Feb. 26, 1963 S. BARBIERI 3,079,490

FLASH LAMP UNIT

Filed March 21, 1961 2 Sheets-Sheet 1

Fig. 1.

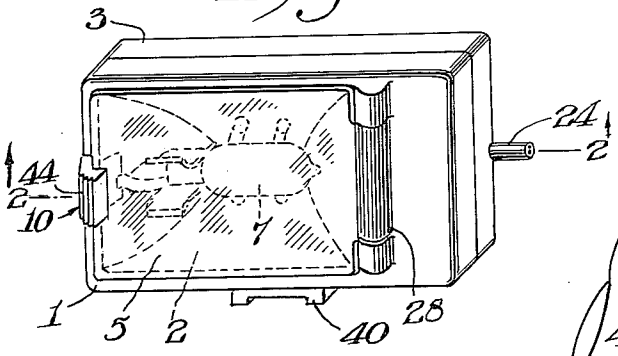

Fig. 2.

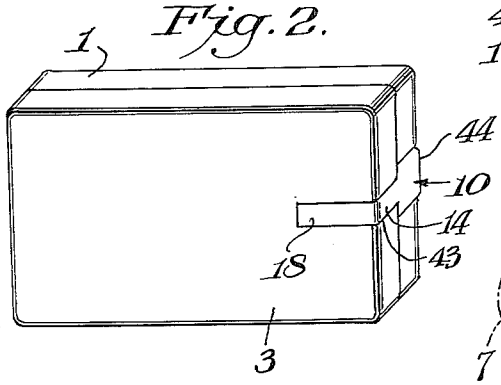

Fig. 3.

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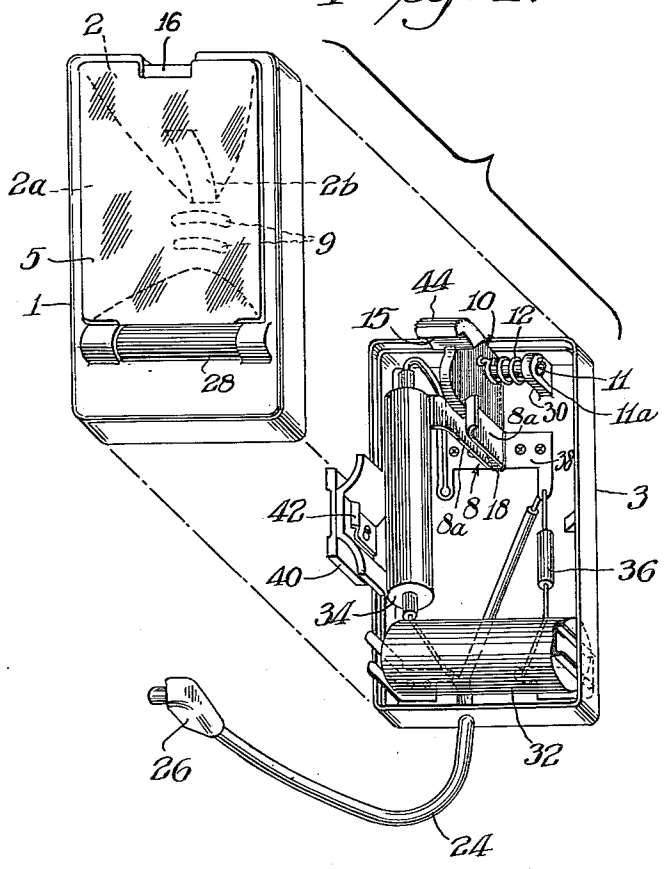
Fig. 4.



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FLASH LAMP UNIT

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This invention relates to a flash lamp unit in which a protective transparent plate is positioned in front of the flash lamp, and it more particularly relates to such a unit which automatically moves its protective plate out of the path of the flash lamp when it is ejected.

Flash lamps or bulbs used in photography often explode flinging splinters of glass all about. The manufacturers of these flash lamps, therefore, recommend that a protective shield be positioned in front of the bulb to prevent the splinters from flying if it should explode. However, most existing flash bulb units do not provide protective plates of this sort, and those that do require that they be removed by hand before the used flash lamp can be injected.

An object of this invention is to provide a flash lamp unit having a protective plate in front of the flash lamp which is automatically moved out of the way when the flash bulb is ejected.

Another object is to provide such a unit which is relatively simple and economical to manufacture.

In accordance with this invention a transparent door is movably mounted upon the unit in front of the reflective recess within which the flash bulb is inserted. An ejector is mounted upon the casing adjacent the flash lamp socket by a translating means for movement through the socket to eject the flash lamp. A linking means connects the ejector to the driving means which reacts between the door and the casing for moving it away from the opening. This causes the driving means to automatically move the door out of the path of movement of a flash lamp when the ejector is actuated. The driving means is conveniently provided by a spring which reacts between the door and the casing, and a latch connects the door to the ejector which releases it when actuated. The latch and ejector may be combined in a unitary actuating element which includes a latching arm and an ejecting arm.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIGS. 1 and 2 are respectively front and rear perspective views of one embodiment of this invention;

FIG. 3 is a cross-sectional view taken through FIG. 1 along the line 2—2; and

FIG. 4 is an exploded view of parts of the embodiment shown in FIGS. 1, 2 and 3.

In FIGS. 1–3 is shown a flash lamp unit including a casing having a front section 1 and a rear portion 3. As shown in FIG. 3, reflector section 2, which forms an inner surface of the casing and a wall of recess 2*a*, is secured to front housing portion 1. Transparent plate 5, which is for example formed of a strong acrylic plastic, is movably or rotatably mounted about the axis of rotation provided by shaft 4. Plate or door 5 covers the open side of the casing communicating with recess 2*a*. A driving means, such as torsion spring 6, reacts between door 5 and the casing for moving door 5 away from the opening in front of recess 2*a*. A socket means 8 including a pair of leaf springs 8*a* is mounted within recess 2*a* to provide a means

for holding flash lamp 7 and for providing electric current to it.

An ejector 10 is mounted upon the casing adjacent socket 8. Ejector 10 is rotatably mounted about the axis of rotation of shaft 11, and a torsion spring 12 urges it into the closed or latched position shown in FIGS. 1, 2 and 3 in solid outline. Shaft 11 and its associated bearing 11*a* shown in FIGS. 3 and 4 constitutes a means for translating the ejector through socket 8 for ejecting a flash lamp 7 therefrom. Arm 14 of ejector means 10 includes a hook 15 which engages a correspondingly formed indentation 16 at the end of door 5 for inactivating spring 6 which urges door 5 into the opened position indicated in broken outline in FIG. 3. Door 5 accordingly constitutes a linking means which connects ejector 10 with driving spring 6.

Ejector 10 includes latching arm 14 and an ejecting arm 18 to form a unitary actuating element made in the form of an L-shaped lever. Ejecting arm 18 incorporates a pair of reference surfaces 20 and 22 disposed substantially at right angles to each other. In the latched condition of ejector 10 surfaces 20 and 22 are arranged between prongs 8*a* for locating the base of flash lamp 7 between them in position for ignition and subsequent ejection.

In FIG. 3 flash lamp 7 is shown in solid outline in the firing position with its base located by surfaces 20 and 22 in front of ejector 10 shown in solid outline. The side of flash lamp 7 rests against ribs 9 which extend from the rear of the concavely formed wall of reflector 2. An electrical cable 24 extends into the interior of the rear casing half 3 for connecting the flash lamp unit to a camera (not shown) through a plug 26 shown in FIG. 4.

FIG. 4 shows upper casing half 1 including door 5 which is rotatably mounted upon it by means of a hinge 28 to which is attached concave reflector 2 which forms a wall of recess 2*a*. The surface of reflector 2 directed toward the opening closed by door 5 is reflectively coated, such as by aluminum plating it. Indentation 16 upon the end of door 5 is shown in FIG. 4 as well as the cooperating hooked tip 15 of lever 10 in connection to rear casing portion 3. FIG. 4 also shows the details of ejector 10 including latching arm 14 and ejecting arm 18 which pass between the prongs 8*a* of socket 8. Ejector 10 is urged into the latched position by torsion spring 12 which is mounted over shaft 11 of ejector 10 and reacts between bearing post 30 and the side of ejector 10 to urge it into the latched position.

The electrical portions of the apparatus are also shown in FIG. 4, and they include a battery 32, which is for example a fifteen volt dry cell, and a capacitor 34 rated at for example 100 μ F. A resistor 36 is also included within the electrical circuit, which is connected to the base 38 of prongs 8. These electrical aspects will not be further described because very many conventional electrical circuits are operative of this device.

A mounting flange 40 is connected to the side of rear casing portion 3 to provide means for connecting the flash lamp unit to a camera, (not shown) in a conventional manner. A spring clip 42 is mounted within mounting flange 40 for detachably securing casing portions 1 and 3 together. Reflector 2*a* as shown in FIG. 4 also includes a slot 2*b* through which ejector 10 moves to eject a flash lamp from socket 8.

In the closed condition the arms 14 and 18 of ejector 10 as shown in FIG. 2 are aligned with the rear and end walls of the casing. The rear end of casing halves 1 and 3 therefore incorporates slot 43 shown in FIG. 2 which receives lever 10. The front end 44 of lever arm 14 is formed as shown in FIGS. 1 and 3 to provide a protuberance which is knurled to provide a means for grasping lever 10 to operate it.

Operation

FIG. 3 shows in solid outline the position of flash lamp 7 inserted within socket 8 and resting against reference surfaces 9. The base of lamp 7 is located between stop surfaces 20 and 22 of ejecting lever 10. In this position door 5 is maintained latched closed and transmits the latching effect of hook 15 of lever 10 to inactivate the driving force of torsion spring 6 which is reacting at hinge 28 against door 5.

After flash bulb 7 has fired, lever 10 is grasped at tip 44 by a finger of the operator, as shown in FIG. 3, and rotated to the position shown in broken outline. As lever 10 is rotated ejecting arm 18 moves through prongs 8a and ejects flash bulb 7 in the manner shown in broken outline in FIG. 3. However, lever 10 in its initial phase of movement releases its hook 15 from latching surface 16 of door 5 to allow driving spring 6 to fiing door 5 suddenly open to the broken outline position shown in FIG. 3. This autmatically moves door 5 out of the path of flash lamp 7 as it is being ejected. Spring 12 then snaps lever 10 back to its latching position after it released for engaging door 5 when it is manually rotated into the closed position. Before door 5 is closed, a new flash lamp 7 is inserted into socket 8. The inclined surface 46 at the tip of end 44 of lever 10 permits door 5 to shove lever 10 aside against the force of spring 12 to engage indentation 16 within hook 15.

Door 5 is accordingly opened, and a spent flash lamp 7 ejected by actuation of a single element, namely lever 10. After a fresh flash lamp 7 is inserted into socket 8, only a simple pushing effort is required to reclose and lock door 5 in preparation for igniting lamp 7.

What is claimed is:

1. A flash lamp unit comprising a casing enclosing a recess, a side of said housing adjacent said recess including an opening through which said recess is exposed, the inner surface of said casing forming a wall of said recess which is directed toward said opening, said wall being reflective, socket means having a space within it mounted within said recess to provide a means for holding a flash lamp, a transparent door for substantially covering said opening, movable means mounting said transparent door upon said casing for movement in front of and away from said opening, driving means reacting between said door and said casing for moving it away from said opening, ejector means mounted upon said casing adjacent said socket, translating means mounting said ejector upon said casing for movement through said space within said socket means for ejecting a flash lamp therefrom, and a linking means connecting said ejector to said driving means for activating said driving means to move said door away from said opening out of the path of movement of a flash lamp being ejected from said socket by said ejector when it is actuated.

2. A unit as set forth in claim 1 wherein said driving means comprises a resilient means which reacts between said door and said casing in a direction to move it away from said opening, said linking means comprises said door, and latching means connecting said door to said ejector means for holding said door in front of said opening and releasing said door and activating said resilient driving means to open said door when said ejector is actuated to eject a flash lamp.

3. A unit as set forth in claim 2 wherein said movable means mounting said transparent door upon said casing comprises rotatable means disposed remote from said ejector, and said ejector includes said latching means.

4. A unit as set forth in claim 3 wherein said ejector comprises a lever, including ejecting and latching arms which respectively constitute said ejector and said latching means, said translating means mounting said ejector upon said casing comprising a pivot, a catch being mounted upon said door, and said lever being arranged to alternately cause said ejecting arm to move through said space in said socket and said latching arm to engage said door.

5. A unit as set forth in claim 4 wherein said socket means includes a pair of substantially parallel prongs extending outwardly from said surface, and said ejector being rotatably mounted to move outwardly between said prongs.

6. A unit as set forth in claim 4 wherein said socket comprises a pair of prongs extending from said recess parallel to the path of movement of said ejecting arm, said ejecting arm including a pair of surfaces disposed at right angles to each other, and said surfaces being arranged between said prongs adjacent the rear and side of said recess for locating said base of said flash lamp between said prongs in position for ignition and subsequent ejection.

7. A flash lamp unit comprising a casing including a recess, a side of said casing adjacent said recess including an opening through which said recess is exposed, the inner surface of said casing forming a wall of said recess which is directed toward said opening being reflective, a transparent door for substantially covering said opening, rotatable means mounting said transparent door upon said casing for movement substantially covering and exposing said opening, resilient means reacting between said door and said casing for urging said door into the opened position, socket means mounted within said recess said socket means having a space within it for holding a flash lamp, an ejector mounted upon said casing adjacent said socket, movable means mounting said ejector upon said casing for movement through said space within said socket for ejecting a flash lamp from it, a latching means upon said casing for engagement with said door for locking it in the closed position, translating means mounting said latching means upon said casing for movement into and out of engagement with said door, and a coupling connecting said ejector with said latching means for disengaging it from said door to cause it to open when said ejector is actuated to eject said flash lamp.

8. A unit as set forth in claim 7 wherein said latching means and said ejector are combined in a unitary actuating element, said movable means comprising rotatable means mounting said unitary element upon a rear corner of said casing said translating means also comprising said movable means, said unitary element including a latching arm and an ejecting arm, said latching and ejecting arms being respectively disposed substantially in line with side and rear surfaces of said casing, when said door is latched and said ejecting arm is in the ready condition, said latching arm including a catch which engages said door, and said ejecting arm being movable through said socket means to eject said flash lamp when said latching arm is disengaged from said door to cause it to open.

9. A unit as set forth in claim 8 wherein said unitary actuating element comprises an L-shaped lever with said latching arm disposed in line with an end of said casing, and said ejecting arm being disposed in line with the rear of said casing in the ready condition.

10. A unit as set forth in claim 9 wherein said ejecting arm includes locating and ejecting surfaces which are disposed at right angles to each other, said locating surface being disposed substantially in the direction of movement of said ejecting means through said space within said socket means to provide a stop for locating a flash lamp in said space within said socket means, and said ejecting surface being disposed in back of the position in which a flash lamp is held in said space within said socket.

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