

DESIGNING AND FABRIC STRUCTURE.

Influence of the Twist of the Yarns.

By Wm. Watson.

The twist, which is put into yarns in order to bind the fibres together, affects the handle, strength, and wearing property of a cloth, and also has a considerable influence upon the appearance of a fabric in which any form of twill line is developed. Generally, just sufficient twist is inserted to enable the threads to withstand the strain of weaving. More turns per inch are required in fine than in thick threads, and for short than for long-fibred materials, while warp yarns are mostly harder twisted than filling yarns. The twist, while strengthening the yarn, makes it harder, and reduces its lustre; to many fabrics the necessary firmness of structure is imparted by the warp, and softness and brightness by the filling. For special purposes, yarns are twisted more or less than the normal, according to the effect required in the cloth; thus *voile* and *crepon* yarns are very hard twisted, whereas yarns for raised fabrics are twisted soft.

If the direction of the twist is to the right, as shown at *A* in the accompanying illustration, it is termed *open-band*, and if to the left, as represented at *B*, *cross-band*. In cotton yarns, *A* represents warp twist (twist way) and *B* filling twist (filling way), whereas in worsted yarns, warp twist is as shown at *B*, and filling twist as shown at *A*. Single woolen yarn is almost invariably twisted as indicated at *B*. In folded yarns, the twist is mostly inserted in the opposite direction to that of the single threads, since this causes some of the twist to be taken out of the singles, and a softer folded yarn results than if the direction of the twist is the same in both twisting operations; the latter method increases the twist in the singles and tends to make the folded yarn hard.

C, *D*, *E*, and *F* in the illustration shows the different ways in which the warp and filling threads may be placed in relation to each other, as regards the direction of the twist.

In *C*, the warp twist is as shown at *A*, and the filling twist as at *B*, the surface direction of the twist being to the right in both threads when the filling is laid at right angles to the warp.

D shows the exact opposite of *C*, the surface direction of the twist being to the left.

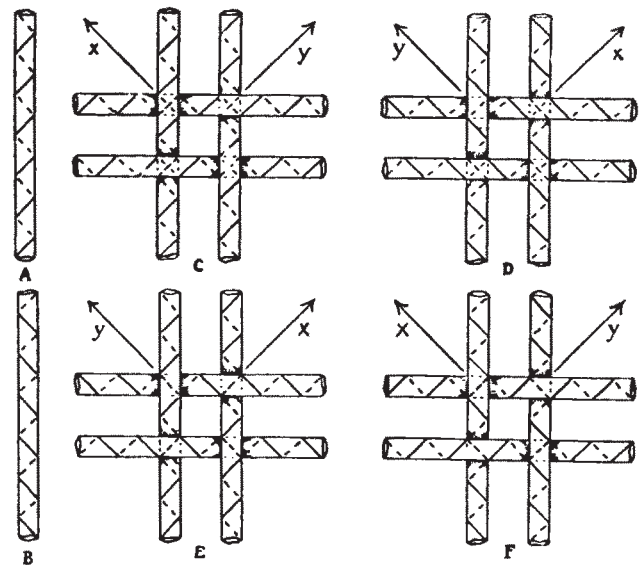
E shows both series of threads twisted as shown at *A*, and *F* same as at *B*.

In *C* and *D*, the direction of the twist, on the under side of the top thread, is opposite to that on the upper side of the lower thread, hence the threads do not readily bed into, but tend to stand off from each other, which assists in showing up the weave and structure of the cloth distinctly.

In *E* and *F*, on the other hand, the twist of the under side of the top thread is in the same direction

as that on the upper side of the lower thread, hence in this case the conditions are favorable for the threads to bed into each other and form a compact cloth in which the weave and thread structure are not distinct.

In twill fabrics, the clearness and prominence of the twill lines are accentuated if their direction is opposite to the surface direction of the twist of the yarn. If, however, the lines of a twill are required to show indistinctly, the twill should run the same as the surface direction of the twist of the yarn.



If one yarn predominates on the surface, the twill should oppose, or run with, the twist of the surface threads, according to whether the effect is required to show prominently or otherwise. Thus in *C* and *D*, the arrows *X* indicate the direction in which the twill should run if the lines are required to show boldly and clearly, and the arrows *Y* if an indistinct twill effect is desired. In *E* and *F* the arrows *X* show the proper direction for producing a bold twill, and the arrows *Y* for producing an indistinct twill if the filling predominates on the surface. If, however, the warp forms the face of the cloth in *E* and *F*, the arrows *Y* indicate the proper direction for a bold twill effect, and the arrows *X* for an indistinct twill.

If a twill runs both to right and left in a cloth (a herring-bone twill), it shows more clearly in one direction than the other. Also, the difference in the appearance of right and left twist is sufficient to show clearly in a twill fabric in which the weave is continuous, and *shadow* effects are produced in warp-face weaves by employing both kinds of twist in the warp threads.