

PATENT SPECIFICATION

(11) 1 235 382

DRAWINGS ATTACHED

- (21) Application No. 26872/68 (22) Filed 5 June 1968
(31) Convention Application No. 643 503 (32) Filed 5 June 1967 in

- (33) United States of America (US)
(45) Complete Specification published 16 June 1971
(51) International Classification B 65 h 75/16
(52) Index at acceptance

G2E A14 A6A2 A6A3 A6A4
G5R 51B4 51B7Y 53D1C 53D1Y 53D3 53DY 54C1D3
54C1DY 54C1Y 54C2C 54C2Y 54CY 54F3 54FY
55K3A 55K3Y 55KY 56X1 56X7S

- (72) Inventors JOHN JOSEPH BUNDSCHUH
KENNETH WILLIAM THOMSON



(54) CARTRIDGE FOR REEL OF STRIP MATERIAL

(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 cartridge for a duo-flanged reel containing a roll of strip material for insertion in and removal from an apparatus, such as a cinematographic projector.

An object of the present invention is to provide an improved cartridge for use with an apparatus having a mechanism for moving the leader portion of a strip from the cartridge to an automatic strip threading means for the apparatus.

According to the present invention there is provided a cartridge defining a chamber for receiving a duo-flanged reel containing a roll of strip material, characterised in that rail means formed in the chamber extend from the peripheral wall surface of the chamber and are adapted to extend within and between the two flanges of the reel to confine the reel within a predetermined area of the cartridge, and to confine the strip material generally within the diameter of the reel flanges and thereby minimize the extent of clockspringing of the material, the said peripheral wall surface of the chamber defining an elongated opening at a predetermined location through which a strip material pick-up and a roll driving mechanism of the apparatus may extend, and the rail means in the area of the said opening comprising a pair of rails between which at least a part of the said opening is located and which serve to guide the pick-up and roll driving mechanism into engagement with the roll of strip material.

The elongated opening may comprise an intermediate portion of greater width than

the two adjacent end portions, and further being so located in the chamber wall and of sufficient length as to lie within the range of possible tangential paths that may be taken by the leading end of the outer convolution of strip material.

A cartridge for a duo-flanged reel will now be described by way of example with reference to the accompanying drawings in which like numerals denote like elements and in which:

Fig. 1 is an elevational view of a clamshell cartridge with its cover partially open to show a reel of strip material disposed therein, and with a portion of the cartridge broken away to show the taper of the guide rails adjacent to an opening in the bottom of the cartridge, and a code notch formed in the bottom of the cartridge being detected by a detector finger of an apparatus;

Fig. 2 is a top plan view of the cartridge shown in Fig. 1 with the top half of the cartridge removed;

Fig. 3 is a bottom plan view of the cartridge shown in Figs. 1 and 2 illustrating the openings through which the strip material drive mechanism and the pick-up mechanism of the apparatus may extend and through which the strip material may pass out of and into the cartridge;

Fig. 4 is a cross-sectional view of the cartridge and reel of strip material taken along line 4-4 of Fig. 1 but with the cartridge closed, and illustrating the support of the reel by the rotatable head portion of an apparatus spindle member;

Fig. 5 illustrates a perspective view of the cartridge and a portion of an apparatus with its pick-up and drive mechanisms extending through the openings in the bottom of the cartridge into engagement with the roll of strip material;

Fig. 6 is an elevational view of part of the cartridge and the apparatus with a portion of the cartridge broken away to illustrate the positions assumed by the pick-up and drive mechanisms with a relatively full roll of strip

material on the reel;

Fig. 7 is a view similar to Fig. 6 and illustrating the position assumed by the pick-up and drive mechanisms when the initial amount of strip material on the reel is considerably less than the possible capacity of the reel, and further illustrating the possible range of tangential paths within which the leader of strip material may follow when initially guided out of the opening in the bottom of the cartridge;

Fig. 8 is a perspective view of a portion of the cartridge in cross-section and through an opening in the bottom of the cartridge illustrating the relative positions of the pick-up mechanism and the guide rails;

Fig. 9 is a perspective view of a portion of the cartridge in cross-section through an opening in the bottom of the cartridge illustrating the relative positions of the drive mechanism and the guide rails;

Fig. 10 is a side elevational view of part of the cartridge illustrating the latch side and the position of the openings through which the pick-up mechanism will extend;

Fig. 11 is a side elevational view of part of the cartridge illustrating the hinge side and the position of the openings through which the drive mechanism will extend; and

Fig. 12 is an enlarged view similar to Fig. 7 and illustrating the leader of the strip material being "walked" over to the coil of strip material for subsequent movement out of the cartridge.

The cartridge, shown generally at 31, is preferably in the form of a clamshell housing having a lower casing member 34 and an upper casing member 35 that may be suitably connected to the lower casing member by hinge 32. The upper and lower casing members may be releasably held together by latch member 33, the latter being affixed to the lower casing member for locking cooperation with abutment 33a on the upper casing member. In this manner the cartridge may be readily loaded and unloaded. Upon opening the clamshell housing a conventional reel 36 of strip material may be inserted, such as a 50-foot strip material reel having a cylindrical core or hub from which a pair of parallel flanges extend radially outwards. Film strip 37 is wound in a roll 38 with the inner end of the strip being connected to the core of the reel by any suitable means such as a clip member 39, which is disposed within slot 41 in the core of the reel.

Although the cartridge is shown as being constructed in clamshell form, it may alternatively be constructed as that the reel is inserted into the cartridge chamber through an opening in one side wall of the cartridge; or may be constructed in two halves with the separation line lying in a plane perpendicular to the axis of the cartridge and in

which the reel of strip material may be placed in one half of the cartridge on one of its chamber surfaces, and the other half of the cartridge placed over the opposite side of the reel.

The reel 36 is received loosely within the chamber of the cartridge 31 and the convolution of strip material 37 are confined within the diameter of the reel flanges 42 by a pair of inwardly extending rails 43 in the upper and lower casing members, which rails are arranged to extend into close adjacency with the outer strip material convolutions of a full roll, as may be seen in Figs. 2, 4 and 5. The rails confine the relative lateral movement of the reel to the central area of the cartridge chamber so as to facilitate assembly of the reel onto a spindle member of an apparatus on which the magazine is to be used, thereby preventing the reel flanges from coming into frictional contact with either wall surface of the cartridge chamber. The rails perform further and more significant guiding functions to be described later.

The two casing members 34, 35 of the cartridge 31 are provided with semi-circular openings 44 which together define circular holes at the opposite sides of the closed clamshell housing, which holes will be in generally coaxial relation to a grooved cylindrical hole 45 extending through the hub portion of the reel when the reel is located in the cartridge. The cartridge includes a tongue 48 and a depression 50 (Figs. 1, 6, 7 and 11) that are adapted to co-operate with a supporting rack (not shown) as described in Patent Application 26873/68.

The bottom wall of the lower casing member 34 is provided with an elongate slot 46 which defines end portions 46a, 46b that constitute entrance and exit openings for a stripper or pick-up mechanism of the apparatus on which the cartridge is to be loaded and for the drive mechanism of the apparatus, which portions are at either end of an intermediate portion that constitutes an exit opening for the strip material. The strip material passes through the widest or intermediate portion 47 of the slot 46.

The pair of guide rails 43, although shown as being substantially continuous around the inside periphery of the cartridge chamber may also be intermittently spaced around the inside chamber periphery. In this manner when the cartridge with its received reel of strip material is loaded on the apparatus, the rails assure that the reel will be confined to the central area of the cartridge and thus facilitate assembly of the spindle member through the opening 45 in the reel.

Details of the particular apparatus on which the cartridge may be used are described in Patent Application No. 26873/68. A device for stripping the leading end of a film from the cartridge is described

and claimed in Patent Application 26874/68 (Serial No. 1,234,812) and will now be described so as to show the further utility and function of the guide rails 43 in the cartridge 5 chamber.

In Figs. 5, 6 and 7, the stripper assembly of the apparatus is shown generally at 56. It will be sufficient, for purposes of the description here, to say that such stripper assembly includes a pivotally movable roll driving mechanism 64 and a movable stripper or pick-up mechanism 65, and that both are suitably and selectively controlled for movement through openings in the cartridge into and out of engagement with the roll of strip material in the cartridge by mechanism described in the application mentioned in the preceding paragraph. The driving mechanism includes a resilient drive belt 148 of generally circular cross-section, e.g. a so-called "O-Ring", which is stretched around pulleys (not shown) and projects beyond the upper edges of the side plates of the driving mechanism.

When the cartridge and its reel of strip material are in operational position on spindle 95 with the rotatable spindle head member 51 in reel driving engagement within reel opening 45, the cartridge being suitably held in fixed position on the apparatus will be spaced relatively to the spindle member and to the reel so that the reel will thus be supported out of contact with the chamber wall surfaces of the cartridge.

When the strip material is to be moved out of the cartridge toward the automatic threading mechanism (not shown) of the apparatus, the pick-up and driving mechanisms 65, 64 are selectively moved into the cartridge, respectively through portions 46a, 46b of slot 46 into engagement with the outer convolution of strip material. As the pick-up and driving mechanisms move into the cartridge they are guided into engagement with the roll of strip material by the guide rails 43 (as shown in Figs. 8 and 9) as the mechanisms pass between the rails.

Since the normal tendency of coiled strip material is to clockspring, the guide rails 43 perform still another and important function of confining the clockspring action of the strip material convolutions to the area within the diameter of the reel flanges (as seen, for example, in Figs. 2 and 4). This confinement action becomes still more significant when it is appreciated that when the pick-up and driving mechanisms move into engagement with the strip material on one side of the roll, the roll may buckle or tend to become distorted on the opposite side of the roll, which result if permitted to occur may interfere with the effectiveness of the strip material feed-out action. The guide rails thus confine and minimize the effect and extent of such buckling or distortion.

There is a further co-operation of the guide rails with the pick-up and drive mechanisms. The guide rails serve to guide the outer convolution of strip material as it is driven around the roll in clockwise manner, as viewed from Fig. 5, until the leading end of the strip material convolution is diverted from the roll periphery by the roll driving mechanism and the pointed end 174 of the pick-up mechanism can enter the channel that is formed between the one surface 175 (Figs. 6, 7 and 12) of the pick-up mechanism on the one hand, and the main drive surface of drive belt 148 of the driving mechanism, whereupon the leading end then passes out of the cartridge through the exit portion 47 of slot 46 to the automatic threading mechanism of the apparatus.

The exit portion 47 is so spaced in the bottom of the cartridge with respect to the reel and its roll of strip material when the reel is mounted on a spindle member, and is of sufficient length along the circumference of the chamber peripheral wall surface that the strip material will readily pass through the exit portion tangentially from the roll irrespective whether there are only a few feet of material wound around the reel or the full roll capacity of the reel is being utilized. In other words, the intermediate portion or exit portion 47 is so positioned as to lie within the range of the possible tangential paths that may be taken by the leading end of the outer convolution of strip material. This range is illustrated in Fig. 7 by the angle "A". The guide rails are tapered tangentially relative to the roll of strip material, as shown at 43a with the end of such tangential taper being adjacent the strip material exit portion 47 of slot 46. The taper is toward the exit portion 47. When the roll of strip material is at its maximum capacity the taper serves to facilitate guiding the leading end of the strip material out of the cartridge.

Still another co-operation which exists between the guide rails, and the pick-up and driving mechanisms is the formation of an enclosed channel between the apparatus and the cartridge mounted on the apparatus. When the two mechanisms extend through the openings in the cartridge and into engagement with the roll of strip material, an enclosed channel is formed between the pick-up and driving mechanisms on the one hand, and the cartridge on the other hand with the result that the strip material is reliably enclosed and moved out of the cartridge directly to the automatic threading mechanism (not shown) of the apparatus. As illustrated in Fig. 12 one drive surface for the strip is provided by the belt 148 as it moves along a substantially linear path aligned with the line Y-Y' towards the roll. That portion of the belt moving along this

path enters the chamber for the strip at the point P as it passes the guide rails 43. The line Y-Y' is inclined to the roll radius at the point P and makes an angle B of more than 90° with the perpendicular ZZ' through point P in a plane transverse to the roll axis. Because of the confining action of the guide rails 43 the point P represents the outermost point along this portion of the belt which can be engaged by the leading edge of the strip. This applies whether the roll of strip material from which the leader is to be withdrawn is at a maximum capacity, as illustrated at Fig. 6, or is considerably less than the maximum capacity, as illustrated at Figs. 7 and 12.

In this manner, therefore, a locking angle, which might otherwise result at point "P" is avoided. If the angle B was substantially 90° or less, there would be a tendency, particularly with rolls of strip material of considerably less than maximum capacity, for the leader to be deflected away from the roll engaging portion of the drive belt. As a consequence of this arrangement, if the leader of the strip material should clock-spring radially from the roll as far as to the rails, shown in the solid line position of 37 in Fig. 12, then the one surface of the driving mechanism, upon being contacted by the end of the leader when the roll is rotated by the driving mechanism, will progressively deflect the leader end towards the roll, as shown in the successive dotted line positions 37' and 37". After engaging the roll engaging portion of the drive belt, the leader end will be diverted by the finger 174 of the pick-up mechanism 65 into the enclosed channel formed by the pick-up mechanism and the driving belt mechanism with the cartridge for subsequent movement out of the cartridge.

It should be further appreciated that the rail means 43 need be in pairs only in that area of the cartridge chamber adjacent to the pick-up and drive mechanism entry openings and the strip material exit portion, while the rail means may be a single or solid annular member around the remaining periphery of the cartridge chamber. Also, as heretofore mentioned, the rail means may be intermittently and suitably spaced about the periphery of the chamber.

A tactile discontinuity in the form of a notch 300 may be provided at a suitable predetermined location in the external surface of the cartridge, and may serve to indicate by its presence or absence in the cartridge information contained on said strip material,

for example, whether the strip material in the cartridge contains a sound track, such as an optical one or magnetic striping. The notch 300 is illustrated in Fig. 1 as co-operating with a detector finger 302 of the apparatus.

WHAT WE CLAIM IS:—

1. A cartridge defining a chamber for receiving a duo-flanged reel containing a roll of strip material characterized in that rail means formed in the chamber extend from the peripheral wall surface of the chamber and are adapted to extend within and between the two flanges of the reel to confine the reel within a predetermined area of the cartridge, and to confine the strip material generally within the diameter of the reel flanges and thereby minimize the extent of clockspringing of the material, the said peripheral wall surface of the chamber defining an elongated opening at a predetermined location through which a strip material pick-up and a roll driving mechanism of the apparatus may extend, and the rail means in the area of the said opening comprising a pair of rails between which at least a part of the said opening is located and which serve to guide the pick-up and roll driving mechanisms into engagement with the roll of strip material.

2. A cartridge as claimed in Claim 1, and wherein the said elongated opening comprises an intermediate portion of greater width than the two adjacent end portions, and further being so located in the chamber wall and of sufficient length as to lie within the range of possible tangential paths that may be taken by the leading end of the outer convolution of strip material.

3. A cartridge as claimed in Claim 4, and wherein the rails adjacent to one end of the said intermediate portion of the opening are tapered tangentially toward said opening with respect to the roll of strip material when the latter is in the cartridge to facilitate guiding the strip material out of the cartridge.

4. A cartridge as claimed in Claim 1, 2 or 3, wherein a tactile discontinuity indicative of an informational characteristics contained on the strip material in the roll is provided at a predetermined location in the external surface of the cartridge.

5. A cartridge for a duo-flanged reel containing a roll of strip material, constructed and adapted to be used substantially as hereinbefore described and as shown in the accompanying drawings.

L. A. TRANGMAR, B.Sc., C.P.A.,
Agent for the Applicants.

path enters the chamber for the strip at the point P as it passes the guide rails 43. The line Y-Y' is inclined to the roll radius at the point P and makes an angle B of more than 90° with the perpendicular ZZ' through point P in a plane transverse to the roll axis. Because of the confining action of the guide rails 43 the point P represents the outermost point along this portion of the belt which can be engaged by the leading edge of the strip. This applies whether the roll of strip material from which the leader is to be withdrawn is at a maximum capacity, as illustrated at Fig. 6, or is considerably less than the maximum capacity, as illustrated at Figs. 7 and 12.

In this manner, therefore, a locking angle, which might otherwise result at point "P" is avoided. If the angle B was substantially 90° or less, there would be a tendency, particularly with rolls of strip material of considerably less than maximum capacity, for the leader to be deflected away from the roll engaging portion of the drive belt. As a consequence of this arrangement, if the leader of the strip material should clockspring radially from the roll as far as to the rails, shown in the solid line position of 37 in Fig. 12, then the one surface of the driving mechanism, upon being contacted by the end of the leader when the roll is rotated by the driving mechanism, will progressively deflect the leader end towards the roll, as shown in the successive dotted line positions 37' and 37". After engaging the roll engaging portion of the drive belt, the leader end will be diverted by the finger 174 of the pick-up mechanism 65 into the enclosed channel formed by the pick-up mechanism and the driving belt mechanism with the cartridge for subsequent movement out of the cartridge.

It should be further appreciated that the rail means 43 need be in pairs only in that area of the cartridge chamber adjacent to the pick-up and drive mechanism entry openings and the strip material exit portion, while the rail means may be a single or solid annular member around the remaining periphery of the cartridge chamber. Also, as heretofore mentioned, the rail means may be intermittently and suitably spaced about the periphery of the chamber.

A tactile discontinuity in the form of a notch 300 may be provided at a suitable predetermined location in the external surface of the cartridge, and may serve to indicate by its presence or absence in the cartridge information contained on said strip material,

for example, whether the strip material in the cartridge contains a sound track, such as an optical one or magnetic striping. The notch 300 is illustrated in Fig. 1 as co-operating with a detector finger 302 of the apparatus.

WHAT WE CLAIM IS:—

1. A cartridge defining a chamber for receiving a duo-flanged reel containing a roll of strip material characterized in that rail means formed in the chamber extend from the peripheral wall surface of the chamber and are adapted to extend within and between the two flanges of the reel to confine the reel within a predetermined area of the cartridge, and to confine the strip material generally within the diameter of the reel flanges and thereby minimize the extent of clockspringing of the material, the said peripheral wall surface of the chamber defining an elongated opening at a predetermined location through which a strip material pick-up and a roll driving mechanism of the apparatus may extend, and the rail means in the area of the said opening comprising a pair of rails between which at least a part of the said opening is located and which serve to guide the pick-up and roll driving mechanisms into engagement with the roll of strip material.

2. A cartridge as claimed in Claim 1, and wherein the said elongated opening comprises an intermediate portion of greater width than the two adjacent end portions, and further being so located in the chamber wall and of sufficient length as to lie within the range of possible tangential paths that may be taken by the leading end of the outer convolution of strip material.

3. A cartridge as claimed in Claim 4, and wherein the rails adjacent to one end of the said intermediate portion of the opening are tapered tangentially toward said opening with respect to the roll of strip material when the latter is in the cartridge to facilitate guiding the strip material out of the cartridge.

4. A cartridge as claimed in Claim 1, 2 or 3, wherein a tactile discontinuity indicative of an informational characteristics contained on the strip material in the roll is provided at a predetermined location in the external surface of the cartridge.

5. A cartridge for a duo-flanged reel containing a roll of strip material, constructed and adapted to be used substantially as hereinbefore described and as shown in the accompanying drawings.

L. A. TRANGMAR, B.Sc., C.P.A.,
Agent for the Applicants.

