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(56) Documents Cited:
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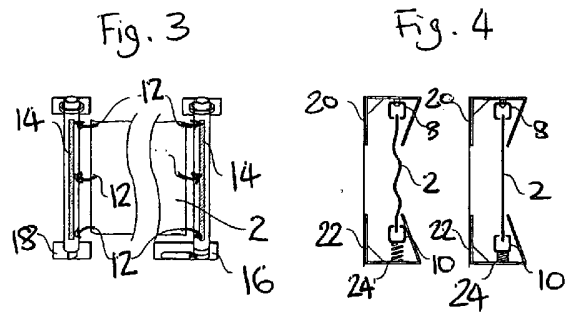
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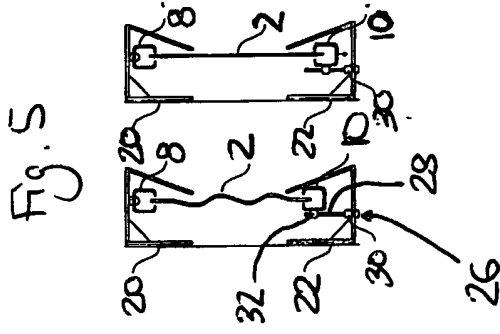
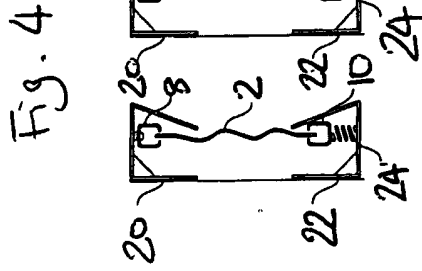
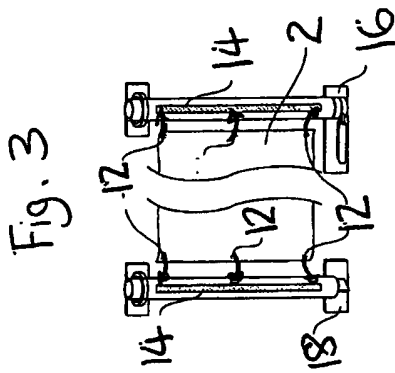
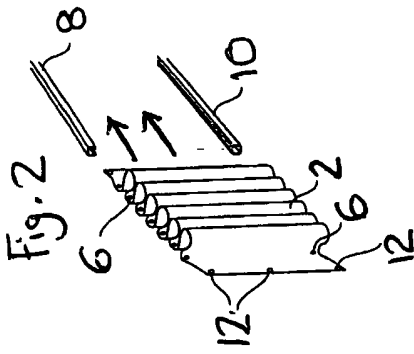
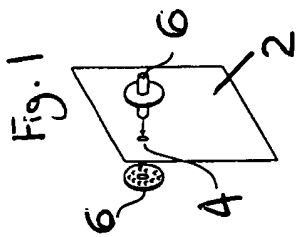
(54) Abstract Title: **Method of assembling a tensile fabric arrangement**

(57) A method of assembling a tensile fabric arrangement comprises introducing a length of a tensile fabric 2 into upper and lower guiding aids 8 and 10 (figure 2), securing right and left ends of the fabric, applying a horizontal tension to the fabric (figure 3), and applying a vertical tension to the fabric using one or more tensioning arrangements located in the lower guiding aid 10 (figures 4 and 5). The one or more tensioning arrangements may comprise spring (24, figure 4) or screw (26, figure 5) arrangements. The invention is particularly for use with billboards.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 2007.



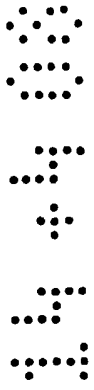


Fig 6a

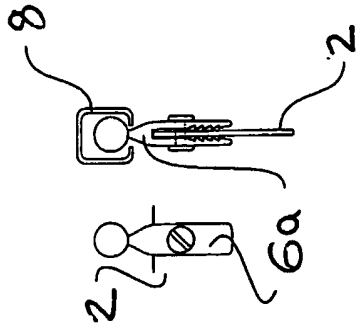


Fig 6b

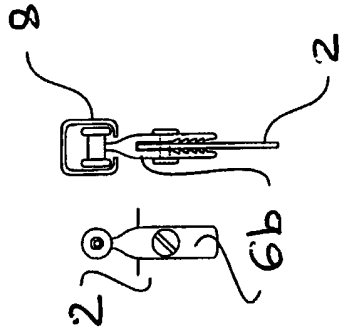


Fig 6c

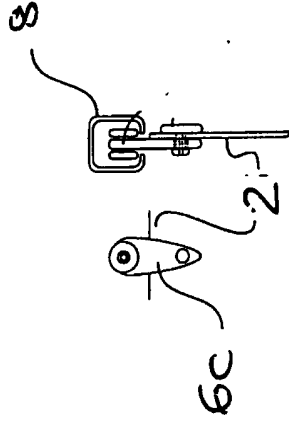


Fig 6d

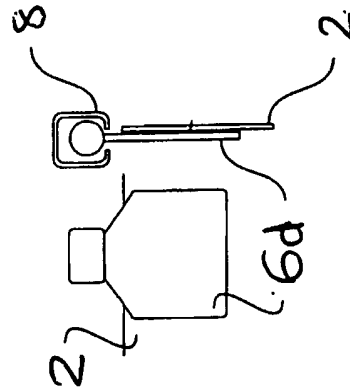


Fig 6e

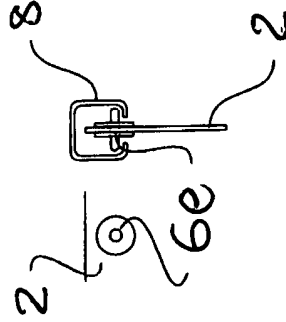
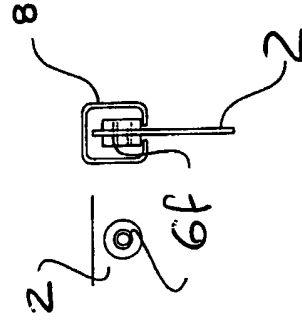


Fig 6f



Method of Assembling a Tensile Fabric Arrangement

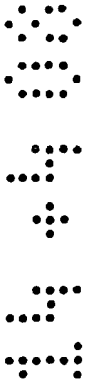
This invention relates to a method of assembling a tensile fabric arrangement, and to tensioned structures, such as tensile fabric or filmic structures for *e.g.* billboards, buildings, shelters such as bus shelters and canopies.

Methods of assembling tensile fabric arrangements, such as tensioned fabric or filmic printed materials for billboards, have been known for over 100 years. The old-fashioned method of using a bucket of paste to adhere posters to billboards is still widely used to this day, even though it is time-consuming and awkward. Adhering the pieces to the surface and lining them up to create the desired picture usually takes about 20 minutes to complete, and the joins between the adjacent pieces are readily visible.

Tensioned fabric and filmic structures are well known, for example for providing shelter from rain or sun. Tensioned fabric or filmic printed materials for billboards are also known, including framing systems providing retention and optional tensioning of the printed material. Elasticated materials are known including elastic cord sometimes referred to as "shock cord" or "bungee cord". Means of structural connections to fabrics or films are also known, for example eyelet holes with annular metal reinforcers, or gripper devices, such as holdon™ two-part gripper devices, or edge seams containing cable. These are used to distribute local stresses in fabric or filmic structures, for example at the connection points to associated tensioned cables, springs or tie rods, such as tie rods comprising a turnbuckle tensioning device.

It is an object of the present invention to provide a method of assembling a tensile fabric arrangement which is quicker and has a better appearance than existing methods.

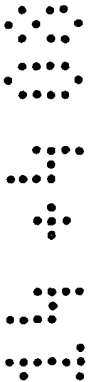
There is therefore provided a method of assembling a tensile fabric arrangement comprising the steps of:



- (i) introducing a length of a tensile fabric into upper and lower guiding aids;
- (ii) securing right and left ends of the fabric;
- (iii) applying a horizontal tension to the fabric; and
- (iv) applying a vertical tension to the fabric using one or more tensioning arrangements located on the lower guiding aid.

The tensioning arrangements are typically located within the lower guiding aid such that they are concealed from public view when in normal use.

According to one embodiment of the present invention, the one or more tensioning arrangements comprise one or more springs in a spring tensioning arrangement. Typically, a plurality of spring tensioning arrangements is used, usually located about every 1-2 m, more typically about every 1.5 m along the length of the lower guiding aid.



Alternatively, the one or more tensioning arrangements may comprise one or more screws in a screw tensioning arrangement. Typically, a plurality of screw tensioning arrangements is used, usually located about every 2-3 m along the length of the lower guiding aid. However, as many tensioning arrangements as considered necessary may be used.

In assembling a tensile fabric arrangement according to the method of the invention, a length of a tensile fabric is introduced into upper and lower guiding aids. The guiding aids help to align the fabric. The upper and lower guiding aids are typically runner tracks which are located a distance apart corresponding approximately with the height of the tensile fabric. The guiding aids are permanently fixed to a billboard structure, usually to brackets attached to the main billboard structure.

A plurality of devices, such as hanging clips, which have portions thereof which are wider than the rest of the body of the device, are used to engage the tensile fabric with the guiding aids. The hanging clips are typically inserted through a number of

openings which are provided along the upper and lower edges of the tensile fabric. Any number of openings may be provided, but they are typically situated between about every 20-60 cm apart along the upper and lower edges of the tensile fabric, more typically about every 30-45 cm. Alternatively, marks may be made on the tensile fabric to indicate where the hanging clips should be located. It will be appreciated that some of the types of hanging clips do not require openings in the fabric to be effective.

The hanging clips are then introduced into the open ends at the left or right hand end of the guiding aids. Each end of the guiding aids is open to permit the introduction. Typically, the guiding aids are designed so they are approximately U-shaped in character but the gap between the two sides narrows towards the edge of the guiding aid which engages with the hanging clips so there is only a small gap between each side. The hanging clips are held in place by the wider portions which are too wide to fit through the small gap provided at the lower edge of the guiding aids. The tensile fabric is then pulled along the guiding aids and into position like a curtain. The hanging clips may be provided in one piece or they may be provided in more than one piece, such as male and female pieces which engage with each other through the openings provided along the upper and lower edges of the tensile fabric.

According to the method of the invention, the right and left ends of the tensile fabric are typically secured to first and second support members located in the proximity of the right and left ends of the upper and lower guiding aids. The first and second support members are typically poles. The support members are kept permanently in place, apart from when there is a need for maintenance and/or repair thereof. The tensile fabric may be secured in position with the support members using any convenient and effective manner, such as using adhesive or removable tape, but typically, the right and left ends of the tensile fabric are secured to the first and second support members using Velcro®. A number of patches of Velcro® may be located on the right and left ends of the reverse side of the tensile fabric (*i.e.* the side which will be hidden from view when the fabric is in its final position). Three patches are usually

employed, one each at the top, middle and bottom of each of the right and left edges of the tensile fabric.

These Velcro® patches are affixed to a further quantity of Velcro® which is attached to each of the first and second support members. Typically, this further quantity of Velcro® is comprised of strips which extend for most or all of the length of the support members and is advantageously approximately the same height as the tensile fabric to be affixed thereto. This enables the tensile fabric to be accurately positioned more easily so that it is substantially vertical. Also, using Velcro® allows the tensile fabric to be very easily removed from the support members once it is no longer required so the support members can be re-used.

According to one embodiment of the invention, one of the support members has a locking mechanism at one end, usually the end nearer to the ground. The locking mechanism is typically a ratchet hook. This is typically located in the bottom right hand corner of, for example, a billboard surface, as viewed from the front and can be used to apply horizontal tension to the tensile fabric. It prevents the support member from moving when the tensile fabric is under tension, thus maintaining a desired level of tension. The other support member does not have a ratchet, but typically has a mechanism which helps to secure it in place, such as a fixing hook which is able to receive the bottom end of this support member. This is typically located in the bottom left hand corner of, for example, a billboard surface, as viewed from the front.

To apply a horizontal tension to the tensile fabric, the support member which does not have a locking mechanism is rotated clockwise until enough of the tensile fabric has wrapped around itself to enable friction grip. The locking mechanism is then engaged on the other support member.

The support members are typically held in place by hoops at their top ends (*i.e.* the ends furthest from the ground). At their bottom ends they are each typically equipped with *e.g.* a small U-rod which may be each placed in U-shaped recesses which can be provided.

Once the horizontal tension has been applied to the tensile fabric, a vertical tension can then be applied. This can be achieved by using one or more tensioning arrangements, which are typically located in the lower guiding aid and hidden from view. Typical tensioning arrangements used in the invention include a spring tensioning arrangement or a tensioning arrangement using a screw.

It will be apparent to a skilled person that the vertical tension may be applied first before the horizontal tension, but typically the horizontal tension is applied before the vertical tension.

As many of these tensioning arrangements may be used as desired, but how many are used depends upon the length of the tensile fabric and the level of tension required. Typically, the spring tensioning arrangements are arranged about every 1.5 m along the length of the tensile fabric, while the screw tensioning arrangements are arranged about every 3 m along the length of the tensile fabric. For greater tension levels, more tensioning arrangements may be employed.


When the springs are applying tension to the tensile fabric, they are under negative spring tension. They are typically attached both to a bracket attached to a billboard structure which supports the lower guiding aid and to the lower guiding aid itself.

When the tensile fabric is pulled into place along the guiding aids, devices such as packing blocks can be used to raise the lower guiding aid at least at each end to bring the two guiding aids closer together to ease the sliding into place of the fabric. Once the tensile fabric has been pulled all the way across the guiding aids and has been secured to the support members and the locking mechanism has been engaged to impart horizontal tension to the fabric, the packing blocks can be removed. The spring then reverts to its position of negative tension, lowering the lower guiding aid, which stretches the tensile fabric and creates vertical tensioning thereof.

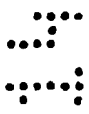
When subsequently removing the tensile fabric in order to replace it, the packing blocks can simply be put back in position to raise the lower guiding aid and relieve the vertical tension on the fabric and allow for an easier removal of the tensile fabric as it can be simply pulled back along the guiding aids like a curtain and removed.

According to a further embodiment of the invention, the tensioning arrangement may be a screw tensioning arrangement. Like the spring tensioning arrangement, the screw tensioning arrangement is also fixed both to the bracket attached to a billboard structure which supports the lower guiding aid and to the lower guiding aid itself.

The screw tensioning arrangement comprises a vertical threaded shaft having a screw at the bottom end thereof adjacent the bracket. Further up the shaft is provided a device having a threaded bore enabling it to move up and down the threaded shaft. This device is also fixed to the lower guiding aid.



When the tensile fabric is being pulled into place along the guiding aids, the device is positioned at a point high up on the threaded shaft on at least the tensioning arrangements at each end of the lower guiding aid. This raises the lower guiding aid to facilitate the introduction of the tensile fabric into the guiding aids.



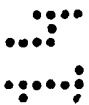
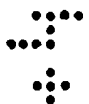
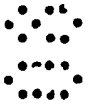
Once the tensile fabric has been pulled all the way across the guiding aids and has been secured to the support members, and the locking mechanism has been engaged to impart horizontal tension to the fabric, vertical tension is achieved by turning the screw at the bottom of the threaded shaft clockwise. This causes the device to move lower down the threaded shaft, thus lowering the lower guiding aid attached to it, which in turn stretches the tensile fabric engaged with it to create vertical tension therein.

Also provided by the present invention is a spring or screw tensioning arrangement for applying tension to a tensile fabric for a billboard, and a tensile fabric tensioned using a spring or screw tensioning arrangement.

The tensile fabric may be any tensile fabric which is durable under exposure to the elements and which has some elastic properties. Such tensile fabrics include, but are not limited to, compositions comprising polyethylene. The tensile fabric may be any size as required commensurate with the size of the billboard or other display means.

The tensile fabric arrangements of one or more embodiments of the invention are typically temporary, for example comprising frequently replaced billboard advertisements, or temporary shelters or temporary flags or banners.

As a means of an example only, and in a non-limiting manner, the method of the invention may be advantageously explained in terms of its application to billboards, where posters can be installed in front of the existing pasted-on posters, although various embodiments of the invention can be used in a wide variety of tensile structures, of many optional structural forms and materials, such as buildings or bus shelters, or anywhere having the requisite arrangement of the guiding aids and support members.



Conventional billboards can be seen everyday on the streets. There are many thousands of them in the UK alone. As mentioned above, it is still very common to see posters which have been pasted onto the billboard surface piece by piece, and the joins of the pieces are clearly visible.

Using the method of the invention, posters on billboards are clear and smooth in appearance, with no joins present which could be visible, unlike pasted on posters, and the method can be carried out in only about 3½ minutes, in contrast to the 20 minutes needed for pasting posters to the billboard.

Additional and/or alternative advantages and salient features of the invention will become apparent from the following detailed description, which, taken in conjunction with the annexed drawings, disclose preferred embodiments of the invention.

Reference is made to the following Figures, which are intended to be illustrative only and in no way limiting upon the scope of the invention.

Fig. 1 shows a hanging clip being fixed to a poster composed of a tensile fabric.

Fig. 2 shows a poster being introduced into the upper and lower runner tracks in preparation for it being pulled into place across the billboard.

Fig. 3 shows how the poster is attached to the support members using Velcro® when the poster is in place.

Fig. 4 shows the before and after of the poster being tensioned using the spring tensioning arrangement.

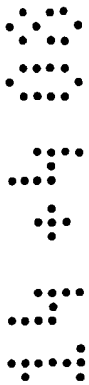
Fig. 5 shows the before and after of the poster being tensioned using the screw tensioning arrangement.

Figs. 6a-6f show a number of different variations of hanging clips.

The polyethylene poster 2 is printed with location marks or openings 4 where the hanging clips 6 are to be fixed. This is shown in Fig. 1. Different types of hanging clips which can be used with the invention are shown in Figs. 6a-6f, but for this illustration, the hanging clips shown being attached to the poster 2 are those shown in Fig. 6e.

The poster 2 is lifted up to the top (right or left) of a billboard and the hanging clips 6 at the top and bottom of the poster 2 are introduced into upper and lower runner tracks 8 and 10. The poster 2 is pulled into place across the billboard like a curtain. This is depicted in Fig. 2.

The right and left ends of the poster 2 each have a number (in this case 3) of female Velcro® patches 12 on its reverse side, at the top, middle and bottom. The patches 12 are fixed to the male Velcro® strip 14 located on each of poles 16 and 18, which are themselves located at the ends of the runner tracks 8 and 10. The male Velcro® strip 14 is about the same height as the poster and aligned at close to 90 degrees to the lower runner track 10 to facilitate the poster being positioned correctly.



Pole 16 at one end of the runner tracks 8 and 10 has a ratchet mechanism at its bottom end, while pole 18 at the other end of the runner tracks 8 and 10 does not. Once the poster 2 is fixed to the poles, the non-ratchet pole 18 is rotated clockwise until enough of the poster 2 has wrapped around itself to enable friction grip. The ratchet pole 16 is then tightened by rotating the pole anticlockwise, tensioning the poster 2 as it is horizontally stretched. This is depicted in Fig. 3.

The upper and lower runner tracks 8 and 10 are permanently fixed to upper and lower billboard brackets 20 and 22 at various points across the billboard. The lower runner track 10 is constantly under negative spring tension. The springs 24 (only one of which is shown) are attached to lower billboard brackets 22 and to the lower runner track 10, and are located approximately every 1.5 m along the length of the lower runner track 10. This is depicted in Fig. 4.

When the poster 2 is being slid into position, the lower runner track 10 can be lifted up at each end using packing blocks (not shown) to remove tension from the spring 24 and ease the process. This is shown in the left hand depiction in Fig. 4. Once the poster 2 has been ratcheted tight to create horizontal tension, the packing blocks are removed, which causes the spring 24 to compress once more and create vertical tensioning of the poster 2. This is shown in the right hand depiction in Fig. 4.

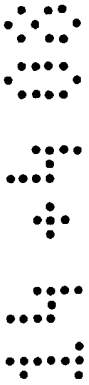
Alternatively, the poster 2 can be subjected to vertical tension using a screw tensioning arrangement 26 as shown in Fig. 5.

As in Fig. 4, the upper runner track 8 is permanently fixed to upper billboard bracket 20 at various points across the billboard. The lower runner track 10 is attached to a screw tensioning arrangement 26 which is also attached to billboard bracket 22. The screw tensioning arrangement 26 has a vertical threaded shaft 28 having a screw 30 at its bottom end adjacent the bracket 22. A device 32 having a threaded bore is positioned further up the threaded shaft. As can be seen, the device 32 is fixed to the lower runner track 10.

Once the poster 2 has been ratcheted tight as shown in Fig. 3, vertical tension is imparted to poster 2 by rotating the screw 30 clockwise to pull lower runner track 10 downwards.

When the poster 2 is being pulled into place along the runner tracks 8 and 10, the device 32 is positioned at a point high up on the threaded shaft 28 on at least some of the screw tensioning arrangements 26 of the lower runner track 10. This lifts the lower runner track 10 to facilitate the introduction of the poster 2 into the runner tracks 8 and 10.

Once the poster 2 has been pulled all the way across the runner tracks 8 and 10 and has been secured to poles 16 and 18, and the ratchet has been engaged to impart horizontal tension to the poster 2, the screw 30 is rotated clockwise. This causes the device 32 to move lower down the threaded shaft 28, thus lowering the lower runner track 10, which in turn stretches the poster 2 to create vertical tension in it.

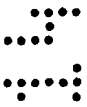
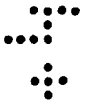
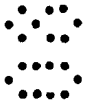


Figs. 6a-6f show a number of different variations of hanging clips 6a-6f which may be used in the method of the invention. In 6a-6d the clips are connected to the poster 2 about halfway up the body of the clip or lower with the wider portion at the top of the clip being free to engage with the upper runner track 8 to support the poster 2. In 6e and 6f, the clips are affixed in such a manner to allow the poster 2 to protrude slightly above the top of the clip. This also allows the clip to engage with the upper runner track 8 to support the poster 2.

One or more embodiments of the invention enables the adoption of environmentally friendly materials, for example polyethylene fabric printed with UV-cured ink, which can be recycled after use, compared to existing systems, for example self-adhesive PVC film printed with solvent-based PVC inks, which are very undesirable materials, requiring landfill with the attendant chemical migration problems of PVC.

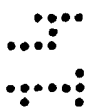
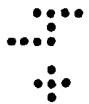
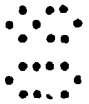
In summary, various embodiments of the invention can be used in many different types of tensile structures and the embodiments illustrated are not limiting. The

foregoing description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. On the contrary, those skilled in the art should appreciate that variations may be constructed and employed without departing from the scope of the invention, aspects of which are recited by the claims appended hereto.

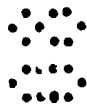


CLAIMS

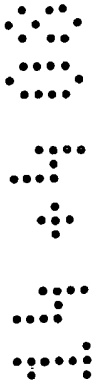
1. A method of assembling a tensile fabric arrangement comprising the steps of:
 - (i) introducing a length of a tensile fabric into upper and lower guiding aids;
 - (ii) securing right and left ends of the fabric;
 - (iii) applying a horizontal tension to the fabric; and
 - (iv) applying a vertical tension to the fabric using one or more tensioning arrangements located on the lower guiding aid.
2. A method according to claim 1, wherein the one or more tensioning arrangements comprises one or more springs.
3. A method according to claim 2, wherein the springs are located about every 1-1.5 m along the lower guiding aid.
4. A method according to claim 1, wherein the one or more tensioning arrangements comprises one or more screws.
5. A method according to claim 4, wherein the screws are located about every 2-3 m along the lower guiding aid.
6. A method according to any preceding claim, wherein the right and left ends of the fabric are secured to first and second support members located near right and left ends of the upper and lower guiding aids.
7. A method according to claim 6, wherein the right and left ends of the fabric are secured to first and second support members using Velcro®.



8. A method according to any preceding claim, wherein the fabric is maintained in engagement with the upper and lower guiding aids using a plurality of hanging clips.
9. A method according to any of claims 6-8, wherein one of the support members has a locking mechanism.
10. A method according to any of claims 6-9, wherein one of the support members does not have a locking mechanism and horizontal tension is applied to the fabric by rotating the support member not having a locking mechanism, and engaging the locking mechanism on the other support member.
11. A method according to claim 9 or claim 10, wherein the locking mechanism is a ratchet hook.
12. A method according to any of claims 6-11, wherein the support members are poles.
13. A method according to any preceding claim, wherein the tensile fabric is a polyethylene-based composition.
14. A method as according to any preceding claim, wherein the tensile fabric arrangement is for assembly on a billboard structure, a building, or a shelter.
15. A spring or screw tensioning arrangement for applying tension to a tensile fabric for a billboard.
16. Use of a spring or screw tensioning arrangement for applying tension to a tensile fabric for a billboard.
17. A tensile fabric tensioned using a spring or screw tensioning arrangement according to claim 15.



18. A method or spring or screw tensioning arrangement substantially as herein described in the description and drawings.



15

Application No: GB0805131.0

Examiner: Paul Makin

Claims searched: 1-14

Date of search: 2 July 2008

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,Y	X: 1,4-7,9,12-14 Y:1,4-7,9,11-14	WO 89/02495 A1 (LOOMIS) see particularly line 18 page 33 to line 14 page 36
X	1,4,5,6,13,14 at least	US 2004/205992 A (DEVANEY) whole document
X	1,4,5,6,13,14 at least	US 5140765 A (KING) whole document
X	1,4,5,6,13,14 at least	US 5685099 A (FAVATA) whole document
X	1,2,3,6,13,14 at least	US 6339889 A (GRIESEMER) whole document
X	1,2,3,6,13,14 at least	US 4580361 A (HILLSTROM) whole document
Y	1,4-7,9,11-14 at least	JP 2006030675 A (MIURA) see the figures and WPI Abstract Accession No. 2006-106673[11]

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

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G09F

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
G09F	0011/08	01/01/2006
E04H	0015/32	01/01/2006
G09F	0015/00	01/01/2006
G09F	0017/00	01/01/2006