

SPECIFICATION

Axial Ball-and-socket Joint

The invention relates to an axial joint, that is to say a ball-and-socket joint, wherein housing and ball pin have a common axis in their mid position. Such axial joints are frequently needed, particularly in motor vehicle construction, generally as linkages with a ball-and-socket joint at both ends.

- 10 The object of the invention is to produce such a ball-and-socket joint or such a linkage in a particularly economical manner.

In an axial ball-and-socket joint, consisting of a housing, a ball pin and a hard resilient ball socket with a cylindrical wall which has slits passing through one side of the equator of the ball and extending in the meridional direction, this problem is solved in the manner characterised in the main claim.

- 20 It is particularly advantageous if the ball socket has, at its open outer end, a flange, the diameter of which corresponds to the external diameter of the tube and that a peripheral gap for locating a sealing bellows is provided between the end of the housing and the flange. This peripheral gap forms a groove for the securing of a sealing bellows effected in a manner known *per se*. Usually, this groove would have to be cut in the housing from the outside whereas according to the invention it results from appropriate dimensioning of socket and tube themselves.

- According to the invention, a plastics socket is used which does not require any more machining after its production. An ordinary commercial tube serves as a housing. The assembly of the unit is effected in a manner known *per se*: The ball head of the ball pin is inserted in the ball socket and this is inserted in the housing. Instead of the housing being closed at its two ends, as previously, the socket in the housing according to the invention is only fixed by a peripheral corrugation projecting inwards from the tube and engaging in a corresponding peripheral groove in the socket. The only part of the joint to be machined is the ball pin so that the axial ball-and-socket joint can be produced more cheaply than has hitherto been achieved. This applies in particular when a strut consists of a continuous tube as a common housing for a ball-and-socket joint according to the invention at each end of the tube.

One example of an embodiment of the invention is illustrated in the drawing.

- Each ball-and-socket joint consists of a housing 1 which is formed by a cylindrical tube. In the housing there is a hard resilient ball socket 2 with a cylindrical wall 3, which has slits 4 passing from one side of the equator of the ball to the free end and extending in the meridional direction. These slits 4 render possible the insertion of the ball pin 5 by deforming the resilient tongues remaining between the slits, before the socket 2 is pushed into the housing 1 and fixed there. The axial location of the socket 2 and hence of the ball

- 65 of the ball pin 5 is effected through an inwardly projecting peripheral corrugation 6 in the cylindrical housing 1, which engages in a corresponding peripheral groove 7 in the socket 2. At its open end, the socket 2 has a flange 8, the diameter of which corresponds to the external diameter of the tubular housing 1. Between the end of the housing and the flange, a peripheral gap 9 is left free for the location of a sealing bellows 10. In this manner the separate operation which would otherwise be necessary for the production of the bellows groove is saved.

The axial ball-and-socket joint according to the invention can either be used individually, as in the lower part of Figure 1, or as a strut, for example a stabilizer strut consisting of a continuous tube 1'. In this case the tube 1' forms a common housing for one such ball-and-socket joint at each end of the tube.

- The easy running of the joint can be influenced depending on the height of the pressure exerted by the tool producing the corrugation. If the corrugation in the housing tube 1 engages at least partially in the slit region of the socket 2 the joint becomes stiffer as a result of greater radial initial tensioning of the resilient tongues present between the slits 4. Despite the simplicity of the joint, therefore, differences in tolerance which would cause different eases of running, can be compensated for by appropriate selection of the pressure of the tool for the corrugations.

Claims

1. A ball-and-socket joint consisting of a cylindrical tube as a housing, a ball pin and a ball socket fixed axially in the tube, characterised by the combination of the following features:
 - a) the ball socket is made of a hard resilient plastics material and has slits passing through the side of the equator of the ball adjacent to the end of the tube and extending in the meridional direction;
 - b) at the side remote from the slits, the ball socket has an axial extension with a peripheral groove therein;
 - c) the cylindrical tube comprises an inwardly projecting peripheral corrugation which engages in the peripheral groove of the joint and fixes this and the ball of the ball pin axially.
2. An axial ball-and-socket joint as claimed in claim 1, characterised in that the peripheral corrugations engage at least partially in the slit region of the socket and are of different depths according to the required difficulty of running of the joint.
3. An axial ball-and-socket joint as claimed in claim 1, characterised in that the ball socket has, at its open outer end, a flange, the diameter of which corresponds to the external diameter of the tube, and that a peripheral gap for the location of a sealing bellows is provided between the end of the housing and the flange.
4. An axial ball-and-socket joint strut, for example a stabilizer strut, consisting of a continuous tube as a common housing for a ball-



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- 10 The object of the invention is to produce such a ball-and-socket joint or such a linkage in a particularly economical manner.

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- According to the invention, a plastics socket is used which does not require any more machining after its production. An ordinary commercial tube serves as a housing. The assembly of the unit is effected in a manner known *per se*: The ball head of the ball pin is inserted in the ball socket and this is inserted in the housing. Instead of the housing being closed at its two ends, as 40 previously, the socket in the housing according to the invention is only fixed by a peripheral corrugation projecting inwards from the tube and engaging in a corresponding peripheral groove in the socket. The only part of the joint to be machined is the ball pin so that the axial ball-and-socket joint can be produced more cheaply than has hitherto been achieved. This applies in particular when a strut consists of a continuous tube as a common housing for a ball-and-socket joint according to the invention at each end of the tube.

One example of an embodiment of the invention is illustrated in the drawing.

- Each ball-and-socket joint consists of a 55 housing 1 which is formed by a cylindrical tube. In the housing there is a hard resilient ball socket 2 with a cylindrical wall 3, which has slits 4 passing from one side of the equator of the ball to the free end and extending in the meridional direction. 60 These slits 4 render possible the insertion of the ball pin 5 by deforming the resilient tongues remaining between the slits, before the socket 2 is pushed into the housing 1 and fixed there. The axial location of the socket 2 and hence of the ball

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- The axial ball-and-socket joint according to the invention can either be used individually, as in the lower part of Figure 1, or as a strut, for example a stabilizer strut consisting of a 80 continuous tube 1'. In this case the tube 1' forms a common housing for one such ball-and-socket joint at each end of the tube.

- The easy running of the joint can be influenced depending on the height of the pressure exerted by the tool producing the corrugation. If the corrugation in the housing tube 1 engages at least partially in the slit region of the socket 2 the joint becomes stiffer as a result of greater radial initial 90 tensioning of the resilient tongues present between the slits 4. Despite the simplicity of the joint, therefore, differences in tolerance which would cause different eases of running, can be compensated for by appropriate selection of the pressure of the tool for the corrugations. 95

Claims

1. A ball-and-socket joint consisting of a cylindrical tube as a housing, a ball pin and a ball socket fixed axially in the tube, characterised by 100 the combination of the following features:

- a) the ball socket is made of a hard resilient plastics material and has slits passing through the side of the equator of the ball adjacent to the end of the tube and extending in the meridional direction; 105

- b) at the side remote from the slits, the ball socket has an axial extension with a peripheral groove therein;

- c) the cylindrical tube comprises an inwardly projecting peripheral corrugation which engages in the peripheral groove of the joint and fixes this and the ball of the ball pin axially. 110

2. An axial ball-and-socket joint as claimed in claim 1, characterised in that the peripheral corrugations engage at least partially in the slit region of the socket and are of different depths according to the required difficulty of running of the joint. 115

3. An axial ball-and-socket joint as claimed in claim 1, characterised in that the ball socket has, at its open outer end, a flange, the diameter of which corresponds to the external diameter of the tube, and that a peripheral gap for the location of a sealing bellows is provided between the end of the housing and the flange. 120

4. An axial ball-and-socket joint strut, for example a stabilizer strut, consisting of a continuous tube as a common housing for a ball- 125

and-socket joint as claimed in the previous claims at each end of the tube.

5. A ball-and-socket joint substantially as hereinbefore described with reference to the

5 accompanying drawing.

6. An axial ball-and-socket joint stabilizer strut substantially as hereinbefore described with reference to the accompanying drawing.

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