

The Weaving of Lengthwise Pleats

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Pleats are very desirable and are in very good demand. Generally, pleats in piece goods are produced by pressing or sewing, but lengthwise pleats can also be produced by weaving. This is not universally known, for no information on the subject can be found in any weaving textbook. Cross or horizontal folds only are mentioned. In this discussion, it will be explained how such pleats can be woven directly into a fabric. Illustrations of cloth samples cannot be clearly reproduced, and, therefore, it is necessary to sketch the weave on point paper.

For the purpose of weaving pleats, longitudinally, twill weaves are the most suitable. The pleats are formed where the warp ends

The ends are then drawn into the harness in an opposite direction, shown in Fig. No. 1, thus forming a herringbone effect in the cloth.

The point where the weave reverses, is marked by a line so that it can be easily noted where the shading reverses. To obtain a better idea as to the construction of the cloth, horizontal lines are drawn at the bottom of the design.

Below these lines the pleat is sketched, as it will run lengthwise in the cloth. It is true that the pleat does not lay exactly as sketched, but the illustration gives a general idea of how the pleat will appear when the above weave is used. In addition, the various stripes are designated as 1, 2, 3, 4 and 5, and will, for

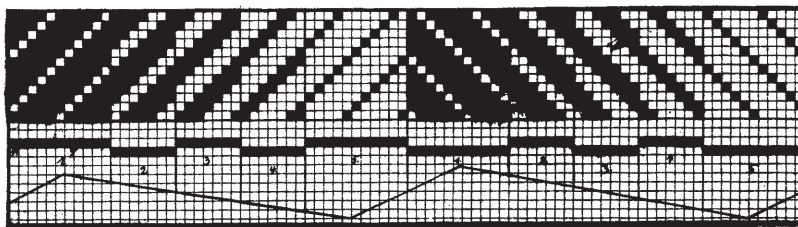


Fig. 1

float above or below, and are crowded and pushed together, thereby pressing the cloth upward or downward. That part of the cloth which is woven with ends that float less, remains in a horizontal position, but permits itself to be pulled vertically. It is a decided advantage to use coarser yarn for warp than for filling, as an illustration, 78/2 combed warp and 50 denier rayon filling.

In Fig. No. 1, two repeats are drawn for pleats running longitudinally. A six-harness twill weave is used. The design commences with eleven ends, 6-harness warp effect twill (5 up, 1 down). These are followed by 7 ends of a 6-harness warp twill (4 up, 2 down), then by 7 ends of a 6-harness twill (3 up, 3 down). This is followed by 7 ends of a 6-harness filling twill (4 down, 2 up), then terminated by 11 ends of a 6-harness filling twill (5 down, 1 up). This weave forms one pleat.

that reason, assist the designer to form a clearer picture.

Fig. No. 2 shows the dimensions of the pleat. In width, the pleat measures 0.36 of an inch. The upper fold being 0.33 of an inch. The folds do not form sharp angles, but produce round curves on the upward and downward bends. Six ends in the design constitute one-half of stripe No. 1, the fold being bent upward. These six warp ends crowd together and are lifted upward by the filling so that they appear somewhat curved. The various measurements of the pleats can easily be seen from drawings Nos. 1 and 2.

Fig. No. 3 shows how the filling interweaves. The sketch is exaggerated for the purpose of conveying a clear idea to the reader.

Fig. No. 4 shows a cross-section of the woven cloth. In the loom, the cloth is flat, but when taken off, the pleats appear. When

the cloth is wet, the pleating is still more pronounced. To weave a cloth 47 inches wide, it is necessary to space it 55 inches wide in the reed. As a rule, 10%-20% shrinkage must



Fig. 2

be allowed for this type of fabric. Much depends upon the setting in width and the size of the yarn used. It is always a decided advantage to use a warp yarn which is about three times as coarse as the filling yarn. This is merely a suggestion, and not absolutely necessary. The cloth construction is such that the ends per inch exceed the number of the picks per inch. If these conditions are consistently followed, the pleats will always turn out well.

Figures No. 5 to No. 8 are weave designs for producing lengthwise pleats in a cloth.

Figure No. 5 is a weave formation with 18 harnesses. This weave is very suitable because the larger the number of harnesses, the more pronounced will be the pleat. In this

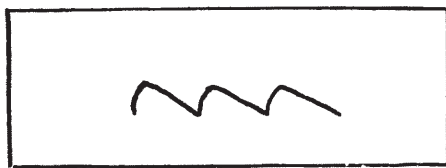


Fig. 4

fabric, the pleat will be 0.05 of an inch high and 0.16 of an inch wide. The weave formation consists of five ends of a 6-harness warp twill (5 up, 1 down), three ends of a 6-harness warp twill (4 up, 2 down) and two ends of an equal sided 6-harness twill (3 up, 3 down). This is joined by three ends, 6-harness filling twill (4 down, 2 up) and five ends 6-harness filling twills (5 down, 1 up).

The pleats can also be made larger simply by increasing the number of ends in each repeat.

Fig. No. 6 is a design for producing a

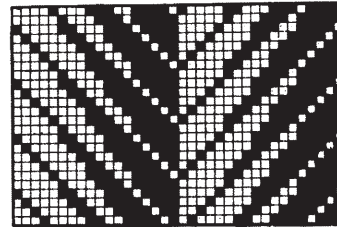


Fig. 5

broader pleat. The pleat in this case, will be 0.08 of an inch high and 0.29 of an inch wide. The oblique fold is 0.25 inches wide. The weave also consists of a 6-harness twill, the

repeats, however, consist of groups of 7 ends each. Since the full repeat consists of 70 ends, it is necessary to weave this fabric on a Jac-

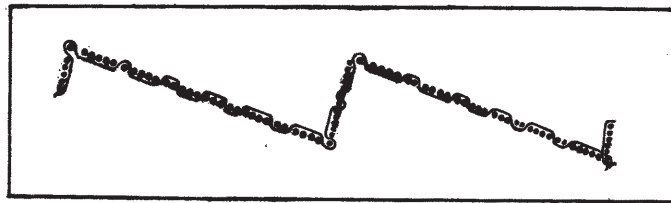


Fig. 3

quard loom. The same holds true for Fig. No. 5 if it is enlarged.

In the designs so far shown, the shading has been obtained by having the twill step up one pick. Although this is the most suitable method of weaving pleats, it is not absolutely necessary to use this method, as other methods for shading may be chosen for folds, as long as the shadings, which appear lengthwise, continually decrease.

In Fig. No. 7, the shading is so chosen that the twill increases two picks at a time. It begins with seven ends of an 8-harness warp twill (7 up, 1 down), which is followed by five ends of an 8-harness warp twill (5 up, 3 down); this is followed by five ends of an 8-harness filling twill (5 down, 3 up) and finally seven ends of an 8-harness filling twill (7 down, 1 up). In this case, the pleats will be 0.78 of an inch high, and 1.5 inches wide.

Fig. No. 8 shows a different form of shading. In this, a 6-harness warp twill (5 up and

1 down) alternates with a 6-harness filling twill (5 down and 1 up). The pleat starts with five ends of a 6-harness warp twill (5 up and 1 down) and one end of a filling twill (5 down and 1 up), and is followed with four ends of a 6-harness warp twill (5 up and 1 down) and two ends 6-harness filling twill (5 down and 1 up), three ends 6-harness twill (5 up and 1 down), three ends of a 6-harness twill (5 down and 1 up), then two ends of a 6-harness twill (5 up and 1 down), then four ends of a 6-harness twill (5 up and 1 down), then four ends of a 6-harness twill (5 down and 1 up), then one end of a 6-harness twill (5 up and 1 down) and ending with five ends of a 6-harness twill (5 down and 1 up).

This weave formation is also suitable for the production of pleated cloth, but the pleats are not so uniform as in the former weaves. Too many wavy pleats are produced, because

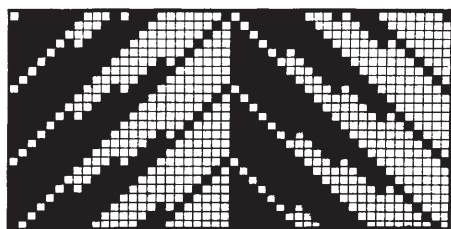


Fig. 7

this weave crowds the ends too much. The weaves are about 0.13 of an inch high and 0.09 of an inch wide. This design can be woven with 12 harnesses.

With the above designs as a guide, it is possible to work out any number of pleating weaves. It is not necessary to adhere strictly to the twill weave, but the best effects are obtained with them. The pleats are more flat when satin weave is used. A satin weave has

the tendency to flatten the cloth. However, whenever a satin weave is used, it is also advisable to use twill weave with it. Better results are obtained when that part of the pleat, which is supposed to be pressed upward and downward by warp ends, as in Fig. No. 1 (1 and 5), to employ twill weave. For the face of the pleat, a satin weave can be used,

in which case the fold will be kept broader and will be well marked.

Whether these designs are made for piece-dyed or yarn-dyed goods, is of no particular importance, but it has been found that pleats are more easily

formed when the fabric is yarn-dyed, because then the fabric is not subjected to so much handling in the finishing operation. Pleated goods contract a great deal when piece-dyed.

Numerous new designs can be developed, especially when colored goods are woven. By proper shading, each pleat can be woven with a different color, thereby creating exceedingly attractive effects. If filling is used of a differ-

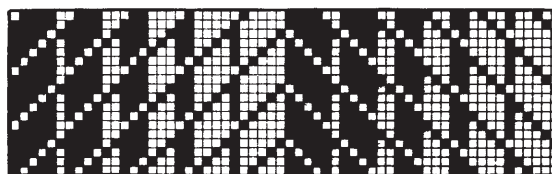


Fig. 8

ent color from that of the warp, additional effects can be produced in the folds.

The reason for using a 6-harness twill, is that this weave produces the best result. If, however, coarse yarn is used, then a twill with less than six harnesses can be used, but it is always advisable to use a twill requiring an even number of harnesses, i.e., 4, 6, or 8, etc.

In finishing, these fabrics require very little pressing, but if sharp edges are desired in the pleats, more pressure should be applied.