

# US Patent & Trademark Office

## Patent Public Search | Text View

---

United States Patent	12388215
Kind Code	B2
Date of Patent	August 12, 2025
Inventor(s)	Chang; Kuang-Yeh et al.

---

### Electronic device and assembly thereof

---

#### Abstract

An electronic device includes a casing and an electronic assembly. The casing has an opening between a first side surface and a second side surface parallel to each other, and the opening has a first side edge and a second side edge opposite to each other. The electronic assembly is assembled in the casing, and includes a body, a connecting portion, and a waterproof ring. The connecting portion is arranged on one side of the body. The waterproof ring includes an outer ring, an inner ring, and two blocking portions. The outer ring is a closed ring, and is arranged around an outer surface of the connecting portion. The inner ring is arranged on the outer surface of the connecting portion and is closer to the body than the outer ring. The two blocking portions are each connected to the outer ring and the inner ring.

---

<b>Inventors:</b>	<b>Chang; Kuang-Yeh (Taipei, TW), Chang; Juei-Chi (Taipei, TW)</b>
<b>Applicant:</b>	<b>Getac Technology Corporation (New Taipei, TW)</b>
<b>Family ID:</b>	<b>1000008752211</b>
<b>Assignee:</b>	<b>Getac Technology Corporation (New Taipei, TW)</b>
<b>Appl. No.:</b>	<b>18/136273</b>
<b>Filed:</b>	<b>April 18, 2023</b>

#### Prior Publication Data

<b>Document Identifier</b>	<b>Publication Date</b>
US 20240106159 A1	Mar. 28, 2024

#### Foreign Application Priority Data

CN	202310147992.X	Feb. 22, 2023
----	----------------	---------------

#### Related U.S. Application Data

**Publication Classification****Int. Cl.:** H01R13/52 (20060101); G06F1/16 (20060101)**U.S. Cl.:****CPC** H01R13/5202 (20130101); G06F1/1656 (20130101);**Field of Classification Search****CPC:** H01R (13/5202); G06F (1/1635)**USPC:** 174/50.52

---

**References Cited****U.S. PATENT DOCUMENTS**

<b>Patent No.</b>	<b>Issued Date</b>	<b>Patentee Name</b>	<b>U.S. Cl.</b>	<b>CPC</b>
4795173	12/1988	Osborne	277/467	F16J 15/56
8089757	12/2011	Chen et al.	N/A	N/A
8454101	12/2012	Kuo	N/A	N/A
9772658	12/2016	Hsu	N/A	N/A
10199763	12/2018	Zhu et al.	N/A	N/A
10468812	12/2018	Lee et al.	N/A	N/A
11296470	12/2021	Mizrahi	N/A	H01R 13/631
11733737	12/2022	Lee	361/679.02	G06F 1/1684
11876329	12/2023	Mizrahi	N/A	H01R 13/631
12152708	12/2023	Mitchell	N/A	F16B 7/0426
2010/0099279	12/2009	Homme et al.	N/A	N/A
2012/0238147	12/2011	Matsumoto	439/660	H01R 13/512
2017/0084891	12/2016	Lu	N/A	H01M 50/267
2019/0348806	12/2018	Mizrahi	N/A	G06F 1/1656
2020/0161800	12/2019	Liao	N/A	H01R 13/5219
2021/0313734	12/2020	Gohda et al.	N/A	N/A
2022/0209479	12/2021	Mizrahi	N/A	G06F 1/1632
2023/0262909	12/2022	Lee	312/223.1	G06F 1/181

**FOREIGN PATENT DOCUMENTS**

<b>Patent No.</b>	<b>Application Date</b>	<b>Country</b>	<b>CPC</b>
107437595	12/2016	CN	N/A
114981134	12/2021	CN	N/A
2014150017	12/2013	JP	N/A
M444538	12/2012	TW	N/A
2010027565	12/2009	WO	N/A

---

## Background/Summary

CROSS-REFERENCES TO RELATED APPLICATIONS (1) This application claims the benefit of U.S. provisional application Ser. No. 63/410,571, filed on Sep. 27, 2022 and claims the priority of Patent Application No. 202310147992.X filed in China, P.R.C. on Feb. 22, 2023. The entirety of the above-mentioned patent applications are hereby incorporated by references herein and made a part of the specification.

## BACKGROUND OF THE INVENTION

### Technical Field

(1) The present invention relates to an electronic device, and in particular, to an electronic device with a waterproof assembly.

### Related Art

(2) Due to a casing design of a conventional electronic device, a part of a connecting portion between an electronic assembly and the electronic device may be exposed when the electronic assembly is assembled in the electronic device. As a result, external water may seep into the casing of the electronic device through the exposed part of the connecting portion, resulting in an ineffective waterproof function.

## SUMMARY OF THE INVENTION

(3) In view of the above, an embodiment provides an electronic device, including a casing and an electronic assembly. A casing has an opening between a first side surface and a second side surface parallel to each other. The opening has a first side edge and a second side edge opposite to each other, and the first side edge and the second side edge are obliquely arranged between the first side surface and the second side surface. The electronic assembly is assembled in the casing, and includes a body, a connecting portion, and a waterproof ring. The connecting portion is arranged on one side of the body. The waterproof ring includes an outer ring, an inner ring, and two blocking portions. The outer ring is a closed ring and arranged around an outer surface of the connecting portion. The inner ring is arranged on the outer surface of the connecting portion and is closer to the body than the outer ring. The two blocking portions are each connected to the outer ring and the inner ring. When the connecting portion correspondingly passes through the opening, one side of the outer ring is in close contact with the first side surface, one side of the inner ring is in close contact with the second side surface, one blocking portion is correspondingly located at the first side edge, and the other blocking portion is correspondingly located at the second side edge.

(4) In some embodiments, the other side of the outer ring opposite to the first side surface protrudes from the opening.

(5) In some embodiments, the inner ring has a notch facing a top of the body.

(6) In some embodiments, the two blocking portions are adjacent to the notch.

(7) In some embodiments, when the connecting portion correspondingly passes through the opening, the two blocking portions are located in a range where both the first side edge and the second side edge cover the outer ring.

(8) In some embodiments, the connecting portion has a first surface and a second surface, and the two blocking portions are respectively arranged on two opposite ends and are located in a distance range of two thirds of a distance from the first surface to the second surface.

(9) In some embodiments, the outer ring and the inner ring are arranged at a specific distance.

(10) In some embodiments, the two blocking portions extend in a direction parallel to an axial direction of the outer ring and the inner ring and are connected to the outer ring and the inner ring.

(11) In some embodiments, the two blocking portions extend in a direction oblique to an axial

direction of the outer ring and the inner ring and are connected to the outer ring and the inner ring. (12) An electronic assembly group is further provided, including a body, a connecting portion, and a waterproof ring. The connecting portion is arranged on one side of the body. The waterproof ring includes an outer ring, an inner ring, and two blocking portions. The outer ring is a closed ring and arranged around an outer surface of the connecting portion. The inner ring is arranged on the outer surface of the connecting portion and is closer to the body than the outer ring. The two blocking portions are each connected to the outer ring and the inner ring, and the two blocking portions are respectively located on two opposite ends.

(13) In conclusion, according to the electronic device and the electronic assembly provided in the above embodiments, the waterproof ring with the outer ring and the inner ring is arranged at the connecting portion of the electronic assembly, and the blocking portions are connected to the outer ring and the inner ring. In this way, even if water flows in through either side of the connection portion, the water is stopped by the blocking portions and therefore cannot seep into the casing on the other side, to obtain a waterproof function.

---

## Description

### BRIEF DESCRIPTION OF DRAWINGS

- (1) FIG. 1 is an exploded view of an electronic device according to an embodiment.
- (2) FIG. 2 is a schematic diagram of a casing according to an embodiment.
- (3) FIG. 3 is a schematic diagram of the casing according to an embodiment from another perspective.
- (4) FIG. 4 is a schematic diagram of an electronic assembly according to an embodiment.
- (5) FIG. 5 is a schematic diagram of the electronic assembly according to an embodiment from another perspective.
- (6) FIG. 6 is a side view of the electronic assembly according to an embodiment.
- (7) FIG. 7 is a schematic diagram of an electronic assembly assembled in an electronic device according to an embodiment.
- (8) FIG. 8 is a side view of an electronic assembly according to another embodiment.
- (9) FIG. 9 is a side view of an electronic assembly according to still another embodiment.

### DETAILED DESCRIPTION OF THE INVENTION

(10) Refer to FIG. 1 to FIG. 7. FIG. 1 is an exploded view of an electronic device according to an embodiment. FIG. 2 is a schematic diagram of a casing according to an embodiment. FIG. 3 is a schematic diagram of the casing according to an embodiment from another perspective. FIG. 4 is a schematic diagram of an electronic assembly according to an embodiment. FIG. 5 is a schematic diagram of the electronic assembly according to an embodiment from another perspective. FIG. 6 is a side view of the electronic assembly according to an embodiment. FIG. 7 is a schematic diagram of an electronic assembly assembled in an electronic device according to an embodiment. As shown in FIG. 1, an electronic device **100** includes a casing **110** and an electronic assembly **130**. The electronic device **100** is, for example, a notebook computer or a tablet computer, and the electronic assembly **130** is, for example, a battery assembly, a pluggable hard disk or a pluggable CD-ROM driver, but the present invention is not limited thereto.

(11) As shown in FIG. 2, FIG. 3, and FIG. 7, the casing **110** has a first side surface **111** and a second side surface **112** parallel to each other, and an accommodating slot **114** is formed between the first side surface **111** and the second side surface **112**. The electronic assembly **130** is assembled and accommodated in the accommodating slot **114**, for example. The casing **110** has an opening **113** between the first side surface **111** and the second side surface **112** parallel to each other. The opening **113** has a first side edge **1131** and a second side edge **1132** opposite to each other, and the first side edge **1131** and the second side edge **1132** are obliquely arranged between the first side

surface **111** and the second side surface **112**. Further, the opening **113** is correspondingly arranged on the accommodating slot **114**. The first side surface **111** and the second side surface **112** are two opposite surfaces of the casing **110**, and the first side edge **1131** and the second side edge **1132** extend obliquely from the first side surface **111** and are connected to the second side surface **112**, and form the opening **113** for assembling the connecting portion **132** of the electronic assembly **130**.

(12) As shown in FIG. 2 and FIG. 4, the electronic assembly **130** is assembled in the casing **110** and includes a body **131**, a connecting portion **132**, and a waterproof ring **133**. The connecting portion **132** is arranged on one side of the body **131**. The body **131** of the electronic assembly **130** is assembled and accommodated in the accommodating slot **114** of the casing **110**. The connecting portion **132** is caused to pass through the opening **113** to complete the assembly of the electronic assembly **130** to the casing **110**. Further, the connecting portion **132** of the electronic assembly **130** is, for example, an electrical connecting terminal. The electronic device **100** has another electrical connecting terminal (not shown in the figure). The connecting portion **132** of the electronic assembly **130** may be electrically connected to other electronic components (not shown in the figure) in the electronic device **100** to supply power or transmit data.

(13) As shown in FIG. 4 to FIG. 6, waterproof ring **133** includes an outer ring **1331**, an inner ring **1332**, and two blocking portions **1333**. The waterproof ring **133** with double rings prevents water from seeping into the casing **110** from the outside. Moreover, the waterproof ring **133** with double rings can prevent water from seeping into the electronic assembly **130** from the outside.

(14) The outer ring **1331** is a complete closed ring and arranged around an outer surface of the connecting portion **132**. As shown in FIG. 6, the outer ring **1331** is located at an end far away from the body **131**.

(15) The inner ring **1332** is arranged on the outer surface of the connecting portion **132** and is closer to the body **131** than the outer ring **1331**. As shown in FIG. 6, the inner ring **1332** is an incomplete closed ring.

(16) The two blocking portions **1333** are each connected to the outer ring **1331** and the inner ring **1332**. Although the outer ring **1331** and the inner ring **1332** are arranged at a distance  $d$ , water can be prevented from seeping through the gap between the outer ring **1331** and the inner ring **1332** by the two blocking portions **1333**. A connection position and a connection manner of the two blocking portions **1333** have various implementations, which are detailed later.

(17) When the connecting portion **132** correspondingly passes through the opening **113**, one side **S1** of the outer ring **1331** is in close contact with the first side surface **111**, another opposite side **S2** of the outer ring **1331** protrudes from the opening **113**, one side **S3** of the inner ring **1332** is in close contact with the second side surface **112**, one blocking portion **1333** is correspondingly located at the first side edge **1131**, and the other blocking portion **1333** is correspondingly located at the second side edge **1132**. As shown in FIG. 7, when the electronic assembly **130** is assembled in the casing **110**, the outer ring **1331**, as a complete closed ring, is in close contact with the first side surface **111**. However, since the first side edge **1131** and the second side edge **1132** are obliquely connected to the first side surface **111** and the second side surface **112**, the outer ring **1331** is further in close contact with a part of the first side edge **1131** and a part of the second side edge **1132**, and the side **S2** of the outer ring **1331** corresponding to the second side surface **112** is exposed from the opening **113**. The inner ring **1332**, as an incomplete closed ring, is in close contact with the second side surface **112**. In addition, the two blocking portions **1333** between the outer ring **1331** and the inner ring **1332** are respectively in close contact with the first side edge **1131** and the second side edge **1132**.

(18) In this way, the inner ring **1332** can prevent water from entering the electronic device **100** through the second side surface **112** at the accommodating slot **114**, a part of the first side edge **1131**, and a part of the second side edge **1132**, water about to enter in a direction of the first side surface **111** at the accommodating slot **114** is stopped by the outer ring **1331** and the two blocking

portions **1333**, the outer ring **1331** can prevent water from entering the electronic device **100** through the first side surface **111**, a part of the first side edge **1131**, and a part of the second side edge **1132**, and the two blocking portions **1333** can prevent water from entering through the first side edge **1131** and the second side edge **1132**. In another embodiment, the outer ring **1331** can prevent water from entering through the first side surface **111**, a part of the first side edge **1131**, and a part of the second side edge **1132**, and water about to enter in a direction of the second side surface **112** is stopped by the inner ring **1332** and the two blocking portions **1333**.

(19) Specifically, since the waterproof ring **133** with the outer ring **1331** and the inner ring **1332** is arranged at the connecting portion **132** of the electronic assembly **130**, and the blocking portions **1333** are connected to the outer ring **1331** and the inner ring **1332**, not only the inner ring **1332** prevents water from seeping from the outside of the electronic device **100**, but also the blocking portions **1333** and the outer ring **1331** prevent water from flowing into the casing **110** of the electronic device **100** through a part of the connecting portion **132** exposed from the casing **110** (that is, a position corresponding to the accommodating slot **114**, that is, a left side of the first side edge **1131** shown in FIG. 7), to maintain a waterproof function. In another embodiment, the outer ring **1331** prevents water from seeping into the electronic assembly **130** from the inside of the electronic device **100**, and water about to flow in through the part of the connecting portion **132** exposed from the casing **110** (a right side of the first side edge **1131** shown in FIG. 7) is stopped by the blocking portions **1333** and the inner ring **1332** and therefore cannot seep into the electronic assembly **130**, to maintain the waterproof function.

(20) In an embodiment, the inner ring **1332** has a notch **1334**. The notch **1334** faces a top of the body **131**. As shown in FIG. 6 and FIG. 7, the inner ring **1332** is an incomplete closed ring, and the notch **1334** thereof faces the first side surface **111** of the casing **110**. Since the water in the direction of the first side surface **111** can be stopped by the outer ring **1331**, the notch **1334** may be arranged on the inner ring **1332** corresponding to the structure of the casing **110** (the accommodating slot **114**), to avoid squeeze of the structure and reduce the material consumption during the assembly.

(21) As shown in FIG. 6 and FIG. 7, in terms of the connection position of the second blocking portions **1333**, in an embodiment, when the connecting portion **132** correspondingly passes through the opening **113**, the two blocking portions **1333** are located in a range where both the first side edge **1131** and the second side edge **1132** cover the outer ring **1331**. For example, if the two blocking portions **1333** are arranged outside the coverage of the first side edge **1131** and the second side edge **1132**, the two blocking portions **1333** are exposed from the opening **113**, and the external water can enter the casing **110** through the gap between the outer ring **1331** and the inner ring **1332**.

(22) As shown in FIG. 4 to FIG. 6, in an embodiment, the connecting portion **132** has a first surface **1321** and a second surface **1322**, and the two blocking portions **1333** are respectively arranged on two opposite ends and are located in a distance range of two thirds of a distance from the first surface **1321** to the second surface **1322**. By arranging the two blocking portions **1333** close to the side of the first surface **1321**, the two blocking portions **1333** are prevented from being exposed from the opening **113** when the electronic assembly **130** is assembled in the casing **110**, thereby preventing seeping of the external water.

(23) In terms of the connection manner of the two blocking portions **1333**, as shown in FIG. 6, in an embodiment, the waterproof ring **133** has a central axis C. The central axis C passes through the outer ring **1331** and the inner ring **1332**, and the two blocking portions **1333** extend in a direction parallel to the central axis C of the outer ring **1331** and the inner ring **1332** and are connected to the outer ring **1331** and the inner ring **1332**.

(24) In an embodiment, the outer ring **1331** and the inner ring **1332** are arranged at a specific distance d. Since an excessively small distance between the outer ring **1331** and the inner ring **1332** may lead to a difficulty in structural formation, the specific distance d, for example, 0.5 mm is set.

(25) Referring to FIG. 8, FIG. 8 is a side view of an electronic assembly according to another embodiment. In terms of a connection position of the two blocking portions **1333**, in this

embodiment, the two blocking portions **2333** are adjacent to a notch **2334**. For example, the two blocking portions **2333** may alternatively be located far away from the notch **2334**, as long as the two blocking portions **2333** are located in a coverage of the first side edge **1131** and the second side edge **1132**, to maintain the waterproof function.

(26) Referring to FIG. 9, FIG. 9 is a side view of an electronic assembly according to still another embodiment. In terms of a connection position of the two blocking portions **3333**, in this embodiment, the two blocking portions **3333** extend in a direction oblique to an axial direction of an outer ring **3331** and an inner ring **3332** and are connected to the outer ring **3331** and the inner ring **3332**. The two blocking portions **3333** may alternatively be obliquely connected to the outer ring **3331** and the inner ring **3332**. For example, the two blocking portions **3333** may be correspondingly arranged at edges covered by the first side edge **1131** and the second side edge **1132** respectively, and extend obliquely along the first side edge **1131** and the second side edge **1132** to be connected to the outer ring **3331** and the inner ring **3332**.

(27) According to the electronic device and the electronic assembly in the above embodiments, the waterproof ring with the outer ring and the inner ring is arranged at the connecting portion of the electronic assembly, and the blocking portions are connected to the outer ring and the inner ring. Not only the inner ring prevents water from seeping from the outside of the electronic device, but also water about to flow in through the part of the connecting portion exposed from the casing is stopped by the blocking portions and the outer ring and therefore cannot seep into the casing of the electronic device, to maintain the waterproof function. In addition, the outer ring can prevent water from seeping into the electronic assembly from the inside of the electronic device, and water about to flow in through the part of the connecting portion exposed from the casing is stopped by the blocking portions and the inner ring and therefore cannot seep into the electronic assembly, to maintain the waterproof function.

## Claims

1. An electronic device, comprising: a casing, having an opening between a first side surface and a second side surface parallel to each other, wherein the opening has a first side edge and a second side edge opposite to each other, and the first side edge and the second side edge are obliquely arranged between the first side surface and the second side surface; and an electronic assembly, assembled in the casing and comprising: a body; a connecting portion, arranged on one side of the body; and a waterproof ring, comprising: an outer ring, being a closed ring and arranged around an outer surface of the connecting portion; an inner ring, arranged on the outer surface of the connecting portion and closer to the body than the outer ring; and two blocking portions, each connected to the outer ring and the inner ring, wherein when the connecting portion correspondingly passes through the opening, one side of the outer ring is in close contact with the first side surface, one side of the inner ring is in close contact with the second side surface, one blocking portion is correspondingly located at the first side edge, and the other blocking portion is correspondingly located at the second side edge.
2. The electronic device according to claim 1, wherein the other side of the outer ring opposite to the first side surface protrudes from the opening.
3. The electronic device according to claim 1, wherein the inner ring has a notch facing a top of the body.
4. The electronic device according to claim 3, wherein the two blocking portions are adjacent to the notch.
5. The electronic device according to claim 1, wherein when the connecting portion correspondingly passes through the opening, the two blocking portions are located in a range where both the first side edge and the second side edge cover the outer ring.
6. The electronic device according to claim 1, wherein the connecting portion has a first surface

and a second surface, and the two blocking portions are respectively arranged on two opposite ends and are located in a distance range of two thirds of a distance from the first surface to the second surface.

7. The electronic device according to claim 1, wherein the outer ring and the inner ring are arranged at a specific distance.

8. The electronic device according to claim 1, wherein the two blocking portions extend in a direction parallel to an axial direction of the outer ring and the inner ring and are connected to the outer ring and the inner ring.

9. The electronic device according to claim 1, wherein the two blocking portions extend in a direction oblique to an axial direction of the outer ring and the inner ring and are connected to the outer ring and the inner ring.

10. An electronic assembly, comprising: a body; a connecting portion, arranged on one side of the body; and a waterproof ring, comprising: an outer ring, being a closed ring and arranged around an outer surface of the connecting portion; an inner ring, arranged on the outer surface of the connecting portion and closer to the body than the outer ring; and two blocking portions, each connected to the outer ring and the inner ring, wherein the two blocking portions are respectively located on two opposite ends.

11. The electronic assembly according to claim 10, wherein the inner ring has a notch facing a top of the body.

12. The electronic assembly according to claim 11, wherein the two blocking portions are adjacent to the notch.

13. The electronic assembly according to claim 10, wherein the connecting portion has a first surface and a second surface, and the two blocking portions are respectively arranged on two opposite ends and are located in a distance range of two thirds of a distance from the first surface to the second surface.

14. The electronic assembly according to claim 10, wherein the outer ring and the inner ring are arranged at a specific distance.

15. The electronic assembly according to claim 10, wherein the two blocking portions extend in a direction parallel to an axial direction of the outer ring and the inner ring and are connected to the outer ring and the inner ring.

16. The electronic assembly according to claim 10, wherein the two blocking portions extend in a direction oblique to an axial direction of the outer ring and the inner ring and are connected to the outer ring and the inner ring.

---