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(54) FILM WINDING DEVICE

(71) We, AGFA-GEVAERT AKTIENGESELLSCHAFT, a body corporate organised according to the laws of the Federal Republic of Germany, of Leverkusen, Federal Republic of 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 invention relates to film winding devices and especially to ones for completing the winding through of a film.

For developing purposes, cartridge films are now generally removed from the cartridge in a special apparatus, secured to one another, and wound up to form a large reel, so that a strip of film several hundred metres long may be developed by the continuous process.

In the case of known film-removing apparatuses, however, it is important that the films have been wound through the cartridge to the end. In order that the end of the film should not be wound completely onto the take-up spool, an aperture is provided in the film and a hook is provided on the cartridge so that the end of the film is retained in the film gate, ready for removal in the apparatus.

When films are not wound through to the end, an operator must transport the film manually to the end position. For this purpose, a rack has hitherto been used which is engaged with the gearwheel of the take-up spool and then driven. A simple crank handle has also been used, being inserted into the take-up spool. Such methods are time-consuming, however, and are also tiring if winding-on is necessary in many cases. In addition, a great disadvantage with these known procedures is that the whole of the remainder of the film is exposed when the film is wound through. It is therefore no longer possible to expose an identification number or the like onto the film.

The invention provides a film winding device for use with cartridges for completing the winding through of a film in a cartridge, which device comprises means for supporting a cartridge, light-proof means arranged to prevent light from entering the picture gate of a cartridge placed on the supporting means, and a

gearwheel capable of being driven and arranged to drive the take-up spool of a cartridge placed on the supporting means so as to wind on the film, the arrangement being such that the cartridge can be held on the supporting means by an operator while the gearwheel is driven and the film in the cartridge is wound on with light excluded from the picture gate.

Film winding devices can be constructed in accordance with the invention by means of which the film can be wound through to the end in a short time, without the wound-on film being exposed. Simple means may be used for the device, and it is possible for the device to be such that it can be operated with one hand.

The drive of the take-up spool is preferably initiated by placing a cartridge onto the device. Thus, there may be provided a micro-switch which initiates the drive of the gearwheel and which is actuated by the cartridge when the cartridge is placed on the device.

The light proof means may be a resilient, substantially rectangular, cushion or pad, one side of which is approximately equal in length to the dimension of the picture gate in a direction between the spools and the other side of which extends between the connecting pieces, at the sides of the picture area, that connect the film chambers of the cartridge, so that the connecting pieces in use are in contact with the cushion or pad. The light proof means may form part of a shaped member which also forms the supporting means, the said shaped member having recesses for accommodating the film chambers of the cartridge and in which the cartridge can be placed only one way around. Resilient strips may be provided on the shaped member for contact with the cartridge connecting pieces for additional light-exclusion. Preferably, the shaped member forms a wall of a housing in which the gearwheel is mounted.

The gearwheel may be coupled directly or by means of gearing to a motor, the driving force at the gearwheel being such that tearing of the film when a hole in the film is engaged by a projection in the cartridge is prevented.

A film winding device for use with cartridges for completing the winding through of a film will now be described by way of example, with

reference to the accompanying drawings, in which:

Figure 1 is a cross-section through the device; and

5 Figure 2 is a section taken along the lines II-II in Figure 1.

10 In Figure 1 the reference numeral 1 indicates a film cartridge of the "110" type. The cartridge has a gearwheel 2 connected to the take-up spool, a hook 3 to retain the end of the film, a picture gate 4, and the connecting pieces 5 and 6 joining the film chambers.

15 The film winding device has a housing 7, one side of which is approximately complementary in shape to that of a film cartridge, so that the latter can only be inserted into the housing wall 8 in one way, with the picture gate 4 facing towards the housing. Resilient longitudinal members 9 are fitted onto the housing wall 8, spaced so as to be contacted by the connecting pieces 5 and 6, thereby ensuring a substantially light-proof seal with respect to the picture gate 4. In addition, recesses 10 are formed in the housing wall 8 so that the cartridge 1 can be
25 inserted into the housing 7 when being held between the fingers.

30 Supporting inside the housing 7, there is a gearwheel 11 which is preferably of metal and which projects into a recess 12 in the housing wall 8 for the take-up section of the cartridge in such a way that when the cartridge is inserted the gearwheel 11 engages with the take-up gearwheel 2 of the cartridge. On the axis of the gearwheel 11 there is also mounted
35 a gearwheel 13 which is connected to a motor 15 by way of a worm gear 14.

40 In a recess 16 in the housing wall 8 for receiving the supply spool section of the cartridge there is an aperture 17 through which projects an actuating member 18 of a micro-switch 19. The micro-switch 19 is electrically connected to the motor 15 and to a voltage supply (not shown).

45 The method of operation of the device illustrated in Figures 1 and 2 is as follows. The operator of an apparatus for removing films from cartridges first takes a cartridge out of its order wallet and, if the film is properly wound to its end, with one hand places the cartridge
50 into an opening provided for the purpose in the apparatus, and at the same time places the order wallet in another feeding-in opening. If on removing a cartridge from an order wallet, the operator finds that the film has not yet
55 been wound to the end, the cartridge 1 is held by the connecting pieces 5 and 6 and placed in the housing wall 8. The gearwheel 2 of the take-up spool thereby engages with the gearwheel 11 of the device, and by means of the member 18 the supply spool film chamber of the cartridge
60 1 actuates the micro-switch 19 so that the motor 15, and thus the gearwheel 11, begin to turn. The film is then wound through until an aperture therein catches on the hook 3, without
65 being exposed to the light.

The output of the motor and the transmission ratio of the gearwheels 14, 13, 11, 2 are so selected that the film stops the device without the film being torn at the aperture by the force of the motor 15. The operator also simultaneously receives an audible signal
70 indicating when the winding-through operation is at an end. Depending on the length of film still to be wound through, the operation takes from approximately a quarter of a second to
75 two seconds.

The housing 7 may be produced in a simple manner using two injection-moulded sections, each forming half of the housing. For one-handed operation, it is important that the housing 7 should be firmly seated. To this end, the housing may for example be let into a recess in a plate 20 of the apparatus.

80 Instead of the above-described apparatus, even simpler means may be employed in accordance with the invention. For example, it is possible for the parts forming the device of the invention, that is, the light exclusion means and the driven gearwheel, to be fitted directly into an operating panel of a film-removing apparatus at a distance corresponding to the size of the cartridge. In that case either the gearwheel could turn continuously or a micro-switch could be provided in the operating panel. The light exclusion means could, for example, be a rubber cushion extending over the picture gate between the connecting pieces in one direction and as far as the spool chambers in the other direction. When the cartridge is placed with its connecting pieces on the cushion or pad, the picture gate is then sealed off in a light-proof manner.

85 The micro-switch may of course also be arranged at other positions, provided that it can be actuated when the cartridge is placed in position.

90 The apparatus of the invention may be for any size of cartridge, for example, 110 or 126. WHAT WE CLAIM IS:—

1. A film-winding device for use with cartridges for completing the winding through of a film in a cartridge, which device comprises means for supporting a cartridge, light-proof means arranged to prevent light from entering the picture gate of a cartridge placed on the supporting means, and a gearwheel capable of being driven and arranged to drive the take-up spool of a cartridge placed on the supporting means so as to wind on the film, the arrangement being such that the cartridge can be held on the supporting means by an operator while the gearwheel is driven and the film in the cartridge is wound on with light excluded from the picture gate.

2. A device as claimed in claim 1, wherein the light proof means is a resilient, substantially rectangular, cushion or pad, one side of which is approximately equal in length to the dimension of the picture gate in a direction between the spools and the other side of which



reference to the accompanying drawings, in which:

Figure 1 is a cross-section through the device; and

Figure 2 is a section taken along the lines II-II in Figure 1.

In Figure 1 the reference numeral 1 indicates a film cartridge of the "110" type. The cartridge has a gearwheel 2 connected to the take-up spool, a hook 3 to retain the end of the film, a picture gate 4, and the connecting pieces 5 and 6 joining the film chambers.

The film winding device has a housing 7, one side of which is approximately complementary in shape to that of a film cartridge, so that the latter can only be inserted into the housing wall 8 in one way, with the picture gate 4 facing towards the housing. Resilient longitudinal members 9 are fitted onto the housing wall 8, spaced so as to be contacted by the connecting pieces 5 and 6, thereby ensuring a substantially light-proof seal with respect to the picture gate 4. In addition, recesses 10 are formed in the housing wall 8 so that the cartridge 1 can be inserted into the housing 7 when being held between the fingers.

Supporting inside the housing 7, there is a gearwheel 11 which is preferably of metal and which projects into a recess 12 in the housing wall 8 for the take-up section of the cartridge in such a way that when the cartridge is inserted the gearwheel 11 engages with the take-up gearwheel 2 of the cartridge. On the axis of the gearwheel 11 there is also mounted a gearwheel 13 which is connected to a motor 15 by way of a worm gear 14.

In a recess 16 in the housing wall 8 for receiving the supply spool section of the cartridge there is an aperture 17 through which projects an actuating member 18 of a micro-switch 19. The micro-switch 19 is electrically connected to the motor 15 and to a voltage supply (not shown).

The method of operation of the device illustrated in Figures 1 and 2 is as follows. The operator of an apparatus for removing films from cartridges first takes a cartridge out of its order wallet and, if the film is properly wound to its end, with one hand places the cartridge into an opening provided for the purpose in the apparatus, and at the same time places the order wallet in another feeding-in opening. If on removing a cartridge from an order wallet, the operator finds that the film has not yet been wound to the end, the cartridge 1 is held by the connecting pieces 5 and 6 and placed in the housing wall 8. The gearwheel 2 of the take-up spool thereby engages with the gearwheel 11 of the device, and by means of the member 18 the supply spool film chamber of the cartridge 1 actuates the micro-switch 19 so that the motor 15, and thus the gearwheel 11, begin to turn. The film is then wound through until an aperture therein catches on the hook 3, without being exposed to the light.

The output of the motor and the transmission ratio of the gearwheels 14, 13, 11, 2 are so selected that the film stops the device without the film being torn at the aperture by the force of the motor 15. The operator also simultaneously receives an audible signal indicating when the winding-through operation is at an end. Depending on the length of film still to be wound through, the operation takes from approximately a quarter of a second to two seconds.

The housing 7 may be produced in a simple manner using two injection-moulded sections, each forming half of the housing. For one-handed operation, it is important that the housing 7 should be firmly seated. To this end, the housing may for example be let into a recess in a plate 20 of the apparatus.

Instead of the above-described apparatus, even simpler means may be employed in accordance with the invention. For example, it is possible for the parts forming the device of the invention, that is, the light exclusion means and the driven gearwheel, to be fitted directly into an operating panel of a film-removing apparatus at a distance corresponding to the size of the cartridge. In that case either the gearwheel could turn continuously or a micro-switch could be provided in the operating panel. The light exclusion means could, for example, be a rubber cushion extending over the picture gate between the connecting pieces in one direction and as far as the spool chambers in the other direction. When the cartridge is placed with its connecting pieces on the cushion or pad, the picture gate is then sealed off in a light-proof manner.

The micro-switch may of course also be arranged at other positions, provided that it can be actuated when the cartridge is placed in position.

The apparatus of the invention may be for any size of cartridge, for example, 110 or 126. WHAT WE CLAIM IS:—

1. A film-winding device for use with cartridges for completing the winding through of a film in a cartridge, which device comprises means for supporting a cartridge, light-proof means arranged to prevent light from entering the picture gate of a cartridge placed on the supporting means, and a gearwheel capable of being driven and arranged to drive the take-up spool of a cartridge placed on the supporting means so as to wind on the film, the arrangement being such that the cartridge can be held on the supporting means by an operator while the gearwheel is driven and the film in the cartridge is wound on with light excluded from the picture gate.

2. A device as claimed in claim 1, wherein the light proof means is a resilient, substantially rectangular, cushion or pad, one side of which is approximately equal in length to the dimension of the picture gate in a direction between the spools and the other side of which



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extends between the connecting pieces, at the
sides of the picture area, that connect the film
chambers of the cartridge, so that the connect-
ing pieces in use are in contact with the cushion
or pad.

3. A device as claimed in claim 1, wherein,
the light proof means forms part of a shaped
member which also forms the supporting
means, the said shaped member having recesses
for accommodating the film chambers of the
cartridge and in which the cartridge can be
placed only one way around.

4. A device as claimed in claim 3, wherein
resilient strips are provided on the shaped
member for contact with the cartridge connect-
ing pieces for additional light-exclusion.

5. A device as claimed in claim 3 or claim 4,
wherein the shaped member forms a wall of a
housing in which the gearwheel is mounted.

6. A device as claimed in any one of claims
1 to 5, wherein the gearwheel is coupled
directly or by means of gearing to a motor and

the driving force at the gearwheel is such that
tearing of the film when a hole in the film is
engaged by a projection in the cartridge is
prevented.

7. A device as claimed in any one of claims
1 to 6, wherein the gearwheel is made of metal.

8. A device as claimed in any one of claims
1 to 7, wherein a micro-switch is provided
which initiates the drive of the gearwheel and
which is actuated by the cartridge when the
cartridge is placed on the device.

9. A film winding device for use with
cartridges for completing the winding through
of film substantially as hereinbefore described
with reference to, and as shown in, the
accompanying drawings.

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