

PATENT SPECIFICATION

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- (21) Application No. 25919/71 (22) Filed 19 April 1971
 (31) Convention Application Nos. 26 014 (32) Filed 6 April 1970
 76 082 28 Sept. 1970 in
 (33) United States of America (US)
 (44) Complete Specification published 20 FEB 1974
 (51) International Classification G03B 1/10
 (52) Index at acceptance
 G2A 13F4
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(54) PHOTOGRAPHIC FILM CARTRIDGE AND CAMERA THEREFOR

(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 film cartridges, to cameras for receiving the same, and the means for transporting film loaded in the cartridge.

It is an object of the present invention to provide a gear driven film cartridge of improved form.

A further object of the invention is to provide a camera for receiving the improved cartridge.

According to the present invention there is provided a film cartridge having a take-up chamber and drive means for drawing film into the take-up chamber, wherein the drive means is inaccessible so as to be incapable of manual operation.

The invention also provides a photographic camera arranged to receive a film cartridge comprising connected supply and take-up chambers, the take up chamber including a core having at one end a gear and arranged, on rotation of the gear, to draw film from the supply chamber to the take-up chamber, the camera comprising supply and take-up recesses respectively for receiving the chambers of the cartridge, and a camera drive gear for meshing with the core gear of an inserted cartridge, wherein the camera drive gear is a spur gear mounted on a shaft in the take-up recess and axially spaced from or capable of being axially spaced from or relieved so as to be axially spaced from the interior wall of the take-up recess.

[Price 25p]

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

Fig. 1 is a perspective view of a film cartridge (part broken away) and camera according to the invention;

Fig. 2 is a said section in a plane including the line II-II in Fig. 1, as it would appear when the cartridge is loaded in the camera, with a camera drive gear shown in engagement with a cartridge gear;

Fig. 3 is a front perspective view of another embodiment of a film cartridge according to the invention showing particularly the lower end portion thereof.

Fig. 4 is a partial cross-sectional view of a take-up compartment of the cartridge shown in Fig. 3; and

Fig. 5 is a rear view of a pair of cartridges, according to the second embodiment of the invention, in a stacked relationship.

Because cameras and film cartridges are well known, the present description will be directed in particular to camera and cartridge elements 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 Fig. 1 in position for insertion into a camera 3 and comprises a film supply compartment 4, a connecting wall 5 defining a film plane on the forward face thereof, and a film take-up compartment 2. 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 and vertical stepped support members 40. A received cartridge is urged into engagement with members 8 and 40 by leaf springs 9 mounted

on the interior of a camera door 10, which is hinged to the rearward part of camera 3 in a conventional manner. The camera film advance mechanism comprises a manually operable knob 11 to which is attached a driving spur gear 12, gear 12 being engageable with a gear 13 connected to a core in take-up chamber 2, in a manner and for reasons to be described hereinafter.

The section through the line II-II of Fig. 1, illustrated in Fig. 2, indicates that take-up chamber 2 comprises a substantially cylindrical casing 20, a top wall 21 including a gear cover 22 and a portion 23, and a bottom wall 24. Enclosed in take-up chamber 2 is a film core 26 having an annular recess at its upper end in a mating relationship with guide members 28 and 29 to form a labyrinthic light seal at the upper end of chamber 2, and another recess at its lower end by means of which core 26 is journaled on post 30. Integral with the film spool 26 is a gear 13 which, when rotated, drives core 26 to wind film 50 from supply chamber 4 onto core 26. In accordance with the present invention, the gear cover 22 extends over gear 13 to an extent sufficient to render gear 13 manually inaccessible, and has extending therefrom a post 34 which serves as a bearing for gear 13. The diameter of gear 13 is substantially less than the diameter of take-up chamber 2, and gear cover 22 is only large enough to fulfil its function, thereby maintaining the compactness of the cartridge. Wall portion 23 and gear cover 22 define an opening 36 through which driving gear 12 in camera 3 is given access to gear 13 for engagement therewith. In accordance with a further feature of the invention, the end portion 37 of gear cover 22 is tapered to guide driving gear 12 through opening 36 and into meshing engagement with gear 13. Preferably compartment 7 of camera 3 is so structured that, upon insertion of film cartridge 1 into camera 3, gears 12 and 13 necessarily become engaged. To facilitate this engagement, the gear 12 is spaced, on its shaft, axially from the adjacent interior surface of the compartment 7 to permit the radial segment of the gear cover adjacent the opening 36 to be received in such space.

For purposes of economy of manufacture, the housing shown consists of only two sections. One section includes part of side wall 20, gear cover 22, guide member 28 and bearing post 34, and the other section includes the remaining part of side wall 20, guide member 29, wall portion 23, post 30, and wall 24. These components are preferably made from moulded plastic material, but other suitable materials and methods will readily occur to those skilled in the art.

Figs. 3 and 4 disclose a preferred film

cartridge, according to the present invention, which is particularly adapted to be stacked compactly with like cartridges in an end-to-end and preferably also interlocked relationship. The cartridge includes generally cylindrical parallel film supply and take-up compartments disposed on opposite sides of and extending forwardly from an intermediate wall. The upper and lower end portions of the cartridge are defined by substantially flat, parallel exterior surfaces having only minor surface interruptions. However, as explained above, the gear cover 22 extends outwardly from one end portion of the cartridge, and a recess for accommodating the gear cover of an adjacent cartridge is provided in the opposite end portion, to permit the compact stacking of cartridges without interference from the cover. Such an arrangement permits stacking of the cartridges in straight rows without having to provide additional space in the stack to accommodate any increased cartridge dimension resulting from the raised protuberances. Additionally, the cartridges fit together in a mating or registered relationship that prevents relative slipping between stacked cartridges and facilitates their handling during manufacture, storage and shipping.

Referring to Figs. 3 and 4, the film cartridge 1' comprises a supply compartment 4' and a take-up compartment 2' disposed on opposite sides of a film support wall 5'. A set of opposed pairs of forwardly extending walls 10' and 14' respectively, cooperate to define an aperture through which film on support wall 5' may be photographically exposed, and these walls additionally aid in accurately locating the cartridge in a camera.

Supply compartment 4' has a substantially cylindrical configuration, and includes a pair of substantially flat end walls which are separated by a distance slightly less than the separation of walls 10'. Film is initially wound in convolute form in supply compartment 4', and is incrementally transported across wall 5', whereon it may be photographically exposed, and drawn into take-up compartment 2'.

Take-up compartment 2' has a side wall 15' which defines a substantially cylindrical chamber, and includes an upper end wall 21' and a lower end wall 24'. The exterior surfaces of the latter end walls are coplanar with the corresponding surfaces of supply compartment 4'. A winding core 26' is rotatably mounted within wall 15' on a spindle 30', as indicated in Fig. 4. A gear 13' is affixed to an end of core 26' and rotation is imparted to the latter in response to the driving engagement of gear 13' with a corresponding gear 12 (see Figs. 1 and 2) in a camera. Thus, film is normally drawn into compartment 2' and wound

around core 26' in response to the rotation of gear 13'. The core gear is mounted to extend beyond surface 21' to render the gear engageable by a camera gear, and has a relatively small diameter to reduce the bulk of the cartridge.

In order to protect gear 13' against damage and tampering, a gear cover 22' extends over and partially encloses the gear to render the same manually inaccessible, leaving an access opening 36' for a mating camera gear. Thus, gear 13' and cover 22' protrude beyond the otherwise generally flat upper surface of the cartridge. The top to bottom distance of the cartridge taken between the exterior surfaces of cover 22' and end wall 24' is substantially in excess of a similar measurement taken elsewhere on the cartridge.

In order to facilitate the handling and storage of the cartridge, a recess 33' is provided in end wall 24', and is configured to accommodate the gear cover of an adjacent cartridge. Referring to Fig. 5, recess 33' of the upper cartridge receives cover 22' of the lower cartridge, whereby the two cartridges are compactly nested or stacked together. The interlocking of the cartridges additionally inhibits the relative slipping thereof. In the absence of this provision, a stack of cartridges would tend to fan out by virtue of the lower top to bottom dimension of the supply compartment as compared to the like dimension of the take-up compartment, a highly utilitarian feature when one considers the vast volume of cartridges handled during the manufacture, shipping, storage and processing function associated therewith.

For ease and economy of manufacture, the recess defining walls of the cartridge are preferably integral with end wall 24'. In addition, spindle 30' is advantageously integral with the preceding elements as shown in Fig. 4, whereby the compartment 2' is necessarily light impervious at its lower end, there being no junctures in the respective walls.

It will be appreciated that the camera drive gear 12 should in all embodiments be capable of receiving a portion of the gear cover 22 or 22' between itself and the adjacent interior surface of the take-up compartment 7. The spur gear 12 has been described as being spaced from such surface but in other embodiments it may be merely relieved to receive the cover. In still further embodiments it may be movable axially so as to be spicable or present a relieved surface to the gear cover.

WHAT WE CLAIM IS:—

1. A film cartridge having a take-up chamber and drive means for drawing film into the take-up chamber, wherein the

drive means is inaccessible so as to be incapable of manual operation.

2. A cartridge as claimed in Claim 1 wherein the drive means comprises a drive gear mounted on a take-up core in the take-up chamber.

3. A cartridge as claimed in Claim 2 wherein the gear is provided at an axial end of the chamber and a cover, protruding from the end encloses the gear save for a slot in the cover, part circumferentially of the gear, permitting access for a drive gear of a camera.

4. A cartridge as claimed in Claim 3 wherein the axial end of the chamber, remote from the gear, is recessed to receive the cover of a next similar cartridge when the two cartridges are stacked together in co-axial disposition.

5. A cartridge as claimed in Claim 3 or 4 wherein the slot in the cover is tapered in a radially inwardly direction so as, in use, to guide a camera drive gear into meshing engagement with the core gear.

6. A cartridge as claimed in Claim 4 or 5 further including a supply chamber connected to the take-up chamber by a film support wall wherein the maximum dimension of the cartridge parallel to the axis of the take-up core is between the cover and the opposite axial end of the take-up chamber.

7. A film cartridge having an inaccessible drive means so as to be incapable of manual operation and substantially as hereinbefore described with reference to and as illustrated in Fig. 1 and 2 or Figs. 3, 4 and 5 of the accompanying drawings.

8. A photographic camera arranged to receive a film cartridge comprising connected supply and take-up chambers, the take-up chamber including a core having at one end a gear and arranged, on rotation of the gear, to draw film from the supply chamber to the take-up chamber, the camera comprising supply and take-up recesses respectively for receiving the chambers of the cartridge, and a camera drive gear for meshing with the core gear of an inserted cartridge, wherein the camera drive gear is a spur gear mounted on a shaft in the take-up recess and axially spaced from or capable of being axially spaced from or relieved so as to be axially spaced from the interior wall of the take-up recess.

9. A photographic camera as claimed in Claim 8 including a seal between the recesses for receiving, locating and supporting a film support wall forming the connection of the cartridge chambers, and a camera back for urging a cartridge inserted in the camera into correct location therein with the camera drive gear in meshing engagement with the core gear of the cartridge.

10. A photographic camera as claimed

around core 26' in response to the rotation of gear 13'. The core gear is mounted to extend beyond surface 21' to render the gear engageable by a camera gear, and has a relatively small diameter to reduce the bulk of the cartridge.

In order to protect gear 13' against damage and tampering, a gear cover 22' extends over and partially encloses the gear to render the same manually inaccessible, leaving an access opening 36' for a mating camera gear. Thus, gear 13' and cover 22' protrude beyond the otherwise generally flat upper surface of the cartridge. The top to bottom distance of the cartridge taken between the exterior surfaces of cover 22' and end wall 24' is substantially in excess of a similar measurement taken elsewhere on the cartridge.

In order to facilitate the handling and storage of the cartridge, a recess 33' is provided in end wall 24', and is configured to accommodate the gear cover of an adjacent cartridge. Referring to Fig. 5, recess 33' of the upper cartridge receives cover 22' of the lower cartridge, whereby the two cartridges are compactly nested or stacked together. The interlocking of the cartridges additionally inhibits the relative slipping thereof. In the absence of this provision, a stack of cartridges would tend to fan out by virtue of the lower top to bottom dimension of the supply compartment as compared to the like dimension of the take-up compartment, a highly utilitarian feature when one considers the vast volume of cartridges handled during the manufacture, shipping, storage and processing function associated therewith.

For ease and economy of manufacture, the recess defining walls of the cartridge are preferably integral with end wall 24'. In addition, spindle 30' is advantageously integral with the preceding elements as shown in Fig. 4, whereby the compartment 2' is necessarily light impervious at its lower end, there being no junctures in the respective walls.

It will be appreciated that the camera drive gear 12 should in all embodiments be capable of receiving a portion of the gear cover 22 or 22' between itself and the adjacent interior surface of the take-up compartment 7. The spur gear 12 has been described as being spaced from such surface but in other embodiments it may be merely relieved to receive the cover. In still further embodiments it may be movable axially so as to be spacable or present a relieved surface to the gear cover.

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2. A cartridge as claimed in Claim 1 wherein the drive means comprises a drive gear mounted on a take-up core in the take-up chamber.

3. A cartridge as claimed in Claim 2 wherein the gear is provided at an axial end of the chamber and a cover, protruding from the end encloses the gear save for a slot in the cover, part circumferentially of the gear, permitting access for a drive gear of a camera.

4. A cartridge as claimed in Claim 3 wherein the axial end of the chamber, remote from the gear, is recessed to receive the cover of a next similar cartridge when the two cartridges are stacked together in co-axial disposition.

5. A cartridge as claimed in Claim 3 or 4 wherein the slot in the cover is tapered in a radially inwardly direction so as, in use, to guide a camera drive gear into meshing engagement with the core gear.

6. A cartridge as claimed in Claim 4 or 5 further including a supply chamber connected to the take-up chamber by a film support wall wherein the maximum dimension of the cartridge parallel to the axis of the take-up core is between the cover and the opposite axial end of the take-up chamber.

7. A film cartridge having an inaccessible drive means so as to be incapable of manual operation and substantially as hereinbefore described with reference to and as illustrated in Fig. 1 and 2 or Figs. 3, 4 and 5 of the accompanying drawings.

8. A photographic camera arranged to receive a film cartridge comprising connected supply and take-up chambers, the take-up chamber including a core having at one end a gear and arranged, on rotation of the gear, to draw film from the supply chamber to the take-up chamber, the camera comprising supply and take-up recesses respectively for receiving the chambers of the cartridge, and a camera drive gear for meshing with the core gear of an inserted cartridge, wherein the camera drive gear is a spur gear mounted on a shaft in the take-up recess and axially spaced from or capable of being axially spaced from or relieved so as to be axially spaced from the interior wall of the take-up recess.

9. A photographic camera as claimed in Claim 8 including a seal between the recesses for receiving, locating and supporting a film support wall forming the connection of the cartridge chambers, and a camera back for urging a cartridge inserted in the camera into correct location therein with the camera drive gear in meshing engagement with the core gear of the cartridge.

10. A photographic camera as claimed



in Claim 8 and substantially as hereinbefore described with reference to and as illustrated in Fig. 1 and 2 of the accompanying drawings.

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Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1974.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained

