

PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Film Magazine and Cameras for Use Therewith.

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 (Assignees of HUBERT NERWIN), 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 roll film magazines.

An object of the present invention is the provision of a film magazine of improved construction.

According to the present invention, there is provided a photographic roll film magazine comprising a body and a cover which together define a film supply chamber, an intermediate member, and a film take-up chamber arranged to receive a take-up spool, and wherein the cover has along or adjacent its periphery a ridge or a rebate so as to provide thereat two contiguous perpendicular surfaces, and the body is formed with a rebate or a ridge providing complementary peripheral contiguous surfaces so that the said contiguous surfaces of the body and the cover, on assembly, mate in a light-tight manner.

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

Figure 1 is an exploded perspective view of a loaded film magazine according to a preferred embodiment of the invention;

Figure 2 is a broken plan view of the roll film and backing paper used in the magazine, as seen from the film side;

Fig. 3 is a rear view of the film magazine; Fig. 4 is a sectional view of an empty

magazine taken along the line IV—IV of Fig. 3:

Fig. 5 is a sectional view taken along the line V—V of Fig. 3:

Fig. 6 is a fragmentary, part-sectional front view of the empty film magazine:

Fig. 7 is a sectional view taken along the line VII—VII of Fig. 6:

Fig. 8 is an enlarged portion of the magazine shown in Fig. 4 illustrating means employed to support and locate one edge of the film and backing paper in an exposure plane in the magazine:

Fig. 9 is an enlarged portion of the magazine shown in Fig. 5 illustrating light sealing means employed in a film passageway of a film supply chamber of the magazine:

Fig. 10 is a perspective view of a camera arranged to receive a magazine according to the present invention showing the magazine located for insertion into the camera:

Fig. 11 is a perspective front view of the magazine showing one embodiment of magazine coding means:

Fig. 12 is a top view of a magazine showing an alternative embodiment of magazine coding means; and

Fig. 13 is a top view of a magazine showing a further embodiment of magazine coding means.

THE FILM MAGAZINE

General Description:

Referring to Figs. 1 to 11, and more particularly Figs. 1 and 2, a loaded film magazine 51 of a preferred form of the present invention comprises a moulded plastic magazine body 52, a moulded plastic magazine cover 53, a moulded plastic spool 54, a strip of light protective paper 55 attached to take-up spool 54 by an adhesive paster 56, a length of film 57 attached to the protective paper 55 by a second adhesive paster 58

[Price 4s. 6d.]

and a film identification and exposure guide 59 attached to the magazine cover 53. In the assembled magazine, the film is initially wound upon itself to form a coreless film supply roll 61 which is housed in a film supply chamber 62 formed by the co-operation of the magazine body and the magazine back, as illustrated in cross-section in Fig. 5, with the backing paper extending across a magazine exposure opening 63 and attached to the spool 54 located in a film spool chamber 64. With the magazine components so disposed, the cover member 53 is cemented or otherwise permanently joined to the magazine body 52. The magazine is not intended to be reloaded; an exposed roll of film is removed therefrom for processing by breaking the magazine open.

Light Sealing Means:

In order to prevent light from entering the magazine along the mating edges of the body and the cover member, these edges are provided at all points with closely fitting mating surfaces normal to the adjacent outer surface of the magazine, as shown, for example, at 65 and 66 of Fig. 4 and with contiguous mating surfaces as shown, for example, at 67 and 68 at right angles thereto effectively to block the entry of light through the joint. As is most clearly illustrated in Figs. 1 and 7, the light sealing means, employed at the ends of the film take-up chamber to prevent light leakage past spool flanges 69, comprise annular ribs 71 and 72 on the magazine body 52 and the cover 53 respectively, which engage circumferential grooves 73 in each of the spool flanges 69 rotatably to support and locate the film spool. The junctions of the ribs are protected against light leakage by overlapping mating surfaces as previously described.

Magazine Film Gate and Film Passageways:

The portion of film to be exposed is accurately supported in a flat plane behind the magazine exposure opening by means integral with the moulded magazine components, and the magazine itself is accurately located in the camera, as described later, to ensure that the film in the exposure opening lies in the focal plane of the camera lens system. To support the film in a flat plane, the magazine cover is provided with a flat rectangular surface 75 surrounded by a shallow recess 76 as shown in plan view in Fig. 6 and, in cross-section, in Figs. 4, 5, 8 and 9. The film and backing paper are maintained in flat supported engagement with the surface 75 by the engagement of the film with a rectangular rearwardly facing surface 77 of a magazine wall 78 surrounding the exposure opening opposite recess 76 and spaced forwardly of surface 75 by a distance

closely approximating the combined thickness of the film and paper. Thus, as shown in enlarged views in Figs. 8 and 9, the film and paper are maintained in flat relation against surface 75 due to their natural resistance to being flexed simultaneously in transverse directions. In case the combined thickness of the film and paper is slightly greater than the distance between the planes of surfaces 75 and 77, the film and paper are bowed slightly into recess 76 without materially effecting the flatness of the film in the exposure plane or causing the film to bind as it is wound across the opening. Along the top edge of the exposure opening, the magazine wall 78 is provided with a notch 79 to accommodate the end of a metering member, as shown at 80, in Figure 10, which is adapted to extend through the film and into a recess 81 in the magazine cover. Since the film extends beyond the top of the notch, however, the continuous surface 77 is narrowed but not completely interrupted thereby.

Fig. 9 is a cross section, to an enlarged scale, of the film passageway into the film supply chamber, the same construction, also being employed in the passageway into the spool chamber as shown in Fig. 5. As previously explained, the film is maintained in contact with surface 77 of wall 78 by virtue of the resiliency of the film and paper and the correspondence between the combined thickness of the film and paper and the spacing of surfaces 75 and 77. The intimate contact thus obtained between the film and surface 77 eliminates the need for additional light sealing elements such as plush or felt, and thereby the possibility of contaminating the film with lint or other foreign matter originating in the light seal. Since recess 76 is wider than opposing wall 78, the passageway may freely accommodate the adhesive paste 58 which must pass therethrough during the initial film winding operation.

After the film and paper have been completely wound onto the take-up spool, the passageway is obviously no longer completely light tight. At this stage of the winding operation, however, the trailing end of the backing paper has been wound upon the spool over the exposed film and substantially reduces the danger of the film being fogged by any slight amount of light entering through the passageway of the spool chamber. As a means of further protecting the fully exposed film in the spool chamber, cameras adapted to accommodate such magazines may be provided with film metering mechanisms, as described in our Patent Specification No. 1,024,721, which limit the final winding operation of the camera to cause the end of the backing strip to remain in the passageway of the spool chamber. While the presence of the paper alone in the passageway

does not provide quite as effective a light seal as does paper and film together, this arrangement, in conjunction with the backing paper wound over the exposed film on the spool, substantially eliminates the danger of fogging the film.

Film Guiding Means:

As the film and paper are wound from the supply chamber into the spool chamber, the lateral freedom of the strips in the area of the film gate is limited by edge guides 82 and 83, moulded integrally with the magazine body 52 as most clearly illustrated in Figs. 1, 4 and 8. These guide members accurately centre the film and paper in the film gate and guide it onto the take-up spool while providing sufficient lateral freedom to allow for slight variations in the width of the strips. As an additional means of preventing the film from riding over the flanges 69 of the spool 54 and causing jamming or damage to the film, the semi-cylindrical internal surface 84 of the spool chamber located between the spool flanges is of smaller radius than the flanges as shown in Fig. 7. At the point where the film strip enters the spool chamber, similar means are employed on the magazine cover, as shown at 85 of Figs. 5 and 7, to guide the film between the spool flanges.

Magazine Locating Means:

As shown in Fig. 10, a camera adapted to accommodate the magazine constructed according to the present invention, comprises a main housing 86 provided with a central boxlike member 87 located between two chambers 88 and 89 adapted respectively freely to accommodate the film supply and spool chamber portions of the magazine. A continuous rearwardly projecting rib 91 is provided along the rearward portion of member 87, and is adapted to be received by a corresponding continuous channel 92 surrounding the exposure opening of the magazine as illustrated in Figs. 6, 8 and 9. To load the camera, the hinged cover member 93 is released by means of latch member 94 and is moved to the position illustrated. After a film winding knob 95 is withdrawn, as shown, to retract the spool engaging key, (not shown), from the chamber 89, the magazine is placed in the camera with the rib 91 in mating relation with the channel 92. The cover member may then be closed and the winding knob depressed to engage the key with a suitable clutch member 96 formed in one of the flanges of the film take-up spool. With the cover in its closed position behind the magazine, pressure pads 97 on the magazine are engaged by spring members 98 on the hinged cover member to urge the magazine forward with a bottom surface 99 of the channel 92 in contact with a rear surface 100 of the rib 91, thereby

accurately locating the film plane of the magazine with respect to the camera lens system 101. To prevent distortional influences on the magazine in the camera, the lateral positioning of the magazine is determined by the lateral freedom of the rib 91 in the channel 92 so that other portions of the magazine are held out of contact with the camera housing. As is readily apparent, the co-operating rib and slot structure between the camera and magazine also serves to provide a labyrinthic light barrier between the two units so that, of the camera components, only the box-like member 87 need be light-tight.

Exposure Guide Label:

As illustrated in Figs. 1 and 10, an exposure guide label 59 appropriate to the particular type of film in a magazine may be attached to the cover thereof in the area surrounding an aperture 102 through which exposure indicating numerals 103, Fig. 1, are visible. With the magazine installed in the camera, the exposure guide label and the exposure indicating numeral aligned with the aperture are visible through a window 104 in the hinged cover member 93. Since the magazine is not intended to be re-used, the appropriate label may be permanently attached to the loaded magazine or, if desired, an appropriate guide might be moulded into the magazine back prior to assembling the magazine, in which case, of course, the advantage of being able to load all kinds of film into the same magazine components would be lost.

Magazine Coding Means:

In order to enable an element of a camera to be adjusted automatically according to the sensitivity of the film in a magazine, a physically detectable coding means may be provided on the magazine as shown in a preferred embodiment in Figs. 11 to 13. In Fig. 11, this coding means comprises a coding notch 105, the position of which along the forwardly projecting rib 106 is empirically determined as a function of the sensitivity or speed of the particular film loaded in the magazine. For example, as viewed in Fig. 11, the higher the film speed, the further notch 105 would be from the left end of the rib 106. Figs. 12 and 13 show alternate coding means in which the position of an abutment shoulder 105^a or a projection 105^b along the rib is determined by the speed of the film in a magazine. It should be noted that all of these coding means comprise the removal of material from the rib rather than the addition of material, thereby affording a simple means of coding a standard magazine after it has been loaded with film. The removal of material from the rib is preferably accomplished by punching out a

solid section or by locally melting the rib rather than by a sawing or grinding technique, in order to prevent contaminating the magazine with dust or shavings.

- 5 A second coding notch or similar means may also be provided on the magazine along a rib 107 as shown at 108 in Fig. 11. The positioning of this coding means along the rib is empirically determined as a function of
10 the type of film in the magazine in order that exposed magazines may be automatically sorted prior to being processed. If a greater range of values were to be coded along either of the ribs than would be practical by means
15 of a single abutment surface, two or more such surfaces might be employed along the rib, for example, in a binary coding system.

The subject-matter of the present application is closely related to that of our application no. 198/63 (Serial No. 1,034,901) of
20 which the present application is a divisional.

WHAT WE CLAIM IS:—

1. A photographic roll film magazine comprising a body and a cover which together define a film supply chamber, an intermediate member, and a film take-up chamber arranged to receive a take-up spool, and wherein the cover has along or adjacent its periphery a ridge or a rebate so as to
25 provide thereat two contiguous perpendicular surfaces, and the body is formed with a rebate or a ridge providing complementary peripheral contiguous surfaces so that the said contiguous surfaces of the body and the
30 cover, on assembly, mate in a light-tight manner.

2. A magazine as claimed in claim 1 wherein the spool has circumferentially grooved end flanges which mate, in a light-tight manner with annular ribs on the cover and the body when the cover is in mating relation to the body.
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3. A magazine as claimed in claim 1 or 2 wherein the body, the cover and the spool are each of a moulded plastics material.
45

4. A magazine as claimed in claim 1, 2 or 3, wherein the cover is cemented to the body along their mating surfaces.

5. A magazine as claimed in claim 4
50 wherein the cemented joint between the body

and the cover is permanent and the magazine is disposable, the take-up spool being removable therefrom by breaking of the magazine.

6. A magazine as claimed in any preceding claim wherein the body provides an exposure opening and the cover provides a raised surface immediately rearwardly of the exposure opening. 55

7. A magazine as claimed in claim 6 wherein a front wall of the body, peripherally of the exposure opening is provided with means indicative of film speed. 60

8. A magazine as claimed in claim 6 or 7 wherein means indicative of film type are provided on the body. 65

9. A magazine as claimed in claim 6 or any claim appendant thereto wherein the raised surface is provided with an aperture wherethrough an exposure indicating numeral on a backing paper of film contained in the magazine is visible. 70

10. A magazine as claimed in claim 6 or any claim appendant thereto wherein the cover member is provided with a label, arranged in use to be visible through a window in a camera back, appropriate to the particular type of film in the magazine. 75

11. A magazine as claimed in claim 10 wherein the label is moulded into the exterior surface of the cover. 80

12. A magazine as claimed in claim 6 or any claim appendant thereto wherein the exposure opening is surrounded by a forwardly projecting rib adapted, in use, to mate light-tightly with a complementary formation on a camera. 85

13. A magazine as claimed in any preceding claim having a coreless coil of film and interwound backing paper in the film supply chamber, a leader of the backing paper extending to the film take-up chamber and being secured to the spool. 90

14. A magazine as claimed in claim 13 wherein the film or the film and the backing paper have spaced metering perforations adjacent one longitudinal edge. 95

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Patent Agent.

solid section or by locally melting the rib rather than by a sawing or grinding technique, in order to prevent contaminating the magazine with dust or shavings.

- 5 A second coding notch or similar means may also be provided on the magazine along a rib 107 as shown at 108 in Fig. 11. The positioning of this coding means along the rib is empirically determined as a function of the type of film in the magazine in order that exposed magazines may be automatically sorted prior to being processed. If a greater range of values were to be coded along either of the ribs than would be practical by means of a single abutment surface, two or more such surfaces might be employed along the rib, for example, in a binary coding system.

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2. A magazine as claimed in claim 1 wherein the spool has circumferentially grooved end flanges which mate, in a light-tight manner with annular ribs on the cover and the body when the cover is in mating relation to the body.

3. A magazine as claimed in claim 1 or 2 wherein the body, the cover and the spool are each of a moulded plastics material.

4. A magazine as claimed in claim 1, 2 or 3, wherein the cover is cemented to the body along their mating surfaces.

5. A magazine as claimed in claim 4 wherein the cemented joint between the body

and the cover is permanent and the magazine is disposable, the take-up spool being removable therefrom by breaking of the magazine.

6. A magazine as claimed in any preceding claim wherein the body provides an exposure opening and the cover provides a raised surface immediately rearwardly of the exposure opening.

7. A magazine as claimed in claim 6 wherein a front wall of the body, peripherally of the exposure opening is provided with means indicative of film speed.

8. A magazine as claimed in claim 6 or 7 wherein means indicative of film type are provided on the body.

9. A magazine as claimed in claim 6 or any claim appendant thereto wherein the raised surface is provided with an aperture wherethrough an exposure indicating numeral on a backing paper of film contained in the magazine is visible.

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