

**A HAND BOOK OF WEAVES**

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**DOUBLE CLOTHS**

A double cloth consists of two distinct fabrics, face and back, which are generally stitched together by interlacing the face threads with the back threads. The various applications of double cloth construction are as follows:

FIG. 1357

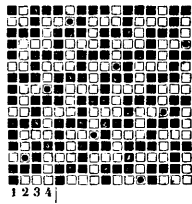


FIG. 1358



FIG. 1359

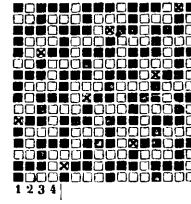


FIG. 1360



FIG. 1361



FIG. 1362

1. Hollow fabrics, such as lamp wicking, fire hose, seamless bags, woven felt for covering pipes, etc. The face and back are joined at both sides, forming a tubular fabric.

2. To increase the weight and thickness of a cloth. Often the face does not permit the addition of a back filling only, in which case a separate set of warp threads for the back must be added to carry the back filling.

3. To make the fabric thicker and heavier than is possible with back filling alone. It is evident that in double cloth, the warp threads being divided into two parts, a much

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smaller number of threads is woven in one texture than is the case with back filling cloths, in which all the warp threads are woven together. The more open the set of the warp, the more easily will it receive the filling, and thus the thicker and heavier can the cloth be made.

4. For the better production of plaids and

than the filling. This is due to the more open set of the filling, which leaves the warp threads more exposed. This difficulty may be relieved by laying the warp with more open set, using finer yarn for the back filling and inserting more picks.

5. Cloths are also made double that the cost may not increase in proportion to the

FIG. 1349



FIG. 1350



FIG. 1351



FIG. 1352

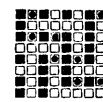


FIG. 1353



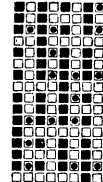
FIG. 1354



FIG. 1355



FIG. 1356



checks in both light and heavy goods. If such patterns are made in filling back fabrics the set of the filling is likely to be too

increase in the weight and thickness. Double textures not only permit of a closer set of the filling, but offer the advantage

FIG. 1363

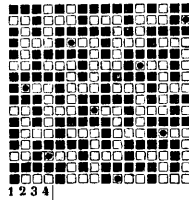


FIG. 1364

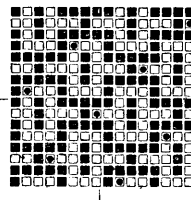


FIG. 1365

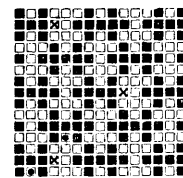


FIG. 1366

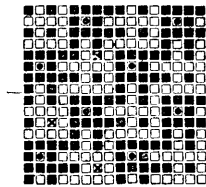


FIG. 1367

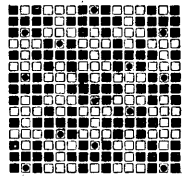
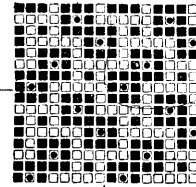


FIG. 1368-1369



FIG. 1370



coarse, as it is difficult to insert as many face picks per inch in a filling back cloth as in a cloth without back filling. The result of the more open filling set is that each square of the weave represents a space which in the cloth itself is longer than it is wide. The chief defect of such a texture is that the warp colors are more prominent

that in both warp and filling the backing yarn can be made of much cheaper material than that used for the face. This is especially true of the back filling yarn which in double cloths is often very coarse and made of exceedingly low stock. Such yarn, if used for the backing of regular back filling cloths, would be likely to show through on

the face. Moreover the large size of the backing would make it impossible to drive the required number of picks into the fabric.

6. Cloth with face and back of contrasting colors, such as plaid back overcoating. The set and weave of the face of a double cloth are usually made to conform somewhat to those of the back. This, however, is not essential; both set and weave of the back may be entirely different from those on the face. This is not to be understood as permitting the use of any and every possible combination of diverse weaves for back and face, as the shrinking or fulling properties of the different weaves in combination must be considered. Judgment must be used on this point as no fixed rules can be laid down.

The face and back threads in both warp and filling are arranged so that one back thread comes after one, two, three or four face threads. Following are some practical combinations:

Face Weave	Back Weave	Set
Plain	Plain	1 face 1 back
Plain	Plain	2 face 1 back
Plain	Twill 2 up 2 down	1 face 1 back
Plain	Basket 2 up 2 down	1 face 1 back
Basket 2 up 2 down	Basket 2 up 2 down	1 face 1 back
Basket 2 up 2 down	Plain	2 face 1 back
Basket 3 up 3 down	Plain	2 face 1 back
Basket 3 up 3 down	Plain	3 face 1 back
Twill 2 up 1 down	Plain	2 face 1 back
Twill 2 up 2 down	Plain	2 face 1 back
Twill 2 up 2 down	Twill 2 up 2 down	1 face 1 back
Twill 2 up 2 down	Twill 3 up 1 down	1 face 1 back
Twill 2 up 2 down	Broken twill 3 up 1 down	1 face 1 back
Broken twill 3 up 1 down	Broken twill 3 up 1 down	2 face 1 back
Broken twill 3 up 1 down	Plain	2 face 1 back
Satin 5-leaf	Satin 5-leaf	2 face 1 back
Twill 3 up 3 down	Plain	3 face 1 back
Twill 3 up 3 down	Plain	2 face 1 back
Twill 3 up 3 down	Twill 2 up 1 down	2 face 1 back
Tricot long	Plain	4 face 1 back

The set of face and back in the warp may be different from that in the filling. For example, the warp may be set 1 face 1 back and the filling 2 face 1 back, or the warp may be set 3 or 4 face 1 back, and the filling 2 face 1 back. The object of such variations is to increase the proportion of filling in the goods, on account of the lower cost of the filling, and to obtain a better cover on the back.

Weaves for double cloths are drafted as follows:

1. The spaces for the back threads are indicated by the diagonal lines, Figs. 1341 and 1342, in which the set is 1 face 1 back and 2 face 1 back respectively. This is to distinguish the back threads from the face, and serves no other purpose.

2. The face weave is next drafted with black squares indicating warp risers, and blank squares for warp sinkers. For example, Fig. 1343 shows a plain weave on Fig. 1341; Fig. 1344, a 2 up 2 down twill on Fig. 1342.

3. All face warp threads are now raised above the back picks. This is shown by Fig. 1345 for Fig. 1343; by Fig. 1346 for Fig. 1344.

The weave intended for the back is drafted on the back warp and filling threads. The dotted squares indicate warp risers. Figs. 1347 and 1348 show a plain weave on the back of Figs. 1345 and 1346 respectively.

For cloths set 2 face 1 back, the draft is begun 1 face 1 back.

All double fabric weaves are drafted in the manner just described. It is evident that face and back each form separate textures, which may be of different colors.

#### TUBULAR FABRICS

Seamless sacks or tubular fabrics, such as lamp wicks, fire hose, bags, etc., are usually woven with a plain weave. The warp is made with an odd number of threads. For example, a warp for lamp wicking is made of 67 ends, of which 34 are for the upper and 33 for the lower fabric. This arrangement is necessary to prevent two adjacent threads at the edge from being woven alike.

The double plain weave is shown at Figs. 1347 and 1358, the picks being thrown alternately on face and back. Four threads are drawn in the outside dent of the reed; in each of the next two dents, 2 threads; and 3 threads in a dent for the rest of the warp. The more open set next to the edges is to counteract the tendency of the filling to contract more at the sides than in the center of the cloth.

Fire hose is often made of hemp yarn; warp, 3 ply; filling, 5-ply twisted slack. The warp is reeded 3 in a dent. The filling is set very close, causing a warp take-up of 20

to 25 per cent. The weave is shown at Fig. 1347.

Bags without seams at the bottom are woven with 2 back picks alternating with 2 face picks. The shuttle passes from right to left and return for 2 back picks; then from right to left and return for 2 face picks. In this way the right side is closed, forming the bottom, and the left side is open, forming the top or mouth of the bag. The weave is shown at Fig. 1349.

Each side of the bag is closed by weaving the entire warp (face and back) for a short distance into a single fabric with the weave shown at Fig. 1353. The projecting edges are turned inside the bag.

Seamless bags are frequently woven like fire hose. At the beginning the whole warp is woven single for a short distance, as just described, to close the bottom of the bag. The sides are woven seamless and the edges at the top are seamed after the bag comes from the loom.

Circular woven fabrics are sometimes made to cover cylindrical objects. In Europe the cylinders of rotary cloth presses are occasionally covered with a circular woven felt, which must be accurately made in order that the covered surface of the cylinder may be smooth. Usually they are woven with a 4-leaf twill, 2 up 2 down. In order that the twill may run in the same direction throughout the circumference of the tubular fabric, the twill of the upper weave is run in a direction opposite to that of the lower weave as both are viewed in the loom.

If this requirement is not observed the twill in one-half of the completed fabric will be to the left, that of the other half to the right. Fig. 1352 shows the draft to be used for this purpose; the upper twill is shown at Fig. 1350; the lower twill at Fig. 1351.

For very thick double felt the face and back are each woven with back filling, frequently with a broken 1 up 3 down twill, Fig. 1283. In such cases the order for the filling threads should first be determined. Two methods are available. The upper and lower picks of the face texture can be inserted in succession, and followed by the

upper and lower picks of the back texture; or the two inner picks of the cloth (the lower pick of the face and upper pick of the back) can be woven first and then followed by the exterior picks of the cloth, upper pick of the face and lower pick of the back.

Figs. 1354, 1355 and 1356 show a broken 3 up 1 down back filling twill in the first named order, Fig. 1354 being the face, Fig. 1355 the back, and Fig. 1356 the complete double weave. In the woven tube the outside filling corresponds to the upper picks of the face, and the lower picks of the back weave.

#### REGULAR DOUBLE FABRICS

Double weaves are chiefly used, not for tubular goods, but to increase the weight and thickness of a fabric. For this purpose it is necessary that the two textures should be carefully and regularly stitched together, by interlacing the threads of one fabric with those of the other; in other words, either by raising the back warp above the face filling or by lowering the face warp below the back filling. Raising the back warp above the face filling is called stitching from back to face. Lowering the face warp below the back filling is called stitching from face to back.

The method of stitching has great influence on the appearance and handle of the cloth.

Following are the principal points to be observed:

1. Uniform distribution of the stitchers.
2. The right number of stitchers. General rules on this point are as follows: For 1 face 1 back weaves, 2 stitches are inserted in an area of 8 threads square; for 2 face 1 back, 2 stitchers in an area of 6 threads square; or 2, 4 or 8 stitchers in an area 12 threads square.
3. As far as possible stitch with each back warp thread, when stitching from back to face.
4. Insert, as far as possible, each stitcher where the stitching warp thread is above both the preceding and following picks; also where both warp threads next to the stitching thread are up so as to cover the back

stitcher. This rule refers to stitching from back to face.

5. Arrange the stitchers so as to disarrange the color pattern and weave as little as possible.

