June 24, 1958 T. M. SCRUGGS 2,840,117

METHOD OF SELVAGE AND SEAM MANUFACTURE AND PRODUCTS THEREOF

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FIG. 1.

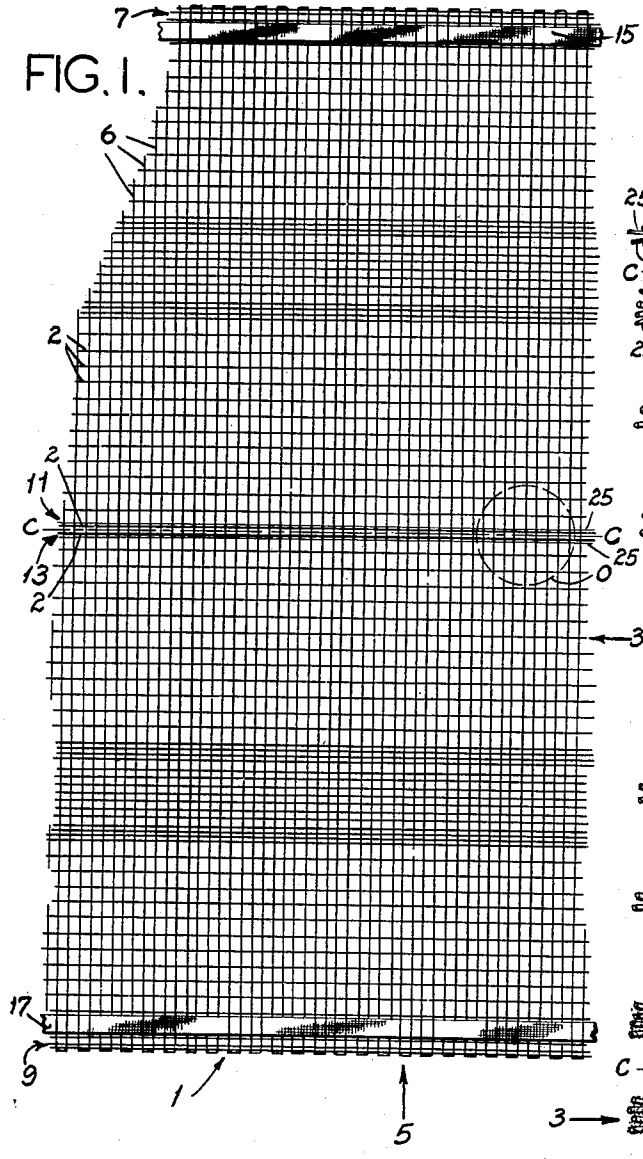


FIG. 2.

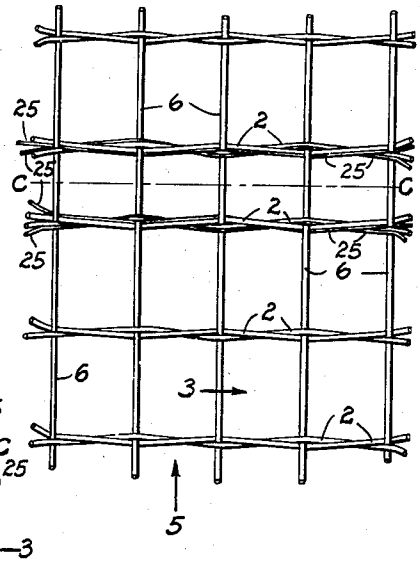
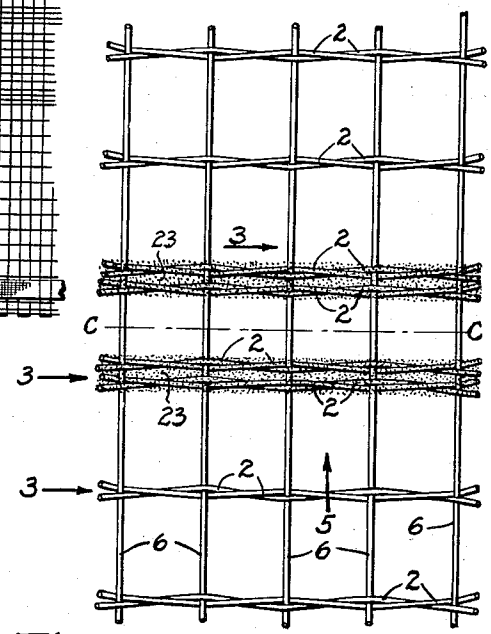


FIG. 5.



Thomas M. Scruggs,
Inventor.
Koenig and Pope,
Attorneys.

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FIG. 3.

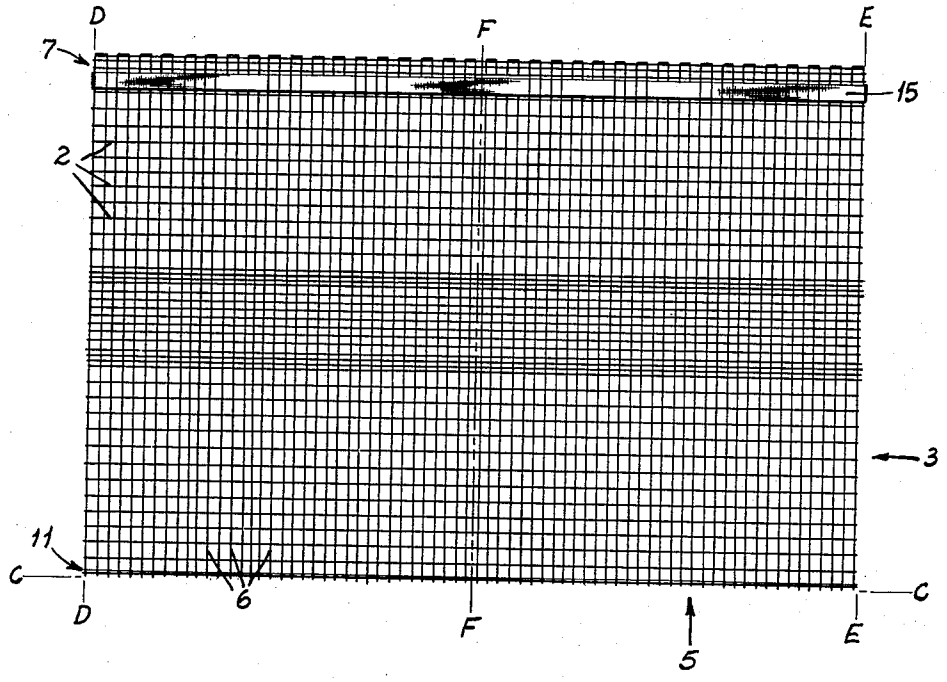
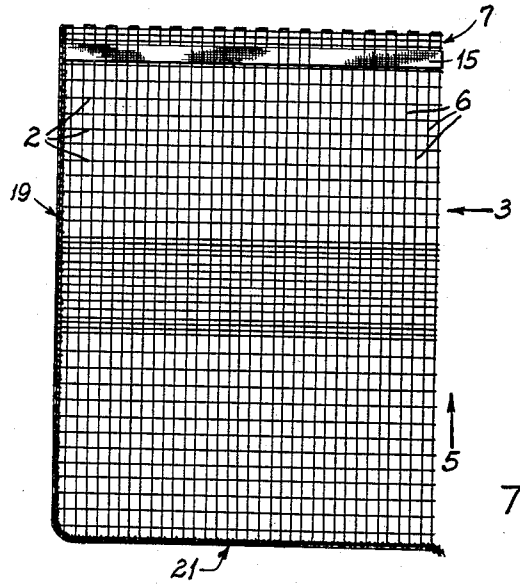


FIG. 4.



Thomas M. Scruggs, Inventor.
Koenig and Pope, Attorneys.

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METHOD OF SELVAGE AND SEAM MANUFACTURE AND PRODUCTS THEREOF

Thomas M. Scruggs, Richmond Heights, Mo., assignor to Bemis Bro. Bag Company, St. Louis, Mo., a corporation of Missouri

Application May 21, 1954, Serial No. 431,513

6 Claims. (Cl. 139—383)

This invention relates to a method of selvage and seam manufacture and to the resulting selvage and seam for use on woven material, bags and the like.

Among the several objects of the invention may be noted the provision of an improved method of selvage and seam manufacture for woven web material which, after weaving, is split, folded and seamed to form bags; the provision of a selvage of the class described which lends itself to the production of preferred overstitch seams in bags which are neater in appearance and less bulky than those heretofore employed; and the provision of a selvage and seam of the class described which may be produced without costly changes in weaving, selvaging and seaming procedures. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, steps and sequence of steps, features of construction and manipulation, and arrangements of parts which will be exemplified in the structures and methods hereinafter described, and the scope of which will be indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a diagrammatic plan view of a web of open-mesh woven material as it proceeds from a weaving process;

Fig. 2 is a detail view of certain portions of Fig. 1 indicated within the dotted area O which is superimposed upon Fig. 1;

Fig. 3 is a plan view of a split and severed blank produced from the material shown in Fig. 1;

Fig. 4 is a plan view of a finished bag, as produced from the blank shown in Fig. 3; and,

Fig. 5 is a view similar to Fig. 2, illustrating the appearance of the type of selvage such as would appear in the area O of Fig. 1 if it were made according to former practices.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Fig. 1, there is shown a fragment of a woven open-mesh web **1** as it proceeds from a loom, for example from left to right. This consists of a longitudinal relatively high-strength warp **3** and a cross-woven transverse relatively high-strength filling **5**. These are woven with marginal selvages at **7**, **9**, **11** and **13**. In the case of a so-called leno weave, the filling **5** consists of single strands **6**, and the warp **3** consists of double leno-woven strands **2**, crossing over one another and on opposite sides enveloping and spacing the filling strands **6**. While any suitable type of yarn may be used for the strands **2** and **6**, in the fabric under consideration they are composed of spun or twisted paper yarn of sufficient strength for use of the material in bag constructions. Included also in the weave are draw tapes **15** and **17**, which are put in as ususal by the loom.

For the smaller consumer-size open-mesh bags (and

others if found desirable), the width of the woven web is made twice that of the bag heights and the web is centrally separated or split along line C—C, for example (but without limitation), at the time that any desired printing operations are performed upon the fabric. Each of the two separated portions of the web is then transversely severed or segmented along lines such as shown at D—D and E—E in Fig. 3. The result is a bag blank as illustrated in Fig. 3, which later is folded along a line such as indicated at F—F, to produce (after side and bottom seaming) a bag such as indicated in Fig. 4. The side and bottom seams are shown at **19** and **21**, respectively. In the case of open-mesh material, conventional flat seams at **19** and **21** are not as neat nor are they as satisfactory as the conventional overstitched type of seam illustrated. An overstitched seam is made by rolling over the adjacent margins and overstitching, the result being a strong and neat rolled edge.

It will be apparent that, when the separating cut is made at C—C, the adjacent edge of the split portions of the web require selvaging, in order to prevent any adjacent warp strands **2** from slipping laterally from the filling strands **6**. It may be observed that this problem is not so acute at the segmenting lines D—D and E—E (Fig. 3), because the filling strands **6** are not as prone to slip laterally from the crossed warp strand **2**. Moreover, fewer operations intervene between the time of the severing steps performed at D—D, E—E, and the completion of the bag, than occur after the splitting step along line C—C. Thus dislocations are most prone to occur at the separation C—C, rather than at D—D or E—E.

Fig. 5 diagrammatically shows how selvaging was formerly accomplished adjacent the separating line C—C. Two warps **3**, each consisting of two leno-woven strands, were closely bunched and a substantial amount of quick-drying nitrocellulose lacquer **23** was applied by means of an applicator wheel and allowed to dry. This adhered the crossing strands **2** and **6**. Thus, after splitting on line C—C, there existed considerable bulk in the selvage, i. e., each selvage consisted of four fairly thick strands of paper yarn and a band of a considerable amount of dried nitrocellulose lacquer. Thus when the bag blank such as shown in Fig. 3 was folded over as illustrated in Fig. 4, the overstitched bottom seam **21** contained eight yarn strands and two elongate flat bands of lacquer. This considerably bulked the seam. To reduce such bulking is one purpose of my improvement.

The improvement is accomplished, as illustrated in Fig. 2, by eliminating from the loom which makes the web shown in Fig. 1 one of the marginal sets of warp strands **2** of Fig. 5. Then a warp strand **25** is paired in the loom with each of the remaining marginal warp strands **2**, four of the latter remaining. Each warp strand **25** is composed of a relatively low strength cellulose acetate strand, preferably substantially smaller in diameter than its mated warp strands **2**. The strands **25** are not required to be of high tensile strength since they are not intended to add to the main strength of the fabric. Weaving then proceeds as usual, thereby placing alongside of each warp strand **2** a coextensively woven thin cellulose acetate warp strand **25**, as indicated by the interlacing shown in Fig. 2. Before splitting on line C—C, a solvent is applied to the combined warp strands **2** and **25**, for example, by means of suitably placed applicator rollers. A suitable solvent is acetone, which is volatile. This partially dissolves or "melts" the strands **25** without completely doing so. The amount of strand dissolution is limited by the amount of acetone applied. In view of the sufficiently small amount and volatility of the acetone, it disappears before strands **25** lose their strand-like characteristics. In order to control this operation as described, the acetone may be blended with one or more of the higher boiling point

ketones or other active or latent solvents to delay volatilization, which increases the dissolving period. When volatilization of the solvent is completed, no further dissolving action occurs. Thus for less dissolving action, less of the higher boiling point ketones are employed with acetone; and for more dissolving action, more of such ketones are employed. The control is managed so that the strands **2** become adhered to one another and to the filling strands **6**, preferably without completely destroying the strand-like characteristics of the cellulose acetate, as illustrated in the drawings (Fig. 2).

After splitting on line C—C, each selvage consists of two (instead of four as heretofore) relatively thick and strong warp strands **2**, with two of the weaker solvent-adhered relatively thin cellulose acetate strands **25**. It will be noted that before application of the solvent to the cellulose acetate strands **25**, they are not adherent, so that the conventional weaving process is not interfered with. Moreover, after wetting by the solvent, with partial dissolution, adherence, and drying upon volatilization, the remaining strand portions **25** are again dry in the finished selvage.

It will be seen, in view of the above, that finally there results a selvage adjacent line C—C (Fig. 3) which is light and strong. The blank (Fig. 3) without raveling can then be converted to the bag (Fig. 4) by means of the overstitched seaming **19, 21**. The resulting overstitched seam of the bag contains only four (instead of eight as formerly) of the usual warp strands **2**, the remaining four partially dissolved adherent cellulose acetate strands **25** being small in bulk.

It will also be seen that the cellulose acetate strands **25** are examples of any relatively thin strands **25** are examples of any relatively thin strands (interlaced or woven with the usual warp strands **2**) of any substances which will behave as a subsequently hardening solute when contacted by a suitable volatile solvent, the volatility of the solvent limiting the dissolving action. The hardened solute forms a sufficiently strong adherence to prevent raveling under normal manipulations in completing bag manufacture. It will also be apparent that the substance of the warps **3** and filling **5** may be any material appropriate to the desired fabric such as the spun paper already referred to, cotton, wool, et cetera. Moreover, the size of the mesh of the fabric may be anything appropriate to the use to which the fabric is put. However, the invention, as is apparent, is particularly advantageous in the case of open-mesh fabric.

While the above description relates to a presently preferred form of the invention, it will be understood that various other strand materials may be employed with appropriate solvents. Also, the strands to be adhered may be composed of a thermoplastic material which may be caused to adhere by heating instead of application of a solvent. It will also be apparent that the strand to be adhered, whether solvent or thermoplastic, may be plied with the paper yarn on the twister that forms the yarn in the case of the adhered marginal warp strands. It will also be understood that the acetate thermoplastic or other adherent strands can be paired with warp strands of weaves other than those of the particular form shown in the drawings.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions and methods without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A leno-woven open-mesh web in which each of the two warp elements on opposite sides of a warpwise line on which the web is to be cut includes two principal warp strands and at least one auxiliary strand of a material adapted for adhesion to the warp and filler strands of the web, said auxiliary strand being of a smaller diameter than said principal warp strands and being woven into the web coincident with one of said two principal warp strands so that it follows the same pattern as said one principal warp strand throughout the length of the web and lies contiguous to said one principal warp strand throughout the length of the strands.

2. A leno-woven open-mesh web in which each of the two warp elements on opposite sides of a warpwise line on which the web is to be cut includes two principal warp strands and two auxiliary strands of a material adapted for adhesion to the warp and filler strands of the web, each auxiliary strand being of a smaller diameter than said principal warp strands, one auxiliary strand being woven into the web coincident with one of said two principal warp strands so that it follows the same pattern as said one principal warp strand throughout the length of the web and lies contiguous to said one principal warp strand throughout the length of the strands, and the other auxiliary strand being woven into the web coincident with the other of the two principal warp strands so that it follows the same pattern as said other principal warp strand throughout the length of the web and lies contiguous to said other principal warp strand throughout the length of the strands.

3. A leno-woven open-mesh web as set forth in claim 2 wherein said auxiliary strands are composed at least in part of a substance adapted to form a solute upon application of a volatile solvent, said solute being adapted to dry after volatilization of the solvent.

4. A leno-woven open-mesh web as set forth in claim 2 wherein the auxiliary strands are composed of cellulose acetate.

5. The method of making an open-mesh web for use in making bags, comprising weaving an open-mesh web comprising warp and filler elements, the warp elements at least in a central portion of the web being leno woven and each including two principal warp strands, incorporating during the weaving in each of the two leno-warp elements on opposite sides of the center line of the web at least one auxiliary strand of a material adapted for adhesion to the warp and filler strands of the web, said auxiliary strand being of a smaller diameter than said principal warp strands and being woven into the web coincident with one of said two principal warp strands so that it follows the same pattern as said one principal warp strand throughout the length of the web and lies contiguous to said one principal warp strand throughout the length of the strands, and subsequently slitting the web on its center line between the two warp elements which include the auxiliary strands.

6. An open-mesh web in which each of the two warp elements on opposite sides of a warpwise line on which the web is to be cut includes a principal warp strand and an auxiliary strand of a material adapted for adhesion to the warp and filler strands of the web, said auxiliary strand being woven into the web coincident with said principal warp strand so that it follows the same pattern as said principal warp strand throughout the length of the web and lies contiguous to said principal warp strand throughout the length of the strands.

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