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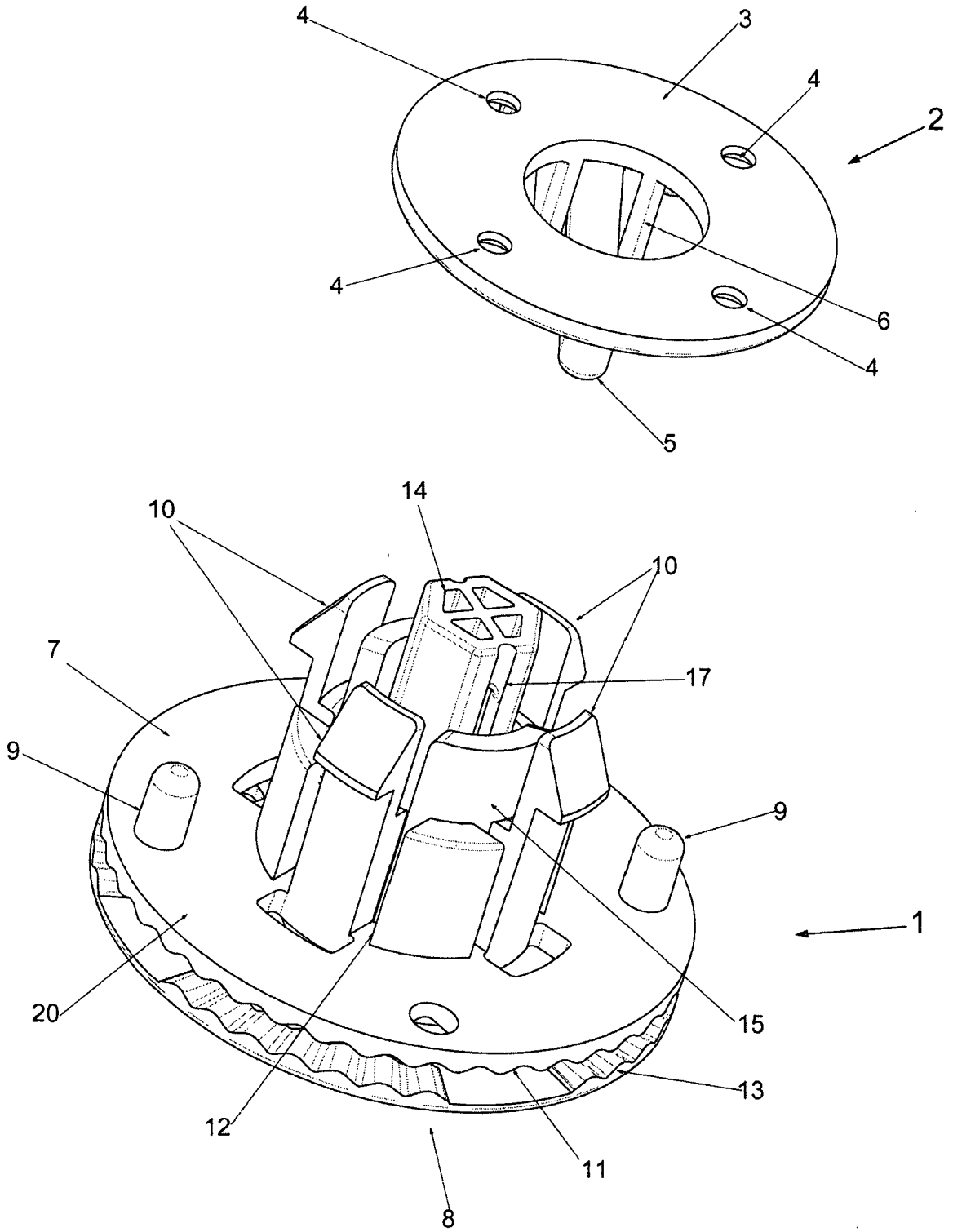


Figure 1

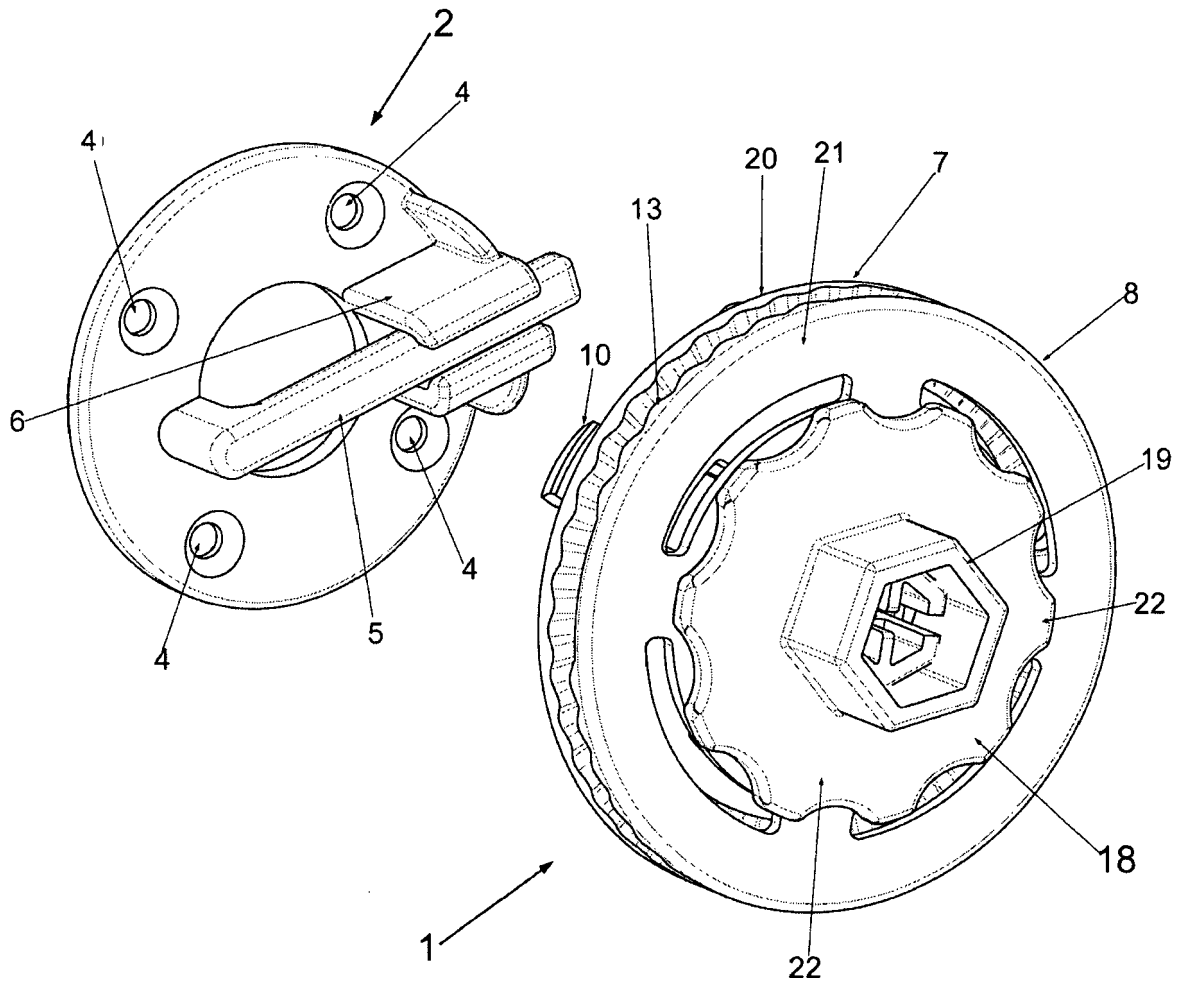


Figure 2



TITLE

A Tensioning Device

DESCRIPTION

Field of Invention

The present invention relates to the construction of furniture and fittings for homes, shops and other businesses. The invention provides a tensioning device and system for the construction of such furniture and fittings and a method of using said device and system to construct furniture and fittings. The device, system and method are particularly suitable for constructing modular furniture that has a short life-span, such as that used in pop-up shops.

Background

It is often necessary to construct furniture and fittings for homes, shops and businesses quickly. As a result, such furniture and fittings are often formed from standard components and fixings such that they can be constructed quickly and easily by relatively unskilled workers but such that the resulting furniture or fitting is robust enough to withstand normal use in the short to medium term. For example, a lot of home furniture is now supplied as 'flat-pack' furniture that is intended to be assembled at home by the purchaser.

Additionally, there is now a growing requirement for semi-permanent shop fittings. In particular, there is growing trend for 'pop-up' shops where a retailer will take over a retail premises for a relatively short period of time, for example 12 to 18 months. These pop-up shops require fittings that appear to be the same standard as the fittings of more permanent shops but require those fittings to be relatively cheap and easy to both construct and deconstruct.

In light of the above, there is a need for fixings for furniture and fittings that are simple to use, that allow furniture and fittings to be constructed quickly and cheaply and that allow the furniture and fittings to be deconstructed easily.

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### Summary of Invention

The present invention provides a tensioning device for forming fittings and furniture, the device comprising

a stationary part for fixedly mounting on a wall of a piece of furniture or a fitting;

a rotating part comprising attaching means for attaching a flexible cord and being rotatably mounted on a mounting of the stationary part;

wherein the mounting of the stationary part is formed such that, when the device is mounted on a piece of furniture or fitting, the rotating part can be manually rotated to twist a flexible cord attached thereto at the attaching means thereby pulling a surface of the rotating part against a surface of the stationary part such that friction between the surface of the rotating part and surface of the stationary part prevents rotation of the rotating part solely under the action of a twisted flexible cord attached to the attaching means without manual intervention.

The tensioning device of the present invention is particularly advantageous as it is a simple and effective device for tensioning walls of a piece of furniture or a fitting. By suitably mounting the stationary part of the device to a wall of the furniture or fitting and attaching a first end of a cord to the rotating part of the device and a second end of the cord to an opposing wall and then rotating the rotating part of the device the cord can be twisted to pull the wall and the opposing wall of the furniture or fitting together, thereby providing structural rigidity to the furniture or fitting. For example, the device can be used to provide a tensile force between the base and upper surface of a shop counter and thereby securely hold sidewalls mounted therebetween in position. Due to the manner in which the mounting of the stationary cord is formed, after twisting the cord to the desired tension, the cord will not rotate without manual intervention and the tension supplied by the cord will remain constant.

Due to the simplicity of the action of the tensioning device it is anticipated that it will be able to be used easily by unskilled people. All that is required after the device and cord have been correctly mounted, is the manual rotation of the rotating part of the device. If it is desirable or necessary to deconstruct furniture or fittings constructed using the device of the present invention this can be done by cutting the cord,

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unattaching the cord from the attaching means of the rotating part or by rotating the rotating part to untwist the cord and thereby relieve the tension therein.

The crucial feature of the device of the present invention is that the mounting of the stationary part is formed such that, when the device is mounted on a piece of furniture or fitting, the rotating part can be manually rotated to twist a flexible cord attached thereto at the attaching means thereby pulling a surface of the rotating part against a surface of the stationary part such that friction between the surface of the rotating part and surface of the stationary part prevents rotation of the rotating part solely under the action of a twisted flexible cord attached to the attaching means without manual intervention.

The rotating part, stationary part and the mounting of the stationary part are formed and arranged such that twisting a flexible cord attached to the attaching means of the rotating part pulls a surface of the rotating part against a surface of the stationary part. Friction between the surface of the rotating part and the surface of the stationary part then prevents rotation of the rotating part under the sole action of the twisted flexible cord. In order to enhance this action, the surfaces of the rotating part and the stationary part may be formed to maximise the friction therebetween. For example, they may have a rough surface texture and/or they may be non-planar. In particular, portions or the whole of the surface may have interlocking non-planar profiles, wherein the profiles are sufficiently rounded to allow manual rotation of the rotating part but sufficiently non-planar to prevent rotation of the rotating part under the sole action of a twisted flexible cord.

In addition to, friction preventing rotation of the rotating part under the sole action of the twisted flexible cord, the device may include a ratchet mechanism to prevent rotation. That is, the mounting of the stationary part may comprise a ratchet mechanism for allowing rotation in a first direction and preventing rotation in a second direction, wherein rotation in the first direction will twist and tension the cord and rotation in the second direction will untwist and release tension

in the cord. A ratchet mechanism may be formed in any manner apparent to the person skilled in the art.

When in use, the stationary part of the tensioning device is mounted on a wall of the furniture or fitting being formed. In order to allow the device to be correctly located in the wall it may be preferable that the stationary part additionally comprises at least one locating protrusion for positioning the device on the wall. For example, the stationary part may comprise a plurality of protrusions that are intended to be located in appropriately positioned apertures formed in the wall. By aligning the protrusions with the apertures, the tensioning device may be quickly and accurately located. The at least one protrusion may be simple protrusions that act only to locate the device. Alternatively, the at least one protrusion may be a resilient member or other fixing means that acts to hold the tensioning device in position in the wall of the furniture or fitting. The at least one protrusion may also act to prevent the stationary part from rotating relative to a wall on which the stationary part is mounted.

It may be preferable that the attaching means of the rotating part is coaxial with a rotational axis of the rotating part. This is advantageous as it can minimise the torque applied to the rotating part of the device when the flexible cord is twisted, thereby minimising the force required to prevent the rotation of the rotating part under the sole action of the flexible cord. Furthermore, it may be advantageous as it can ensure that the flexible cord remains in the correct alignment as it is twisted to apply tension to the furniture or fitting.

The attaching means of the rotating part can be formed in any manner apparent to a person skilled in the art. Suitable attaching means include, but are not limited to, a hook, an openable clip and an aperture formed through the rotating part. The attaching means can be any one or any combination of these attaching means or any other suitable attaching means.

It is advantageous that when in use, the rotating part of the device of the present invention can be manually rotated, rather than specific machinery being required to

rotate the rotating part. It is to be understood that manual rotation should be interpreted to include the use of simple tools to rotate the rotating part, for example spanners wrenches and other similar tools. Using simple tools to rotate, rather than bare hands, to rotate the rotating part may be preferred as it can allow a greater torque to be applied to the rotating part. In order to allow simple tools to be used it may be preferable that the rotating part comprises a suitably shaped shaft portion that allows it to be rotated with a spanner or wrench.

The device of the present invention may be formed of any suitable materials that are apparent to the person skilled in the art. However, in order to produce the cheapest and most resilient device, it may be preferable that the stationary part and the rotating part are substantially formed of plastic. If they are formed of plastic, it may be preferable that the stationary part and the rotating part are formed by injection moulding.

The device of the present invention may be formed such that, when in use, the stationary part and the rotating part are located on an outer side of a wall of the furniture or fitting. Alternatively, the device of the present invention may be formed such that, when in use, the stationary part and the rotating part are located on an inner side of a wall of the furniture or fitting. Furthermore, the device may be formed such that when in use the rotating part of the present invention is either the innermost or outermost part of the device. It will be readily understood that the best orientation and positioning of the parts of any specific device according to the present invention will be able to be determined by the skilled person based upon the relevant design factors e.g. cost, the intended use of the device and the material from which the device is formed.

The present invention a system for tensioning fittings or furniture comprising:

- a tensioning device, as described above;
- a flexible cord; and
- a fixing for attaching the cord to a wall of a fitting or piece of furniture.



That is, the tensioning device described above is preferably used as part of a system that additionally comprises a flexible cord and a fixing for attaching the cord to a wall of a fitting or piece of furniture and the present invention provides a system that additionally comprises those components.

In the context of the present invention the term 'a cord' is intended to be a broad enough term to include any flexible member that can be easily twisted to provide tension. Such members include wires, strings, cords, tapes and these members can be formed of any of wide variety of materials including metals, fabrics and plastics. As will be readily understood, the main requirement of a flexible cord of a system according to the present invention is that it does not substantially plastically deform when tension is applied to it.

Similarly, a fixing of the present invention may be any fixing that allows an end of a flexible cord to be attached to a wall of furniture or a fitting, that can withstand the tension applied thereto when the cord is twisted, and that prevents the end of the flexible cord rotating as the cord is twisted. Suitable fixings include, but are not limited to, hooks, eyebolts and apertures formed through the furniture or fitting.

Alternatively, in the same manner as the tensioning device of the present invention, the fixing may be a specifically manufactured apparatus that is intended to be mounted on a wall of the furniture or fitting and may comprise attaching means for attaching the flexible cord. In such embodiments the attaching means can be formed in any manner apparent to a person skilled in the art. Suitable attaching means include, but are not limited to, a hook, an openable clip and an aperture formed through the rotating part. The attaching means can be any one or any combination of these attaching means or any other suitable attaching means.

In preferred embodiments of the system of the present invention the fixing may be an injection moulded fixing for fixedly mounting on a sidewall of a piece of furniture or a fitting comprising attaching means for attaching the flexible cord.

The present invention also provides a method of constructing furniture or fittings using the system described above. The method comprising the steps of:

- positioning sidewalls between a first wall and an opposing wall;
- fixing the tensioning device to a first wall of the furniture or fitting;
- fixing the fixing to an opposing wall of the furniture or fitting;
- attaching a first end of the cord to the tensioning device;
- attaching a second end of the cord to the fixing; and subsequently
- rotating the rotating part of the tensioning device to twist the cord to pull the first wall towards the opposing wall and thereby hold the sidewalls in position.

These steps may be carried out in any order that would allow the method to function as intended and that would be apparent to the person skilled in the art. The only requirement is that the rotation of the rotating part, and consequent twisting of the flexible cord, is the final step that is carried out. Otherwise, the order in which the other steps of the method are carried out is relatively inconsequential. Furthermore, it will be understood that due to the features of the tensioning device, after the cord has been twisted to an appropriate tension, it will not untwist without manual intervention and the tension will remain applied to the wall and the opposing wall.

The method of the present invention is particularly suitable for forming temporary and semi-permanent furniture, such as flat-pack furniture or the fittings found in pop-up shops. In preferred embodiments of the method of the present invention the fitting may be a shop counter for a pop-up shop.

The method of the present invention allows quick and easy assembly and disassembly of furniture. As a result, the method is also particularly suitable for forming furniture that is set up and used for very short periods of time, from a single day to a couple of weeks, and subsequently dismantled, for example furniture that is used in trade exhibitions or similar events.

Similarly, the method of the present invention can allow the quick removal and replacement of the sidewalls of a piece of furniture. This can be particularly useful if

it desirable to refresh furniture by replacing or changing the appearance of the sidewalls of furniture. In a retail environment this is often necessary or desirable, for example it may be desirable to rebrand a shop for a special event or as part of rebranding of a business. However, in these situations it is often not necessary to completely refit the shop. In these cases the method of the present invention can allow quick removal and replacement of the sidewalls of a piece of furniture, which can allow rebranding or refreshing without the need to completely refit a business.

The first wall and the opposing wall of the fitting or furniture of the method of the present invention may be formed of any suitable material. In preferred embodiments of the invention the first wall and the opposing wall may be formed of a wood-based material including but not limited to wood, fibre board, chip board or any other similar material.

The sidewalls of a piece of furniture or fitting constructed using the method of the present invention may be formed of any suitable material. However, the method is particularly suitable for constructing furniture or fittings wherein the sidewalls are formed of a cardboard material. In particular, the method is particularly suitable for forming counters other similar pieces of furniture and fittings where it is necessary to have a solid and resilient top surface but wherein the sidewalls can be relatively lightweight and can be formed of a cardboard material or very lightweight wood based material if desired.

The method of the present invention may further comprise a final step of releasing the tension from the twisted cord in order to deconstruct the furniture. The tension can be released from a twisted cord by any of the following means:

- cutting the cord;
- unattaching either the first or second end of the cord;
- by unmounting the fixing or the tensioning device; or
- by rotating the rotating part of the tensioning device in the appropriate direction.

The step of rotating of the rotating part of the tensioning device can be carried out in any manner that is apparent to the person skilled in the art, depending on the specific design and positioning of the tensioning device. The rotating can be done by hand, using a simply tool, such as a spanner or a wrench, or by using a specialised rotating, tool such as an electric screw driver, with appropriate attachment.

Other features and advantages of the present invention will be apparent from a preferred embodiment of the invention which is shown in the Figures and is described below.

### Drawings

Figure 1 is a first perspective view of a tensioning device and fixing of a preferred embodiment of a system according to the present invention; and

Figure 2 is a second perspective view of the tensioning device and fixing of Figure 1.

A preferred embodiment of a tensioning device 1 and a fixing 2 of a system according to the present invention is shown in Figures 1 and 2. The tensioning device 1 and fixing 2 are intended to be used with a flexible cord (not shown) in a method according to the present invention to construct a piece of furniture or a fitting (not shown).

The fixing 2 is a simple injection moulded plastic fixing for attaching to a wall of the furniture or fitting and to a second end of the flexible cord. The fixing 2 has a flat base 3 with a four apertures 4 formed therethrough. The fixing 2 is intended to be fixed to the wall of the furniture or fitting using screws (not shown) positioned through the apertures 4. A flexible retaining bar 5 is formed on an upper side of the base 3 and is attached to the base at an inner end, an outer end of the bar being unattached. The outer end of the retaining bar 5 is held in position by a clip 6 formed on the upper side of the base such that the bar 5 is held substantially parallel to the base 3 but such that the outer end of the bar is free to be flexed towards the base.

The tensioning device 1 has a stationary part 7 and a rotating part 8. The stationary part 7 comprises a round disc 20 that has two locating protrusions 9 formed on an upper side. Four resilient fixing members 10 are also formed on the upper side of the round disc 20. A surface 11 of a lower side of the round disc 20 has a regularly undulating profile that is substantially rotationally symmetrical about a central axis of the stationary part. The stationary part 7 has a circular aperture 12 formed through its centre, with the central axis of the stationary part central to the aperture. The four resilient fixing members 10 are formed and regularly spaced around an outer edge of the central aperture 12.

The rotating part 8 consists of a main part 21 and a tightening disc 22, which can only be seen in Figure 2. As will be apparent, the tightening disc 22 is not essential to the operation of the tightening device 1 but simply aids its operation. The rotating part 8 is rotationally mounted on the stationary part 7, through the central aperture 12 of the stationary part.

The rotating part 8 consists of a circular disc 13, a central attaching column 14, two partially cylindrical walls 15 and two partially cylindrical retaining members 16. The central attaching column 14 is positioned centrally with respect to the circular disc 13, extends a substantial distance upwards from an upper surface of the circular disc and extends a small distance downwards from a lower surface of the circular disc. The central attaching column 14 is substantially hexagonal in cross-section and has an aperture formed 17 near an upper end for attaching the flexible cord. The two partially cylindrical walls 15 are formed around, but are spaced from, the attaching column 14, they each extend around approximately 80° of the attaching column 14 and are substantially opposite one another. The cylindrical retaining members 16 are also formed around but are spaced from the attaching column 14, they each extend around approximately 80° of the attaching column 14 and are substantially opposite one another. Together, the retaining members 16 and the partially cylindrical walls 15 substantially form a cylindrical wall that is formed around and spaced from the attaching column 14. The outer side of this cylindrical wall 15, 16 is sized to conform to the central aperture 12 formed in the stationary part 7 such that the rotating part 8

can be rotatably mounted through the central aperture. The retaining members 16 are sized such that when the rotating part 8 is mounted through the central aperture 12 the rotating part is resiliently clipped to the stationary part 7 but can still freely rotate relative to the stationary part 7. The upper surface of the circular disc 13 has sections that have a regularly undulating profile that is substantially rotationally symmetrical about a central axis of the rotating part 8 and that matches the corresponding surface 11 of the stationary part 7.

The tightening disc 22 is formed to slide over a lower end of the attaching column 14 and be held in place thereby. Specifically, the tightening disc 22 comprises a substantially circular flat disc 18 with a smaller diameter than the circular disc 13 of the rotating part 8 and a central hexagonal column portion 19 mounted centrally thereon. The column portion 19 is hollow and has a hexagonal inner profile that matches the outer profile of the attaching column 14 such that the column portion 19 can be mounted around the portion of the attaching column 14 that extends downwards from the lower surface of the circular disc 13. The circular flat disc 18 has a corresponding aperture 20 formed therethrough and has a shaped outer edge 21 that allows for easy manual rotation. The outer profile of the column portion 19 is hexagonal in shape and is sized to allow the tightening disc 22 to be easily rotated using a correspondingly sized wrench or spanner.

The tensioning device 1 and fixing 2 are used in the following manner. First, the fixing 2 is screwed into position on a wall of the furniture or fitting using screws located through the apertures 4 thereof. Second, the tensioning device 1 is positioned through a suitable sized and shaped aperture formed in an opposing wall of the furniture or fitting. Specifically, the aperture will be sized and have a depth such that the tensioning device 1 can be mounted therethrough and clipped in position by the four resilient fixing members 10. Holes for locating the locating protrusions 9 will also be formed in appropriate positions in the opposing wall. Locating the locating protrusions in suitable apertures prevents rotation of the stationary part relative to the opposing wall without the need for the stationary part to be screwed, or otherwise permanently fixed, to the opposing wall. When the tensioning device 1 is positioned

through the aperture of the opposing wall the circular disc 13 of the rotating part 8 and the round disc 20 of the stationary part will be positioned on an outer side of the opposing wall and the central attaching column 14 will extend through the aperture. Subsequently, the flexible cord will be attached to the attaching column 14 at a first end and to the fixing 2 at a second end. The rotating part 8 of the tensioning device 1 can then be manually rotated to twist the flexible cord and thereby pull the wall towards the opposing wall.

When the flexible cord is twisted the matching regularly undulating profiles of upper surface of the circular disc 13 and the round disc 20 are also pulled against one another under the action of the twisted flexible cord. This provides a resistance to rotation of the rotating part 8 that is sufficient to prevent rotation of the rotating part under the action of the twisted flexible cord but that is not sufficient to prevent manual rotation of the rotating part 8. The action of the locating protrusions 9 prevents the stationary part of the tensioning device from rotating. When it is desirable to release the tension from the flexible cord this can be done by manually rotating the rotating part 8 or the cord may be unattached from the tensioning device 1 or fitting 2 or the cord may simply be cut.

The tightening disc 22 can be used to aid the manual rotation of the rotating part 8. This is done by positioning the tightening disc 22 on the main part 21 of the rotating part 8 in the manner shown in Figure 2 and described above. This allows a wrench or spanner to be used on the column portion 19 of the tightening disc 22 to rotate the rotating part 8. Alternatively or additionally the shape of the outer edge of the tightening disc 22 allows the tightening disc to be rotated by hand more easily than is possible for the circular disc 13 of the rotating part 8. The tightening disc 22 of the rotating part 8 can be separated from the main part 21 when it is not in use.

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Claims

1. A tensioning device for forming fittings and furniture, the device comprising  
a stationary part for fixedly mounting on a wall of a piece of furniture or a  
5 fitting;

a rotating part comprising attaching means for attaching a flexible cord and  
being rotatably mounted on a mounting of the stationary part

wherein the mounting of the stationary part is formed such that, when the  
device is mounted on a piece of furniture or fitting, the rotating part can be manually  
10 rotated to twist a flexible cord attached thereto at the attaching means thereby pulling  
a surface of the rotating part against a surface of the stationary part such that friction  
between the surface of the rotating part and surface of the stationary part prevents  
rotation of the rotating part solely under the action of a twisted flexible cord attached  
to the attaching means without manual intervention.

15 2. A tensioning device according to claim 1, wherein portions or the whole of the  
surface of the rotating part and the surface of the stationary part have interlocking  
non-planar profiles, wherein the profiles are sufficiently rounded to allow manual  
rotation of the rotating part but sufficiently non-planar to prevent rotation of the  
rotating part under the sole action of the twisted flexible cord.

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3. A tensioning device according to any preceding claim, wherein the stationary  
part additionally comprises at least one locating protrusion for positioning the device  
on a sidewall of a piece of furniture or fitting.

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4. A tensioning device according to any preceding claim, wherein the attaching  
means of the rotating part is coaxial with a rotational axis of the rotating part.

5. A tensioning device according to any preceding claim, wherein the attaching  
30 means is a hook.

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6. A tensioning device according to any of claims 1 to 4, wherein the attaching means comprises an openable clip.

7. A tensioning device according to any of claims 1 to 4, wherein the attaching means comprises an aperture formed through the rotating part.

8. A tensioning device according to any preceding claim wherein the rotating part comprises a suitably shaped shaft portion that allows it to be rotated with a spanner or wrench.

9. A tensioning device according to any preceding claim, wherein the stationary part and the rotating part are substantially formed of plastic.

10. A tensioning device according to any preceding claim, wherein the stationary part and the rotating part are formed by injection moulding.

11. A tensioning device according to any preceding claim, wherein the stationary part comprises a plurality of resilient members for holding the stationary part in position in cooperatively formed apertures formed in a piece of furniture or fitting.

12. A system for tensioning fittings or furniture comprising:  
a tensioning device according to any of claims 1 to 11;  
a flexible cord; and  
a fixing for attaching the cord to a wall of a fitting or piece of furniture.

13. A system according to claim 12, wherein the cord is a string or wire.

14. A system according to claim 13, wherein the cord is a tape.

15. A system according to any of claims 12 to 14, wherein the fixing is a hook.

16. A system according to any of claims 12 to 14, wherein the fixing is an eyebolt.

17. A system according to any of claims 12 to 14, wherein the fixing is an injection moulded fixing for fixedly mounting on a sidewall of a piece of furniture or a fitting comprising attaching means for attaching the flexible cord.

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18. A method of constructing furniture or fittings using the system of any of claims 12 to 17 comprising the steps of:

positioning sidewalls between a first wall and an opposing wall;

fixing the tensioning device to a first wall of the furniture or fitting;

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fixing the fixing to an opposing wall of the furniture or fitting;

attaching a first end of the cord to the tensioning device;

attaching a second end of the cord to the fixing; and subsequently

rotating the rotating part of the tensioning device to twist the cord to pull the first wall towards the opposing wall and thereby hold the sidewalls in position.

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19. A method according to claim 18, wherein the fitting is a shop counter.

20. A method according to claim 18 or claim 19, wherein the first wall and opposing wall are formed of a wood-based material.

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21. A method according to any of claims 18 to 20, wherein the sidewalls are formed of a cardboard material.

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