kink.

We next wet the spooled yarn in water, preferably hot to accelerate the process, or by steam and then dry it by any suitable means. The use of spools with perforated cores expedites the drying. The dried yarn has its original abnormal twist, but the strain or resiliency, which has caused the kinks, has been substantially removed or relieved so that the yarn when relieved of tension, as by unwinding from the spools, does not kink. We wind the yarn on the spools of an Axminster loom. In this unkinked condition the yarn ends are drawn through the tubes of the loom, uniformly laid against the reed and pushed up into the shed by the upward movement of the comb, as in conventional Axminster weaving. We thus avoid the formation of distorted random ends which would have occurred if the tendency to kink had not been removed and which would have prevented the proper drawing of the yarn through the tubes and the uniform laying of the yarn against the reed.

We then wet the woven fabric with water or steam whereby the legs of the pile, while retaining their twist, become soft and expand or swell. After drying the fabric the pile surface has the desired soft texture and thoroughly covers and conceals the backing fabric. This is in striking contrast to the condition of the pile after having been woven, when the legs of the pile are thin and wiry so that the pile surface has a harsh texture and the backing fabric may be seen through the pile. The wetting can be done satisfactorily by immersing the fabric in hot or cold water or by spraying it with hot water, but we prefer to steam the fabric for about ten minutes at 90° to 100° C. We have found water to be a satisfactory wetting agent, but other wetting agents, if desired, may be used or added to the water. The final step of drying the fabric may be carried out by any suitable apparatus, preferably in a drying chamber through which hot air is circulated.

Our finished Axminster fabric has a permanently set, swollen, twisted pile which retains its twist when the fabric is wet or shampooed. Our fabric is claimed in our copending application Serial No. 61,768, filed November 24, 1948.

We claim:

1. The process for the production of an Axminster pile fabric having pile of wool yarns hard twisted to such a degree that they have a tendency to kink which comprises treating a kinky

hard twisted wool yarn having the kinks set therein, to temporarily remove the kinks and inhibit the tendency of the yarn to kink when relieved of tension, by wetting the yarn and then drying the yarn under sufficient tension to straighten out the kinks, winding the kink-free yarn on the spools of an Axminster loom and weaving the yarn on said loom as the pile of an Axminster pile fabric, and then wetting and drying the legs of the pile of the resulting Axminster pile fabric, whereby the tendency of the pile yarn to kink is restored, and the legs of the pile are softened and swollen while retaining their twist.

2. The process for the production of an Axminster pile fabric having pile of wool yarns hard twisted to such a degree that they have a tendency to kink which comprises treating a kinky hard twisted wool yarn having the kinks set therein, to temporarily remove the kinks and inhibit the tendency of the yarn to kink when relieved of tension, by wetting the yarn and then drying the yarn under sufficient tension to straighten out the kinks, winding the kink-free yarn on the spools of an Axminster loom and weaving the yarn on said loom as the pile of an Axminster pile fabric, and then wetting the legs of the pile of the resulting woven Axminster fabric by exposing its pile face to steam at atmospheric pressure and drying the fabric, whereby the tendency of the pile yarn to kink is restored, and the legs of the pile are softened and swollen while retaining their twist.

3. The process for the production of an Axminster pile fabric having pile of wool yarns hard twisted to such a degree that they have a tendency to kink which comprises twisting wool yarn sufficiently to cause the yarn to kink when relieved of tension, setting kinks in the yarn by steaming the yarn at a pressure above atmospheric while the yarn is relieved of tension and kinky, treating the resulting kinky hard twisted wool yarn having the kinks set therein, to temporarily remove the kinks and inhibit the tendency of the yarn to kink when relieved of tension, by wetting the yarn and then drying the yarn under sufficient tension to straighten out the kinks, winding the kink-free yarn on the spools of an Axminster loom and weaving the yarn on said loom as the pile of an Axminster pile fabric, and then wetting the legs of the pile of the resulting woven Axminster fabric and drying the fabric, whereby the tendency of the pile yarn to kink is restored, and the legs of the pile are softened and swollen while retaining their twist.

4. The process for the production of an Axminster pile fabric having pile of wool yarns hard twisted to such a degree that they have a tendency to kink which comprises twisting wool yarn sufficiently to cause the yarn to kink when relieved of tension, setting kinks in the yarn by steaming the yarn at a pressure above atmospheric while the yarn is relieved of tension and kinky, treating the resulting kinky hard twisted wool yarn having the kinks set therein, to temporarily remove the kinks and inhibit the tendency of the yarn to kink when relieved of tension, by wetting the yarn and then drying the yarn under sufficient tension to straighten out the kinks, winding the kink-free yarn on the spools of an Axminster loom and weaving the yarn on said loom as the pile of an Axminster pile fabric, and then wetting the legs of the pile of the resulting woven Axminster fabric by exposing its pile face to steam at atmospheric pressure and drying the fabric, whereby the tendency of the pile yarn to kink is restored, and the legs of the pile are softened and swollen while retaining their twist.

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