United States Patent

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[33] **Great Britain**
[31] **1354/68 and 37831/68**

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[54] **YARN GUIDE**
8 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **226/198**
[51] **Int. Cl.** **B65h 57/16**
[50] **Field of Search** 226/198, 199, 196; 242/157

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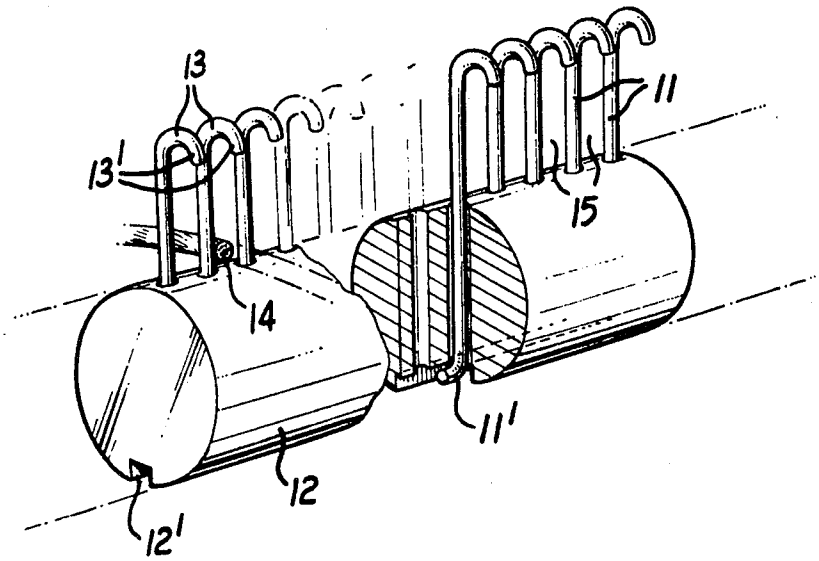
ABSTRACT: A yarn guide comprises two or more closely spaced guide elements which define yarn-receiving pockets between successive such elements, the pockets being limited at the one end by a body part on which the elements are mounted and at the other side by a displaceable retention member. The retention member will usually be formed integrally with the related guide element and will be such as to be displaceable by a yarn moving transversely of its length into engagement with the pocket but relatively nondisplaceable by a yarn moving transversely of its length and outwardly of the pocket. The guide elements may be elongated in the direction of the yarns to be separated thereby to form plates between adjacent such yarns or they may take the form of pinlike members having not substantial length in the yarn direction.



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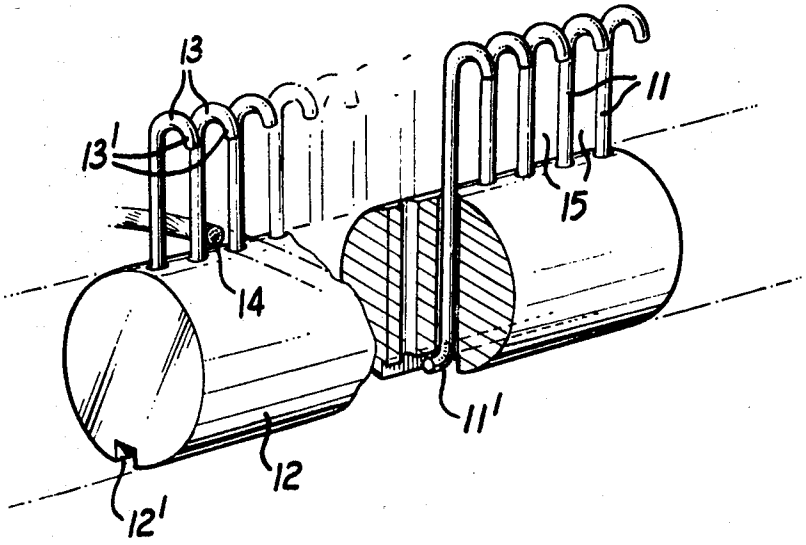

FIG. 1.

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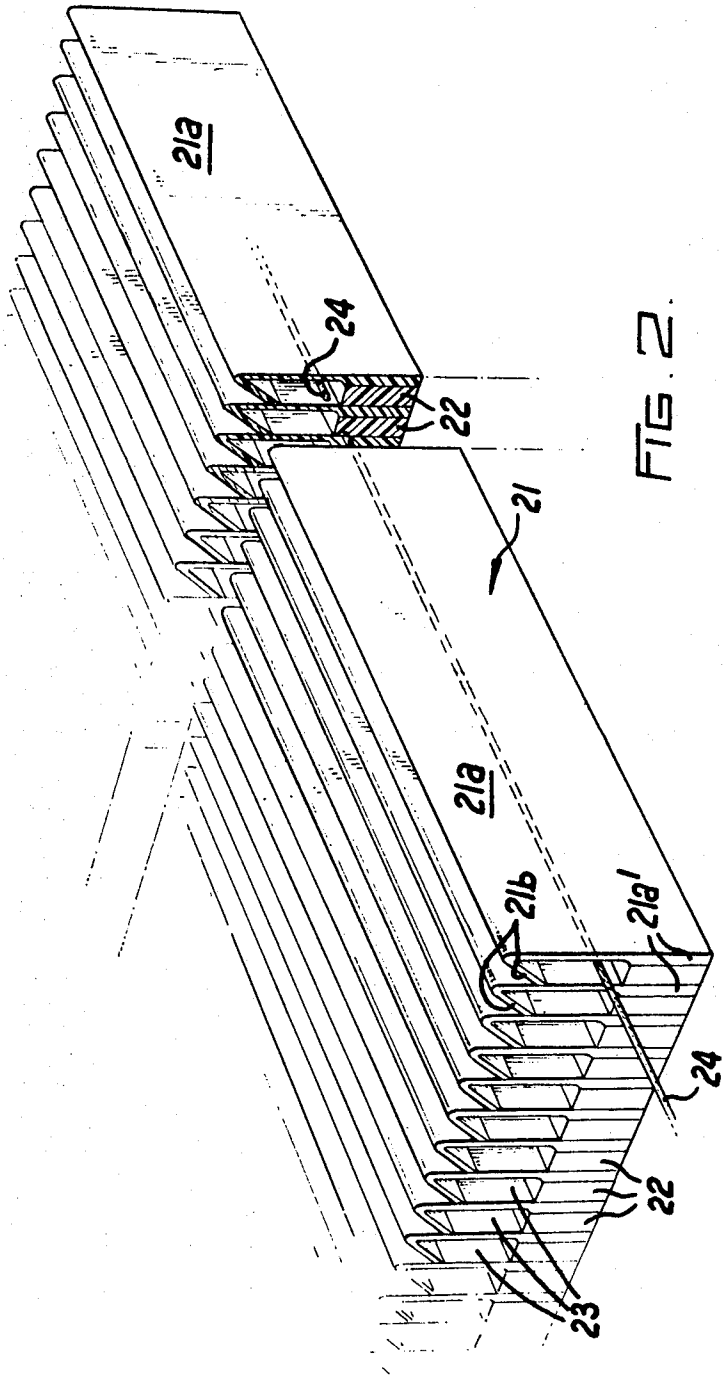

FIG. 2.

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YARN GUIDE

The invention concerns yarn guides and has particular, though by no means exclusive, reference to an arrangement for guiding and maintaining a requisite separation in the individual yarns of a sheet thereof moving to a tufting machine.

Difficulty is frequently experienced when handling large numbers of yarns in quickly and accurately threading such yarns through guides therefor, the problem being particularly acute in the context of tufting machines where many hundreds of yarns are involved. The primary object of the present invention is to provide a simple yet effective guide which avoids this problem.

According to one aspect of the present invention a guide means for moving textile yarns and like elongate materials includes a plurality of guide elements arranged in spaced-apart disposition and defining yarn-receiving pockets for yarn or the like between successive such elements, and retention means on some, at least, of the said elements adapted to abut an adjacent element thus effectively to close the space between such element and said adjacent element and to restrain a yarn against removal from the said space by displacement motion in the plane of the guide, the said retention means being resiliently displaceable from its position of abutment with an adjacent element to allow entry of a yarn to the space closed by such means.

Whilst generally a multiplicity of elements will be provided upon a common body part, the guide means may comprise simply two spaced guide elements arranged in spaced disposition upon a body part, and a retention means associated with one of such elements and extending into abutment with the other element.

The individual elements may take the form of pins or like members having a retention means formed integrally therewith or applied thereto as preferred.

In such an arrangement the retention means will preferably abut a guide element in such a manner as at least partially to overlap the same in the transverse direction of the guide means, the overlapping portion of the retention means lying at that side of the guide element facing in the direction of yarn feed.

The individual elements may, however, be defined by elongate members, and thus, according to another aspect of the invention a guide means for moving textile yarns and like elongate materials comprises a plurality of elongate members arranged in spaced-apart disposition thus to define open-sided side-by-side yarn-receiving cavities or the like and a retention means at or adjacent the outer edge of some at least of the said members and extending across an adjacent cavity to define at least a partial closure thereto. The said retention means being readily displaceable in one direction thus to provide access to the related cavity in a transverse direction thereof but being effectively nondisplaceable in the opposite direction thereby to preclude removal of said yarn in the opposite direction.

Usually the retention means will extend throughout the full longitudinal extent of the related elongate member and each such member will be provided with such a means, the said retention means extending towards and lying in abutment with the next adjacent member.

The invention will now be described further, by way of example only, with reference to the accompanying drawings in which:

FIG. 1 is a broken away perspective view of a first embodiment of the invention and shows an arrangement suitable for the separation and guiding of a multiplicity of yarns; and

FIG. 2 is a similar view of a second embodiment and shows an arrangement which defines open-ended but otherwise closed treatment chambers for yarns passing therethrough.

Referring now to FIG. 1 of the drawings, which FIG. shows a first embodiment of the invention, a yarn guide comprises a plurality, say 12, of guide elements 11 arranged in spaced parallel disposition upon a body part 12, the said elements extending diametrically through the said body part and being nonrotatably mounted thereon by the engagement of respective tails 11' to the said elements with a longitudinal channel 12' formed in the body part.

The upper end of each guide element 11 is provided with an integrally formed hook 13, the hook and element defining a plane inclined slightly to that defined by the element and the tail thereto.

The spacing of the elements 11, the length of each hook 13 and the downward inclination of the latter are so chosen that the tip 13' of each hook abuts the next successive guide element 11 and overlies same in the manner clearly apparent from the drawings.

A yarn 14 is entered into the space 15 between successive guide elements 11 by drawing such yarn downwardly against the outside of that hook 13 which extends across the space, the said hook abutting the next adjacent element in spaced disposition relative to the upper extremity thereof and being resiliently displaceable to allow passage of the yarn into the space. Subsequent upward bodily movement of the yarn against the underside of the hook causes the yarn to move into the angle between the hook and guide element, but without any disengagement of the yarn from the said space.

Conveniently the guide element 11 are fabricated from spring steel, hardened if necessary, and the hooks 13 are formed integrally therewith. If preferred, however, alternative materials may be utilized. In some circumstances it may be found preferable to form the hooks separately and subsequently apply such hooks to the guide element.

Whilst, in the embodiment described and illustrated in FIG. 1, each guide element 11 has a hook 13 formed integrally therewith, in some circumstances it may be found preferable to provide hooks only on alternate guide elements, in which case each hook would be of double form and would cooperate with the next adjacent guide element at each side of the element with which the hook is particularly associated.

The arrangement as shown in FIG. 1 does allow of the guiding of a multiplicity of yarns individually and in parallel disposition at closer centers than has been possible hitherto, this being especially so if the yarns are all to lie in a common plane and hence all of the guides to lie in such a plane. As a consequence we are able to move all yarns as a sheet along paths of constant length.

A second embodiment of the invention is shown in FIG. 2. The arrangement of FIG. 2 comprises a multiplicity of individual elongate members 21 mounted in spaced, parallel disposition by spacer blocks 22, adjacent such members 21 defining guide channels 23 therebetween each to receive a yarn or yarns 24.

Each elongate member 21 has a straight body part 21*a*, the lower region of such body part being thickened as at 21*a*' thus to give an increased rigidity to the member, and an integrally formed lip 21*b*, which lip may be continuous or discontinuous as preferred, the said lip 21*b* being inclined at an acute angle to the body part 21. The elongate member is preferably formed as an extruded strip from a synthetic plastics material, say polypropylene, and may be transparent or nontransparent as preferred. The extrusion will be of such thickness as will give a requisite degree of rigidity yet will readily allow of the displacement of the lip for threading purposes. A convenient thickness of polypropylene for the body part has been found to be approximately 0.020 inches, whilst the overall height of the said body part is approximately 0.875 inches.

The spacer blocks 22 are likewise of a synthetic plastics material, and such blocks and the elongate members are secured together by means of an adhesive.

In the arrangement shown in FIG. 2 the successive elongate members are disposed at approximately 0.160-inch centers, the outer extremity of the lip of one elongate member bearing lightly upon the back of the next adjacent elongate member.

If it is required to utilize such arrangements as are illustrated in the drawing as a yarn guide means, then an appropriate number of yarns all arranged in a requisite spaced disposition can be entered simultaneously simply by aligning the yarns with the guide means and passing the yarns downwardly into the guide channels as defined by the space between adjacent elements, the hooks or lips defining the closures to the respective channels being displaced by the yarns to provide the necessary access.

The resilience of the hooks or lips causes same to return to their original positions in abutment with the next adjacent member, and any subsequent outward movement of the yarns in the transverse direction thereof is limited by the hooks or lips, as appropriate, and in the case of the embodiment of FIG. 2 such outward movement simply pressing the lip more firmly against the next adjacent elongate member.

If, in the embodiment illustrated in FIG. 2 the lip is continuous and a lip is provided in respect of each elongate member each guide channel will be closed at its outer face. As such channel is also closed at its inner face by the spacer block, fluid may be passed through the channel if desired, leakage being avoided in that the pressure in the fluid serves to urge the lip into sealing relationship with the next adjacent elongate member.

By providing the guide means to a standard dimension in the transverse direction of materials being guided thereby, whether such guide means is of the character of that shown in FIG. 1 or that of FIG. 2, and with the individual guide elements at gauge separations, a guide of an appropriate dimension can be obtained by combining a requisite number of standard guide means or modules, which composite guide means will maintain the individual yarns of a sheet accurately at a required separation consistent with the gauge separations of the needles of a tufting machine.

The invention is not restricted to the exact features of the embodiments disclosed since alternatives will readily present themselves to one skilled in the art.

Thus, for example, the guide means of FIG. 2 may be fabricated from material other than those specified, although certainly from economic and practical considerations extruded materials are preferred, whilst the elongate members may be formed integrally with the spacers. Indeed, it may well be found practical to extrude the guide arrangement as a whole in a single operation. The guide arrangement as disclosed, whilst being intended primarily for the guiding of yarns, may, as has been indicated be of application in the treatment of moving yarns or elongate materials with fluids. The structure, in addition to presenting the very desirable advantage of ease of threading, does also provide a convenient means of shielding a moving yarn from damage or contamination. Furthermore, the use of such a structure does provide a safety feature in that a machine operative is protected from a moving yarn in close proximity to which he may be working.

What I claim is:

1. Guide means for moving textile yarns and like elongated materials including a plurality of pinlike guide elements arranged in spaced-apart disposition and defining yarn-receiving pockets for yarns or the like between successive such elements, and retention means on at least some of the said elements adapted to abut an adjacent element thus effectively to close the space between such element and said adjacent element and to restrain a yarn against removal from the said space by displacement motion in the plane of the guide, the said retention means being resiliently displaceable from its position of abutment with an adjacent element to allow entry of a yarn to the space closed by such means, and each retention means is adapted and arranged to abut a guide element in such manner as at least partially to overlap the same in a direction extending transversely of the space defined by and between the element in question and is in abutment at that side thereof lying further in the direction of yarn feed.

2. Guide means as claimed in claim 1 wherein each guide element has a tail thereto, the said element being mounted in a body part, a slot being provided in the said body part to receive the tail for location purposes.

3. Guide means for moving textile yarns and like elongated materials including a plurality of guide elements arranged in spaced-apart disposition and defining yarn-receiving pockets for yarn or the like between successive such elements, and retention means on at least some of the said elements adapted to abut an adjacent element thus effectively to close the space between such element and said adjacent element and to restrain a yarn against removal from the said space by displacement motion in the plane of the guide, the said retention means being resiliently displaceable from its position of abutment with an adjacent element to allow entry of a yarn to the space closed by such means, and each guide element comprises an elongate member and the means is defined by a plurality of such members arranged in spaced parallel disposition to form open-sided side-by-side yarn-receiving cavities extending in the direction of yarn feed, and by a retention means at or adjacent the outer edge of some, at least, of the said members and extending across an adjacent cavity to define at least a partial closure thereto, the said retention means being readily displaceable in one direction thus to provide access to the related cavity in a transverse direction thereof but being effectively nondisplaceable in the opposite direction thereby to preclude removal of said yarn in the opposite direction.

4. Guide means as claimed in claim 3 wherein the said retention means extend throughout the full longitudinal extent of the related elongate member.

5. Guide means as claimed in claim 3 wherein the retention means comprises a lip adapted and arranged to abut the next adjacent elongate member.

6. Guide means as claimed in claim 3 wherein a spacer is provided between each successive elongate member, the said spacer closing the cavity defined by and between successive elongate members at the lower edge thereof.

7. Guide means as claimed in claim 3 wherein each elongate member comprises an extruded section.

8. Guide means as claimed in claim 7 wherein the elongate members are of extruded synthetic plastics material.