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(54) Title: A HOLDING MEANS FOR AN ELECTRONIC DEVICE

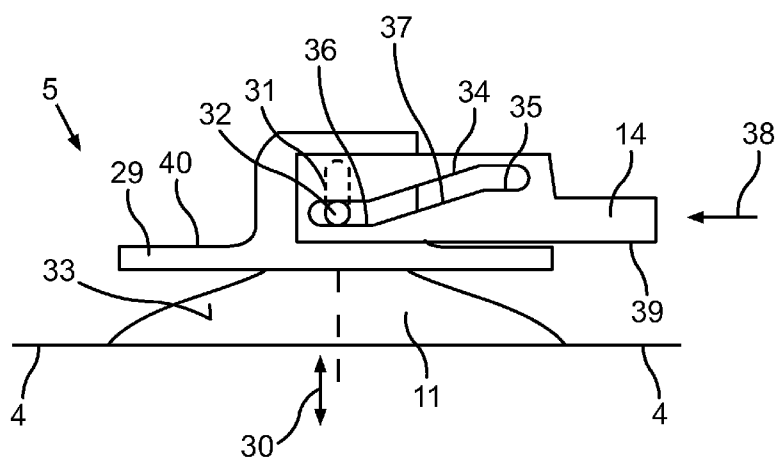


Fig.5

(57) Abstract: The invention relates to a holding means (5) for holding an electronic device (1, 12) to a vehicle component (4), in particular to a windscreen of a vehicle. It comprises a basic body (6) for carrying the electric device (1, 12) and a suction cup (11) for attaching the basic body (6) to the vehicle component (4). A pressing element (29) is movable relative to the suction cup (11) between an unlocking position and a locking position, in which the pressing element (29) is brought into contact with a reverse side (33) of the suction cup (11) facing away from the vehicle component (4). An actuator (14) is movable by a user between a starting position and a final position and upon moving into the final position causes a movement of the pressing element (29) into its locking position.

A Holding Means for an Electronic Device

The invention relates to a holding means, which is formed for holding an electronic device – for instance a mobile phone – to a vehicle component, in particular to a windscreen of a vehicle. The holding means has a basic body and a suction cup. The basic body serves for carrying the electronic device, and the suction cup is designed to attach the basic body to the vehicle component.

Holding means for attaching a mobile phone to the windscreen of a vehicle are already known from the prior art in a plurality of designs. Such holding means as a rule contain a basic carrier or basic body, to which the mobile phone can be fixed, namely for instance by means of a snap-on connection, a plug-in connection, or the like. On the other hand the known holding means also include fasteners serving for fastening the basic body to the windscreen. For this purpose as a rule a suction cup – i.e. a suction element made of rubber – is employed, by means of which the holding means can be temporarily and releasably mounted to the surface of the windscreen. If such suction cup is pressed against the surface of the windscreen, the air is sucked out of a clearance between the windscreen and the suction cup, and the air volume between the windscreen and the suction cup decreases. This has the effect that a pressure on the part of the ambient air acts on the suction cup so that the suction cup remains in contact with the windscreen. Known suction cups commonly have a tongue or a lip, by means of which the connection can be released. For this purpose the user can pull the suction cup at the tongue and open the vacuum chamber formed between the windscreen and the suction cup. Then the connection between the windscreen and the suction cup is released. In order to be able to re-fix the holding means to the windscreen again, the user needs to press the suction cup against the surface again.

The document US 2010/0286904 A1 describes a device assembly for performing a driver assistance function. The device assembly includes a mobile terminal as well as a holder removable installed in the vehicle for temporarily receiving the mobile terminal. An image recording device is connected to the holder, which is connectable to the mobile terminal via an image signal line and an electrical interface provided on the holder. The holder can be designed as a section attachment device and can be attached to a vehicle windshield. The holder can receive the mobile terminal via a receptacle arm, in which the appropriate interface for transmitting the image signals and for the power supply are positioned.

The document WO 2005/090124 A1 discloses that an image processing module for processing camera image data of the environment of a motor vehicle on the one hand and a display for displaying the images on the other hand can be formed by a micro-computer, in particular a palmtop, a personal digital assistant or a mobile telephone. The integration of the image processing module in the vehicle interior guarantees that the image processing module is not exposed to large temperature variations or extremely high temperatures.

Thus, in the prior art, suction cups are employed in order to be able to fix the holding means to the windscreen. A disadvantage of the known suction cups is that the connection with the windscreen is not always reliable. However, if a reliable connection is provided, the suction cups can hardly be detached from the windscreen again. In the prior art it – thus – is problematic that either the connection with the windscreen is relatively poor and thus may come off on its own, or else the holding means can only be demounted at great effort.

It is an object of the invention to provide a solution, how to fix a holding means of the initially named kind to the vehicle component in a particularly reliable way and to detach it from the vehicle component again at little effort.

According to the invention, this object is solved by a holding means with the features of patent claim 1. Advantageous implementations of the invention are the subject matter of the dependent claims, of the description and of the figures.

A holding means according to the invention is designed for holding an electronic device on a vehicle component, namely in particular to a windscreen of a vehicle. The holding means comprises a basic body serving for carrying the electronic device. The holding means also comprises a suction cup for attaching the basic body to the vehicle component. The holding means comprises a pressing element, which is movable relative to the suction cup. The pressing element is movable relative to the suction cup between an unlocking position and a locking position. In the locking position the pressing element is brought into contact with a reverse side of the suction cup, so that the suction cup is positioned immediately between the surface of the vehicle component (windscreen) on the one hand and the pressing element on the other hand. Moreover, an actuator is provided, which is movable by a user between a starting position and a final position and

upon moving into the final position causes a movement of the pressing element into its locking position.

Thus, the holding means comprises a pressing element which quasi serves for pressing the suction cup against the surface of the vehicle component. The pressing element can be brought from its unlocking position into the locking position, in which it contacts the reverse side of the suction cup and thus keeps the vacuum between the suction cup and the surface of the component chamber from opening and the connection from being released. In the locking position thus the pressing element presses the suction cup against the surface of the vehicle component. And vice versa, in the unlocking position, the pressing element releases the suction cup, so that the connection between the suction cup and the surface of the vehicle component can be released. The holding means also includes an actuator, which can be moved by the user between a starting position and a final position. In the final position of the actuator the pressing element is in the locking position; in the starting position of the actuator the pressing element is in the unlocking position. The suction connection thus can be locked or secured and then be released again very easily by way of simple moving of the actuator. By the moving of the actuator into the final position it thus is avoided that the connection between the suction cup and the vehicle component is released. Thus the holding means is fixed particularly reliably to the vehicle component and can be demounted again at little effort, namely by way of moving the actuator into its starting position. Then the suction cup can be detached again from the vehicle component at little effort.

The mounting of the holding means thus can be as follows: The user takes the holding means and presses the suction cap against the surface of the vehicle component, in particular the windscreen. Upon pressing the suction cap against the vehicle component, the air is sucked out of the clearance between the suction cup and the vehicle component and the air volume is reduced. Now the suction cup is only insufficiently fixed to the vehicle component. The user can now move the actuator from the starting position into the final position, so that also the pressing element is moved from the unlocking position into the locking position. The pressing element now is at least partially in contact with the reverse side of the suction cup and thus keeps the vacuum chamber between suction cup and vehicle component from opening and the connection from being released. For demounting the holding means the user merely needs to bring the actuator back into its starting position, so that the pressing element simultaneously is moved into the unlocking position.

This means that the moving of the actuator from the final position into the starting position may also cause a movement of the pressing element into its unlocking position. Thus the pressing element at little effort can be moved back into its unlocking position. The demounting of the holding means thus is particularly simple; the user merely needs to move the actuator into the starting position and to detach the suction cup from the vehicle component.

The actuator – or a control element – preferably is a component which is separate or different from the pressing element.

In one embodiment, the pressing element can be moved relative to the suction cup in a direction perpendicular to the surface of the vehicle component. In other words, the pressing element can be moved relative to the suction cup perpendicularly to a plane which is defined by an opening of the suction cup. On the one hand the holding means thus has a particularly compact set-up; on the other hand thus a reliable locking of the connection is also facilitated, because the pressing element can be brought into even contact at least with an edge of the reverse side of the suction cup or the forces can be evenly distributed across the edge of the reverse side of the suction cup.

It proves particularly advantageous if the actuator can be slid forth and back between the starting position and the final position perpendicularly to a relative direction of movement between the pressing element and the suction cup. If the direction of movement of the actuator essentially is perpendicular to the direction of movement of the pressing element, the holding means has a particularly compact design, and valuable construction space can be saved. The actuator namely can be a particularly flat element.

The pressing element can be connected with the basic body. The pressing element can be formed in a single piece with the basic body. The suction cup can be slidably mounted via a bearing to the pressing element. Such design is particularly cost-saving and allows for a firm arrangement of the suction cup on the pressing element as well as a reliable movability of the suction cup relative to the pressing element.

The bearing can have a guidance on the one hand and a bearing pin slidably mounted within the guidance on the other hand. In particular the bearing pin is an integral part of the suction cup, whilst the guidance is preferably formed in the pressing element.

It is particularly advantageous, if the actuator has a guidance, too. Then the bearing pin can also be slidably mounted within the guidance of the actuator. One and the same bearing pin can thus be mounted on the one hand within the guidance of the pressing element and on the other hand also in the guidance of the actuator. In this way components can be saved, as the bearing pin is a pin shared between the guidance of the actuator and the guidance of the pressing element. The guidance of the actuator preferably extends – at least partly – in essence perpendicularly to the guidance of the pressing element. Thus a movement of the actuator perpendicularly to the direction of movement of the pressing element relative to the suction cup is facilitated.

The guidance of the actuator can have a slant – namely a slanted section. Thus, it is facilitated that upon sliding the actuator relative to the pressing element the bearing pin is moved within the pressing element and thus also the suction cup relative to the pressing element. A linear sliding of the actuator thus causes an equally linear, perpendicular sliding of the suction cup relative to the pressing element. Such mechanism is particularly robust and reliable, as well as compact.

The basic body is designed for bearing the electronic device. The electronic device may be for instance a mobile phone (smart phone). But it may equally as well be a navigation device, a PDA (personal digital assistant) or the like.

In one embodiment, the basic body also has an additional fastener, which is designed for fastening a further electronic device. In particular the fastening device is designed for fastening a camera to the basic body. The fastening device may have a recess formed in the basic body, in which then a pin of the further device (in particular the camera) can be received. In the recess also a magnetic element – for instance a magnet – may be provided, which can be connected to a corresponding magnetic counter piece – such as for instance a metallic element – of the further device. Such magnetic connection holds the further device particularly reliably to the holding device.

Further features of the invention appear from the claims, the figures and the description of figures. All of the features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the description of figures and/or shown in the figures alone are usable not only in the respectively specified combination, but also in other combinations or else alone.

Now, the invention is explained in more detail by way of individual preferred embodiments as well as with reference to the attached drawings.

There show:

- Fig. 1 a schematic and perspective view of a system comprising a mobile phone, a camera, and a holding means according to one embodiment of the invention;
- Fig. 2 a schematic and perspective view of a reverse side of a carrier or holder to which the mobile phone is fixed;
- Fig. 3 a schematic and perspective view of a front side of the holder according to Fig. 2;
- Fig. 4 a schematic and perspective view of the holding means according to Fig. 1 and the camera, wherein a fastener for fastening the camera is described in detail;
- Fig. 5 a schematic and perspective sectional view of a fastening unit, which serves for fastening the holding means to a windscreen of a vehicle, and
- Fig. 6 a schematic view of the fastening unit according to Fig. 5, wherein an actuator is in a final position and a pressing element is in a locking position.

In Fig. 1 a system according to one embodiment of the invention is shown. It includes a mobile phone 1, which is an electronic device. The mobile phone 1 has a reverse side 2, as well as a front side 3, on which a touch screen is arranged. The mobile phone 1 can be operated by means of the touch screen. Alternatively, also a navigation device or a PDA can be employed.

For fastening the mobile phone 1 to a windscreen 4 (see Figs. 5 and 6), a holding means 5 is provided. The holding means 5 includes a basic body 6, which in general serves for bearing the mobile phone 1. The basic body 6 comprises a rectangular and sheet-like

holder 7, as well as an arm 8, which is hinged via a ball joint 9 to a reverse side 10 of the holder 7. The holder 7 thus can be moved relative to the arm 8 in a number of degrees of freedom.

The holder 7 is designed for holding or carrying the mobile phone 1; the mobile phone 1 can be attached to the holder 7.

The holding means 5 is fixed by means of a suction cup 11 to the windscreen 4, the suction cup 11 being an integral part of a fastening unit for fastening the basic body 5 to the windscreen. The suction cup 11 is a rubber element and allows for mounting the holding means 5 to the windscreen 4. The suction cup 11 in essence has the shape of a circle or a disk. If the suction cup 11 is pressed against the windscreen 4, a vacuum chamber is formed between the suction cup 11 on the one hand and the windscreen 4 on the other hand, and the holding means 5 is held to the windscreen 4 due to an air pressure, which acts upon the suction cup 11.

To the arm 8 also a camera 12 can be fastened, which can be switched on and off again by means of a push button 13.

At the basic body 6 moreover an actuator 14 is movably arranged, the function of which is set out in further details further below.

In Fig. 2 the reverse side 10 of the holder 7 with the mobile phone 1 mounted thereon is shown in more detail. On the reverse side 10 of the holder 7 two operating buttons 15, 16 are arranged opposite to each other, which for example serve for adjusting the volume of an acoustic signal output by the mobile phone 1. Through pushing the operating button 15 the volume can be raised; through pushing the operating button 16 the volume can be lowered. At the holder 7 a connecting part 17 is pivotably mounted which has an electronic interface – such as a plug – for connecting the mobile phone 1. This electronic interface may be a standard interface. At the connecting part 17 a further operating button 18 is arranged, which can be pushed in the direction of the holder 7, namely as shown by arrow 19. By means of this operating button 18 a further function of the mobile phone 1 can be performed. The operating button 18 can for example be a hard key for applications of the mobile phone 1.

The connecting part 17 is in the form of a hook pivotably mounted on the holder 7. The connecting part 17 in this set-up can be pivoted about a pivot axis extending in parallel to an edge of the holder 7 adjacent to the connecting part 17.

In Fig. 3 a front side 20 of the holder 7 is shown (without the mobile phone 1). On the front side 20 a further suction cup 21 is arranged, which is designed for attaching the mobile phone 1 to the holder 7. For attaching the mobile phone 1 to holder 7 the mobile phone 1 is pressed with its reverse side 2 against the suction cup 21. For releasing this connection the user merely needs to push two actuating elements 22, 23 arranged at opposing longitudinal edges of the holder 7. Then the suction cup 21 is deformed and the mobile phone 1 can be detached from the holder 7 again. Before the mobile phone 1 is pressed against the suction cup 21, it is first of all connected to the above-named electronic interface (referred to as 24 in Fig. 3), which protrudes from the angled connection part 17 and points in the direction towards the suction cup 21.

On the connection part 17 moreover an LED 25 is arranged, which for instance can laminate when the mobile phone 1 is connected to the interface 24.

Making reference to Fig. 4 the fastening of the camera 12 to the arm 8 of the basic body is described in more detail. The arm 8 has an essentially cylindrical fastening portion 26. At one side of the fastening portion 26 there is the suction cup 11 for fastening the holding means 5 to the windscreen 4; at the opposite side a recess 27 is formed in the fastening portion 26, in which an end portion of a pin 28 of the camera 12 can be received. If the pin 28 is received in the recess 27, a magnetic force acts, which holds the pin 28 within the recess 27. A magnet here can either be arranged on the side of the pin 28 or else within the recess 27.

Presently, the interest is focussed on the fastening of the holding means 5 to the windscreen 4 of the vehicle. Making reference to Figs. 5 and 6 this fastening is explained in more detail. A pressing element 29 is connected to the arm 8 or the fastening portion 26 (see Fig. 4). The pressing element 29 can be rigidly connected to the arm 8. The pressing element 29 can be formed as a single piece with the arm 8 or the fastening portion 26. The suction cup 11 is slidably mounted on the pressing element 29 and thus can be moved relative to the pressing element 29. In other words also the pressing element 29 can be moved relative to the pressing element 29. This movement is effected in a direction perpendicular to the surface of the windscreen 4, namely as shown by arrow 30. For this purpose the pressing element 29 has a guidance 31 shown in Figs. 5

and 6 by a broken line and formed longitudinally perpendicular to the surface of the windscreen 4, in which guidance 31 a bearing pin 32 of the suction cup 11 is slidably guided.

The pressing element 29 can be moved back and forth between an unlocking position shown in Fig. 5 and a locking position shown in Fig. 6. In the unlocking position the pressing element 29 is removed and spaced from the reverse side 33 of the suction cup 11. In the locking position – on the other hand – the pressing element 29 is in contact with the reverse side 33, and this at least at the radial edge portion of the reverse side 33. The pressing element 29 in one embodiment can be brought into contact with the major part of the surface of the reverse side 33.

The side of the pressing element 29 facing the reverse side 33 of the suction cup 11 can be adapted to the shape of the reverse side 33 of the suction cup 11. Thus the pressing element 29 can be brought fully or across the complete surface into contact with the reverse side 33. For moving the pressing element 29 between the unlocking position and the locking position the above-named actuator 14 is provided (see Fig. 1). The actuator 14 equally has a guidance 34, which extends essentially perpendicular to the guidance 31 of the pressing element 29. The guidance 34 has a first section 35, which extends perpendicular to the guidance 31 and in parallel to the windscreen 4. The guidance 34 moreover has a second section 36, which equally extends in parallel to the windscreen 4 and thus in parallel to the first section 35, however is offset relative to the first section 35. Between the first and the second section 35, 36 the guidance 34 has a slant 37, which extends at an angle of more than 0° and less than 90° relative to the guidance 31. Equally, the bearing pin 32 of the suction cup 11 is slidably guided within the guidance 34. The slant 37 in this set-up causes that the moving of the actuator 14 from a starting position shown in Fig. 5 into a final position shown in Fig. 6 (as shown by arrow 38) causes a movement of the pressing element 29 from the unlocking position into the locking position. In the starting position of the actuator 14 (Fig. 5) the bearing pin 32 is positioned in the second section 26 of the guidance 34. In the final position (Fig. 6), though, the bearing pin 32 is positioned in the first section 35 of guidance 34.

The guidance 31 on the one hand and the bearing pin 32 on the other hand overall form a bearing, via which the suction cup 11 is slidably arranged on the pressing element 29. Accordingly, also the guidance 34 of the actuator 14 on the one hand and the bearing pin 32 on the other hand form a bearing, by means of which the actuator 14 can be

moved relative to the pressing element 29 and relative to the suction cup 11 between the starting position and the final position.

This means that the actuator 14 can be moved relative to the pressing element 29 in a direction perpendicular to the direction of movement of the pressing element 29. Upon moving the actuator 14 it slides with its bottom side 39 along a top side 40 of the pressing element 29. The relative direction of movement between the actuator 14 and the pressing element 29 thus is perpendicular to the relative direction of movement between the pressing element 29 and the suction cup 11.

The holding means 5 can be mounted to the windscreen 4 as follows: The user takes the holding means 5 and presses the suction cup 11 against the windscreen 4 in the interior of the vehicle. The air is sucked out from a clearance between the suction cup 11 and the windscreen and a vacuum chamber is formed between the suction cup 11 and the windscreen 4. Now an air pressure acts on the suction cup 11 on the part of the ambience. A connection between the suction cup 11 and the windscreen 4 is thus made. In order to avoid an undesired releasing of this connection, the user slides the actuator 14 from the starting position shown in Fig. 5 into the final position according to Fig. 6, so that the pressing element 29 is brought into contact with the reverse side 33 of the suction cup 11. The pressing element 29 in this position covers the major part of the surface of the reverse side 33, at least the radial edge portion of the reverse side 33. Thereby the vacuum chamber between the suction cup 11 and the windscreen 4 is kept from opening and the connection from being released. For demounting the holding means 5 the user will move the actuator 14 from the final position according to Fig. 6 into the starting position according to Fig. 5, so that the pressing element 29 is removed from the reverse side 33 of the suction cup 11. Now the suction cup 11 can be removed from the windscreen 4 at little effort.

Claims

1. A holding means (5) for holding an electronic device (1, 12) to a vehicle component (4), in particular a windscreen of a vehicle, the holding means (5) comprising a basic body (6) for carrying the electronic device (1, 12) as well as a suction cup (11) for attaching the basic body (6) to the vehicle component (4), characterized by
 - a pressing element (29) movable relative to the suction cup (11) between an unlocking position and a locking position in which the pressing element (29) at least partly is brought into contact with a reverse side (33) of the suction cup (11) facing away from the vehicle component (4), and
 - an actuator (14) movable by a user between a starting position and a final position and which upon moving into the final position causes a movement of the pressing element (29) into its locking position.
2. A holding means (5) according to claim 1, characterized in that the actuator (14) upon moving into the starting position causes a movement of the pressing element (29) into its unlocking position, in which the pressing element (29) is arranged spaced apart from the reverse side (33) of the suction cup (11).
3. A holding means (5) according to claim 1 or 2, characterized in that the pressing element (29) is movable relative to the suction cup (11) in a direction (30) perpendicular to a surface of the vehicle component (4).
4. A holding means (5) according to any one of the preceding claims, characterized in that the actuator (14) is slidable perpendicularly to a relative direction of movement (30) of the pressing element (29) relative to the suction cup (11) back and forth between the starting position and the final position.

5. A holding means (5) according to any one of the preceding claims, characterized in that the pressing element (29) is connected to the basic body (6) and the suction cup (11) is mounted slidably via a bearing (31, 32) on the pressing element (29).
6. A holding means (5) according to claim 5, characterized in that the bearing (31, 32) has a guidance (31) on the one hand and a bearing pin (32) mounted within a guidance (31) on the other hand.
7. A holding means (5) according to claim 6, characterized in that the actuator (14) has a guidance (34), wherein a bearing pin (32) is also slidably mounted within the guidance (34) of the actuator (14).
8. A holding means (5) according to claim 7, characterized in that the guidance (34) of the actuator (14) has a slant (37), by means of which upon moving of the actuator (14) the bearing pin (32) is slidable within the guidance (31) of the pressing element (29).
9. A holding means (5) according to any one of the preceding claims, characterized in that the basic body (6) is formed for bearing a mobile phone (1) as an electronic device.
10. A holding means (5) according to any one of the preceding claims, characterized in that the basic body (6) has a fastener for fastening a further electronic device, in particular a camera (12).
11. A holding means (5) according to claim 10, characterized in that the fastener has a recess (27) formed in the basic body (6) for receiving a corresponding pin (28) of the further device.

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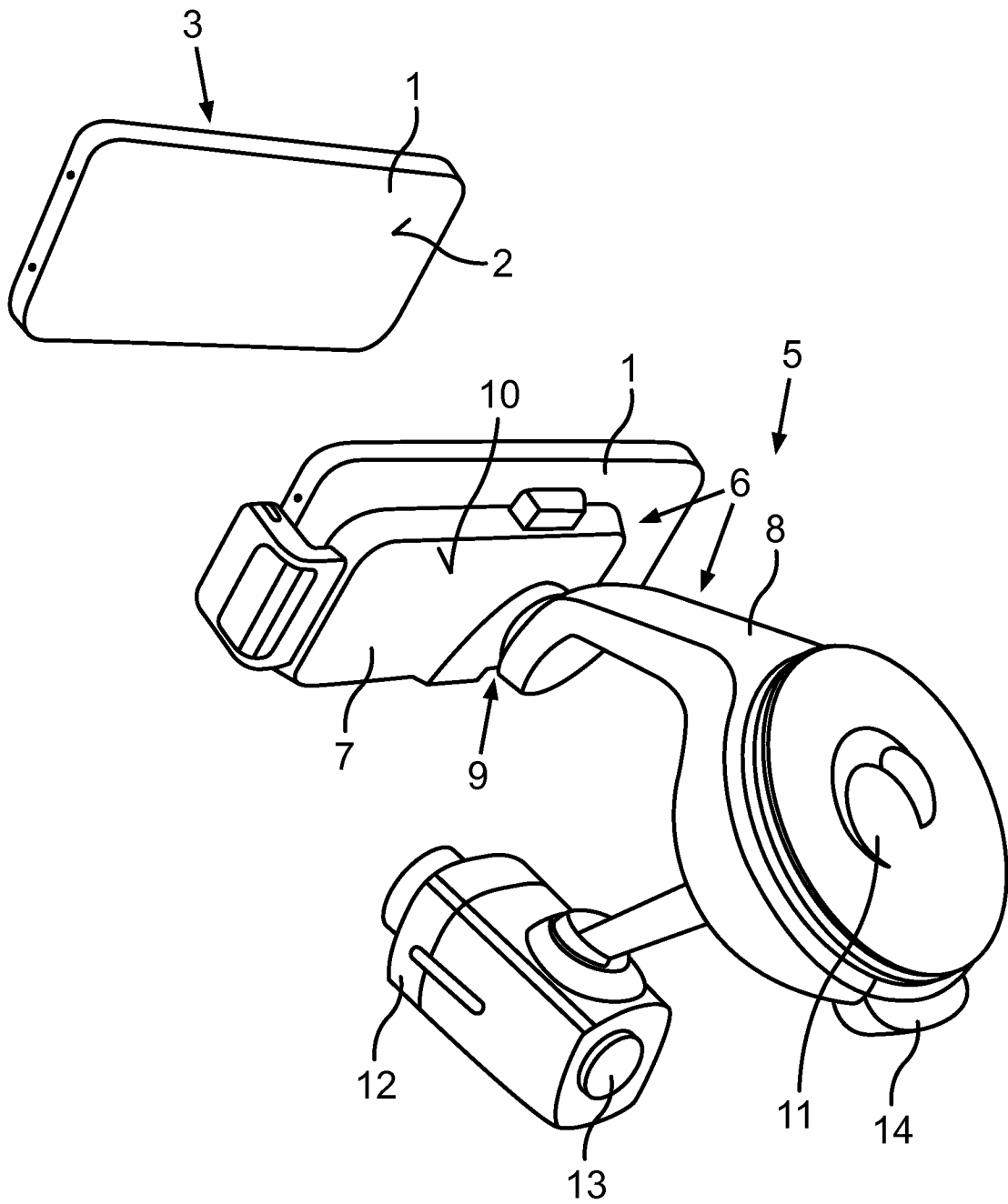


Fig.1

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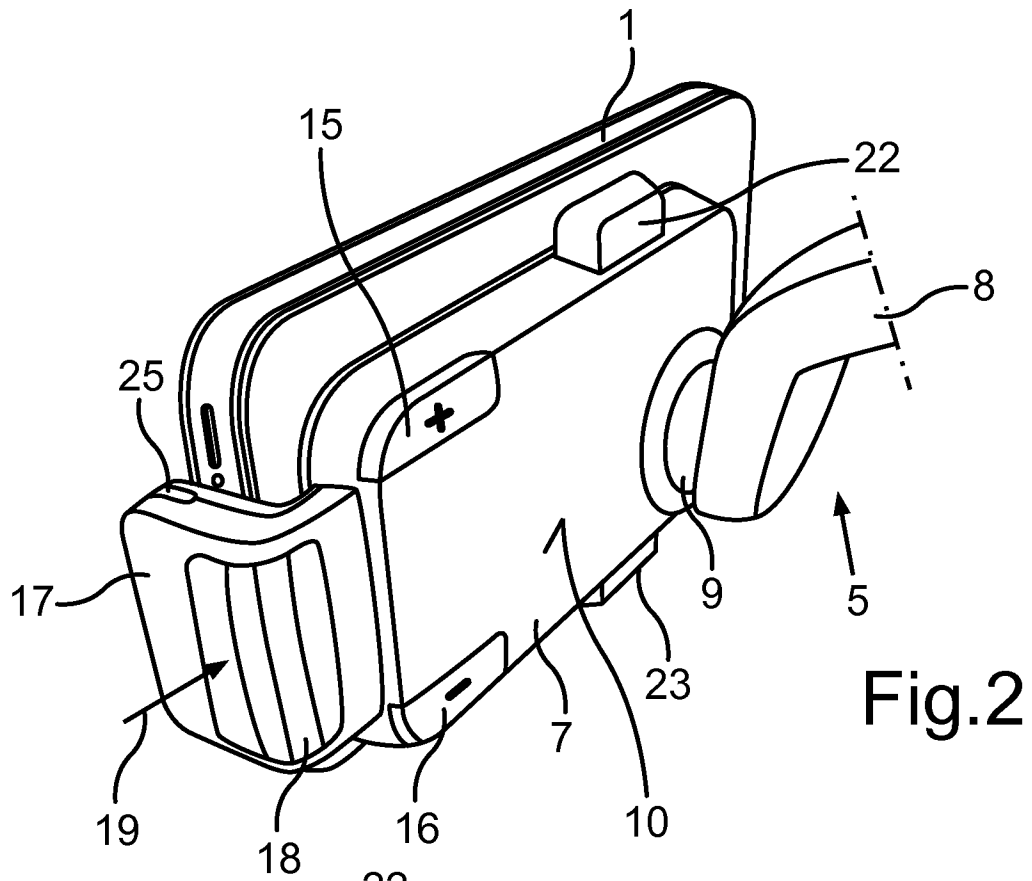


Fig.2

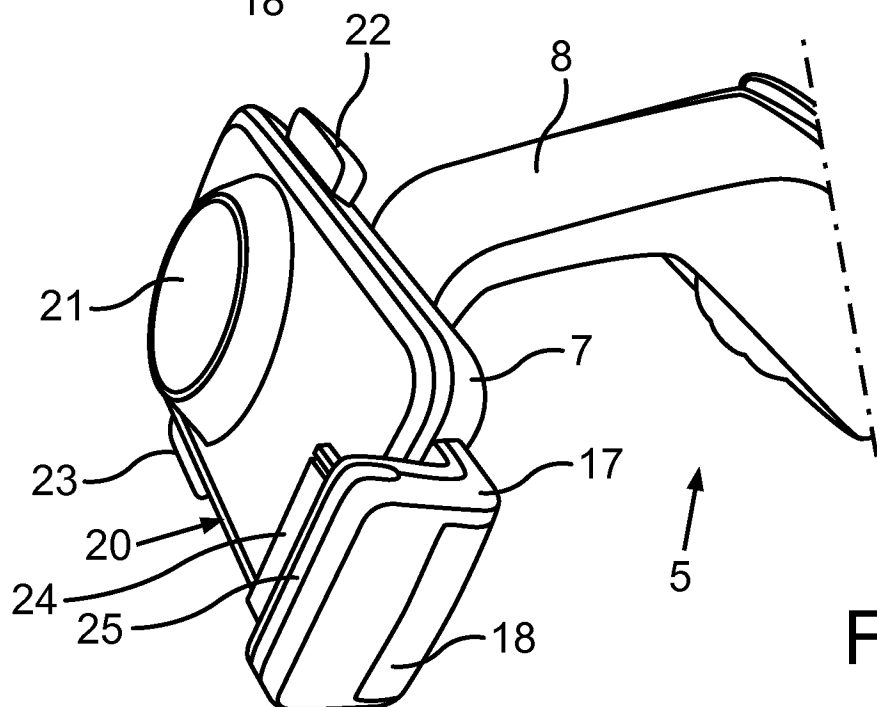


Fig.3

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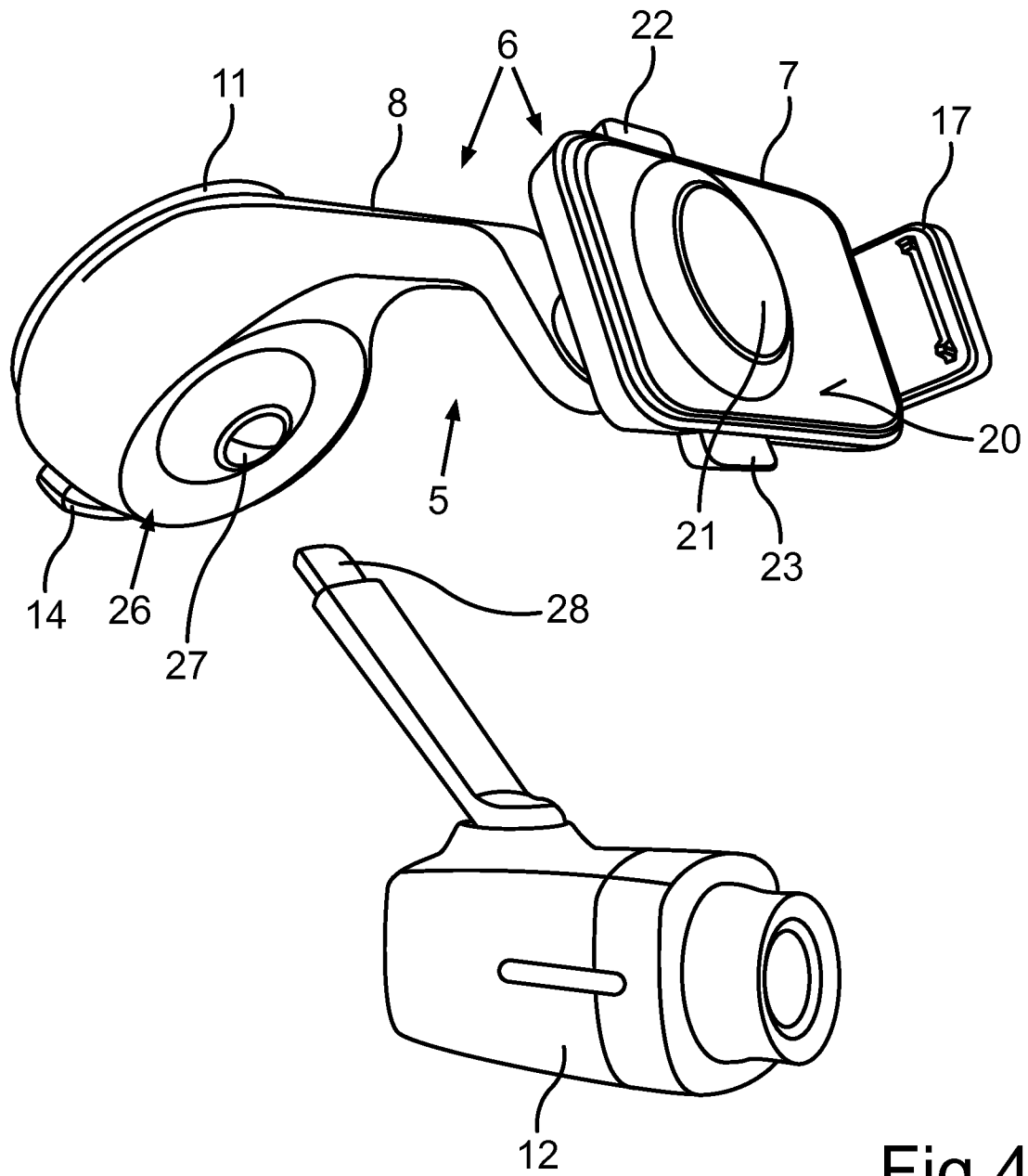


Fig.4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/058968

A. CLASSIFICATION OF SUBJECT MATTER

INV. B60R11/02 B60R11/04 F16B47/00 F16M13/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60R F16B F16M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 881 257 A1 (BURY SP ZOO [PL]) 23 January 2008 (2008-01-23) paragraphs [0001], [0002], [0013], [0022]; claim 1; figures 1,4 -----	1-11
X	DE 20 2008 011798 U1 (CHANG TA SHUO [TW]) 11 December 2008 (2008-12-11) figures 1-6 -----	1-3,9
X	US 2009/294608 A1 (BRASSARD PAUL [US]) 3 December 2009 (2009-12-03) paragraphs [0033] - [0035]; figure 5 -----	1-3,9
X	EP 1 964 723 A2 (LG ELECTRONICS INC [KR]) 3 September 2008 (2008-09-03) figures 3-5b -----	1-3,9



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

17 January 2012

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24/01/2012

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/058968

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1881257	A1	23-01-2008	EP 1881257 A1	23-01-2008
			US 2008302946 A1	11-12-2008

DE 202008011798	U1	11-12-2008	NONE	

US 2009294608	A1	03-12-2009	NONE	

EP 1964723	A2	03-09-2008	EP 1964723 A2	03-09-2008
			US 2008217826 A1	11-09-2008
