

SPECIFICATION

Cartridge assembly

- 5 The present invention relates to photographic film cartridge assemblies for use with cameras and, more specifically, to means in such cartridge assemblies for inhibiting undesired movement of the film in the cartridge casing.
- 10 Various terms such as 'cartridge', 'cassette', and 'magazine' have been used to refer to film containers. Such a container, when loaded with film, is herein referred to as a 'cartridge assembly'.
- 15 It is commonplace to enclose photographic film in a cartridge, cassette, magazine, or the like, designed to afford convenient loading of a camera. Such enclosures typically have been configured to accommodate an elongated strip of roll film. It is also known to provide a plurality of exposure areas in a generally circular array on a disk-shaped sheet of film and to rotate such film disk incrementally to bring successive exposure areas into alignment with the camera's optical axis for exposure. Illustrative examples of film disk arrangements are shown in U.K. Patent Application No. 7911900 (Publication No.) to which reference should be made.
- 30 In the aforesaid patent application, a film disk is mounted on a central core to form a film unit rotatably supported within a protective casing for insertion into a camera. The film disk has a plurality of image areas on a generally annular exposure region extending around the core so that individual image areas may be brought into alignment with an exposure window in the casing as the disk is rotated. The cartridge assembly also includes a cover member having an opaque leaf portion which is rotatable independently of the film unit. When the cartridge is not in a camera, the leaf portion underlies the casing's exposure window to prevent film fogging.
- 45 In the disclosure of that Patent Application, the film unit is prevented from rotation in one direction by a ratchet mechanism. However, when the cartridge assembly is not in a camera, it is possible to rotate the film unit in an opposite, film advancing direction by manual manipulation. Although such manipulation would, of course, be operator misuse, the resulting loss of image area availability and waste of film may lead to user dissatisfaction with the product. In cartridge assemblies in accordance with the present invention, inadvertent film unit advancement, whilst the cartridge assembly is not in a camera, is inhibited.
- 60 In accordance with the present invention, there is provided a photographic cartridge assembly comprising an opaque casing having an exposure window, a film unit mounted in the casing for movement relative thereto such

that successive portions of the film unit are aligned with the exposure window;

- a cover member including an opaque region, mounted in the casing for movement, independent of the film unit, between a closed position in which the opaque region is aligned with and covers the exposure window, and an open position in which the opaque region is out of alignment with and uncovers the exposure window; cooperating means on the film unit and the cover member for inhibiting movement of the film unit when the cover member is in its exposure window covering position; and
- 80 means for disabling the movement inhibiting means when the cover member is in its exposure window uncovering position.
- In a preferred embodiment of the present invention, the film is disk-shaped. The movement inhibiting means includes (1) a discontinuity associated with each image area and (2) a tooth on the cover member for engaging the discontinuities. When the cover member is moved from alignment with the exposure window, a separator layer between the cover member and the film inhibits engagement between the tooth and the discontinuities. The discontinuities may also be used in conjunction with a camera's film metering mechanism to locate associated image areas on the camera's optical axis for exposure.
- The invention will be described further, by way of example, with reference to the accompanying drawings, in which:
- 100 *Figure 1* is an exploded perspective view of an open film cartridge assembly in accordance with the present invention;
- Figure 2* is a vertical section of the cartridge assembly of Fig. 1, in the closed position;
- 105 *Figure 3* is a perspective view from above and in front of a central core portion of the cartridge assembly of Fig. 1;
- Figure 4* is a perspective view from below and to the rear of the central core portion of Fig. 3;
- 110 *Figure 5* is a perspective view, to an enlarged scale, of a portion of the cartridge assembly of Fig. 1;
- Figure 6* is a perspective view from above and in front of a cover member of the cartridge assembly of Fig. 1;
- 115 *Figure 7* is a perspective view of the film cartridge assembly of Fig. 1;
- Figure 8* is a perspective view of a still picture camera for receiving the cartridge assembly of Fig. 1; and
- 120 *Figure 9* is a perspective view from above and behind the still picture camera of Fig. 8 and of a film cartridge assembly, showing the camera open for receiving the cartridge assembly.
- As cartridge assemblies, and photographic cameras for receiving the assemblies are well known, the present description is directed in particular to elements forming part of or coop-
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erating more directly with cartridge assembly elements to which the present invention is specifically directed.

The present invention is an improvement of the cartridge assembly described in the aforementioned U.K. Patent Application No. 7911900. Any structure not shown herein may take the form shown in that application, and the disclosure of such application is hereby specifically incorporated into the present description. Apparatus not specifically shown or described herein or in the incorporated application is understood to be selectable from apparatus known in the art.

A cartridge assembly, as shown in the exploded perspective view of Fig. 1 and in the sectioned elevation of Fig. 2, includes a film unit 10, a separator layer 12, a cover member 14, and a casing 16 with front and rear parts 18 and 20, respectively. The terms 'front' and 'rear' are used herein with reference to the orientation of the cartridge assembly during actual use of the apparatus described. That is, the front of the cartridge would face along the camera's optical axis in a direction toward the taking lens.

The film unit 10, includes a central core 22 (shown in Figs. 3 and 4), a film disk 24, and a mounting ring 26 which is bonded to core 22 to secure film disk 24 thereto. The film disk is illustrated as having a generally circular outer perimeter, but other non-circular (e.g., polygonal) film shapes may be visualized for use in accordance with the present invention. Accordingly, the term 'disk' as herein used is intended to include non-circular as well as the illustrated circular configuration.

The film disk 24 comprises a moderately flexible but self-supporting base sheet formed of, for example, cellulose acetate or poly(ethylene terephthalate). The base sheet carried photosensitive elements on one face thereof, thus providing a photographic imaging surface on which a latent image can be recorded and subsequently photographically developed.

The film disk 24 is arranged to record photographic images on an annular exposure region concentric with the film unit axis.

Referring to Fig. 3, the central core 22 includes an inner raised ring 28, about a central opening, and an outer raised ring 30. A projection 32 extends radially inwardly from the ring 30 to form, with a projection 34 on the front casing part 18, part of an initial and final locking system explained in detail in aforementioned U.K. Patent Application No. 7911900.

The radially inner surface 36 of the inner ring 28 has splines for driving engagement with a camera structure. The perimeter of film disk 24 is notched as at 38 (two notches only being shown in Fig. 1) to provide discontinuity means for cooperation with a camera's metering pawl to locate successive portions of the film disk in alignment with an exposure win-

dow 44 in the casing front part 18.

The rear casing part 20 of the cartridge assembly has a circular opening 42, aligned with the exposure window 44 in the front casing part 18. An opaque, rigid pressure plate 46 is received in the rear casing part behind the film disk 24 and is movable towards and away from the front casing part selectively to be brought to bear against the rear surface of the film disk. The pressure plate, in bearing against the film disk, presses the film disk into contact with a camera's film support surface extending into the exposure window 44.

Cover member 14 has a central opening 48 sized to receive an annular wall 50 of the casing front part 18 so that the cover member is rotatable about the axis of the annular wall. The cover member is formed of thin but relatively stiff, sheet material and includes a generally fan-shaped leaf portion 52 so sized as to cover the exposure window 44. At least the leaf portion 52 of the cover member is opaque.

A locking mechanism, for preventing inadvertent rotation of the cover member before the cartridge assembly is loaded into a camera, includes a tab 54 on the cover member 14. The tab is aligned with an aperture 56 in the front casing part 18 and, as shown in Fig. 5, engages a tooth 58 of the casing front part when the leaf portion 52 is aligned with the exposure window 44. The tab 54 is depressed, on loading the cartridge into a camera, by a camera pin 60 (shown in Fig. 9 and detailed in Fig. 5) to disable the locking mechanism whilst the cartridge assembly is in the camera. The cover member 14 also includes a pair of lugs 62 and 65, shown in Fig. 6, and a ramped tooth 66 shown in Fig. 1 on a portion thereof which, at all times, is out of alignment with the exposure window 44. The functions of the lugs and of the tooth will be explained hereinafter.

Still referring to Fig. 1, the separator layer 12 is formed of an opaque sheet material and has a central aperture 90 sized to receive the annular wall 50 of the casing front part 18. A framing window 68, in the separator layer, is aligned with the exposure window 44. A hole 70 in the separator layer is aligned with a ramped tooth 72 on the front casing part 18 so that the tooth 72 may pass through the hole 70 and enter the notches 38 on the periphery of the film disk 24 to inhibit reverse rotation of the film unit 10 after the cartridge assembly has been removed from a camera.

Another hole 74 in the separator layer is radially aligned with the notches 38 on the film disk 24. Before the cartridge assembly is loaded into a camera, the cover member leaf portion 52 is aligned with the exposure window 44 and the ramped tooth 66 and the engaged notch 38 cooperate to inhibit rotation of the disk assembly 10 in a forward

direction.

In this arrangement, the leaf portion 52 of the cover member 14 is in light blocking relationship with the exposure window 44 and the separator layer window 68. Inasmuch as the leaf portion 52 is larger than the aligned windows 44 and 68 between which it is interposed, a labyrinthic light baffling arrangement is created to restrict the access of actinic light rays to the film disk 24 through the windows.

The cartridge assembly is adapted to be received in a camera as shown schematically in Figs. 8 and 9 and referred to by numeral 100. The camera front shown in Fig. 8 includes a picture-taking lens 102, a viewfinder 104, a shutter release button 106 movable along a slot 108, and a tab 110 movable along an arcuate slot 112. A locking tab 114 at one side of the camera 100 is movable along a slot 116 to disengage an internal latch 118 (Fig. 9) located on a rear door 120 of the camera, whereupon the rear door may be opened for loading a film cartridge assembly into a receiving chamber 122 of the camera.

When the cartridge assembly is received in chamber 122, a pin 124, coupled to the film advance tab 110 and extending from an arcuate slot 126, engages the film drive lugs 62 and 64 (Fig. 6) on the cover member 14. A splined rotatable post 128, projecting into the camera chamber 122, extends through the centre opening in core 22 of the received cartridge assembly. When the loading door 120 is closed, the post 128 extends into a recess 130 in the door.

When the film cartridge assembly is loaded into camera chamber 122, the pin 60 enters the cartridge assembly through the opening 56 to move the tab 54 from alignment with the tooth 58. The cover member 14 can now be rotated by the pin 124 from its exposure window covering position. As the cover member turns, the ramped tooth 66 is moved from the region of the hole 74 in the separator layer 12 and rides up onto the surface of the separator layer. The tooth 66 can no longer enter the film disk notches 38, and the film unit can be rotated in a film advancing direction by incremental rotation of the splined post 128. This moves successive exposure areas of the film disk 24 across the exposure window 44.

When an operator wishes to remove the cartridge assembly from the camera, either when all frames have been exposed, or, temporarily, to load the camera with a cartridge containing a different type of film (e.g., slide vs. print film, colour vs. black and white, or one A.S.A. value vs. another), the operator rotates tab 110 from the position shown in Fig. 8, in a counter-clockwise direction, so that the cover member 14 is returned to its exposure window closing position. Only when

the tab 110 has been so moved can the latch 118 be released and the door 120 opened, and the cartridge assembly removed from the camera.

70 The mechanism shown at 132 in Fig. 9 is for urging the pressure plate 46 against the film disk 24.

This invention has been described in detail with particular reference to the preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the scope of the invention as defined in the appended claims.

80 CLAIMS

1. A photographic cartridge assembly comprising an opaque casing having an exposure window, a film unit mounted in the casing for movement relative thereto such that successive portions of the film unit are aligned with the exposure window,

a cover member including an opaque region, mounted in the casing for movement, independent of the film unit, between a closed position in which the opaque region is aligned with and covers the exposure window, and an open position in which the opaque region is out of alignment with and uncovers the exposure window;

95 cooperating means on the film unit and the cover member for inhibiting movement of the film unit when the cover member is in its exposure window covering position; and means for disabling the movement inhibiting means when the cover member is in its exposure window uncovering position.

2. A cartridge as claimed in claim 1 wherein the film unit comprises a disk of film having an exposure region comprising the successive portions.

3. A cartridge as claimed in claim 1 or 2 wherein the movement inhibiting means comprises

110 discontinuity means on the film unit; and a tooth on the cover member which engages the discontinuity means when the cover member is in its exposure window covering position.

4. A cartridge as claimed in claim 3 wherein the discontinuity means comprises a plurality of discontinuities, each discontinuity being associated with a respective one of the successive film unit portions.

5. A cartridge as claimed in claims 2 and 120 3 wherein the discontinuity means comprises a plurality of notches along the periphery of the film disk, each notch being associated with a respective one of the portions of the exposure region.

125 6. A cartridge as claimed in claim 4 or 5 wherein the discontinuities serve for metering a camera's film advance mechanism.

7. A cartridge as claimed in any of claims 3 to 6, wherein the disabling means comprises a separator layer mounted in the casing



direction.

In this arrangement, the leaf portion 52 of the cover member 14 is in light blocking relationship with the exposure window 44 and the separator layer window 68. Inasmuch as the leaf portion 52 is larger than the aligned windows 44 and 68 between which it is interposed, a labyrinthic light baffling arrangement is created to restrict the access of actinic light rays to the film disk 24 through the windows.

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The mechanism shown at 132 in Fig. 9 is for urging the pressure plate 46 against the film disk 24.

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80 CLAIMS

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a cover member including an opaque region, mounted in the casing for movement, independent of the film unit, between a closed position in which the opaque region is aligned with and covers the exposure window, and an open position in which the opaque region is out of alignment with and uncovers the exposure window;

cooperating means on the film unit and the cover member for inhibiting movement of the film unit when the cover member is in its exposure window covering position; and means for disabling the movement inhibiting means when the cover member is in its exposure window uncovering position.

2. A cartridge as claimed in claim 1 wherein the film unit comprises a disk of film having an exposure region comprising the successive portions.

3. A cartridge as claimed in claim 1 or 2 wherein the movement inhibiting means comprises

discontinuity means on the film unit; and a tooth on the cover member which engages the discontinuity means when the cover member is in its exposure window covering position.

4. A cartridge as claimed in claim 3 wherein the discontinuity means comprises a plurality of discontinuities, each discontinuity being associated with a respective one of the successive film unit portions.

5. A cartridge as claimed in claims 2 and 3 wherein the discontinuity means comprises a plurality of notches along the periphery of the film disk, each notch being associated with a respective one of the portions of the exposure region.

6. A cartridge as claimed in claim 4 or 5 wherein the discontinuities serve for metering a camera's film advance mechanism.

7. A cartridge as claimed in any of claims 3 to 6, wherein the disabling means comprises a separator layer mounted in the casing



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and the discontinuity means when the cover
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position.

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