

Description

Technical Field

The present invention relates to a guide mechanism according to the preamble of Claim 1. Such a guide mechanism is known from for example DE-A-28 47 319.

This application is related to the commonly assigned application filed on even date herewith, International Publication No. WO 87/07036, entitled "Zoom Lens Drive System for lens shutter type of Camera", the disclosure of which is expressly incorporated by reference herein.

It is an object of the invention to provide a lens shutter type of camera with an axially movable lens barrel and with a shutter block which is attached to the movable part of this lens barrel. In this camera operational signals should be conducted between a camera body and the shutter block.

DISCLOSURE OF INVENTION

A flexible printed circuit board, i.e., an FPC, in a lens shutter type of camera which is adapted to conduct operational signals from the camera body to a shutter block attached to an axially movable lens barrel within the camera. A guide plate is provided for the FPC which has a front end with at least one bent portion and a rear end attached to the camera body which has a second bent guide portion thereon. The front guide plate end is attached to the shutter block. The lens shutter type of camera can also include an anti-reflection device attached to the flexible printed circuit board.

In another aspect of the present invention, a lens shutter type of camera is provided having a photographing optical system with a zoom lens having a rotatable cam ring with cam grooves engaged by at least one lens group in the zoom lens which is movable along an axis of the photographing optical system in order to vary the optical length of this optical system in response to rotational motion of the cam ring.

Other objects, features and advantages of the present invention will hereinafter be described.

BRIEF DESCRIPTION OF DRAWINGS

The above and other objects, features, and advantages of the present invention will be described in greater detail with respect to the accompanying drawings, in which like reference numerals represent similar elements throughout the several views, and wherein:

Fig. 1 is a schematic perspective view of a first embodiment of a lens shutter type of camera and an exploded perspective view of one embodi-

ment of a guiding device for a flexible printed circuit board (i.e., an FPC) with a cam ring being partially cut away;

Fig. 2 is a longitudinal sectional view of a lens barrel block and two photographing optical lenses formed in accordance with the present invention;

Fig. 3 is a perspective view of the FPC board guide member of Fig. 1;

Fig. 4 is a sectional view of a mechanical arrangement of an FPC board guide plate with respect to the space defined between the cam ring and a front lens group frame;

Fig. 5 is a side elevational view of an FPC board which is illustrated in extension (in dashed lines) and in a deformed position (in solid lines), respectively;

Fig. 6 is a side elevational view of a light intercepting means used in association with an FPC board;

Fig. 7 is an exploded perspective view of a lens barrel block used in the camera of Fig. 1;

Fig. 8 is a developed view of the camming grooves in a "flattened" cam ring used to surround the front and rear lens element groups of the photographic optical system of the camera of Fig. 1.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will now be described below in greater detail, with specific reference to the accompanying drawings which illustrate a variety of embodiments and features of the present invention.

The description will be generally provided in accordance with the following general sub headings:

A. The Overall Camera Construction for a Lens Shutter Type of Camera

B. FPC Board Guide and Anti-Reflection Mechanism

A. Overall Camera Construction for a Lens Shutter Type of Camera

The overall construction of a lens shutter type of camera formed in accordance with the present invention is well illustrated in Figs. 1, 2, and 7. A lens shutter type of camera formed in accordance with the present invention essentially comprises a photographic optical system like a zoom lens barrel block 1. Additionally it comprises a finder... and strobe block 2 (hereinafter referred to as a finder block), a light emitter 3 and a light receiver 4 forming a portion of a distance measuring, i.e., AF, device, and a zooming motor 5 which is used for the zooming operation of the photographing optical system. All of these elements are secured to a base 6 which forms an immovable

portion of the camera body.

Base 6 includes, as is illustrated in Fig. 2, a lens barrel supporting plate portion 6a which lies in a plane which is perpendicular to the optical axis of the lens; and a horizontal supporting plate portion 6 is provided which extends at right angles from the lens barrel support plate portion 6a. Support plate portion 6 extends beyond the side edge of plate 6a, in order to support finder assembly 8 and strobe assembly 9. The base further comprises motor supporting plate portions 6 which are positioned perpendicularly with respect to the horizontal support plate portion 6. Lens barrel block 1 is supported on lens barrel support plate portion 6a, which has a central opening (unreferenced) for receiving the lens barrel block. A zooming motor 5 is attached to motor support plate portions 6 and is located above the central portion of lens barrel block 1. Preferably, only a single such motor (e.g., a DC motor) is used to drivingly engage all of the movable elements of the system. A distance measuring device includes a light emitter 3 and a light receiver 4, which are secured to the horizontal support plate portion of base 6, and which are located on opposite sides of zooming motor 5.

Finder block 2 is secured to the right hand portion of horizontal support plate portion 6, as viewed from the front of the camera.

Lens barrel block 1 is adapted to be actuated by zooming motor 5, and the construction of this block will be described hereinbelow with more specific reference to Figs. 1, 2, 7. A rear securing plate 11 is mounted to lens barrel support plate portion 6a of base 6 by fastening screws 10, as is best illustrated in Fig. 7. Rear securing plate 11 includes four guide rods 12 which are attached to and through bores in the rear portion of the guide plate and which are located about the optical axis of the photographing optical system and parallel to this axis. A front securing plate 13 is secured to the front ends of guide rods 12; these guide rods and plates are the main securing elements for lens barrel block 1.

A rotatable cam ring 14 is positioned between front and rear securing plates 13 and 11, respectively; a sector gear 15 is provided about a substantial portion (but preferably not the entire 360° of the outer periphery of cam ring 14; this gear can be attached to the cam ring by conventional means, e.g., via set screws 15a, as seen in Fig. 1; this gear is adapted to engage, either directly or indirectly, a first pinion 7 (Fig. 1) which is positioned between the gear train support plate and the motor support plate portion. Gear 15 can be a sector gear which will cover a predetermined range of rotational movement of cam ring 14. The cam ring is itself provided with Zooming cam grooves 20 and 21 (see Fig. 1) which are used to engage the front and rear lens element groups, respectively.

Fig. 8 is a schematic or developed view of zoom-

ing cam grooves 20 and 21 of ring 14. Cam groove 21, used to engage the rear lens element group, includes an extreme wide angle fixing section 21a, a variable magnification section 21b inclined upwardly (as seen in Fig. 8) from section 21a, and an extreme telephoto fixing section 21c. Cam groove 20, used for the front lens element group, includes a section 20a for opening and closing barrier block 30, a lens retraction section 20b, an extreme wide angle fixing section 20c, a variable magnification section 20d, an extreme telephoto fixing section 20e, a macro transfer section 20f, and an extreme macro fixing section 20g.

When the term macro is used throughout this specification, it refers to a "close-up" photographing configuration for the camera. Previously, the term "macro" has occasionally been used to mean "bigger than life"; however, the term macro has been used throughout this specification as an equivalent term for close-up, and whenever it is used it should be taken to have such a meaning unless indicated to the contrary herein.

The total angle θ_1 of the rotational displacement of cam ring opening and closing section 20a, lens retraction section 20b, and extreme wide angle fixing section 20c of zooming cam groove 20 is identical to angle θ_1 of the extreme wide angle fixing section 21a of zooming cam groove 21. Angle θ_2 of the variable magnification, i.e., variable power, section 20d of zooming cam groove 20 is identical to angle θ_2 of the variable magnification, i.e., variable power, section 21b of zooming cam groove 21. Further, the total angle θ_3 of the extreme telephoto fixing section 20e, the macro position fixing section 20f, and the macro transfer section 20g, is equal to the angle θ_3 of the extreme telephoto fixing section 21c. In the illustrated embodiment, the zooming range is between approximately 35mm and approximately 70mm.

A roller 17, as illustrated in both Figs. 2 and 7, is positioned within zooming cam groove 20; this roller is attached to a front lens group frame 16. A roller 19 of rear lens group frame 18 is positioned within zooming cam groove 21, again as illustrated in Figs. 2 and 7. Front lens group frame 16 and rear lens group frame 18 are movably guided by guide rods 12, and a decorative frame 22 and shutter block 23 are secured to the front lens group frame 16 via set screws 22a, as best seen in the exploded view of Fig. 7, as well as in the cross-sectional view of Fig. 2.

The front lens frame 24 which supports front lens element group L1 is engaged by shutter block 23 via helicoid 25, which is shown in Fig. 7. Front lens frame 24 includes an arm 24a which engages lens feeding lever 23a of shutter block 23 (see Fig. 7), so that when lens feeding lever 23a rotates in a circumferential direction in order to rotate front lens frame 24, the front lens frame will move along the direction of the optical axis of the photographing optical system under the guidance of helicoid 25. Rear lens element group L2

is directly attached to rear lens group frame 18, as seen in Fig. 2. One desired configuration of lens groups L1 and L2, as illustrated in Fig. 2, are disclosed in commonly assigned U.S. Patent Application Serial No. 935,982, filed on November 28, 1986, the disclosure of which is expressly incorporated by reference herein.

The structure of shutter block 23 is known per se. This shutter block rotates lens feeding lever 23a over a predetermined angular displacement in accordance with a detection signal which is received by the shutter block from the distance measuring device, as described hereinafter, via a pulse motor which is incorporated within the camera body and which is adapted to open shutter sector 23b, which has been closed for a predetermined time, and to thereafter return lens feeding lever 23a into its original position after the shutter has again closed. This type of shutter block is disclosed, e.g., in unexamined Japanese Published Patent Application (KOKAI) No. 60-235,126, dated November 21, 1985, the disclosure of which is expressly incorporated by reference herein. The present camera utilizes such a shutter block in the fundamental way disclosed therein.

Finder block 2 includes finder assembly 8 and strobe assembly 9. The finder device and the strobe device are adapted to vary, respectively, the field of finder view and the illumination angle, i.e., the intensity of the strobe, in accordance with variance in the focal length of the lens barrel block 1. Zooming motor 5 is used as a power source both for finder control and strobe control; only a single motor need therefore be used.

As seen in Fig. 1, sector gear 15 of cam ring 14 is engaged by a second pinion 50 which is different from the first pinion 7 referred to previously. Shaft 51, to which pinion 50 is attached, extends rearwardly towards the rear portion of base 6, and is provided with a reduction gear train 52 adjacent a rear end of the shaft. The reduction gear train includes a final gear 52a which meshes with a rack 53a of movable cam plate 53. This substantially flat cam plate 53 is slidable in right and left hand lateral directions, as viewed in Fig. 1, and includes a downwardly bent portion 53b at its rear end, as best shown in Fig. 1. Rack 53a is formed on the lower end of bent portion 53b of cam plate 53. Reduction gear train 52 is adapted to reduce rotation of gear 15 in order to restrict or limit the lateral movement of cam plate 53. The cam plate is provided with a variable power cam groove 55 for guiding movement of finder device 8, a parallax correction cam groove 56, and a strobe cam groove 57 for guiding movement of strobe device 9.

The lens system used in finder optical assembly 8 essentially comprises a subject lens group L3, an eyepiece group L4, and a movable variable power lens group L5, and further comprises a deflection prism P1 which is used when the camera is placed

into the macro or close-up mode.

Variable power lens group L5 makes the image picture size, which is adapted to vary in accordance with the variable power operation of lens barrel block 1, be coincident with the field of view in finder device 8. Deflection prism P1 will enter the optical path of the finder lens system only in the macro mode, in order to adjust parallax which otherwise occurs in such mode. Specifically, parallax which inevitably occurs when using lens shutter type of cameras will increase as the subject whose picture is being taken approaches the camera; and, accordingly, a large parallax would normally result in the macro mode. In order to solve this problem and reduce the large parallax which otherwise occurs in the macro mode, deflection prism P1 is provided in the form of a wedge with a thicker lower end and a thinner upper end. Deflection prism P1, when located along the optical axis of the finder optical system, serves to deflect rays downwardly in order to take a picture of a subject which is located extremely close to the camera.

Strobe assembly 9 restricts or limits the illumination angle when the focal length of the photographing lens is large, namely, as the zoom lens is fed forwardly; and the strobe assembly 9 is moved to increase the illumination angle in the macro mode, in order to decrease the amount of light which reaches the subject. In the embodiment illustrated, strobe device 9 includes a fixed Fresnel Lens L6, a movable concave reflector 59, and a xenon lamp which can be moved along the direction of the optical axis of the strobe. Alternately, a simple strobe could be used in which the illumination angle would be fixed. Although such a strobe arrangement is possible, it is preferable to move the lamp in the optical axis direction in accordance with movement of the zoom lens in order to optimize the quantity of light given to a subject during photography, dependent upon the position occupied by the photographing optical system in the zoom lens.

B. FPC Board Guide and Anti-Reflection Mechanism

The FPC board guide and its associated anti-reflection mechanism of the are best illustrated in Figs. 1, 3, 4, 5 and 6.

In a lens shutter type of camera as in the present invention, it is necessary to provide operational signals to shutter block 23 on lens barrel block 1 from the body of the camera. Shutter block 23 is supported by support frame 22 of front lens element group L1, and accordingly moves together with front lens element group L1 along the direction of the optical axis. In order to send operational signals from the camera body to the shutter block 23 which moves in such an optical axis direction, in response to outputs of the distance measuring device, i.e., the range finder, and, e.g., the exposure control device on the camera body, a flex-

ible printed circuit board (hereinafter referred to as an FPC board) is desirably used. The mechanism for guiding movement of the FPC board and the anti-reflection assembly which are used in conjunction with such board are described hereinbelow in detail with more specific reference to Figs. 1 - 6.

FPC board 160 (see Figs. 1 and 3) provides operational signals to shutter block 23 from one side of the camera body. This board is made from a flexible synthetic resin sheet having a predetermined printed circuit pattern thereon; in general, such FPC boards are well known.

As illustrated in Fig. 1, FPC board 160 has a connecting pattern 161 at a front end of the board to which shutter block 23 can be electrically connected, and a rear connecting pattern 162 to which a CPU (a central processing unit which is not illustrated in the drawings) which is provided in the camera body can be electrically connected. FPC board guide plate 163, which guides FPC board 160, is secured to the camera body at a base or rear portion thereof, and extends into a space between cam ring 14 and decorative frame 22, forwardly of lens barrel block 1. Securing clips 166 are provided for attaching the FPC board 163 to the guide plate, and clamping members 167 (see Fig. 4) are provided for attaching the FPC board to the front portion of a camera body frame, e.g., which is die cast, or to the rear portion of a lens barrel frame (base 6).

A bent guide 165 is provided on the front end of FPC board 163; this bent guide comprises a pair of front and rear guide pins 168 and 169. These guide pins are preferably stationary (although it is conceivable that rollers could be used instead) and are adapted to maintain the curvature of the FPC board 163 along an immovable bent portion 160a of the board, at which point the board extends forwardly from the camera body and is bent in opposite directions so as to extend towards the camera body. FPC board 160, which is bent around guide pin 168, extends rearwardly into the gap between guide pin 169 and FPC board guide plate 163, and is again freely bent forwardly by or at a movable bent portion 160b.

It should be appreciated that the relative positional relationship between guide pins 168 and 169, and FPC board 160, is constant, irrespective of the movement of shutter block 23 forwardly and rearwardly in an axial direction. Accordingly, guide pins 168 and 169 are preferably immovable pins which are not rotatable. Alternately, it is possible to replace these pins with guide rods or shafts over which the FPC board will be bent in opposite directions.

As shutter block 23 moves forwardly and rearwardly, the movable bent portion 160b of the FPC board also moves forwardly and rearwardly. Although the extension of the FPC board 160 extends rearwardly from the board guide plate 163, as shown in Figs. 1 and 3, actually the rear extension of FPC

board 160 can be bent forwardly along, and by, a bent guide 170 of guide plate 163 in order to move the board towards the front part of the camera body.

The inner surface of FPC board 160 faces the gap between the front lens group frame 16 (as well as decorative frame 22) and rear group lens frame 18, and there is therefore a possibility that rays of light which are incident upon the lens system will be reflected by FPC board 160, resulting in undesirable internal reflection. In order to prevent such internal reflection, an anti-reflection material or apparatus can be (and should be) provided on FPC board 160.

Several alternate solutions can be used to provide anti-reflection means on the FPC board 160. As one solution, FPC board 160 can be formed from a dull-finish, black synthetic resin material. Alternately, the FPC board 160 can be provided along its inner surface, i.e., on its surface which is adjacent to the optical axis of the camera, with an anti-reflection sheet 171, as illustrated in Fig. 6. Such a sheet can comprise, e.g., a dull-finish black paper or the like, and is adapted to be placed on the FPC board 160. Preferably, the anti-reflection sheet 171 is simply loosely superimposed on the FPC board without being adhered to the board in order to provide flexibility against deformation due to expansion and shrinkage of the material. Sheet 171 lies on the FPC board in the area between bent portions 160a and 160b of FPC board 160. A third solution is to coat at least the inner surface of FPC board 160 with an anti-reflective layer.

With the guide mechanism of the FPC board and with the anti-reflection mechanism which are noted above, when the zooming motor 5 is driven to rotate in order to rotate cam ring 14, front lens group frame 16 and rear lens group frame 18 will be moved in directions along the optical axis in accordance with the cam grooves 20 and 21 on cam ring 14 in order to effect a zooming operation, and can be moved into a position in which the camera is in its macro setting or mode. Movement of the front lens group frame 16 causes shutter block 23 to move in the same direction, so that FPC board 160 will be extended in accordance with movement of the shutter block 23. Extension of the board is made possible by displacement of movable bent board portion 160b. Specifically, FPC board 160 is integrally connected to the CPU in the body of the camera at rear end connecting pattern or portion 162 (see Fig. 1) and the intermediate portion of the FPC board is guided by FPC guide plate 163. The immovable bent portion 160a of the FPC board 160 is immovably guided by guide pins 168 and 169; and, accordingly, when the front end connecting pattern 161 of FPC board 160 moves in accordance with or in response to movement of shutter block 23, only the movable bent board portion 160b will be displaced forwardly and rearwardly in order to absorb the movement of shutter block 23, as illustrated in Figs. 3 and

5. In this fashion, FPC board 160 can be surely guided within the annular space 164 located between cam ring 14 and decorative frame 22 (Fig 4).

Since the FPC board 160 has an anti-reflection structure as disclosed above, internal reflections which would otherwise cause an undesirable phenomena, e.g., a flare or a ghost, will not occur.

Claims

1. A camera body having a flexible printed circuit board - FPC-board - (160) for passing operational signals to a shutter block (23) of a lens characterised

- in that the camera body comprises an FPC-guide device (163; 165, 168, 170) which has at its front end a guide member (168),
- in that said FPC-board (160) is secured to the camera body at the rear end thereof (162) and extends along the FPC guide device (163; 165, 168, 169, 170) and is bent along said guide member (168) toward the camera body, and
- in that said FPC board (160) is further bent toward the shutter block (23) for securing its front end (161) to the shutter block (23).

2. A camera body in accordance with claim 1, characterised in that said guide device (163; 165, 168, 169, 170) has front and rear plate ends each comprising a bent guide portion (165, 170).

3. A camera body in accordance with one of the preceding claims, characterised in that said guide device (163; 165, 168, 169, 170) has an inner surface against which said FPC-board (160) is positioned, and in that said inner surface comprises as said guide member (168) at least one stationary pin (168) around which at least a portion of said FPC-board (160a) is immovably positioned.

4. A camera body in accordance with claim 3, characterised in that said guide device (163, 165, 168, 169, 170) has a second pin (169) about which said FPC-board (160b) is movably positioned, in that said first pin (168) is located adjacent a first end of said guide device (163, 165), and in that said second pin (169) is located between first and second guide device ends (163, 165, 170).

5. A lens shutter type of camera having a lens barrel block (1) comprising an axially movable lens barrel (22), comprising a shutter block (23) being attached to said lens barrel (22) and having a camera body of one of the preceding claims, the camera being arranged to pass operational signals

from said camera body to said shutter block (23) which is provided on the axially movable member of said lens barrel (22) by the flexible printed circuit board (160) of said camera body.

6. A camera in accordance with claim 5, having a photographic optical system (L8) which is automatically focussed in accordance with the distance of an object to the film plane in said camera.

7. A camera in accordance with one of the claims 5 or 6, wherein said FPC-guide device (163, 165, 168, 169, 170) further comprises means for separating said FPC-board (160) from a rotatable cam ring (14) positioned about said lens barrel (22).

8. A camera in accordance with one of the claims 5, 6 or 7, further comprising an anti-reflection device (171) attached to said flexible printed circuit board (160).

9. A camera in accordance with one of the claims 5, 6, 7 or 8, wherein said FPC board (160) comprises synthetic resin.

10. A camera in accordance with claim 8 or 9, wherein said device (171) comprises an anti-reflection layer or an anti-reflection coating or a dull-finish black paper of synthetic resin attached to at least one surface of said FPC board (160), said at least one surface being located adjacent to the optical axis of said photographic lens assembly (1) when said board (160) is attached to said shutter block (23).

Patentansprüche

1. Kameragehäuse mit einer flexiblen gedruckten Schaltungsplatte - FPC-Träger - (160) zum Leiten von Betriebssignalen an eine Verschlusseinheit (23) eines Objektives, dadurch gekennzeichnet,

- daß das Kameragehäuse eine FPC-Führungsvorrichtung (163; 165, 168, 170) enthält, die an ihrem vorderen Ende ein Führungsteil (168) hat,
- daß der FPC-Träger (160) mit seinem rückwärtigen Ende (162) an dem Kameragehäuse befestigt ist und sich entlang der FPC-Führungsvorrichtung (163; 165, 168, 169, 170) erstreckt und entlang der besagten Führungsvorrichtung (168) zum Kameragehäuse hin umgebogen ist, und
- daß der besagte FPC-Träger (160) außerdem zu der Verschlusseinheit (23) hin umge-



5. In this fashion, FPC board 160 can be surely guided within the annular space 164 located between cam ring 14 and decorative frame 22 (Fig 4).

Since the FPC board 160 has an anti-reflection structure as disclosed above, internal reflections which would otherwise cause an undesirable phenomena, e.g., a flare or a ghost, will not occur.

Claims

1. A camera body having a flexible printed circuit board - FPC-board - (160) for passing operational signals to a shutter block (23) of a lens characterised

- in that the camera body comprises an FPC-guide device (163; 165, 168, 170) which has at its front end a guide member (168),
- in that said FPC-board (160) is secured to the camera body at the rear end thereof (162) and extends along the FPC guide device (163; 165, 168, 169, 170) and is bent along said guide member (168) toward the camera body, and
- in that said FPC board (160) is further bent toward the shutter block (23) for securing its front end (161) to the shutter block (23).

2. A camera body in accordance with claim 1, characterised in that said guide device (163; 165, 168, 169, 170) has front and rear plate ends each comprising a bent guide portion (165, 170).

3. A camera body in accordance with one of the preceding claims, characterised in that said guide device (163; 165, 168, 169, 170) has an inner surface against which said FPC-board (160) is positioned, and in that said inner surface comprises as said guide member (168) at least one stationary pin (168) around which at least a portion of said FPC-board (160a) is immovably positioned.

4. A camera body in accordance with claim 3, characterised in that said guide device (163, 165, 168, 169, 170) has a second pin (169) about which said FPC-board (160b) is movably positioned, in that said first pin (168) is located adjacent a first end of said guide device (163, 165), and in that said second pin (169) is located between first and second guide device ends (163, 165, 170).

5. A lens shutter type of camera having a lens barrel block (1) comprising an axially movable lens barrel (22), comprising a shutter block (23) being attached to said lens barrel (22) and having a camera body of one of the preceding claims, the camera being arranged to pass operational signals

from said camera body to said shutter block (23) which is provided on the axially movable member of said lens barrel (22) by the flexible printed circuit board (160) of said camera body.

6. A camera in accordance with claim 5, having a photographic optical system (L8) which is automatically focussed in accordance with the distance of an object to the film plane in said camera.

7. A camera in accordance with one of the claims 5 or 6, wherein said FPC-guide device (163, 165, 168, 169, 170) further comprises means for separating said FPC-board (160) from a rotatable cam ring (14) positioned about said lens barrel (22).

8. A camera in accordance with one of the claims 5, 6 or 7, further comprising an anti-reflection device (171) attached to said flexible printed circuit board (160).

9. A camera in accordance with one of the claims 5, 6, 7 or 8, wherein said FPC board (160) comprises synthetic resin.

10. A camera in accordance with claim 8 or 9, wherein said device (171) comprises an anti-reflection layer or an anti-reflection coating or a dull-finish black paper of synthetic resin attached to at least one surface of said FPC board (160), said at least one surface being located adjacent to the optical axis of said photographic lens assembly (1) when said board (160) is attached to said shutter block (23).

Patentansprüche

1. Kameragehäuse mit einer flexiblen gedruckten Schaltungsplatte - FPC-Träger - (160) zum Leiten von Betriebssignalen an eine Verschluss Einheit (23) eines Objektivs, dadurch gekennzeichnet,

- daß das Kameragehäuse eine FPC-Führungsvorrichtung (163; 165, 168, 170) enthält, die an ihrem vorderen Ende ein Führungsteil (168) hat,
- daß der FPC-Träger (160) mit seinem rückwärtigen Ende (162) an dem Kameragehäuse befestigt ist und sich entlang der FPC-Führungsvorrichtung (163; 165, 168, 169, 170) erstreckt und entlang der besagten Führungsvorrichtung (168) zum Kameragehäuse hin umgebogen ist, und
- daß der besagte FPC-Träger (160) außerdem zu der Verschluss Einheit (23) hin umge-



bogen ist, um mit seinem vorderen Ende (161) an der Verschlusseinheit (23) befestigt zu werden.

2. Kameragehäuse nach Anspruch 1, dadurch gekennzeichnet, daß die Führungsvorrichtung (163; 165, 168, 169, 170) vordere und rückwärtige Plattenränder hat, die jeweils ein gebogenes Führungsteil (165, 170) enthalten.
3. Kameragehäuse nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Führungsvorrichtung (163; 165, 168, 169, 170) eine Innenseite hat, gegenüber der der besagte FPC-Träger (160) angeordnet ist und daß diese Innenseite als besagtes Führungsteil (168) mindestens einen feststehenden Stift (168) enthält, um den herum mindestens ein Teil des FPC-Trägers (160a) unbeweglich angeordnet ist.
4. Kameragehäuse nach Anspruch 3, dadurch gekennzeichnet, daß die besagte Führungsvorrichtung (163; 165, 168, 169, 170) einen zweiten Stift (169) hat, um den herum der besagte FPC-Träger (160b) beweglich angeordnet ist, daß besagter erster Stift (168) in der Nähe eines ersten Endes der Führungsvorrichtung (163; 165) angeordnet ist und daß besagter zweiter Stift (169) zwischen dem ersten und einem zweiten Ende der Führungsvorrichtung (163, 165, 170) angeordnet ist.
5. Zentralverschlussskamera mit einer Objektivseinheit (1), die einen axial beweglichen Objektivtubus (22) einschließlic einer an diesem befestigten Verschlusseinheit (23) enthält, und mit einem Kameragehäuse nach einem der vorhergehenden Ansprüche, wobei die Kamera ausgebildet ist, um Betriebssignale von dem Kameragehäuse zu der besagten, in dem axial beweglichen Teil des besagten Objektivtubus (22) vorgesehenen Verschlusseinheit (23) über die flexible gedruckte Schaltungsplatte (160) des Kameragehäuses zu leiten.
6. Kamera nach Anspruch 5, mit einem fotografisch-optischen System (L8), das automatisch in Übereinstimmung mit dem Abstand eines Objektes zur Filmebene in der Kamera fokussiert wird.
7. Kamera nach einem der Ansprüche 5 oder 6, wobei die besagte FPC-Führungsvorrichtung (163; 165, 168, 169, 170) außerdem Mittel zum Trennen des besagten FPC-Trägers (160) von einem um den Objektivtubus (22) herum angeordneten drehbaren Nockenring (14) enthält.
8. Kamera nach einem der Ansprüche 5, 6 oder 7,

die außerdem eine an besagter gedruckter Schaltungsplatte (160) angebrachte Anti-Reflexionsvorrichtung (171) enthält.

9. Kamera nach einem der Ansprüche 5, 6, 7 oder 8, wobei besagter FPC-Träger (160) Kunstharz enthält.
10. Kamera nach einem der Ansprüche 8 oder 9, wobei besagte Antireflexionsvorrichtung (171) eine Antireflexionsschicht, eine Antireflexionsabdeckung oder eine mattschwarze Kunststoffolie enthält, die an mindestens einer Seite des besagten FPC-Trägers (160) angebracht ist und wobei besagte mindestens eine Seite an die optische Achse der besagten Aufnahmeobjektivanordnung (1) angrenzt, wenn der besagte Träger (160) an der besagten Verschlusseinheit (23) befestigt ist.

Revendications

1. Boîtier d'appareil photo comportant une carte de circuits imprimés souple - carte FPC - (160) pour faire passer des signaux fonctionnels vers un bloc d'obturateur (23) d'un objectif ;
caractérisé :
en ce que le boîtier d'appareil photo comprend un dispositif de guidage de carte FPC (163 ; 165, 168, 170) qui a un élément de guidage (168) à son extrémité avant ;
en ce que la carte FPC (160) est fixée au boîtier d'appareil photo au droit de son extrémité avant (162) et s'étend le long du dispositif de guidage de carte FPC (163 ; 165, 168, 169, 170), et est repliée le long dudit élément de guidage (168) en direction du boîtier d'appareil photo ; et
en ce que ladite carte FPC (160) est en outre repliée en direction du bloc d'obturateur (23) pour fixer son extrémité avant (161) au bloc d'obturateur (23).
2. Boîtier d'appareil photo selon la revendication 1, caractérisé en ce que ledit dispositif de guidage (163 ; 165, 168, 169, 170) a des extrémités de plaque avant et arrière qui comprennent chacune une partie de guidage repliée (165, 170).
3. Boîtier d'appareil photo selon l'une quelconque des revendications précédentes, caractérisé en ce que ledit dispositif de guidage (163 ; 165, 168, 169, 170) a une surface intérieure contre laquelle se positionne ladite carte FPC (160), et en ce que ladite surface intérieure comprend, en tant que ledit élément de guidage (168), au moins un axe fixe (168) autour duquel au moins une partie de ladite carte FPC (160a) est positionnée de façon



immobile.

4. Boîtier d'appareil photo selon la revendication 3, caractérisé en ce que ledit dispositif de guidage (163, 165, 168, 169, 170) a un second axe (169) autour duquel se positionne, de façon mobile, ladite carte FPC (160b), en ce que ledit premier axe (168) est situé adjacent à une première extrémité dudit dispositif de guidage (163, 165), et en ce que ledit second axe (169) est situé entre les première et seconde extrémités de dispositif de guidage (163, 165, 170). 5
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5. Appareil photo du type à obturateur d'objectif ayant un bloc de barillet d'objectif (1) comprenant un barillet d'objectif mobile axialement (22), comprenant un bloc d'obturateur (23) qui est fixé audit barillet d'objectif (22) et ayant un boîtier d'appareil photo selon l'une quelconque des revendications précédentes, l'appareil photo étant conçu pour faire passer des signaux fonctionnels dudit boîtier d'appareil photo audit bloc d'obturateur (23) qui est disposé sur l'élément mobile axialement dudit barillet d'objectif (22) près de la carte de circuits imprimés souple (160) dudit boîtier d'appareil photo. 15
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6. Appareil photo selon la revendication 5, comportant un système optique de photographie (L8) qui est mis au point automatiquement en fonction de la distance d'un objet au plan de film dudit appareil photo. 30

7. Appareil photo selon l'une des revendications 5 ou 6, dans lequel ledit dispositif de guidage de carte FPC (163, 165, 168, 170) comprend en outre un moyen pour séparer ladite carte FPC (160) d'une bague à cames (14) mobile en rotation placée autour dudit barillet d'objectif (22). 35
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8. Appareil photo selon l'une des revendications 5, 6 ou 7, comprenant en outre un dispositif antiréfléchissant (171) fixé à ladite carte de circuits imprimés souple (160). 45

9. Appareil photo selon l'une des revendications 5, 6, 7 ou 8, dans lequel ladite carte FPC (160) est constituée de résine synthétique.

10. Appareil photo selon la revendication 8 ou 9, dans lequel ledit dispositif (171) comprend une couche antiréfléchissante ou un revêtement antiréfléchissant ou un papier noir mat fait de résine synthétique fixé à au moins une face de ladite carte FPC (160), ladite au moins une face étant adjacente audit axe optique dudit ensemble d'objectif de photographie (1) lorsque ladite carte (160) est fixée audit bloc d'obturateur (23). 50
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