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(54) MOTION PICTURE 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 a motion picture camera having a device for disabling an anti-backup mechanism in a film cartridge employing a disengageable anti-backup mechanism when such a cartridge is placed within the camera, and to such a device which does not impair operation in a camera of a cartridge not equipped with such a disengageable anti-backup device.

Certain types of commercial film cartridges (referred to as "super 8" cartridges) include a substantially rectangular housing in which a supply roll of film and a takeup core are rotatably mounted in a side-by-side, coaxial relationship. Such cartridges are described in our Letters Patents Nos. 1,096,300 and 1,031,930. In these cartridges there is a tendency for the film to "clockspring", "clockspringing" being a partial loosening and radial displacement of successive outer convolutions of the film roll resulting from the reverse rotation of the core when the cartridge is subjected to sharp movements. This tendency to "clockspring" can be prevented by the use of an anti-backup mechanism as described and claimed in our Letters Patent Uo. 1,317,655 or No. 1,374,224.

Such anti-backup mechanisms operate to prevent the reverse rotation of a film takeup core and hence prevent clockspringing. However, there are various problems associated with the use of an anti-backup mechanism which makes it desirable that the mechanism be disengaged when the cartridge is inserted in a camera. The problems are: (1) there is a "clicking" noise made

by the anti-backup mechanism during operation and this noise is picked up by the sound apparatus that may be associated with the camera; and (2) the film must be driven in the reverse direction (a) to permit "fade, lap and dissolve" type filming sequences or (b) to permit the removal of the exposed film through the exposure aperture of the cartridge for film processing:

To disengage the anti-backup mechanisms, the camera can be equipped with an anti-back disabling device as described and claimed in our Letters Patent No. 1,317,655. Such a device comprises a pin located to disable the anti-backup mechanisms when the film cartridge is placed in the camera by an operator depressing it into a disabled position when "fade, lap and dissolve" filming is desired. If a disabling device of this type is rigidly fixed in position, it renders the camera unsuitable for receiving commercially available super 8 film cartridge with anti-backup mechanisms that are not disengageable since such cartridges have a rigid core centre and therefore cannot accommodate a rigid disabling pin in a camera.

An object of the present invention is to provide a device capable of automatically disengaging a disengageable anti-backup mechanism in a film cartridge when such a cartridge is placed in a camera, and to such a device which does not interfere with insertion into the camera of a cartridge without a disengageable anti-backup device.

In accordance with the present invention there is provided a motion picture camera having a chamber adapted to receive a cartridge having a disengageable anti-backup mechanism, and a device for disabling the anti-backup mechanism automatically when the cartridge is inserted into the camera, the disabling device comprising an elongate disengaging member, means mounting said member for movement between a first position wherein the members is effective to disable the anti-backup mechanism of a re-

ceived cartridge and a second position wherein the member is in a retracted position relative to the chamber, and means for urging the member to its first position from its second position.

In the accompanying drawings:—

Fig. 1 is a perspective view of a motion picture camera constructed in accordance with the present invention and showing a film cartridge of one type that can be loaded into a camera;

Fig. 2 is a fragmentary cross-section view, to an enlarged scale, showing the disabling device depressing the anti-backup mechanism to its disengaged position;

Fig. 3 is a view similar to Fig. 2 but showing the disabling device in a retracted position it assumes when a second type of film cartridge is loaded into the camera;

Fig. 4 is a partial perspective view showing the relationship of the disabling pin with respect to the anti-backup mechanism of the cartridge shown in Figs. 1 and 2; and

Fig. 5 is a view similar to Fig. 4 but showing the pin with respect to the type of cartridge shown in Fig. 3.

In Fig. 1 of the drawings an anti-backup disabling device generally designated 1 is shown as part of a motion picture camera 3 and is positioned on an inner wall 3a of the camera cartridge chamber 3b into which a cartridge 5 is insertable. The camera 3 and cartridge 5 are adapted to record sound on a sound track on the film while the film is being exposed to scene light by operation of the camera. Generally, the portion of cartridge 5 above recess 6 can be similar to the cartridge disclosed in our Letters Patent No. 1,374,224. Of course, if sound recording is not desired, the cartridge 5 can be of the type disclosed in such application or in our Letters Patent No. 1,317,655. In order to avoid unnecessary lengthening of this specification and complication of the drawings, and since a description of the portions of cartridge 5 and camera 3 not pertinent to the present invention may be found in the above-cited patents and application, the following description will be directed primarily to the anti-backup disabling device 1 of the present invention.

Referring again to Fig. 1, the cartridge includes a film take-up core 7 having a pair of lugs 7a and 7b. One end of the film 8 is attached to the core so that the film is wound onto the core in response to rotation of the core. When the cartridge 5 is fully inserted into the camera 3, one of the two lugs 7a and 7b of the take-up core 7 is engaged by a drive lug 9 projecting from wall 3a of the cartridge chamber adjacent to the disabling device 1. As is well known in the art, during operation of the

camera the drive lug 9 is driven through a friction drive to rotate core 7.

Fig. 2 more clearly illustrates the operation of the disabling device 1. The disabling device 1 comprises a pin 11 having a head end portion 11a, an enlarged shoulder portion 11b, and a tail end portion 11c. A spring 13 is coiled around portion 11c and engages shoulder portion 11b. Portions 11b and 11c of pin 11 are located in a cavity 15 formed by the interfitting of cylindrical portions 17a and 19a, respectively, of a gear 17 and a mounting plate 19. The ends of spring 13 react against the mounting plate 19 and shoulder portion 11b to urge the shoulder portion toward gear 17 and the shoulder portion 11a toward the cartridge 5. The head portion 11a protrudes through a hole 17b in the gear 17, the hole being coaxial with the axis X of rotation of the gear and being of a diameter which allows only the head portion 11a to protrude through gear 17. The remainder of the pin 11 is retained in cavity 15 by virtue of the engagement of the shoulder portion 11b and gear 17. A plate 21 and a plate 23 jointly are substantially cylindrical in shape and are mounted within a complementary recess in gear 17. The plates are coaxial with gear 17 and frictionally coupled thereto. Drive lug 9 projects from plate 23 in spaced relation to axis X so that it is driven in a circular path by gear 17.

Referring now to Figs. 2 and 4, the disengageable anti-backup mechanism for cartridge 5 is described and claimed in our said Letter Patent No. 1,374,224. The mechanism comprises a control member 25 movable along axis X in a slot 27 in a stationary post 24 around which core 7 rotates, the slot holding the member 25 against rotation relative to the post 24. Member 25 generally is shaped like a tuning fork and has two flexible arms 25a and 25b. Post 24 has a plurality of circumferentially spaced ratchet surfaces 29 that normally are engaged by the end portions of arms 25a and 25b to prevent rotation of the core in the unwinding direction (see Fig. 4). The arms are urged into contact with surfaces 29 by the complementary-shaped ramp surfaces on the arms and the slot in the post, and the arm can be moved by pin 11 to the Fig. 2 position wherein they are disengaged from surfaces 29, thereby permitted rotation of the core in both directions.

When a sound film cartridge 5 (or other cartridge with a disengageable anti-backup mechanism) is fully inserted in the camera as shown in Fig. 2, the head portion 11a of the pin 11 protrudes through openings in the film take-up core 7 and post 24 and engages the arms of the anti-backup device 25. The

pin 11, under force exerted by spring 13, forces the anti-backup device 25 to its Fig. 2 position wherein it is clear of ratchet surfaces 29. As noted earlier, the anti-backup device 25 tends to return to its Fig. 4 position against the force exerted by the pin 11, but the force of the spring 13 is greater than the force exerted by the anti-backup device 25 and, therefore, the anti-backup device 25 is held clear of the ratchet surfaces 29. The disabling device of the present invention also can be used with other disengageable anti-backup devices, such as disclosed in the beforementioned Letters Patent No. 1,317,655. As shown in Fig. 2, when the film cartridge 5 is fully inserted, the drive lug 9 protrudes into one of the recesses 7c or 7d in the core formed by lugs 7a and 7b, and is thereby in position to engage one of the core lugs 7a and 7b to rotate the core 7 in the manner previously described.

Figs. 3 and 5 illustrate operation of the disabling device of this invention when the camera receives a cartridge which does not have a disengageable anti-backup device and is not provided with an opening to receive the head portion 11a of the pin 11. This type of cartridge is generally designated 31 and comprises a take-up core 32 which rotates about post 24 in the manner previously described for core 7. However, core 32 has a portion 32a that extends across the outer end of post 24 so that head portion 11a of the pin 11 cannot penetrate the core and the post. As illustrated in the drawings, portion 32a of the core is substantially coplanar with the outer surface of the cartridge and its centre is aligned with axis X of the disabling device. Cartridge 31 may be constructed in the manner disclosed in the beforementioned Letters Patent No. 1,031,930.

As cartridge 31 is loaded into the camera the portion 32a of the take-up core engages the outer surface of head portion 11a of the pin 11 and retracts the pin against the force exerted by spring 13, thereby moving the pin to the position illustrated in Fig. 3. While the pin does not continue to exert some force onto the take-up core and thereby produce a frictional force that must be overcome by lug 9, the resulting frictional force is relatively small and is minimized by the fact that the pin is coaxial with the axis of rotation on the take-up core. When cartridge 31 is removed from the camera spring 13 returns the pin 11 to its normal

or rest position wherein the shoulder portion 11b abuts against the adjacent surface of gear 17.

The disabling device 1 of the present invention allows the camera to be loaded with cartridges of the type shown at 5 or 31 and is effective, on the one hand, to disengage automatically the anti-back-up device in a cartridge 5 or, on the other hand, to retract to permit normal operation of a cartridge of the type shown at 31. The relatively simple disabling device is automatic in operation and does not require any adjustment or effect on the part of the camera operator.

WHAT WE CLAIM IS:—

1. A motion picture camera having a chamber adapted to receive a cartridge having a disengageable anti-backup mechanism and a device for disabling the anti-backup mechanism automatically when the cartridge is inserted into the camera, the disabling device comprising an elongate disengaging member, means mounting said member for movement between a first position wherein the member is effective to disable the anti-backup mechanism of a received cartridge and a second position wherein the member is in a retracted position relative to the chamber, and means for urging the member to its first position from its second position.

2. A motion picture camera according to Claim 1, wherein the disengaging member comprises an elongate pin having a head portion engageable with the anti-backup mechanism of the cartridge inserted in the camera chamber, the pin further comprising a shoulder for limiting extension of the head portion into the chamber, and said means urging the member to its first position comprises a spring engageable with the pin.

3. A motion picture camera according to Claim 2, wherein the camera has means defining a cavity, the shoulder on the pin being located in the cavity and being movable therein, the pin includes a second end portion opposite from the head portion, and the spring comprises a coil spring positioned around the second end portion and engageable with the shoulder on the pin and with means defining the cavity in the camera.

4. A motion picture camera according to Claim 1, constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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pin 11, under force exerted by spring 13, forces the anti-backup device 25 to its Fig. 2 position wherein it is clear of ratchet surfaces 29. As noted earlier, the anti-backup device 25 tends to return to its Fig. 4 position against the force exerted by the pin 11, but the force of the spring 13 is greater than the force exerted by the anti-backup device 25 and, therefore, the anti-backup device 25 is held clear of the ratchet surfaces 29. The disabling device of the present invention also can be used with other disengageable anti-backup devices, such as disclosed in the beforementioned Letters Patent No. 1,317,655. As shown in Fig. 2, when the film cartridge 5 is fully inserted, the drive lug 9 protrudes into one of the recesses 7c or 7d in the core formed by lugs 7a and 7b, and is thereby in position to engage one of the core lugs 7a and 7b to rotate the core 7 in the manner previously described.

Figs. 3 and 5 illustrate operation of the disabling device of this invention when the camera receives a cartridge which does not have a disengageable anti-backup device and is not provided with an opening to receive the head portion 11a of the pin 11. This type of cartridge is generally designated 31 and comprises a take-up core 32 which rotates about post 24 in the manner previously described for core 7. However, core 32 has a portion 32a that extends across the outer end of post 24 so that head portion 11a of the pin 11 cannot penetrate the core and the post. As illustrated in the drawings, portion 32a of the core is substantially coplanar with the outer surface of the cartridge and its centre is aligned with axis X of the disabling device. Cartridge 31 may be constructed in the manner disclosed in the beforementioned Letters Patent No. 1,031,930.

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or rest position wherein the shoulder portion 11b abuts against the adjacent surface of gear 17.

The disabling device 1 of the present invention allows the camera to be loaded with cartridges of the type shown at 5 or 31 and is effective, on the one hand, to disengage automatically the anti-back-up device in a cartridge 5 or, on the other hand, to retract to permit normal operation of a cartridge of the type shown at 31. The relatively simple disabling device is automatic in operation and does not require any adjustment or effect on the part of the camera operator.

WHAT WE CLAIM IS:—

1. A motion picture camera having a chamber adapted to receive a cartridge having a disengageable anti-backup mechanism and a device for disabling the anti-backup mechanism automatically when the cartridge is inserted into the camera, the disabling device comprising an elongate disengaging member, means mounting said member for movement between a first position wherein the member is effective to disable the anti-back-up mechanism of a received cartridge and a second position wherein the member is in a retracted position relative to the chamber, and means for urging the member to its first position from its second position.

2. A motion picture camera according to Claim 1, wherein the disengaging member comprises an elongate pin having a head portion engageable with the anti-backup mechanism of the cartridge inserted in the camera chamber, the pin further comprising a shoulder for limiting extension of the head portion into the chamber, and said means urging the member to its first position comprises a spring engageable with the pin.

3. A motion picture camera according to Claim 2, wherein the camera has means defining a cavity, the shoulder on the pin being located in the cavity and being movable therein, the pin includes a second end portion opposite from the head portion, and the spring comprises a coil spring positioned around the second end portion and engageable with the shoulder on the pin and with means defining the cavity in the camera.

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