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(54) Hinge for shower door

(57) A door hinge (1) for a shower door (2) including a first hinge element (4) and a second hinge element (5). The first hinge element (4) includes a first part (40) hinged to the second hinge element (5) along a hinge axis and a second part (41) movably connected to the first part (40) by an adjustable connection (6). The adjustable connection (6) includes a threaded spindle (60) that extends at an angle between the hinge axis and a direction perpendicular thereto and is configured to selectively pull or push, in use, the second part (41) relative to the first part (40) toward or away from the second hinge element (5).

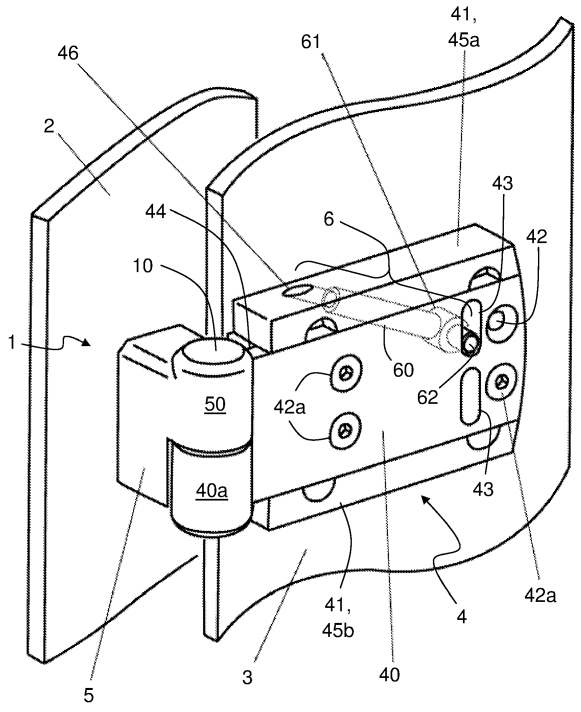

FIGURE 1

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Description

[0001] This invention relates generally to hinges for shower doors as well as shower doors, shower enclosures, showers and bathrooms incorporating such hinges. More specifically, although not exclusively, this invention relates to such hinges that are adjustable horizontally and/or vertically.

[0002] Adjustable door hinges have been known for some time, but manufacturers of such hinges have been trying to optimise the balance between the extent and ease of adjustability with rigidity and reliability of the hinge design. This balance is particularly difficult to achieve with shower door hinges, which are subjected to particularly harsh conditions such as exposure to hot water, humidity and hard water (limescale) deposits.

[0003] DE2758333 discloses an adjustable window hinge having one leaf with two parts that are movable relative to one another by an adjustment screw that actuates a foot to adjust the hinge in a horizontal direction. However, the hinge of DE2758333 does not retain positively the two parts together, since the screw only limits the movement of the foot.

[0004] It is therefore a non-exclusive object of the invention to provide an adjustable hinge that mitigates the issues associated with known hinge designs. It is a further non-exclusive object of the invention to provide an improved adjustable hinge that is particularly suited to shower doors.

[0005] Accordingly, one aspect of the invention provides a door hinge for a shower door, the hinge comprising first and second hinge elements, the first hinge element including a first part hinged to the second hinge element and a second part movably connected to the first part by an adjustable connection, wherein the adjustable connection comprises an actuator that extends at an angle between the hinge axis and a direction perpendicular thereto, which actuator is configured to selectively pull or push, in use, the second part relative to the first part toward or away from the second hinge element.

[0006] The provision of configuring the actuator such that it is able to selectively pull or push the second part toward or away from the second hinge element provides positive control over the position of the second part relative to the first part in both directions of movement. Moreover, the provision of having the actuator extending at an angle between the hinge axis and a direction perpendicular thereto, more specifically an angle with respect to both the vertical and the horizontal, provides easy access to adjust the hinge.

[0007] For the avoidance of doubt, the term 'hinge axis' as used herein refers to the axis of rotation about which the first and second hinge elements are hinged.

[0008] Preferably, the hinge or adjustable connection further comprises conversion means for converting a linear movement of the actuator, for example along the actuator, to a horizontal or vertical movement of the second part relative to, e.g. toward or away from, the second hinge element. The conversion means may comprise a carriage or nut that may be slideable along a guide and/or may include an aperture or hole, e.g. with an internal thread. The carriage or nut may include one or more projections, which projection or projections may comprise a pin or pins which may be received and/or slideable along the guide, which guide may comprise a slot. The guide or slot may extend vertically, for example to convert or for converting a linear movement of the actuator to a horizontal movement of the second part relative to, e.g. toward or away from, the second hinge element. Additionally or alternatively, the guide or slot may extend horizontally, for example to convert or for converting a linear movement of the actuator to a vertical movement of the second part relative to the second hinge element.

[0009] The actuator may comprise a threaded shaft which may have an external thread, for example a bolt or screw, e.g. a threaded spindle, which may be rotatably connected to one of the first and second parts and/or threadedly connected to the other of the first and second parts. Additionally or alternatively, the actuator may be rotatably connected to the one part by an annular projection on one of the actuator and the one part which is received within an annular groove or against an annular abutment of the other of actuator and the one part. In some embodiments, the actuator is rotatably connected by one or more, e.g. a pair of circlips and/or threadedly connected to the carriage and/or the other of the first and second parts may comprise the guide.

[0010] In a preferred embodiment, the adjustable connection comprises threaded spindle that is rotatably connected to the first part and threadedly connected to the carriage, wherein the spindle extends upwardly and/or toward the hinge, for example it may extend or lie at an angle of between 15 and 75 degrees from the hinge axis, e.g. between 15 and 60 degrees such as about 30 degrees or between 30 and 60 degrees such as 45 degrees or between 45 and 75 degrees such as 60 degrees. In such embodiments, the spindle is preferably configured to selectively pull or push, in use, the carriage toward or away from the second hinge element and/or the guide or slot may extend vertically, for example it may be a vertical guide or slot, wherein the carriage may ride upward or downward when the spindle pulls or pushes the carriage.

[0011] Preferably, the hinge or the adjustable connection further comprises fastening or clamping or clamp or securing means, e.g. for fastening or clamping or securing the first and second parts together. The fastening or clamping or securing means may comprise one or more fasteners such as clamp fasteners or screws, which fasteners or screws may engage a clamp block, e.g. threaded holes of a clamp block. The one or more clamp screws may each extend through a respective slot in the second part, e.g. to permit relative movement between the first and second parts.

[0012] The second part may include a recess, e.g. a central recess, within which recess the first part may be slideably received. The second part may further include

a guide or slot or hole, e.g. in an upper portion thereof, through which the spindle may be accessed or adjusted or extends and/or by which the spindle rotatably engages the second part. Preferably, the hinge is reversible, for example the first part may include a further guide or slot, for example above or below the guide or slot and/or the fastening or clamping or securing means or fasteners or screws may be reversible or symmetrical, e.g. thereby making the hinge reversible.

[0013] Alternatively, the actuator may comprise a rack and pinion arrangement or any other suitable arrangement.

[0014] Advantageously, the hinge may further comprise a gap or tolerance or take up adjuster, for example a take up means or element or screw, e.g. between the first and second hinge element such as for maintaining contact therebetween and/or for compensating for manufacturing tolerances.

[0015] Further aspects of the invention provide a shower door, shower enclosure or bathroom comprising a hinge according to the first aspect of the invention.

[0016] Embodiments of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a hinge according to one embodiment of the invention with the cover plate removed; and

Figure 2 is an exploded perspective view of the hinge of Figure 1 including the cover plate.

[0017] Referring to Figures 1 and 2, there is shown a door hinge 1 for connecting a shower door panel 2 to a hinge panel 3, both of which panels 2, 3 are made of glass in this embodiment. The hinge 1 includes a hinge pin 10 defining a hinge axis 10, a cover plate 11, a first hinge element 4 secured to the hinge panel 3 in the normal way and a second hinge element 5 secured to the door panel 2.

[0018] The first hinge element 4 includes a movable first part 40 and a fixed second or mounting part 41. The movable part 40 includes a cylindrical lower hinge arm 40a that is hinged to a cylindrical upper hinge arm 50 of the second hinge element 5. The mounting part 41 is secured to the hinge panel 3 in the normal way and the movable part 40 is slideably connected to it by an adjustable connection 6. The movable part 40 is substantially rectangular in plan with four holes 42 for receiving clamp screws 42a and upper and lower aligned vertical guide slots 43 adjacent the end thereof that is opposite the hinge arm 40a. The mounting part 41 includes a transverse recess 44 between upper and lower portions thereof 45a, 45b. The movable part 40 is slideably received within the recess to allow for horizontal adjustment. The upper portion 45a includes an access hole 46 extending toward, and at an angle of about 60 degrees in relation to, the hinge axis 10. The access hole 46 is configured for easy access from the upper side of the first hinge element 4 in use.

[0019] As shown more clearly in Figure 2, the mounting part 41 further includes four mounting holes 41 a, a carriage guide 41 b and three clamp slots 41 c therein as well as a backing plate 47, a gasket 48 and four fixing screws 49. The carriage guide 41 b is in the form of a slot 41 b that extends coaxially to the access hole 46 and includes a circlip groove (not shown) adjacent each of its ends. The clamp slots 41 c are positioned to cooperate with the holes 42 in the movable part 40 to permit linear adjustment between the movable part 40 and the mounting part 41.

[0020] The second hinge element 5 further includes a riser 51 slideably received within a central axial hole 52 of the upper hinge arm 50, a take up screw 53, a cap 54, a mounting screw 55, a mounting plate 56, a backing plate 57 and a gasket 58. The riser 51 is substantially cylindrical in shape with a pair of opposed flat surfaces 51 a and cam surfaces 51 b on a lower portion thereof that cooperate, in use, with cam surfaces 51 c of the movable part 40 of the first hinge element 4. The flat surfaces 51 a of the riser 51 cooperate with correspondingly shaped flat surfaces (not shown) of the central axial hole 52 to maintain its orientation. The upper portion of the axial hole 52 is threaded for engagement with the take up screw 53, which is adjusted up or down to ensure that upper and lower hinges 1 share the door weight by eliminating any differences that result from manufacturing tolerances. The cap 54 includes four prongs that engage the inner surface of the axial hole 52 to cover the take up screw 53 and hole 52 for aesthetic purposes.

[0021] The adjustable connection 6 includes a threaded spindle 60 with an engagement end 60a, a cylindrical carriage 61 with a guide pin 62, a pair of circlips 63 and an L-shaped clamp block 64. The spindle 60 is rotatably connected within the access hole 46 by the circlips 63 that are received within the circlip grooves (not shown). The spindle 60 engages a transverse threaded hole 61 a that extends through the carriage 61. The guide pin 62 extends from the centre of one of the flat circular faces of the carriage 61 and is slideably received in the uppermost vertical slot 43 of the movable part 40. The clamping block 64 includes three clamp screw engagement holes 65, one adjacent each of its free ends and a further one at its heel, each hole 65 being configured to receive and engage a respective one of the clamping screws 42a.

[0022] The backing plate 47 of the mounting part 41 is rectangular in plan and includes four receptacles 47a adjacent each of its corners in the form of cylindrical projections each with a central tapped hole 47b. The gasket 48 is substantially coterminous with the backing plate 47 and includes four lipped holes 48a that receive the cylindrical receptacles 47a in use and engage holes 30 in the hinge panel 3. The mounting part 41 is secured to the hinge panel 3 by the fixing screws 49, each of which is received in a respective hole 41 a of the mounting part 41 and engages one of the tapped holes 47b of the receptacles 47a of the backing plate 47.

[0023] Similarly, the backing plate 57 of the second hinge element 5 is also rectangular in plan and includes one receptacle 57a in a lower portion thereof with a central tapped hole 57b. The gasket 58 is substantially coterminous with the backing plate 57 and includes a lipped hole 58a that receives the cylindrical receptacle 57a in use and engages a hole 20 in the door panel 2. The mounting plate 56 is substantially coterminous with the mounting face of the second hinge element 5 and includes a hole 56a that also receives the cylindrical receptacle 57a in use. The second hinge element 5 is secured to the door panel 2 by the fixing screw 55, which is received in a hole 59 of the second hinge element and engages the hole 57b of the receptacle 57a of the backing plate 57.

[0024] In use, the spindle 60 is rotated using an Allen key inserted into the access hole 46 that engages the engagement end 60a of the spindle 60. Rotation of the spindle 60 causes the carriage 61 to move therealong and along the carriage guide 41 b, which in turn causes the guide pins 62 to pull or push the movable part 40 toward or away from the second hinge element 5 and, consequently, to ride up or down the vertical guide slot 43. When the position of the parts 40, 41 of the first hinge element 4 is as desired, the parts 40, 41 are secured together by inserting and tightening the clamping screws 42a. This clamps the movable part 40 and the mounting part 41 between the heads of the clamp screws 42a and the clamping block 64 to prevent their relative movement.

[0025] The hinge 1 is also reversible between left and right handed orientations by virtue of the two vertical guide slots 43 and the four clamp screw holes 42a. It will be appreciated that this may be achieved by flipping the mounting part 41 about a horizontal axis (relative to that which is shown in the Figures) while retaining the orientation of the movable part 40. The access hole 46 is then accessible from below, rather than above, but this precludes the need for different hinge designs for left and right handed configurations.

[0026] It should be noted that the spindle 60 actively pulls or pushes the movable part 40 relative to the mounting part 41 without relying on the weight of the door panel 2 to effect movement in either direction. This provides a more reliably adjustable hinge than many prior art designs.

[0027] It will be appreciated by those skilled in the art that several variations are envisaged without departing from the scope of the invention. For example, the guide slots may be horizontal instead of vertical, e.g. where the hinge 1 is configured for vertical adjustment instead of horizontal adjustment.

[0028] Moreover, those skilled in the art would also appreciate that any number of combinations of the aforementioned features and/or those shown in the appended drawings provide clear advantages over the prior art and are therefore within the scope of the invention described herein.

Claims

1. A door hinge for a shower door, the hinge comprising first and second hinge elements, the first hinge element including a first part hinged to the second hinge element along a hinge axis and a second part movably connected to the first part by an adjustable connection, wherein the adjustable connection comprises an actuator that extends at an angle between the hinge axis and a direction perpendicular thereto, which actuator is configured to selectively pull or push, in use, the second part relative to the first part toward or away from the second hinge element.

2. Hinge according to claim 1 further comprising a converter for converting an actuating movement in a direction along the actuator to a movement of the second part in a direction perpendicular to the hinge axis.

3. Hinge according to claim 2, wherein the converter comprises a carriage slideable along a vertical guide.

4. Hinge according to claim 3, wherein the actuator comprises a threaded spindle that engages a threaded hole of the carriage.

5. Hinge according to claim 3 or claim 4, wherein the carriage comprises a projection received within and slideable along the guide.

6. Hinge according to any preceding claim, wherein the actuator extends at an angle of between 15 and 75 degrees from the hinge axis.

7. Hinge according to claim 6, wherein the actuator extends at an angle of about 60 degrees from the hinge axis.

8. Hinge according to any preceding claim further comprising securing means for securing the first and second parts together.

9. Hinge according to claim 8, wherein the securing means is provided by one or more clamp fasteners.

10. Hinge according to any preceding claim, wherein the first part includes a further guide below the guide, thereby making the hinge reversible.

11. Hinge according to any preceding claim further comprising a take up adjuster.

12. A shower door comprising a hinge according to any preceding claim.

13. A shower enclosure comprising a hinge according to any one of claims 1 to 11 and/or a shower door according to claim 12.

14. A bathroom comprising a shower enclosure according to claim 13.

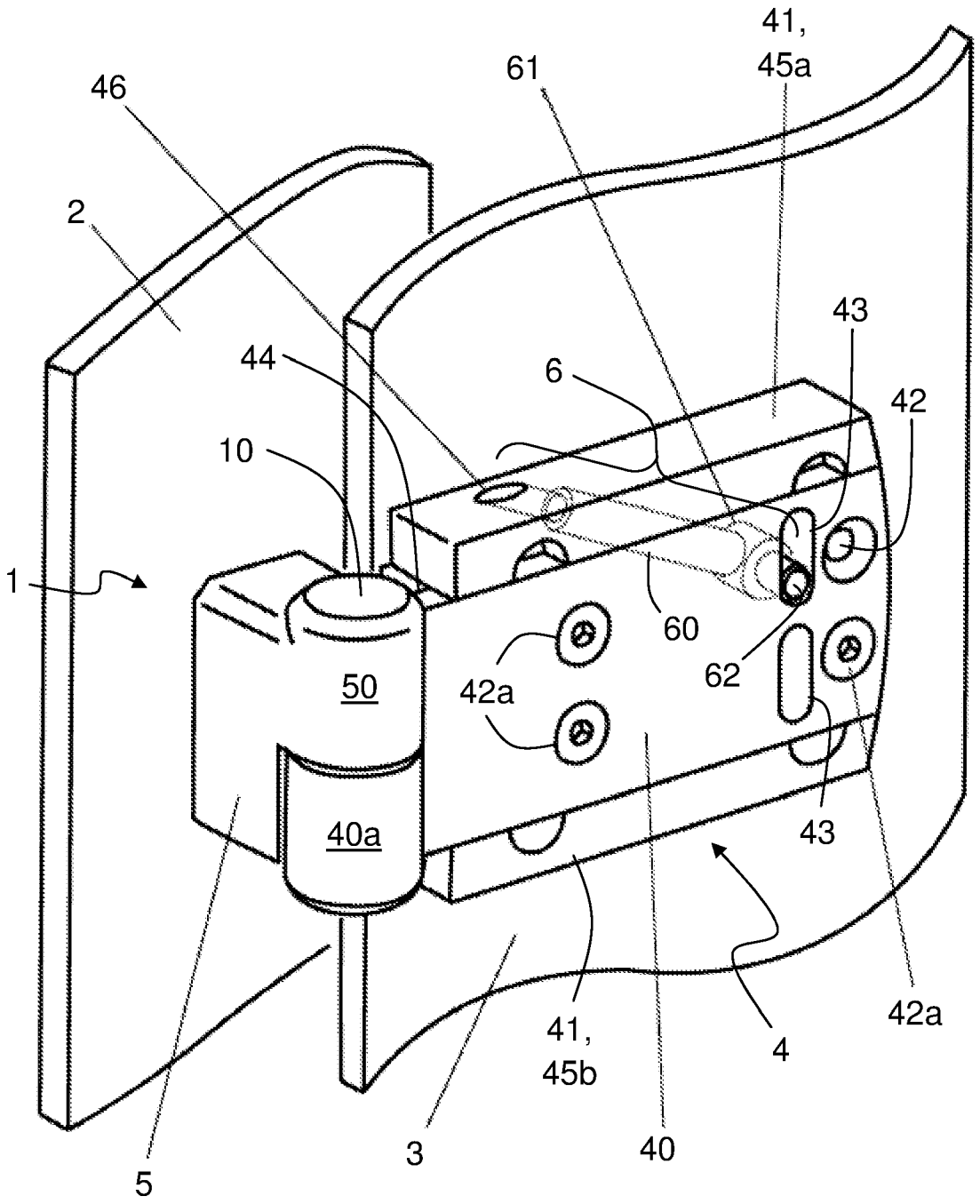

FIGURE 1

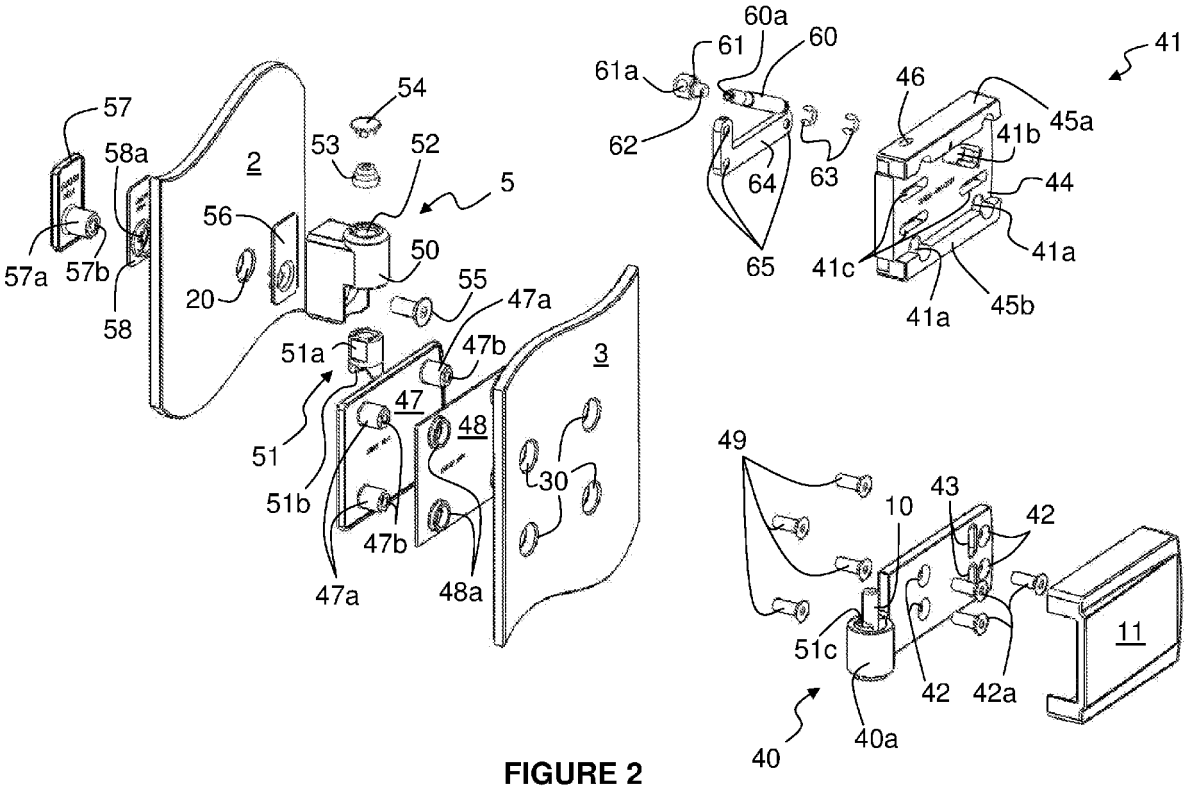
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FIGURE 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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