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COMPLETE SPECIFICATION

Film Threading Devices

We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America, 343 State Street, Rochester, New York 14650, United States of America, (Assignees of EDWARD SHERMAN MCKEE) 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 an automatic device for presenting the leading end of a film or strip in roll ~~for~~ to a threading mechanism of a utilization device such as a cinematograph projector.

In the art of automatic threading, considerable attention has been given to devices for threading a film through a cinematograph projector starting with placing of the leader portion of the film in a self-threading guide mechanism or track. The present invention relates to the automatic placing of the leader portion of the film in the guide mechanism. Such a device is particularly useful in projectors which are designed to display selectively one of a plurality of motion picture films contained in a multiple rack. These projectors are sometimes referred to as juke box projectors.

Therefore, a primary object of the present invention is to provide an improved automatic device adapted for use in motion picture projectors.

In accordance with one form of the invention, a roll of film is mounted in a housing on a rotatable core with a surface thereof being exposed for surface driving. Within this exposed region is placed a film stripper selectively biased against the outer surface of the roll to pick up and initially guide the leading end of the roll to a guide track of the projector. A surface drive belt or wheel is positioned adjacent to the stripper for rotating the

roll to initiate stripping action and forms a mating leader film guide.

Two embodiments of the invention will be more particularly described, by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is an elevation view partially in section of one embodiment of the invention;

Fig. 2 is a partial end view of the mechanism shown in Fig. 1; and

Fig. 3 illustrates another embodiment of the invention.

Referring now to the drawings, wherein like numbers refer to similar parts, Fig. 1 shows a central shaft 10 supporting a reel 11 on which is wound a roll 12 of film 13. The roll 12 is protected by a housing 14 which may be of the type utilized to store several such rolls of film. The housing 14 is open at the lower side, as indicated, whereby the roll 12 may be engaged by a surface drive belt 15 driven by a pulley 16 over an idler pulley 17. One drive belt that works very well is a rubber hoop of the type often used in an O-ring seal. The belt 15 is pivotably supported on a pulley shaft 18.

During the stripping operation, the idler pulley 17 is biased as by a spring means indicated at 19 to have the belt 15 engage the outer peripheral surface of the roll 12. This surface driving engagement preferably occurs only at the edge of the roll of film where the perforations 20 (Fig. 2) are located so that the surface drive cannot damage the picture area of the film 13. As shown in Fig. 1, the idler rotates in a counterclockwise direction indicated by an arrow 21. During the stripping operation, a film stripper 24 is also biased against the outer peripheral surface of the roll 12 as by a spring 25. The stripper 24 preferably is formed of a slippery plastic material so that the film 13 may slide easily thereover.

As the film 13 is stripped from the roll 12,

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its leader end moves through a guide mechanism or track having upper and lower guide surfaces 26 and 27 respectively along the path of arrow 28, to a utilization device indicated in Fig. 1 as a pull-down claw 29 of a projector (not fully shown). It should be noted that a mating surface 30 of the belt 15 helps to guide the film 13 into the passageway between the guide surfaces 26 and 27. Similarly, a bottom outer surface 32 of the stripper 24 will cooperate to guide the film 13 between the guide surfaces 26 and 27. Thus, simply pressing the stripper 24 and the drive belt 15 against the outer surface of the roll 12 and energizing the pulley 16 will form a passageway 30-32 to guide the film 13 into the guide surfaces 26 and 27 and thus to the utilization device (29).

As indicated, the spring 19 is drivable to an engaging position such as a solenoid 36 with the solenoid 36 being energized by conventional means not illustrated, at the start of the stripping action and being de-energized once the film 13 is under the control of the claw 29. The spring 25 is positioned to press the stripper 24 against the surface of the roll 12 by a similar selectively operable positioning means 37. Several interlocking control means are known for generating signal information to de-energize the solenoids 36 and 37. One simple means is illustrated as a microswitch 38, sensitive to the passage of the film 13 beyond the claw 29.

Fig. 3 shows a somewhat different embodiment of the present invention wherein a roll 12' is of a much smaller diameter and the stripper 24' is provided with an outer curved surface 32' having a radius R equal to the surface's distance from its pivot support point 39. A drive wheel 17' is used in this embodiment which has a diameter sufficient to guide the film to guide surface 26' (which is slightly longer than 26) in all positions of the wheel 17'. The wheel 17' is driven by gearing 40 and is again pivotally supported on a shaft 41 of the more remote drive gear so that surface driving of several size rolls such as 12 or 12' is feasible.

Although the roll 12' of Fig. 3 is illustrated as substantially smaller than the roll 12 of Fig. 1, the smaller roll 12' may be stripped by the embodiment of Fig. 1 and the large roll 12 may be stripped by the embodiment of Fig. 3 with equal faculty. As illustrated in Fig. 3, when stripping a smaller roll (12'), both the stripper 24' and the inner drive surface 30' of the drive wheel 17' are moved closer to the support shaft 10 than the equivalent elements of Fig. 1. Also the drive surface 30' of the drive wheel 17' may be formed of a rubber band or the like.

WHAT WE CLAIM IS:—

1. A device for presenting the leading end of a length of film or other strip wound in a roll to a threading mechanism comprising means for rotatably supporting a roll of film, guides means adjacent to the support means to receive film from the roll as the roll is unwound, a stripper mounted to engage the peripheral surface of the roll and separate the outermost layer from the roll and having a surface positioned for guiding the separated part of the film to the guide means, and a surface drive engaging the roll surface for rotating the roll in a manner to cause the leading end thereof to move toward the stripper, the surface drive having a surface to guide the film to the guide means.
2. A device according to claim 1 wherein the surface drive comprises an endless belt.
3. A device according to claim 1 wherein the surface drive comprises a drive wheel.
4. A device according to any of the preceding claims wherein the surface drive is adapted to engage the peripheral surface of a roll of cinematograph film only over the area normally occupied by perforations in the film.
5. A device according to any of the preceding claims wherein the stripper and the surface drive are each resiliently urged into contact with the roll surface.
6. A device according to any of the preceding claims wherein the stripper and the surface drive are pivotally mounted for movement into engagement with the roll surface.
7. A device according to claim 6 wherein the grinding surface of the stripper lies in a cylindrical locus having a centre of curvature co-axial with the pivotal mounting of the stripper.
8. A device according to any of the preceding claims wherein the stripper and the surface drive are each provided with means to cause them to be engaged or disengaged with the roll surface as required.
9. A device according to any of the preceding claims wherein the guide surfaces of the stripper and of the surface drive form a channel corresponding to a channel formed by the guide means.
10. A device for presenting the leading end of a length of film or other strip wound in a roll to a threading mechanism constructed and arranged substantially as hereinbefore described and shown in Figs. 1 and 2, or 3, of the accompanying drawings.

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its leader end moves through a guide mechanism or track having upper and lower guide surfaces 26 and 27 respectively along the path of arrow 28, to a utilization device indicated in Fig. 1 as a pull-down claw 29 of a projector (not fully shown). It should be noted that a mating surface 30 of the belt 15 helps to guide the film 13 into the passageway between the guide surfaces 26 and 27. Similarly, a bottom outer surface 32 of the stripper 24 will cooperate to guide the film 13 between the guide surfaces 26 and 27. Thus, simply pressing the stripper 24 and the drive belt 15 against the outer surface of the roll 12 and energizing the pulley 16 will form a passageway 30—32 to guide the film 13 into the guide surfaces 26 and 27 and thus to the utilization device (29).

As indicated, the spring 19 is drivable to an engaging position such as a solenoid 36 with the solenoid 36 being energized by conventional means not illustrated, at the start of the stripping action and being de-energized once the film 13 is under the control of the claw 29. The spring 25 is positioned to press the stripper 24 against the surface of the roll 12 by a similar selectively operable positioning means 37. Several interlocking control means are known for generating signal information to de-energize the solenoids 36 and 37. One simple means is illustrated as a microswitch 38, sensitive to the passage of the film 13 beyond the claw 29.

Fig. 3 shows a somewhat different embodiment of the present invention wherein a roll 12' is of a much smaller diameter and the stripper 24' is provided with an outer curved surface 32' having a radius R equal to the surface's distance from its pivot support point 39. A drive wheel 17' is used in this embodiment which has a diameter sufficient to guide the film to guide surface 26' (which is slightly longer than 26) in all positions of the wheel 17'. The wheel 17' is driven by gearing 40 and is again pivotally supported on a shaft 41 of the more remote drive gear so that surface driving of several size rolls such as 12 or 12' is feasible.

Although the roll 12' of Fig. 3 is illustrated as substantially smaller than the roll 12 of Fig. 1, the smaller roll 12' may be stripped by the embodiment of Fig. 1 and the large roll 12 may be stripped by the embodiment of Fig. 3 with equal faculty. As illustrated in Fig. 3, when stripping a smaller roll (12'), both the stripper 24' and the inner drive surface 30' of the drive wheel 17' are moved closer to the support shaft 10 than the equivalent elements of Fig. 1. Also the drive surface 30' of the drive wheel 17' may be formed of a rubber band or the like.

WHAT WE CLAIM IS:—

1. A device for presenting the leading end of a length of film or other strip wound in a roll to a threading mechanism comprising means for rotatably supporting a roll of film, guides means adjacent to the support means to receive film from the roll as the roll is unwound, a stripper mounted to engage the peripheral surface of the roll and separate the outermost layer from the roll and having a surface positioned for guiding the separated part of the film to the guide means, and a surface drive engaging the roll surface for rotating the roll in a manner to cause the leading end thereof to move toward the stripper, the surface drive having a surface to guide the film to the guide means.
2. A device according to claim 1 wherein the surface drive comprises an endless belt.
3. A device according to claim 1 wherein the surface drive comprises a drive wheel.
4. A device according to any of the preceding claims wherein the surface drive is adapted to engage the peripheral surface of a roll of cinematograph film only over the area normally occupied by perforations in the film.
5. A device according to any of the preceding claims wherein the stripper and the surface drive are each resiliently urged into contact with the roll surface.
6. A device according to any of the preceding claims wherein the stripper and the surface drive are pivotally mounted for movement into engagement with the roll surface.
7. A device according to claim 6 wherein the grinding surface of the stripper lies in a cylindrical locus having a centre of curvature co-axial with the pivotal mounting of the stripper.
8. A device according to any of the preceding claims wherein the stripper and the surface drive are each provided with means to cause them to be engaged or disengaged with the roll surface as required.
9. A device according to any of the preceding claims wherein the guide surfaces of the stripper and of the surface drive form a channel corresponding to a channel formed by the guide means.
10. A device for presenting the leading end of a length of film or other strip wound in a roll to a threading mechanism constructed and arranged substantially as hereinbefore described and shown in Figs. 1 and 2, or 3, of the accompanying drawings.

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