

In Fig. 3 a bold twill is given, undue looseness of texture being obviated by the plain interlacings on either side of the twill itself. Many modifications of this are of course possible, and the production of useful ground makes based on this type requires merely the exercise of a little patience.

Weaving particulars:

Warp: All single 28's worsted, 24's reed 3's.

Filling: Same as warp. 72 ends and 60 picks per inch.

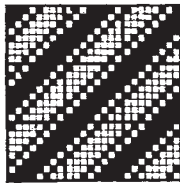


Fig. 3

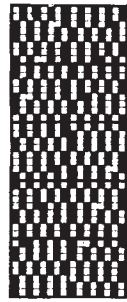


Fig. 4

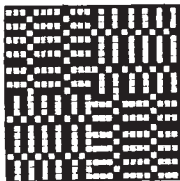


Fig. 5

Fig. 4, complete on 16 threads and 40 picks, makes a neat ground pattern in worsted yarns. It is composed of a three-and-two warp rib, worked in the form of a diagonal stripe, the positions of the three's and two's being reversed in adjacent sections, and it should readily lend itself to various schemes of modification.

One of these is illustrated at Fig. 5, the warp and filling ribs being manipulated to produce a check effect on twenty-four ends and picks.

Fabric structure in connection with weave Fig. 4 is thus:

Warp: 32's worsted.

Reed: 24 by 4

Filling: 32's worsted 70 picks per inch.

Fabric structure in connection with weave Fig. 5 is thus:

Warp: 2/36's mohair

Reed: 14 x 4

Filling: Same as warp. 56 Picks per inch.

Spot Silk Wanted.

The New York market is more active, quotations made having attracted considerable buying for March and April deliveries. Double extra, both white and yellow, especially in odd sizes, such as 16-18, 20-22, 24-26, are very difficult to obtain for any prompt deliveries.

There has been increased activity in thrown silks, and considerable business has been booked ahead in both organzine and crepe twists. Also there is some call for early deliveries of all grades of thrown silks, indicating that recent accumulations of supplies have been used up since the resumption of operations in local mills.

Silk manufacturers generally still complain of the poor demand for their products, but, nevertheless, stocks on hand are gradually being liquidated, we understand, and, while forward business is difficult to obtain on staple goods, certain specialties, such as shirtings and men's linings, pussy willow and like fabrics are sold ahead for several months.

Clay Twills.

CLAY WORSTEDS are a type of cloth which admit of practically no ornamentation, so far as weave and coloring are concerned, and whose value depends upon qualities which are useful rather than ornamental.

Chief among these qualities are firmness in the hand and lustre on the finished cloth, but the firmness must not be of such a nature as to prevent the cloth from hanging properly when made up for wear, nor must the lustre depend entirely upon any finishing process, the result of which would at best be only transient and unsatisfactory. No amount of care exercised in the finishing process, or in the choice of dyeing materials will remedy mistakes in the build of the cloth, or give the best results, unless the fabric is properly constructed.

Manufacturers often wonder why their competitors' goods are more popular than their own. If one were to examine carefully the goods of his successful competitor, he would very likely find that the trouble should not be laid at the door of a finisher, but at his own, because the construction of his cloth is faulty, and consequently nothing possible in the finishing will make his fabric right.

In a typical 15 to 16 oz. clay worsted, one that is probably the best seller on the market, and one that is as near perfect in structure as possible, there are about 67 ends 2/30's worsted warp, and 64 picks 14's (worsted counts) union filling in 1 sq. in. of finished cloth. The warp is a good 60's quality, with the average number of turns per inch in the two-fold, the twist of which opposes the twill in the weave, which runs from left to right. It is hardly necessary to say that if the twill is to show distinctly in the finished cloth this latter condition is essential. The filling is a union containing about 60 per cent wool of the same grade as the warp, and 40 per cent cotton, both of which are free from any trace of vegetable matter, such as shives, burrs, etc., which would spoil the finished goods both to the touch and the eye. The weave is an ordinary 3-and-3 twill.

Now, let us see how nearly the cloth under consideration approximates a fabric of perfect construction, setting the warp 63 in. in the reed, to finish 56 in. full. In a 20/3 reed this would mean 3780 ends (60×63), which would be practically equal to 67 ends on 56 in. when finished ($56 \times 67\frac{1}{2} = 3780$).

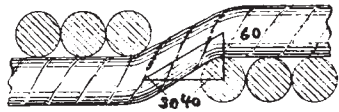
Is there any good reason why 67 ends per inch in the finished cloth gives satisfactory results? We think there is. The number of ends in any yarn of average twist which in the grease would lie side by side in the space of 1 in. is found by taking the square root of the yards per pound and deducting 10 per cent. Applying this rule to 2/30's worsted, which is equal to 15's single, the answer is 83, or the diameter of each thread is equal to $\frac{1}{83}$ in.

We can now apply the rule, for in a plain weave there must be, for a cloth of perfect structure, a space between each end about equal to its diameter. In the six-end twill under notice, the weave contains six ends, and two intersections, or eight units in all, while in six ends in the plain weave there would be twelve units, six ends and six intersections, and the number of ends, therefore, in a six-end twill to be as perfect as a plain weave using the same yarn becomes simply a question of proportion.

We have seen that the diameter of 2/30's worsted is $\frac{1}{88}$ in.; so allowing space to equal the diameter, 42 ends should be the number of ends of this count in a plain cloth, and the proportion of ends for a six-end twill is — 8 : 12 : : 42 : 63. To 63 add 5 per cent for waste, and the number of ends is approximately what is required for a perfect cloth, so far as the warp is concerned. The 5 per cent is added for waste as the diameter of the yarn was found in the grease, and the rule above quoted as to number of ends refers to finished cloth, the diameter of the yarn in which would be somewhat less owing to loss in finishing.

We have previously spoken of the lustre on the finished goods, which is primarily due to perfect construction, and not to any particular process in finishing, which could only be transient. Can the excess of filling over warp, and consequent disturbance of the balance of structure, be allowed to exist, and at the same time perfection in another respect (which is of the utmost importance to the lustre and appearance of the finished cloth) be attained? We think it can, and will try to explain as clearly as possible.

If a thread of warp is drawn out of the finished cloth, a distinct waviness will be apparent, and this is due to shrinkage in weaving and finishing, being at a minimum when the piece is stretched light on the beam, and at a maximum after finishing. Upon the character of this waviness or bend in the warp, greatly depends the lustre of the finished article.



The accompanying illustration shows a certain section of the cloth cut through the filling, and will assist in making our meaning clear. It will be noticed that the warp is bent out of the straight line, making a certain angle, with a perpendicular line drawn through the point in the warp where bending takes place, and the centre of the filling. This is an angle of 60°, and undoubtedly gives most excellent results. There are several good reasons why this angle is so satisfactory and suitable, and why it is essential, if the best results, so far as lustre is concerned, are to be obtained; such reasons need not be discussed here, but it may be stated as a matter of fact that in the best types of plain, equally balanced fabrics this angle of 60° is always found, and the cloth we are considering, which is certainly one of the best of its type, is one more fabric which may be added to this list.

A further examination of the figure will show that the angle made by the warp-thread as it passes between the filling ends is entirely dependent upon the number of picks in the cloth: the less the number of picks, the nearer will the warp approach a straight line; and the greater the number, the more it will be bent out of the straight line; consequently the angle required must be obtained by the number of picks in the cloth. If this angle is one of 60°, it is a fairly easy matter to find the number of picks required, for it will be noticed that a perpendicular drawn through the warp just at the point of bending and the centre of the filling forms the altitude of a right-angled triangle, with angles of 60, 30, and 90°, the hypotenuse of which is a line drawn through the centre of the warp, and the base a horizontal line from the centre of the warp at the point of intersection to the centre of the filling. The altitude of this triangle is easily found, being half the diameter of the warp

plus half the diameter of the filling, and as this triangle is just half an equilateral triangle, the hypotenuse must be equal to twice the altitude. We have now only the base to find, and this can be done by multiplying the altitude by 1.732.

A reference to the six-end twill will show that there are six ends and two intersections in one repeat; therefore the space occupied by one pattern is equal to the base of two triangles and the diameter of four threads, the triangles representing the point where intersection takes place, and the diameters where the intersection does not occur, and where the space occupied may be equal to the diameter of four picks. Let us see how this will work out, and if the result will show that the fabric under consideration approximates angular perfection or otherwise.

We have explained how to find the diameter of threads, and applying this rule, the diameter of 14's filling, which is taken from yarn in the finished cloth, and therefore clean, will be $\sqrt{560 \times 14} - 10$ per cent, or 79, equal to $\frac{1}{79}$ in.: and of 2/30 equal to $\frac{1}{15}$ worsted warp will be $\sqrt{560 \times 15} - 10$ per cent, or 83, or $\frac{1}{83}$ in., twice the altitude of the triangle. $\frac{1}{79} + \frac{1}{83} = \frac{2}{81}$ and $\frac{1}{3}$ of $\frac{2}{81} = \frac{1}{81}$ and $\frac{1}{81} \times 1.732 = \frac{1}{46}$, or $\frac{1}{46}$ is the base of one triangle; but the base of two triangles is required, and the diameters of four picks, so $\frac{1}{46} \times 2 = \frac{1}{23}$ and $\frac{1}{79}$ (diameter of 14's) $\times 4 = \frac{1}{20}$ (approximately) and $\frac{1}{23} \times \frac{1}{20} = \frac{43}{460}$, or equal to 10.7 patterns in 1 in. of cloth, and as there are six ends in each pattern, 6×10.7 or 64.2 picks required in 1 in. of cloth to bend the warp to the required angle of 60°, or practically the same as the finished cloth contains.

We have pointed out that in the cloth in question the filling is somewhat heavier than the warp, and it will also be seen that the threads and picks are not exact, thus disturbing what is known as the perfect balance of structure; but these two imperfections are of relatively small importance compared to the maintenance of the proper angle, so that the finished cloth may have a lustre which is not only pleasing to the eye, but which has the merit of being permanent and lasting, and is due to perfect reflection of light upon the surface of the cloth.

Broad Silk Orders Exhaust the Supply.

Retail buyers of broad silks are appearing in the New York market in force placing the last of their spring delivery orders. Ordinarily it would be too late in the season for other than filling-in orders but so much stock was cancelled after the armistice was signed that silk buying is now at its height, rather than drawing to a close. Some uptown and downtown jobbers have been so heavily taxed for certain descriptions of spring piece goods that they are compelled to purchase supplies from competitors, it being too late to get the mills to make some of the patterns in time to deliver same for the spring selling season which has practically arrived. High prices, fancy shades and designs are especially sought this month.

Sellers did not advance prices on some constructions of silks and only slightly on others. The five-day a week working plan recently granted by the Paterson silk mills has tended to increase the cost of production for most weaves.

The demand for real hot weather fabrics, *i. e.*, georgettes and crepe de chenes is gaining impetus daily. It is time for the blouse trade to consider merchandise for the next cutting-up period and negligee manufacturers are in need of large quantities of the flimsy materials for the coming summer.