

PATENT SPECIFICATION (11)

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(54) CAMERA HAVING AN EXTERNAL LENS COVER

(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:—

This invention relates to cameras having external lens covers.

The invention provides a camera having an external lens cover comprising at least one blade capable of being moved out of the image-forming ray path for picture-taking, and the camera having control means on the lens or on the lens mount which so co-operates with the cover that the blade or blades can be moved out of the ray path by movement of the lens or the lens mount, respectively.

With the arrangement of the invention, the cover can be moved out of the way of the lens simply by moving the lens or its mount, preferably, by rotating it about the optical axis of the lens. This movement may be one that is in any case necessary during the normal adjustment of the camera for picture-taking. The invention makes possible a part-saving and space-saving arrangement.

The blade or blades may be spring-biased under the action of one or more restoring springs.

Advantageously, the lens mount has at least one opening in front of the lens and extending in a plane perpendicular to the optical axis of the lens, the blade or blades being so positioned that they move through the opening or openings to cover the lens. The blade or blades may pivot through the openings or move laterally through the openings. Preferably the lens mount is rotatable about the optical axis of the lens to move the blade or blades, and the control means is formed by an edge of an opening.

The camera may be of the kind wherein the lens is pulled out for use, and retracted when not in use. The invention is particularly advantageous in such a camera since this necessary movement can also be arranged to move the cover, and the lens can be uncovered

automatically when the lens is pulled out for use and covered again when the lens is retracted. Advantageously, the lens mount is rotatable about the optical axis of the lens when the lens is in its retracted position, to move the blade or blades. Preferably, the engagement between the lens mount and the carrier of the lens mount is by means of one or more projections on one of the parts that engages recesses on the other part, the recesses comprising two circumferentially-extending recesses spaced apart in an axial direction, corresponding to the retracted and pulled-out positions of the lens, and axially-extending recesses joining the circumferentially-extending recesses to allow the lens to be moved between the pulled-out and retracted positions.

The camera of the invention may be a still camera or a cine camera.

Cameras constructed in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a partially cut-away view of a first camera;

Figure 2 is a section through the lens part of the camera shown in Figure 1;

Figure 3 is a perspective view, partially cut away and partially sectional, of the lens part of the camera shown in Figure 1;

Figure 4 shows a part of a second camera; and

Figure 5 shows a part of a third camera.

Like parts are given like reference numerals throughout the drawings.

Referring to Figures 1 to 3 of the drawings, the camera comprises a case 1, a mount 4 for a compound lens 3, a hollow cylindrical carrier 2 for the lens mount 4, and an adjusting ring 5 for the lens. The adjusting ring 5 for the lens is joined to the lens mount 4 and projects from the front of the camera. The lens is pulled out for use, and is retracted to an inoperative position (shown in the drawings) when not in use.

The lens mount carrier 2 has at least one axial recess 2a and near to its front and back face circumferentially-extending grooves 2d and 2c, respectively, which extend along the curved surface of the cylinder and communicate with the axial recess 2a. The lens mount

carrier 2 also has a slot (not shown in the drawings) which, when the lens mount 4 is located in the inoperative position, forms an extension of a slot 4a in the lens mount 4 which lies perpendicular to the axis of the lens 3. The lens mount 4 carries on the side facing the film a number of locking lugs 4b corresponding to the number of recesses 2a, the locking lugs being so shaped that they can be moved axially along the respective recesses 2a and, when the mount 4 is rotated, into the grooves 2d, 2c around the periphery of the lens carrier 2. In the camera housing 1 a cover blade 7 for protecting the camera lens externally when not in use is rotatably mounted about an axis 6. It is urged by a spring 8 towards the lens mount 4.

When the lens 3 is located in the position in which it is inoperative (as shown in the drawings), only the adjusting ring 5 projects from the camera case, and the blade 7 engages the slot 4a positioned in front of the composite lens 3 and covers up the lens. Each lug 4b therefore lies in the rear groove 2c of the lens mount carrier 2. The edge of the slot 4a is designed as a control cam 4c (see Figure 1), against which control cam an edge 7a of the blade lies.

To move the lens 3 into the position in which it can be used, the adjusting ring 5 shown in Figures 1 to 3 is first turned clockwise as seen in Figure 1. The locking lug or lugs 4b are initially moved along the grooves 2c. The control cam 4c co-acts with the edge 7a of the blade and moves the blade 7 out of the position in which the lens is covered; into a position out of the picture-taking ray path shown in Figure 1 with dot-dash lines where the edge 7a is finally positioned against the edge of the lens mount 4 and where the locking lug, or lugs, 4b have moved into the recess 2a. The lens mount 4 is now pulled out into the use position. Although the control cam 4c has disengaged the blade 7, the latter is, however, held clear of the ray path by the lens mount 4 itself. The operative position of the lens 3, which may for example be such that it is focussed on infinity, is attained when the locking lug, or lugs, 4b are able to engage the groove, or grooves, 2d. To lock the lens in its use position, it is turned anti-clockwise (as seen in Figure 1) so that the locking lug, or lugs, engage the groove, or grooves, 2d.

To return the lens 3 to the position in which it is not in use, it is first of all turned clockwise again so that the locking lug 4b disengages the groove 2d and moves into the recess 2a. The lens 3 is then pushed into the camera and finally, the locking lug 4b is rotated into the groove 2c again. In this position, the blade 7 is able to move into the slot 4a again under the action of spring 8 and cover up the lens 3 externally.

The camera shown in Figure 4 is similar

to that described with reference to Figures 1 to 3, except that the cover has two blades 9 and 10, and that it is driven by a pin 4e. The two blades are rotatable about an axis 6. The blades 9 and 10 may be urged under the action of springs 11 and 12 into a position in which the lens 3 is covered. A control arm 4d on the lens mount 4 is provided with a pin 4e. One edge 9a of the blade 9 and an arm 10a of the blade 10 lie against the pin 4e. If the lens mount 4 is turned anti-clockwise, out of the position shown in Figure 4, the blades 9 and 10 uncover the lens 3 and the lens mount 4. The lens may then be pulled in the manner described in connexion with Figures 1 to 3, out of the camera into the position in which it can be used. Alternatively, this lens could be a lens which is not to be pulled out of the camera for use but which when turned appropriately is merely uncovered by the protective shutter 9, 10 for use.

The camera shown in Figure 5 differs from that shown in Figures 1 to 3 in that the protective cover comprises a laterally displaceable blade 7. The single blade 7 is mounted not rotatably but displaceably, and a slidable arm secured to the blade can be pulled or pushed by the spring 8 into the position in which the lens is not used. When the lens mount is turned anti-clockwise, the cam 4c of the lens mount 4 pushes the slidable arm with the blade 7 out of the vicinity of the lens into the position indicated by dot-dash lines.

Of course, other embodiments are also possible in accordance with the invention. Thus with cameras having slidable film transport members that can be pulled and pushed relative to the camera, and rotation of the lens to displace the blades 7 or 9 and 10, respectively, could be derived from the film transport member for example by way of a toothed gearing.

A positive connection between the lens mount 4 and the blade or blades 7 or 9 and 10 would also be possible.

WHAT WE CLAIM IS:—

1. A camera having an external lens cover comprising at least one blade capable of being moved out of the image-forming ray path for picture-taking, and the camera having control means on the lens or on the lens mount which so co-operates with the cover that the blade or blades can be moved out of the ray path by movement of the lens or the lens mount, respectively.

2. A camera as claimed in claim 1, wherein the blade or blades are spring-biased into the position covering the camera lens.

3. A camera as claimed in claim 1 or claim 2, wherein the lens mount has at least one opening in front of the lens and extending in a plane perpendicular to the optical axis



carrier 2 also has a slot (not shown in the drawings) which, when the lens mount 4 is located in the inoperative position, forms an extension of a slot 4a in the lens mount 4 which lies perpendicular to the axis of the lens 3. The lens mount 4 carries on the side facing the film a number of locking lugs 4b corresponding to the number of recesses 2a, the locking lugs being so shaped that they can be moved axially along the respective recesses 2a and, when the mount 4 is rotated, into the grooves 2d, 2c around the periphery of the lens carrier 2. In the camera housing 1 a cover blade 7 for protecting the camera lens externally when not in use is rotatably mounted about an axis 6. It is urged by a spring 8 towards the lens mount 4.

When the lens 3 is located in the position in which it is inoperative (as shown in the drawings), only the adjusting ring 5 projects from the camera case, and the blade 7 engages the slot 4a positioned in front of the composite lens 3 and covers up the lens. Each lug 4b therefore lies in the rear groove 2c of the lens mount carrier 2. The edge of the slot 4a is designed as a control cam 4c (see Figure 1), against which control cam an edge 7a of the blade lies.

To move the lens 3 into the position in which it can be used, the adjusting ring 5 shown in Figures 1 to 3 is first turned clockwise as seen in Figure 1. The locking lug or lugs 4b are initially moved along the grooves 2c. The control cam 4c co-acts with the edge 7a of the blade and moves the blade 7 out of the position in which the lens is covered, into a position out of the picture-taking ray path shown in Figure 1 with dot-dash lines where the edge 7a is finally positioned against the edge of the lens mount 4 and where the locking lug, or lugs, 4b have moved into the recess 2a. The lens mount 4 is now pulled out into the use position. Although the control cam 4c has disengaged the blade 7, the latter is, however, held clear of the ray path by the lens mount 4 itself. The operative position of the lens 3, which may for example be such that it is focussed on infinity, is attained when the locking lug, or lugs, 4b are able to engage the groove, or grooves, 2d. To lock the lens in its use position, it is turned anti-clockwise (as seen in Figure 1) so that the locking lug, or lugs, engage the groove, or grooves, 2d.

To return the lens 3 to the position in which it is not in use, it is first of all turned clockwise again so that the locking lug 4b disengages the groove 2d and moves into the recess 2a. The lens 3 is then pushed into the camera and finally, the locking lug 4b is rotated into the groove 2c again. In this position, the blade 7 is able to move into the slot 4a again under the action of spring 8 and cover up the lens 3 externally.

The camera shown in Figure 4 is similar

to that described with reference to Figures 1 to 3, except that the cover has two blades 9 and 10, and that it is driven by a pin 4e. The two blades are rotatable about an axis 6. The blades 9 and 10 may be urged under the action of springs 11 and 12 into a position in which the lens 3 is covered. A control arm 4d on the lens mount 4 is provided with a pin 4e. One edge 9a of the blade 9 and an arm 10a of the blade 10 lie against the pin 4e. If the lens mount 4 is turned anti-clockwise, out of the position shown in Figure 4, the blades 9 and 10 uncover the lens 3 and the lens mount 4. The lens may then be pulled in the manner described in connexion with Figures 1 to 3, out of the camera into the position in which it can be used. Alternatively, this lens could be a lens which is not to be pulled out of the camera for use but which when turned appropriately is merely uncovered by the protective shutter 9, 10 for use.

The camera shown in Figure 5 differs from that shown in Figures 1 to 3 in that the protective cover comprises a laterally displaceable blade 7. The single blade 7 is mounted not rotatably but displaceably, and a slidable arm secured to the blade can be pulled or pushed by the spring 8 into the position in which the lens is not used. When the lens mount is turned anti-clockwise, the cam 4c of the lens mount 4 pushes the slidable arm with the blade 7 out of the vicinity of the lens into the position indicated by dot-dash lines.

Of course, other embodiments are also possible in accordance with the invention. Thus with cameras having slidable film transport members that can be pulled and pushed relative to the camera, and rotation of the lens to displace the blades 7 or 9 and 10, respectively, could be derived from the film transport member for example by way of a toothed gearing.

A positive connection between the lens mount 4 and the blade or blades 7 or 9 and 10 would also be possible.

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1. A camera having an external lens cover comprising at least one blade capable of being moved out of the image-forming ray path for picture-taking, and the camera having control means on the lens or on the lens mount which so co-operates with the cover that the blade or blades can be moved out of the ray path by movement of the lens or the lens mount, respectively.

2. A camera as claimed in claim 1, wherein the blade or blades are spring-biased into the position covering the camera lens.

3. A camera as claimed in claim 1 or claim 2, wherein the lens mount has at least one opening in front of the lens and extending in a plane perpendicular to the optical axis



of the lens, the blade or blades being so positioned that they move through the opening or openings to cover the lens.

5 4. A camera as claimed in claim 3, wherein the lens mount is rotatable about the optical axis of the lens to move the blade or blades, and the control means is formed by an edge of an opening.

10 5. A camera as claimed in any one of claims 1 to 3, wherein the lens mount is rotatable about the optical axis of the lens to move the blade or blades, and the control means comprises an arm projecting from the lens mount and bearing a control pin.

15 6. A camera as claimed in any one of claims 1 to 5, wherein the lens is pulled out for use, and retracted when not in use.

20 7. A camera as claimed in claim 6, wherein the lens mount is rotatable about the optical axis of the lens when the lens is in its retracted position, to move the blade or blades.

25 8. A camera as claimed in claim 6 or claim 7, wherein the engagement between the lens mount and the carrier of the lens mount is by means of one or more projections on one of the parts that engages recesses on the other part, the recesses comprising two circumferentially-extending recesses spaced apart in an axial direction, corresponding to the retracted and pulled-out positions of the lens, and axially-extending

recesses joining the circumferentially-extending recesses to allow the lens to be moved between the pulled-out and retracted positions. 35

9. A camera as claimed in claim 8, wherein the projections are on the lens mount, and the recesses in the lens mount carrier.

40 10. A camera as claimed in any one of claims 7 to 9, wherein the blade or blades are so arranged that they are held out of the ray path by the exterior of the lens mount when the lens mount is pulled out.

45 11. A camera as claimed in any one of claims 6 to 10, wherein the lens mount has an adjusting ring which extends beyond the front face of the camera in the retracted position of the lens.

50 12. A camera as claimed in any one of claims 1 to 11, wherein the camera is a still camera.

55 13. A camera as claimed in any one of claims 1 to 11 wherein the camera is a cine camera.

14. A camera substantially as hereinbefore described with reference to, and as shown in, Figures 1 to 3, or Figure 4 or Figure 5, of the accompanying drawings.

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