

PATENT SPECIFICATION (11)

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(54) CINE CAMERA

(71) We, AGFA-GAVAERT AKTIEN-GESELLSCHAFT, a body corporate, organised under the Laws of Germany, of Leverkusen, 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 cine camera having a motor driven reciprocatory film claw and a toothed wheel driven in response to the movement of the film claw and coupled to a film take up reel.

Cameras of this type have previously been proposed in which the film take up reel is coupled to one of a pair of meshing gearwheels and, alternately, one pawl drives one of the gearwheels in one sense and the other pawl drives the second gearwheel in the opposite sense. It is an object of the invention to create a simpler form of this known arrangement.

The invention provides a cine camera which includes reciprocatory film transport means, means for driving a film reel and a motor for driving the film transport means, the film reel drive means including one toothed wheel arranged to be coupled to the film reel, a member arranged to reciprocate in response to movement of the film transport means and two pawls mounted on the member and arranged so to engage the toothed wheel that movement of each pawl in a direction corresponding to one sense of rotation of the toothed wheel rotates the toothed wheel in the said one sense, while during movement of each pawl in a direction corresponding to the opposite sense of rotation of the toothed wheel the pawls ratchet over the toothed wheel and the pawls are arranged to engage such points on the periphery of the toothed wheel that one pawl drives the toothed wheel in the said one sense in response to movement of the member in one direction and the other pawl drives the toothed wheel in the said one sense in response to movement of the member in the opposite direction.

Compared with known cine cameras, the present invention eliminates one of the

toothed wheels with a consequent increase in simplicity.

Advantageously, the member is pivotably mounted and both pawls are so mounted on the same side of axis of pivoting of the member that they move in the same direction as one another relative to the axis of rotation of the toothed wheel.

Advantageously, the points of engagement of the pawls with the toothed wheel are approximately diametrically opposite one another.

Preferably, an arm of member is approximately in the shape of a 'U' and each pawl is mounted on a different one of the arms of the 'U'. By arranging the pawls approximately diametrically opposite one another the force required to rotate the toothed wheel is considerably reduced.

There is, advantageously, provided first and second resilient means so coupled to the film transport means and so tensioned by the film transport means that when the film transport means is in one range of positions the said arm of the member is urged towards the toothed wheel by the first resilient means and when the film transport means is in another range of positions the said arm of the member is urged away from the toothed wheel by the second resilient means. In an advantageous manner the second resilient means is so arranged that when the gearwheel is prevented from rotating due to the film being fully wound any further movement of the film transport means is compensated for by an alteration in the tension of the second resilient means. Preferably, the first resilient means is arranged to engage the U-shaped arm of the member and the second resilient means is arranged to engage the member at a point remote from the U-shaped arm.

A cine camera constructed in accordance with the invention will now be described, by way of example, with reference to the accompanying drawing which is a view of a film reel drive.

The cine camera described below is based

on known cine cameras which have a film transport drive motor and a mechanism co-operating therewith for driving a reciprocatory film claw. Movement of a film take up reel is achieved by the driving action of pawls in response to the movement of an arm 2 which is supported in the camera housing 1 and which derives reciprocatory movement from the film claw. The film take up reel is coupled to a gearwheel 4 which is rotatable about a spindle 3 and which engages with a counting mechanism drive 5.

In the present case, a lever 7 is arranged in the camera housing 1 and is rotatable about a spindle 6 of the lever 7. One arm 7a is approximately semicircular or U-shaped and is arranged round part of the gearwheel 4. Supported on the arm 7a approximately diametrically opposite one another on the gearwheel 4 are two pawls 8 and 9 each of which is urged into engagement with the teeth of the gearwheel 4 by means of a spring 10 or 11 which is fixed at one end on the arm 7a. The pawls 8 and 9 are so arranged that, during movement of the arm 7a in one direction, one of the pawls 8 tend to rotate the gearwheel 4 in one sense, anticlockwise as shown in the drawing, whilst the other pawl 9 ratchets over the gearwheel 4 and during movement of the arm 7a in the opposite direction the pawl 9 drives the gearwheel 4 in the one sense whilst the pawl 8 ratchets over the gearwheel 4. A hairpin spring 12 is located about the spindle 6. One shank of the spring 12 rests against the arm 2 coupled to the film claw, and the other shank resting against a lug 7b of the lever 7. In addition, a further spring 13, one end of which is fixed in the camera housing 1, engages with a lug or pin 7c on the arm 7a and tends to urge the arm 7a towards the gearwheel 4.

If during the film advance stage of movement of the film claw the arm 2 is moved in the direction of the arrow assuming the position shown in broken lines and the hairpin spring 13 urges the lever 7 in the opposite direction to that of the arrow, towards the gearwheel 4, so that the pawl 9 drives the gearwheel 4 anticlockwise and the pawl 8 ratchets over the teeth. If the wheel 4 should stop during this movement due to film being fully wound, the arm 2 moves further without any additional load. In the return or idle phase of movement of the film claw, the arm 2 carries the lever 7 along with it by way of the hairpin spring 12 against the action of the hairpin spring 13. The pawl 8 now drives the gearwheel 4 in an anticlockwise direction. When the gearwheel 4 comes to a standstill, before the end of the idle phase is reached, the hairpin spring 12 takes up the movement by being tensioned without further movement of the lever 7.

WHAT WE CLAIM IS:—

1. A cine camera which includes reciprocatory film transport means, means for driving a film reel and a motor for driving the film transport means, the film reel drive means including one toothed-wheel arranged to be coupled to the film reel, a member arranged to reciprocate in response to movement of the film transport means and two pawls mounted on the member and arranged so to engage the toothed wheel that movement of each pawl in a direction corresponding to one sense of rotation of the toothed wheel rotates the toothed wheel in the said one sense, while during movement of each pawl in a direction corresponding to the opposite sense of rotation of the toothed wheel the pawls ratchet over the toothed wheel and the pawls are arranged to engage such points on the periphery of the toothed wheel that one pawl drives the toothed wheel in the said one sense in response to movement of the member in one direction and the other pawl drives the toothed wheel in the said one sense in response to movement of the member in the opposite direction.

2. A camera as claimed in claim 1, wherein the member is pivotably mounted and both pawls are so mounted on the same side of axis of pivoting of the member that they move in the same direction as one another relative to the axis of rotation of the toothed wheel.

3. A camera as claimed in claim 1 or claim 2, wherein the points of engagement of the pawls with the toothed wheel are approximately diametrically opposite one another.

4. A camera as claimed in any one of claims 1 to 3, wherein an arm of the member is approximately in the shape of a 'U' and each pawl is mounted on a different one of the arms of the 'U'.

5. A camera as claimed in claim 4, wherein there is provided first resilient means tending to urge the said arm of the member towards the toothed wheel and second resilient means so coupled to the film transport means and tensioned by the film transport means that when the film transport means is in one range of positions the said arm of the member is urged towards the toothed wheel by the first resilient means and when the film transport means is in another range of positions the said arm of the member is urged away from the toothed wheel by the second resilient means.

6. A camera as claimed in claim 5, wherein the second resilient means is so arranged that when the gearwheel is prevented from rotating due to the film being fully wound any further movement of the film transport means is compensated for by

on known cine cameras which have a film transport drive motor and a mechanism co-operating therewith for driving a recipro-
5 up reel is achieved by the driving action of
pawls in response to the movement of an
arm 2 which is supported in the camera
housing 1 and which derives reciprocatory
10 movement from the film claw. The film take
up reel is coupled to a gearwheel 4 which is
rotatable about a spindle 3 and which en-
gages with a counting mechanism drive 5.

In the present case, a lever 7 is arranged
15 in the camera housing 1 and is rotatable
about a spindle 6 of the lever 7. One arm
7a is approximately semicircular or U-
shaped and is arranged round part of the
gearwheel 4. Supported on the arm 7a ap-
20 proximately diametrically opposite one
another on the gearwheel 4 are two pawls 8
and 9 each of which is urged into engage-
ment with the teeth of the gearwheel 4 by
means of a spring 10 or 11 which is fixed
25 at one end on the arm 7a. The pawls 8 and
9 are so arranged that, during movement
of the arm 7a in one direction, one of the
pawls 8 tend to rotate the gearwheel 4 in
one sense, anticlockwise as shown in the
30 drawing, whilst the other pawl 9 ratchets
over the gearwheel 4 and during movement
of the arm 7a in the opposite direction the
pawl 9 drives the gearwheel 4 in the one sense
whilst the pawl 8 ratchets over the gearwheel
35 4. A hairpin spring 12 is located about the
spindle 6. One shank of the spring 12 rests
against the arm 2 coupled to the film claw,
and the other shank resting against a lug
7b of the lever 7. In addition, a further
40 spring 13, one end of which is fixed in the
camera housing 1, engages with a lug or pin
7c on the arm 7a and tends to urge the arm
7a towards the gearwheel 4.

If during the film advance stage of move-
45 ment of the film claw the arm 2 is moved
in the direction of the arrow assuming the
position shown in broken lines and the hair-
pin spring 13 urges the lever 7 in the oppo-
site direction to that of the arrow, towards
50 the gearwheel 4, so that the pawl 9 drives
the gearwheel 4 anticlockwise and the pawl
8 ratchets over the teeth. If the wheel 4
should stop during this movement due to
film being fully wound, the arm 2 moves
55 further without any additional load. In the
return or idle phase of movement of the film
claw, the arm 2 carries the lever 7 along
with it by way of the hairpin spring 12
against the action of the hairpin spring 13.
60 The pawl 8 now drives the gearwheel 4 in
an anticlockwise direction. When the gear-
wheel 4 comes to a standstill, before the
end of the idle phase is reached, the hairpin
spring 12 takes up the movement by being
65 tensioned without further movement of the
lever 7.

WHAT WE CLAIM IS:—

1. A cine camera which includes reci-
procatory film transport means, means for
driving a film reel and a motor for driving
the film transport means, the film reel drive
70 means including one toothed-wheel arranged
to be coupled to the film reel, a member
arranged to reciprocate in response to
movement of the film transport means and
two pawls mounted on the member and ar-
75 ranged so to engage the toothed wheel that
movement of each pawl in a direction cor-
responding to one sense of rotation of the
toothed wheel rotates the toothed wheel in
the said one sense, while during movement
80 of each pawl in a direction corresponding
to the opposite sense of rotation of the
toothed wheel the pawls ratchet over the
toothed wheel and the pawls are arranged
to engage such points on the periphery of
85 the toothed wheel that one pawl drives the
toothed wheel in the said one sense in re-
sponse to movement of the member in one
direction and the other pawl drives the
toothed wheel in the said one sense in re-
90 sponse to movement of the member in the
opposite direction.

2. A camera as claimed in claim 1,
wherein the member is pivotably mounted
and both pawls are so mounted on the same
95 side of axis of pivoting of the member that
they move in the same direction as one an-
other relative to the axis of rotation of the
toothed wheel.

3. A camera as claimed in claim 1 or
100 claim 2, wherein the points of engagement
of the pawls with the toothed wheel are ap-
proximately diametrically opposite one an-
other.

4. A camera as claimed in any one of
105 claims 1 to 3, wherein an arm of the mem-
ber is approximately in the shape of a 'U'
and each pawl is mounted on a different
one of the arms of the 'U'.

5. A camera as claimed in claim 4, 110
wherein there is provided first resilient
means tending to urge the said arm of the
member towards the toothed wheel and sec-
ond resilient means so coupled to the film
transport means and tensioned by the film
115 transport means that when the film trans-
port means is in one range of positions the
said arm of the member is urged towards
the toothed wheel by the first resilient means
and when the film transport means is in an-
120 other range of positions the said arm of the
member is urged away from the toothed
wheel by the second resilient means.

6. A camera as claimed in claim 5, 125
wherein the second resilient means is so
arranged that when the gearwheel is preven-
ted from rotating due to the film being
fully wound any further movement of the
film transport means is compensated for by



an alteration in the tension of the second resilient means.

- 5 7. A camera as claimed in claim 5, wherein the first resilient means is arranged to engage the U-shaped arm of the member and the second resilient means is arranged to engage the member at a point remote from the U-shaped arm.

8. A cine camera substantially as hereinbefore described with reference to, and as shown in, the accompanying drawing. 10

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