

The Warping or Beaming Machine follows the winding frame, and has a V-shaped creel, to contain 500 or more warpers' bobbins, the threads from which are passed through a reed, under and over tension rollers, and thence through a guide comb, and on to a warpers' beam, consisting of a wood roller about 5 inches diameter, with iron flanges about 21 inches diameter. The yarn is now in a suitable condition for being sized, to facilitate weaving, &c.

Sectional Warping is a method largely adopted for dyed or coloured warps, and where the warp yarn is sized in the hank. The machine for this purpose is a diminutive beaming frame, with a creel for 400 to 600 bobbins.

The yarn is warped in sections, or cheeses, about 5 inches in width, the number depending upon the number of threads to be put on the loom beam.

If the yarn is required in balls for transport, the ends from a section are gathered together into a loose rope and coiled in a balling machine.

For warps containing coloured ends, the system of sectional warping presents well known advantages. The yarn can be sized in the hank after reeling (each colour being kept separate), then wound on warpers' bobbins on the Drum Winder, already described, and, finally, placed in the creel of the Sectional Warping machine in the required order to form stripes and other effects as in check and fancy cloths.

Size Mixing.—This is performed in becks or wooden cisterns fitted with revolving "dashers" to stir the mixture. The mixing of size requires constant care and supervision, as variation in quality of materials used, atmospheric conditions, time of storage, &c., necessitate changes in proportions of ingredients to obtain correct and unvarying weights of size in the yarn, and to prevent mildew. The ingredients and the proportions used are very variable, each manufacturer having his own particular recipe; experience, therefore, is the only reliable guide in matters of this kind.

The following are the principal ingredients used:—

- 1st. *Adhesive Substances* which have vegetable origin.—Wheat flour, farina, sago, rice, dextrine or British gum, and Irish moss.