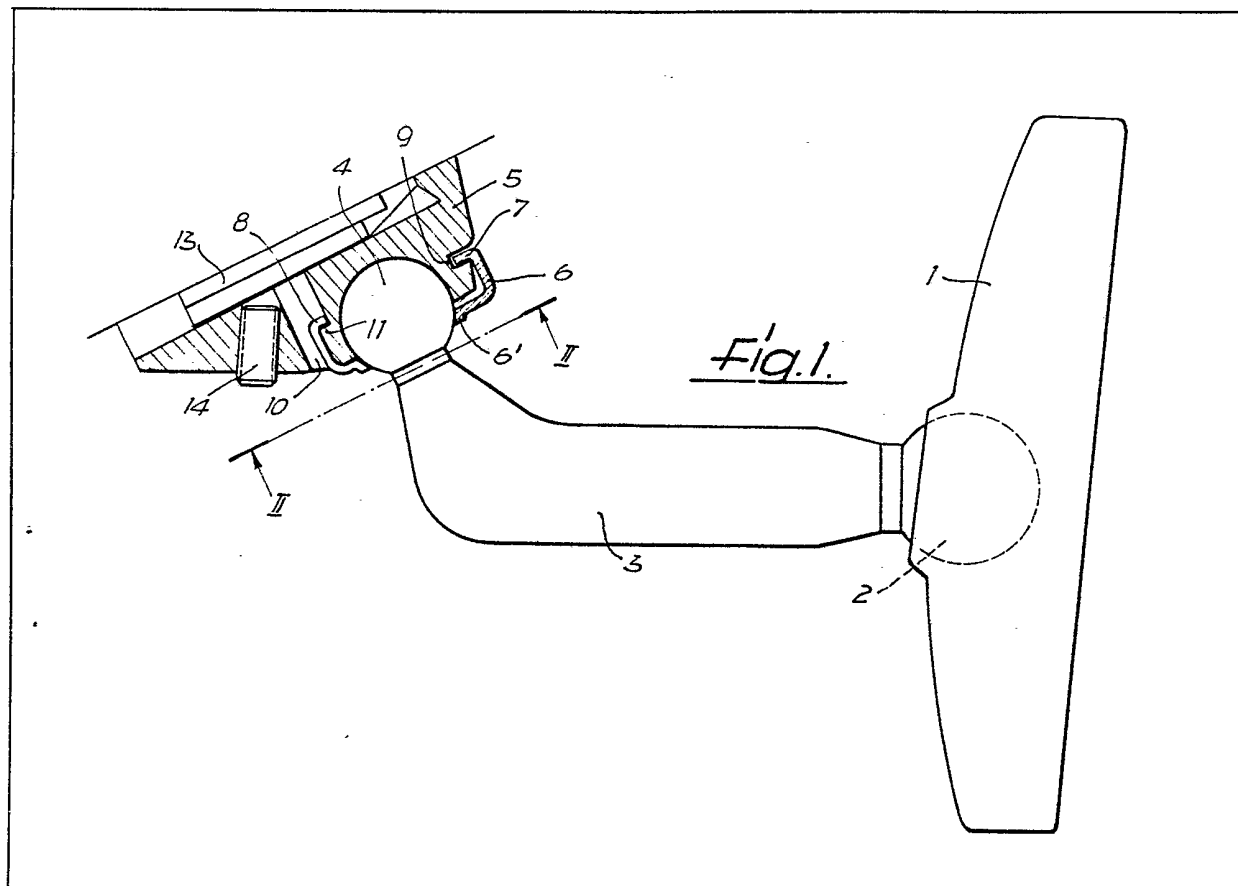


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GB 1224875
GB 1221431
GB 1219475
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(54) A motor vehicle mirror

(57) A vehicle mirror (Fig. 1) which can become detached from its mounting by an impact, without breaking, has a mounting arm (3) connected to a mounting foot (5) by means of a ball or roller element (4) held in an appropriately shaped socket in the foot by a spring clip (6, 7, 8).



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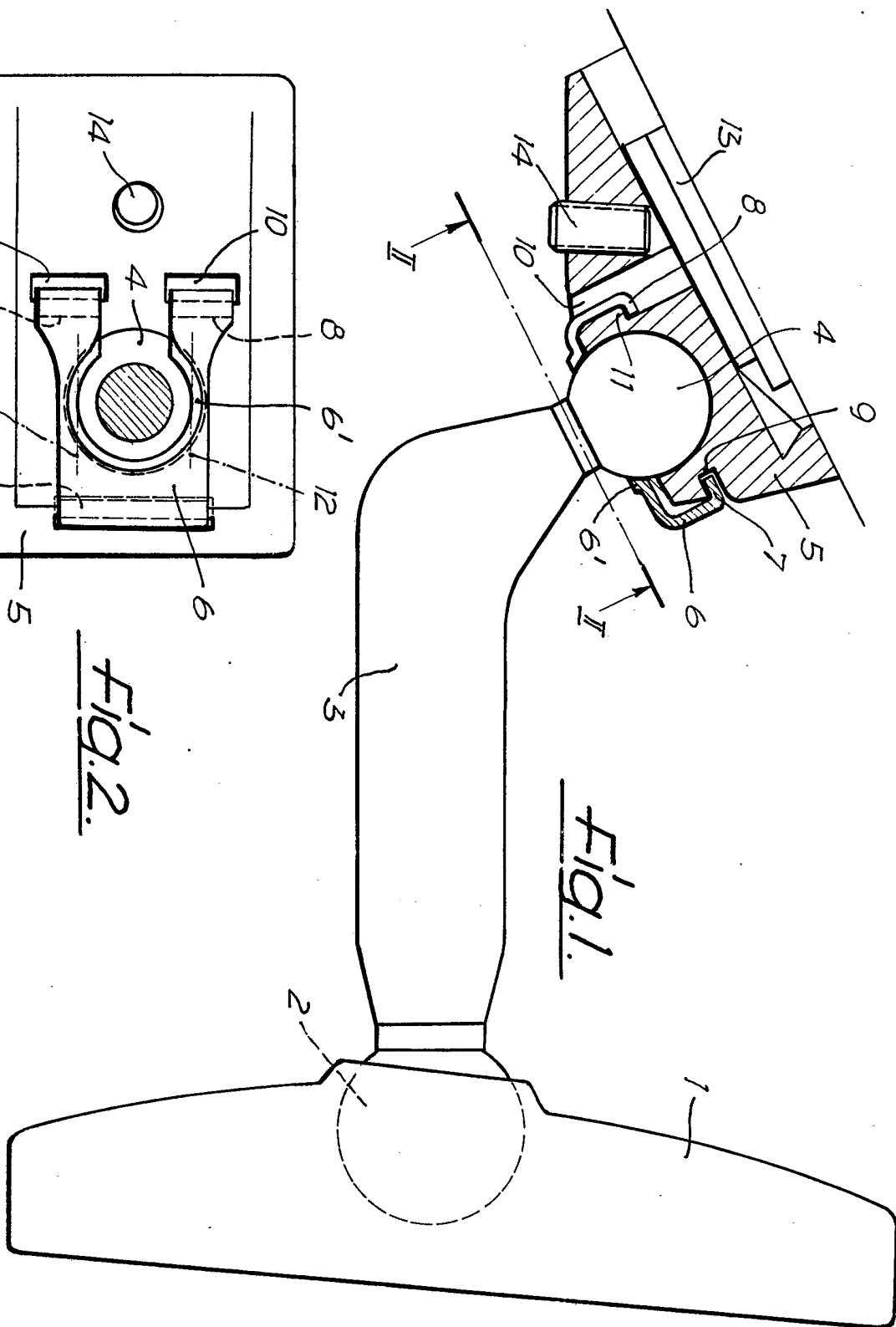


Fig. 1.

Fig. 2.

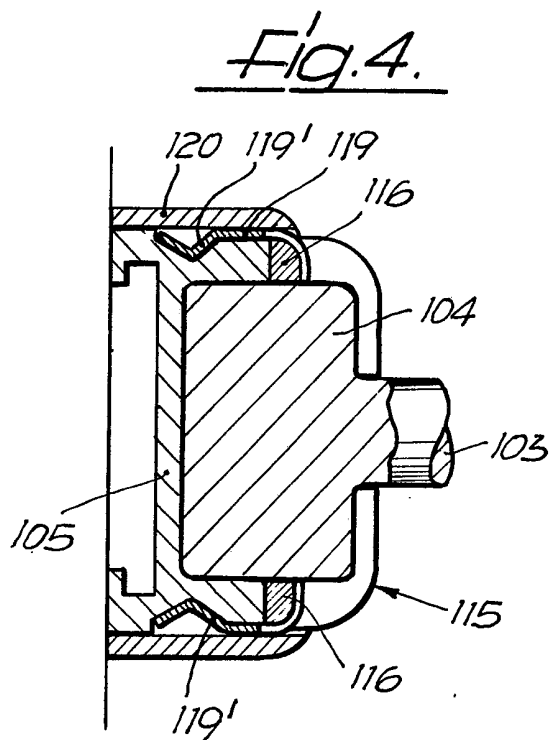
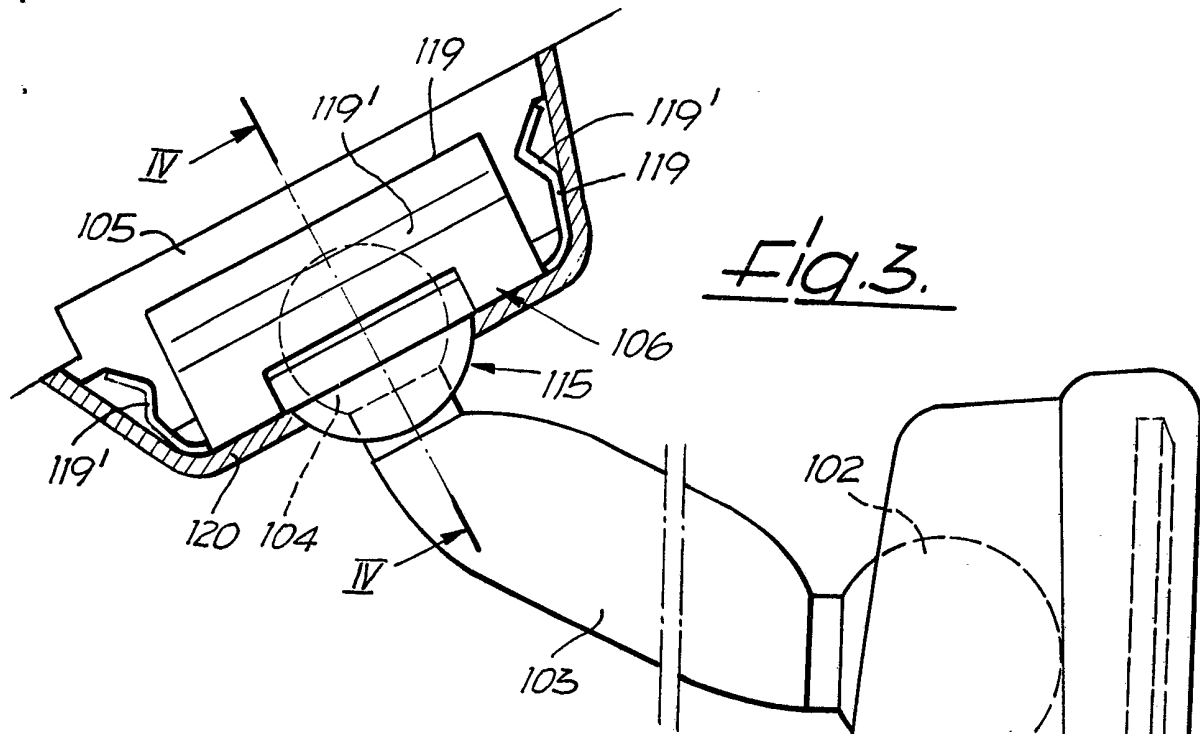


Fig. 5.

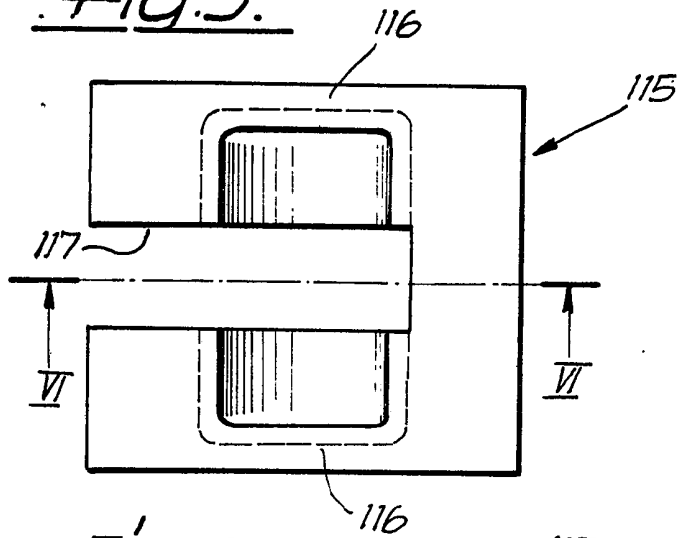


Fig. 7.

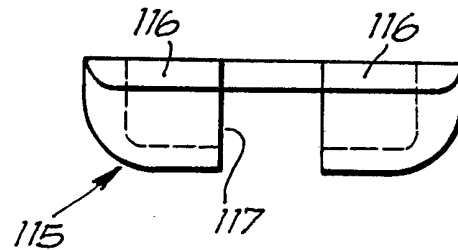


Fig. 6.

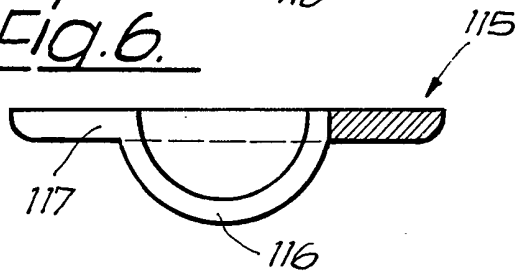


Fig. 8.

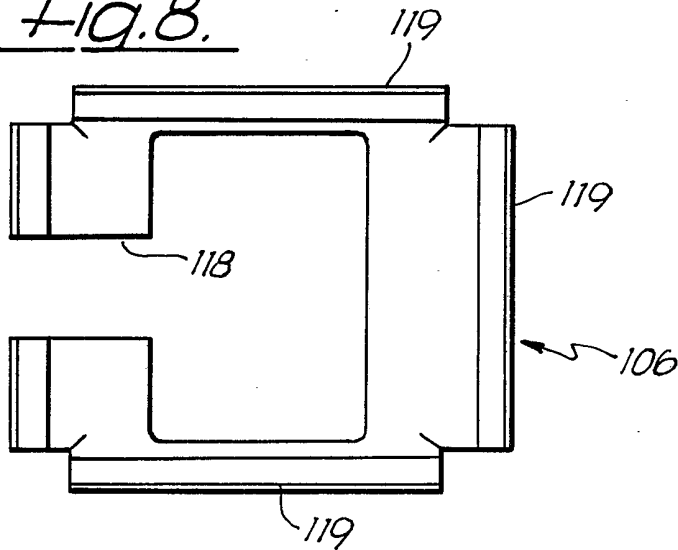


Fig. 9.

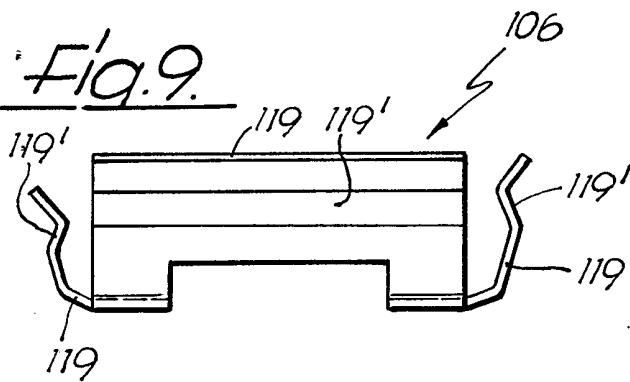


Fig. 12.

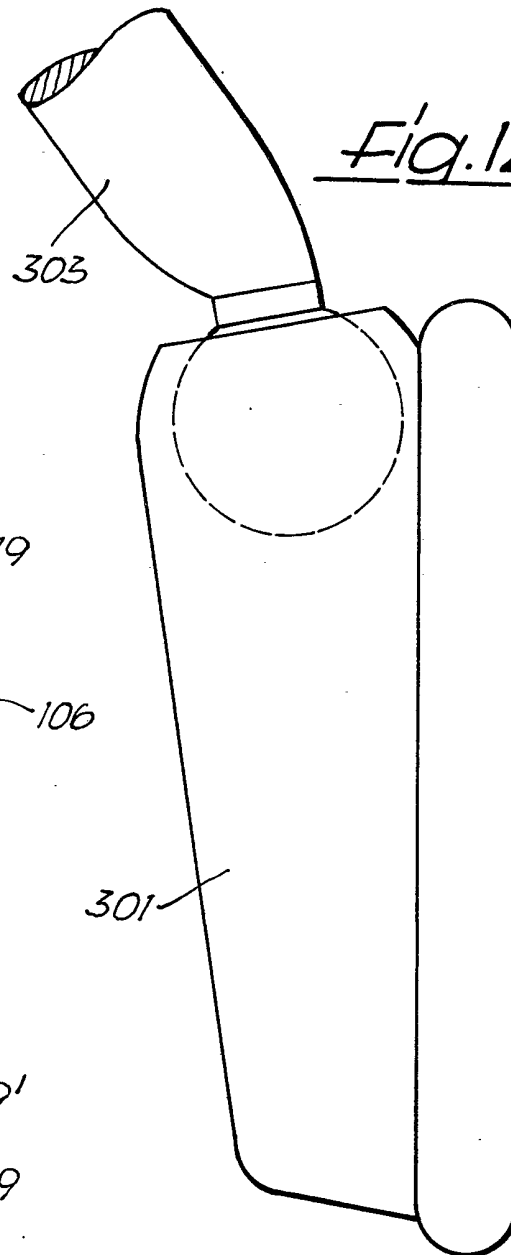


Fig. 10.

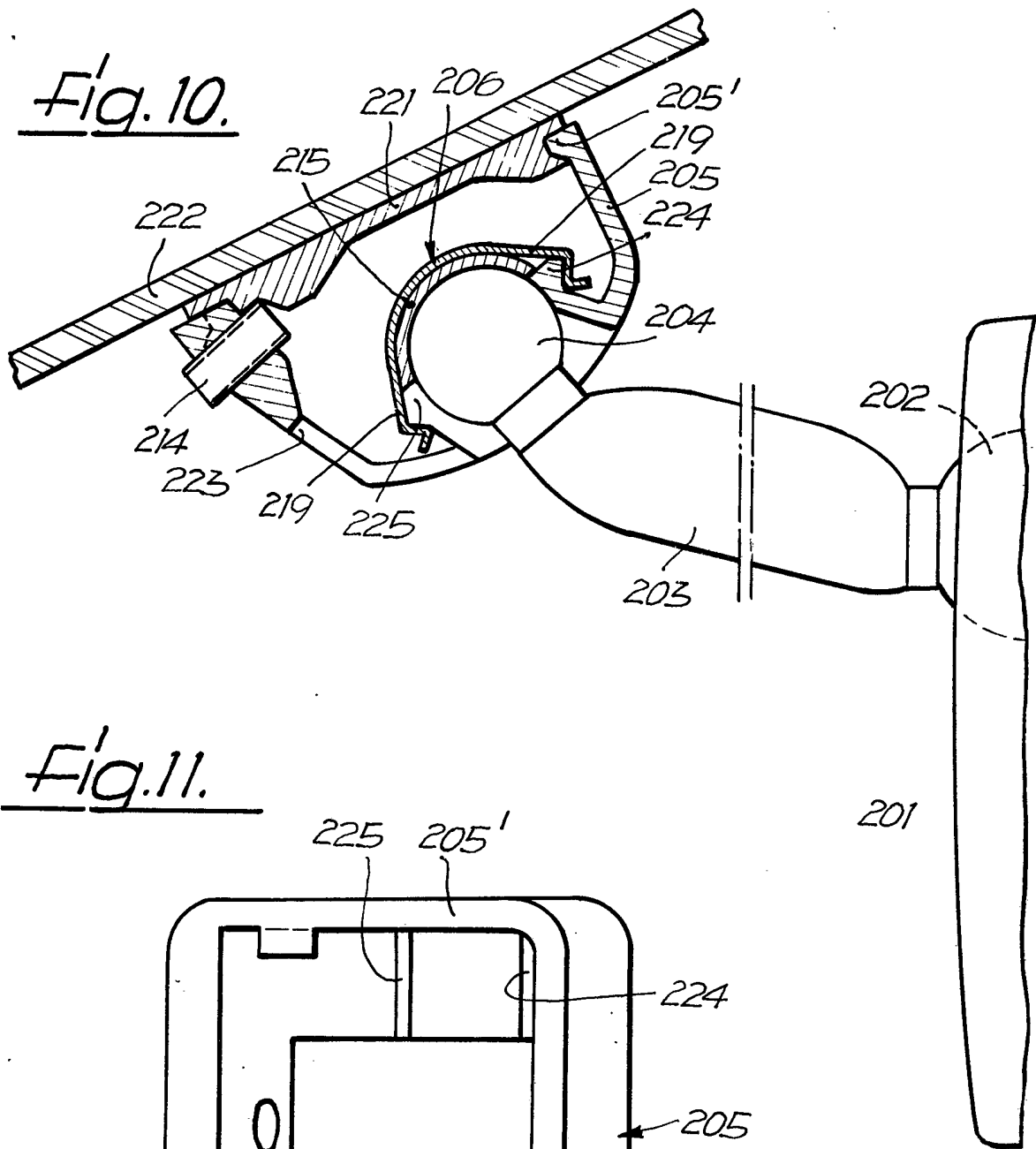
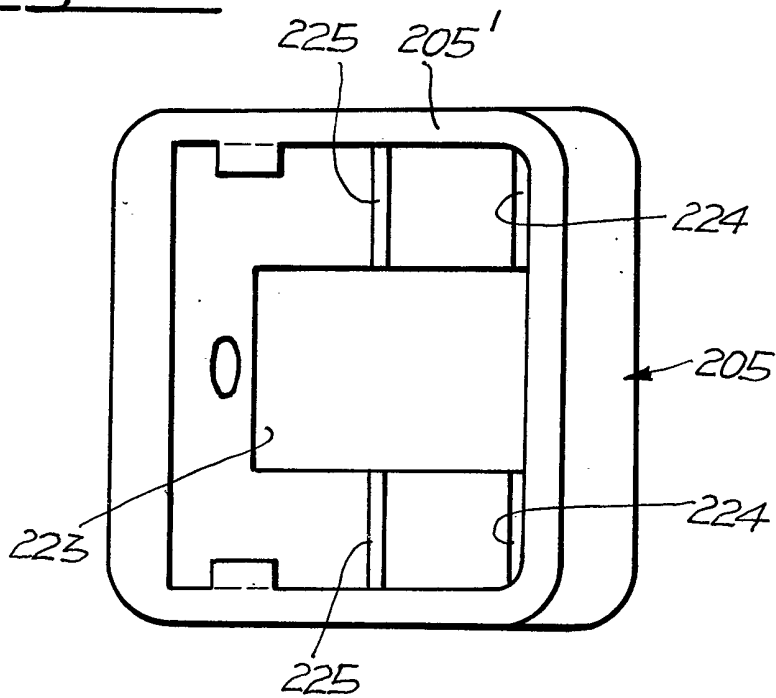


Fig. 11.



• SPECIFICATION
A motor vehicle mirror

The invention relates to an internal mirror for motor vehicles, with a mirror housing which is provided at one end of a bearing arm, the other end of which is detachably connected to a foot which is to be fixed to the vehicle.

For reasons of safety the bearing arm of such internal mirrors must be released from the foot when it is subjected to an impact, the impact force of which lies above a specific limit. In the known mirrors, the bearing arm therefore has a breaking point at its transition to the foot. However, this solution has the disadvantages that measures have to be taken to avoid projecting spikes at the breaking point, and that the mirror has to be renewed after the arm has been broken.

The invention is based on the problem of providing an internal mirror for motor vehicles, the bearing arm of which, as with the known internal mirrors, can be separated from the foot by an impact, particularly by a so-called pendulum impact, but which is not rendered unusable by this separation and which also does not form any dangerous spikes or the like on the foot.

This problem is solved by a mirror which has the characteristics in Claim 1. Namely, it is only necessary to make the force-fitted connection between the foot and the fixing such that when there is an impact with an impact force above the limit value the fixing releases the foot and the latter can thereby be released from the mounting socket. During this process no parts are damaged or destroyed in any way, so that after the impact the foot needs only be inserted in the mounting socket again and the fixing connected to the foot again. Since the parts are not damaged or destroyed, there are also no spikes or other dangerous projections occasioned by the separation.

Advantageous developments of the internal mirror according to the invention form the subjects of the subsidiary Claims. If it is also required to release the arm from the foot when there is an impact or blow which is produced on the roller element by a force or force component against the contact surface of the foot on the window, then an embodiment may advantageously be chosen in which the foot has a hollow body equipped with a passage for the bearing arm and a fixing plate releasably connected to this body for fixing to the window of the motor vehicle, and the mounting socket formed by the hollow body for the roller element is located at a distance from this fixing plate. The roller element can then be released from the mounting socket which forms the foot when the holding force of the fixing device is exceeded in the direction of the fixing plate. If the arm is to be able to be pivoted relative to the foot only in a vertical plane, the roller element is expediently formed as a cylinder. However, a ball may also be provided, but this must be provided laterally with at least one flat surface which rests on a flat

surface in the mounting socket. Wear on the fixing and on the roller element may be prevented by an intermediate part lying between the two parts. Such an intermediate part also has the advantage that the spring does not need to be adapted to the shape of the roller element. This is a particular advantage when the spring is connected directly to a protective cap, preferably made of plastic, which covers over the entire foot on the side facing towards the inside of the vehicle.

In the following the invention is explained in detail, with reference to embodiment examples shown in the Drawing.

Figure 1 is a side view, partially sectioned, of a first embodiment example.

Figure 2 is a section along the line II—II in Figures 1.

Figure 3 is a partially sectioned partial side view of a second embodiment example.

Figure 5 is a plan view onto the intermediate part in the embodiment example shown in Figure 2.

Figure 6 is a section along the line VI—VI in Figure 5.

Figure 7 is a side view of the intermediate part shown in Figure 5.

Figure 8 is a plan view onto the fixing in the embodiment example shown in Figure 3.

Figure 9 is a side view of the fixing shown in Figure 8.

Figure 10 is a partial side view, partially sectioned, of a third embodiment example.

Figure 11 is a plan view onto the foot of the third embodiment example.

Figure 12 is an incomplete side view of a modified version of the embodiment example shown in Figures 10 and 11.

An internal rear-view mirror for a motor vehicle has a mirror housing 1 containing a mirror which is not shown and equipped on its rear face with a hole which forms the access to a socket mounting (not shown), in which a ball 2 which forms one end of a bearing arm 3 is mounted. This enables the mirror housing 1 to be pivoted within certain limits in all directions relative to the bearing arm 3. The rod-shaped bearing arm 3, which is bent in the embodiment example, is equipped with a plastic casing which begins some distance from the ball 2 and terminates some distance from the other end of the bearing arm 3 which is formed by a second ball 4.

The second ball 4 is mounted in a socket in a foot 5 which is to be connected to the body of the motor vehicle. The socket is open towards that side of the foot 5 which faces away from the contact surface via which the foot rests on the body.

As Figure 1 shows, the socket accommodates slightly more than half the second ball 4, i.e. the opening defined by the edge of the socket has a diameter which is slightly smaller than the diameter of the ball 4. This is possible since the plastic from which the foot 5 is made allows the edge of the socket to be stretched elastically temporarily by the required amount as the ball is

inserted in the socket. However, the friction force between the ball 4 and the socket which is obtained by this does not normally suffice to hold the mirror securely in the selected position when there are also vibrations. An elastic clip 6 is therefore provided which rests on the ball 4 and also presses this into the socket.

As Figure 2 shows, the clip 6 is U-shaped. In the embodiment example it consists of a spring plate which is coated with plastics at least on its outer surface. Naturally, however, other spring-elastic materials, such as spring-elastic plastics, would also be suitable materials.

As Figure 2 shows, the two sections of the two shanks of the clip which adjoin the yoke of the clip 6 define together with the yoke a circular opening, the diameter of which is slightly larger than the diameter of the rod-shaped middle part of the bearing arm 3 which adjoins the second ball 4 (see Figure 1). So that there is not merely linear contact between the clip 6 and the ball 4, the edge 6' of the clip 6 which defines this opening is somewhat raised. In the embodiment example, the distance between the two shanks in the section which adjoins this opening is somewhat smaller than the diameter of the opening, but somewhat larger than the rod-shaped end of the central part of the bearing arm 3 which adjoins the ball 4, so that the clip 6 can be slipped on without any difficulty. However, the distance between the two shanks could be made the same as the diameter of the opening for contact on the ball 4 over their entire length, since it is not necessary to secure the clip 6 against displacement relative to the ball 4 in the longitudinal direction of the shank when, as in the embodiment example, the clip 6 is connected to the foot 5 so that it cannot be moved in this direction.

The force-fitted connection of the clip 6 and the foot 5 is effected with the aid of a hook 7 formed on the yoke of the clip 6, together with a hook 8 formed on each of the free ends of the two shanks. As Figure 1 shows, the hooks 7 and 8 extend towards the surface of the foot 5 which rests on the body, but the engagement direction of the hooks 8 is opposite to that of the hook 7. As Figure 1 shows, the latter engages in a groove 9 which is open in the direction facing away from the socket. It engages thereby behind the part of the material which forms the edge of the socket. The hooks 8 engage in a slit 10 which is open towards the side facing away from the contact surface on the body. The wall which bounds the slit 10 on the side facing the socket forms a shoulder 11 running in the transverse direction, behind which the hooks 8 engage.

During assembly the clip 6 needs only be pressed against the foot 5. It then springs out sufficiently far for the hooks 7 and 8 to arrive in the position shown in Figure 1. The force which must be exerted by the ball 4 on the clip 6 in order to disengage the hooks 7 and 8 and thus enable the ball 4 to come out of the socket is established by the dimensioning of the clip 6, the shape of the hooks 7 and 8 and the shape of the material parts

behind which the hooks engage, so that the ball 4 can only escape from the socket when the force acting on the mirror housing 1 of the bearing arm 3 exceeds the predetermined minimum value.

If it is desired to restrict the amount which the bearing arm 3 can pivot relative to the foot 5, for example, to a plane passing through the slit between the shanks of the clip 6, the ball may be provided laterally with one or two flat surfaces lying parallel to the pivoting plane, as indicated by the dashed lines 12 in Figure 2. The socket in this case is constructed so that it has surface areas which rest against these flat side surfaces.

In the embodiment example, for connecting the foot to the body the former is provided on its side facing the body with a dovetail groove 13 in which a rail provided on the body and having a corresponding dovetail profile can be inserted. A clamping screw 14 in the foot 5 secures the latter against displacement in the longitudinal direction of the dovetail groove 13.

In the second embodiment example of an internal rear-view mirror for a motor vehicle shown in Figure 3, the mirror housing 101 which contains the mirror which is not shown is again equipped on its rear face with a hole which forms the access to a socket mounting which is not shown. However, this socket mounting is disposed above the centre of the mirror housing. A ball 102 which forms one end of a bearing arm 103 is mounted in the socket mounting. The bearing arm is provided with a plastic casing, beginning some distance from the ball and terminating some distance from the other end of the bearing arm 103, formed by a cylinder 104.

The cylinder 104 is mounted in a mounting socket with a horizontal axis, formed by a foot 105. The foot 105 is fixed to the vehicle, for example, it may be glued or welded to the window. The mounting socket is open on that side of the foot 105 which faces away from the contact surface via which the foot rests on the vehicle.

As Figures 3 and 4 show, the mounting socket accommodates approximately half of the cylinder 104. The foot 105 does not therefore need to be made of an elastic material, but can be made of metal, for example, as a pressure casting. Over the part of the cylinder lying outside the mounting socket an intermediate part 115 made in one piece engages, being drawn towards the foot 105 by means of a spring clip 106 and thereby producing a friction force between the cylinder on one hand and the foot and the intermediate part 115 on the other hand; this force is sufficient to hold the mirror securely in the chosen position even during vibrations, but allows a pivoting movement of the cylinder around its longitudinal axis for the purposes of adjusting the height of the mirror.

The design of the one-piece intermediate part 115 which eliminates wear between the cylinder 104 and the spring clip 106 is shown in Figures 5 to 7. It consists of two clamp-type sections 116 which are arranged coaxially spaced out next to each other, and the flanges of which, which lie in a

common plane, are parts of a single rectangular plate into which a slit 117 extends, the width of this being the same as the diameter of the bearing arm 103 at the transition to the cylinder 104. As Figure 7 shows, the semi-cylindrical regions of the clamp-type sections 116 are closed off at the ends which face away from each other, by an end wall. The intermediate part 115 therefore lies not only on the casing surface of the cylinder 104, but also on its two end surfaces. However, as Figure 5 shows particularly clearly, the plate which also forms the flanges of the section 116 extends out over these end walls.

The design of the clip 106 made of spring plate is shown in Figures 8 and 9. On the four sides of a rectangular frame, one of the two long sides of which is divided by a slit 118, the width of which is adapted to the diameter of the bearing arm 103 at the transition to the cylinder 104 so that the clip 106 may be pushed on, tongues 119 bent towards the same side are provided; these are constructed integral with the frame and spring in pairs against each other, that tongue which is provided on the side divided by the slit 118 consisting of two parts lying parallel to each other. As Figures 3, 4 and 9 show, at their terminal section up to the free end, the tongues 119 are first bent towards the cylinder obliquely, and are then bent in the opposite direction, thus outwards. This gives the terminal section of the tongues 119 the profile shape of a wedge. Each of these terminal sections engages in a groove in the foot 105 which is open to the outside, and the cross-section profile of which is adapted to the wedge-shape of the terminal sections of the tongues. The inclination of that flank 119' of the wedge-shaped terminal section of the tongues 119 which lies near to the frame part is selected, as is the spring force of the tongues 119, so that when an impact is exerted on the mirror housing 101, the force of which lies above a predetermined limit value, the holding force of the tongues is exceeded and they are disengaged from the grooves in the foot 105. In this way, the bearing arm 103 is released from the foot 105 when such an impact occurs, without any parts being damaged.

In order to make the mirror usable again after such an impact, it is only necessary to insert the cylinder 104 in the mounting socket of the foot 105 again and to put back the intermediate part 115 and the clip 106. For this purpose, the slit 118 in the intermediate part 115 is lined up with the end of the bearing arm 104 adjoining the cylinder and is pushed on until the two semi-cylindrical parts line up with the cylinder 104 and can be applied against the latter. After this, the clip 106 is put on in a corresponding way by means of the slit 118, and is laid on the intermediate part 115 and pressed against the foot 105 until all the tongues 119 are engaged in the grooves in the foot. Finally, a cap 120 made of plastics is put on; this covers over the clip 106 and the foot and leaves only the semi-cylindrical parts of the intermediate part 115 free.

The third embodiment example of the internal

mirror according to the invention for motor vehicles, shown in Figures 10 and 11, differs from the above-described embodiment examples in that the bearing arm 203 which bears the mirror housing 201 can also be released from the foot 205 when a blow or impact is directed onto the mirror housing in such a way that a force or force component is exerted on the end of the bearing arm connected to the foot, directed towards the window of vehicle which bears the foot.

As Figure 10 shows, the foot 205 is formed by a beaker-shaped hollow body, the rim 205' of which defines a rectangular area. The two sections of this rim 205' which in the mounted state run horizontally each engage from above or from below respectively in a groove in a fixing plate 221 which, in the embodiment example, is made of metal, like the foot 205, and seal off the hollow body from the vehicle window 222 on which the mirror is to be fixed. The fixing plate 221 is glued or attached in some other way to the window 222 via the side facing away from the hollow body. A clamping screw 214 which passes through the hollow body and presses against the fixing plate secures the hollow body against displacement relative to the fixing plate 221 in the longitudinal direction of the two grooves in which the opposing sections of the rim 205' engage.

As shown particularly in Figure 11, in the region lying at a distance from the fixing plate 221 and forming the base of the beaker, the foot 205 has a rectangular hole 223 which lies symmetrically to the longitudinal central plane of the foot 205. This hole 223 serves as a passage for one end of the bearing arm 203 which, as in the embodiment example according to Figures 3 to 8, is formed by a transversely-disposed cylinder 204 projecting laterally beyond the bearing arm as a roller element. The axial length of this cylinder 204 is greater than the width of the hole 223, but smaller than its length so that the cylinder 204 can be inserted through the hole 223 into the interior of the foot 205, and it is possible to construct the cylinder 204 in one piece with the bearing arm.

Extending along that edge of the hole 223 which lies at the top in the mounted state there is a side plate 224 projecting into the interior of the foot 205 and constructed in one piece therewith, which extends up to the side walls of the foot 205. This side plate 224 forms an upper mounting socket for the cylinder 204, as shown in Figure 10. A lower mounting socket 225 for the cylinder 204 is formed by two side plates arranged on either side of the hole 223 and, like the side plates 224, formed on the foot 205 and projecting into the interior thereof. As Figure 10 shows, the hole 223 allows a pivoting movement of the bearing arm 203 in a vertical plane between a position in which, in the mounted state of the mirror, the bearing arm 203 emerges from the foot 205 in an approximately horizontal direction, and a position in which, in the mounted state of the mirror, it emerges from the foot 205 in a direction pointing downwards and forwards.

A third mounting socket for the cylinder 204 is

formed by an intermediate part 215 which, as Figure 10 shows, bridges over the gap between the bearing surface inside the foot 205 formed by the side piece 224 and the lower mounting socket

- 5 225. A clip 206 arranged, like the intermediate part 215, inside the foot 205, and made of spring plate, lies on that side of the intermediate part 215 facing away from the cylinder 204 and engages via the tongues 219 formed by its two
- 10 shanks over the side plate 224 and the lower mounting socket 225 respectively. The terminal sections of the two tongues 219 form wedges pointing towards each other which engage behind a strip-like projection on the side plate 224 or the
- 15 lower mounting socket 225 and rest against a corresponding sloping surface on the projection. The force with which the clip 206 of the intermediate part 215 presses on the cylinder 204 and presses it against the side plate 224 and the
- 20 lower mounting socket 225 is selected so that the necessary friction force is obtained to hold the bearing arm 203 in the chosen pivoted position, even under unfavourable conditions, for example, during strong vehicle vibrations. In addition, the
- 25 force with which the tongues 219 press against the side plate 224 and the lower mounting socket 225, and the inclination of the sloping surface, are chosen so that when a force directed against the fixing plate 221, and exceeding the predetermined
- 30 limit value, acts on the cylinder 204, the tongues 219 of the clip 206 can be spread sufficiently far for the clip to be released and the intermediate part 215 freed, whereupon the cylinder 204 is also released from the side plate 224 and the
- 35 lower mounting socket 225. The bearing arm 203 is then only suspended loosely in the foot 205.

The end of the bearing arm 203 facing away from the cylinder is formed by a ball 202 which forms the part of a ball and socket joint via which

40 the bearing arm is connected to the mirror housing 201. As Figure 10 shows, for safety reasons, this ball and socket joint is arranged off-centre as in the embodiment example shown in Figures 3 to 9.

- 45 As Figure 12 shows, the socket mounting of the mirror housing 301 for the ball provided at one end of the bearing arm 303 may also be provided in the vicinity of the upper edge of the mirror housing. By this means, when there is a blow on the mirror housing, the force which acts at the
- 50 other end of the bearing arm, tending to release it from the foot, is further increased. This type of connection to the mirror housing can also be provided advantageously in the other embodiments.

55 CLAIMS

1. A vehicle mirror comprising a mirror housing on one end of a mounting arm whose other end is detachably connected to a mounting foot, wherein the said other end is in the form of a circular
- 60 element held in a socket in the foot by a fixing element.

2. An internal mirror for a motor vehicle having a mirror housing at one end of a bearing arm, the other end of which is detachably connected to a

- 65 foot to be fixed to the vehicle, wherein the end of the bearing arm connected to the foot is a roller element which is inserted in a mounting socket in the foot and is held in contact by a fixing element which is connected in a force-fitted to the foot.

- 70 3. A mirror according to claim 2, wherein the fixing element is a spring clip.

4. A mirror according to claim 3, wherein the clip has two shanks which are substantially parallel, the distance between them being less
- 75 than the diameter of a ball which forms the roller element.

5. A mirror according to claim 4, wherein hooks which engage in slots in the foot are formed on a yoke portion of clip and on the shank ends of the
- 80 clip.

6. A mirror according to any of claims 2 to 5, wherein the fixing element is made of spring plate coated with plastics.

7. A mirror according to any of claims 2 to 6, 85 wherein the roller element has at least one lateral surface which rests on a flat surface in the socket.

8. A mirror according to claim 2 or claim 3, wherein the roller element is partly covered by an intermediate part which forms a mounting socket,
- 90 and on which the fixing element acts.

9. A mirror according to any of claims 2, 3, or 8, wherein the roller element is a cylinder.

10. A mirror according to any of claims 2, 3, 8, or 9, wherein a plastics covering cap is mounted
- 95 over the fixing element.

11. A mirror according to any of claims 2, 3, or 8 to 10, wherein the spring clip has at least two tongues which spring towards each other and which each engage a sloping surface on the foot.

- 100 12. A mirror according to claim 11, wherein the sloping surfaces are formed by the flanks of strip-like projections, or grooves with a wedge-shaped profile.

13. A mirror according to claim 11 or 12, 105 wherein, in addition to a first pair of tongues, the tongues of which spring transverse to the longitudinal axis of the cylinder, the spring clip has a second pair of tongues which spring in the direction of the longitudinal axis of the cylinder.

- 110 14. A mirror according to any of claims 2, 3 or 8 to 12, wherein the foot has a hollow body with a passageway for the bearing arm and a fixing plate which is releasably connected to the hollow body and is fixable to the window of the vehicle, the
- 115 mounting socket formed by the hollow body for the roller element being spaced from the fixing plate.

15. A mirror according to claim 14, wherein the part of the hollow body which forms the mounting
- 120 socket is formed by portions which project towards the fixing plate inside the hollow body, and which engage over the spring clip arranged inside the hollow body at a distance from the fixing plate.

- 125 16. A mirror according to claim 15, wherein the sloping contact surfaces on the foot for the tongues formed by the shanks of the spring clip are provided on the parts which form the mounting socket.

17. A mirror according to any of claims 14 to 16, wherein the intermediate part which forms a mounting socket is arranged in the interior of the hollow body and at least partially bridges the gap between the free ends of the portions which project into the interior of the hollow body.

18. A mirror according to any of claims 2 to 17, wherein the connecting point between the bearing

arm and the mirror housing is off-centre.

19. A mirror according to claim 18, wherein the connecting point between the bearing arm and the mirror housing lies at the upper edge of the latter.

20. An internal mirror for a motor vehicle, constructed and arranged substantially as herein described and illustrated in the drawings.