

one machine, hoping to finally obtain Lee's privilege. The machinery brought back to London was set up in Old Street Square, and became the origin of the hosiery manufacture in the metropolis. The machines were sought after, and sold, while others, on an improved plan (see Fig. 4) devised by Aston, were constructed. These had a fixed sinker placed between every two movable jack sinkers, and also twice the number of needles, so that the gauge and value of the frame itself were doubled. Of these, many were soon built in London and Nottinghamshire. In 1620, the Venetian ambassador to England gave £500 for a frame, which, with an apprentice by the name Mead he sent to Venice. But, though in repute for mechanical skill, the smiths there could not give it needful repairs, so that it was brought back by Mead to England, and the project failed. Of the workmen left by James Lee at Rouen, France, one soon died, whereas the other worked on his unimproved frame for about forty years.

For over a century after Aston's improvement the hand stocking frame remained practically unaltered, but about the year 1745, an Irishman, of Dublin, is supposed to have added the *tuck presser*, whereby a distortion of the face of the fabric could be made. This invention was also claimed by the French stockingers, about 70 years previous. At that time little was thought of the invention, although a century later great use was made of it.

(To be continued.)

## A STUDY IN WEAVE FORMATION.

### EPINGLÉ WEAVES.

The same refer to a system of warp effect weaves used for woolens and worsteds, in men's and women's wear.

The effect produced are fine, broken-up rib effect lines, distributed in the shape of either steep twills for woolens and worsteds, or corkscrews for worsteds only. In woolens, the epinglé effect is less prominently noticed on account of the nap these fabrics are provided with in the finishing, whereas in worsteds the effect is distinctly shown up. The face of the fabrics is formed by the warp, the filling producing the back of the structure.

To explain the construction of these weaves, examples 1 to and inclusive 10 are given. On the same principle other weaves can be constructed.

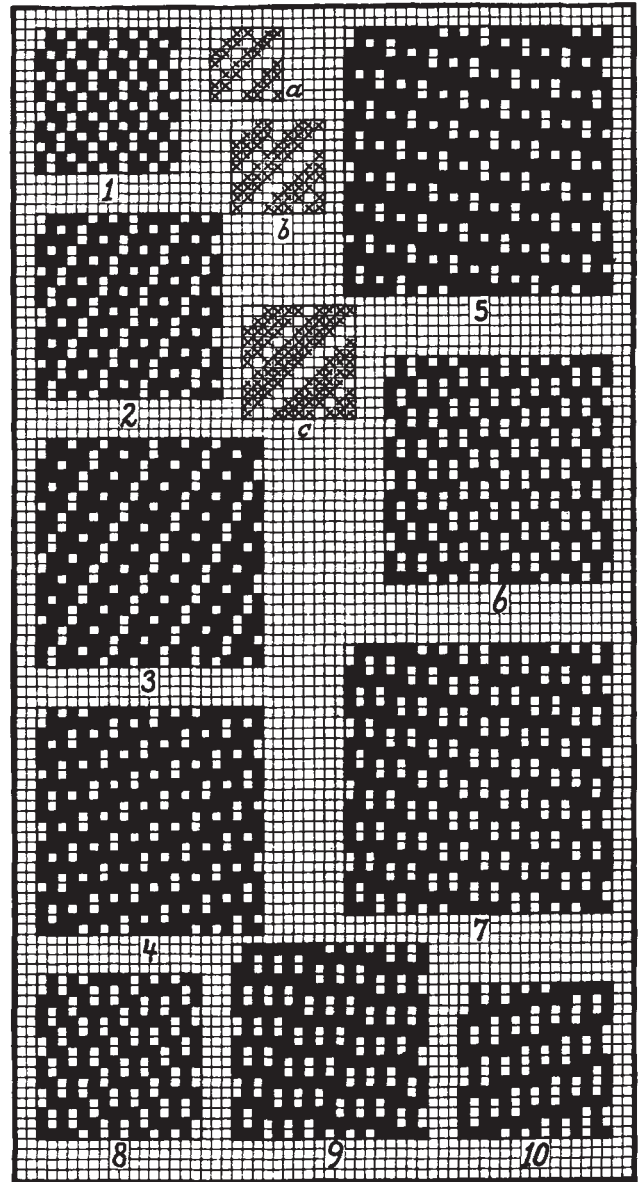
Fig. 1 shows us such an epinglé weave, repeating on 7 warp-threads and 7 picks. The same has for its foundation the  $\frac{2}{1}\frac{2}{2}$  7-harness 45 deg. twill, shown in diagram *a*, drafting the latter by the satin draw 1, 3, 5, 7, 2, 4 and 6. The effect produced by the epinglé weave in the fabric is what we may call a granite rib-twill, technically called a well broken-up 63 deg. steep twill. Repeat of weave 7 x 7.

Weave Fig. 2 has for its foundation the  $\frac{3}{1}\frac{3}{2}$  9-harness 45 deg. twill, shown in diagram *b*, drafting the latter by means of satin draw 1, 3, 5, 7, 9, 2, 4, 6 and 8. Weave Fig. 2 repeats on 9 warp-threads and 9 picks, and shows a somewhat more pronounced rib twill effect on the face of the fabric as compared to weave Fig. 1.

Weave Fig. 3 has for its foundation the  $\frac{4}{1}\frac{4}{2}$  11-harness 45 deg. twill, shown in diagram *c*, drafting the latter by its satin draw 1, 3, 5, 7, 9, 11, 2, 4, 6, 8 and 10. Weave Fig. 3 repeats on 11 warp-threads and 11 picks and refers to a somewhat heavier fabric struc-

ture as compared to the previously given two epinglé weaves, the face effect in weave Fig. 3 interlacing  $\frac{2}{1}\frac{2}{2}$  as compared to the  $\frac{1}{1}\frac{1}{1}$  in weaves Figs. 1 and 2.

Figs. 4 and 5 show other styles of epinglé weaves, obtained the same as the previously given examples from the 45 deg. twills, by means of satin draws, used in connection with weave Fig. 4 the  $\frac{4}{1}\frac{4}{2}$  11-harness twill and in connection with weave Fig. 5 the  $\frac{5}{1}\frac{5}{2}$  13-



harness twill. In both instances 3 is used as the *counter* for the satin draw, *vis*: 1, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9 in connection with weave Fig. 4, and 1, 4, 7, 10, 13, 3, 6, 9, 12, 2, 5, 8, 11 for weave Fig. 5. Both weaves will be used with somewhat heavier textures than examples of weaves quoted before. Weave Fig. 4 repeats on 11 x 11, and weave Fig. 5 repeats on 13 x 13.

The next five examples of weaves given (Figs. 6 to 10) show a more pronounced rib effect, for which reason they mostly refer to worsted fabric structures being technically known as oblique rib weaves, or possibly more popular by the name corkscrews.

Weave Fig. 6 has the  $\frac{3}{2}\frac{4}{2}$  11-harness 45 deg. twill for its foundation, the latter being drafted by a satin

draw, using 3 as the counter, *i. e.*, the same as was used in connection with weave Fig. 4. Repeat of weave: 11 x 11.

Weave Fig. 7 has the  $\frac{4}{2}\frac{5}{2}$  13-harness 45 deg. twill for its foundation, using the satin draw, corresponding to the one used for weave Fig. 5 with it. Repeat of weave: 13 x 13.

Weave Fig. 8 is produced by the same satin draw arrangement (using 3 for counter) from the three-twill-line effect  $\frac{3}{2}\frac{3}{2}\frac{4}{2}$  16-harness 45 deg. twill. Repeat of weave 16 x 16; only one repeat warp and filling ways of this weave is given, the same being also the case with weaves Figs. 9 and 10. Previous to this, 2 repeats warp and filling ways was given with epinglé weaves Figs. 1 to and inclusive 7.

Weave Fig. 9 has for its foundation the  $\frac{4}{2}\frac{4}{2}\frac{5}{2}$  19-harness 45 deg. twill, using a satin draw with 3 for counter, as before. Repeat of weave 19 x 19.

Weave Fig. 10 is based upon the  $\frac{5}{2}\frac{5}{2}\frac{3}{2}$  15-harness 45 deg. twill, using the same in connection with the satin draw as required, to produce the epinglé weave, using in this instance 4 as the counter. Repeat of weave 15 warp-threads and 15 picks.

**MANUFACTURE OF RIBBONS, TRIMMINGS, ETC.**

(Continued from April issue.)

**Ribbons Showing Raised Loops.**

Fig. 157 shows us a sketch of such a ribbon. In the same the ground is to be interlaced with taffeta, the loops (as shown by oval spots) to be produced by floating the filling around wires, placed in proper position through dents of the reed.

Fig. 158 shows the weave plan for producing such a fancy ribbon, the lay-out referring to a single shuttle loom. An explanation of this weave plan will show how these loops are formed on the face of the ribbon.

*Arrangement of Warp:*

- 6 warp-threads (Set a)
- 1 wire
- 4 warp-threads (Set b)
- 1 wire
- 4 warp-threads (Set c)
- 1 wire
- 6 warp-threads (Set d)

23 ends repeat of pattern.

*Dot type* shows the warp-threads interlacing with the filling on taffeta.

*Full type* shows the raising and lowering of the three wires, *e, f* and *g*.

Repeat of Filling pattern shows 32 picks.

The filling to enter pick 1 from the left, see arrow *h*.

Picks 1, 2 and 3 and 4 interlace with taffeta for all the warp-threads, with all three wires raised.

Pick 5. Filling enters from the left. Warp sets *a* and *b* interlace on taffeta, *c* and *d* are down; wires *e* and *f* are raised, *g* is down. The shuttle in entering the shed draws the filling along, the latter becoming hitched to the fabric structure by wire *f*.

Pick 6. Filling enters from the right, no warp-threads or wires being raised, the shuttle consequently drawing the filling along, the same being hitched by and around wire *f* to the fabric.

Pick 7. Filling enters from the left. Warp sets *a* and *b* are down, sets *c* and *d* interlace with taffeta; wire *f* and *g* are up, wire *e* is down. The shuttle in passing this shed draws the filling along, the latter

becoming hitched to the fabric structure by wire *f*.

This procedure completes the first loop, shown in the centre set at the bottom of fabric sketch Fig. 157; three picks are required for the formation of each loop. The filling caught by wire *f* after thus causing the formation of the loop referred to, in turn interlaces with taffeta in connection with warp sets *c* and *d*, the shuttle being then on the right hand side of the loom.

Pick 8 is a clear taffeta pick, throughout the entire width of the fabric, the same as picks 2 and 4 previously referred to, *i. e.*, all four sets of warp-

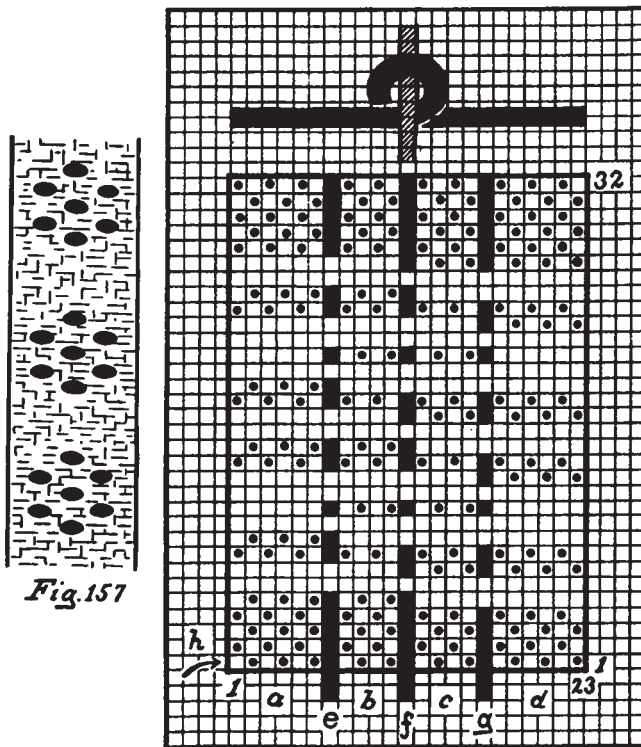


Fig. 157

Fig. 158

threads (*a, b, c* and *d*) interlace on taffeta, all three wires being raised, *i. e.*, out of the way of the filling.

Picks 9, 10 and 11 form the first loop from the bottom, in the first or left hand row of loops shown in fabric sketch Fig. 157, the loop hitching then around wire *e*. The filling for this purpose enters, interlacing with taffeta in pick 9, into warp-set *a*, passing in turn under wire *e*, and over all the other warp-sets and wires; in pick 10 the filling is made to pass over all the wires and warp-sets, and in pick 11 under wires *e, f* and *g*, interlacing with taffeta only into warp-sets *b* and *c*.

Picks 11, 12 and 13 in turn form the first loop on wire *g, i. e.*, the first loop from the bottom seen on the right hand row of loops in fabric sketch Fig. 157. The filling on leaving the fabric on pick 11 under wire *g*, in turn on pick 12 passes over this wire as well as the other two wires, without interlacing with the warp-threads of the fabric, and in turn in pick 13 passes without interlacing into warp-sets *a, b* and *c*, and above wires *e* and *f*, then under wire *g*, in turn interlacing with warp-set *d* on taffeta.

Pick 14 is identical with pick 4, and when picks 15, 16 and 17 then produce the second loop on wire *f*, it being the second loop in the centre row of loops, considered from the bottom, in fabric sketch Fig. 157.

Pick 18 is a duplicate of pick 8 previously referred