

MOUNTING ASSEMBLY

FIELD OF THE INVENTION

The present invention is related to mounting assemblies. In particular, the
5 present invention is related to mounting assemblies for rotatable objects.

BACKGROUND OF THE INVENTION

Hinges and joints are available for objects to be reversibly rotated and
fixed into an intermediate position. These include mechanisms for couches
10 and sofas which allows for a sitting and a lying down position, and several
intermediate positions. These rotating mechanisms and joints, however, are
complicated and bulky, and are not useful for application in small, light
objects, such computers and telephones. Specifically, it is desirable to have
rotatable panels or hubs on computers housing which are user-friendly and
15 attractive to the consumer. This panel should ideally be fitted onto the CPU
housing and only pulled out into an extended position when required. Due to
the limited amount of space in the housing, there is a need to develop a
mounting assembly which is space-saving and durable.

OBJECT OF THE INVENTION

It is therefore an object of the present invention to provide a mounting assembly to overcome the shortcomings as stated above.

It is another object to provide a mounting assembly which allow rotation of
5 the mounted object.

It is a further object to provide a mounting assembly which allows the mounted object to be fixed in an intermediate rotated position.

SUMMARY OF THE INVENTION

10 The present invention is a mounting mechanism or assembly which allows a device to be rotatably attached to a main housing such that the device may be kept flush against the wall of the housing when not in use, and pulled out into a jutting position for easy access when in use. The mounting mechanism makes use of frictional forces to prevent the device from being pushed back
15 into the housing under normal use. The back of the device comprises a generally convex surface with at least one fastening member and at least one resilient brake member. The brake member is attached at one side to the convex surface, with an opposing second side provided with a rounded protrusion. The convex surface of the back panel of the device is adapted to
20 fit into a concave recess in the housing. The concave recess is provided with engaging means wherewith the fastening member can slidably engage. Retaining means with at least one cavity is provided on the concave recess

for engaging the protrusion of the brake member to create friction when the device is attached or rotated within the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

- 5 Figure 1 is a front perspective view of the computer housing according to one embodiment of the present invention.

Figure 2A is a perspective view of the back of the hub according to one embodiment of the present invention, with the brake member and the fastening member shown in greater detail in Figures 2B and C respectively.

- 10 Figure 3 is a front perspective view of the computer housing without the hub.

Figure 4A is the front view of the computer housing. 4B-E are the cross-sectional views across lines A-A, B-B, C-C and D-D respectively.

Figure 5 is a front view of the hub. Figure 5B-D are cross-sectional views across lines E-E, F-F and G-G respectively.

- 15 Figure 6 is a front view of the housing with the hub attached. Figures 6B-C are cross-sectional view of lines H-H and I-I respectively.

DESCRIPTION OF THE INVENTION

In the preferred embodiment, the device is a hub which can be used as an internet phone, an analog phone, a modem-telephony device or a personal computer quick access panel. Figure 1 shows an example of a hub
5 **20** and hub housing **22** in accordance with the present invention. The front panel of the hub contains control and dialing buttons **24** for operations performed by the user. In this drawing, the hub is pulled up and out from the housing at an angle such that the front panel is facing upwards for easy access to the user. The housing contains a recessed chamber **26** to allow
10 the hub to be rotated back into the housing when not in use.

Figure 2 shows the back of the hub with the convex surface **28** disposed on one end. Two fastening members **30** are provided on the two sides of the concave surface with the brake member **32** in between. In this embodiment, the fastening member **30** (as shown in Fig. 2C), is a ridge-like structure **34**
15 with an internal hollow to provide a channel **38**. The brake member **32** (as shown in Figure 2B) comprises a resilient, narrow, elongated sheet of hard plastic **40** which is attached to the body of the hub at one side. The other opposing side of the sheet is provided with a rounded protrusion **42**, which is in the most preferred embodiment is semi-cylindrical. Resilience for the
20 brake member is provided in this embodiment with a longitudinal gap **44** and side gaps **46** between the sheet and the convex body of the hub along and adjacent to the protrusion. With this gap, the sheet is only attached to the body of the hub on one side, such when pressure is applied to the protrusion

the sheet can flex. The resilient sheet may also be made from metal or another rigid material, in combination with the gaps.

Figure 3 shows the housing in greater detail with the device detached. In this example, engaging means **50** are provided on the two sides of the semi-cylindrical concave surface **51** with retaining means **52** provided in the center.

Figure 4 shows the features of the housing in greater detail. The cavity of the retaining means in the most preferred embodiment is a series of elongated troughs aligned in parallel with their longitudinal axis parallel to the axis of rotation of the device. Figure 4B is a cross-sectional view of the retaining means showing the concave surface **51** and the troughs **54**. The housing is also provided with engaging means **56** with the cross-section shown in Figure 4E. A rib structure **58** with a catch **60** at the end is used to engage the ridge-like structure **34** of the hub. Additional locking features such as a sliding guide **62** shown in Figures 4C and D secures the hub onto the housing when the hub is rotated. The sliding guide **62** will start to engage the ridge-like structure **34** when the hub is rotated more than a few degrees e.g. 9 degree. Before the hub is rotated, catch **60** provides the locking effect. Beyond a certain angle of rotation, the ridge-like structure **34** will no longer be in contact with the catch anymore. From that point onwards, the sliding guide alone will serve to guide the sliding movement. The catch needs to be flexible in order for the ridge-like structure **34** to snap in.

Figure 5 shows further details of the preferred embodiment of the present invention illustrating how the hub **20** may be attached to the housing. Figure

5B shows how the semi-cylindrical protrusion **42** of the brake member **32** interacts with the troughs **54** of the retaining means to create friction. The protrusion engages a trough fittingly due to the resilience of the slightly curved (concave) sheet **40** which is biased towards the housing. When the user wants to rotate the hub outward, a downward and outward force is exerted such that the protrusion slides to a lower trough. Figure 6B further illustrates how the direction of the force (shown by arrow **62**) which is exerted when the control buttons are pressed are substantially axial to the curve of hub and housing, while the force (shown by arrow **64**) which needs to be exerted to overcome frictional forces in order to rotate the hub is in a substantially tangential direction relative to the concave surface. The forces exerted is particularly different if the control buttons are localized near the center of rotation of the hub. If greater frictional force is required, a thin layer of material which can provide friction may be added to the cavity of the retaining means. For example, the plurality of troughs may be lined with a thin layer of rubber of 0.1 -1mm thick to provide additional friction to prevent the cylindrical protrusion from sliding too easily against the retaining means.

Figures 6A and 6C gives further details of how the fastening member interacts and engages the engaging means. Figure 5C is an enlarged cross-sectional view of the fastening member **30** engaged to the engaging means **50** of the hub. The ridge-like structure of the engaging means is pressed into channel **38** of the fastening means and catch **60** secures the two parts together. Figure 5C shows the sectional view of the hub engaged to the hub-housing at the zero degree turn. The catch is catching onto the ridge-like structure **34** of the hub. When the hub rotates, the ridge-like structure will

move along the concave surface until it engages the sliding guide 62. The sliding guide serves and guides the sliding movement. It is a reinforcement to the catch, which is flexible in order for the ridge-like structure 34 to snap in.

For a hub which is used as a control panel or telephone panel made of
5 ABS plastic, the length 48 of the side gaps as shown in Figure 2B is preferably 4-7mm. The most preferred length is 5mm. For other materials and applications, other dimensions of the gaps or other forms of braking element may be used to provide a measure of resilience, and is within the knowledge of one in the art in the light of the teaching provided herewith.

10 Two fastening member are preferably provided for balance and symmetry. In the most preferred embodiment, as shown in the Figures above, the retaining means and brake member are provided in the center with a fastening member on each of the two sides. Although the embodiment described above shows the brake member disposed on the convex surface,
15 and the retaining means disposed on the corresponding concave surface, it would be understood that their positions may be interchanged.

While the present invention has been described particularly with references to Figs 1 to 5 with emphasis on a mechanism for rotating a control panel, it should be understood that the figures are for illustration only and
20 should not be taken as limitation on the invention. In addition it is clear that the apparatus of the present invention has utility in many applications where rotatable joints are required. It is contemplated that many changes and modifications may be made by one of ordinary skill in the art without departing from the spirit and the scope of the invention described.

CLAIMS

- 1 1. A mounting assembly for rotatably mounting a device comprising :
- 2 a device with a back panel, the back panel having at least one
- 3 generally convex surface provided with at least one fastening member
- 4 and at least one resilient brake member, said brake member provided
- 5 with a protrusion; and
- 6 a housing for said device having a concave recess for complementary
- 7 alignment to said convex surface of said device, said housing having
- 8 engaging means for sliding engagement with said fastening member,
- 9 said concave recess further having retaining means with at least one
- 10 cavity for engaging the protrusion of the brake member to provide
- 11 friction when the device is attached to or rotated within the housing.
- 1 2. A mounting assembly according to claim 1 wherein the brake member
- 2 further comprises a resilient sheet having one side attached to the
- 3 convex surface and an opposing side provided with said protrusion.
- 1 3. A mounting assembly according to claim 2 wherein the protrusion has
- 2 a generally cylindrical shape with the longitudinal axis parallel to the
- 3 axis of rotation of the device.
- 1 4. A mounting assembly according to claim 3 wherein the cavity of the
- 2 retaining member is a trough adapted for receiving and engaging the
- 3 protrusion.



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- 1 5. A mounting assembly according to claim 4 wherein a plurality of
2 troughs aligned in parallel are provided on the concave recess of the
3 housing, such that the device may be rotated and fixed at any position
4 where the protrusion engages a trough.
- 1 6. A mounting assembly according to claim 4 wherein the trough is lined
2 with a thin layer of material which creates friction.
- 1 7. A mounting assembly according to claim 6 wherein the layer of
2 material is rubber.
- 1 8. A mounting assembly according to claim 1 wherein the fastening
2 means comprises a channel, and the engaging means comprises a
3 rib with a catch adapted for insertion into the channel.
- 1 9. A mounting assembly according to claim 8 wherein the channel is
2 elongated with the longitudinal axis running along the convex surface
3 of the housing in the direction of rotation of the device.
- 1 10. A mounting assembly according to claim 1 wherein the housing and
2 the device are made from plastic.
- 1 11. A mounting assembly according to claim 1 wherein the concave and
2 convex surfaces are generally round shaped.
- 1 12. A mounting assembly according to claim 1 wherein the concave and
2 convex surfaces are semi-cylindrical in shape.
- 1 13. A mounting assembly according to claim 1 wherein the convex
2 surface is disposed on one end of the back panel.



1 14. A mounting assembly according to claim 1 wherein one fastening
2 member is provided in the center of said convex surface, said
3 engaging means are provided on two sides of said fastening member,
4 the two sides being lateral to the axis of rotation.

1 15. A mounting assembly for rotatably mounting a device comprising :
2 a device with a back panel, the back panel having at least one
3 generally convex surface provided with at least one fastening member
4 and at least one retaining means with at least one cavity; and
5 a housing for said device having a concave recess for complementary
6 alignment to said convex surface of said device, said housing having
7 engaging means for sliding engagement with said fastening member,
8 said concave recess further having at least one resilient brake
9 member, said brake member provided with a protrusion for engaging
10 the cavity of the retaining means to provide friction when the device is
11 attached to or rotated within the housing.

