the free movement of the peck. It will be obvious, however, that with the presser wheel there is no restriction as to the direction of movement of the frames, other than that of the pattern wheel and the working limits of movement—say about 3½ inches—of the frames themselves. In both systems, the outer pattern grooves control the needle frames nearest the pin frame, and the inner grooves control the frames further back. When the pattern is suitable, it is possible to combine the leading features of both systems in one wheel.

Each order of interlacing requires a separate needle frame and groove in the pattern wheel, and, in general, each pattern requires its own pattern wheel. It is possible, however, by altering the spacing of the needles in the various frames, to obtain different combinations of the individual orders of working on the cloth, and so produce varied effects from one wheel. Colored yarns may also be used, with considerable effect, for developing the patterns. The dimensions of the pattern wheels vary between 8 or 10 inches as a minimum to 24 inches maximum outside diameter, and are determined, among other considerations, by the following: The number of picks in a repeat of the lappet figure must be accommodated; the pitch of the ratchet teeth must not be too fine, otherwise the action will not be reliable; the arc, or rather the circular space between two adjacent radial lines near the centre of the wheel must not be too small for the diameter—say ¼″ to ⅜″—of a feeler or peck; space must also be provided for a groove for each frame to be employed. A wheel 12 inches diameter over the points of the teeth would give a circumferential space for practically 38 teeth (12″ × 3.1416 = 37.7 teeth) of one inch pitch, and at a radius of 2¼″ we should have

$$\frac{2.25'' \times 2 \times 3.1416}{38 \text{ teeth}} = \frac{3}{19}''$$

or practically ⅜″ space between each pair of radial lines at this distance. 38 teeth × 2 picks per tooth = 76 picks in a repeat of the pattern for a common wheel. This number could be doubled by increasing the diameter of the wheel to 24 inches; and it could then be further increased by reducing the pitch of the teeth, say, to ¾ inch. Thus:—

$$\frac{24'' \times 3.1416}{0.75'' \text{ pitch}} \times 2 \text{ picks per tooth} = 201, \text{ say } 200 \text{ picks.}$$

If the pitch of the teeth be further reduced to ½ inch, giving approximately 150 teeth or 300 picks in a revolution, the arc between two radial lines, at 6 inches from the centre of the wheel, would measure only a quarter of an inch. This would require a peck of not more than ¼″ diameter.

(To be continued.)

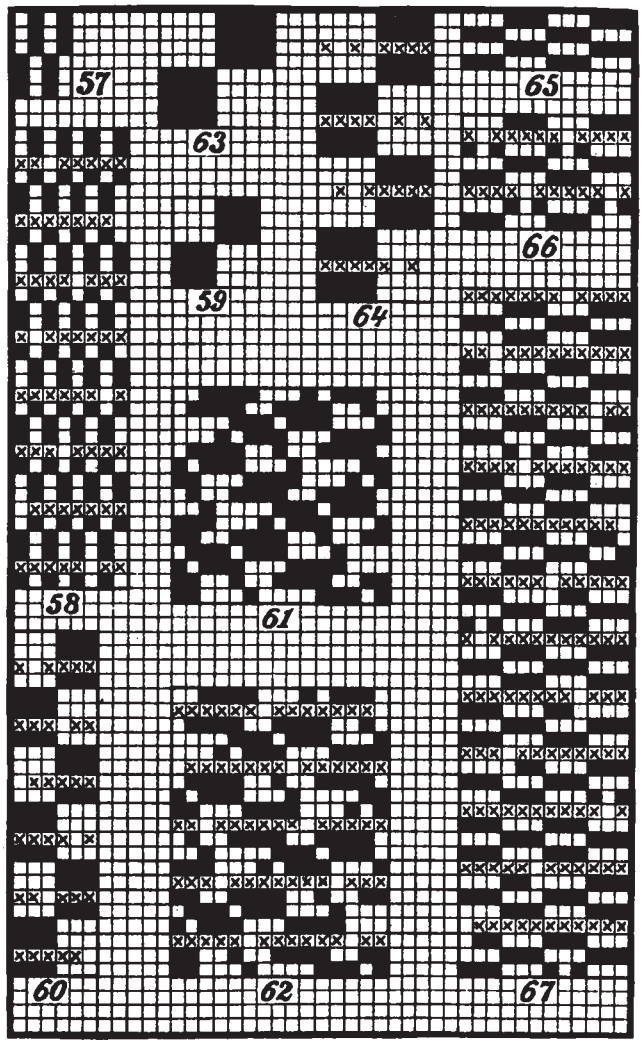
The latest styles in silken scarfs show impressive shadowy designs in rose, blue and mauve. Some of them are silk crepé, some silk cashmere, some silk gauze and some softest satin. The plain-colored satin borderings give a kimono effect when the scarf is draped over the shoulders, and falls softly down the front.

TO INCREASE WEIGHT AND BULK OF FABRIC BY MEANS OF BACK FILLING.

(Continued from page 32.)

Arrangement 3 picks Face : 1 pick Back.

Provided 2 face : 1 back filling will produce too much bulk to the fabric structure, or that an extra heavy count of back filling has to be used, we may arrange the combination of face and back to be 3 : 1, or in extreme cases 4 : 1.



The accompanying plate of weaves has been designed to explain the subject in connection with details given.

Fig. 57 is the 2 by 6 rib weave, warp effect, which is shown in weave Fig. 58 arranged 3 : 1 for a back filling. The connection of the latter to the face structure is done by means of the 8-leaf satin; repeat of weave 8 by 32.

Fig. 59 is the 6-harness basket weave, shown arranged 3 : 1 for a back filling in Fig. 60, the latter being stitched to the face structure by the 6-leaf satin; repeat of weave 6 by 24.

Fig. 61 is a 15-harness granite weave, shown arranged 3 : 1 for a back filling in Fig. 62. Every third warp-thread is, in this instance, not used for stitching the back filling; repeat of weave 15 by 20.