

PATENT SPECIFICATION

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(54) FILM WINDING GEARING FOR CINEMATOGRAPHIC APPARATUS

(71) We, FRANKE & HEIDECKE G.m.b.H., a German Body Corporate, trading as ROLLEI-WERKE FRANKE & HEIDECKE, of 196 Salzdlumerstrasse, Braunschweig,

Germany, 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 film winding gear for cine-cameras or cinematographic projectors.

In the operation of driving the film winding mechanism account has to be taken of the continually changing diameter of the coil of film, if smooth and uniform winding is to be guaranteed. It is usual to drive the take-up spool at a speed enabling the entire film to be wound up. In order to balance out the reduction in the speed of the take-up spool accompanying the increase in the diameter of the coil of film, use is generally made of elastic couplings. In the case of projectors resilient endless belts are frequently used for this purpose.

The present invention provides a film winding gear for cine-cameras or cinematographic projectors, comprising a pawl carrier moveable to and fro to cause pawls carried thereby alternately to engage diametrically opposite sides of a common ratchet wheel for rotating the ratchet wheel stepwise in one direction, the pawl carrier being coupled to a driving mechanism through the intermediary of a crank pin engaged with and guided between two jaws of a crank guide, wherein the two jaws are urged to a closed position under spring pressure, and direct coupling between the crank pin and the crank guide is eliminated as soon as a predetermined engaging force between the crank pin and the crank guide is reached to move the jaws apart out of their closed position. The jaws may also be loosely rotatable about a pin about

which a driving lever is pivotable; in this case the driving lever bears an entrainment pin which, together with the crank pin of the pawl carrier is situated between the jaws. The teeth of the pawl may be integral with the pawl carrier, in which case the latter is moveable to and fro along a rectilinear path and is moveable laterally of the path so that pawl teeth on respective sides of the pawl carrier engage ratchet teeth on the ratchet wheel alternately whilst the diametrically opposite teeth are moved out of engagement.

Two preferred embodiments of the present invention will now be described by way of example, with reference to the accompanying drawing, wherein:—

Figure 1 is an example having individually moveable pawls; and

Figure 2 is a corresponding arrangement in which the pawl teeth are integral with the pawl carrier.

A film take-up shaft 1 is rigidly connected to a ratchet wheel 2. Around this ratchet wheel 2 is an annular pawl carrier 3 with the pawls 4 and 5, which are pivotable about pins 6 and 7 and which are kept engaged with the system of teeth of the ratchet wheel 2 by the springs 8 and 9. The pawl carrier 3 is guided by forks 10 and 11 on fixed pins 12 and 13. On the to and fro movements in the rectilinear direction A/B the ratchet wheel 2 is caused by the pawls 4 and 5 to accompany them in the direction shown by the arrow C. The pawl carrier is driven by a fork on the pin 14. This fork consists of two levers 15 and 16, pivotable about the fixed pivot pin 17. The double drive lever 18 and 19 is pivotable about the same pin 17. The lever 18 is provided at the other end with a pin 20, which likewise rests in the fork 15, 16. The two jaws 15 and 16 forming the fork are held against the pins 20 and 14 by a drawn spring 21. At the other end 19 of the lever

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is a pin 22 which slides in a curved axial groove 23 provided on the driving shaft 24. When this shaft 24 rotates the double lever 18 and 19 performs an oscillatory motion, as a result of which the pin 14 of the pawl carrier 3 is caused to accompany its movement, the said pin in its turn causing the pawl carrier 3 to move to and fro in the direction A/B. If the film is tightly wound up direct coupling between the jaws 15, 16, and the pins 14, 20, is no longer effected since the spring 21 allows the jaws 15, 16 to separate. The tension of the film is thus determined and limited by the spring 21 without impeding the further movement of the driving shaft 24.

In the version shown in Figure 2, the pawl teeth 4' and 5' are an integral part of the pawl carrier 3'. In this case the pawl carrier 3' is pivotable within limits, owing to the pin-and-slot connection 25, 26. The pawl carrier 3' is thus able not only to perform a diametrical rectilinear movement A/B but also an oscillatory movement about the pin 13' laterally of the path A/B. The groove 26 limits this movement, so that either only the pawl 4' or only the pawl 5' can engage the system of teeth of the ratchet wheel 2. The pawl teeth can be given the shape required to ensure that one pawl causes the other to engage.

WHAT WE CLAIM IS:—

1. Film winding gear for cine-cameras or cinematographic projectors, comprising a pawl carrier moveable to and fro to cause pawls carried thereby alternately to engage diametrically opposite sides of a common ratchet wheel for rotating the ratchet wheel stepwise in one direction, the pawl carrier being coupled to a driv-

ing mechanism through the intermediary of a crank pin engaged with and guided between two jaws of a crank guide, wherein the two jaws are urged to a closed position under spring pressure, and direct coupling between the crank pin and the crank guide is eliminated as soon as a predetermined engaging force between the crank pin and the crank guide is reached to move the jaws apart out of their closed position.

2. Film winding gear in accordance with claim 1, wherein the jaws are loosely rotatable about a pin about which a driving lever is pivotable, the driving lever bears an entrainment pin which, together with the crank pin of the pawl carrier, is situated between the jaws.

3. A film winding gear in accordance with any one of the claims 1 to 2, wherein the pawl teeth are integral with the pawl carrier, the pawl carrier is moveable to and fro along a rectilinear path and is moveable laterally of the path so that pawl teeth on respective sides of the pawl carrier engage ratchet teeth on the ratchet wheel alternately whilst the diametrically opposite teeth are out of engagement.

4. Film winding gear in accordance with any one of the claims 2 to 3, wherein the jaws are clamped together by means of a draw spring.

5. Film winding gear, substantially as described herein with reference to and as illustrated by the accompanying drawings.

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3. A film winding gear in accordance with any one of the claims 1 to 2, wherein the pawl teeth are integral with the pawl carrier, the pawl carrier is moveable to and fro along a rectilinear path and is moveable laterally of the path so that pawl teeth on respective sides of the pawl carrier engage ratchet teeth on the ratchet wheel alternately whilst the diametrically opposite teeth are out of engagement.

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