

where they are required to produce the design. In this way a large amount of dyed yarn must of necessity be concealed under the surface. In a Brussels of five colors, or a five-frame carpet, only about one-fifth of the dyed worsted forms the surface of the carpet and is invisible, while roughly speaking, about four-fifths lies under the surface and is lost to view. By Whytock's process this great loss of valuable material is altogether avoided, all the colored yarn in the tapestry carpet being on the surface and visible. Another point of advantage is the saving of space with tapestry looms, a Brussels loom occupying three times the space in length that a tapestry one requires. In the early days of Whytock's invention the yarn was wound on the printing drum from bobbins, by rotating the drum by means of a hand crank, while a simple arrangement guided the threads across the breadth of the drum. At that time the colors were applied to the yarn, not by means of a printing pulley and color-box, as now employed, but with straight wooden sticks or rulers which were dipped into the color paste and then applied to the yarn across the drum. The edges of the printing sticks were covered with felt. Originally the printing drum seems to have been made of tin and covered over with waterproof cloth. The point at which these color rulers were applied was midway up the drum, where a ledge or guiding shelf was erected to keep the ruler exactly parallel to the edge of the drum. The introduction of rollers or pulleys running in a small box and color paste, and printing at the bottom of the drum instead of the side, was a great improvement on the old system.

Like the majority of clever inventions, Whytock's method of coloring tapestry carpets is very simple in theory, yet in

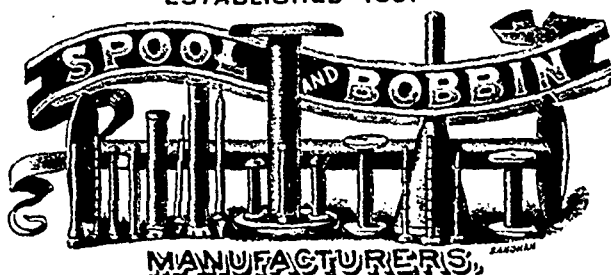
actual practice the many little important details requiring attention give it a complexity which renders it difficult to comprehend at first sight. The following explanation will give an intelligent idea of the tapestry process of carpet making to those unacquainted with it in actual work. The design of the carpet pattern is first painted on paper divided into little squares or parallelograms, each little oblong representing a loop in the finished carpet. This colored design, which somewhat resembles a mosaic, is pasted on a board and hung beside the printer.

The circumference of the large cylinder or drum, which is made of wood, is first covered with varnished or glazed cloth to prevent the dyes from entering and staining the wood. It is then wound evenly round with one layer of the carpet yarn, giving it the appearance of an immense bobbin covered with one layer of thread. The drum is covered only half-way across with yarn, thus making only half the number of carpets. Underneath the drum, and running in the direction of its axis, is a small set of rails, on which runs the carriage for the color-boxes for supplying the various colors to the yarn. In each box and partly submerged in the color paste, is a roller or pulley varying in width from  $\frac{1}{4}$  to  $\frac{1}{2}$ -inch, which, as the color-

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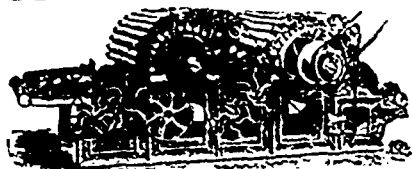
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