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(56) Documents cited
GB 2197829 A GB 1600514 A GB 1547233 A
GB 1497334 A GB 1473431 A EP 0214337 A1
EP 0064335 A1

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(54) **Vehicle rear-view mirror**

(57) A vehicle rear view mirror, including a hollow body (2) housing a reflective plate (4), support means (5) adapted to be fixed to the bodywork of the vehicle and articulated connection means (10) for connecting the body (2) to the support means (5) and defining a first, substantially vertical, axis of rotation (a) and a second axis of rotation (b) substantially perpendicular to the first axis (a); the connection means (10) including a spherical head (7) fixed to the support means (5), a spherical cap portion (8) integral with a side wall of the body (2) and cooperating with the said spherical head, and retaining means (16, 23, 24, 34) for ensuring that the spherical head (7) with the spherical-cap-portion (8) of the body (2) are kept in mutual contact.

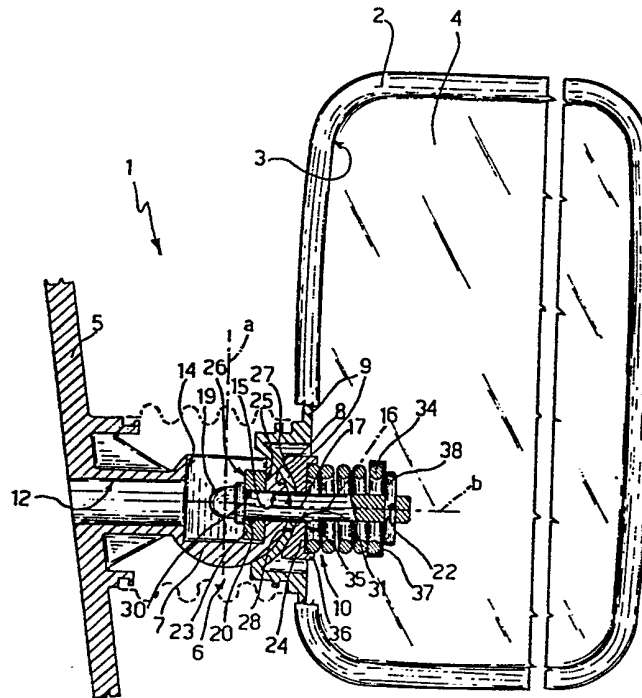


Fig.1

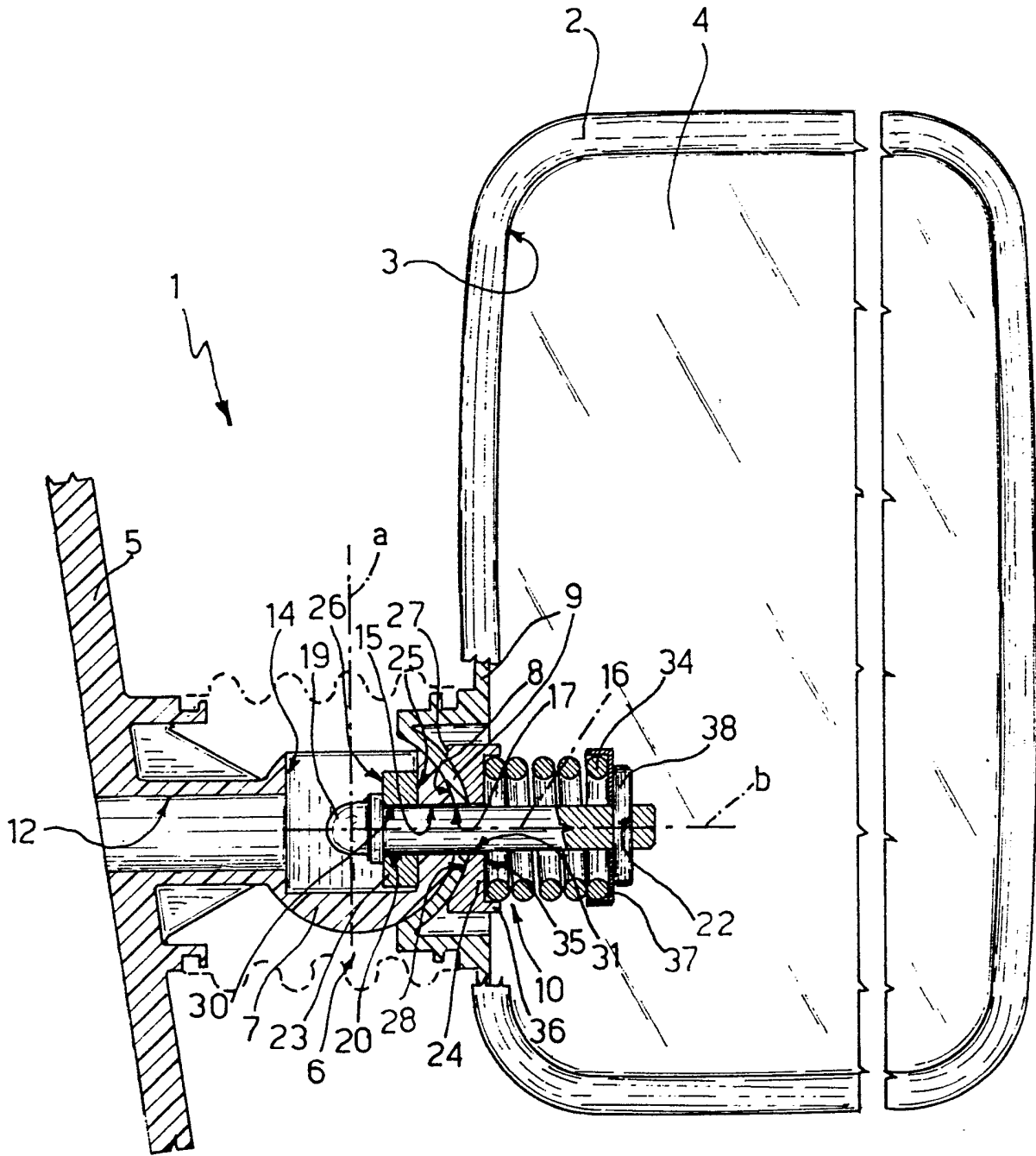


Fig. 1

A VEHICLE REAR-VIEW MIRROR

The present invention relates to a vehicle rear-view mirror and particularly, but not exclusively, to an external rear-view mirror for a commercial vehicle.

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Rear-view mirrors are known of the type comprising a body housing a reflective plate, a support member adapted to be fixed to the bodywork of a vehicle, and articulated connection means for connecting the mirror body to the support member and arranged to allow the mirror body to rotate about a substantially vertical axis and, at least to a
10 limited extent, to rotate about a substantially horizontal axis parallel to the reflective plate to adjust its inclination.

The connection means generally include a first spherical articulation member integral with the support member and a second spherical articulation member fixed to the body.

15 The spherical articulation members are usually made from metal and the second articulation member is connected to the mirror body, which is instead made from plastics material, by co-moulding.

Known mirrors of the type described briefly above have several disadvantages. In
20 particular, the co-moulding of the body on the second articulation member results in a structural weakness. Moreover, the assembly of the articulated connection means is generally rather complicated.

An object of the present invention is to provide a vehicle rear view mirror which does
25 not have the disadvantages of the known mirrors specified above. This object is achieved by the present invention in that it relates to a vehicle rear view mirror, of the type comprising:-

- a hollow body having a front aperture;
- a reflective plate housed in the aperture in the body;
- 30 - support means adapted to be fixed to the bodywork of the vehicle; and
- means for articulating the body to the support means and defining a first,

substantially-vertical axis of rotation for the body and a second axis of rotation for the body substantially perpendicular to the first axis, the connection means including a first spherical articulation member rigid with the support means, a second spherical articulation member rigid with the mirror body and means for retaining the first and
5 second articulation members together, characterised in that the second articulation member is defined by a portion of the body.

For a better understanding of the present invention, a preferred embodiment is described below purely by way of non-limiting example, with reference to the
10 appended drawings, in which:

Figure 1 is a partially-sectioned elevational view of a mirror made in accordance with the principles of the present invention; and

15 Figure 2 is a partially-sectioned plan view of the mirror of Figure 1 on an enlarged scale.

With reference to the drawings, an external rear-view mirror for a commercial vehicle is generally indicated 1.

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The mirror 1 comprises a body 2 essentially in the form of a hollow shell with a front aperture 3, which is conveniently made by moulding from a plastics material. A reflective plate 4 is housed in the aperture 3 in the body 2.

25 The mirror 1 further includes an essentially plate-like support element 5 which is adapted to be fixed rigidly to a portion of the vehicle bodywork and articulated connection means, generally indicated 6, for connecting the body 2 to the support element 5.

30 The articulated connection means 6 comprise essentially a spherical head 7 integral with the support element 5, a concave spherical seat 8 defined by a spherical cap

shaped portion 9 integral with a side wall of the body 2 facing the support element 5 and retaining means 10 for ensuring that the spherical head 7 and the seat 8 are kept in mutual contact.

5 More particularly, the spherical head 7 projects from the end of a tubular part 11 cantilevered from the support element 5 and has a central, upwardly open cylindrical chamber 14 with a substantially vertical axis "a". The spherical head 7 also has a through-slot 15 in a zone facing the mirror body 2 and extending in a plane perpendicular to the axis "a" through an angle of slightly more than 180°.

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The retaining means 10 include a pin 16 with a substantially horizontal axis "b" which is housed in a central through-hole 17 in the seat 8 and slidably engages the slot 15 in the spherical head 7. The end of the pin 16 within the chamber 14 in the spherical head 7 has a head 19 defining an axial shoulder 20 and the pin also has a diametral through-hole 22 close to its opposite end within the body 2 of the mirror 1. The interior 12 of the tubular part 11 has a larger diameter than the head 19 and communicates with the chamber 14 in the head 7 so as to allow the introduction of the pin 16.

20 The retaining means 10 also include a pair of sliding blocks 23, 24, suitably made from a plastics material with a low coefficient of friction, mounted respectively within the chamber 14 in the spherical head 7 and inside the body 2 in contact with the seat 8 of the latter. More particularly, the block 23 has a through-hole 30 engaged by the pin 16 and is in the form of part of a cylinder defined by a cylindrical face 25 cooperating with the lateral wall of the chamber 14 and a flat face 26 cooperating with the axial shoulder of the pin 16. The block 24 is disc shaped and has a spherical-cap-shaped seat 28 in its face 27 which cooperates with a convex face of the portion 9 of the body 2 within the body itself; the block 24 also has a central through-hole 31 engaged by the pin 16.

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A helical spring 34 co-axial with the pin 16 is precompressed between a face 35 of the block 24 opposite the face 28, the face 35 being provided with an annular peripheral guide projection 36 for this purpose, and a centrally apertured cap 37 mounted on the pin 16. An axial stop for the cap 37 is formed by a retaining pin 38 engaged in the
5 diametral hole 22 in the pin 16.

The connection means 6 for connecting the body 2 to the support element 5 are conveniently protected by a tubular bellows sleeve 39 of elastomeric material, indicated schematically in broken outline, fixed at its ends to respective seats of the support
10 element 5 and of the body 2.

The mirror 1 operates as follows.

As clearly shown by the arrows in Figure 2, the articulated connection means 6
15 connecting the mirror body 2 to the support element 5 allow the body itself to rotate about the axis "a" of the chamber 14 and about the axis "b" of the pin 16.

During rotation about the axis "a", the pin 16 slides in the slot 15 in the spherical head 7 while the block 23 and the seat 8 slide on the side wall of the chamber 14 and on the
20 outer surface of the head 7 respectively. The magnitude of this rotation is determined by the contact of the pin 25 with the opposite ends of the slot 15, and is thus about 180°. It is thus possible for the mirror to be folded against the bodywork (either forwardly or rearwardly) as a result of an accidental knock or an intended operation. Moreover, the resilient load of the spring 34 is such as to ensure that the mirror body
25 2 is stable in any angular position so as to avoid vibrations in use.

The rotation about the axis "b" of the pin 16 occurs with sliding of the seat 8 between the outer surface of the spherical head 7 and the seat 28 of the block 24. This rotation allows the adjustment of the inclination of the body 2, and hence of the reflective plate
30 4, in dependence on the height of the user; the amplitude of the rotation may thus be limited, for example to 10° to 20°, by stop means of any known type, not illustrated,

formed on the spherical head 7 and on the body 2, for example a tooth and a corresponding notch.

From an examination of the characteristics of the present invention, the advantages
5 achieved thereby are obvious. Above all, the articulated connection between the mirror
body 2 and the support member 5 is achieved without the use of co-moulded parts but
by the direct sliding of a portion of the mirror body on to the spherical head 7. The
connection is thus highly reliable and there is no risk of structural failure in use.
Moreover the realisation and assembly of the mirror 1 are very simple and economic.

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Finally it is clear that the mirror 1 may be modified and varied without thereby
departing from the scope of protection of the present invention.

CLAIMS

1. A vehicle rear view mirror , of the type comprising:-
 - a hollow body having a front aperture ;
 - 5 - a reflective plate housed in the aperture in the body ;
 - support means adapted to be fixed to the vehicle bodywork; and
 - means for articulating the body to the support means and defining a first, substantially-vertical axis of rotation for the body and a second axis of rotation for the body substantially perpendicular to the first axis , the
 - 10 connection means including a first spherical articulation member rigid with the support means, a second spherical articulation member rigid with the mirror body and means for retaining the first and second articulation members together, characterised in that the second articulation member is defined by a portion of the body .
 - 15
 2. A rear view mirror according to Claim 1, characterised in that the first articulation member is a spherical head rigid with the support means and the second articulation member is a spherical seat defined by a spherical-cap-shaped part of a side wall of the body which cooperates with an
 - 20 external surface of the spherical head .
3. A mirror according to Claim 1 or Claim 2, characterised in that the retaining means for keeping the first and second articulation members together includes resilient means for exerting sufficient load to ensure that the
 - 25 spherical head and the spherical-cap part of the body are kept in mutual contact.
4. A mirror according to Claim 2 or Claim 3, characterised in that the retaining means include a pin aligned on the second axis of rotation
 - 30 engaging in a central hole in the spherical-cap part of the body and housed in a slot in the spherical head extending in a plane

perpendicular to the said first axis of rotation , the pin being constrained to rotate about the first axis of rotation .

5. A mirror according to Claim 4, characterised in that the spherical head has a cylindrical chamber aligned on the first axis of rotation and communicating with the slot .
6. A mirror according to Claim 5, characterised in that the retaining means include a pair of sliding blocks formed with respective through-holes for housing the said pin , a first of the blocks being housed in the cylindrical chamber in the spherical head and having an outer cylindrical surface for cooperating with a lateral wall of the chamber, a second of the blocks being housed within the said body and having a spherical-cap-shaped seat cooperating with the spherical-cap-shaped part of the body , one of the blocks cooperating with first axial stop means on the pin and the other of the blocks cooperating with the resilient means .
7. A mirror according to Claim 6, characterised in that the resilient means comprise a helical spring coaxial with the pin and compressed between the said second block and second axial stop means on the pin .
8. A mirror according to Claim 7, characterised in that the second axial stop means comprise a cap coaxial with the pin and cooperating with the spring and a retaining pin transverse the said pin .
9. A mirror according to any one of Claims 5 to 8, characterised in that the spherical head extends from one end of a tubular part cantilevered on the support means , the interior of the tubular portion communicating with the cylindrical chamber in the spherical head and having a larger diameter than the transverse dimension of the said first axial

stop means of the pin .

9. A vehicle rear view mirror substantially as described and illustrated in the appended drawings.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

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Relevant Technical fields

- (i) UK Cl (Edition K) B7J
(ii) Int Cl (Edition 5) B60R 1/06

Search Examiner

COLIN THOMPSON

Databases (see over)

- (i) UK Patent Office
(ii)

Date of Search

21 FEBRUARY 1992

Documents considered relevant following a search in respect of claims

1-9

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2197829 A (MITTELHAUSSER) whole document relevant	1,2,3,4,5
X	GB 1600514 (MANZONI) see especially Figure 1	1,2,3,4,5
X	B 1547233 (MITTELHAUSER) see especially Figure 1	1,2,3,4,5
X	GB 1497334 (ICHIKOH IND LTD) see especially Figure 2	1,2,3,4,5
X	GB 1473431 (FORD MOTOR CO LTD) see especially Figure 1	1,2,3,4,5
Y	EP 0214337 A1 (HOME KG) see especially Figures 2 and 3	1,3
X	EP 0064335 A1 (BRITAX (WINGARD) LTD) see especially Figure 1	1,3

-10-

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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