United States Patent	12394579
Kind Code	B2
Date of Patent	August 19, 2025
Inventor(s)	Eda; Masato

Press button structure of ultrasonic diagnostic apparatus

Abstract

A press button structure includes a substrate, a movable contact member, a guide member, and a cap member composed of an upper cap member and a lower cap member. The movable contact member includes a base, a protrusion having a lower face including a movable contact, and an elastic member connecting the base and the protrusion. The guide member is cylindrical and is disposed to surround a side of the protrusion. The lower cap member covers the side face of the protrusion and is located between the side wall of the protrusion and the guide member. More specifically, the lower cap member is disposed adjacent and opposite an inner side face of the guide member in a manner that the lower cap member is slidable upward and downward along the inner side face of the guide member.

Inventors: **Eda; Masato (Chiba, JP)**

Applicant: **FUJIFILM Healthcare Corporation** (Kashiwa, JP)

Family ID: **1000008765247**

Assignee: **FUJIFILM Corporation (Tokyo, JP)**

Appl. No.: **18/200077**

Filed: **May 22, 2023**

Prior Publication Data

Document Identifier	Publication Date
US 20230402238 A1	Dec. 14, 2023

Foreign Application Priority Data

JP	2022-093049	Jun. 08, 2022

Publication Classification

Int. Cl.: **H01H13/14** (20060101); **A61B8/00** (20060101); **H01H13/10** (20060101)

U.S. Cl.:

CPC **H01H13/14** (20130101); **A61B8/467** (20130101); **H01H13/10** (20130101);

Field of Classification Search

CPC: H01H (13/14); H01H (13/10); H01H (13/06); H01H (3/12); H01H (13/84); H01H (13/85); A61B (8/467); A61B (8/4444); A61B (8/4455); A61B (8/44); A61B (8/00)

References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
7705258	12/2009	Geldmacher	200/341	G07C 9/00944
7740166	12/2009	Takeuchi	200/406	H01H 13/48
2009/0301852	12/2008	Keist	200/341	B60K 35/10

FOREIGN PATENT DOCUMENTS

Patent No.	Application Date	Country	CPC
2005-296487	12/2004	JP	N/A
2006-020755	12/2005	JP	N/A

Primary Examiner: Caroc; Lheiren Mae A

Background/Summary

CROSS REFERENCE TO RELATED APPLICATION

(1) This application claims priority to Japanese Patent Application No. 2022-093049 filed on Jun. 8, 2022, which is incorporated herein by reference in its entirety including the specification, claims, drawings, and abstract.

TECHNICAL FIELD

(2) The present specification discloses a press button structure of an ultrasonic diagnostic apparatus.

BACKGROUND

(3) Ultrasonic diagnostic apparatuses that perform ultrasonic diagnosis while transmitting and receiving ultrasonic waves to and from a subject have been known. As described in JP 2005-296487 A, for example, an ultrasonic diagnostic apparatus includes an operation panel that is operated by a user such as a doctor to input instructions in the ultrasonic diagnostic apparatus. The operation panel of the ultrasonic diagnostic apparatus includes a plurality of operation elements including a press button.

(4) There has been a disadvantage of a press button of an ultrasonic diagnostic apparatus in that pressing different locations on a surface of the press button results in different senses of pressing or feeling of pressing. Referring to FIGS. **5** to **9**, this disadvantage will be described in relation to a conventional press button structure.

(5) FIG. **5** is an exploded view of a press button structure **110** of an ultrasonic diagnostic apparatus according to a prior art example, and FIG. **6** is a vertical cross sectional view of the press button

structure **110**. In FIG. **5** and FIG. **6**, an X-axis denotes a horizontal direction along a width of the ultrasonic diagnostic apparatus, a Y-axis denotes a horizontal direction along a depth of the ultrasonic diagnostic apparatus that is normal to the X-axis, and a Z-axis denotes a direction along a height of the ultrasonic diagnostic apparatus (the forward direction of the Z-axis being upward).
(6) The press button structure **110** includes a substrate **112**, a movable contact member **114** disposed over (outside) the substrate **112**, a casing **116** disposed further above the movable contact member **114**, and a cap member **118**.
(7) The substrate **112** is an electronic substrate including a conductor pattern, and a fixed contact **120** is disposed on an upper surface of the substrate **112**.
(8) The movable contact member **114** includes a base **122**, a protrusion **124** having a convex shape protruding upward, and an elastic member **126** connecting the base **122** and the protrusion **124**. A movable contact (not shown) is disposed on a lower face of the protrusion **124**. The elastic member **126** urges the protrusion **124** upward, and, in a natural state, holds the protrusion **124** to keep the movable contact of the protrusion **124** and the fixed contact **120** of the substrate **112** apart from each other. In the illustrated example of the press button structure **110**, the elastic member **126** has a circular shape, and, in the natural state illustrated in FIG. **6**, assumes a skirt shape sloped outwardly downward. An inner edge of the circular elastic member **126**, or an upper edge in its natural state, is connected to a side wall of the protrusion **124**, or a lower edge of the side wall in the example of the press button structure **110**, and an outer edge of the elastic member **126**, or a lower edge in its natural state, is connected to the base **122**.
(9) The casing **116** forms an outer surface of the ultrasonic diagnostic apparatus, and more specifically, of the operation panel. The casing **116** includes a button hole **128** to allow the cap member **118** to pass through.
(10) The cap member **118** includes a top plate **118***a* extending horizontally and side walls **118***b* protruding downward from an edge of the top plate **118***a*. The cap member **118** is mounted on the protrusion **124** to cover a top face and part of a side face of the protrusion **124**.
(11) In response to the user depressing of the top plate **118***a* of the cap member **118**, the elastic member **126** elastically deforms to push the protrusion **124** downward. This brings the movable contact disposed on the lower face of the protrusion **124** into contact with the fixed contact **120**, and operation of the press button is detected.
(12) The sense of pressing or feeling of pressing of the press button will be described. FIG. **7** shows a feeling curve. In the graph shown in FIG. **7**, the horizontal axis indicates a stroke of the protrusion **124** (the vertical position of the protrusion **124**) and the vertical axis indicates a load on the protrusion **124**, which can be regarded as a magnitude of a reaction force of the elastic member **126** against the pressing force applied to the protrusion **124**. A graph indicating the relationship between the stroke of the press button and the load is referred to as a feeling curve.
(13) In the natural state, the elastic member **126** has a skirt shape described above; therefore, between stroke **0** and stroke S**1**, the load increases with the pressing amount of the protrusion **124**. At stroke S**1**, the elastic member **126** having a skirt shape extends horizontally into a horizontally parallel circular shape. Thereafter, the reaction force of the elastic member **126** is lowered, and between stroke S**1** and stroke S**2**, the load decreases with the pressing amount of the protrusion **124**. At stroke S**2**, the movable contact comes into contact with the fixed contact **120**. Then, between stroke S**2** and stroke S**3**, the protrusion **124** moves with elastic deformation of the elastic member **126** to cause an increase in the load. Upon stop of pressing of the protrusion **124** by the user, the upward urging force of the elastic member **126** returns the stroke of the protrusion **124** to **0**.
(14) Assuming that the load at stroke S**1**, or a maximum load required until the press button is switched on, is load A, and the load at stroke S**2**, or a load after the press button is switched on, is load C, an index called click rate is conventionally calculated according to the following formula:
$\{(A-C)/A\}\times 100[\%]$

(15) The click rate is an index that represents the user's sense of pressing of the press button. Various click rates or click feeling obtained by pressing the surface of the press button at different locations indicate various senses of pressing obtained by pressing the surface of the press button at different locations. FIG. **8** shows a feeling curve obtained by the user's pressing the center of the top plate **118***a* of the cap member **118** in a plan view, and FIG. **9** shows a feeling curve obtained by the user's pressing an edge of the top plate **118***a* in a plan view. The feeling curve shown in FIG. **8** represents a proper sense of pressing that is intended by a designer of the press button, whereas the feeling curve shown in FIG. **9** does not represent the proper sense of pressing. The click rates or click feelings obtained from these feeling curves are obviously different from each other, in which case, the user feels different senses of pressing of the press button.

(16) One of the factors that cause the feeling curve shown in FIG. **9** lies in the movable portion of the press button, which is the protrusion **124** in the press button structure **110**, being unable to move straight up and down. In the example illustrated in FIG. **6**, for example, in response to user's pressing the right side of the top plate **118***a*, the elastic member **126** deforms only on the right side to cause the protrusion **124** to be inclined downward to the right. Thereafter, further depression of the protrusion **124** by the user causes delayed deformation of the elastic member **126** on the left side after the deformation of the elastic member **126** on the right side to further change the position (inclination) of the protrusion **124**. Such an inclination of the protrusion **124** can cause the distorted feeling curve as illustrated in FIG. **9**.

(17) Here, a gap **130** between the side wall **118***b* of the cap member **118** and the inner wall of the button hole **128** permits the inclination of the protrusion **124**. While narrowing the gap **130** may inhibit the inclination of the protrusion **124**, it is not easy to narrow the gap **130**, for the following reason. Specifically, an ultrasonic diagnostic apparatus may suffer from a problem in that foreign matter such as dust and echo jelly enter and fix to the gap **130** to thereby prevent the upward and downward movement of the cap member **118** or the protrusion **124**. To prevent this problem, it is necessary to keep the gap **130** at a predetermined width or greater, and this prevents narrowing of the gap **130**.

(18) Also, the user of the ultrasonic diagnostic apparatus may hold an ultrasonic probe with one hand and operate the press button with the other hand while viewing an ultrasound image displayed on the display. In this case, the user cannot properly press the center of the press button, making the above-described problem apparent particularly in ultrasonic diagnostic apparatuses.

(19) In addition, the protrusion **124** having an elongated shape extending in one direction in a plan view as illustrated in FIGS. **5** and **6** is particularly likely to cause variations in the sense of pressing corresponding to different pressing locations.

(20) A press button structure of an ultrasonic diagnostic apparatus disclosed in the present specification is therefore aimed toward reducing variations in the sense of pressing obtained by pressing different locations on a surface of the press button disposed in an ultrasonic diagnostic apparatus.

SUMMARY

(21) A press button structure of an ultrasonic diagnostic apparatus disposed in the present specification includes a substrate including a fixed contact, a movable contact member disposed over the substrate, a cylindrical guide member, and a cap member. The movable contact member includes a base, a protrusion, and an elastic member. The protrusion has a convex shape protruding upward and has a movable contact on a lower face of the protrusion, and the movable contact is to be in contact with the fixed contact. The elastic member connects the base and the protrusion, and, in a natural state, urges the protrusion upward to hold the protrusion in a manner that the movable contact and the fixed contact are separated. The elastic member has an upward reaction force that changes in accordance with a pressing amount of the protrusion that is pressed downward. The cylindrical guide member is disposed to surround a side of the protrusion. The cap member is mounted on the protrusion and includes a top plate covering a top face of the protrusion and a side

wall covering a side face of the protrusion. The side wall of the cap member is disposed adjacent and opposite an inner side face of the guide member in a manner that the side wall is slidable upward and downward along the inner side face.
(22) This configuration allows the side wall of the cap member to come into contact with the guide member to thereby inhibit inclination of the protrusion. Specifically, the configuration enables the protrusion to move upward and downward with the inclination of the protrusion being inhibited. This provides a substantially proper feeling curve regardless of the location on the top plate of the cap member to be pressed by the user, and thus reduces variations in the sense of pressing obtained by pressing different locations on the surface of the press button.
(23) The side wall of the cap member may include a flange that protrudes outward in a region above an upper edge of the guide member and covers an upper part of a gap between the side wall of the cap member and the inner side face of the guide member.
(24) This configuration inhibits entry of foreign matter such as dust and echo jelly into the gap between the side wall of the cap member and the inner side face of the guide member.
(25) The flange may extend to a point above an outer edge of the guide member.
(26) This configuration further inhibits entry of foreign matter into the gap between the side wall of the cap member and the inner side face of the guide member.
(27) The press button structure may further include a casing disposed over the movable contact member and having a button hole to allow the cap member to pass through. The cap member may include an upper cap member including the top plate and being inserted through the button hole, and a lower cap member disposed below the casing and including the flange. The upper cap member and the lower cap member are detachable.
(28) This configuration facilitates change of a sheet including printed letters that is inserted between the top plate of the cap member and the protrusion.
(29) The protrusion may have an elongated shape extending along one direction in a plan view.
(30) This configuration reduces variations in the sense of pressing obtained by pressing different locations on a press button surface in a protrusion having an elongated shape which is likely to cause variations in the sense of pressing in accordance with the pressing location.
(31) The press button structure of an ultrasonic diagnostic apparatus disclosed in the specification enables reduction in variations of the sense of pressing obtained by pressing different locations on a surface of a press button disposed in an ultrasonic diagnostic apparatus.

Description

BRIEF DESCRIPTION OF DRAWINGS
(1) An embodiment of the present disclosure will be described based on the following figures, wherein:
(2) FIG. **1** is an exploded view of a press button structure according to an embodiment;
(3) FIG. **2** is a perspective cross sectional view of the button structure according to the embodiment;
(4) FIG. **3** is a vertical cross sectional view of the button structure according to the embodiment;
(5) FIG. **4** is a bottom view of a movable contact member;
(6) FIG. **5** is an exploded view of a press button structure according to a prior art example;
(7) FIG. **6** is a vertical cross sectional view of the press button structure according to the prior art example;
(8) FIG. **7** illustrates a feeling curve;
(9) FIG. **8** illustrates a feeling curve obtained by a user pressing a center of a top plate of a cap member in a plan view, in the press button structure according to the prior art example; and
(10) FIG. **9** illustrates a feeling curve obtained by a user pressing an edge of a top plate of a cap

member in a plan view, in the press button structure according to the prior art.

DESCRIPTION OF EMBODIMENTS

(11) FIG. **1** is an exploded view of a press button structure **10** according to the present embodiment; FIG. **2** is a perspective cross sectional view of the press button structure **10**; FIG. **3** is a vertical cross sectional view of the press button structure **10**; and FIG. **4** is a bottom view of a movable contact member **14**. In FIG. **1** to FIG. **4**, an X-axis indicates a horizontal direction along the width of an ultrasonic diagnostic apparatus, a Y-axis indicates a horizontal direction vertical to the X-axis, which extends along the depth of the ultrasonic diagnostic apparatus, and a Z-axis indicates a direction along the height, with the forward direction along the Z-axis indicating upward.

(12) The press button structure **10** includes a substrate **12**, a movable contact member **14**, a casing **16**, a guide member **18**, and a cap member **20**.

(13) The substrate **12** is an electronic substrate including a conductor pattern, and includes a fixed contact **22** on a top surface.

(14) The movable contact member **14** is disposed over (outside) the substrate **12**, and includes a base **24**, a protrusion **26** having a convex shape protruding upward, and an elastic member **28** connecting the base **24** and the protrusion **26**.

(15) While in the present embodiment the base **24** has a sheet-like shape extending in parallel to the substrate **12**, the shape of the base **24** is not limited to this example.

(16) The protrusion **26** has a convex shape protruding upward. In the present embodiment, the protrusion **26** protrudes upward from the sheet-like base **24**. Further, in the present embodiment, the protrusion **26** has an elongated shape extending along the X-axis in a plan view. Specifically, the protrusion **26** has an elliptical shape extending along the X-axis in a plan view. As illustrated in FIG. **2** and FIG. **3**, the protrusion **26** is hollow and is opened downward. The protrusion **26** includes a swelling portion **26***a* protruding sideward in a lower half portion of its side wall. Further, as illustrated in FIG. **4**, the protrusion **26** includes movable contacts **30** on its lower face. In this embodiment, the protrusion **26** includes a plurality of (four) movable contacts **30**.

(17) The elastic member **28** has elasticity and urges the protrusion **26** upward with an elastic force. The elastic member **28**, in its natural state, holds the protrusion **26** to keep the movable contact **30** of the protrusion **26** and the fixed contact **22** of the substrate **12** apart from each other. While in the present embodiment the movable contact member **14** is entirely made of a resin such as rubber and is entirely elastic, at least the elastic member **28** may be elastic. In the present embodiment, the elastic member **28** has a circular shape, and assumes a skirt shape sloped outward and downward in the natural state illustrated in FIG. **2** and FIG. **3**. The inner end of the circular elastic member **28** (the upper end in the natural state) is connected with the side wall of the protrusion **26** (the lower end of the swelling portion **26***a* in the present embodiment), and the outer end of the elastic member **28** (the lower end in the natural state) is connected with the base **24**.

(18) The casing **16** is disposed on top of the movable contact member **14** to form an outer surface of the ultrasonic diagnostic apparatus (more specifically, of the operation panel). The casing **16** is made of resin and includes a button hole **32** to allow the protrusion **26** and the cap member **20** (particularly, an upper cap member **34**) to pass through.

(19) The guide member **18** has a cylindrical shape and is disposed to surround the side wall of the protrusion **26**. The guide member **18** is made of resin. In the present embodiment, the guide member **18** is made of polyoxymeethylene (POM) resin. POM has a low coefficient of friction (easy to slip), a high abrasion resistance, and a high fatigue resistance. In the present embodiment, the protrusion **26** has an elliptical shape extending along the X-axis in a plan view, as described above, and therefore the guide member **18** also has an outer shape and inner hole having a corresponding elliptical shape in a plan view.

(20) The guide member **18** is placed from above to surround the protrusion **26** with the casing **16** being removed. Mounting the casing **16** in this state causes the guide member **18** to be sandwiched

and held between the base **24** of the movable contact member **14** and the casing **16**. Specifically, the guide member **18** is held with a hook receiver **18***b* (see FIG. **1**) disposed on the guide member **18** coming into engagement with a hook (not shown) disposed on the bottom of the casing **16**. The guide member **18** is thus detachable with respect to the protrusion **26**.

(21) The cap member **20** is attached to the protrusion **26** to cover the top face and at least part of the side face of the protrusion **26**. The cap member **20** is made of resin such as polycarbonate. In the present embodiment, the cap member **20** includes an upper cap member **34** and a lower cap member **36** which are detachably connected with each other. However, the cap member **20** need not be separated into the upper cap member **34** and the lower cap member **36**.

(22) The upper cap member **34** includes a top plate **34***a* extending horizontally to cover the top face of the protrusion **26** and a side wall **34***b* protruding from an edge of the top plate **34***a*. The upper face of the top plate **34***a* serves as a pressing face that is to be pressed by the user. The upper cap member **34** is inserted into the button hole **32** along with the protrusion **26**.

(23) The lower cap member **36** has a substantially cylindrical shape which corresponds to the shape of the inner hole of the guide member **18** in a plan view. As, in the present embodiment, the inner hole of the guide member **18** has an elliptical shape in a plan view as described above, the lower cap member **36** has a corresponding outer shape that is an elliptical shape in a plan view.

(24) The lower cap member **36** is detachably connected to a lower edge of the side wall **34***b* of the upper cap member **34**. In the present embodiment, the lower cap member **36** is disposed below the (lower edge of) the casing **16**. In other words, the lower cap member **36** is not inserted through the button hole **32**.

(25) The lower cap member **36** includes, in an upper portion of its inner side face, an inward protrusion **36***a* protruding inward. The inward protrusion **36***a* is disposed along the entirety or part of the circumferential direction. The inward protrusion **36***a* has a lower face that is in contact with the upper face of the swelling portion **26***a* of the protrusion **26**. Thus, the lower cap member **36** is disposed in contact with the side wall of the protrusion **26**. As illustrated in FIGS. **2** and **3**, in the present embodiment, substantially the entire side face of the protrusion **26** is covered with the side wall **34***b* of the upper cap member **34** and the lower cap member **36**. Therefore, the side wall **34***b* of the upper cap member **34** and the entire lower cap member **36** form the side wall of the entire cap member **20**.

(26) In a mount state in which the cap member **20** is mounted on the protrusion **26**, the lower cap member **36** is located between the side wall of the protrusion **26** and the guide member **18**. More specifically, the lower cap member **36** is disposed opposite and adjacent to an inner side face **18***a* of the guide member **18** in a manner that the lower cap member **36** is vertically slidable along the inner side face **18***a*.

(27) The lower cap member **36** further includes a flange **36***b* protruding outward in a portion above the upper edge of the guide member **18**. The flange **36***b* covers a portion above a gap **40** between the lower cap member **36** and the inner side face **18***a* of the guide member **18**. The flange **36***b* has a top face that is in contact with the lower face of the casing **16**, particularly with the edge of the button hole **32**. This configuration prevents the lower cap member **36** from passing through the button hole **32** and moving upward past the lower end of the casing **16**.

(28) In particular, the flange **36***b* may extend outward to a portion above the outer edge of the guide member **18** or further outward, as illustrated in FIG. **3**.

(29) The press button structure **10** according to the present embodiment has been described. The operation of the press button structure **10** and the effect of each component will be now described below.

(30) Similar to the press button structure **110** according to the prior art example, pressing the top plate **34***a* of the upper cap member **34** by the user causes elastic deformation of the elastic member **28**, thereby pressing the protrusion **26** downward. Contact of the movable contacts **30** disposed on the lower face of the protrusion **26** with the fixed contact **22** disposed on the substrate **12** triggers

detection of operation of the press button.
(31) The feeling curve for the press button structure **10** is similar to that shown in FIG. **7**. Specifically, in the natural state in which the elastic member **28** has a skirt shape, between strokes **0** and S**1**, the load increases in accordance with the pressing amount of the protrusion **26**. At stroke S**1**, the elastic member **28** changes its shape from the skirt shape to a horizontally extending shape or a horizontally parallel circular shape. Thereafter, the reaction force of the elastic member **28** decreases; therefore between strokes S**1** and S**2**, the load decreases in accordance with the pressing amount of the protrusion **26**. The upward reaction force of the elastic member **28** thus changes in accordance with the pressing amount of the protrusion **26** that is pressed downward. Specifically, the magnitude of the reaction force between strokes **0** and S**1** and the magnitude of the reaction force between strokes S**1** and S**2** differ from each other, which provides a click feeling to the user. At stroke S**2**, the movable contacts **30** come into contact with the fixed contact **22**, and thereafter (between strokes S**2** and S**3**), the protrusion **26** moves due to elastic deformation of the elastic member **28** and the load increases. At stop of the user's depression of the protrusion **26**, the stroke of the protrusion **26** returns to **0** due to an upward urging force of the elastic member **28**.
(32) In the press button structure **10**, the guide member **18** is disposed immediately beside the outer side face of the lower cap member **36**. Therefore, the user's pressing of the top plate **34***a* at an edge portion in a plan view brings the lower cap member **36** into contact with the guide member **18** to thereby reduce inclination of the protrusion **26**. In other words, the protrusion **26** is prevented from being inclined while being allowed to move upward and downward. This configuration achieves a substantially proper feeling curve (see FIG. **7** or FIG. **8**) with the user's pressing of the top plate **34***a* at any location, and thus reduces variations in the sense of pressing obtained by pressing different locations on the surface of the press button.
(33) In particular, in the present embodiment, the guide member **18** that is made of POM has a small coefficient of friction. Therefore, the protrusion **26** can move upward and downward smoothly even with the lower cap member **36** in contact with the guide member **18**.
(34) To inhibit inclination of the protrusion **26**, the gap **40** between the lower cap member **36** and the inner side face **18***a* of the guide member **18** is set to be significantly narrow, which is at least smaller than the gap **130** (see FIG. **6**) between the side wall **118***b* of the cap member **118** and the inner side wall of the button hole **128** of the press button structure **110**. This may cause foreign matter such as dust and echo jelly entering the gap **40** to fix therein and prevent the upward and downward movement of the lower cap member **36** or the protrusion **26**.
(35) In consideration of this disadvantage, in the present embodiment, the flange **36***b* covering the region above the gap **40** is disposed. This flange **36***b* inhibits entry of foreign matter into a gap **42** between the side wall **34***b* of the upper cap member **34** and the inner side wall of the button hole **32** from further entering the gap **40**. The flange **36***b* that extends further to a region above the outer side edge of the guide member **18** further inhibits entry of the foreign matter into the gap **40**. This reduces obstruction of the upward and downward movement of the protrusion **26** caused by the foreign matter. The gap **42** may have a width similar to that of the gap **130** of the press button structure **110**.
(36) It is also possible to employ a transparent top plate **34***a* of the upper cap member **34** and insert a sheet (now shown) with printed letters that indicate a function of the press button, for example, between the top plate **34***a* and the protrusion **26**. Assuming that this sheet is to be changed with the change of the function of the press button, the cap member that is a single member which cannot be separated into the upper cap member **34** and the lower cap member **36** and that has the flange **36***b* is disadvantageous in that, to change the sheet, not only the cap member **20** but also the casing **16** needs to be removed.
(37) In the present embodiment, the cap member **20** is composed of the upper cap member **34** and the lower cap member **36** having the flange **36***b*, and the upper cap member **34** and the lower cap member **36** are detachable. This configuration eliminates the need to remove the casing **16** to

change the sheet; it is only necessary to remove the upper cap member **34** from the lower cap member **36**. Therefore, in the present embodiment, sheet change can be easily performed.
(38) The press button structure of an ultrasonic diagnostic apparatus according to the disclosure is not limited to the embodiment described above, and various modifications may be made without departing from the scope of the claims.

Claims

1. A press button structure of an ultrasonic diagnostic apparatus, the press button structure comprising: a substrate including a fixed contact; a movable contact member disposed over the substrate, the movable contact member comprising: a base; a protrusion having a convex shape protruding upward, the protrusion having a movable contact on a lower face of the protrusion, the movable contact to be in contact with the fixed contact; and an elastic member connecting the base and the protrusion, the elastic member, in a natural state, urging the protrusion upward to hold the protrusion in a manner that the movable contact and the fixed contact are separated, the elastic member having an upward reaction force that changes in accordance with a pressing amount of the protrusion that is pressed downward, a cylindrical guide member disposed to surround a side of the protrusion; and a cap member mounted on the protrusion, the cap member comprising a top plate covering a top face of the protrusion and a side wall covering a side face of the protrusion, wherein the side wall of the cap member includes a flange that protrudes outwardly in a region above an upper edge of the guide member and covers an upper part of a gap between the side wall of the cap member and an inner side face of the guide member, and the side wall of the cap member extends further downward relative to the flange and is disposed adjacent and opposite an inner side face of the guide member in a manner that the side wall is slidable upward and downward along the inner side face of the guide member.
2. The press button structure of an ultrasonic diagnostic apparatus according to claim 1, wherein the flange extends to a point above an outer edge of the guide member.
3. The press button structure of an ultrasonic diagnostic apparatus according to claim 1, further comprising: a casing disposed over the movable contact member and having a button hole to allow the cap member to pass through, wherein the cap member comprises: an upper cap member including the top plate, the upper cap member being inserted through the button hole; and a lower cap member disposed below the casing and including the flange, and wherein the upper cap member and the lower cap member are detachable.
4. The press button structure of an ultrasonic diagnostic apparatus according to claim 1, wherein the protrusion has an elongated shape extending along one direction in a plan view.