

closely-covered surface, or such as are to have the fullest possible feel, must not be wet sponged, as unteasled goods become thinner in feel by this manipulation.

Wet lustring is also a good means for removing washing folds, creases, etc., from the unteasled material. By simply beaming up smoothly and laying them down for a few hours in lukewarm water, goods without folds are obtained, and this method is frequently employed in finishing chevots, meltons, and serges. Another advantage of wet lustring is that the durability of the material is less impaired than by the treatment with dry steam.

One more feature to be considered in employing the wet-lustring process is the fastness to water and sponging, or rather fastness to boiling of the colors; dyestuffs which bleed or change the color when treated with boiling water must be avoided from the start. Most of the natural dyestuffs—indigo, also logwood, fustic, sanders, and others—are sufficiently fast to boiling; also most of the alizarins, anthracene and anthracene acid dyestuffs, and analogous products. Generally colors which are not fast to boiling show also less fastness to fulling. Several products which are exclusively employed for piece-dyeing are also somewhat degraded by wet lustring, such as brilliant black, naphthol black, and naphthylamine black. This is prevented, however, by adding to the water-bath some Glauber's salt and sulphuric acid.

The oldest and most primitive application of wet lustring consists in winding the goods as they come from the teaseling machine or laying machine upon rollers, wrapping the rolls in some covering material, and laying them down in boiling water. Usually a winding apparatus is attached to the teaseling machine, which automatically performs the winding operation. The winding roller or beam is placed upon the front drawing roller, by which it is driven, its trunnions working in sliding bearings, so that it can rise with the increase of its circumference. When goods are handled which require winding with different tension a special cloth winder with tension-regulating device is employed. The rolls are entered into the boiling vat, which is filled with hot or boiling water, in such a manner that they do not touch each other, and only rest on either side upon their trunnions, as otherwise press stains or water stains are apt to be produced. The best plan is to hang the rolls upon an iron frame, which can, by some hoisting apparatus, be lowered into and lifted from the boiling vat. After four to six hours the rolls are lifted from the bath, unwound, and rinsed for some time upon the washing-machine with clean, cold water, eventually with the addition of a solution of fuller's earth. Then it is well laid with old teasels or wet brushes, and afterwards dried.

According to the amount of lustre required, the material is wound loosely or solidly (the former giving

more lustre, the latter more body), left for a longer or shorter period in the boiling vat, cooled more quickly or more slowly, etc. In general, however, the material should not be wound too firmly, because it loses thereby in handle, becoming thin and parchment-like, and because it takes too much time before the boiling water penetrates all parts of the roll, which is necessary for the prevention of an uneven lustring effect. For the promotion of the quicker penetration of the boiling water hollow perforated copper cylinders are preferable to wooden rollers.

With the more general introduction of the wet-lustring method the desire grew more and more urgent to replace the old methods of beaming and immersion in boiling water, which consumed time and labor and caused all kinds of trouble, by a simpler, more expeditious method, ensuring better guarantee for the prevention of damages and difficulties, to attain which purpose special continuously-working machines were found to be the best and most suitable means. The type for such a machine was furnished by the crabbing machine, which is used in finishing worsted goods for the important scalding or fixing operation. This machine serves for similar purposes as those intended for wet lustring. With the worsted goods the object is partly to fix the threads of the tissue so that they permanently remain in the position assigned to them by the weave, and do not change it, partly to limit the shrinking and felting capacity, so that the stuff in the subsequent washing shall not shrink so much and the surface not be felted. In the case of wool-yarn goods the intention is likewise to obtain by the treatment with boiling water a fixation of the tissue but at the same time to cover the grain.

Scalding or fixing machines modelled after the crabbing machine, are to-day in use in various forms for the wet lustring of wool-yarn fabrics. The way of operating with these machines is simpler, and the result is a better one than with the old boiling method. The simplest form of such scalding or fixing machines is that with one trough and two rollers. The material passes over a stretching or tentering apparatus into the scalding trough, which is filled with boiling hot water, and is then smoothly wound upon the lower of the two rollers, which are placed one above the other. In winding it must be seen to that selvage falls exactly upon selvage, and that the selvages are neither too thick nor too long, so that they do not stand out too much over the cloth. The roller bearing the material, and which dips with about one-half of its thickness into the liquid, is then, according to the desired effect, for a longer or shorter time run in the boiling water under the pressure of the upper roller, which is regulated by weighted levers or springs. The operation being ended, the hot water contained in the trough is let out, the trough filled with cold water, and the material in unwinding passed through the cold water, the so-called fixing bath, to be eventually rinsed upon the washing machine.