

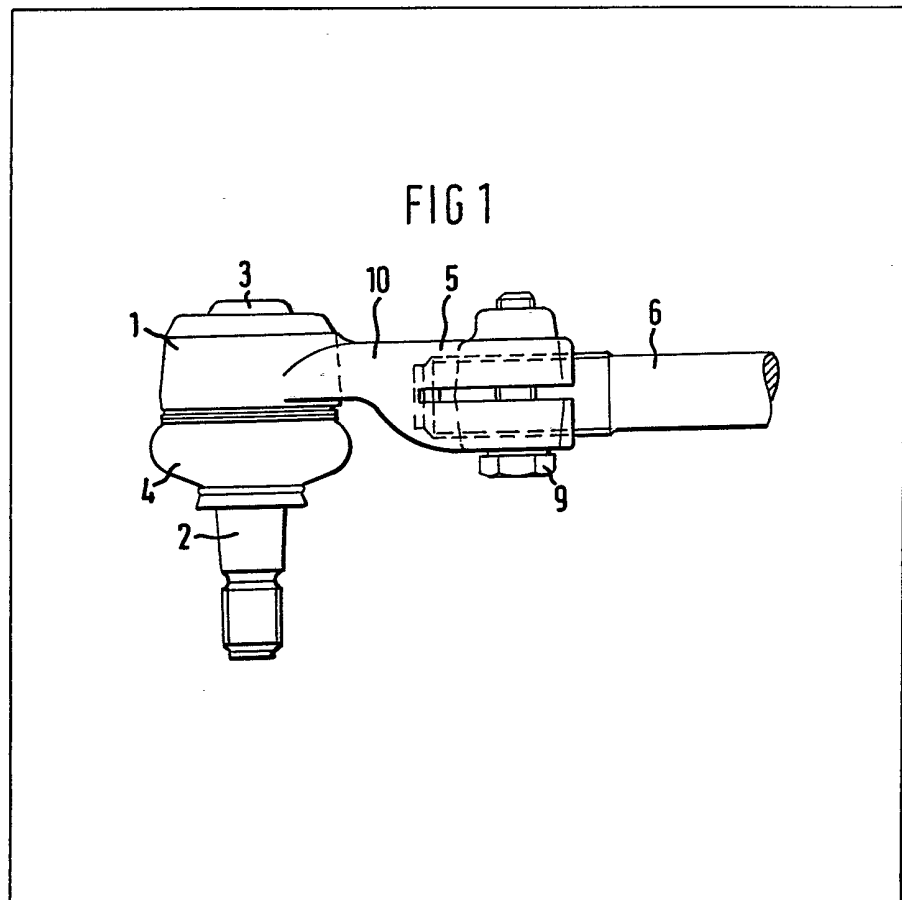
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(71) Applicants
Lemförder Metallwaren
A.G., 2844 Lemförde,
Federal Republic of
Germany
(72) Inventor
Hans Dubielzig
(74) Agents
Venner Shipley & Co.,
Rugby Chambers, 2 Rugby
Street, London
WC1N 3QU

(54) **Ball-and-socket joints**

(57) A ball-and-socket joint has a joint casing 1 which has an integral connecting pin 5 to which, for example, a track rod 6 of a steering linkage is connectible. A ball pin 2 is mounted in the casing 1 which has a cover 3 at one end and at the other end is sealed by a resilient cap 4. For supporting the track rod 6 the outer end of pin 5 is provided with an

internal screwthread into which engages the external screwthread of the rod 6. in the transition zone 10 between the wall of the casing 1 and the adjacent end of the screwthread 7 there is provided a free space which is formed by a continuous aperture extending through the pin 5 perpendicularly to the axis of the pin 5. In an alternative construction the free space is formed by a recess.



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FIG 1

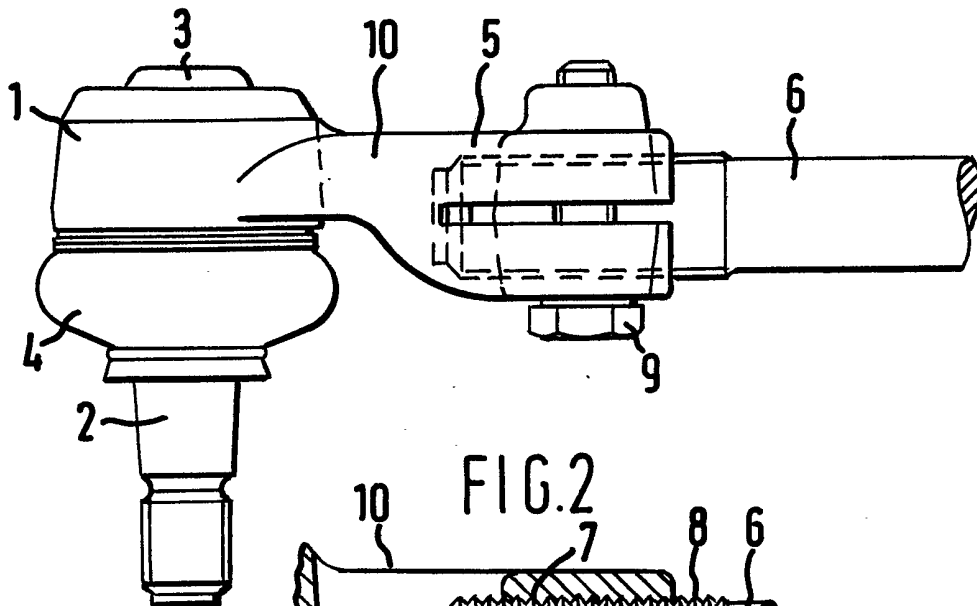


FIG.2

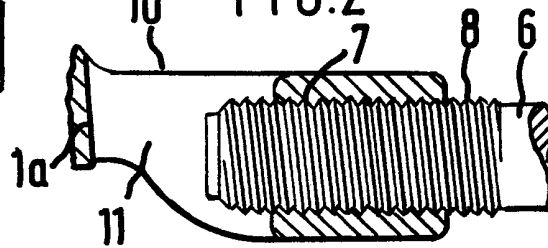


FIG.3

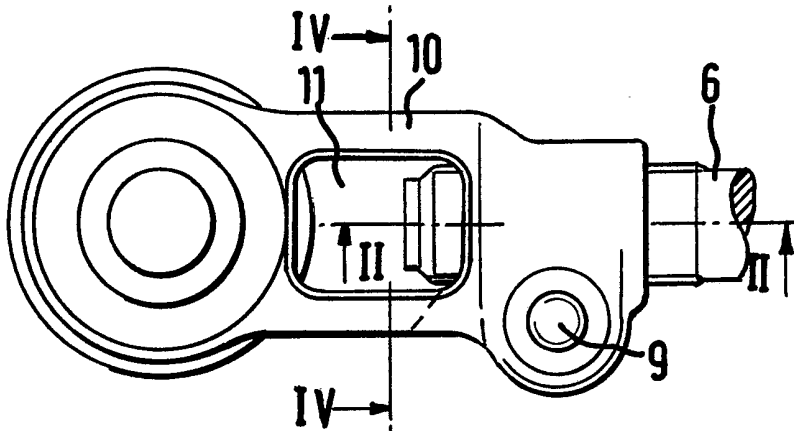


FIG.4

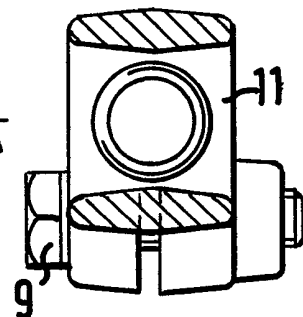


FIG.5

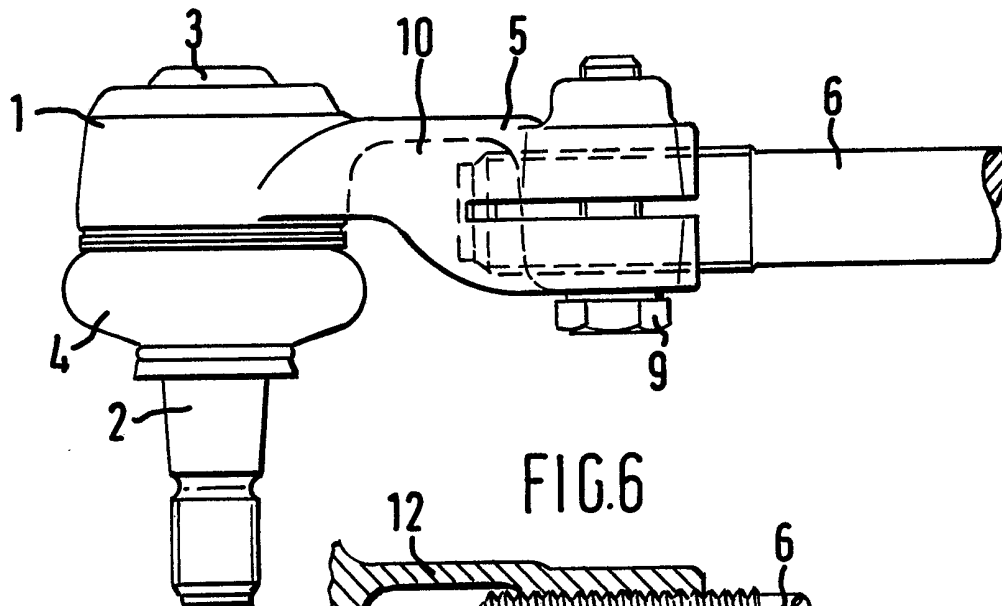


FIG.6

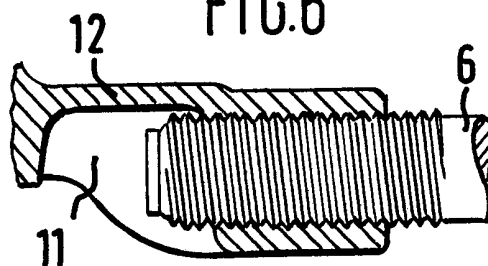


FIG.7

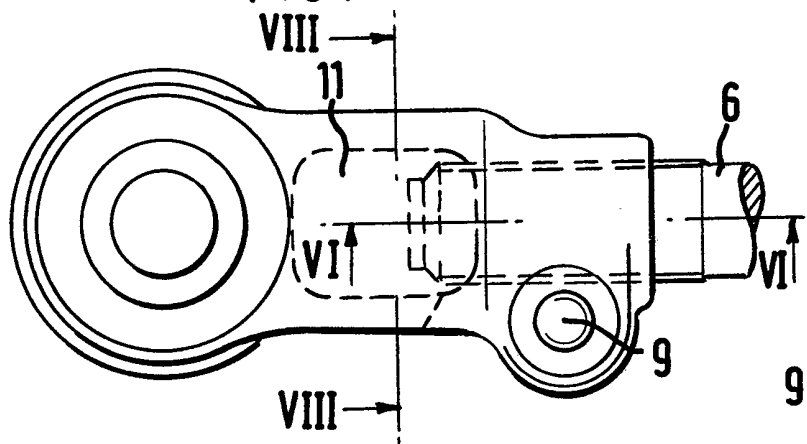
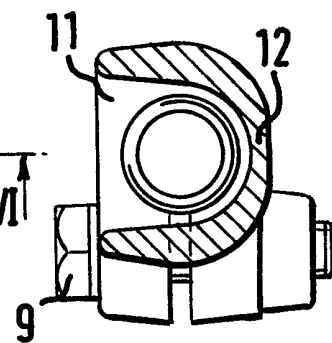


FIG.8



SPECIFICATION

Ball and socket joint

This invention relates to a ball-and-socket joint, for example, for motor vehicle steering and control linkages, of the kind in which the joint casing is constructed integrally with its connecting pin, which is formed with an internal screwthread.

In a joint whose casing is manufactured integrally with a connecting pin from a forged pre-shaped blank, the internal screwthread being made in a blind bore with which the connecting pin is conventionally formed, due to the fact that the bore is closed at the casing end there is left between the centre of the ball and the possible depth to which an element (e.g. track rod) is screwed in, a relatively large distance which is due to the manufacturing technique of introducing the internal screwthread into the blind bore. As a result it is difficult to obtain an advantageous maximum adjusting range between the joint and the steering or control linkage. Another disadvantage of the prior art joints is that the screwthread cannot be cut out freely, so that the metal residues accumulating during cutting must subsequently be carefully removed.

It is an object of the invention to provide a ball-and-socket joint of the foregoing kind in which as large an adjusting path as possible is obtained without lengthening the connecting pin itself. Another object is to simplify the production of the internal screwthread.

In order that the invention may be more readily understood, reference is made to the accompanying drawings which illustrate diagrammatically and by way of example embodiments thereof, and in which:—

Fig. 1 is a side elevation of a ball-and-socket joint connected to a control rod,

Fig. 2 is a partial longitudinal section of Fig. 1 on the line II—II of Fig. 3,

Fig. 3 is a plan view of the joint of Fig. 1,

Fig. 4 is a cross-section on the line IV—IV of Fig. 3,

Fig. 5 is a side elevation of another embodiment of the joint,

Fig. 6 is a section on the line VI—VI of Fig. 3,

Fig. 7 is a plan view of Fig. 5, and

Fig. 8 is a cross-section on the line VIII—VIII of Fig. 7.

The ball-and-socket joint illustrated in Fig. 1 comprises in known manner a casing 1 in which a ball pin 2 is mounted. The casing 1 is closed at the top by a cover 3 and sealed on the side where the pin emerges by a cap 4 of resilient material. The casing 1 carries a pin or shaft 5 which extends at right-angles to the central axis (vertical as viewed in Fig. 1) of the casing 1 and which serves as a connection to a control linkage, for example, a track rod 6, and for this purpose is formed with an internal screwthread 7 into which the track rod 6,

provided with an external screwthread 8, is screwed and secured in conventional manner by a clamping screw 9.

In the embodiment illustrated in Fig. 1, a free space 11, which extends substantially perpendicularly to the axis of the screwthreads and completely through the transitional zone of the pin, as is shown more particularly in Fig. 4, is provided in the transitional zone 10 between the connecting pin 5 and the joint casing 1, between the end of the screwthreaded bore adjacent the casing and the casing wall 1a. This enables the distance between the centre of the ball or the joint casing 1 and the possible depth to which the track rod 6 can be screwed in to be reduced, as a result increasing the adjusting range. Advantages are also obtained for the production of the internal screwthreads, since the residues collecting during the cutting of the internal screwthread can freely emerge at the casing-side end of the bore.

The embodiment illustrated in Fig. 5 differs from that of Fig. 1 merely by the variant construction of the free space 11, which in this embodiment does not extend through the transitional zone of the pin, but is constructed as an upwardly (as viewed in Fig. 5) extending recess therein. As a result there is produced in the upper part of that zone a bridge-like connection 12 between the side walls of the free space, the result being an additional stiffening and reinforcement in the whole transitional zone of the pin 5. This embodiment is shown particularly clearly in Fig. 8.

The joint casing and the connecting pin are produced integrally as a pre-shaped forging or pressing, the free space being formed at the same time, while the solid pin is subsequently provided with the continuous screwthreaded bore.

CLAIMS

1. A ball-and-socket joint having a joint casing which is constructed integrally with a connecting pin which is formed with an internal screwthread, characterised in that the pin bore in which the internal screwthread is formed is open at the casing end and a free space is provided in the transitional zone between the connecting pin and the joint casing.

2. A ball-and-socket joint according to claim 1, wherein the free space is a continuous aperture extending completely through the connecting pin.

3. A ball-and-socket joint according to claim 1, wherein the free space is formed by a recess in the connecting pin.

4. A ball-and-socket joint according to claim 2 or 3, wherein the continuous aperture or the recess in the connecting pin extends substantially perpendicularly to the axis of the screwthread.

5. A ball-and-socket joint, substantially as herein described with reference to and as shown in Figs. 1 to 4 or 5 to 8 of the accompanying drawings.