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Hara et al.

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[54] **ELECTRICAL STRUCTURE FOR A CAMERA**

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[51] **Int. Cl.**[6] **G03B 17/02**
[52] **U.S. Cl.** **354/288**; 354/485
[58] **Field of Search** 354/288, 485, 354/275

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,317,628 3/1982 Shimizu 354/288
4,853,734 8/1989 Tokura et al. 354/485

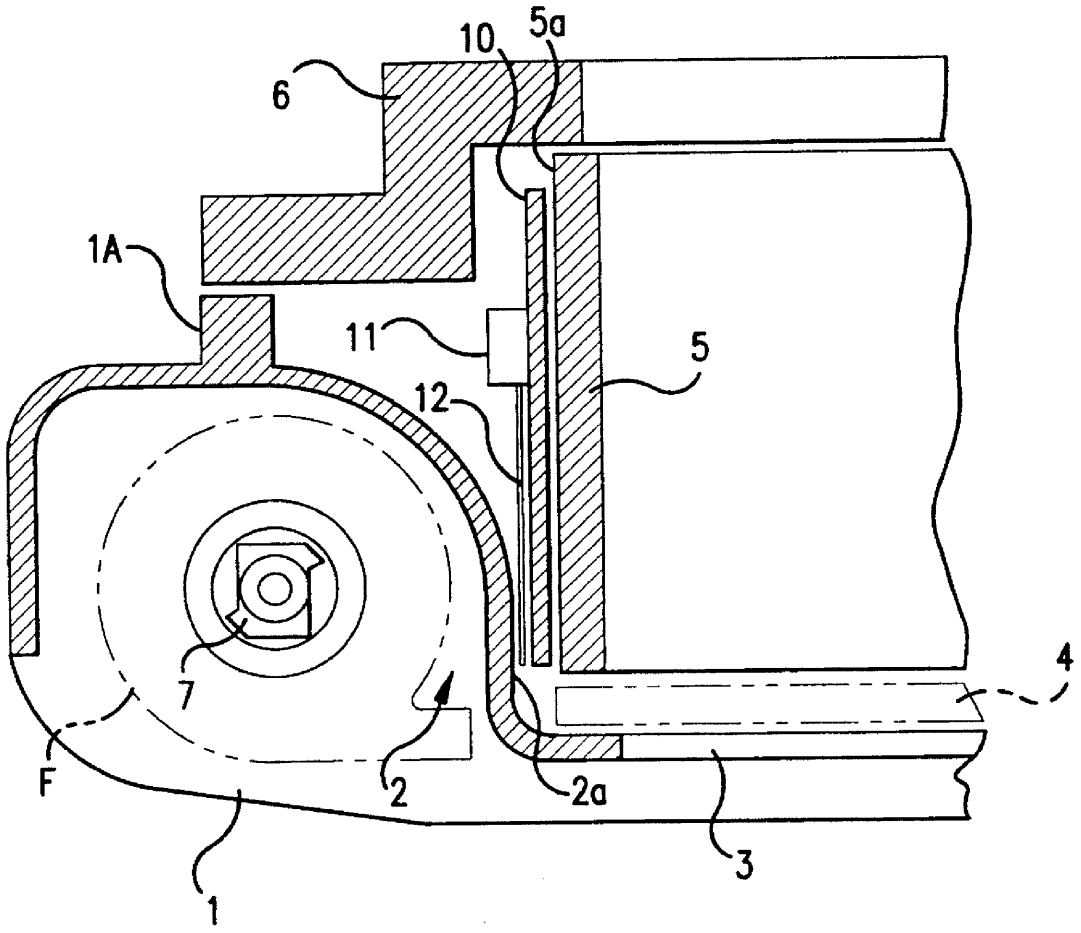
Primary Examiner—A. A. Mathews

Attorney, Agent, or Firm—Oliff & Berridge

[57] **ABSTRACT**

The invention is directed to an electrical connecter, mounted on a mounting board within a camera, to which an FPC board is connected, that does not increase the size of the camera, and is a simplified shape and structure. The main camera body is equipped with a flat portion on one portion of the outer wall that forms a film chamber comprising either a cartridge chamber or a spool chamber. A mounting board has a section that faces and is substantially parallel to the flat portion and an extension section that does not face the flat portion. A horizontal or vertical electrical connecter is attached to the extension section of the mounting board on the surface generally facing the outer wall of the film chamber and an electrical board comprising an FPC board or the like is connected to the electrical connecter. To enhance the features of the camera, a first electrical component is loaded on the surface of the mounting board opposite to the electrical connector loaded surface. The FPC board runs along the connector loaded surface. The FPC board passes around an edge section of the mounting board to extend along the surface of the mounting board opposite the connecter loaded surface. A second electrical component is loaded on the extended part of the FPC board.

24 Claims, 16 Drawing Sheets



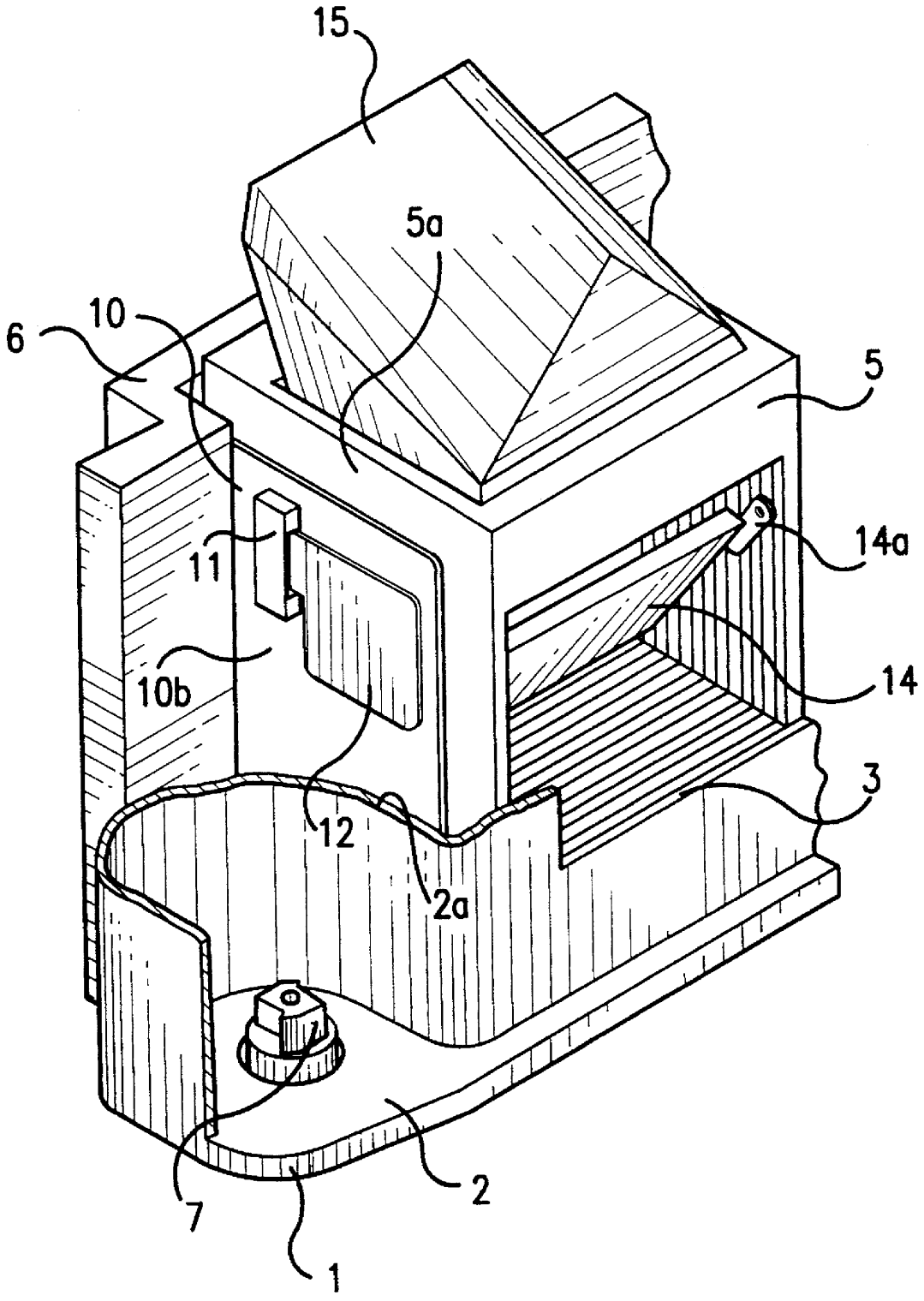


FIG. 1

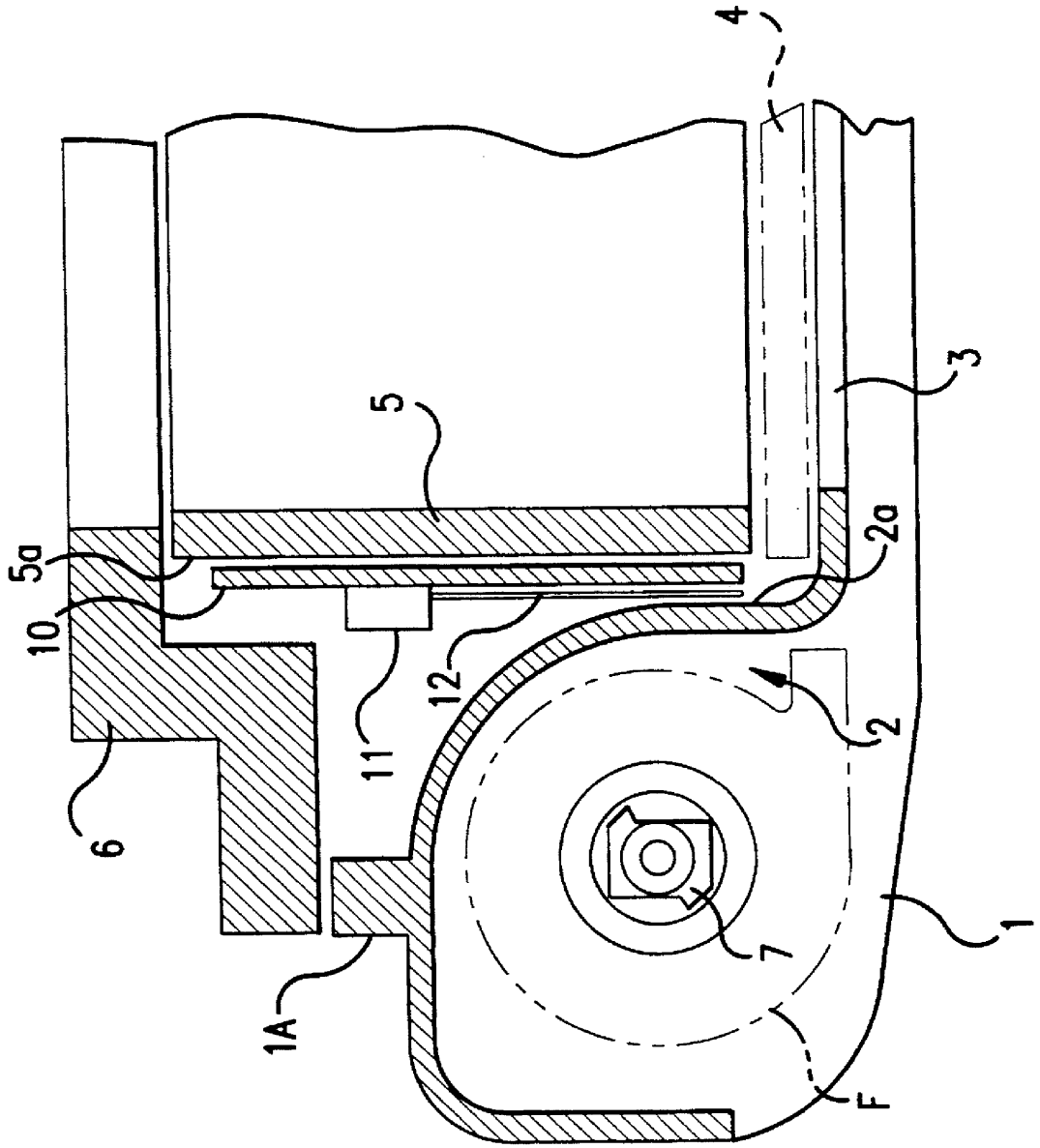


FIG.2

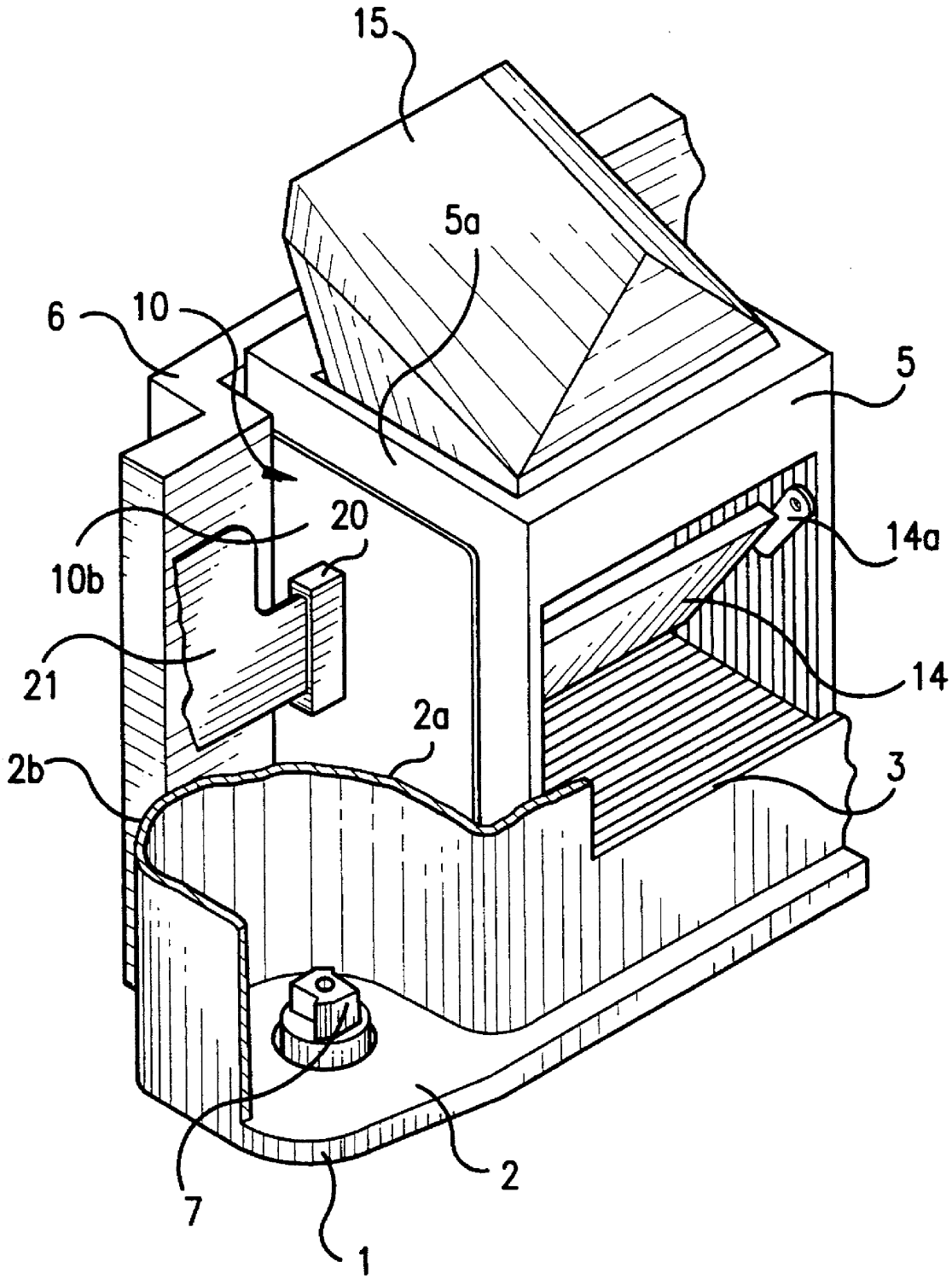


FIG.3

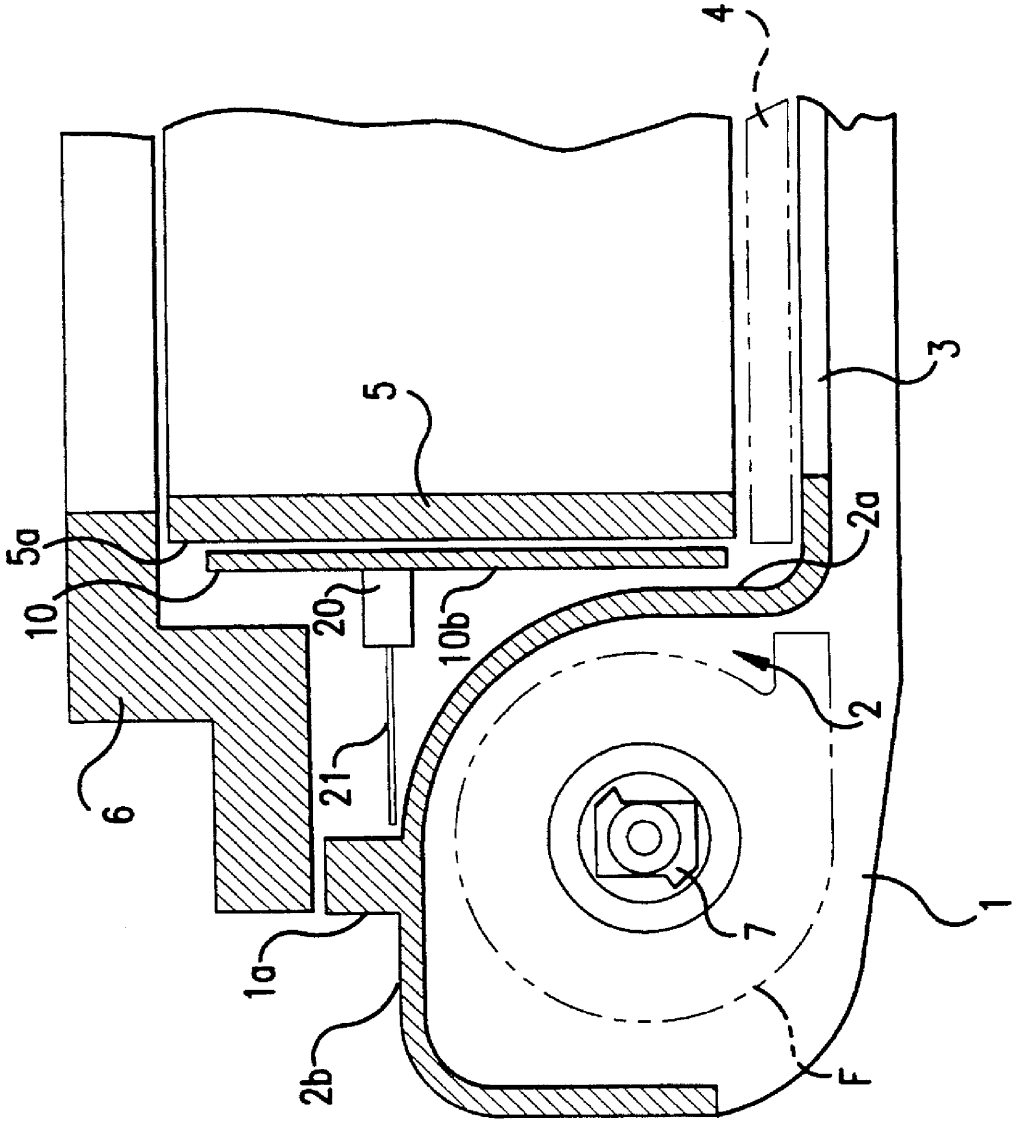


FIG.4

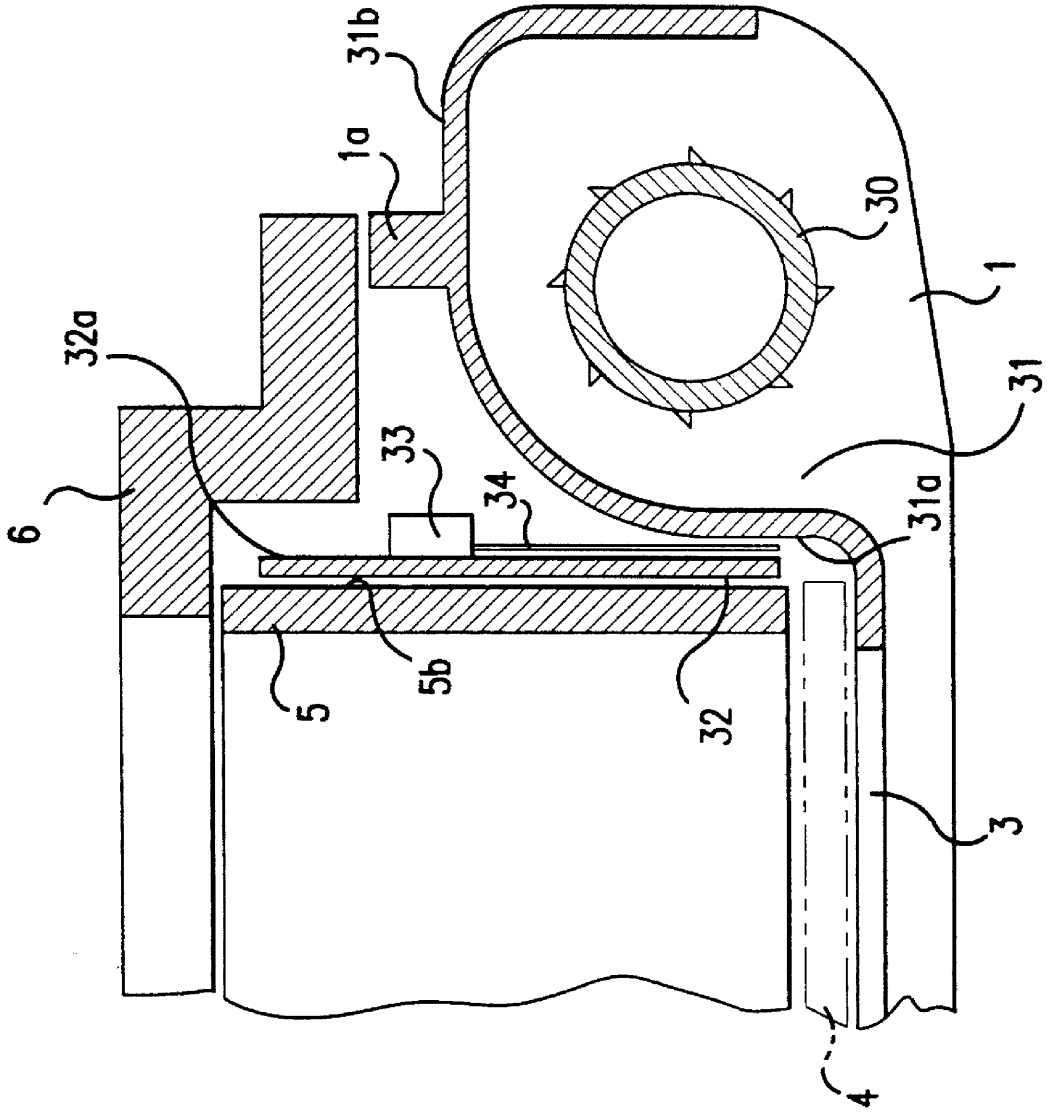


FIG.5

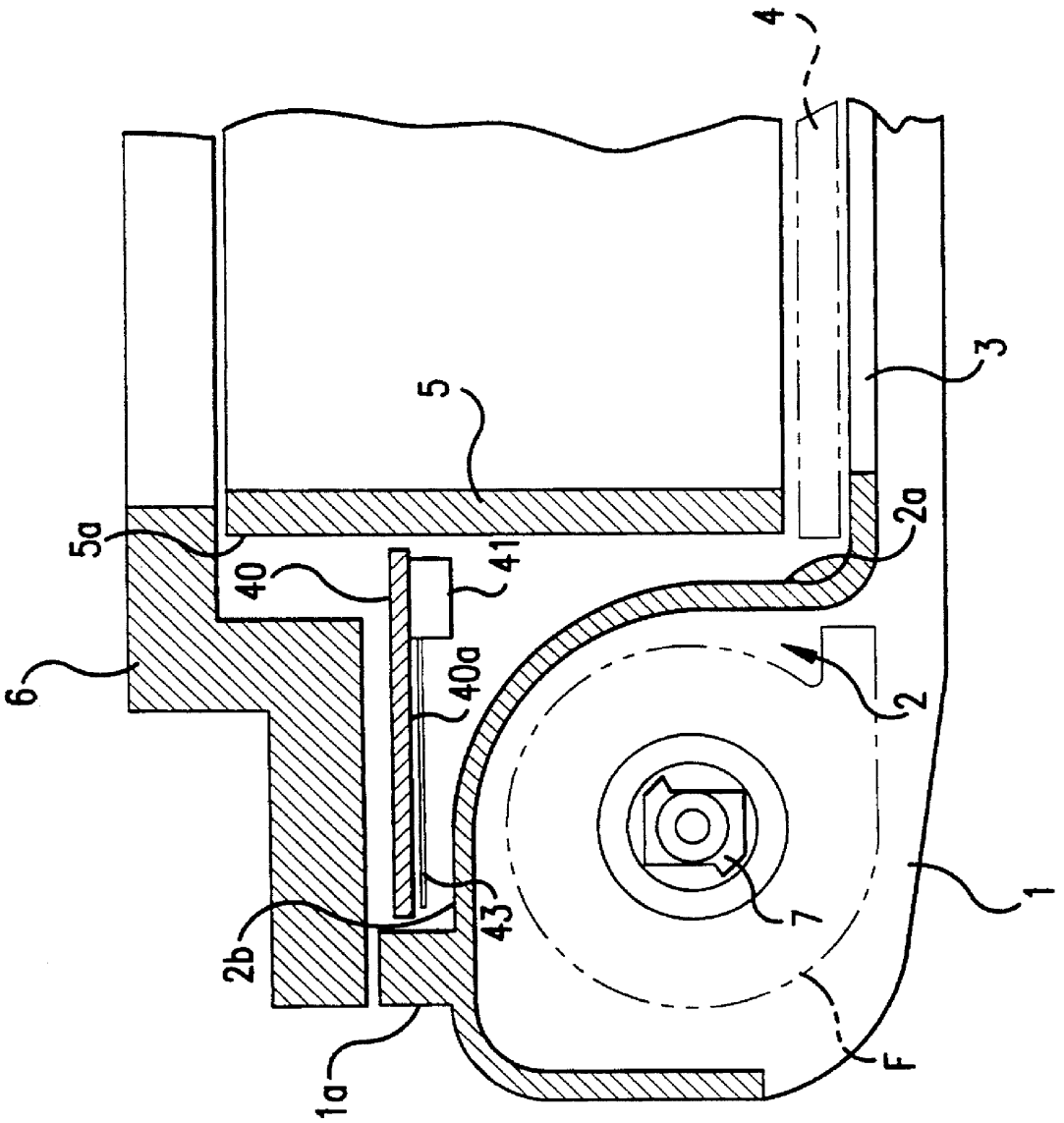


FIG.7

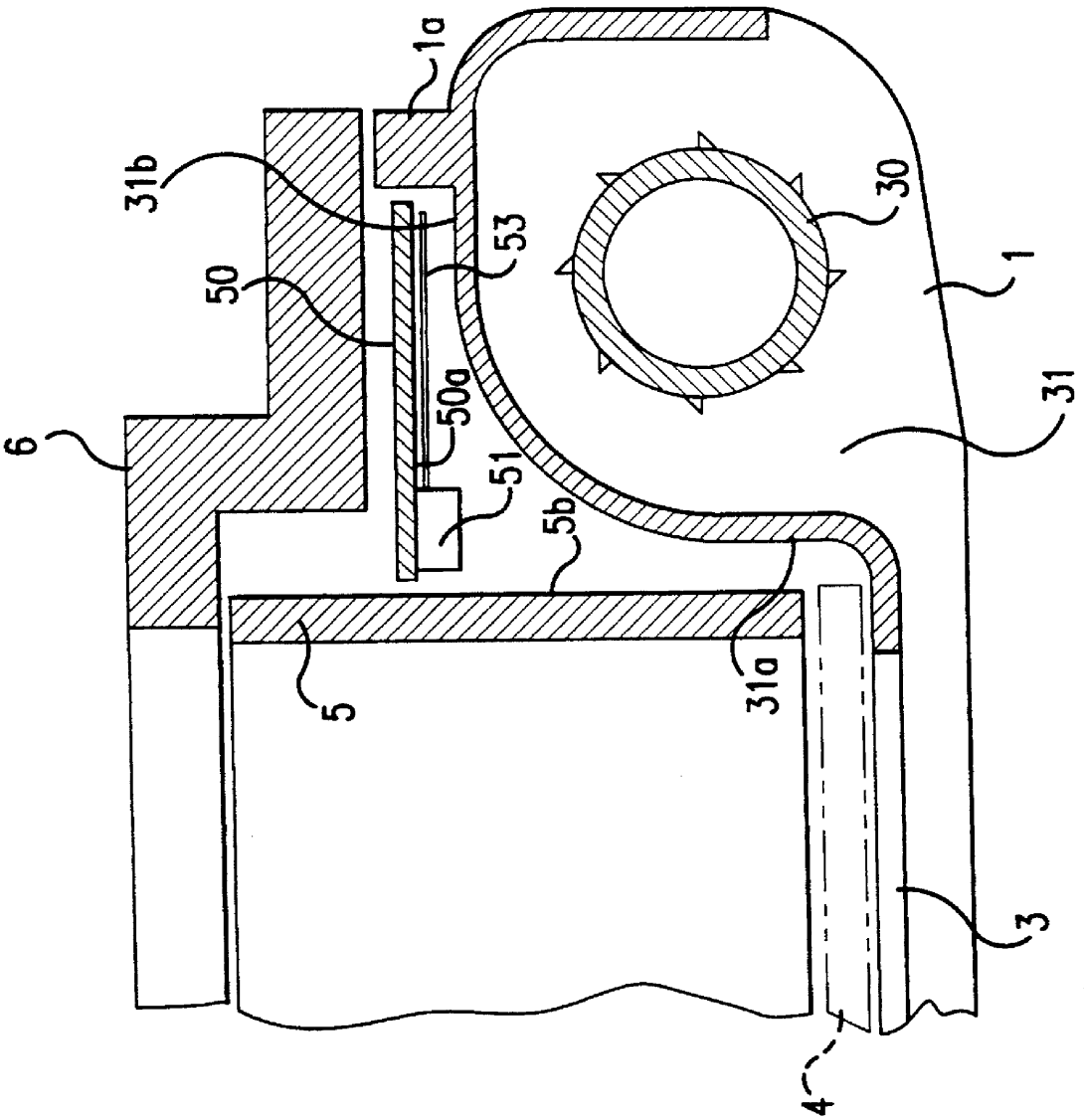


FIG.9

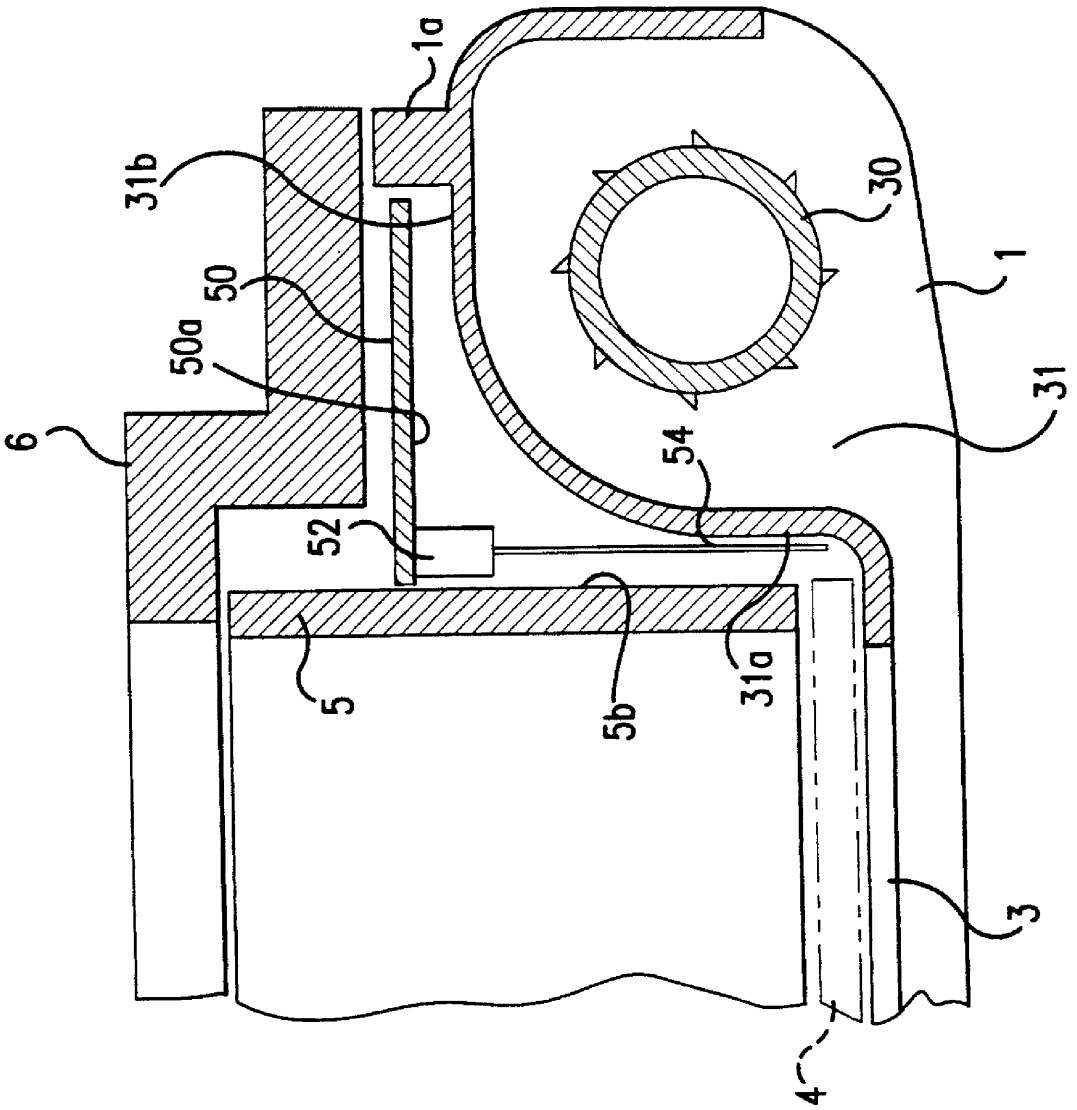


FIG.10

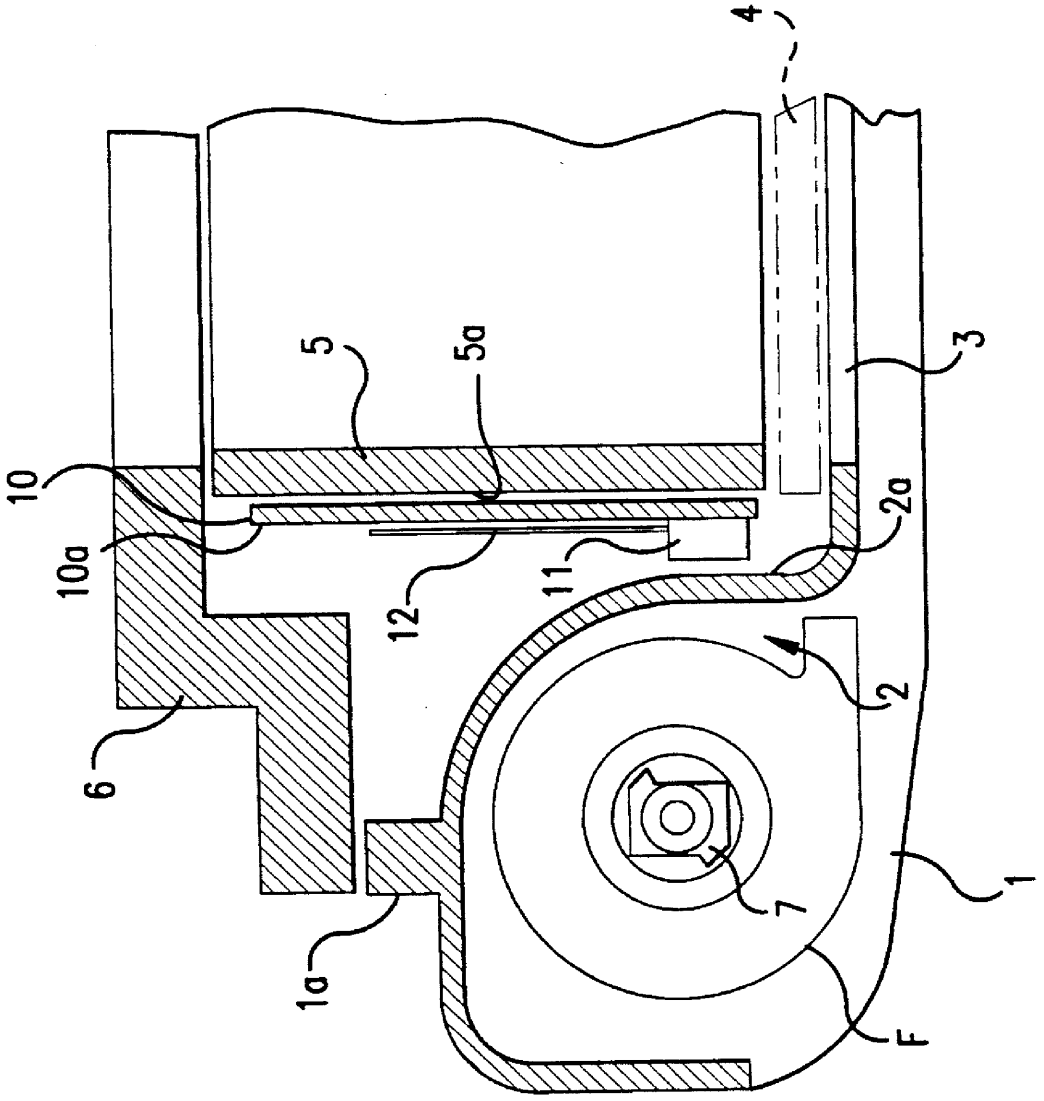


FIG. 11
RELATED ART

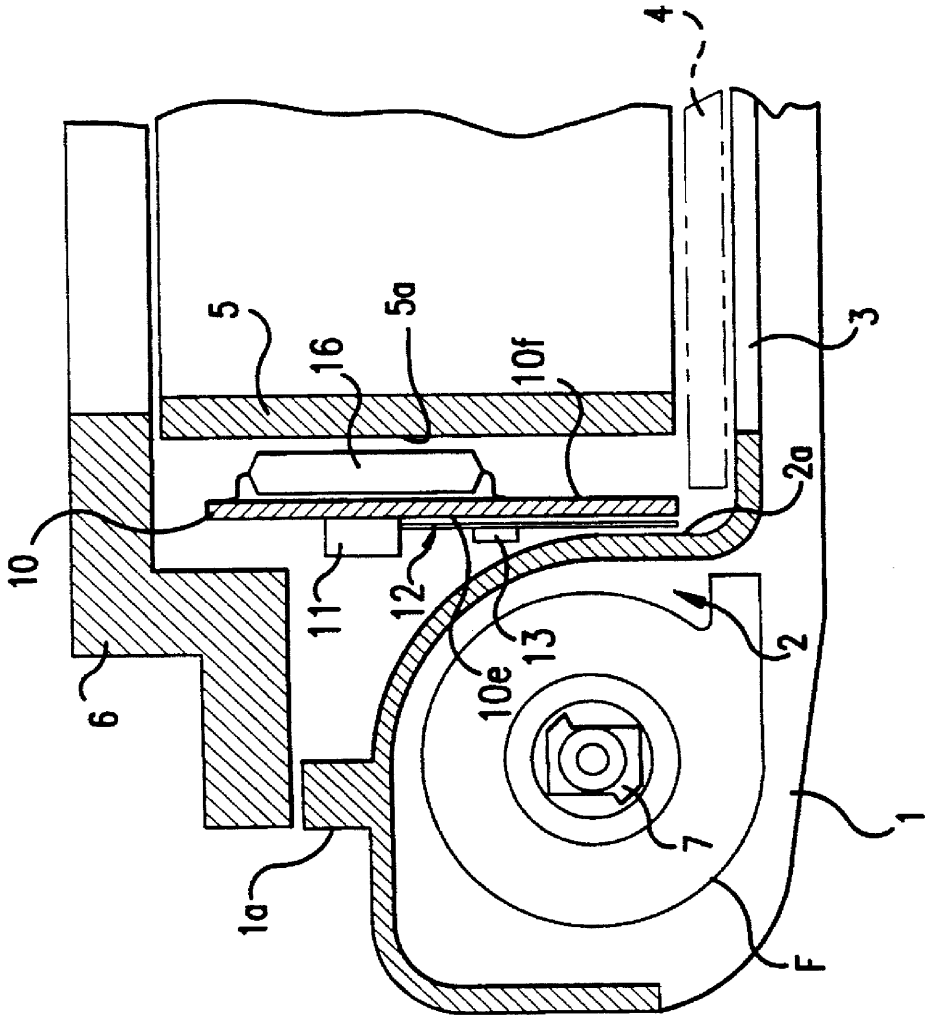


FIG.12

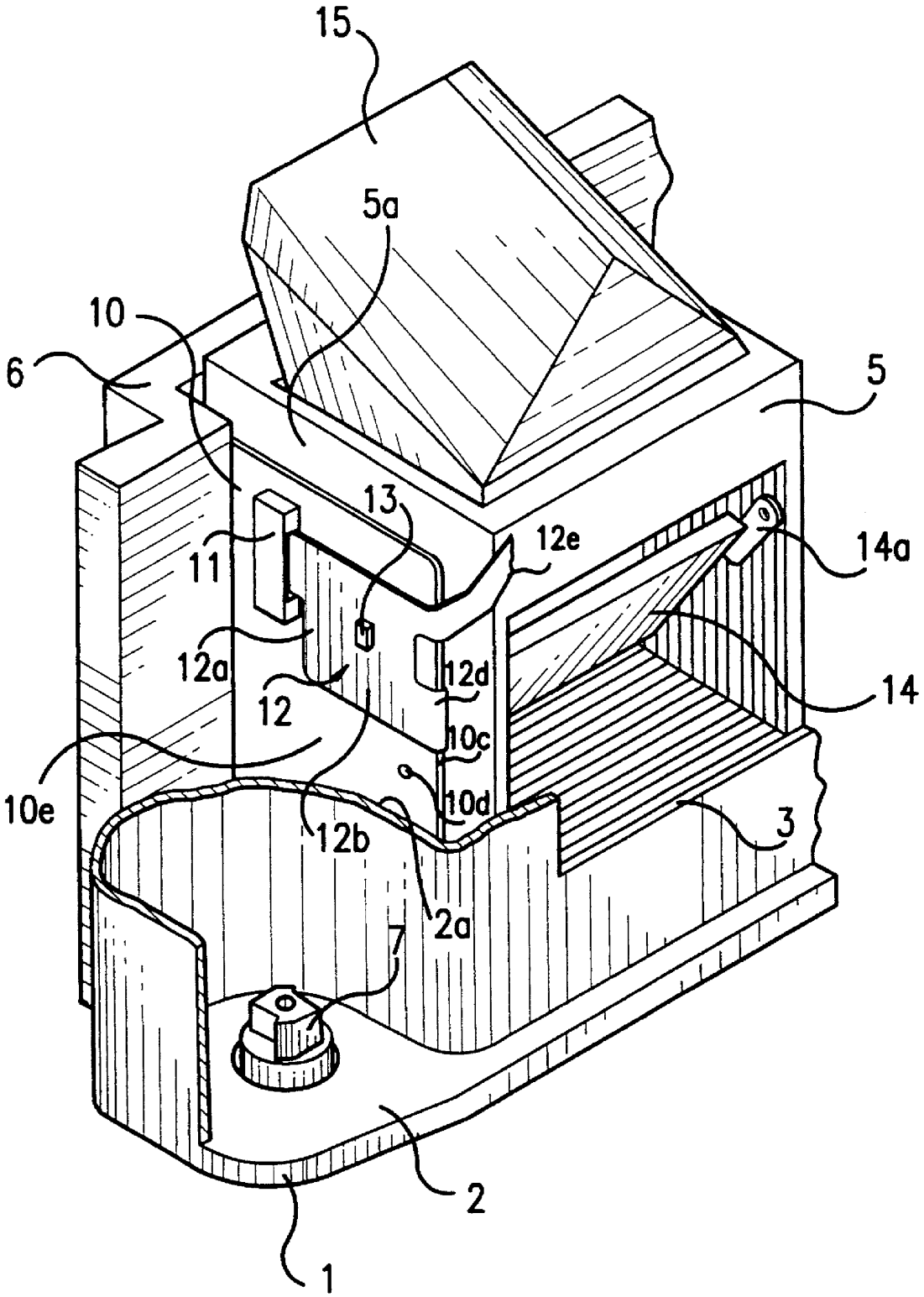


FIG. 13

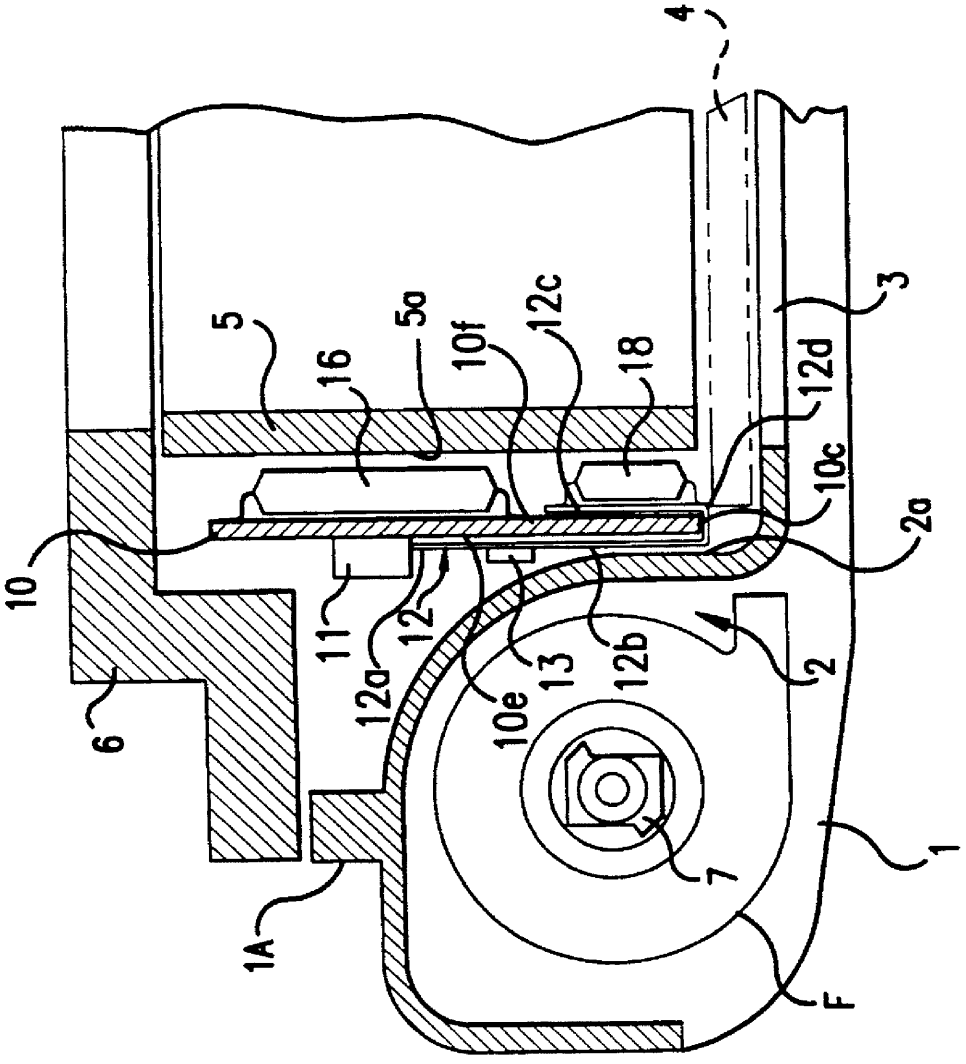


FIG. 14

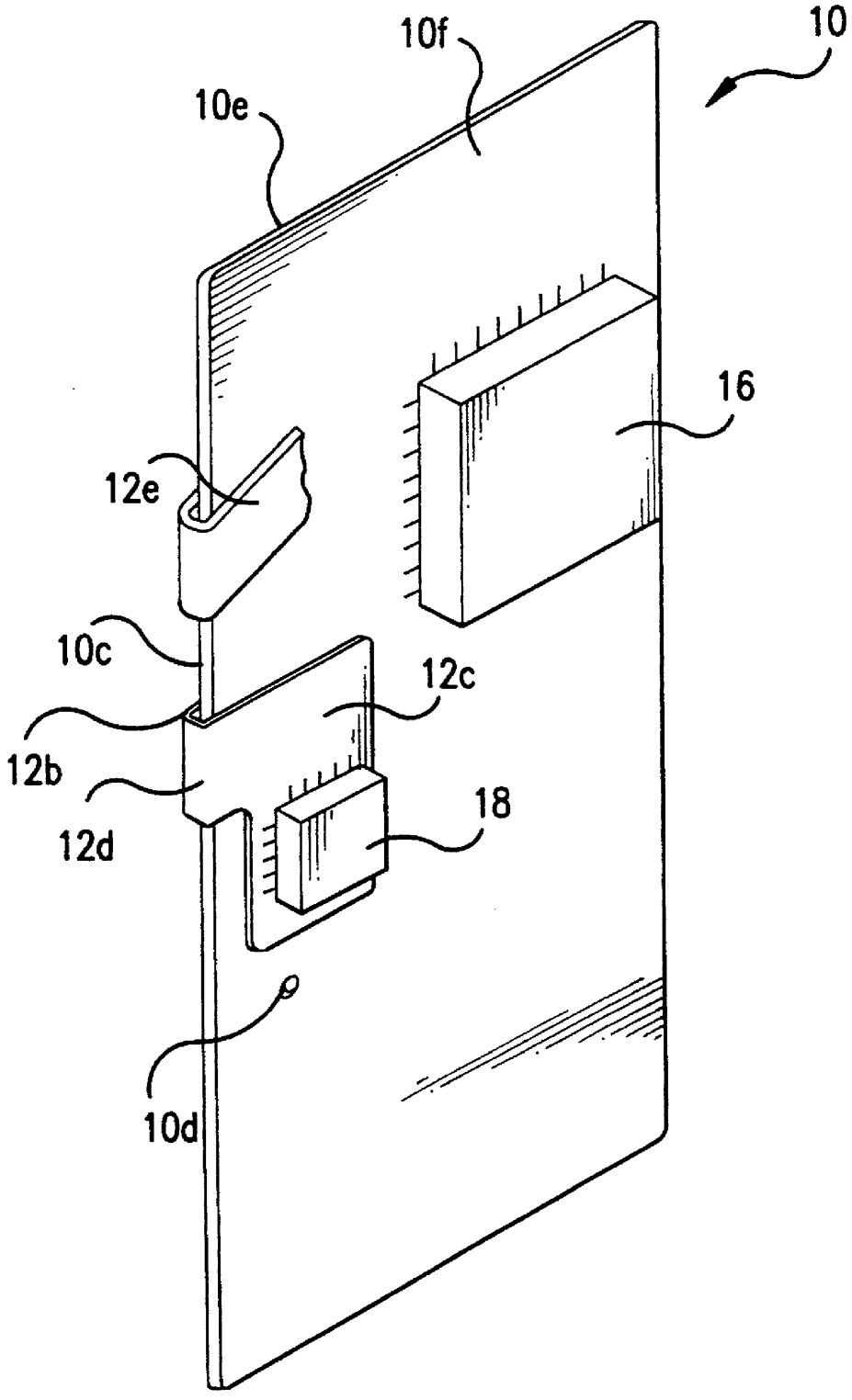


FIG.15

ELECTRICAL STRUCTURE FOR A CAMERA

BACKGROUND OF THE INVENTION

The invention relates to a camera in which flexible printed circuit board(s) are integrated within the camera to provide electrical connections for electrical structure parts, especially a camera with an improved flexible printed circuit board electrical structure that minimizes space requirements.

With conventional cameras of this type, it has been attempted to arrange a mounting board comprising an electrical control circuit alongside built-in components with a flat surface inside the camera and to install an electrical connecter, which is a connecting means to the various electrical components inside the camera, for electrically connecting an electrical board, such as a flexible printed circuit board (referred to hereafter as FPC board), to the mounting. In this case, in order to make it possible to arrange the thicknesses of the mounting board and the electrical connecter, a wide exclusive mounting region is necessary.

FIG. **11** shows an example of a conventional camera of this type. It presents a cross section that shows one side of the camera partially enlarged. In this drawing, the camera main body **1** is equipped with a cartridge chamber **2**, as the film chamber, into which a film cartridge F is loaded and an aperture component **3** through which the film runs out from and back to the cartridge chamber **2**.

Shutter unit **4** is shown by an imaginary line in the middle of the drawing to the front of the aperture component **3**. A shrouding component **5** is provided to the front of the shutter unit **4** and is a structural component that surrounds the photographic light path from the photo lens (not shown) to the film. The side of the shrouding component **5** closest to the cartridge chamber **2** consists of the flat outer wall **5***a*.

The front body **6** is attached to the front surface of the main body **1** through the joining component **1***a* so as to cover the shrouding component **5**. A commonly known rear cover (not shown) is positioned on the back side of the main body **1**.

A film rewinding fork **7** carries out film rewinding by connecting with the cartridge shaft of the film cartridge F loaded into the cartridge chamber **2**.

A flat surface portion **2***a* forms part of the outer wall of the cartridge chamber **2**. The flat surface portion **2***a* is positioned opposite the flat outer wall **5***a* of the shrouding component **5**. A mounting board **10** equipped with a controlling circuit for controlling the driving of the various electrical components inside the camera is positioned between the outer wall **5***a* and the flat portion **2***a* closest to the outer wall **5***a* of the shrouding component **5**.

A horizontal (or other) electrical connecter **11** is attached to the mounting surface **10***a* of the mounting board **10**. An FPC board **12**, which is the means by which the various electrical components within the camera are connected, is connected to the electrical connecter **11**.

In the structure of the basic conventional camera described above, because of the combined thickness of the mounting plate **10** and the horizontal electrical connecter **11**, it is necessary to ensure a sufficient gap, in which they are located, between the outer wall **5***a* of the shrouding component **5** and the flat surface portion **2***a* of the outer wall of the cartridge chamber **2**.

Therefore, in a conventional camera of this type, it is necessary to position the flat surface portion **2***a* of the outer wall of the cartridge chamber **2** well to the left side of FIG.

11. Thus, a structural layout must be used in the camera in which the entire cartridge chamber **2** is displaced to the left of the camera main body. As a result, the camera as a whole may become larger.

In other words, in a camera of the conventional structure described above, because a fairly wide exclusive mounting region is required in order to make possible the installation of mounting board **10**, the electrical connecter **11** mounted therein and the FPC board **12**, connected to the electrical connecter **11**, the camera as a whole becomes unavoidably larger.

When it is desired to provide enhanced features to the camera, additional electrical components must be provided. For such a camera, a two-sided mounting board is normally used. With such mounting boards, the added electrical components are located on one board surface while the electrical connector for use in electrical connection is placed on the opposite board surface to provide for component integration in the limited space.

However, as can be seen in FIG. **11**, should electrical components be placed on the other side of the mounting board **10** from the electrical connector **11**, the space between the flat outer wall **5***a* and the mounting board **10** must be increased with a commensurate increase in the distance between the flat outer wall **5***a* and the flat surface portion **2***a* of the outer wall of cartridge chamber **2**. Such a structure again increases the size of the camera.

SUMMARY OF THE INVENTION

The invention has been conceived in light of these types of problems. The invention has the object of providing a camera which has a structure comprising a mounting board, an electrical connecter mounted and connected to the mounting board, and an FPC board or the like connected to the connecter, that is an improved assembly and structure in which the size of the mounting portions of the camera is minimized. When providing enhanced features, additional electrical components may be mounted to the mounting board but in such a manner as to minimize the space required.

In order to meet these requirements, the basic camera of the invention comprises a main body with a flat surface on one portion of the outer wall that forms the film chamber, which is a cartridge chamber or a spool chamber; a mounting board with a portion that is adjacent to the flat surface, faces the flat surface in the main body and is approximately parallel thereto as well as an extension section that does not face the flat surface; an electrical connecter which is on the side opposite the main body on the mounting board and which is attached to the cover; and an electrical board that is connected to the electrical connecter.

In the basic camera of the invention, either a side flat portion of the main body that borders on the photo lens side or a flat portion on the front surface of the main body is used as the flat portion that forms part of the outer wall of the film chamber and is arranged alongside the mounting board.

Further, in the basic camera of the invention, either a horizontal or vertical electrical connecter is used and a flexible print circuit board that carries out the electrical connection with the electrical components within the camera is used as the electrical board.

According to the invention, the installing position and structure of the electrical connecter positioned inside the basic camera and the assembly and structure of the mounting board onto which the connecter is mounted are carefully

of the cartridge chamber **2** and an extension section **10***b* that does not face the flat surface **2***a;* an electrical connecter **11** which is on the top end of the mounting board **10** and is attached to the extension section **10***b;* and an FPC board **12** as an electrical board that is connected to the electrical connecter **11**.

In the first embodiment, the side flat portion **2***a* of the main body **1** that borders on the photo lens side (outer wall **5***a* of the shrouding component **5**) is used as the flat portion that forms part of the outer wall of the film chamber **2** and is arranged alongside the mounting board **10**. In addition, in this first embodiment, a parallel connecter is used as the electrical connecter **11** and an FPC board **12**, that carries out the electrical connection with the electrical components positioned within the camera, is used as the electrical board.

Through this structure, the installing position and structure of the electrical connecter **11** positioned inside the camera and the assembly and structure of the mounting board **10** onto which the electrical connecter **11** is mounted are carefully planned. The exclusive mounting region is constructed compactly, the mounting efficiency is improved, and an increase in the size of the camera can be prevented.

The extension section **10***b* of the mounting board **10** does not face the side flat component **2***a* on the outer wall of the cartridge chamber **2** and a horizontal electrical connecter **11** is connected and mounted to the extension section **10***b*. Horizontal is defined as substantially parallel to the mounting board **10**. In other words, the mounting board **10** is adjacent and parallel to the flat surface **2***a* of the outer wall of the cartridge chamber **2** and is positioned in the thickness space between the flat outer wall **5***a* of the shrouding component **5** and the flat surface **2***a*. In addition, the electrical connecter **11** is connected and mounted to the extension section **10***b,* which extends to a position that does not face the flat surface **2***a* of the outer wall of the cartridge chamber **2**.

An FPC board **12** is connected to the electrical connecter **11** as the means of connecting the wiring with the electrical components inside the camera. The FPC board **12** extends along the surface of the mounting board **10** facing the cartridge chamber **2**, as shown in FIGS. **1** and **2**.

In this type of structure, since the electrical connecter **11** is not on the mounting board **10** adjacent to the flat surface **2***a* of the outer wall of the cartridge chamber **2**, but is connected and arranged on the extension section **10***b,* the mounting space between the flat surface **2***a* of the outer wall of the cartridge chamber **2** and the flat outer wall **5***a* of the shrouding component **5** can be held to a bare minimum while allowing the electrical connecter **11** to be mounted efficiently.

FIGS. **3** and **4** show a second embodiment of the invention. In this embodiment, a vertical electrical connecter **20** is mounted to the extension section **10***b* of the mounting board **10**. Vertical is defined as substantially transverse to the mounting board **10** for this specification. An FPC board **21** is connected to the vertical electrical connecter **20** as the electrical board. In this embodiment, the FPC board **21** extends substantially parallel to a front flat surface portion **2***b* of the cartridge chamber **2** of the main body **1**.

With this structure, as with the first embodiment, the mounting space for the assembly of the electrical connecter **20** can be kept to a bare minimum, the exclusive region for mounting can be kept to a bare minimum, and, as a result, the size of the camera as a whole may be decreased.

FIGS. **5** and **6** show third and fourth embodiments of the invention respectively. In these drawings, components which are the same as or correspond to FIGS. **1–4** or FIG. **11** have the same reference numbers and detailed descriptions are omitted.

In the third and fourth embodiments shown in FIGS. **5** and **6**, respectively, a mounting board **32** is positioned in the space between a side flat surface portion **31***a* of the outer wall of the spool chamber **31**, containing a film winding spool **30**, and the flat outer wall **5***b* of the other side of the shrouding component **5**. The invention in these embodiments applies to the horizontal or vertical electrical connecters **33** or **36** which is mounted to the mounting board **32** and an FPC board **34** or **37** which is connected to the electrical connecter **33** or **36**, respectively. A front flat surface portion **31***b* comprises a front outer wall of the spool chamber **31**.

In FIG. **5**, the mounting board **32** is positioned parallel to and in the space between the flat outer wall **5***b* of the shrouding component **5** and the side flat surface portion **31***a* on the outer wall of the spool chamber **31**. In addition, a horizontal electrical connecter **33** is mounted to the extension section **32***a* of the mounting board **32**, which extends to a position that does not face the side flat surface portion **31***a* on the outer wall of this spool chamber **31**. In this embodiment, the FPC board **34**, which is the electrical board, is connected to the horizontal electrical connecter **33**. The FPC board **34** is positioned alongside the mounting board **32**.

With this structure, as with the previously described embodiments, the mounting space between the flat outer wall **5***b* of the shrouding component **5** and the side flat surface portion **31***a* on the outer wall of the spool chamber **31** can be kept to a bare minimum, and efficient mounting is possible by establishing the above-mentioned mounting space of the electrical connector **33** in the clear or open portion of the camera.

In FIG. **6**, as with the embodiment of FIGS. **3** and **4** described above, a vertical electrical connecter **36** is mounted onto the extension section **32***a* of the mounting board **32**. An FPC board **37**, which is the electrical board, extends from the connector **36** substantially parrallel to the front flat surface portion **31***b* of the spool chamber **31** outer wall on the front surface side of the body **1**. The result is the reduced space required.

FIGS. **7** and **8** show fifth and sixth embodiments, respectively, of the camera of the invention. In these figures, components that are the same as or correspond to those of previous embodiments have the same reference number attached and detailed descriptions are omitted.

In these figures, the differences from the previously described embodiments are that the mounting board **40** is positioned parallel to the front flat surface portion **2***b* on the outer wall of the cartridge chamber **2**, a horizontal electrical connecter **41** (see FIG. **7**) or a vertical electrical connecter **42** (see FIG. **8**) is mounted on the extension section **40***a* of the mounting board **40**, which does not face the flat portion **2***b,* and an FPC board **43** or **44**, which is the electrical board, is connected to the connecter **41** or **42**, respectively. In FIG. **7**, the FPC board **43** is positioned substantially parallel to the board surface of the mounting board **40**, but in FIG. **8** the FPC board **44** is positioned to extend in a direction transverse to the mounting board **40**.

FIGS. **9** and **10** show seventh and eighth embodiments, respectively, of the basic camera relating to the invention. In these figures, components that are the same as or correspond to those of the previous embodiments have the same reference numbers attached and detailed descriptions are omitted.

In FIGS. **9** and **10**, the differences from the previously described embodiments are the mounting board **50** is par-

allel to the front flat surface portion **31***b* of the outer wall of the spool chamber **31**, a horizontal electrical connecter **51** (see FIG. **9**) or a vertical electrical connecter **52** (FIG. **10**) is mounted on the extension section **50***a* of the mounting board **50**, which does not face the flat portion **31***b*, and an FPC board **53** or **54**, which is the electrical board, is connected to the connecter **51** or **52**, respectively. In FIG. **9**, the FPC board **53** is positioned substantially parallel to the board surface of the mounting board **50**, but in FIG. **10**, the FPC board **54** is positioned so as to extend in a substantially transverse direction from the mounting board **50**.

In each of the embodiments shown in FIGS. **5–10**, described above, as with the embodiments of FIGS. **1–4**, the mounting space between the components facing the side or front flat surface portions **2***a*, **2***b*, **31***a*, **31***b* on the outer wall of the film chamber (cartridge chamber **2**, spool chamber **31**, or the like) can be kept to a bare minimum. The structure in which the above-mentioned mounting board **40** or **50** is positioned parallel to the front flat surface portion on the outer wall of the film chamber in the main body **1** also has the advantage of being able to keep the space between the camera cover (not shown) or the like positioned on the front side of the front body **6** or the main body **1** and the flat portion to a bare minimum.

The basic camera of the invention is not limited to the structure of the embodiments described above. It is obvious that the shape, structure, or the like of the various camera components may be altered as is suitable, and various examples of alteration are conceivable. For example, in the embodiments described, the mounting boards **10**, **32**, **40**, **50** were positioned approximately parallel to the side or front flat surface portions (**2***a*, **2***b*, **31***a*, **31***b*) on the outer walls of the film chambers (**2**, **31**), and horizontal or vertical electrical connecters **11**, **20**, **33**, **36**, **41**, **42**, **51**, **52** were mounted to extension sections **10***b*, **32***a*, **40***a*, **50***a* and do not face the front flat surface portions (**2***a*, **2***b*, **31***a*, **31***b*). However, the same results may be obtained with similar structures.

Further, the invention is not limited to FPC boards **10**, **32**, **40**, **50** as the electrical boards. Various connecting means, such as lead lines or the like, may be used with suitable results.

As described above, according to the basic cameras relating to the invention, since the basic cameras comprise a main body with a flat surface on one portion of the outer wall that forms the film chamber, which is a cartridge chamber or spool chamber, a mounting board with a portion that is adjacent to the flat surface and faces the flat surface on the main body in a substantially parallel relationship and an extension section that does not face the flat surface, an electrical connecter which is on the side opposite the main body on the mounting board and which is attached to the extension section, and an electrical board that is connected to the electrical connecter, the structure produces various superior results, which are listed below, notwithstanding the simplicity and low price of the camera.

According to the basic camera of the invention, either a side flat portion of the main body that borders the photo lens side or a flat portion on the front surface of the main body is used as the flat portion that forms part of the outer wall of the film chamber and is arranged alongside the mounting board. Either a horizontal or vertical electrical connecter is used, and a flexible print board that carries out the electrical connection with the electrical components within the camera is used as the electrical board.

Through this structure, the installing position and structure of the electrical connecter positioned inside the camera and the assembly and structure of the mounting board onto which the electrical connecter is mounted are carefully considered. The exclusive mounting region is constructed compactly, the mounting efficiency is improved, and a size increase of the camera can be prevented resulting in a smaller, more compact, and user-friendly camera.

Building on the concept described with respect to the basic camera of the invention, the structure of an elementary advanced feature camera is shown in FIG. **12**.

With the mounting structure of the enhanced feature camera, when a two-sided mounting board **10** with a relatively thick electrical component (first electrical component **16**) mounted on one side, and with an electrical connector **11**, to connect the FPC board **12**, provided on the opposite side, is laid out in the space having limited width formed by the outer wall **5***a* of the shrouding component **5** and the flat side section **2***a* of the outer wall of the cartridge chamber **2**, it is necessary to widen the space to avoid interference between the outer wall **5***a* of the shrouding component **5** and the second mounting surface **10***f* on which the first electrical component **16** with a relatively large thickness is mounted.

Further, with the two-sided mounting board **10** described above, it is necessary to secure sufficient space to guarantee placement of the FPC board **12** along the first mounting surface **10***e* on which the electrical connector **11** is mounted.

To do so, the two-sided mounting board **10** is placed, taking the conditions described above into consideration, in the space between the outer wall **5***a* of the shrouding component **5** and the flat side section **2***a* of the outer wall of the cartridge chamber **2** (hereinafter called the direction of thickness). However, to obtain additional space for electrical components providing further enhanced features, without unduly increasing the size of the camera, it is necessary to make use of existing space in the camera by a higher density loading of the mounting board **10** and the FPC board **12**.

FIGS. **13** through **15** portray a first enhanced feature embodiment of the invention. In the figures, components identical or equivalent to those described earlier with respect to FIG. **12** are identified with the same reference numbers; hence, a detailed explanation of such components is omitted.

As shown in FIG. **13**, a quick return mirror **14** is provided inside the shrouding component **5**, which, as is commonly known, guides light to the finder optical system. The quick return mirror **14** operates in such a manner as to retreat from the light path to the film during shooting and to return to the original position after shooting. A revolving bearing unit **14***a* of the quick return mirror **14** is supported on an axis by the shrouding component **5** to permit the rotation of the quick return mirror **14**. A pentagonal prism **15** comprises a finder optical system and is a well known optical component.

According to the enhanced feature camera of the invention, a two-sided mounting board **10** is placed in a space with the necessary width formed between the shrouding component **5**, which is a first camera structural member having a nearly flat outer wall **5***a*, and a cartridge chamber **2** or a film chamber, which is a second camera structural member created by an outer wall having a flat side section **2***a* which is substantially parallel to the outer wall **5***a* of the shrouding component **5**. The two-sided mounting board **10** has a first mounting surface **10***e* facing and substantially parallel to the flat side section **2***a* of the outer wall of the cartridge chamber **2**. The mounting board **10** has first section of the first mounting surface **10***e* which is adjacent to and facing the flat side section **2***a*, and a second section which extends beyond the flat side section **2***a*. Moreover, the first mounting surface **10***e* and a second mounting surface **10***f* are on opposite sides

of the mounting board **10**. A first electrical component **16** with a certain thickness, such as IC, is loaded on the second mounting surface **10***f*.

A horizontal electrical connector **11** is mounted in the second section of the first mounting surface **10***e* of the mounting board **10**. The FPC board **12** is connected to the horizontal electrical connector **11** through a connection terminal **12***a*, and the surface **12***b* of the FPC board runs substantially parallel to the first mounting surface **10***e*.

Moreover, in the invention, the FPC board **12** extends to the opposite side, or second mounting surface **10***f* of the mounting board **10** by having an extended section **12***c* running substantially parallel to second mounting surface **10***f*. The extended section **12***c* is loaded with a second electrical component **18** with a certain thickness.

Thus, the FPC board **12** has a surface section **12***b* extended along the first mounting surface **10***e* within a space between the flat side section **2***a* of the outer wall of the cartridge chamber **2** and the first mounting surface **10***e* of the mounting board **10**, an extension section **12***e* for connection to an electrical circuit (not shown) along an edge section **10***c* of the mounting board **10**, and a bending section **12***d* which is bent around edge section **10***c* in addition to extended section **12***c*. The bending section **12***d* directs the extended section **12***c* along the second mounting surface **10***f* of the mounting board **10**.

As stated above, a second electrical component **18** thin enough to be placed in the space between the outer wall **5***a* of the shrouding component **5** and the mounting board **10**, is loaded on the extended section **12***c*, which is continuously formed through the bending section **12***d* as part the FPC board **12** and which extends along the second mounting surface **10***f* of the mounting board **10**. A third electrical component **13**, thin enough for the space between the surface section **12***b* of the FPC board **12** and the flat side section **2***a* of the outer wall of the cartridge chamber **2** is loaded on the surface section **12***b*.

Shown in FIGS. **13** and **15** is an opening **10***d* provided in the mounting board **10**. The opening **10***d* is used to anchor the mounting board **10** to the outer wall of the shrouding component **5** using an anchoring means (not shown) such as an anchoring screw. In such a structure, when the two-sided mounting board **10**, with an electrical connector **11** loaded on the first mounting surface **10***e* in an electrically connected condition and with a first electrical component **16** with a certain thickness loaded on the second mounting surface **10***f*, is laid out and placed within the space having a limited width formed by the flat side section **2***a* in the outer wall of the cartridge chamber **2** and the outer wall **5***a* of the dark box member, a space is secured in the direction of thickness toward the side of the second mounting surface **10***f*, which is the mounting side of the first electrical component **16**.

The reasons for securing enough space in the direction of thickness toward the second mounting surface **10***f* are to ease the restriction on the thickness dimension of the electrical component which becomes mountable, and to eliminate problems in the space in the thickness direction if the surface section **12***b* of the FPC board **12** connected to the electrical connector **11** is placed along the first mounting surface **10***e*.

The technological reasons for not requiring the mounting board **10** to use the same surface for loading the first electrical component **16** and loading the horizontal electrical connector **11** are that the FPC board **12**, to be connected to the horizontal electrical connector **11**, may cause interference in the first electrical component **16** if it is placed along the horizontal direction of the mounting board **10**, that the electrical connector **11** and the electrical component **16** need to be placed further apart to begin with for convenience of formation of a wiring pattern on the FPC board **12** and, that, in order to realize high density mounting, it is desirable to spread and place electrical components on both sides of the board.

In the invention, only relatively thin electrical components, such as the third electrical component **13**, can be loaded on the surface section **12***b* of the FPC board **12**. However, the bending section **12***d* which is bent around the edge section **10***c* of the mounting board **10** and the extended section **12***c* stretched along the second mounting surface **10***f* between the outer wall **5***a* of the shrouding component **5** and the second mounting surface **10***f* of the mounting board **10** enable loading of the second electric component **18** on the extended section **12***c*. Moreover, the structure of the invention allows the loading of electrical components with thicknesses exceeding the limit for loading on the surface **12***b* of the FPC board **12** on the side of the first mounting surface **10***e* to be loaded on the second mounting surface **10***f*, e.g., the second electrical component **18** on the extended section **12***c* of the FPC board **12** provided along the side of the second mounting surface **10***f*.

Stated more precisely, it becomes possible to load on the extended section **12***c* the second electrical component **18** with a width greater than the space, in the direction of thickness, between the surface section **12***b* of the FPC board **12** and the flat side section **2***a* of the outer wall of the cartridge chamber or the space, in the direction of thickness, between the surface section **12***b* of the FPC board **12** and the first mounting surface **10***e* of the mounting board **10**.

Thus, the invention enables the mounting, without overly restricting their thickness, of electric components on the FPC board **12** which is provided inside a camera, resulting in improved mounting efficiency on the mounting board **10** and the FPC board **12**. Such improved efficiency of mounting brings about superior benefits by enabling high density mounting, which leads to a reduction of camera size, and enhancement of the camera's capabilities through increasing the size of the electric circuitry.

FIG. **16** presents a second enhanced feature embodiment of the invention. In the figure, components equivalent to the components described in FIGS. **1–3** and FIG. **5** are identified with the same reference numbers and a detailed explanation is omitted. In this second enhanced feature embodiment, a mounting board **10** is placed between the side of a flat section **21***a* in the outer wall of a spool chamber **21**, which is a film chamber having a film winding spool **20**, and the other flat outer wall **5***b*, which is a structural member, of the shrouding component **5**. The invention is applied to a horizontal electrical connector **11** which is mounted on the mounting board **10** and the FPC board **12** mounted to the connector **11**.

It is easily understood that, even in such a structure, mounting of the mounting board **10** and the FPC board **12** is realized, as in the case of the first enhanced feature embodiment, by using the space with the minimum width necessary between the flat outer wall **5***b* and the flat side section **21***a* of the wall of the spool chamber **21**, by providing a horizontal electrical connector **11**, and by the FPC board **12** having an extended section **12***c* connected to the electrical connector **11** after bending around edge section **10***c* of the mounting board **10**.

The invention of the enhanced feature embodiments is not limited to the structures above, but can obviously be altered

and changed, if necessary, to fit the shape and structure of each component of a camera. For example, in the enhanced feature embodiments above, structures were described in which spaces formed between the outer wall **5***a*, **5***b* of the shrouding component **5** and the flat section **2***a*, **21***a* on the outer walls of the cartridge chamber **2** and the spool chamber **21**, which are film chambers, are used as spaces to place the mounting board **10** and the FPC board **12**. However, the invention is not limited to the embodiments, but is equally effective in a structure where space in the direction of thickness is formed by structural members in the camera in a broader sense such as the body of the camera, the front body of the camera, various structure components, assembled structure components, exterior members, electrical components, and electrical boards.

Moreover, in the enhanced feature embodiments above, a structure was described in which the FPC board **12** is bent around the edge section **10***c* of the mounting board **10** that is toward the rear of the camera when held in a normal operating position. However, it is obvious that the invention is not limited to the edge section **10***c* toward the rear edge of the body. It is also obvious that in the enhanced feature embodiments described above, the location for mounting the second electrical component **18** can be anywhere on the front or back surfaces of the extended section **12***c* in the FPC board.

Further, in the enhance feature embodiments described above, an example was provided of the placement of the mounting board **10** having the FPC board **12** between the outer wall **5***a*, **5***b* of the shrouding component **5** and the flat side surface **2***a*, **21***a* of the film chamber. However, it is obvious that the surrounding area is not limited to a flat surface, but a curved side surface, inclined surface, or dropped surface can also be used as long as there is space in the thickness direction enabling placement of a two-sided mounting board **10**.

The invention of the enhanced feature embodiments enables mounting without unduly restricting the thickness of electric components loaded on an FPC board which is provided inside a camera, resulting in improved mounting efficiency. Such improved efficiency brings about superior benefits by enabling high density mounting, which enables the reduction in camera size and provides enhancement of the capability of the camera through increasing the size of the electric circuitry.

The invention of the enhanced feature embodiments especially improve the mounting efficiency and realize higher density mounting by having a first electrical component with a certain thickness loaded on the mounting board on the opposite side of the connector loading side and by having a relatively thick second electrical component loaded on the extension section of the FPC board running along the same surface to which the first electrical component is mounted. Moreover, the invention of the enhanced feature embodiments can further enhance the advantages described above by having relatively thin electrical components loaded on the board surface of the FPC board running along the connector loading surface of the mounting board.

What is claimed is:

1. An electrical components mounting assembly for a camera having a body comprising a front containing a lens, a back, a first side, a second side, a top, a bottom, and an internal structural member extending from the front to the back, comprising:

a mounting board mounted in the camera body substantially parallel to a one of the front of the camera and a side of the internal structural member;

an electrical connector mounted to a first side of said mounting board; and

a FPC board electrically connected to said electrical connector, wherein the camera has a further structural member opposing the one of the front of the camera and the side of the internal structural member and offset by a first thickness space and the further structural member further opposes the other of the front of the camera and the side of the internal structural member and is offset by a second thickness space, said mounting board having a section opposing the further structural member and an extension section that does not oppose the further structural member and said electrical connector is mounted to said mounting board in said extension section.

2. The mounting assembly according to claim **1**, wherein said electrical connector has an opening substantially parallel to said mounting board.

3. The mounting assembly according to claim **1**, wherein said electrical connector has an opening transverse to a plane of the mounting board.

4. The mounting assembly according to claim **2**, wherein said FPC board is mounted in the opening of said electrical connector to make the electrical connection, said FPC board extending substantially parallel to said mounting board.

5. The mounting assembly according to claim **4**, wherein said mounting board and said FPC board extend into the first thickness space which is between the internal structural member and the further structural member.

6. The mounting assembly according to claim **1**, wherein the further structural member is a film cartridge chamber.

7. The mounting assembly according to claim **1**, wherein the further structural member is a film take-up chamber.

8. The mounting assembly according to claim **5**, wherein said mounting board and said FPC board extend into the second thickness space which is between the camera front and the further structural member.

9. The mounting assembly according to claim **4**, wherein said FPC board is mounted in the opening of said electrical connector to make the electrical connection, said FPC board extending substantially transverse of the plane of said mounting board.

10. The mounting assembly according to claim **9**, wherein said mounting board extends into a one of the first and second thickness spaces and said FPC board extends into the other of the first and second thickness spaces.

11. The mounting assembly according to claim **4**, further comprising a first electrical component mounted on a second side of said mounting board.

12. The mounting assembly according to claim **11**, further comprising a second electrical component mounted to said FPC board.

13. The mounting assembly according to claim **11**, wherein said FPC board bends around an edge of said mounting board and has an extended section along the second side of said mounting board.

14. The mounting assembly according to claim **13**, further comprising a second electrical component mounted to said extended section of said FPC board.

15. The mounting assembly according to claim **14**, further comprising a third electrical component mounted to said FPC board.

16. The mounting assembly according to claim **14**, wherein said mounting board and said FPC board extend into the first thickness space.

17. A camera, comprising:

a main body with a flat surface on one portion of an outer wall that forms a film chamber;

a mounting board with a portion that is adjacent to said flat surface and faces said flat surface of the film chamber in a substantially parallel relationship and an extension section that does not face said flat surface;

an electrical connector which is mounted to said extension section; and

an electrical board that is connected to said electrical connector, wherein the flat surface that forms part of the outer wall of the film chamber opposes either a side flat portion of the main body that encloses a photo lens to define a first thickness space or an inner front surface of the main body to define a second thickness space.

18. The camera according to claim **17**, wherein the electrical connecter is either horizontal or vertical.

19. The camera according to claim **17**, wherein the electrical board is a flexible print board that carries out the electrical connection with the electrical components positioned within the camera.

20. A camera, comprising:

a first camera structure member;

a second camera structure member comprising a side wall section facing part of the first camera structure member;

a two-sided mounting board comprising a first section placed in the vicinity of and facing the side wall section of the second camera structure member and a second section extending to the position not directly facing the side wall section;

a horizontal connector for use in electrical connections loaded on the second section of the mounting board;

a first electrical part loaded on the opposite surface from the loading surface of the horizontal connector for use in electrical connections in the mounting board; and

a flexible printed circuit board to be connected to the horizontal connector for use in electrical connections and to be placed along the connector loading surface of the mounting board, wherein the flexible printed circuit board is placed extending to the surface opposite from the connector mounting surface around an edge section of the mounting board, and wherein a second electrical part is loaded on the extended opposite surface.

21. The camera according to claim **20**, wherein the first camera structural member is the side outer wall of a shrouding component placed within the camera.

22. The camera according to claim **20**, wherein the second camera structural member is the outer wall of either a cartridge chamber or a spool chamber.

23. The camera according to claim **20**, wherein a relatively thick electrical part is used as the first and second electrical parts.

24. The camera according to claim **23**, wherein a relatively thin electrical part is loaded on the board surface of a flexible printed circuit board to be placed along the connector loaded surface of the mounting board.

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