

Title: Single-point fixing for the bending-moment-free holding of glass panes

Description

The invention relates to a single-point fixing for the
5 bending-moment-free holding of glass panes having
clamping fittings clamping the glass pane between them, a
connecting component being supported at one clamping
fitting in a ball-and-socket joint and being attachable to a
sub-construction, which component has a ball head, which
10 is supported in a hollow sphere bearing shell of the
clamping fitting.

Glass panes clamped by means of single-point fixings are
subject to multiple constraints through exterior forces, such
as wind, temperature variations or loads on account of
15 different coefficients of expansion of the plates in relation to
the sub-construction. Therefore, not only a tension-free
mounting is a prerequisite; but also, once mounting is
completed, the prescribed loads, which ultimately may
result in the deflection of the glass pane, must be absorbed
20 by the glass plate without any damage. For this purpose,
multiple possibilities have been suggested for clamping the
glass pane in the single-point fixing itself, as well as for
connecting the single-point fixing to a sub-construction.

The document DE 43 40 511 A1 discloses a building
25 structure of this species as a façade or as a roof, wherein a

single-point fixing consists of a plate holder fastened to the plate, at which holder a connecting component, connectable to a sub-construction, is supported in a ball-and-socket joint. The ball-and-socket joint consists of a ball joint, which is supported in a hollow sphere bearing shell and disposed at the connecting component. Nothing is disclosed about the conception of the hollow sphere bearing shell.

The document EP 0 733 148 B1 relates to a holding device for the bending-moment-free support of glass plates, the ball head of a mounting bolt forming a ball joint bearing together with a correspondingly shaped part of a seating disk of a clamping fitting. The mobility of the ball head in the ball joint bearing is adjustable by means of a fastening bushing, which can be brought into contact with the ball head. The ball joint bearing is sealed from exterior influences by a sealing gasket, which receives lubricant if necessary, and, on the one hand is abutting against the seating disk, and on the other hand, against the mounting bolt. It is furthermore suggested to implant the ball head of the mounting bolt with plasma, for example boron, molybdenum, nitrogen and/or carbon at a very low temperature, in order to achieve a long lasting high slip between the ball head and two parts of the ball joint bearing.

In a single-point fixing of the species mentioned in the beginning, it is the object of the invention to optimize the connection between the clamping fitting clamping the glass pane and the connecting component, which is attachable to
5 a sub-construction. In this case, while using a ball head at the connecting component, a cold welding between the ball head and ball socket should be eliminated, which occurs if tolerances overlap unfavourably resulting in local pressure areas.

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

According to the invention, by dividing the hollow sphere bearing shell, a precise adjustment of the hollow sphere half shells with regard to the ball head can be achieved, i.e.
15 the play between the mirror-symmetrically disposed half shells and the ball head can be precisely defined by means of the tightening torque to be applied to the setting member.

With a fitting accuracy during manufacturing, the two facing
20 frontal faces of the half shells can be brought into abutment, that is to say a safety gluing of the thread of the setting member can be omitted. According to the invention, during mounting there will be a planned collision of the mirror-symmetrically formed half shells in the area of the
25 plane of division, such that even with a pairing of

unfavourable tolerances, a locally different functioning of the ball joint will not occur.

Further advantageous features of the invention are characterized by the dependent claims.

- 5 In an embodiment of the invention, the clamping fitting is formed in two pieces and consists of a seating disk abutting the glass pane and a setting member, which can be screwed into the seating disk by means of a thread and has a glass bolt, wherein the setting member, by means of
10 tapered surfaces, can be adjusted at a corresponding tapered surface of a hollow sphere half shell. Forming the two tapered surfaces, corresponding to each other, of the hollow sphere half shell, on the one side, and of the setting member on other side, is chosen advantageously such
15 that, through the wedging in conjunction with a pre-selectable tightening torque, such a locking of the adjustment of the ball bearing can be achieved that an additional securing of the thread of the setting member is redundant. In addition, the tapered surfaces, on account of
20 their oblique shape, allow for sensitively adjusting the hollow sphere half shell in relation to the ball head.

It has proven to be advantageous to manufacture the ball head, on the one side, and the hollow sphere bearing shell on the other side, from different materials; preferably the

ball head is made from alloy steel, and the hollow sphere bearing shell is made from a suitable bearing bronze.

In the following the invention is explained in detail based on one exemplary embodiment, in which:

- 5 Figure 1: shows a partial cross-section through a clamping fitting of a single-point fixing, whereby the complementary clamping fitting, intended for clamping the not illustrated glass pane, has been omitted for clarity's sake.
- 10 The single-point fixing 1 has a clamping fitting 2, abutting the not illustrated glass pane on the side facing the sub-construction, which fitting is connected to the not illustrated sub-construction via a connecting component 4 shown as a mounting bolt. The connecting component 4 is supported in
- 15 the clamping fitting 2 in a tension-resistant and pressure-resistant manner by means of a ball-and-socket joint 3, i.e. by means of a universally rotatable joint. For this purpose, the connecting component 4 has a ball head 6, which is supported in a hollow sphere bearing shell 5. The ball head
- 20 6 is made of an alloy steel; the hollow sphere bearing shell 5 is made of a suitable bearing bronze. Orthogonally to the longitudinal axis 7 of the connecting component 4, i.e. parallel to the plane of the not illustrated glass pane in the area of the plane of division 16, the hollow sphere bearing
- 25 shell 5 is divided into two hollow sphere half shells 8 and 9.

The plane of division is indicated at the line A-A. By means of a thread 12, a setting member 10 can be screwed into the seating disk 11 of the clamping fitting 2 bearing against the glass pane, which member simultaneously has the
5 glass bolt 13 passing through the bore of the glass pane. The setting member 10, at its contact area with, in the plane of the Figure, the upper hollow sphere half shell 8 is provided with tapered surfaces 14, which bear against
10 corresponding tapered surfaces 15 of the hollow sphere half shell 8 for the sensitive adjusting and setting of the ball-and-socket joint 3.

List of reference numerals

	1	single-point fixing
	2	clamping fitting
	3	ball-and-socket joint
5	4	connecting component
	5	hollow sphere bearing shell
	6	ball head
	7	longitudinal axis
	8	hollow sphere half shell
10	9	hollow sphere half shell
	10	setting member
	11	seating disk
	12	thread
	13	glass bolt
15	14	tapered surfaces
	15	tapered surfaces
	16	plane of division
	A-A	line of division

Patent claims

1. A single-point fixing (1) for holding glass panes in a bending-moment-free manner having clamping fittings clamping the glass pane between them, a
5 connecting component (4) being supported at one clamping fitting (2) in a ball-and-socket joint (3) and being attachable to a sub-construction, which component has a ball head (6), which is supported in a hollow sphere bearing shell (5) of
10 the clamping fitting (2), characterized in that, orthogonally towards the longitudinal axis of the connecting component, the hollow sphere bearing shell (5) is divided into two hollow sphere half shells (8, 9) and the clamping fitting (2) has a
15 setting member (10), which sets and fixes the hollow sphere half shells (8, 9) with regard to each other.
2. A single-point fixing according to claim 1, characterized in that the clamping fitting (2) is
20 formed in two pieces and consists of a seating disk (11) bearing against the glass pane and of a setting member having a glass bolt (13), which can be screwed into the seating disk (11) by means of a thread (12).

3. A single-point fixing according to claim 1 and 2, characterized in that the setting member (10) can be set by means of tapered surfaces (14) against corresponding tapered surfaces (15) of a hollow sphere half shell (8).
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4. A single-point fixing according to one of the claims 1 to 3, characterized in that the ball head (6) of the connecting component (4) and the hollow sphere bearing shell (5) are made from different materials.
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5. A single-point fixing according to claim 4, characterized in that the ball head (6) of the connecting component (4) is made from an alloy steel and the hollow sphere bearing shell (5) from bearing bronze.
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