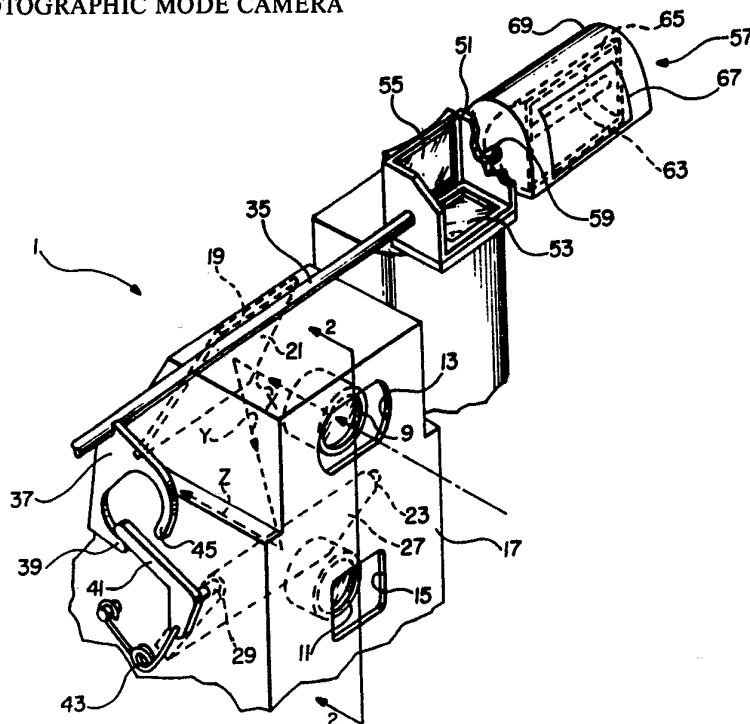




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(54) Title: VARIABLE PHOTOGRAPHIC MODE CAMERA



(57) Abstract

A photographic camera which can be selectively switched between various photographing modes includes a taking lens assembly which provides first and second focal lengths, a viewfinder assembly including first and second lens elements for providing first and second views of a subject to be photographed corresponding to the first and second focal lengths, respectively and an electronic flash assembly including first and second flash lenses for providing first and second angles of illumination corresponding to the first and second focal lengths, respectively. A mechanism connects the taking lens, the viewfinder assembly and the electronic flash assembly to provide for alternatively selecting the first focal length, the first view and the first angle of illumination or the second focal length, the second view and the second angle of illumination substantially concurrently.

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VARIABLE PHOTOGRAPHIC MODE CAMERA

5 TECHNICAL FIELD

The present invention relates generally to the field of photography, and in particular to a photographic camera which can be selectively changed to different photographing modes.

10 BACKGROUND ART

Many amateur photographic cameras are available today which give a photographer an option to take pictures using a telephoto type lens, a wide angle type lens, or a normal type lens. Another
15 type of amateur photographic camera available today is one which gives the photographer the option to use the camera in a close-up photographing mode or what is conventionally known as a normal photographing mode. Typically, these cameras do not
20 necessarily provide the best flash illumination in accordance with a change in the photographing mode.

One such camera is disclosed in U.S. Patent No. 4,690,531 issued September 1, 1987 to Hansen et al. This camera incorporates both a normal
25 objective lens and a telephoto objective lens, an electronic flash device, and a viewfinder having a first lens providing a normal or wide angle view of a subject to be photographed and a second lens providing a narrow angle of view of the subject to
30 be photographed corresponding to the normal and telephoto objective lenses, respectively. The electronic flash device includes a flash housing and a single flash lens which provides only one angle of illumination. The normal objective lens and the
35 first viewfinder lens are moved into picture-taking

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positions in response to moving the flash housing away from the camera body to a position designated "normal". The telephoto objective lens and the second viewfinder lens are moved into picture-taking positions in response to moving the flash housing further away from the camera body to a position designated "tele". The single lens of the electronic flash device remains in place in both the "normal" and "tele" positions. Consequently, the angle of illumination of the flash device is not changed even though there is a change in the photographing mode between "normal" and "tele".

Another camera having alternative telephoto and normal modes is illustrated in U.S. Patent No. 4,171,887 issued October 23, 1979 to Hayata. This camera includes a normal objective lens which can be converted to a telephoto lens, a viewfinder having a normal lens which can be converted to a telephoto lens, and an electronic flash device. The normal viewfinder lens is converted to the telephoto viewfinder lens in response to converting the normal objective lens to the telephoto objective lens. A fresnel lens associated with the electronic flash device can be converted from a normal mode to a telephoto mode by manually sliding a beam adjusting panel in front of the fresnel lens. This involves an operation separate from the operation of converting the objective and viewfinder lenses. The camera is further provided with an error indication circuit which usually alerts the photographer that the beam adjusting panel has not been moved following a conversion of the objective and viewfinder lenses. However, the photographer may neglect to take note of the error indication, in which case the beam adjusting panel will not be in

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the correct position to convert the fresnel lens from a normal mode to a tele mode. Consequently, an uneven flash exposure can occur.

A camera having alternative close-up and normal photographing modes is disclosed in U.S. Patent No. 4,970,537 issued November 13, 1990 to Tsuboi. This camera includes an objective lens which can be focused to a near, close-up, distance. The camera further includes a rotatable viewfinder having a single viewfinder lens element and a rotatable electronic flash device having a single flash lens. The objective lens and the viewfinder are connected through a complex mechanism to the electronic flash device. When the electronic flash device is moved into a close-up mode it is rotated to direct its illumination towards a subject to be photographed at a near distance. At the same time, the viewfinder is rotated to direct its view at the subject to be photographed and the objective lens is adjusted to focus on the subject to be photographed. The single lens element of the viewfinder remains in place in both the normal and close-up photographing modes. Consequently, the view of the subject is not changed, it is merely displaced, thus the composition of the photograph may be uneven. Furthermore, the single lens of the electronic flash device remains in place in both the normal and close-up modes. Consequently, the angle of illumination is not changed it is merely displaced, thus an uneven flash exposure can occur.

DISCLOSURE OF INVENTION

According to the invention, there is provided a photographic camera which includes taking lens means for providing a first focal length and a second focal length, viewfinder means for providing

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a first view of a subject corresponding to the first focal length and a second view of the subject narrower than the first view corresponding to the second focal length, and electronic flash means for providing a first angle of illumination corresponding to said first focal length and a second angle of illumination narrower than said first angle of illumination corresponding to the second focal length. The photographic camera further includes control means connecting the taking lens means, the viewfinder means and the electronic flash means for alternatively selecting the first focal length, the first view and the first angle of illumination or the second focal length, the second view, and the second angle of illumination automatically substantially concurrently. Thus, in contrast to the prior art described above, the present invention is directed to an automatic, error free photographic camera. The camera will produce optimum exposures of images recorded on a photographic film. The photographic camera of the present invention is also simple to manufacture and relatively inexpensive.

Another aspect of the invention is directed to an electronic flash which includes a flash housing, a flash tube supported in the flash housing and having a capability to emit light rays to illuminate a subject. The electronic flash further includes first means mounted to the flash housing for providing a first angle of illumination to direct the light rays towards the subject, second means mounted to the flash housing for providing a second angle of illumination narrower than the first angle of illumination to direct light rays towards the subject, and means for moving the flash housing

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alternatively to locate the first or second means relative to the flash tube to direct light rays towards the subject at the first or second angle of illumination.

5 BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings wherein:

10 Figure 1 is a perspective view of a dual lens camera according to a preferred embodiment of the invention, showing a movable mirror and a fixed mirror relatively positioned for telephoto photography;

15 Figure 2 is an elevation view in cross-section designated 2-2 of certain interior details of the camera depicted in FIG. 1; and

Figure 3 is a perspective view similar to FIG. 1, showing the two mirrors relatively positioned for wide angle photography.

20 MODES OF CARRYING OUT THE INVENTION

The present invention is disclosed in connection with a 35 mm photographic camera. Because such a camera is widely known, this description is directed in particular to
25 photographic elements forming part of or cooperating directly with the invention. It is to be understood, however, that other elements not specifically shown or described may take various forms known to persons of ordinary skill in the
30 art. It should also be understood that the present invention can be utilized in connection with cameras which use other film formats such as 110, 126 and disc and with electronic cameras.

The preferred embodiment will be
35 illustrated particularly in connection with a

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photographic camera which can be selectively switched between a first photographing mode and a second photographing mode, for instance switched between what is conventionally known as a normal mode and a telephoto mode. Referring now to the drawings and in particular to FIGS. 1 and 2, a dual lens camera 1 is shown having a taking lens means 8 including a relatively long focal length lens 9 and a relatively short focal length lens 11 arranged in parallel relation behind respective lens openings 13 and 15 in a front wall 17 on the camera 1. The taking lens means 8 further includes a fixed mirror 19 having a reflective surface 21 permanently located behind the long focal length lens 9, and a movable mirror 23 having a reflective surface 25 positioned behind the short focal length lens 11 with its reflective surface in facing parallel relation to the reflective surface of the fixed mirror 19. The movable mirror 23 in this position has a matte black coating 27 on its underside which is disposed to block ambient light entering the short focal length lens 11, to prevent the light from reaching an exposure aperture 5. At the same time, the two mirrors 19 and 23 define a Z-shaped light-ray path (i.e., one that bends at angles of less than 90 degrees) X,Y,Z from the long focal length lens 9 to the exposure aperture 5. Alternatively, as shown in FIG. 3, the movable mirror 23 may be pivoted in a clockwise direction at an integral shaft 29, out of its blocking position behind the short focal length lens 11 to a non-blocking position, to allow ambient light entering the short focal length lens 11 to pass straight through to the exposure aperture 5 along a non-bending light-ray path N. In the non-blocking

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position, the movable mirror 23 rests against a stop 31 shown in FIG. 2, and it deflects ambient light reflected by the fixed mirror 19 from the long focal length lens 9 to prevent the light from reaching the exposure aperture 5. Thus the alternate positions of the movable mirror 23 shown in FIGS. 1 and 3 determine which one of the two lenses 9 and 11 is used.

If a user of the camera selects a telephoto position, as shown in FIG. 1, the movable mirror 23 is located in its blocking position. However, when the user of the camera 1 selects a normal position illustrated in FIG. 3, a claw or motion-inducing member 37 fixed to a selector shaft 35 is pivoted in a counterclockwise direction in FIG. 1 at the selector shaft 35 to cause a leg 39 of the claw member to kick a lever 41 fixed to the mirror shaft 29 in a clockwise direction in FIG. 1 at the mirror shaft. As a result, an overcenter spring 43 further pivots the lever 41 in the same direction in FIG. 1 against a leg 45 of the claw member 37 to pivot the movable mirror 23 in a clockwise direction in FIG. 1 at the mirror shaft 29 from its blocking position to its non-blocking position. See FIG. 3. At the same time, a known viewfinder assembly 51 fixed to selector shaft 35 is swung by that shaft to raise a relatively short focal length element 53 of the viewfinder assembly 51 to a vertical viewing position, as shown in FIG. 3.

In the field of flash photography it is preferable to evenly illuminate a subject to be photographed. Therefore, to achieve the best image illumination of a subject with a camera which can be selectively switched between varying photographing modes it is preferable to vary the angle of the

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light rays being emitted from an electronic flash to illuminate the photographic subject corresponding to the subject covered by the picture taking lens. Thus, in accordance with the present invention, an
5 electronic flash assembly 57, fixed to a second selector shaft 59 extending between the electronic flash assembly 57 and the viewfinder assembly 51, is rotated to align a first flash lens 61 having a relatively wide angle of illumination relative to a
10 flash tube 63 to direct light rays emitted from the flash tube 63 and to direct light rays reflected from a flash reflector 65 towards a photographic subject.

Alternatively, when the user of the camera
15 1 selects the telephoto position shown in FIG. 1 from the normal position in FIG. 3, the claw member 37 is pivoted in a clockwise direction in FIG. 3 to cause its leg 45 to kick the lever 41 in a counterclockwise direction in FIG. 3. As a result,
20 the overcenter spring 43 further pivots the lever 41 in the same direction in FIG. 3 against the leg 39 of the claw member 37 to pivot the movable mirror 23 in a counterclockwise direction in FIG. 3 back to its blocking position. See FIG. 1. At the same
25 time, the viewfinder assembly 51 is swung by the shaft to raise a relatively long focal length element 55 to a vertical viewing position shown in FIG. 1. Concurrently, the electronic flash assembly
30 57 is rotated to align a second flash lens 67 having a relatively narrow angle of illumination relative to the flash tube 63 to direct light rays emitted from the flash tube 63 and to direct light rays reflected from the flash reflector 65 towards a photographic subject.

35 In accordance with a preferred embodiment

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of the invention the electronic flash assembly 57 includes a flash housing 69 having the flash tube 63 and the flash reflector 65 supported therein. The flash housing 69 can be rotated to alternatively
5 select a telephoto photographing mode, shown in FIG. 1, or a normal photographing mode, illustrated in FIG. 3. The first and second flash lenses 61, 67 are arranged on the flash housing 69 such that when the flash housing 69 is rotated between the telephoto or
10 normal photographing modes the first or second flash lens will be aligned relative to the flash tube 63 and the flash reflector 65 depending on which photographing mode is selected.

It should be obvious to one skilled in the art that a lens cover (not shown) which protects the picture taking lenses and/or the viewfinder lens elements when the camera is not in use can be connected to the flash housing such that when the flash housing is rotated or moved the lens cover
20 would move to uncover the lenses.

The operation of the photographic camera 1 will be described in detail referring to FIGS. 1 to 3.

When the flash housing 69 is rotated from
25 its telephoto position in FIG. 1 to its normal, wide angle, position in FIG. 3, or vice-versa, either the first flash lens 61 having the relatively wide angle of illumination or the second flash lens 67 having the relatively narrow angle of illumination is
30 located in a position relative to the flash tube 63 and the flash reflector 65. In response to rotation of the flash housing 69, the movable mirror 23 is pivoted from its blocking position to its non-blocking position, or vice-versa, and either the
35 short focal length element 53 or the long focal

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length element 55 of the viewfinder assembly 51 is located in a vertical viewing position.

The invention has been described in connection with a dual lens camera utilizing a mirror system to change between a relatively short focal length lens and a relatively long focal length lens. The present invention can also be utilized in what is known conventionally as a converter telephoto/wide angle camera. A converter system utilizes a converter lens which is moved in and out of alignment with a main picture taking lens to convert the main picture taking lens from a wide angle lens to a telephoto lens.

Furthermore, the present invention can be used in conventionally known psuedo tele/pan cameras.

There is thus provided a photographic camera having the capability to be selectively switched between varying photographing modes which provides optimum exposures of images on photographic film. The camera is easy to use and the conversion of the picture taking lens, the viewfinder lens elements and the flash lenses is completed with one operation.

The present invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

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CLAIMS:

1. A photographic camera comprising:
taking lens means for providing a first
focal length and a second focal length;
5 viewfinder means for providing a first view
of a subject corresponding to said first focal
length and a second view of a subject, narrower than
said first view, corresponding to said second focal
length;
10 electronic flash means for providing a
first angle of illumination corresponding to said
first focal length and a second angle of
illumination, narrower than said first angle of
illumination, corresponding to said second focal
15 length; and
control means connecting said taking lens
means, said viewfinder means and said electronic
flash means for alternatively selecting said first
focal length, said first view, and said first angle
20 of illumination or said second focal length, said
second view, and said second angle of illumination
automatically substantially concurrently.
2. A photographic camera as defined in
claim 1, wherein said electronic flash means
25 includes a flash housing.
3. A photographic camera as defined in
claim 2, wherein said control means includes means
for moving said flash housing between a first
position and a second position to alternatively
30 select said first angle of illumination or said
second angle of illumination and means connecting
said taking lens means and said viewfinder means to
said flash housing for alternatively selecting said
first focal length and said first view or said
35 second focal length and said second view in response

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to movement of said flash housing between said first position and said second position, respectively.

4. A photographic camera as defined in claim 3, wherein said moving means includes means
5 for rotating said flash housing between said first position and said second position.

5. An electronic flash comprising:

a flash housing;

a flash tube supported in said flash
10 housing and having a capability to emit light rays to illuminate a subject;

first means mounted to said flash housing for providing a first angle of illumination to direct said light rays towards a subject;

15 second means mounted to said flash housing for providing a second angle of illumination, narrower than said first angle of illumination, to direct said light rays towards a subject; and

means for moving said flash housing
20 alternatively to locate said first or second means relative to said flash tube to direct light rays towards a subject at said first or second angle of illumination.

6. An electronic flash as defined in claim
25 5, wherein said first means includes a first flash lens having a capability to direct light rays towards a subject at said first angle of illumination, and said second means includes a second flash lens means having a capability to
30 direct light rays towards a subject at said second angle of illumination.

7. An electronic flash as defined in claim
6, wherein said moving means includes means for rotating said flash housing between a first position
35 and a second position alternatively to locate said

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first flash lens or said second flash lens relative to said flash tube to direct light rays towards a subject at said first or said second angle of illumination.

5 8. A photographic camera comprising:
an electronic flash housing;

first means mounted to said electronic flash housing for providing a first angle of illumination;

10 second means mounted to said electronic flash housing for providing a second angle of illumination, narrower than said first angle of illumination;

means for moving said electronic flash housing between a first position and a second position to alternatively select said first means or said second means;

viewfinder means for providing a first view of a subject corresponding to said first angle of illumination and a second view of a subject, narrower than said first view, corresponding to said second angle of illumination; and

20 control means connecting said viewfinder means to said electronic flash housing for alternatively selecting said first view or said second view in response to movement of said electronic flash housing between said first position and said second position.

9. A photographic camera as defined in claim 8, wherein said first means includes a first flash lens and said second means includes a second flash lens.

10. A photographic camera as defined in claim 8, wherein said viewfinder means includes first lens element means for providing said first

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view and second lens element means for providing
said second view.

11. A photographic camera as defined in
claim 8, wherein said control means includes means
5 for rotating said flash housing between said first
and second position.

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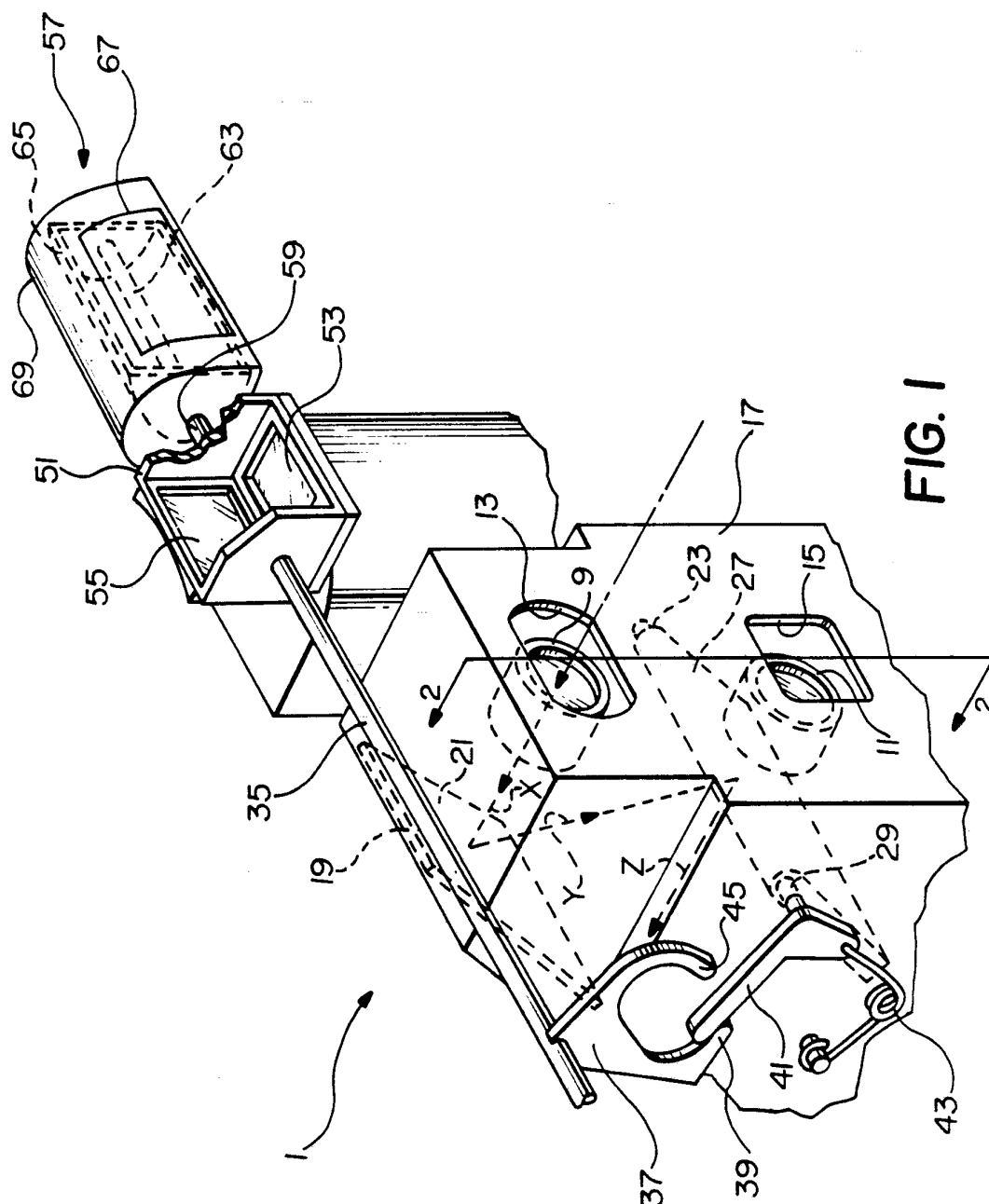
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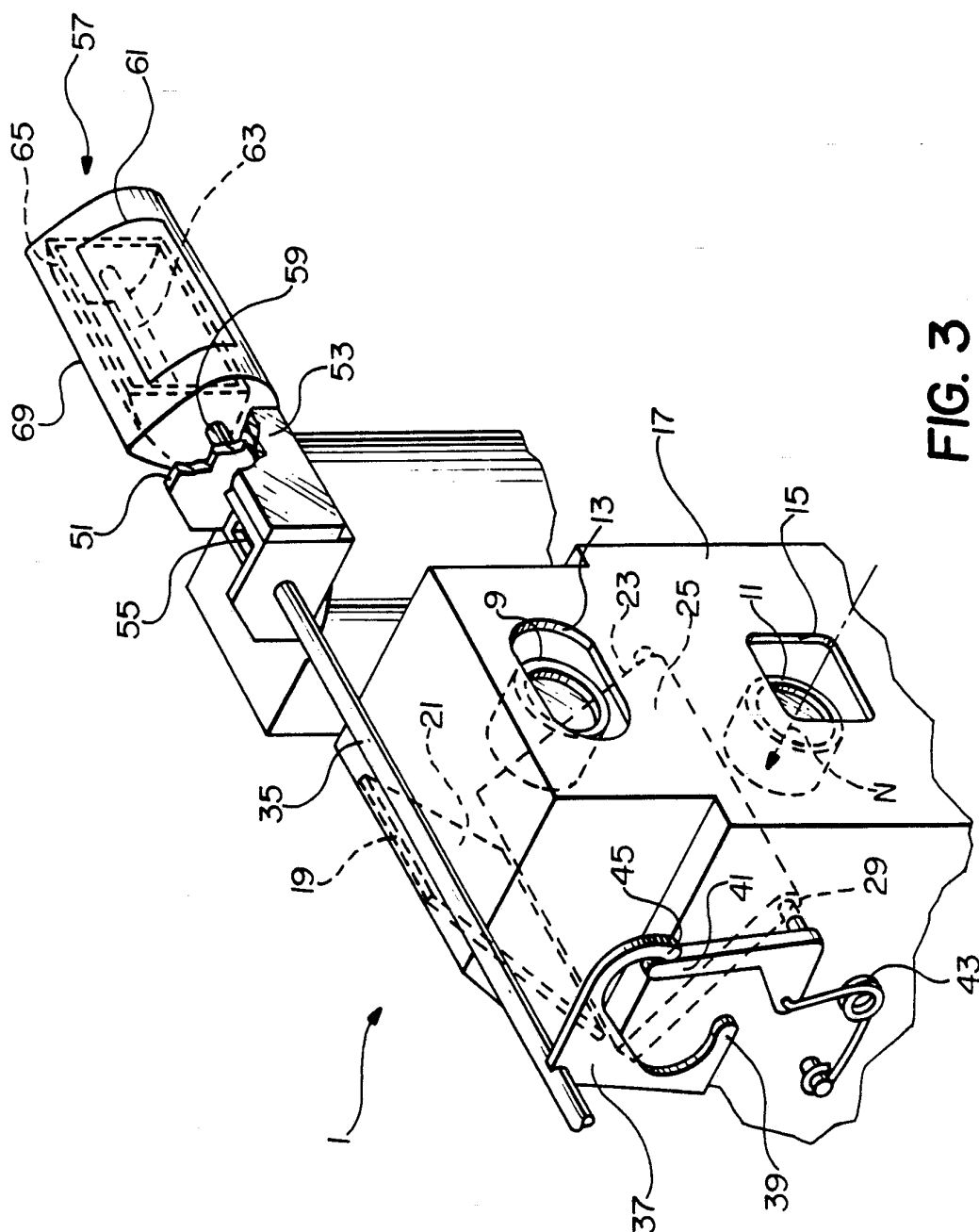


FIG. 3