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## (54) PHOTOGRAPHIC CAMERA

(71) We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America of 343 State Street, Rochester, New York 14650, United States of America do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to photographic cameras for receiving, and capable of physically detecting an indicium on, double compartment film cartridges, the indicium being indicative of certain characteristics of the film within the cartridge, e.g., the type and emulsion speed. More particularly, the invention relates to a sensing device in such cameras for detecting the presence or absence of a coding rib on a double compartment film cartridge loaded into the camera and for effecting a corresponding adjustment of a camera element.

A film cartridge used in the type of camera to which the present invention is directed comprises two parallel cylindrical film compartments held in spaced location by a flat wall member. The film is initially stored within one of the film compartments with its leading end extending along the wall member and attached to a winding core within the other film compartment. When the cartridge is installed in the camera, it is resiliently biased into seating engagement with a support surface of the camera, which cooperates with the flat cartridge wall member to locate the portion of the film between the compartments in a flat plane coincident with a focal plane of the camera's lens system. A projection or rib of predetermined profile extends endwise from the cartridge to present a surface parallel to the axis of the adjacent film compartment at a predetermined location to signify that the film in the cartridge has a particular film speed rating and the absence of such a rib at that location signifies that the film in the cartridge has a different specific film speed rating.

In such an arrangement, however, the force with which the cartridge is urged resiliently into

contact with the internal camera member must be quite limited if the film is to be freely movable. Because of the limited force involved, it has been found that any forces imposed upon the cartridge should be of limited magnitude and carefully controlled.

It is an object of the present invention to provide an improved camera for detecting the coding on an inserted cartridge and for adjusting a camera element in accordance with the sensed code.

According to the present invention there is provided a photographic camera for receiving a double compartment film cartridge of the type having a film take-up compartment, a film supply compartment held in spaced location by means for supporting film in an exposure plane between the compartments, and a tactile indicium indicative of a characteristic of the film in the cartridge, the camera comprising means for receiving, in a direction parallel to the optical axis of the camera, and for supporting such a cartridge in a manner such that the exposure plane of a received cartridge is located at the camera focal plane, and sensing means mounted in the camera and movable in a sensing locus generally parallel to the camera focal plane and being displaceable by the indicium upon insertion of the cartridge into the camera whereby, in use, the force exerted upon the cartridge by the sensing means, when the latter is in tactile sensing engagement with the indicium, is substantially parallel to the camera focal plane.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a camera according to a preferred embodiment of the invention and of a film cartridge for use therein;

Figure 2 is a perspective view showing a detecting member provided in a camera body and a mechanism which controls an automatic exposure control device in the camera;

Figure 3 is a similar perspective view to that shown in Figure 2 but with a film cartridge having a different coding;

Figures 4 and 5 correspond to Figures 2 and

3 and illustrate another embodiment of the detecting mechanism; and

Figures 6 and 7 correspond to Figures 2 and 3 and illustrate a further embodiment of the invention in which increased force derived from the closing of the film compartment door may be utilized to adjust camera functions.

As cameras and film cartridges are well known, the present description will be directed in particular to camera and cartridge elements forming part of, or cooperating more directly with, apparatus in accordance with the present invention. It is to be understood that camera and cartridge elements not specifically shown or described may take various forms well known to those skilled in the art.

A film cartridge 1 is shown in Figure 1 in a position for insertion into a camera 3 according to the invention and comprises a film supply compartment 4, a wall 5 defining a film plane on the forward face thereof, and a film take-up compartment 2. On one end of the cartridge 1 and on the exterior wall of the take-up chamber 2 is an indicator or rib 11 which extends outwardly from the surface of the wall of the take-up chamber 2 a predetermined distance. Camera 3 includes chambers 6 and 7 for receiving the supply and take-up compartments respectively of film cartridge 1. Film cartridge 1 is accurately located with respect to the focal plane of the camera objective (not shown) by means of horizontal support members 8 which engage small pads (not shown) on the forward face of wall 5. A received cartridge is urged into engagement with members 8 by leaf springs 9 mounted on the interior of a camera door 10 which is hinged to the rearward part of the camera 3 in a conventional manner.

Projecting through the wall of the take-up chamber 7 is one end 13 of a detecting or sensing arm 12 (see Figure 2) the end 13 is cam-shaped and is adapted to engage the rib 11 upon insertion of the cartridge into the camera. When the rib 11 on the cartridge 1 engages the cam-shaped surface 13 of the detecting arm 12, the arm is cammed into an opening in the wall of the take-up chamber.

An arrangement such as this allows the wall of the take-up chamber to act as a protective shroud for the detecting arm as well as the rest of the sensing mechanism (to be discussed below). Because the detecting arm 12 is cammed into the wall of the take-up compartment 7 upon the application of a force on the cam-shaped surface 13, it is not subject to inadvertent damage in the manner that many of the earlier projecting pin arrangements were. In the past, when cartridges were improperly inserted into the film chamber, detecting pins were often bent or broken and, in many cases, this rendered the camera unusable.

Figures 1 and 2 illustrate the basic sensing mechanism which includes sensing arm 12 which is pivotably mounted on a pin 14. One

end of the sensing arm 12 has the cam-shaped surface 13 which is adapted to engage an indicium on a film cartridge such as a rib 11 (see Figure 3). The other end of the sensing arm 12 is urged into engagement with a filter arm 15 by a spring 16 which also urges the cam-shaped surface 13 into the take-up chamber 7. Filter arm 15 is pivotably mounted at one end by pin 17 and urged into contact with sensing arm 12 by a spring 18 which is effectively weaker than spring 16. Affixed to the free end of filter arm 15 is a filter element 19 and, upon pivoting of the filter arm about pin 17, the filter element 19 is positioned between an aperture 20 and a photocell 21 thereby reducing the amount of light impinging on the photocell 21.

Thus, upon insertion of a cartridge containing film having a high emulsion speed as shown in Figure 2, the film cartridge would be ribless and the sensing arm 12 would not be deflected. Sensing arm 12 would hold filter arm 15 in the withdrawn position, thereby preventing the insertion of the filter 19 between the aperture 20 and the photocell 21.

However, as shown in Figure 3 film having a low emulsion speed would be charged in a cartridge having a rib 11. Upon insertion of such a cartridge into the film chamber, the rib 11 will engage the cam-shaped surface 13 of the sensing arm 12 causing it to pivot about pin 14, thus allowing filter arm 15 to follow the sensing arm 12 which in turn causes the filter arm to pivot about pin 17 and position the filter element between aperture 20 and the photocell 21 causing a reduction in the amount of light impinging on the photocell 21 which in turn will increase the exposure time so as to accommodate the film having a slower emulsion speed.

Figures 4 and 5 illustrate another embodiment of the invention wherein the sensing mechanism is used to operate an indicator on the exterior of a camera body which can be used to convey information concerning the film in the cartridge which has been loaded in the camera. It may indicate the number of frames on the film or once again may be used to convey information concerning the emulsion speed of the film.

Figure 4 shows a ribless cartridge 1 positioned in the camera which contains a high ASA film type. Through an opening in the camera body 22, a coloured flag 23a may be seen. Spring arm 24 bears against frame member 26 and biases the cam-shaped surface 13 of the sensing arm 12 into the take-up chamber 7; the cam-shaped surface 13 remains undeflected by a ribless cartridge.

In Figure 5, a cartridge 1 having a rib 11 is shown positioned in the take-up chamber 7. The rib 11 engages the cam-shaped surface 13 on the sensing arm 12 causing the arm to pivot about pin 14 in a counterclockwise direction which causes the flag member 23 to rotate about pin 25 while deflecting spring arm 24 against the frame 26. The removal of the

coloured flag 23a from the body opening 22 indicates to the operator that a cartridge containing film having a lower emulsion speed has been inserted into the camera.

5 In Figures 6 and 7, a further embodiment of the invention is illustrated that may be utilized when a great amount of energy is required to shift the camera mechanism to compensate for film having different emulsion speeds. The cam-shaped surface 13 of sensing arm 12 is once again biased for projection through the wall of the take-up chamber 7 by a door sensor spring 27 which provides the biasing action by holding a door sensor 28 against the upper leg of the sensing arm 12. Upon closing of the door 10, the door sensor 28 is driven toward the interior of the camera 3 against a return spring 30 until deflected by one of a pair of cam-shaped surfaces 31a or 31b on a deflector pin 31.

20 A ribless film cartridge 1 is shown positioned in the camera in Figure 6, thus resulting in no deflection of the cam-shaped surface 13 of sensing arm 12 so that the sensing arm remains in its maximum counterclockwise position with door sensor 28 being held against the upper leg of the sensing arm 12 by the door sensor spring 27. Closure of the door 10 results in the door sensor 28 moving forward and being deflected by surface 31a of the deflector pin 31 mounted on the frame 32. With the door sensor 28 in this position, no adjustment of camera functions takes place.

35 Figure 7 illustrates the mechanism with a film cartridge 1 having a rib 11 positioned in the camera. In this situation, the cam-shaped surface 13 is deflected by the rib 11 causing the sensor arm 12 to rotate in a clockwise direction about pivot 14. As a result of this rotation, the sensing arm 12 urges door sensor 28 toward the cartridge against the action of the door sensor spring 27. Upon closure of the film chamber door 10, the door sensor 28 is directed against cam-shaped surface 31b of the deflector 31 which results in the door sensor 28 engaging and moving link member 33 which, for example may be a shutter speed link which alters the shutter to accommodate the emulsion speed of the film contained in the film cartridge.

50 An advantage that may be obtained using this arrangement is that there is no load exerted on the film cartridge by lever 12 after the camera door is closed. This arrangement is also useful where a great amount of energy is required to shift mechanisms in response to different film characteristics, the energy being derived from the closure of the door by the operator instead of being supplied by a spring in the camera.

60 The 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 scope of the invention. For example, it is contemplated that the amount that the rib projects from the cartridge wall may be used to

adjust camera functions instead of the presence or absence of the indicium as discussed above. Further, the rib may take other forms such as an island projection on the end of the cartridge. In any instance it must present a surface the height of which is indicative of a characteristic of film contained in the cartridge. Insertion of the cartridge into the camera enables the described camera mechanism correspondingly to condition the camera.

#### WHAT WE CLAIM IS:—

1. A photographic camera for receiving a double compartment film cartridge of the type having a film take-up compartment, a film supply compartment, held in spaced location by means for supporting film in an exposure plane between the compartments, and a tactile indicative of a characteristic of the film in the cartridge, the camera comprising means for receiving, in a direction parallel to the optical axis of the camera, and for supporting such a cartridge in a manner such that the exposure plane of a received cartridge is located at the camera focal plane, and sensing means mounted in the camera and movable in a sensing locus generally parallel to the camera focal plane and being displaceable by the indicium upon insertion of the cartridge into the camera whereby, in use, the force exerted upon the cartridge by the sensing means, when the latter is in tactile sensing engagement with the indicium, is substantially parallel to the camera focal plane.

2. A camera as claimed in Claim 1 wherein the sensing means is pivotable about an axis extending substantially parallel to but offset from the focal plane.

3. A camera as claimed in Claim 1 wherein the sensing means is pivotable about an axis extending substantially perpendicular to but spaced to one side of the focal plane of the camera.

4. A camera according to Claim 1, 2 or 3 wherein the sensing means includes a sensing arm one end of which defines a cam surface which is adapted to engage the indicium on the cartridge.

5. A camera according to Claim 1, 2, 3 or 4 wherein a portion of a chamber arranged to receive the respective film cartridge compartment and in the wall of which the tactile sensing means is located, forms a protective shroud covering the sensing means except for that portion of the sensing means adapted to engage the indicium on the cartridge.

6. A camera as claimed in Claim 5 wherein the wall has a recess or opening arranged in use to receive the engaged portion of the sensing means.

7. A camera as claimed in any preceding Claim in which the sensing means includes a sensing arm, one end of which is adapted to be displaced by the tactile indicium of the cartridge in a direction generally parallel to the camera's focal plane upon insertion of the cartridge into the camera and the other end of

coloured flag 23a from the body opening 22 indicates to the operator that a cartridge containing film having a lower emulsion speed has been inserted into the camera.

5 In Figures 6 and 7, a further embodiment of the invention is illustrated that may be utilized when a great amount of energy is required to shift the camera mechanism to compensate for film having different emulsion speeds. The cam-shaped surface 13 of sensing arm 12 is once again biased for projection through the wall of the take-up chamber 7 by a door sensor spring 27 which provides the biasing action by holding a door sensor 28 against the upper leg of the sensing arm 12. Upon closing of the door 10, the door sensor 28 is driven toward the interior of the camera 3 against a return spring 30 until deflected by one of a pair of cam-shaped surfaces 31a or 31b on a deflector pin 31.

20 A ribless film cartridge 1 is shown positioned in the camera in Figure 6, thus resulting in no deflection of the cam-shaped surface 13 of sensing arm 12 so that the sensing arm remains in its maximum counterclockwise position with door sensor 28 being held against the upper leg of the sensing arm 12 by the door sensor spring 27. Closure of the door 10 results in the door sensor 28 moving forward and being deflected by surface 31a of the deflector pin 31 mounted on the frame 32. With the door sensor 28 in this position, no adjustment of camera functions takes place.

Figure 7 illustrates the mechanism with a film cartridge 1 having a rib 11 positioned in the camera. In this situation, the cam-shaped surface 13 is deflected by the rib 11 causing the sensor arm 12 to rotate in a clockwise direction about pivot 14. As a result of this rotation, the sensing arm 12 urges door sensor 28 toward the cartridge against the action of the door sensor spring 27. Upon closure of the film chamber door 10, the door sensor 28 is directed against cam-shaped surface 31b of the deflector 31 which results in the door sensor 28 engaging and moving link member 33 which, for example may be a shutter speed link which alters the shutter to accommodate the emulsion speed of the film contained in the film cartridge.

50 An advantage that may be obtained using this arrangement is that there is no load exerted on the film cartridge by lever 12 after the camera door is closed. This arrangement is also useful where a great amount of energy is required to shift mechanisms in response to different film characteristics, the energy being derived from the closure of the door by the operator instead of being supplied by a spring in the camera.

60 The 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 scope of the invention. For example, it is contemplated that the amount that the rib projects from the cartridge wall may be used to

adjust camera functions instead of the presence or absence of the indicium as discussed above. Further, the rib may take other forms such as an island projection on the end of the cartridge. In any instance it must present a surface the height of which is indicative of a characteristic of film contained in the cartridge. Insertion of the cartridge into the camera enables the described camera mechanism correspondingly to condition the camera.

#### WHAT WE CLAIM IS:-

1. A photographic camera for receiving a double compartment film cartridge of the type having a film take-up compartment, a film supply compartment, held in spaced location by means for supporting film in an exposure plane between the compartments, and a tactile indicative of a characteristic of the film in the cartridge, the camera comprising means for receiving, in a direction parallel to the optical axis of the camera, and for supporting such a cartridge in a manner such that the exposure plane of a received cartridge is located at the camera focal plane, and sensing means mounted in the camera and movable in a sensing locus generally parallel to the camera focal plane and being displaceable by the indicium upon insertion of the cartridge into the camera whereby, in use, the force exerted upon the cartridge by the sensing means, when the latter is in tactile sensing engagement with the indicium, is substantially parallel to the camera focal plane.

2. A camera as claimed in Claim 1 wherein the sensing means is pivotable about an axis extending substantially parallel to but offset from the focal plane.

3. A camera as claimed in Claim 1 wherein the sensing means is pivotable about an axis extending substantially perpendicular to but spaced to one side of the focal plane of the camera.

4. A camera according to Claim 1, 2 or 3 wherein the sensing means includes a sensing arm one end of which defines a cam surface which is adapted to engage the indicium on the cartridge.

5. A camera according to Claim 1, 2, 3 or 4 wherein a portion of a chamber arranged to receive the respective film cartridge compartment and in the wall of which the tactile sensing means is located, forms a protective shroud covering the sensing means except for that portion of the sensing means adapted to engage the indicium on the cartridge.

6. A camera as claimed in Claim 5 wherein the wall has a recess or opening arranged in use to receive the engaged portion of the sensing means.

7. A camera as claimed in any preceding Claim in which the sensing means includes a sensing arm, one end of which is adapted to be displaced by the tactile indicium of the cartridge in a direction generally parallel to the camera's focal plane upon insertion of the cartridge into the camera and the other end of



which is coupled to a member which adjusts a camera mechanism in accordance with the displacement.

8. A photographic camera substantially as

hereinbefore described with reference to and as illustrated in Figures 1 to 3, Figures 4 and 5 or Figures 6 and 7 of the accompanying drawings.

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Agent for the Applicants

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