

PATENT SPECIFICATION

(11)

1416450

1416450

- (21) Application No. 51787/72 (22) Filed 9 Nov. 1972
 (31) Convention Application No. 198539 (32) Filed 15 Nov. 1971 in
 (33) United States of America (US)
 (44) Complete Specification published 3 Dec. 1975
 (51) INT CL² G03C 3/02
 (52) Index at acceptance

G2E K1D
 B8M 682 687 D

- (72) Inventors EVAN ALBERT EDWARDS and
 RICHARD HERBERT VANDUZER



(54) IMPROVEMENTS IN/OR RELATING TO FILMSTRIPS

(71) 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, 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 improved system for halting the advance of a photographic filmstrip through a film cartridge.

German OLSS 2139876 describes a system for preventing the end of the filmstrip from passing a predetermined point during advancement of the filmstrip through a film cartridge. In a conventional manner, one end of the filmstrip is attached to a take-up core which is housed in a take-up chamber of the cartridge and which is rotated by a drive mechanism in a camera to draw the filmstrip across an exposure station. Metering apparatus in the camera successively registers each of the respective filmstrip image areas for exposure at the exposure station. The above-cited application teaches the provision in such a system of a generally rectangular perforation adjacent the trailing end of the filmstrip squarely to engage a vertical facet of a ramp-shaped tooth provided on the cartridge to prevent the trailing end of the filmstrip from being completely drawn into the take-up chamber after all image areas have passed the exposure station. This arrangement not only retains the trailing portion of the filmstrip in the take-up chamber access slit so as to form a light lock, but also assures that the filmstrip end will be externally accessible for extraction of the filmstrip from the take-up chamber for processing so as to eliminate the need to break open the take-up chamber.

Although the above-described combination of tooth-and-perforation has proved advantageous, it has been found that, if too much

force is applied to the filmstrip subsequent to engagement of the tooth within the perforation, the web material will tear, thereby freeing the filmstrip from the tooth and allowing the filmstrip undesirably, to be wound fully into the take-up chamber. That is, in such prior art system the web-advancing force was borne solely by the web edge and was particularly concentrated at the corners of the perforation with the result that a relatively small amount of force could tear the web and allow it to escape from the tooth. A need has existed, therefore, for a tooth-and-perforation system that would withstand a fairly large force, yet would retain the basic simplicity and compactness of the arrangement of German OLS 2139876.

Accordingly, it is an object of this invention to provide an improved means for engaging and arresting an advancing filmstrip.

According to the present invention there is provided a film strip arranged to be moved along a predetermined path parallel to the longitudinal axis of the strip and having metering perforations at frame spaced intervals in alignment parallel to said axis, and an arresting perforation out of alignment with the metering perforations, the arresting perforation being elongate and presenting a longitudinal trailing edge inclined at an angle to the axis.

The invention also includes a cartridge for containing a film strip as above described and defining the predetermined path, the cartridge having a tooth projecting into the path and so located as to engage the arresting perforation as the filmstrip is moved therepast, the tooth having an overhung face for engaging the inclined edge of the arresting perforation to restrain the filmstrip against further movement.

The invention will be described further, by way of example, with reference to the accompanying drawings wherein similar reference

numerals indicate corresponding parts in all figures, and wherein:—

Figure 1 is a perspective, partially cut-away view of a film cartridge in accordance with the present invention;

Figure 2 is a perspective view of a film retention tooth including undercut facets in accordance with the subject invention;

Figure 3 is a top view of the retention tooth of Figure 2 in two stages of engagement with a skewed or inclined perforation edge;

Figure 4 is a cross section taken along the line 4—4 of Figure 3;

Figure 5 depicts a filmstrip, according to the present invention, prior to its engagement with a film retention tooth;

Figure 6 shows the filmstrip of Figure 5 in initial engagement with a retention tooth according to the present invention; and

Figure 7 shows the filmstrip after the application of additional force tending to advance the filmstrip and causing the filmstrip conformably to engage the undercut portion of the tooth.

Figure 1 depicts a film cartridge wherein a filmstrip of the present invention may be advantageously employed. As shown therein, the cartridge includes a supply chamber 11 and a take-up chamber 13 with a support wall 15 interconnecting the two chambers. A photosensitive filmstrip 17 having generally parallel longitudinal edges 18 and 18' is initially coiled in the supply chamber, the leading end of the filmstrip extending through a supply chamber exit passageway 19, overlying a portion of the support wall 15, and further extending through an access passageway 21 and into the take-up chamber 13. The filmstrip leading end is adhered to a take-up spool 23 rotatably mounted in the take-up chamber. The take-up spool 23 may be placed in driving engagement with a filmstrip advancing mechanism of a camera (not shown), whereby the filmstrip may be wound around the spool and advanced into the take-up chamber. During such advancement suitable film metering means (not shown) in the camera sequentially engages a series of metering perforations 24 successively to register respective image areas of the filmstrip for exposure at an exposure station indicated generally at 26. The photosensitive filmstrip may also be accompanied by a strip of light-impervious backing paper 31 (see Figures 5—7) which is at least coextensive with, and desirably somewhat longer than, the filmstrip; the backing paper being disposed to lie between the filmstrip 17 and the cartridge wall 15, but being omitted from Figure 1 for the sake of clarity.

A filmstrip retention tooth 25 in accordance with the present invention is disposed within the take-up chamber and may be integrally formed as a part of one wall thereof.

The location of the tooth is not, of course, confined to the take-up chamber but, depending upon the results desired, may be located on any stationary surface over which the filmstrip passes. However, where the tooth is employed in an environment such as described above, i.e. in a film cartridge, it is advisable to locate the tooth so that it rides adjacent one longitudinal edge of the film and is thus outside the photosensitive image areas so as to avoid forming pressure marks on such image areas.

The trailing end of the filmstrip 17 carries an arresting perforation 29, a longitudinal trailing edge 27 of which faces generally in the direction of filmstrip movement (as shown by arrows in Figures 1, 5 and 6) and is inclined to form an acute angle with respect to the longitudinal filmstrip axis. The edge 27 is disposed so that its path of travel (see Figure 5) will cause it to engage the tooth 25 to prevent the trailing film edge from being drawn into the take-up chamber. The ends 28 of the perforation 29 may advantageously be rounded instead of squared so as to reduce the likelihood of the filmstrip tearing where such ends meet the inclined perforation edges. As is also shown in Figure 5, if backing paper 31 is present, a suitable cut-out 33 may be formed therein to allow the tooth 25 to enter the film perforation 29.

Upon sufficient filmstrip advancement, the perforation 29 will so embrace the tooth 25 (see Figure 6) that the inclined edge 27 will abut against the tooth 25, the first and second undercut facets on the tooth (indicated respectively at 35 and 37 in Figure 3) both contacting the inclined edge 27 and being such as to form with respect to the inclined edge, oppositely-directed acute angles A and B. It should be understood that at this point, i.e. just after initial tooth-edge engagement, the filmstrip 17 lies essentially flat against the wall 15 in the manner depicted by dashed lines in Figure 4. It will also be observed that because of their inclined or slanted relationship with respect to the wall 15, the undercut facets 35 and 37 will, at this point, overhang respective portions of the web adjacent to the perforation edge 27.

Resistance to further filmstrip advancement will, of course, be encountered upon initial tooth-edge engagement. However, if any attempt is made to overpower such engagement, tooth-and-film face engagement will come into play: see Figures 4 and 7 wherein it is shown that the filmstrip—in response to an overpowering advance—is caused to curl up (27', Figure 3) so that its formerly upward-facing overhung surface conformably engages at least portions of the undercut facets 35 and 37 in the manner depicted at 17' in Figure 4. Such engagement distributes over the engaged filmstrip surface those forces which would otherwise be applied solely

against the inclined edge 27 and, in so doing, allows the filmstrip to withstand a greater advancing force. In addition, the undercut face 37 tends to prevent the edge 27 from being lifted off tooth 25 as the film 17 is wound onto the core 23.

When it is desired to remove the filmstrip for processing, the trailing end of the film (or of the paper if it is of a greater length than the film) may be grasped adjacent the passageway 21 and pulled from the chamber; the perforation being released from the tooth by riding up the inclined ramp 39.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the scope of the invention as defined in the appended Claims.

WHAT WE CLAIM IS:—

1. A filmstrip arranged to be moved along a predetermined path parallel to the longitudinal axis of the strip and having metering perforations at frame spaced intervals and in alignment parallel to said axis, and an arresting perforation out of alignment with the metering perforations, the arresting perforation being elongate and presenting a longitudinal trailing edge inclined at an angle to the axis.

2. A filmstrip as claimed in Claim 1, wherein the trailing end of the arresting perforation is rounded.

3. A filmstrip as claimed in Claim 1 or 2, further including an elongate strip or backing paper having a cut-out in the region of the arresting perforation.

4. A filmstrip substantially as hereinbefore described with reference to and as illustrated in Figure 1 and Figures 3 to 7 of the accompanying drawings.

5. A cartridge for containing a filmstrip as claimed in any one of Claims 1 to 4 and defining the predetermined path, the cartridge having a tooth projecting into the path and so located as to engage the arresting perforation as the filmstrip is moved therepast, the tooth having an overhung face for engaging the inclined edge of the arresting perforation to restrain the filmstrip against further movement.

6. A cartridge as claimed in Claim 5 wherein the overhung face comprises two facets and is arranged, in use, on further movement of the filmstrip after engagement of the tooth with the inclined edge, to provide a transverse force to the filmstrip causing the latter to deflect from the plane of movement into engagement with the two facets.

7. A cartridge as claimed in Claim 5 or 6 comprising a supply chamber for receiving the filmstrip, a take-up chamber into which the filmstrip is drawn as it moves along the path, and means for drawing the filmstrip along the path, and wherein the tooth is located in the take-up chamber.

8. A cartridge as claimed in Claim 5, 6 or 7 wherein the tooth has a ramp surface substantially opposite the overhung face whereby, when a filmstrip is moved, relative to the tooth, in a direction such as to disengage the inclined edge from the overhung face, the ramp surface causes the filmstrip to ride up and over the tooth.

9. A cartridge for containing a filmstrip and substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 7 of the accompanying drawings.

L. A. TRANGMAR, B.Sc., C.P.A.
Agent for the Applicants.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1975.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

against the inclined edge 27 and, in so doing, allows the filmstrip to withstand a greater advancing force. In addition, the undercut face 37 tends to prevent the edge 27 from being lifted off tooth 25 as the film 17 is wound onto the core 23.

When it is desired to remove the filmstrip for processing, the trailing end of the film (or of the paper if it is of a greater length than the film) may be grasped adjacent the passageway 21 and pulled from the chamber; the perforation being released from the tooth by riding up the inclined ramp 39.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the scope of the invention as defined in the appended Claims.

WHAT WE CLAIM IS:—

1. A filmstrip arranged to be moved along a predetermined path parallel to the longitudinal axis of the strip and having metering perforations at frame spaced intervals and in alignment parallel to said axis, and an arresting perforation out of alignment with the metering perforations, the arresting perforation being elongate and presenting a longitudinal trailing edge inclined at an angle to the axis.

2. A filmstrip as claimed in Claim 1, wherein the trailing end of the arresting perforation is rounded.

3. A filmstrip as claimed in Claim 1 or 2, further including an elongate strip or backing paper having a cut-out in the region of the arresting perforation.

4. A filmstrip substantially as hereinbefore described with reference to and as illustrated in Figure 1 and Figures 3 to 7 of the accompanying drawings.

5. A cartridge for containing a filmstrip as claimed in any one of Claims 1 to 4 and defining the predetermined path, the cartridge having a tooth projecting into the path and so located as to engage the arresting perforation as the filmstrip is moved therepast, the tooth having an overhung face for engaging the inclined edge of the arresting perforation to restrain the filmstrip against further movement.

6. A cartridge as claimed in Claim 5 wherein the overhung face comprises two facets and is arranged, in use, on further movement of the filmstrip after engagement of the tooth with the inclined edge, to provide a transverse force to the filmstrip causing the latter to deflect from the plane of movement into engagement with the two facets.

7. A cartridge as claimed in Claim 5 or 6 comprising a supply chamber for receiving the filmstrip, a take-up chamber into which the filmstrip is drawn as it moves along the path, and means for drawing the filmstrip along the path, and wherein the tooth is located in the take-up chamber.

8. A cartridge as claimed in Claim 5, 6 or 7 wherein the tooth has a ramp surface substantially opposite the overhung face whereby, when a filmstrip is moved, relative to the tooth, in a direction such as to disengage the inclined edge from the overhung face, the ramp surface causes the filmstrip to ride up and over the tooth.

9. A cartridge for containing a filmstrip and substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 7 of the accompanying drawings.

L. A. TRANGMAR, B.Sc., C.P.A.
Agent for the Applicants.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1975.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.



* C L M S *