

# PATENT SPECIFICATION (11)

1 558 804

1 558 804

- (21) Application No. 35722/76 (22) Filed 27 Aug. 1976 (19)  
 (31) Convention Application No. 2 538 425  
 (32) Filed 29 Aug. 1975 in  
 (33) Fed. Rep. of Germany (DE)  
 (44) Complete Specification published 9 Jan. 1980  
 (51) INT. CL.<sup>3</sup> G03B 17/26  
 (52) Index at acceptance  
 B8M 3GY 3L4 M RB



## (54) CARTRIDGE OR CASSETTE

(71) We, AGFA-GEVAERT AKTIEN-GESELLSCHAFT, a Company organised according to the laws of the Federal Republic of Germany, of Leverkusen, the 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 cartridges or cassettes for strip material and especially to film cassettes. The invention is especially applicable to film cassettes for narrow-gauge films.

Cassettes have been proposed having a film take-up spool rotatable only in the direction in which the film is wound-on, in which the reverse wind blocking mechanism for the take-up spool comprises several notches on one part having edges effective in the reverse or unwinding direction, adjacent notches being joined by curved surfaces, and a locking member located on another part that is rotatable with respect to the first part, the locking member co-operating with the notches to prevent rotation in the unwinding direction.

The present invention provides a film cartridge or cassette which comprises a take-up spool and a housing for the spool, the housing being provided with a plurality of stops arranged around a circle coaxial with the axis of the take-up spool and each stop having a stop surface which faces in the same direction around the circle, the spool being provided with an arm and the arrangement being such that the arm engages a stop when the spool is rotated in the unwinding direction so as to tend to prevent rotation in that direction, and the arm being arranged or adapted to break on application of a force greater than a predetermined force so as to allow the free rotation of the spool in the unwinding direction.

Preferably, the arm is resilient, and it is advantageously moulded onto the spool. In a particularly advantageous embodiment,

the arm comprises a part moulded onto the take-up spool and a part co-operating with the stops, which may be formed as notches, there being provided a predetermined breaking point between both parts. The arm is preferably arranged on a stud of the take-up spool which lies inside the generally ring-shaped film wind surface of the take-up spool.

A further advantage may be achieved by the provision of a protective surface lying, with respect to the arm, in the film wind-on direction. The protective surface preferably has a breaking edge which, on rotating the take-up spool in the film unwind direction with sufficient force, meets the arm and shears it off at the predetermined breaking point. Preferably, the protective surface is attached to the surface of a stud of the take-up spool on which the arm, in this case, is arranged.

A film cassette constructed in accordance with the invention will now be described, by way of example, with reference to the accompanying drawing, which shows parts of a narrow gauge, or "Super 8", film cassette in perspective exploded form.

With reference to the drawing, a partition wall 1 of the cassette is arranged between a feed spool (not shown), and a take-up spool 7. On the partition wall 1 is located a substantially frusto-conical mount 2 on which the core of the take-up spool 7 is rotatably mounted. The mount 2 is arranged in the centre of a substantially circular depression in the partition wall 1, three stops, indicated generally by the reference numeral 15, being formed towards the periphery of the substantially circular depression and the stop faces all facing in the same direction around the depression. The edge of each stop that is furthest away from the mount 2 is joined to the edge of the following stop that is nearest the mount 2, proceeding around the circular depression in the direction in which the faces of the stops face, by a curved wall, indicated generally by the reference numeral 5.

Mounted on a substantially cylindrical

stud 17 of the take-up spool is an arm 8 of resilient material. The arm 8 is injection-moulded onto the spool 7, and the stud 17 lies inside the winding surfaces 18, of the spool. The resilient arm 8 comprises an upper arm portion and a lower arm portion 13, for co-operation with the stops 15, which portion 13 is joined to the upper arm portion at a region of discontinuity in construction or weakness which provides a predetermined breaking point 10, for the arm. That surface 12 of the lower arm portion 13 which faces outwardly towards the curved walls 5 when the take-up spool 7 is mounted in its operative position over the frusto-conical mounting 2, is rounded with the same degree of curvature as that of the said curved walls. The stop-surfaces, for example, the faces 3 and 6, of the stops 15 do not extend radially with respect to the frusto-conical mount 2 but are each inclined to the radius of the circular depression at an angle which is generally in the region of 30°. A stop abutment surface 11 of the lower arm portion 13 is correspondingly inclined so that when it engages a stop surface, for example, 3 or 6, to oppose rotation of the spool 7 in the unwinding direction, as described below, the stop abutment surface 11 lies against the stop surface 3 or 6 and the lower arm portion 13 fits snugly into the notch formed between the stop surface and the respective curved wall 5 extending from its radially outermost edge.

Mounted on the stud 17, to either side of the resilient arm 8 extending parallel to the central axis of the spool 7, are flanges 9, each of which is inclined at an acute angle to the tangent to the stud 17 at its point of attachment and which extend towards each other so as to form a channel or recess of dove-tail cross-section for the arm 8. The surfaces of the flanges 9 shields the arm 8 against accidental impact. The distance between the longitudinal edge of each flange 9 and the central axis is equal to or greater than the distance between the arm 8 and the central axis. The flanges 9 extend downwardly (as shown in the drawing) as far as the weakened region 10 of the arm 8, the lower portion of the flange to the left of the arm (also as seen in the drawing) terminating in a breaking edge 14, whose function is described below.

The cartridge arrangement described above functions as follows:—

If the take-up spool 7 is rotated in the winding-on or film take-up direction (clockwise, as seen in the drawing) the resilient arm 8 is bent towards the central axis of the spool 7 while the curved surface 12 of the lower arm portion 13 slides over the contact surface of the curved walls, slipping over the radially innermost edges of the stops 15. Immediately an innermost edge of

a stop 15 has been passed over, the resilient arm 8 springs in an outwards radial direction, the lower arm portion 13 not touching the base circle 4 of the stop/curved wall arrangement at this stage.

When, however an attempt is made to rotate the spool 7 in the opposite direction to that of film take-up, the movement of the lower arm portion 13 is blocked by the abutment of the surface 11 with a stop-surface, for example, the face 3 or 6, so as to prevent free rotation of the spool 7 in this direction. The configuration of the surface 11 and the stop surface, as described above, ensures the proper functioning of this locking operation.

It is necessary for the lock against rotation of the spool 7 in the unwinding direction, that is to say, in an anti-clockwise direction as seen in the drawing, to be releasable in order that the film can be unwound through the picture gate of the cartridge. This requirement is met in the described device in that, as continuous force is applied in the unwinding direction, the resilient arm 8 is bent backwards by stop 15 until it meets the breaking edge 14 on the protective flange 9 and, on application of further, sufficiently strong force, the lower arm portion 13 of the resilient arm is broken off at the predetermined breaking point 10. The lower arm portion 13 is so proportioned at the predetermined breaking point 10 that it breaks off cleanly without leaving any part of the lower arm portion 13 behind. After the arm breakage, the take-up spool 7 can rotate freely for winding off the exposed film. The flanges 9 act as impact protection for the arm 8.

Since the resilient arm 8 lies against a portion 17 of the take-up spool 7 which is separated by the winding surfaces of the spool from the film wound thereon, the broken-off lower arm portion 13, cannot cut or damage the film as it is being unwound.

#### WHAT WE CLAIM IS:—

1. A film cartridge or cassette which comprises a take-up spool and a housing for the spool, the housing being provided with a plurality of stops arranged around a circle coaxial with the axis of the take-up spool and each stop having a stop surface which faces in the same direction around the circle, the spool being provided with an arm and the arrangement being such that the arm engages a stop when the spool is rotated in the unwinding direction so as to tend to prevent rotation in that direction, and the arm being arranged or adapted to break on application of a force greater than a predetermined force as to allow free rotation of the spool in the unwinding direction.

2. A film cartridge or cassette as claimed in claim 1, wherein the arm is resilient.



1,558,804

2

stud 17 of the take-up spool is an arm 8 of resilient material. The arm 8 is injection-moulded onto the spool 7, and the stud 17 lies inside the winding surfaces 18, of the spool. The resilient arm 8 comprises an upper arm portion and a lower arm portion 13, for co-operation with the stops 15, which portion 13 is joined to the upper arm portion at a region of discontinuity in construction or weakness which provides a predetermined breaking point 10, for the arm. That surface 12 of the lower arm portion 13 which faces outwardly towards the curved walls 5 when the take-up spool 7 is mounted in its operative position over the frusto-conical mounting 2, is rounded with the same degree of curvature as that of the said curved walls. The stop-surfaces, for example, the faces 3 and 6, of the stops 15 do not extend radially with respect to the frusto-conical mount 2 but are each inclined to the radius of the circular depression at an angle which is generally in the region of 30°. A stop abutment surface 11 of the lower arm portion 13 is correspondingly inclined so that when it engages a stop surface, for example, 3 or 6, to oppose rotation of the spool 7 in the unwinding direction, as described below, the stop abutment surface 11 lies against the stop surface 3 or 6 and the lower arm portion 13 fits snugly into the notch formed between the stop surface and the respective curved wall 5 extending from its radially outermost edge. Mounted on the stud 17, to either side of the resilient arm 8 extending parallel to the central axis of the spool 7, are flanges 9, each of which is inclined at an acute angle to the tangent to the stud 17 at its point of attachment and which extend towards each other so as to form a channel or recess of dove-tail cross-section for the arm 8. The surfaces of the flanges 9 shields the arm 8 against accidental impact. The distance between the longitudinal edge of each flange 9 and the central axis is equal to or greater than the distance between the arm 8 and the central axis. The flanges 9 extend downwards (as shown in the drawing) as far as the weakened region 10 of the arm 8, the lower portion of the flange to the left of the arm (also as seen in the drawing) terminating in a breaking edge 14, whose function is described below.

The cartridge arrangement described above functions as follows:—

If the take-up spool 7 is rotated in the winding-on or film take-up direction (clockwise, as seen in the drawing) the resilient arm 8 is bent towards the central axis of the spool 7 while the curved surface 12 of the lower arm portion 13 slides over the contact surface of the curved walls, slipping over the radially innermost edges of the stops 15. Immediately an innermost edge of

a stop 15 has been passed over, the resilient arm 8 springs in an outwards radial direction, the lower arm portion 13 not touching the base circle 4 of the stop/curved wall arrangement at this stage.

When, however an attempt is made to rotate the spool 7 in the opposite direction to that of film take-up, the movement of the lower arm portion 13 is blocked by the abutment of the surface 11 with a stop-surface, for example, the face 3 or 6, so as to prevent free rotation of the spool 7 in this direction. The configuration of the surface 11 and the stop surface, as described above, ensures the proper functioning of this locking operation.

It is necessary for the lock against rotation of the spool 7 in the unwinding direction, that is to say, in an anti-clockwise direction as seen in the drawing, to be releasable in order that the film can be unwound through the picture gate of the cartridge. This requirement is met in the described device in that, as continuous force is applied in the unwinding direction, the resilient arm 8 is bent backwards by stop 15 until it meets the breaking edge 14 on the protective flange 9 and, on application of further, sufficiently strong force, the lower arm portion 13 of the resilient arm is broken off at the predetermined breaking point 10. The lower arm portion 13 is so proportioned at the predetermined breaking point 10 that it breaks off cleanly without leaving any part of the lower arm portion 13 behind. After the arm breakage, the take-up spool 7 can rotate freely for winding off the exposed film. The flanges 9 act as impact protection for the arm 8.

Since the resilient arm 8 lies against a portion 17 of the take-up spool 7 which is separated by the winding surfaces of the spool from the film wound thereon, the broken-off lower arm portion 13, cannot cut or damage the film as it is being unwound.

#### WHAT WE CLAIM IS:—

1. A film cartridge or cassette which comprises a take-up spool and a housing for the spool, the housing being provided with a plurality of stops arranged around a circle coaxial with the axis of the take-up spool and each stop having a stop surface which faces in the same direction around the circle, the spool being provided with an arm and the arrangement being such that the arm engages a stop when the spool is rotated in the unwinding direction so as to tend to prevent rotation in that direction, and the arm being arranged or adapted to break on application of a force greater than a predetermined force as to allow free rotation of the spool in the unwinding direction.

2. A film cartridge or cassette as claimed in claim 1, wherein the arm is resilient.



3. A film cartridge or cassette as claimed in claim 1 or claim 2, wherein the arm is moulded onto the spool.
4. A film cartridge or cassette is claimed in any one of claims 1 to 3, wherein the cross-section of the arm is discontinuous in one region to provide a predetermined line of breaking in the region of discontinuity.
5. A film cartridge or cassette as claimed in any one of claims 1 to 4, wherein the arm extends substantially parallel to the central axis of the take-up spool.
6. A film cartridge or cassette as claimed in any one of claims 1 to 5, wherein the arm lies closer to the central axis of the spool than does the winding surface of the spool, at least a portion of the arm being covered by the winding surface.
7. A film cartridge or cassette as claimed in claim 6, wherein the arm is attached to a substantially cylindrical surface of the spool which lies within and coaxial with the winding surface.
8. A film cartridge or cassette as claimed in claim 7, wherein the spool is provided with a breaking edge arranged to abut the arm when the spool is rotated in the unwinding direction so that the arm breaks against the edge in the region of abutment when the force experienced by the arm in the unwinding direction is greater than the said predetermined force.
9. A film cartridge or cassette as claimed in claim 4 and claim 8, wherein the arm is arranged to abut the breaking edge at its predetermined breaking line.
10. A film cartridge or cassette as claimed in claim 8 or claim 9, wherein the breaking edge projects from the said substantially cylindrical surface.
11. A film cassette as claimed in claim 10, wherein the breaking edge comprises part of a shielding surface which projects from the said substantially cylindrical surface and which is located adjacent to and on one side of a portion of the arm which does not contact the stops on rotation of the spool in the unwinding direction.
12. A film cartridge or cassette as claimed in claim 11, wherein a further shielding surface is provided adjacent to and on the opposite side of the arm from the first-mentioned shielding surface.
13. A film cartridge or cassette as claimed in claim 5 and claim 12, wherein the shielding surfaces are longitudinal surfaces extending substantially parallel to the central axis of the take-up spool, each shielding surface projecting from the substantially cylindrical surface at an angle to the radius from the centre of the spool through the line of attachment of that shielding surface to the substantially cylindrical surface so as to form a channel or recess of dove-tail cross-section for the portion of the arm which does not contact the stops on rotation of the spool in the unwinding direction.
14. A film cartridge or cassette as claimed in claim 9 and any one of claim 11 to 13, wherein the arm is attached to the substantially cylindrical surface and the shielding surface lies adjacent to that portion of the arm which extends between the region of attachment of the arm to the said substantially cylindrical surface and the predetermined breaking line of the arm.
15. A film cartridge or cassette as claimed in claims 1 to 14, wherein the outermost edge of the stop surface of each stop, that is to say, the edge that is furthest from the axis of the spool, is joined to the innermost edge of the stop surface in front of it, by a curved wall.
16. A film cartridge or cassette as claimed in claim 15, wherein the region of the arm which bears against the curved walls or portions of the curved walls during rotation of the spool in the winding-on direction, has a curvature corresponding to the curvature of the said curved walls.
17. A film cartridge or cassette as claimed in any one of claims 1 to 16, wherein each stop surface is inclined to a notional line drawn radially from the centre of the spool to the outermost edge of the stop surface so as to form an acute angle with the tangent to the curved wall extending from the inner edge of the stop surface.
18. A film cartridge or cassette as claimed in claim 17, wherein the surface of the arm in the region where it engages a stop surface on rotation of the spool in the unwinding direction is inclined to the radial at the same angle as are the stop surfaces so that, on rotation of the spool in the unwinding direction and consequent engagement of a stop and the arm, the engaging portions of the arm and the stop surface lie substantially against each other.
19. A film cassette substantially as hereinbefore described with reference to, and as shown in, the accompanying drawing.

ABEL & IMRAY,  
Chartered Patent Agents,  
Northumberland House,  
303—306 High Holborn,  
London WC1V 7LH.