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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Take-up Reel for Motion Picture Projector

We, EASTMAN KODAK COMPANY, a Company organised 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 JOHN JOSEPH BUNDSCHUH and KENNETH WILLIAM THOMSON), 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 an improved or modified take-up reel for a motion picture projector or the like of the type described in our co-pending patent application No. 10720/66 (Serial No. 1,131,470), to which the present application is an application for a patent of addition.

In this earlier application there is described a take-up reel having a clutch band slidably mounted on a hub, the band being provided with chordally or radially projecting teeth for engaging the perforations of a film fed into engagement therewith. In such reels, the reel flanges are spaced a distance slightly greater than the width of the film. This provides sufficient tolerance to accommodate a film the width of which is not entirely constant. In such reels, all of the teeth lie in the same plane, and are positioned between the reel flanges so that they can engage the film perforations at all times, even taking into account the tolerances of the flanges and film. Although such reels may be designed to work satisfactorily with a film having a predetermined perforation size and format, such reels do not work satisfactorily where films of the same width, but a different perforation format are used. For instance, where super 8 and regular 8 film are used, such reels, if designed to accept regular 8 film,

will not satisfactorily take up super 8 film under all conditions. The perforations for the super 8 film, as seen in Fig. 5 of the accompanying drawings are closer to one edge of the film than for regular 8 film, as seen in Fig. 4. When film is taken up on one of the reels described in our afore- said patent application, with this film edge in engagement with the flange, the teeth on the clutch band may miss the perforations whereupon the film will not be taken up on the hub.

An object of the present invention is the provision of an improved take-up reel wherein the above disadvantage of our earlier take-up reel is overcome.

In accordance with the present invention there is provided a take-up reel for a perforated film, comprising a hub member having a film-receiving portion and, at one end thereof, a coaxial portion of reduced diameter, an annular clutch member loosely mounted on said coaxial portion and resiliently urged against the shoulder joining the film-receiving and coaxial portions and a plurality of axially spaced teeth extending from the annular clutch member beyond the periphery of the film-receiving portion for engaging the perforations in a film directed into winding relationship with the film-receiving portion of the hub.

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

Fig. 1 is a side elevation, part broken away, of a take-up reel according to the present invention and showing a leading end of a film attached to a clutch band thereof;

Fig. 2 is an enlarged front elevation of the reel of Fig. 1;

Fig. 3 is an enlarged perspective view of the clutch band shown in Fig. 1;

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Fig. 4 is an enlarged fragmentary side elevation of a reel to which a regular 8 film is attached having perforations of a predetermined size and format, and showing the relationship between the teeth of the clutch band and film perforations when the film is in engagement with one reel flange;

Fig. 5 is a view similar to Fig. 4 showing the attachment to the reel of a super 8 film having a different predetermined film perforation size and format, and showing the relationship between the teeth of the clutch band and the film perforations;

Fig. 6 is a similar view showing the relationship between the teeth of the clutch band and the film perforations of a regular 8 film when it is in engagement with the other reel flange;

Fig. 7 is a similar view showing the relationship between the teeth of the clutch band and the film perforations of a super 8 film when it is in engagement with the other reel flange; and

Fig. 8 is a detached fragmentary view of a modification of the clutch band of Fig. 3.

Referring to the drawing, a take-up reel, similar to the reel of our aforesaid co-pending patent application, is disclosed comprising a hub member 10 having a cylindrical land 12 of one diameter, and an adjacent and concentric cylindrical land 14 of a greater diameter. The lands 12, 14 are interconnected by an annular surface or shoulder 16. Reel flanges 18, 20 are secured to the ends of the hub member 10, and are spaced a distance slightly greater than the width of a film to be received.

A mechanism for releasably securing a film onto the take-up reel comprises an annular clutch band or disc 24 as best seen in Fig. 3 loosely mounted on the land 12 with one side thereof in engagement with the surface 16. The inner diameter of the disc 24 is slightly greater than the diameter of its supporting land 12 so that the clutch disc is free to rotate thereon. The outer periphery of clutch disc 24 has an outer diameter that is substantially equal to the diameter of the land 14, and further has a plurality of radially extending teeth 26, 28, 30, the ends of which are axially spaced for a purpose to be explained hereinafter. An annular bowed spring 32, as best seen in Fig. 2, is mounted on the land 12 and has portions at one side bearing against the clutch disc 24, and its opposite side engaging the inner surface of the flange 18. In this position, the spring 32 is slightly compressed so as to urge the clutch disc 24 into engagement with the surface 16 with a constant, predetermined force.

As indicated earlier, the reel flanges 18, 20 are spaced a distance slightly greater than the normal width of the film in order

to ensure accommodation of the film therebetween. In addition, the width of film is not perfectly constant but varies slightly. As a consequence of the tolerances between the reel flanges 18, 20 and the width of the film 22, lateral movement of the film between the flanges 18, 20 is possible between two extremes, one when one edge of the film engages the flange 18, and the other when the opposite edge of the film engages the flange 20. Where only one film size is involved, it is possible to locate clutch disc 24 so that its teeth will engage the perforations no matter which extreme position the film is in. However, when film of substantially the same width but having different perforation formats is used in the projector, such as regular 8 film 34 and super 8 film 36, due to the different perforation size and format, these same teeth may not engage the perforations in both extreme positions of the film. This problem has been overcome, according to the invention, by providing the clutch disc 24 with teeth having axially spaced ends, a pair of diametrically opposed, straight teeth 26 lying in the plane of the disc 24 which is substantially parallel to the plane of the reel flanges 18, 20, a pair of diametrically opposed teeth 28 bent to one side of and transverse to the plane of the disc 24, and another pair of diametrically opposed teeth 30 extending to the opposite side of and transverse to the plane of the disc 24. With this take-up reel, when a regular 8 film is fed onto the hub of the reel with the film in engagement with the flange 20 as seen in Fig. 4, at least one of the ends of the teeth 28 will engage a perforation in the film 34. Moreover, if the film 34 is fed onto the reel with its opposite side in engagement with the flange 18 as seen in Fig. 6, the ends of the aforementioned teeth 28 and the straight teeth 26 will both be in position to engage the perforations in the film 34. Now, if a super 8 film 36 is fed onto the take-up reel, when one of the film edges is in engagement with the reel flange 20 as seen in Fig. 5, one or both of the ends of the teeth 26, 30 will be in position to engage the film perforations. Moreover, if the opposite edge of the film 36 engages the flange 18, the ends of the teeth 30 will still be in position to engage the perforations of the film. Accordingly, with the clutch disc 24, the reel will satisfactorily take-up regular and super 8 film.

In the modification of the clutch disc shown in Fig. 8, parts similar to parts shown in Figs. 1-7 are denoted by the same numerals primed. In this modification, teeth 26', 28' and 30' are located so that their ends lie in axially spaced planes. This same effect could be achieved by using three

separate, spaced clutch discs, each disc having straight teeth.

WHAT WE CLAIM IS:—

1. A take-up reel for a perforated film
5 comprising a hub member having a film-receiving portion and, at one end thereof, a coaxial portion of reduced diameter, an annular clutch member loosely mounted on
10 said coaxial portion and resiliently urged against the shoulder joining the film-receiving and coaxial portions, and a plurality of axially spaced teeth extending from the annular clutch member beyond the periphery
15 of the film-receiving portion for engaging the perforations in a film directed into winding relationship with the film-receiving portion of the hub.

2. A take-up reel according to Claim 1 wherein one of said teeth has its free end
20 lying in a first plane, and another of said teeth has its free end lying in a second plane axially spaced therefrom so that no matter where the film is positioned between said flanges at least one of said teeth will

engage a film perforation. 25

3. A take-up reel according to Claim 1 or 2 wherein the teeth lie in transverse planes.

4. A take-up reel according to Claim 3 wherein a first of planes in which the teeth
30 lie is substantially parallel to the plane of the shoulder.

5. A take-up reel according to Claim 4 wherein a second plane of said transverse
35 planes extends from said first plane on one side thereof, and said clutch member further includes another tooth or teeth being in a third plane transverse to said first and second planes and extending from said first
40 plane on the opposite side thereof.

6. A take-up reel substantially as herein-
before described with reference to and as
illustrated in Figs. 1 to 7 or Figs. 1 to 7
as modified by Fig. 8 of the accompanying
45 drawings.

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15 of the film-receiving portion for engaging the perforations in a film directed into winding relationship with the film-receiving portion of the hub.
2. A take-up reel according to Claim 1
20 wherein one of said teeth has its free end lying in a first plane, and another of said teeth has its free end lying in a second plane axially spaced therefrom so that no matter where the film is positioned between said flanges at least one of said teeth will

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