

Title: Clamping fitting for the attachment of glass panes**Description**

The present invention relates to a clamping fitting for the attachment of glass panes including two clamping components clamping the glass pane between them, one clamping component being adapted as a cone nut engaging in a borehole in the glass pane and presenting a cap, which nut on the outside of the glass pane being covered by a cap which is in true alignment with the outside of the glass pane, whereby said cap is detachably connected with the cone nut by means of a clip fastening arranged at the cap.

An arrangement substantially forming this kind is known from DE 299 19 333 U1, in this case, however, the cone-shaped clamping component is not adapted as a cone nut, but replaced by a resilient ring, whereby a resilient layer, being arranged between the resilient ring and the glass pane, serves as a glass protection. On the threaded bolt, provided to be connected to the sub-construction, is screwed a nut adapted as the inside, i.e. as the second clamping component. The head of the threaded bolt and therefore the aforementioned cone-shaped ring are covered by means of a covering plate, being in true alignment with the outside of the glass pane, which is adapted to being detachably arranged and to being resiliently held in place through the layer extending as far as to the outside of the plate and defining the glass protection.

Furthermore it is disclosed to hold the covering plate with a leaf spring mounted thereto, which can resiliently engage in an opening formed in a borehole of the ring and being engaged from the back. Therefore, a clip fastening is proposed which has to be mounted additionally at a flat side of the cap in form of a leaf

spring, which in suitably manner engages into an opening of the ring, which can be engaged from the back. As for aesthetic reasons, the spring is exclusively arranged at the side of the cap oriented towards the glass pane, corresponding free space has to be forcibly provided, which is lost for the contour of the screw head of the fastening screw. This is all the more important, as in the known arrangement, the ring itself, as it is the case with cone nuts readily available in retail, does not sit flush with the exterior flange thereof at the outside of the glass pane.

10 With the clamping fittings according to DE 197 13 038 C2, the second clamping component consists of a counter-plate being able to clamp with a cone nut, which for example can be screwed directly with the cone nut as a so-called adjustable lock nut. In case of angular connections and the like, the counter-plate can
15 likewise be formed by means of a pivoting member/clamping member, which is screwed with the cone nut. Further fastening means can connect to the aforementioned adjustable lock nut as well as to the aforementioned pivoting member/clamping member, particularly fastening means serving adjustment
20 purposes. The cone nut presents a cap being adapted as one-piece with the hollow cylindrical part of the cone-nut, the hollow cylindrical part being provided with a female thread to connect with the adjustable lock nut. The adjustable lock nut has a fastening screw and an oblong hole for the support of the holding
25 flange. Putting the cone nut in place, and thus establishing the connection between the cone nut and the adjustable lock nut, is only realised once the fastening screw has been tightened, however, it is not guaranteed that the adjustable lock nut is centrically aligned with regard to the borehole of the glass pane.
30 As a result, stress is introduced into the glass pane when installing the cone nut, because of the axial displacement between the cone nut and the adjustable lock nut defining the counter-plate.

In a formation of the clamping fitting according to DE 197 13 038 C2, however, unlike in DE 229 19 33 U1, in arranging a detachable cap, there is the possibility to first clamp the glass pane between the cone nut and the counter-plate without any stress, and then tighten the fastening screw by means of a suitable tool while passing through the cone nut and possibly through an axial through-opening in a counter-plate. The counter-plate may present in this case an oblong hole, or, for example in case of an angular connection, may be equipped with a threaded borehole receiving the fastening screw.

The object of the invention is to provide a clamping fitting of the kind mentioned above in a way that, when using a cone nut, the cap covering the head of the fastening screw is detachably arranged at the cone nut in an optimum way. Particularly the space available under the cap should not be reduced by way of the tools serving to release the cap.

The invention solves the problem with the teaching according to claim 1.

According to this a clip fastening is utilised which is integrally formed or adapted as a one-piece component with the cap.

The aforementioned integration in the cap avoids clip components additionally reducing the space existing under the cap in the area of the fastening screw.

Further features of the invention are characterised by the dependent claims.

In one embodiment form, where the clip fastening is integrally formed with the cap, the invention proposes to arrange in a radial surrounding outside groove of the cap a resilient ring, which outside diameter is slightly greater than the outside diameter of the cap. This resilient ring can be adapted as a snap ring or as an

O-ring, whereby in the embodiment form as a snap ring, the ring may comprise a plurality of straight ring sections, angled with regard to each other, which in the area of the angled section thereof respectively form so to speak small knots, protruding over the outside diameter of the cap. As a result, when seen around the circumference of the ring, there is a plurality of individual small clip fastenings, which on the one hand allow for a reliable connection of the cap with the cone nut, and on the other hand a simple release of the cap. The counter-part, so to speak, of this clip fastening is an undercut groove in the cone nut receiving the resilient ring.

In the embodiment form as a one-piece component of the cap, it is proposed the cap presents at the outside circumference thereof a projection conformed to the cap and being complementary to the undercut groove of the cone nut, this projection may be replaced, unlike the surrounding arrangement, by a plurality of projections conformed to the cap and being complementary to the undercut groove of the cone nut.

In the embodiment form of angular connections or pivoting connections, it has proven to be advantageous, for example to obtain a solid bearing, the cone nut is adapted cup-like and a central borehole is arranged in the cup bottom. In this case, a lateral tolerance allowing compensation of the clamping fitting with regard to a sub-construction or the like is not required.

However, for the adaptation of a movable bearing, it is suitable if the cone nut is likewise shaped cup-like, whereby an oblong hole is arranged in the cup bottom, which allows for possible required lateral displacement of the fastening screw with regard to the clamping fitting. In each case, through the through-opening in the cone nut, provided by the non-existing cap, the fastening screw can be tightened by passing through the cone nut, without

introducing stress into the cone nut or into the counter-plate and thus into the glass pane.

Advantageously the cap is adapted as a flat disc, allowing for convenient production through stamping method, and in a further
5 embodiment of the invention, the material used for the cap can be preferably steel or plastic material; the utilisation of plastic material provides the possibility to produce caps of different colours.

Hereinafter the invention is explained in detail, reference being
10 made to four embodiment examples. It shows:

- Figure 1 a plane view of a clamping component.
- Figure 2 the section according to line A-A of Figure 1.
- Figure 3 a perspective exploded illustration of the clamping component with the fastening screw.
- 15 Figure 4 a plane view of a further embodiment form of a clamping component.
- Figure 5 the section according to line A-A of Figure 4.
- Figure 6 the detail Z according to Figure 5.
- Figure 7 a perspective illustration of the clamping
20 component according to Figures 4 and 5.
- Figure 8 a plane view of another embodiment form of a clamping component.
- Figure 9 the section according to line A-A of Figure 8.
- Figure 10 the detail Z according to Figure 9.
- 25 Figure 11 a perspective illustration of the clamping component.

- Figure 12 a perspective illustration of the cap.
- Figure 13 a plane view of the resilient ring.
- Figure 14 a plane view of yet another embodiment form of a clamping component.
- 5 Figure 15 the section according to line A-A of Figure 14.
- Figure 16 the detail Z according to Figure 15.
- Figure 17 a perspective illustration of the clamping component.

10 Figures 1 to 17 simply illustrate a clamping component 1 adapted as a cone nut 3, which, from the viewing side of the glass pane, is introduced into a borehole in the glass pane. A deliberately adapted counter-plate is not illustrated, for this purpose for example it is referred to the state-of-the-art according to DE 299 19 333 U1 and DE 197 13 038 C2.

- 15 In the embodiment example according to the Figures 1 to 3, a fastening screw 9 penetrates the clamping component 1 adapted as a cone nut 3, which screw leans on a flange 10 of a cup bottom 4 of the cone nut 3. The fastening screw 9 may in this case for example engage into a not-illustrated angular connector.
- 20 As the borehole in the cup bottom 4 of the cone nut 3 is adapted as a central borehole 5, in this case it is about a so-called solid bearing. Operating the fastening screw 9 can be realised, if the cap 2 is released, by passing through the cone nut 3 by means of a suitable tool. As it is visible, the cap 2 is formed as a flat disc 8,
- 25 which in the area of a cone flange 7 can be mounted at the cone flange 7, once the installation is completed.

In a second embodiment example according to the Figures 4 to 7, instead of the central borehole 5, an oblong hole 6 is provided in the cup bottom 4, which allows for lateral displacement of the

fastening screw 9 with regard to the cone nut 3. In this embodiment example a so-called movable bearing is realised. In this case, a screw head 12 leans on the flange 10 of the cup bottom 4. According to Figure 6, the cap 2 is fixed by means of a clip fastening 11 at the cone flange 7.

It becomes apparent that in an embodiment example according to DE 197 13 038 C2, the allocation of a cup bottom can be omitted, if the cone nut, unlike to DE 229 19 333 U1, is directly screwed with a counter-plate, whereby, however, according to the invention, an operation of the fastening screw is possible through the releasable cap while passing through the cone nut.

The Figures 8 to 13 illustrate in a preferred third embodiment example, a clip fastening 13 wherein the cap 2 presents a radial surrounding outside groove 15 into which a resilient ring 16 is embedded. The outside diameter of the resilient ring is in this case slightly greater than the outside diameter of the cap 2. In the area of the cone flange 7 of the cone nut 3, an undercut groove 19 is arranged, which is engaged from the back by the resilient ring 16. According to Figure 13, the resilient ring 16 can be adapted as a snap ring 17 presenting angled ring sections 18. Another embodiment form provides for the resilient ring 16 is adapted as an O-ring. According to the embodiment example of the Figures 8 to 13, the clip fastening is integral part of the cap.

In a fourth embodiment example according to the Figures 14 to 17, the clip fastening 14 is adapted as a surrounding projection 20, which is conformed as one-piece to the cap 2, and clips into the above-described undercut groove 19 of the cone nut 3 in the area of the cone flange 7. The embodiment form, according to the Figures 14 to 17, relates to a clip fastening forming a component of the cap.

References

	1	Clamping component
	2	Cap
	3	Cone nut
5	4	Cup bottom
	5	Central borehole
	6	Oblong hole
	7	Cone flange
	8	Flat disc
10	9	Fastening screw
	10	Flange of cup bottom
	11	Clip fastening
	12	Screw head
	13	Clip fastening
15	14	Clip fastening
	15	Radial surrounding outside groove
	16	Resilient ring
	17	Snap ring
	18	Angled ring section
20	19	Undercut groove
	20	Projection

**Patent claims**

1. A clamping fitting for the attachment of glass panes including two clamping components clamping between them the glass pane, one clamping component (1) being adapted as a cone nut (3) engaging into a borehole in the glass pane, which on the outside of the glass pane is covered by a cap (2) being in true alignment with the outside of the glass pane, which cap is detachably connected with the cone nut (3) by means of a clip fastening (11, 13, 14) arranged at the cap (2), characterised in that the clip fastening (11, 13, 14) is integrated in the cap (2) or formed as a one-piece component of the cap (2).

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2. A clamping fitting according to claim 1, characterised in that in a radial surrounding outside groove (15) of the cap (2) is arranged a resilient ring, which outside diameter is slightly greater than the outside diameter of the cap (2).

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3. A clamping fitting according to claim 1 and 2, characterised in that the resilient ring (16) is adapted as a snap ring (17).

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4. A clamping fitting according to any of the claims 1 to 3, characterised in that the resilient ring (16) consists of a plurality of straight ring sections (18) angled with regard to each other.

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5. A clamping fitting according to any of the claims 1 to 4, characterised in that the resilient ring (16) is adapted as an O-ring.
6. A clamping fitting according to any of the claims 1 to 5, characterised in that in the cone nut (3) is

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arranged an undercut groove (19) receiving the resilient ring (16).

7. A clamping fitting according to any of the claims 1 to 6, characterised in that the cap (2) presents at the outside circumference thereof a surrounding projection (20) conformed to the cap (2) and being complementary to the undercut groove (19) of the cone nut (3).
8. A clamping fitting according to any of the claims 1 to 7, characterised in that the cap (2) presents at the outside circumference thereof a plurality of projections conformed to the cap (2) and being complementary to the undercut groove (19) of the cone nut (3).
9. A clamping fitting according to any of the claims 1 to 8, characterised in that the cone nut (3) is cup-like adapted and in that a central borehole (5) is arranged in the cup bottom (4).
10. A clamping fitting according to any of the claims 1 to 9, characterised in that the cone nut (3) is cup-like adapted and in that an oblong hole (6) is arranged in the cup bottom (4).
11. A clamping fitting according to any of the claims 1 to 10, characterised in that the cap (2) is formed as a flat disc (8).
12. A clamping fitting according to any of the claims 1 to 11, characterised in that the cap (2) is made from steel or from plastic material.