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DRAWINGS ATTACHED

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(54) CARTRIDGE FOR REEL OF FILM

(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:—

This invention relates to a cartridge adapted to contain a reel of film or other strip material.

Two-piece cartridges are known which are adapted to contain a standard reel of processed motion picture film and to be latched to a motion picture projector. However, previous cartridges of this type have been designed to contain relatively small reels of film, particularly 50 or 100-foot reels, and, while satisfactory in these smaller sizes, they lack the structural rigidity desirable in larger 200 or 400-foot cartridges. Without such structural rigidity, the spindle and film-exit openings of previously known cartridges in the larger sizes cannot be accurately located on the projector. Moreover, flexing or distortion in larger cartridges of previously known types often renders their hinge and/or latching members ineffective and thereby permits these cartridges to open whenever subjected to abuse or mishandling. The effects of this lack of structural rigidity may be further aggravated when the larger cartridges are provided with universal aligning means, such as a single-rib.

With such aligning means, the cartridge must be sufficiently rigid to assure that the film exit and the openings provided in the cartridge to receive the projector spindle are accurately located with respect to the cartridge aligning rib.

It is an object of the present invention to provide cartridges which will be structurally rigid when closed whether manufactured in smaller sizes (e.g., 50 and 100-foot) or larger sizes (e.g., 200 and 400-foot).

In accordance with the present invention there is provided a cartridge for containing a reel of film or other strip material and comprising first and second members which together define a reel chamber having a pair of substantially flat side walls spaced by a peripheral wall, each of the first and second members providing one of the side walls and a part of the peripheral wall, and each of the members having in its part of the peripheral wall a groove which receives and locates a part of the side wall of the other member in the closed position of the cartridge.

A cartridge in accordance with one embodiment of the invention and adapted to contain a reel of film and to be mounted on a cartridge-loading motion picture projector will now be described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of part of a cartridge-loading motion picture projector and the cartridge therefor, illustrating means for retaining and orienting the cartridge on the projector.

Fig. 2 is a plan view of the cartridge with one part removed, showing the other part with a standard reel of motion picture film contained therein.

Fig. 3 is a part-sectional view of the cartridge taken along line 3—3 of Fig. 1, illustrating openings in the bottom of the cartridge adapted to receive means for engaging and removing film from the cartridge.

Fig. 4 is a part-sectional view of the cartridge taken along line 4—4 of Fig. 1, showing the manner in which the side-wall of one cartridge part fits within a groove in the edge-wall of the other cartridge part when the cartridge is in the closed position.

Fig. 5 is an exploded view of the cartridge showing the two cartridge parts and the manner in which they enclose a standard reel of motion picture film.

Referring now to the drawings, and particularly to Fig. 1, a structure 10 is disclosed representing a cartridge-loading motion pic-

ture projector, having means for receiving, aligning and latching cartridges of various sizes and shapes. Generally, the structure comprises a vertical wall 12, defining a front surface of the projector, and a horizontal wall 14, extending from the upper portion of the vertical wall, and defining a top surface of the projector.

A rotatable spindle 16, is adapted to be extended and retracted through an elongate opening 18 in wall 12, by an operating lever 20 which projects through a slot 22 in wall 14. The spindle may be extended through the opening for engaging and supporting a standard reel of motion picture film in a cartridge positioned against wall 12, or the spindle may be retracted as shown in Fig. 1 to permit slot loading of the cartridge.

At the lower portion of wall 12 there is a chamber 30 formed by plates 32, 34 and 35, end members 36 and 38, and a cover or closure member 40. The bottom of the chamber 30 is defined by a wall 46 having an opening 48 therein. Opening 48 also extends through the side members 36 and 38 to permit passage of film stripping means through the slot as described more fully in Patent Specification No. 1,254,705.

The side edges of plate 35 are spaced from the adjacent side edges of plates 32 and 34 to form two parallel grooves or recesses 50 and 52. These grooves or recesses are open at the top as illustrated in the drawings so that the cartridge can be moved downwardly along wall 12 during mounting of the cartridge on the projector.

A positioning and latch member 60 is movable lengthwise in a slot or opening 62 formed in plate 32. The location of slot 62 is such that the member 60 is slidable in a direction substantially perpendicular to the recess or groove 50 and is positioned adjacent the upper end of this groove or recess. Member 60 has a tapered end portion 63 which is adapted to project from the slot 62 and into a position over the groove or recess 50 to block upward movement of the cartridge but to permit downward movement of the cartridge along wall 12 and groove or recesses 50 and 52. As explained more fully hereinafter, the member 60 is also adapted to establish the vertical position of a cartridge with respect to the wall 12 of the projector. Member 60 is connected to a lever 64 by a pivot pin 66 and lever 64 is pivoted at 68 so that the lever and member 60 can be moved by finger pressure to a retracted position to release the cartridge from the projector.

The projector 10 is provided with suitable means for biasing a cartridge upwardly from wall 46 toward the member 60 to establish and maintain the cartridge in the desired vertical position with respect to spindle 16. As illustrated in the drawings, this is effected by means of a leaf spring 74 which projects

out of and extends above a recess 76 formed in bottom wall 46. During movement of a cartridge into the chamber 30 the spring may be deflected downwardly until it is substantially fully contained within the recess 76. However, when the cartridge is released the spring 74 acts to bias the cartridge upwardly for proper alignment of the member 60 with a portion of the cartridge in a manner explained more fully herein after.

A pair of spaced latching and locating members are indicated at 78 and 80. These members include upwardly projecting portions which are spaced from the outer surface of plates 32 and 34 by a distance sufficient to permit them to enter an opening in the lower part of the cartridge as described more fully hereinafter. These members function to hold the lower portion of the cartridge in proper location with respect to the wall 12 of the projector and to prevent movement of the lower portion of the cartridge away from the wall.

A cartridge adapted to receive a reel containing approximately 400 feet of film is generally designated 90 in Fig. 1. The cartridge illustrated is generally of the type described in Patent Application No. 55782/68 (Serial No. 1,261,525), and comprises a face generally designated 92 which is adapted to abut or be in close-fitting relation with the wall 12 and plates 32, 34 and 35 of the projector when the cartridge is properly mounted on the projector. As is apparent from Fig. 1, the lower and side portions of the cartridge are shaped and dimensioned so that these portions of the cartridge can be received within and fit snugly within the chamber 30 on the projector. More specifically, the cartridge has a lower edge 94 which is adapted to fit along the bottom wall 46 forming the chamber 30. The cartridge is open at the bottom so that the latching and positioning member 78 and 80 can engage the bottom edge 94 of the cartridge to prevent outward movement of the bottom of the cartridge with respect to wall 12. Also the cartridge has slots through the lower side and bottom portions thereof, indicated at 96, so that the film stripping mechanism previously mentioned can enter the cartridge.

A pair of spaced elongate ribs 100 and 102 extend along face 92 of the cartridge from the lower end thereof upwardly to approximately midway along the cartridge. These ribs are substantially parallel to each other and are positioned such that they may be received within the grooves or recesses 50 and 52, respectively, formed in the wall 12 of the projector. Rib 100 comprises a lower portion 100a and an upper portion 100b separated by a gap 104 which gap is located along rib 100 so that when the rib is positioned within recess 50 the end portion 63 of member 60 can be received in the gap. Since

leaf spring 74 biases the cartridge upwardly and thereby biases the upper end of rib portion 100a into contact with the lower edge of member 60, member 60 and rib portion 100a determine the vertical position of the cartridge with respect to surface 12. The projector spindle 16 is adapted to extend through an opening 106 in the cartridge and into the central core or hub portion 108 of a reel carried within the cartridge, to rotatably support the reel within the cartridge.

In order to assemble or mount the cartridge 90 on structure 10, lever 22 is moved to the position illustrated in Fig. 1 to retract spindle 16. The cartridge 90 is then positioned above chamber 30 with face 92 of the cartridge against or in close proximity to the surface 12 of the projector, and is moved downwardly until the lower portions of the cartridge are received within the chamber 30. As this movement occurs the ribs 100 and 102 enter and move along the grooves 50 and 52, respectively, until the cartridge is bottomed in the recess, whereupon the end portion 63 of member 60 enters into the gap 104 between the two separate portions of rib 100. Spring 74 contacts the lower edge 94 of the cartridge and biases the cartridge upwardly, against member 60 to accurately position the cartridge against said member. Movement of the cartridge into chamber 30 also trips a lever 109 in the manner described in Patent Application No. 35781/71 (Serial No. 1,261,526) to release spindle 16 from its retracted position, whereupon the spindle automatically enters hub 108 of the reel.

The cartridge may be removed from the projector by moving lever 20 to the position illustrated in Fig. 1 to retract spindle 16, by moving lever 64 to the right (as viewed in Fig. 1) to retract member 60, and then by lifting the cartridge to withdraw it from chamber 30.

Referring now in more detail to Figs. 2 to 5, cartridge 90 comprises first and second cartridge members 201 and 203, respectively. The members 201 and 203 are structurally similar except that the lower portion 204 of the second member 203 includes previously-mentioned means adapted to receive and guide a stripper for engaging and removing film from the cartridge. Further, the cartridge members differ in their respective means 205, 207, 209 and 211 for pivoting or latching the cartridge members together.

Since further features of the cartridge to be described hereinafter are similar for both members, and similar reference characters will be applied to each of the members, with the letter "a" on the drawings denoting the first part and the letter "b" on the drawings denoting the second part.

Each cartridge member includes a side-wall in the form of a disk 213a, or 213b, and a peripheral or edge-wall disclosed as a semi-

annular band or cylindrical member 215a, or 215b, which extends perpendicularly from one side of the side-wall along the periphery or outer circumference thereof. In the embodiment disclosed, each cartridge member is formed by moulding a side-wall and an edge-wall as a single integral part. However, it should be apparent to those skilled in the art that other methods of forming and adjoining the side and edge-walls can be employed without departing from the present invention.

Referring now to the side-walls, disk 213a, or 213b, comprises an opening 106a, or 106b, concentric with the outer circumference of the disk, which is adapted to receive the spindle 16 of the projector loosely as previously described. The outer circumference of disk 213a, or 213b, includes two portions 217a and 217b, or 219a and 219b, each of which is diametrically opposed to the other and each of which subtends an angle of approximately 180°. Portion 217a, or 217b, has edge-wall 215a, or 215b, integrally secured thereto. Portion 219a, or 219b, on the other hand, defines an exposed edge having a stepped configuration including arcuate surfaces in the form of shoulders 221a and 223a, or 221b and 223b. Shoulder 221a, or 221b, has a diameter substantially equal to the internal diameter of band 215a, or 215b, while shoulder 223a, or 223b, has a greater diameter and is of a lesser thickness, thus defining a stepped configuration with shoulder 221a, or 221b. As will be described more fully hereinafter in connection with band 215a, or 215b, these shoulders of one cartridge member are adapted to co-operate with corresponding lips on the band of the other cartridge member.

Referring now to the edge-walls, band 215a, or 215b, comprises a semi-annular groove, 225a, or 225b, defined by lips 227a, or 227b, and 229a, or 229b, which extend radially inwardly from band 215a, or 215b, along the side thereof opposite from side-wall 213a, or 213b. The diameter to the bottom of groove 225a, or 225b, is slightly greater than the diameter of shoulder 223a, or 223b, while the diameter to the top of lip 227a, or 227b, is slightly greater than the diameter of shoulder 221a, or 221b, such that the shoulders 221a, or 221b, and 223a, or 223b, will co-operate with lip 227a, or 227b, and groove 225a, or 225b, to form a seal when the cartridge is in the closed position.

Between disk 213a, or 213b, and groove 225a, or 225b, is an annular rib 231a, or 231b, adapted to fit between the flanges 233a, or 233b, of a reel to be contained in the cartridge. Rib 231a, or 231b, prevents clock-springing of film from reel 233 and also prevents incorrect insertion of the reel into the cartridge.

Referring now to the manner in which the cartridge can be assembled to enclose a standard reel of motion picture film, the latch-

ing of pivoting means 207 and 211 can be mutually engaged to form a hinge about which the cartridge members can be swung into the closed position. As the cartridge is closed, surface 223a, or 223b, of a side-wall enters groove 225b, or 225a, of the opposite edge-wall to guide the cartridge members to their closed position. As the members reach the closed position the latch means 205 and 209 engage to maintain the cartridge in the closed position. Moreover, surfaces 221a, or 221b and 223a, or 223b, abut against the top of lip 227b, or 227a, and groove 225b, or 225a, respectively, of the opposite cartridge member to form a seal between the members.

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

Some features of the cartridge described herein form the subject of claims of Patent Application No. 26256/69 (Serial No. 1,266,631).

WHAT WE CLAIM IS:—

1. A cartridge for containing a reel of film of other strip material and comprising first and second members which together define a reel chamber having a pair of substantially flat side walls spaced by a peripheral wall, each of the first and second members providing one of the side walls and a part of the peripheral wall, and each of the members having in its part of the peripheral

wall a groove which receives and locates a part of the sidewall of the other member in the closed position of the cartridge.

2. A cartridge as claimed in Claim 1, wherein the first and second members include means for pivotally attaching these members to each other to permit opening and closing of the cartridge.

3. A cartridge as claimed in Claim 2, wherein the pivotal means permits detachment of one of the first and second members from the other of the members.

4. A cartridge as claimed in Claim 1, wherein at least one of the side walls is formed with a central aperture through which a spindle may be inserted to engage axially a reel contained in the cartridge.

6. A cartridge as claimed in any preceding Claim, wherein the side walls are disks and the parts of the peripheral wall formed to receive and locate the side walls are each adapted to extend around half of the circumference of the side walls.

7. A cartridge as claimed in any preceding Claim, wherein one of the first and second members is formed with a slot in the peripheral wall through which film may be withdrawn from a reel within the cartridge for use in a projector.

8. A cartridge for containing a reel of film substantially as hereinbefore described with reference to Figs. 2, 3, 4 and 5 of the accompanying drawings.

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