MAGAZINE HAVING LATCH MEANS

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ABSTRACT
Magazine having a casing body and a cover plate and provided with latch means for preventing the cover plate from being inadvertently removed from the casing body. The latch means comprises a swingable lever pivoted to either one of the casing body and the cover plate at the inside thereof so as to be swung between the latching position and the unlatching position. The swingable lever is normally urged toward the latching position by a spring and is provided with a hook at its free end having an inclined outer edge with respect to the length of the swingable lever. A latch pin is secured to the other of the casing body and the cover plate at a position interior thereof. When the cover plate is fitted with the casing body, the outer edge of the hook slidably abuts against the latch pin so that the swingable lever is swung toward the unlatching position against the action of the spring and, after the latch pin slides over around the outer edge of the hook, the swingable lever is swung toward the latching position by the action of the spring so as to latch the latch pin by the hook thereby preventing the cover plate from being removed from the casing body. The swingable lever is provided with a magnetically operable portion so that the swingable lever can be swung toward the unlatching position to permit the cover plate to be removed from the casing body by moving a magnet located on the outer surface of the magazine so as to attract and move the magnetically operable portion toward the unlatching position of the swingable lever.

2 Claims, 7 Drawing Figures
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MAGAZINE HAVING LATCH MEANS

BACKGROUND OF THE INVENTION

The present invention relates to a magazine having latch means for preventing the cover plate thereof from being inadvertently removed from the casing body of the magazine.

In the prior art magazine, the cover plate tends to be inadvertently removed from the casing body of the magazine after unexposed film is loaded therein thereby damaging the unexposed film.

Further, in the prior art magazine, the magazine having been used for the exposure might be inadvertently opened in the daylight thereby damaging the scene taken in the exposed film.

The present invention aims at avoiding the above described disadvantages of the prior art magazine.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a novel and useful magazine in which the cover plate is positively prevented from being inadvertently removed from the casing body of the magazine once the cover plate is fitted with the casing body after an unexposed film is loaded therein.

Another object is to provide a novel and useful magazine in which the inadvertent reloading of the film is positively prevented after the magazine has been used for the exposure thereby avoiding the damage of the scene taken in the exposed film.

In order to achieve the above objects, the magazine is provided in accordance with the characteristic feature of the present invention with at least a latch means for latching the cover plate to the casing body, the latching means comprising a swingable lever pivoted to either one of the casing body and the cover plate at the inside thereof and having a hook at its free end with the outer edge thereof inclined with respect to the length of the swingable lever, the swingable lever being swingable between the latching position and the unlatching position and urged toward the latching position by a spring, and a latch pin secured to the other of the casing body and the cover plate, the latch pin abutting against the inclined outer edge of the hook when the cover plate is fitted with the casing body so as to swing the swingable lever toward the unlatching position against the action of the spring and, after the latch pin slides over around the outer edge, to swing the swingable lever toward the latching position by the action of the spring thereby latching the latch pin by the hook of the swingable lever.

The swingable lever may be provided with a magnetically actuable portion so that the swingable lever can be swung toward the unlatching position by magnetically attracting the magnetically actuable portion by a magnet from the exterior of the magazine thereby permitting the cover plate to be removed from the casing body.

In accordance with another feature of the present invention, the magazine is adapted to be used with a photographing device having a magazine loading plate provided with a through-hole through which an actuating pin is projected to the exterior of the loading plate each time the photographing device is operated to load the magazine in position on the loading plate. The magazine is provided with a through-hole in the bottom wall thereof at a position to receive the actuating pin when the magazine is loaded in position on the loading plate, a leaf spring member secured at its one end to the inner surface of the bottom wall of the magazine so as to be resiliently urged to close the through-hole in the bottom wall by the free end of the leaf spring member, a swingable lever swingably pivoted to the inner surface of the bottom wall of the magazine close thereto at a position adjacent to the leaf spring substantially in parallel thereto and swingable between the position to close the through-hole in the bottom wall of the magazine and the position to uncover the through hole, the swingable lever being normally urged by a spring to be swung toward the position to close the through-hole but abutting against the leaf spring member so as to be held spaced from the through-hole of the magazine, the swingable lever being disengaged from the leaf spring member and moved to close the through-hole of the magazine when the magazine is removed from the loading plate of the photographing device after it has been loaded in position on the loading plate by virtue of the fact that the actuating pin projecting through the through-hole into the magazine when the same is loaded urges the leaf spring member so as to be spaced from the bottom wall of the magazine and to disengage the same from the swingable lever so that the swingable lever is swung to abut against the actuating pin, and, after the actuating pin is retracted when the magazine is unloaded, the swingable lever is swung to close the through-hole thereby positively preventing the magazine from being reloaded in position on the loading plate because the swingable lever covering the through hole of the magazine prevents the actuating pin from passing through the through-hole of the magazine during the reloading operation of the photographing device.

The swingable lever may be provided with a magnetically actuable portion permitting the swingable lever to be returned to its initial position abutting against the leaf spring member by attracting the magnetically actuable portion by a magnet from the exterior of the magazine so that the magazine can be again loaded in position on the loading plate.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view partly in section showing an embodiment of the magazine constructed in accordance with the present invention;

FIG. 2 is a side view partly in section showing the magazine shown in FIG. 1;

FIG. 3 is a view taken along line III — III in FIG. 1; and

FIG. 4 shows various positions of the actuating pin of the photographing device cooperating with the magazine of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2, the magazine 2 comprises a casing body 3 and a cover plate 3' fitted with its side walls with the casing body 3. The casing body 3 and the cover plate 3' are made of a material such as non-ferrous metal or plastic material. In the conventional manner, the magazine 2 is provided with film reel driving shafts L adapted to mount thereon film reels and film guide rollers R about which the film F is guided for the exposure. In FIG. 1, the magazine 2 is shown as
being mounted on the magazine loading plate 1 of a photographing device to be described later.

In accordance with the characteristic feature of the present invention, a swingable or pivotally lever 4 is swingably mounted on the inner surface of the side wall of the casing body 3 by a pivot pin 5 secured to the side wall of the casing body 3. The swingable lever 4 has two arms extending from the pivot point of the lever 4 at an angle to each other. A hook 4a is formed at the tip of one arm of the lever 4 while a magnetically actuable portion 4b is provided near the tip of another arm. The outer edge of the hook 4a is inclined, the operation of which will be described later.

A latch pin 3'a is secured to the side wall of the cover plate 3'. A slit 3e is formed in the side wall of the casing body 3 so that the pin 3'a is slidably received in the slit 3e when the cover plate 3' is fitted with the casing body 3.

The swingable lever 4 is normally urged toward the latching position, i.e., in the direction so as to engage the hook 4a with the latch pin 3'a when the cover plate 3' is fitted with the casing body 3 by a spring 6 wound around the pivot pin 5, one arm of which spring abuts against the bottom wall of the casing body 3 while the other arm of the spring 6 is engaged with the arm of the swingable lever 4. In order to prevent the swingable lever 4 from swinging beyond the latching position of the hook 4a, a stopper pin 6a is secured to the side wall of the casing body 3. The inclined outer edge of the hook 4a serves to swing the swingable lever 4 toward the unlatching position, i.e., in the direction opposite to the direction in which the lever 4 is urged by the spring 6 when the latch pin 3'a abuts against the outer edge of the hook 4a during the fitting of the cover plate 3' with the casing body 3.

Two or more swingable levers 4 and the corresponding latch pins 3'a may be provided in the side walls of the casing body 3 and the cover plate 3'.

Further, the swingable lever 4 may be mounted on the cover plate 3' and the latch pin 3'a may be secured to the casing body 3.

In operation, when the cover plate 3' is fitted on the casing body 3, the latch pin 3'a is slidably received in the slit 3e and abuts against the inclined outer edge of the hook 4a of the swingable lever 4 so as to swing the lever 4 toward the unlatching position, and, after the pin 3'a slides over around the outer edge of the hook 4a, the swingable lever 4 is swung toward the unlatching position by the action of the spring 6 so that the pin 3'a is latched by the hook 4a thereby positively preventing the cover plate 3' from being inadvertently removed from the casing body 3.

In order to remove the cover plate 3' from the casing body 3, it is only necessary to bring a magnet from the exterior of the magazine to a position to attract the magnetically actuable portion 4b of the lever 4 and move the magnet in the direction so as to swing the lever 4 toward the unlatching position thereby permitting the cover plate 3' to be removed from the casing body 3.

The magnetically actuable portion 4b may be replaced by any means insofar as the swingable lever 4 can be moved toward the unlatching position from the exterior of the magazine.

In accordance with another feature of the present invention, the magazine 2 is provided with substantially rectangular raised portions at the bottom wall of the casing body 3. As shown in FIGS. 1 and 3, the raised portion is formed by a bottom wall 14a and side walls 14. A cover plate 36 is secured to the bottom wall of the casing body 3 so as to close the hollow space formed by the raised portion.

One of the raised portion is provided with a through-hole 18 at its bottom wall 14a. An elongated leaf spring member 15 is secured at its one end to the inner surface of the bottom wall 14a of the raised portion by a rivet 16 and a round headed pin 17 is secured to the free end of the leaf spring member 15. The leaf spring member 15 is normally urged by its resilient nature to closely contact with the inner surface of the bottom wall of the raised portion so that the round headed pin 17 is received in the through-hole 18 as shown in FIG. 3.

A swingable lever 20 is swingably mounted on the inner surface of the bottom wall 14a of the raised portion at its intermediate portion adjacent to the leaf spring member 15 by a pivot pin 19. One end 20a of the lever 20 is located close to the bottom wall 14a while the other end 20b is offset from the plane of the lever 20 by the stepped portion 20c so that the end 20b lies adjacent to the cover plate 36. The end 20b is provided with or made of a magnetically actuable material such as iron so that the end 20b can be attracted and moved by a magnet located at the upper surface of the cover plate 36 after the film reels are removed from the magazine. The lever 20 is urged in the clockwise direction as seen in FIG. 1 by a spring 21 wound around the pin 19, one end of which abuts against the side wall 14 of the raised portion while the other end is engaged with the stepped portion 20c of the lever 20, so that the end 20a abuts against the free end of the leaf spring member 15, and, as described later, when the free end of the leaf spring member 15 is moved apart from the bottom wall 14a, the end 20a of the lever 20 is disengaged from the leaf spring member 15 and moved to close the through-hole 18. A stopper pin 38 secured to the bottom wall 14a serves to prevent the lever 20 from swinging beyond the position at which the end 20a closes the through-hole 18.

The photographing or camera device adapted to be used with the above described magazine of the present invention comprises a magazine loading plate 1 as shown in FIG. 3.

A through-hole or through-aperture is provided in the magazine loading plate 1 at a position corresponding to the through-hole 18 of the magazine 2 when it is properly loaded on the loading plate 1. A bush 22 having a through-hole is secured to the through-hole of the plate 1 and an actuating pin 23 having a head 23a is slidably fitted in the through-hole of the bush 22 and urged downwardly by a compression spring 24 provided around the bush 22 between the loading plate 1 and the head 23a of the pin 23 so that the upper end of the pin 23 is normally retracted in the plate 1 as shown in FIG. 4(a).

A lever 25 is swingably supported at its intermediate portion by a pin 27 secured to a bracket 26 which is in turn secured to the loading plate 1 by rivets 26a as shown in FIG. 3. A bent portion 28 formed at one end of the lever 25 is adapted to urge the pin 23 upwardly when the lever 25 is swung in the anticlockwise direction as seen in FIG. 3, so that the upper end of the pin 23 is projected from the loading plate 1 so as to be received into the through-hole 18 of the magazine 2 loaded in position on the loading plate 1.
A sleeve 29 is secured at its lower end to the loading plate 1. The upper end of the sleeve is formed with internal thread for receiving a screw 35 having a thin lower end portion 35a which is screwed into the internal thread of the sleeve 29 when the magazine is to be properly loaded in the photographing device. An actuating piece 30 having an upper reduced diameter portion 30a and a lower reduced diameter portion 30b is slidably fitted in the sleeve 29. The lower reduced diameter portion 30b of the actuating piece 30 slidably passes through a hole formed in a bent portion 34 provided at the other end of the lever 25 and is prevented from being withdrawn from the bent portion 34 by a split ring 33 secured at the lower end of the lower reduced diameter portion 30b of the actuating piece 30.

A relatively strong compression spring 31 is located around the lower reduced diameter portion 30b between the actuating piece 30 and the bent portion 34 of the lever 25 with a washer 32 located between the spring 31 and the bent portion 34.

In operation, when the screw 35 is screwed into the internal thread of the sleeve 29 for properly loading the magazine in the photographing device after the magazine 2 is located on the loading plate 1, the lower end portion 35a of the screw 35 urges the actuating piece 30 downwardly so that the lever 25 is swung in the anticlockwise direction through the interposition of the spring 31. Thus, the bent portion 28 urges the actuating pin 23 upwardly against the action of the spring 24, so that the upper end of the pin 23 moves into the through-hole 18 of the magazine to abut against the round headed pin 17 to thereby urge the leaf spring member 15 upwardly apart from the bottom wall 14a as shown in FIG. 4(b) wherein the end 20a of the lever 20 is disengaged from the leaf spring member 15 and abuts against the pin 23 by the action of the spring 21.

When the magazine is removed from the photographing device after exposure of the film therein has been effected, the screw 35 is removed from the sleeve 29 so that the lever 25 is made freely swung in the clockwise direction as seen in FIG. 3. Thus, the pin 23 is retracted from the through-hole 18 of the magazine by the action of the spring 24 so that the end 20a of the lever 20 abuts against the round headed pin 17 of the leaf spring member 15 (FIG. 4(c)) and then the end 20a slides around the head of the pin 17 by virtue of the rounded shape of the head of the pin 17 so that the leaf spring member 15 is raised and the outer end 20a of the lever 20 is brought to the position closing the through-hole 18 of the magazine (FIG. 4(d)). In this position, the pin 23 is prevented from projecting through the through-hole 18 into the interior of the raised portion of the magazine, therefore, reloading of the magazine in the photographing device is positively prevented.

In order to allow the magazine to be reloaded in the photographing device, a magnet is brought adjacent to the magnetically actuable end 20b of the lever 20 after the film reels are removed so as to attract the end 20b. By moving the magnet in the direction so as to swing the lever 20 in the anticlockwise direction as seen in FIG. 1, the end 20a is disengaged from the leaf spring member 1 so that the leaf spring member 15 is urged to contact with the bottom wall 14a by the resilient nature thereof and the round headed pin 17 is received in the through-hole 18, while the end 20a of the lever 20 is urged to abut against the leaf spring member 15 (FIG. 4(a)).

Therefore, the pin 23 is permitted to be received into the through-hole 18 so that the magazine can be again loaded in the photographing device.

As described above, the magazine of the present invention positively prevents the magazine from being inadvertently reloaded before the exposed film is replaced by an unexposed film thereby avoiding the damage of the scene taken on the exposed film.

The magnetically actuable portion 20b may be replaced by any means insofar as it can move the lever from the exterior of the cover plate 38 closing the raised portion of the magazine.

I claim:
1. A camera device comprising in combination:
a loading plate;
a magazine having a casing body with a bottom wall and a cover plate detachably latched to said casing body;
latch means pivotally associated with the interior of said cover plate, said means being selectively movable between a latching position and an unlatching position;
said magazine being operatively supported on said loading plate;
said loading plate provided with a first through-aperture therein;
an actuating pin movably located in said aperture;
said actuating pin being selectively movable to project from said aperture when said camera device is being operated to load said magazine in position on said loading plate and to retract into said aperture when said camera device is being operated to remove said magazine from said camera device;
a second through-aperture formed in said bottom wall and concentrically positioned with said first aperture to receive said actuating pin therethrough when said camera device is being operated to load said magazine in position on said loading plate;
an elongated leaf spring member being secured at one end to the inner surface of said bottom wall and being resiliently urged against said bottom wall to cover said second aperture of said magazine at its free other end;
a swingable lever pivotally supported on the inner surface of said bottom wall close thereto at the position adjacent to said leaf spring member substantially in parallel therewith and selectively swingable between the position to cover said second aperture of said magazine with said secured end and a position spaced apart from said second aperture;
a stopper secured to the inner surface of said bottom wall for preventing said swingable lever from being swung beyond said position to cover said second aperture with said secured end thereof;
and a spring operably coupled with said swingable lever and urging said secured end thereof in the direction to cover said second aperture of said magazine, said secured end of said swingable lever normally abutting against said free end of said leaf spring member so as to be held apart from said second aperture of said magazine, said leaf spring member being provided with a rounded projection at said free end thereof which is normally received.
in said second aperture of said magazine, thereby permitting said secured end of said swingable lever to be disengaged from said leaf spring member and adapted to be moved to cover said second aperture of said magazine so as to prevent said magazine from being reloaded in said camera device once said magazine has been removed therefrom by virtue of the fact that said leaf spring member is moved apart from said bottom wall of said magazine to clear a space therebetween by the abutment of said leaf spring member against said actuating pin received and protruded through said second aperture into the interior of said magazine when said camera device is being operated to load said magazine in position therein so that said secured end of said swingable lever is moved into said space to be held by said actuating pin and again moved to slide over said rounded projection and to cover said second aperture of said magazine after said camera device is operated to unload said magazine so as to retract said actuating pin into said first aperture of said loading plate.

2. A camera device in accordance with claim 1, wherein said casing body of said magazine includes side walls extending perpendicular to said bottom wall and said cover plate includes a top wall and side walls extending perpendicular to said top wall, said side walls of said cover plate being detachably associated with said side walls of said casing body so as to define the configuration of said magazine whereby the detachment of said cover plate from said casing body permits the replacement of film therein.

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