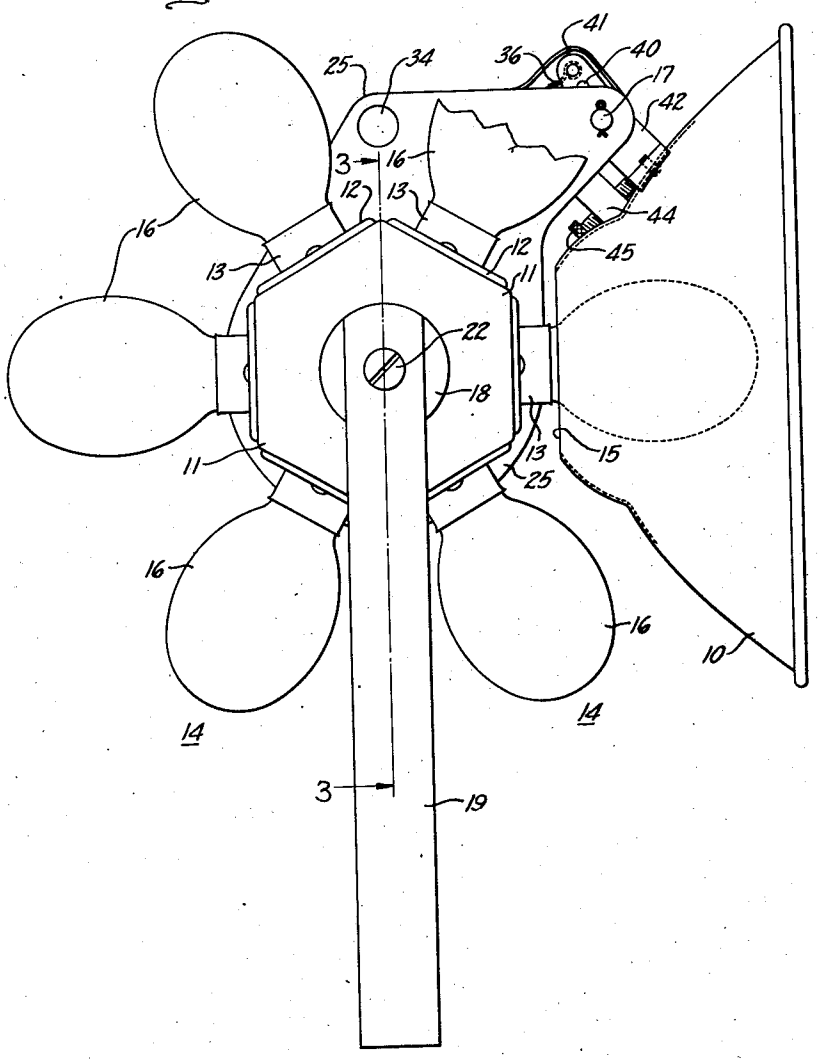
Oct. 1, 1946. J. J. MALLOY 2,408,469

MULTIFLASH LAMP DEVICE

Filed Nov. 1, 1943 2 Sheets-Sheet 1

Fig. 1.



Inventor:
John J. Malloy,
by John H. Anderson
His Attorney.

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Filed Nov. 1, 1943 2 Sheets-Sheet 2

Fig. 2.

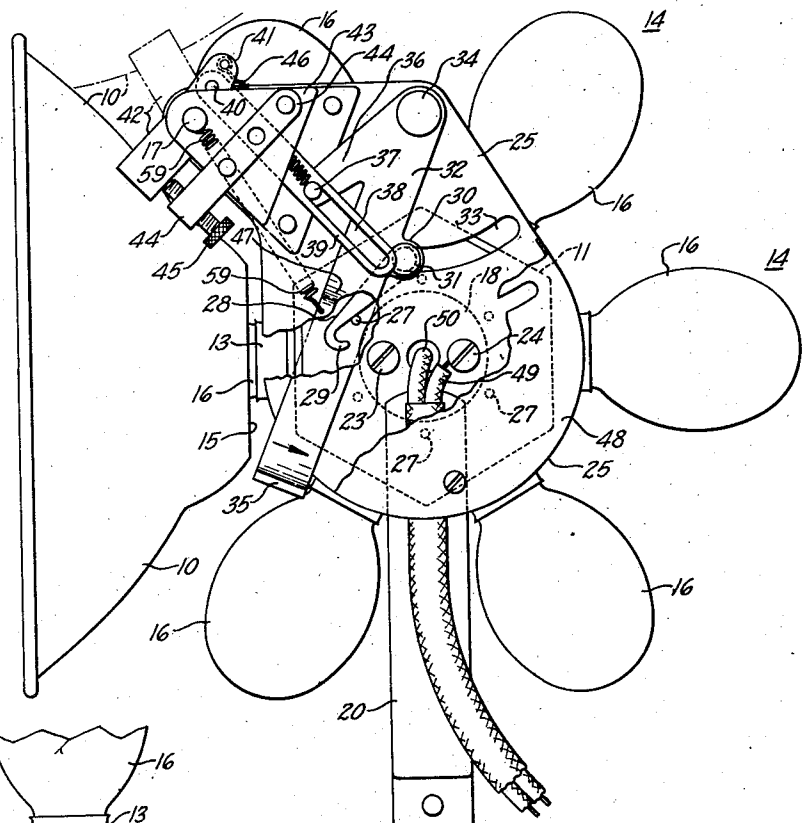
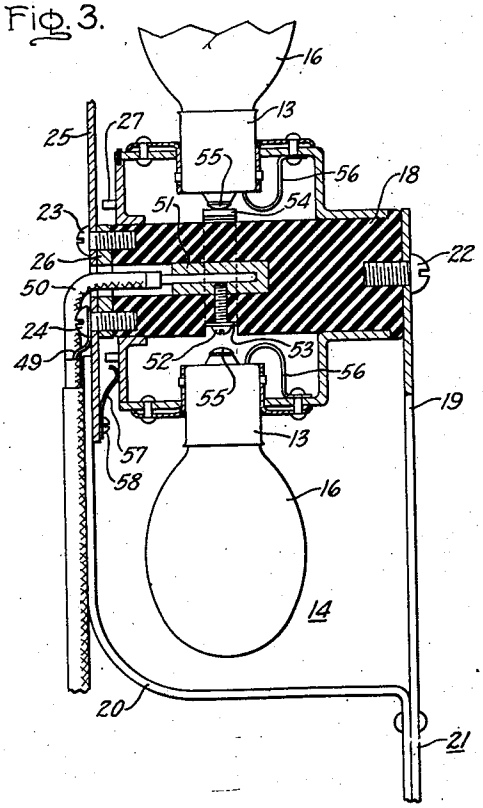


Fig. 3.



Inventor:
John J. Malloy,
by John H. Anderson
His Attorney.

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MULTIFLASH LAMP DEVICE

John J. Malloy, Cleveland Heights, Ohio, assignor to General Electric Company, a corporation of New York

Application November 1, 1943, Serial No. 508,480

8 Claims. (Cl. 240—37)

1

My invention relates to illuminating apparatus for photographic purposes and its principal object is to provide an apparatus or device of this kind accommodating a plurality of flash lamps and capable of emitting a number of flashes of light in rapid succession to enable a photographer to take a series of pictures in a short time. Further objects and advantages of the invention will appear from the following detailed description of species thereof and from the appended claims.

In the drawings accompanying and forming part of this specification, a species of my invention is shown in which Fig. 1 is a side elevational view of the multiflash lamp device; Fig. 2 is a similar view of the device rotated 180° and Fig. 3 is a fragmentary sectional view along the line 3—3 of Fig. 1.

Referring to Fig. 1 of the drawings, my multiflash lamp device comprises a reflector 10 and lamp supporting means 11 mounted for rotation about an axis substantially normal to the axis of the reflector 10 when the reflector is in a lamp enclosing position. The lamp support or rotary holder 11 is provided with a plurality of sockets 12 suitable for accommodating the bayonet bases 13 of a like number of flash lamps 14 which lamps are supported by said holder 11 with their axes radially disposed to the axis of rotation of the holder. The reflector 10, which is preferably of the parabolic type, has a circular opening, indicated at 15, at the vertex thereof which is slightly larger in diameter than the largest outside diameter of the lamp bulbs 16. The reflector 10 is movable in a circular arc about the pivot 17 which is located in a plane normal to the axis of the lamp 14 enclosed by the reflector 10, and which plane intersects said lamp axis between the lamp base 13 and the largest diameter part of the lamp bulb 16. Thus, the reflector 10 may be moved from its normal lamp enclosing position to a position, indicated in dot-dash lines in Fig. 2, in which it is out of the path of movement of the lamps 14 as the latter are advanced successively by the rotary holder 11 into position to be enclosed by the reflector 10 when the latter is returned to its normal position, shown in full lines in Figs. 1 and 2.

The flash lamps 14 removably mounted in the rotary holder sockets 12 comprise a readily combustible material and a supporter of combustion contained in the light transmitting lamp bulb 16. Such lamps are manufactured in large numbers and one species thereof comprising a readily combustible, loosely arranged material filling the bulb is disclosed in U. S. Patent 2,306,563, issued

2

December 29, 1942, to Marvin Pipkin. Another species of flash lamp comprise a compact body of combustible material supported in the bulb and is disclosed in U. S. Patent 2,291,983, issued August 4, 1492, to Marvin Pipkin. Both types of lamps may be used with my multiflash device for producing flashes of actinic light useful for photographic purposes.

As shown in Fig. 3 of the drawings, the rotary lamp holder 11 is mounted for rotation on an axle 18 of electrically insulating material which is immovably supported by the two arms 19 and 20 of the carrier or support 21 by the bolt 22 at the end thereof supported by arm 19 and the two spaced bolts 23 and 24 which pass through support plate 25, which plate 25 is bolted to the arm 20. Interposed between the axle 18 and the plate 25 is a metal washer 26. The rotary holder 11 has projections or pins 27 thereon equal in number to the lamp sockets, and extending in the direction of the plate 25. A pawl 28 (Fig. 2) is disposed between the holder 11 and the plate 25 and is provided with a hooked end portion 29 for engaging the pins 27 when the pawl 28 is moved in a direction away from the reflector 10. Part of plate 25 is broken away in Fig. 2 to show portion 29 of pawl 28 and a pin 27. The opposite end 30 of the pawl 28 is pivoted on the rod 31 secured to the lever arm 32 and passing through the slot 33 in the plate 25. The pawl 28 rests against one of the pins 27 with the hooked end 29 thereof spaced an appreciable distance from the pin 27 on which it rests when the various parts of the device are in the position shown in Figs. 1 and 2 with the reflector 10 enclosing a lamp 14.

The lever arm 32 is pivoted at 34 on the plate 25 so as to be movable in a circular arc in the direction indicated by the arrow (Fig. 2). The movement of arm 32 in the direction of the arrow and in the opposite direction is limited by the ends of arcuate slot 33 in plate 25. The arm 32 is provided with a handle 35 normal thereto.

The pivoted end of arm 32 has a projection 36 extending at an acute angle thereto which projection 36 has a pin 37 engaging with a slot 38 in the connecting rod 39 which is pivoted at 40 on the end portion 41 of reflector support member 42. The member 42 is pivoted at 17 between its end portion 41 and the reflector 10 and is disposed between the plate 25 and the support bracket 43 secured to plate 25. The pivot pin 17 is supported by bracket 43 and plate 25. A stop 44 provided with an adjustable set-screw 45 is attached to bracket 43 for supporting re-

flector 10 in proper position about the lamp 14. A spring 46 is attached to end 41 of support 42 at a point on the far side of pivot 40 from pivot 17. The opposite end of the spring 46 is attached to the free end of pin 37 on projection 36 of arm 32.

The arm 32 has an outwardly curving portion 47 which passes through an arcuate slot in the cover 48 (shown broken away in Fig. 2) attached to plate 25. Thus, handle 35 on arm 32 is accessible for manual manipulation.

As shown in Fig. 3 the insulated wires 49 and 50 for connecting the apparatus to a source of electrical energy, such as a battery of cells, suitable for igniting the lamps 14 are attached, respectively, to the bolt 24 and to the metal sleeve 51 disposed in a cavity in the axle 18. The sleeve 51 and the exposed portion of wire 50 are held in place in axle 18 by the set screw 52 which also holds the spring contact 53 in place and connects it electrically to the wire 50. The spring contact 53 extends partially around the axle 18 and the free end portion 54 thereof engages only with the center contact 55 of the bayonet base 13 of that lamp 14 enclosed by the reflector 10. Thus, the free end, base contact engaging portion 54 of contact 53 is disposed so as to intersect the prolongation of the reflector axis when the reflector 10 is in its lamp enclosing position. The sockets 12 in rotary holder 11 are of the conventional bayonent base accommodating type and comprise a spring member 56 for releasably locking the lamp bases 13 therein. The outer shell contacts of the lamp bases 13 are electrically connected to the wire 49 by bolt 24, plate 25, which consists of metal, spring contact 57 which is bolted thereto at 58 and presses against the metal rotary holder 11, and by the metal shell of sockets 12 with which said outer contacts of the bases 13 are engaged. The wires 49 and 50 may be connected across the electrical energy source in the conventional manner, a switch being provided in the circuit, as is customary, for controlling the ignition of the lamp 14 included in the circuit. The switch may be operated by hand or by synchronizing apparatus which also controls the operation of the camera shutter.

The operation of the above described multiflash lamp device is as follows:

After the lamps 14 have been inserted in the sockets 12, the lamp 14 enclosed by the reflector 10 is ready for ignition by the electrical apparatus described above. When this lamp has been flashed it is replaced by an unflashed lamp by manually moving handle 35 in the direction of the arrow (Fig. 2) until the motion of arm 32 is stopped by rod 31 engaging with the end of slot 33. The reflector 10 is moved about its pivot pin 17 by the spring 46 attached to portion 41 of reflector support 42 and to pin 37. When the handle 35 has been moved a sufficient distance (which is less than the full distance of its travel) to bring the hook end portion 29 of the pawl 28 into engagement with the pin 27, the reflector 10 has been moved by the means described above an angular distance such that rotary holder 11 may start to rotate without striking the lamp 14 to be moved out of the reflector or the lamp 14 to be moved into the reflector. As the handle is moved further in its arcuate path, the holder 11 is rotated by the pawl 28 secured to arm 32 by pivot rod 31 through a sufficient angular distance to bring into position to be enclosed by the reflector 10 the lamp 14 next to the flashed lamp.

The slot 33 in plate 25 is of such size and is so

located that it arrests the motion of handle 35 when the next lamp to be flashed has been moved into proper position. When the handle 35 has reached its limit of travel in the direction of the arrow (Fig. 2) the reflector 10 is in the position indicated by dot-dash lines in this figure. The handle 35 is then moved in the direction opposite to that indicated by the arrow to return the reflector 10 to its lamp enclosing position and the pawl 28 to a position in which the hook 29 is spaced from the next pin 27 to be engaged thereby, which positions are shown in Figs. 1 and 2.

A spring 59 secured to the part of the pivot pin 17 and the arm 32 outside the cover 48 is provided for quickly returning the arm 32 and the elements connected therewith to the position shown in Figs. 1 and 2 after a flashed lamp has been replaced by an unflashed lamp. The reflector 10 is thus returned to its lamp enclosing position faster than it would be by gravity alone by the pin 37 on projection 36 engaging the end of slot 38 in member 39 to impress the force exerted by spring 59 as a turning moment on the pivoted reflector support 42. During the return motion of the pawl 28 and until the holder 11 is to be rotated again for lamp changing purposes, the holder 11 is held stationary by axle 18 to which it is frictionally fitted. The above described operation is repeated until all the lamps 14 have been flashed. The flashed lamps may then be removed from sockets 12 and replaced by unflashed lamps.

The multiple flash lamp device described above may be temporarily or permanently secured to a camera by the carrier 21.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A multiple flash lamp device comprising a concave reflector of sufficient depth to substantially surround and enclose a flash lamp, means for supporting a plurality of flash lamps and advancing them successively first into and then, after being flashed, out of said reflector through the position normally occupied by the reflector, means supporting said reflector and said lamp supporting means in juxtaposition, and means for displacing said reflector out of the path of movement of said lamps upon actuation of the lamp advancement means.

2. A multiple flash lamp device comprising a concave reflector of sufficient depth to substantially surround and enclose a flash lamp and having an axis, rotatable means for supporting a plurality of flash lamps and advancing them successively first into and then, after being flashed, out of said reflector through the position normally occupied by the reflector, said means being arranged for rotation about an axis perpendicular to a plane including said reflector axis, means supporting said reflector and said lamp supporting means in juxtaposition, and means for displacing said reflector out of the path of movement of said lamps upon actuation of the lamp advancement means.

3. A multiple flash lamp device comprising a concave reflector of sufficient depth to substantially surround and enclose a flash lamp, means for supporting a plurality of flash lamps and advancing them successively first into and then, after being flashed, out of said reflector through the position normally occupied by the reflector, said reflector being pivotally mounted, means supporting said reflector and said lamp supporting means in juxtaposition, and means for moving said reflector about its pivot and out of the path

of movement of said lamps upon actuation of the lamp advancement means.

4. A multiple flash lamp device comprising carrier means for supporting a plurality of flash lamps, a concave reflector movably supported adjacent said carrier means and of sufficient depth to normally surround and enclose one of said lamps, and actuating means arranged to synchronize advancement of successive lamps first into and then, after being flashed, out of said reflector together with displacement of the reflector out of the path of movement of the lamps during each advancement thereof.

5. A multiple flash lamp device comprising carrier means for supporting a plurality of flash lamps, a concave reflector movably supported adjacent said carrier means and of sufficient depth to normally surround and enclose one of said lamps, and actuating means comprising a lever of the second class arranged to synchronize advancement of successive lamps first into and then, after being flashed, out of said reflector together with displacement of the reflector out of the path of movement of the lamps during each advancement thereof.

6. A multiple flash lamp device comprising a rotary holder having a plurality of lamp accommodating sockets radially disposed about its axis of rotation and a concave reflector of sufficient depth and so disposed as to substantially surround and enclose a lamp in said holder, means supporting said holder and said reflector in juxtaposition, said holder being arranged to advance successive lamps first into and then, after being flashed, out of said reflector through the position normally occupied by the reflector, and means for displacing said reflector out of the path of movement of said lamps upon actuation of said holder.

7. A multiple flash lamp device comprising a concave reflector of sufficient depth and so disposed as to substantially surround and enclose a flash lamp, means for supporting a plurality of flash lamps and advancing them successively first into and then, after being flashed, out of said reflector through the position normally occupied by the reflector, means supporting said reflector and said lamps supporting means in juxtaposition, said reflector having a lamp-passing opening at its apex and means for displacing said reflector out of the path of movement of said lamps upon actuation of said lamp advancement means.

8. A multiple flash lamp device comprising a concave reflector of sufficient depth to substantially surround and enclose a flash lamp, means for advancing a series of flash lamps successively first into and then, after being flashed, out of said reflector through the position normally occupied by the reflector, means supporting said reflector and said lamp supporting means in juxtaposition, and means for displacing said reflector out of the path of movement of said lamps upon actuation of the lamp advancement means.

JOHN J. MALLOY.