

PATENT SPECIFICATION

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(54) BALL-AND-SOCKET JOINT SUPPORTING A SHOCK-ABSORBER LEG IN A MOTOR VEHICLE

(71) We, A. EHRENREICH GmbH & Co KG, a German Kommanditgesellschaft, of 4000 Dusseldorf-Oberkassel, Hansaallee 190, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a resiliently mounted ball-and-socket joint supporting a shock-absorber leg in motor vehicles with McPherson axles. Such a joint carries about half the front axle load through the helical spring and supports the shock absorber. Hitherto, shock absorber spring legs have generally been supported by a rubber joint, a spherical slip joint or a combination of the two, that is to say a ball-and-socket joint mounted in rubber. The joint housing is supported on the vehicle body through a rubber buffer or a silent block. The ball pin of this joint, mounted in the housing, is a hollow pin through which a cylindrical end pin of the shock absorber is passed axially and then screwed thereto. In addition, a spring washer is provided for the support of the helical spring.

The object of the invention is to simplify this expensive construction considerably and to make it smaller.

According to the present invention there is provided a resiliently mounted ball-and-socket joint supporting a shock-absorber leg consisting of a shock-absorber and a helical spring in a motor vehicle with a McPherson axle, wherein the ball-and-socket joint comprises a ball head having a shank connected to the vehicle body, a two-part housing connected to the shock-absorber leg, and a ball cup mounted in rubber on one of the parts of the housing and forming the socket for the ball head, the other part of the housing engaging against the side of the ball head opposite to that engaged in the ball cup.

The said one part of the housing can

conveniently be formed with a flange constructed in the form of a spring washer for the helical spring, and comprise an axially directed tube extension fitted to an end of the shock-absorber.

Since the shock absorber only needs an angle of deflection of about 2°—3°, so that the ball-and-socket joint only needs to yield by this angle of deflection, according to a further proposal of the invention, the ball head and shank are made mushroom-shaped in such a manner that the side of the ball head remote from the shank has a larger diameter than the side of the ball head adjacent to the shank.

The advantages of the joint according to the invention consist in that the diameter of the ball head and hence the bearing surface of the joint can be kept smaller than hitherto. The ball head is preferably a solid ball and the bearing surface in the housing no longer needs to be interrupted for the passage of the end pin of the shock absorber. As a result of the fact that the shock absorber is supported on the joint housing and the ball head on the vehicle — hitherto it was the reverse — it is possible to dispense with a separate spring washer because the flange of the housing can be constructed in the form of a spring washer for the helical spring.

In addition, the smaller ball diameter at the shank side renders possible a lower structural height in comparison with the former joints.

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

Figure 1 shows the rubber-mounted ball-and-socket joint according to the invention, and

Figure 2 shows the arrangement of this joint on a front axle.

According to Figure 1, the joint consists of a ball pin 1, the spherical ball head 2 of which slides in a plastics ball cup 3 which in turn rests in a steel socket 4. This steel

socket 4 is supported in a two-part housing 6, 7 via a tapered rubber ring 5.

It can be seen, in particular, from Figure 2, that the shank of the ball pin 1 is screwed into the vehicle body 8 by means of a hexagonal nut 9.

The part 6 of the housing has an axially directed tube extension 10 into which the end of the shock absorber 11 is introduced and fixed with a clamp strap 12. The part 7 of the housing engages the side of the ball head 2 opposite to that engaged in the ball cup 3.

A helical spring 13 serving for the springing of the front axle rests with its upper end against the housing 6, which is enlarged in diameter for this purpose. In this way a separate spring washer is saved.

The lower end of the shock absorber is mounted in a steering-knuckle carrier 14 which in turn is disposed on a wheel fork 15 in a manner known *per se*.

Since the angle of deflection, executed by the joint, only needs to be very small, the side of the ball head remote from the shank of the ball pin is larger in diameter than the side of the ball head adjacent to the shank. In this manner there is a saving in structural height. Also, the diameter of the larger half of the ball head is smaller than the diameter of the hollow balls hitherto used.

Considerable simplification and savings result from lower structural height, smaller diameter and from the fact that an upper spring washer is saved for the spring 13.

WHAT WE CLAIM IS:—

1. A resiliently mounted ball-and-socket joint supporting a shock-absorber leg consisting of a shock-absorber and a helical spring in a motor vehicle with a McPherson

axle, wherein the ball-and-socket joint comprises a ball head having a shank connected to the vehicle body, a two-part housing connected to the shock-absorber leg, and a ball cup mounted in rubber on one of the parts of the housing and forming the socket for the ball head, the other part of the housing engaging against the side of the ball head opposite to that engaged in the ball cup.

2. A ball-and-socket joint as claimed in claim 1, wherein said one part of the housing is formed with a flange constructed in the form of a spring washer for the helical spring.

3. A ball-and-socket joint as claimed in claim 1 or 2, wherein said one part of the housing comprises an axially directed tube extension fitted to an end of the shock-absorber.

4. A ball-and-socket joint as claimed in any one of the preceding claims, wherein the ball head and shank are made mushroom-shaped in such a manner that the side of the ball head remote from the shank has a larger diameter than the side of the ball head adjacent to the shank, the larger diameter side of the ball head being engaged in the ball cup.

5. A resiliently mounted ball-and-socket joint supporting a shock-absorber leg in a motor vehicle with a McPherson axle substantially as hereinbefore described with reference to the accompanying drawing.

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WHAT WE CLAIM IS:—

40 1. A resiliently mounted, ball-and-socket joint supporting a shock-absorber leg consisting of a shock-absorber and a helical spring in a motor vehicle with a McPherson

axle, wherein the ball-and-socket joint comprises a ball head having a shank connected to the vehicle body, a two-part housing connected to the shock-absorber leg, and a ball cup mounted in rubber on one of the parts of the housing and forming the socket for the ball head, the other part of the housing engaging against the side of the ball head opposite to that engaged in the ball cup.

2. A ball-and-socket joint as claimed in claim 1, wherein said one part of the housing is formed with a flange constructed in the form of a spring washer for the helical spring.

3. A ball-and-socket joint as claimed in claim 1 or 2, wherein said one part of the housing comprises an axially directed tube extension fitted to an end of the shock-absorber.

4. A ball-and-socket joint as claimed in any one of the preceding claims, wherein the ball head and shank are made mushroom-shaped in such a manner that the side of the ball head remote from the shank has a larger diameter than the side of the ball head adjacent to the shank, the larger diameter side of the ball head being engaged in the ball cup.

5. A resiliently mounted ball-and-socket joint supporting a shock-absorber leg in a motor vehicle with a McPherson axle substantially as hereinbefore described with reference to the accompanying drawing.

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