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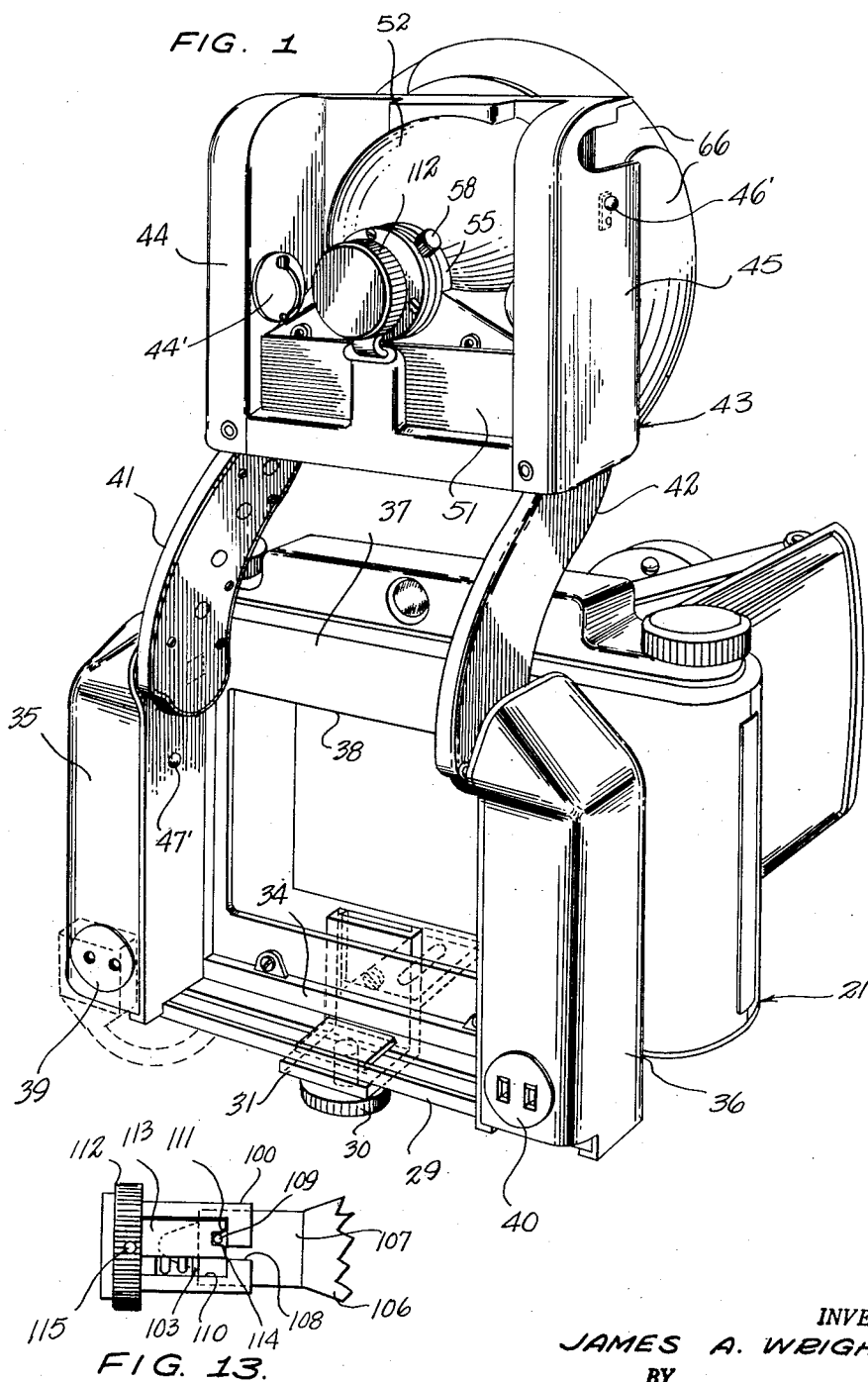
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**2,688,071**

FLASH BULB ATTACHMENT FOR CAMERAS

Filed May 23, 1952

3 Sheets-Sheet 1



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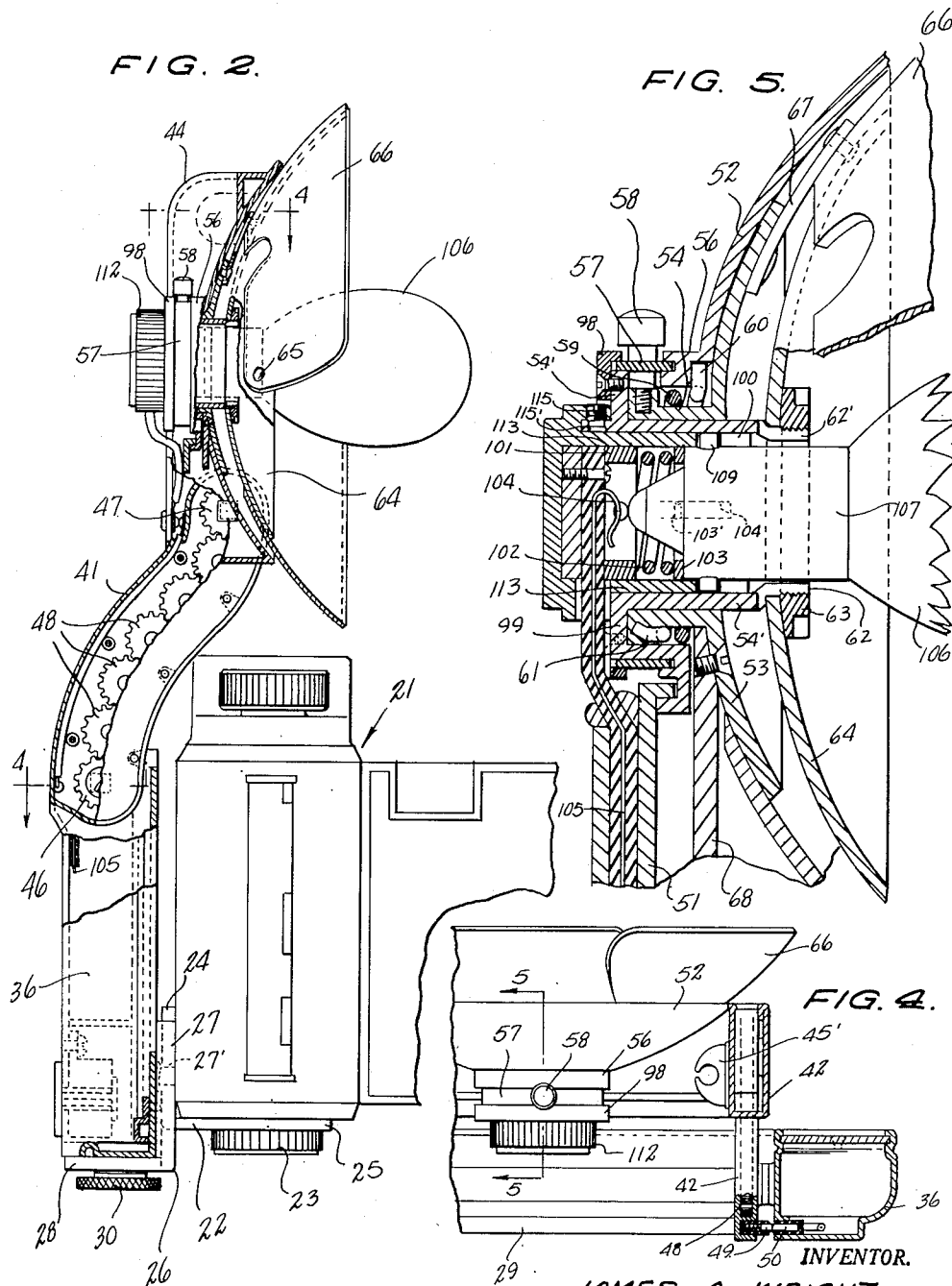
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3 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## FLASH BULB ATTACHMENT FOR CAMERAS

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4 Claims. (Cl. 240—1.3)

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This invention relates to camera accessories, and more particularly to an improved flash bulb and reflector attachment for cameras.

The main object of the invention is to provide a novel and improved extensible flash bulb holder and reflector attachment for cameras, said attachment being simple in construction, being compact in size, and being easy to manipulate.

A further object of the invention is to provide an improved flash bulb holding and reflector attachment for cameras, said attachment being easy to install on a camera, being sturdy in construction, being foldable to a very compact condition, and involving inexpensive components.

A still further object of the invention is to provide an improved extensible flash bulb holding and reflector attachment for cameras which may be normally housed in back of a camera in a compact, out-of-the-way position, and which may be readily extended to an operative position, the attachment including improved flash bulb socket means and including extensible reflector means which automatically extends to provide a large reflective area around the flash bulb responsive to the extension of the socket-supporting means to operative position.

A still further object of the invention is to provide an improved adjustable flash bulb holding and reflector attachment for cameras, said attachment including storage means for electrical components, and being provided with means for automatically increasing the reflector area thereof responsive to the movement of the flash bulb supporting socket thereof to an operative position relative to the camera, the attachment being provided with novel and improved means for ejecting a flash bulb after use of the attachment, and being further arranged so that the attachment may be readily folded to an inoperative, substantially completely housed condition at the rear of the camera after use thereof.

A still further object of the invention is to provide an improved flash bulb attachment for cameras which embodies novel and improved means for housing the bulb-supporting portion thereof and its associated reflector in an out-of-the-way, protected position when not in use, and for rapidly and easily moving the socket and reflector portion of the attachment into operative position, the improved attachment being provided with means for maintaining constant orientation of the flash bulb socket portion and its associated reflector relative to the camera while it is being moved from its inoperative to its operative position, and vice versa, the arrangement

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being such that the reflector portion of the attachment is automatically extended to provide a large reflector area around the flash bulb socket when the socket-supporting portion of the attachment is moved to operative position, and at the same time, the attachment is locked in extended position and remains locked until manually released by the retraction of the extensible elements of the reflector.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a rear perspective view of a camera provided with an improved flash bulb and reflector attachment constructed in accordance with the present invention, the attachment being shown arranged in operative position.

Figure 2 is a side elevational view, partly in vertical cross section, of the flash bulb and reflector attachment shown in Figure 1.

Figure 3 is an enlarged front elevational view of the upper portion of the attachment illustrated in Figures 1 and 2, showing the flash bulb and the extensible reflector associated therewith, the reflector being shown in extended position.

Figure 4 is a horizontal cross sectional view taken on the line 4—4 of Figure 2.

Figure 5 is an enlarged vertical cross sectional detail view taken on the line 5—5 of Figure 4.

Figure 6 is a horizontal cross sectional detail view taken on the line 6—6 of Figure 3.

Figure 7 is a fragmentary rear elevational view, partly in cross section, of the upper portion of the improved flash bulb and reflector attachment, showing the locking means associated with the supporting arms for the bracket element for the flash bulb socket and reflector and the releasing means associated therewith.

Figure 8 is a vertical cross sectional view taken on the line 8—8 of Figure 6.

Figure 9 is a cross sectional view taken on the line 9—9 of Figure 8.

Figure 10 is an enlarged perspective detail view of the locking arm for the central reflector element of the flash bulb and reflector attachment of Figures 1 to 9.

Figure 11 is an enlarged perspective view of the tripping element employed to release the arm of Figure 10 when the socket-supporting member is extended to operative position.

Figure 12 is a side elevational view of the camera of Figure 1 with the improved flash bulb and reflector attachment shown in folded inoperative position.

Figure 13 is a fragmentary top plan detail view showing the operative elements of the bulb-ejecting portion of the flash bulb and reflector attachment of Figs. 1 to 12.

Referring to the drawings, 21 designates a camera of conventional construction and 22 designates an angle bracket secured to the bottom of the camera by a thumb screw 23 engaged in the tripod-connecting aperture provided in the bottom of the camera. The angle bracket 22 is provided with the upstanding, dovetail arm 24, and the horizontal arm 25 of the bracket 22 is slotted so that the arm 24 may be fastened in engagement with the back of the camera.

Designated at 26 is an angle bracket having an upstanding arm 27 which is formed with a dovetail groove slidably engaged with the dovetail arm 24 and frictionally locked therewith, as by providing a friction screw 27' threadedly engaged in the arm 24 which is frictionally engageable with the inside surface of the dovetail groove in arm 27.

The angle bracket 26 is provided with the rearwardly extending horizontal arm 28 on which is disposed the horizontally extending, longitudinally slotted base bar 29, the base bar 29 being adjustably supported on the arm 28 and being secured on the base bar 29 by a clamping member 31 having a depending threaded shank extending through the slot in the bar 29 on which is threadedly engaged a knurled clamping nut 30, as shown in Figure 1. As shown in Figure 1, the clamping plate 31 is rectangular in shape and is dimensioned so as to be engageable with an adjacent upstanding frame portion 34 to limit rotation of the plate 31. Rigidly secured to the base bar 29 is a frame including the vertical hollow side post elements 35, 36 and the rear wall element 37 which is provided with the large rectangular aperture 38 to provide clear viewing of the rear of the camera. The hollow post elements 35 and 36 are employed to house various electrical components associated with the flash bulb circuit, such as dry cell batteries and condenser units. The post element 35 is provided at its lower portion with the socket 39 to which the "Synchro" cable may be connected for synchronizing the operation of the flash bulb with the camera shutter and the lower portion of the post member 36 is provided with a "self-shorting" socket 40 by means of which extension cables may be connected into the flash bulb circuit of the attachment.

Designated at 41, 42 are respective hollow arms pivoted to the inside surfaces of the top end portions of the post elements 35 and 36 for parallel swinging movement from a position between the post elements to an elevated position above said post elements, shown in Figure 1. Pivotal connection to the ends of the arms 41, 42 is a bracket structure shown generally at 43, said bracket structure comprising the hollow vertical side elements 44 and 45 in which the ends of the hollow arms 41 and 42 are received. The forward portions of the side elements 44 and 45 are suitably slotted to allow at least 180° rotation of the arms 41 and 42 in a counterclockwise direction, relative to the elements 44 and 45, as viewed in Figure 2, whereby the arms 41 and 42 may be received in the hollow housing portions 44 and 45 of the bracket member 43.

Designated at 44', 45' are respective grooved rubber clip elements secured to the inside surfaces of the side elements 44 and 45, and which are employed to grip the cable employed in the

camera when not in use, said cable being looped and retained between the elements 44 and 45 by engagement in the grooves of the clip elements. The respective side elements 44 and 45 are provided with yieldable spring-biased detent elements 46' engageable in locking recesses 47' provided in the inside surfaces of the post members 35 and 36 to releasably lock the bracket structure 43 in housed position between the post members.

Disposed in one end portion of each of the arms 41 and 42 and rigidly keyed to the respective hollow post elements 35 and 36 are gears 48. Rigidly keyed to the respective housing elements 44 and 45 and disposed in the top ends of the arms 41 and 42 are the similar gears 47. Journalled in each of the arms 41 and 42 is a train of gears 48 which are identical with the gears 46 and 47 and which serve to couple each gear 46 to the gear 47 in the opposite end of its associated arm. Therefore, the gear trains comprising the gears 46, 48 and 47 act to maintain constant orientation of the bracket structure 45 relative to the optical axis of the camera during swinging movement of the arms 41 and 42, namely, serve to maintain the optical axis of the camera parallel to the optical axis of the bracket assembly 43 at all times.

From Figure 4 it will be noted that electrical contacts are provided on the arm 42 and on the hollow post member 36, said contacts being shown at 49 and 50 and being engageable responsive to the movement of the arms 41 and 42 to their elevated positions shown in Figure 1. These contacts are employed to establish the electrical circuit associated with the flash bulb responsive to the movement of the flash bulb-supporting bracket assembly 43 to its elevated operative position, as will be presently described. The contacts are disengaged when the arms 41 and 42 are swung downwardly from the elevated operative positions thereof shown in Figure 1, whereby the flash bulb is disconnected from its source of energization.

The bracket assembly 43 includes the upstanding wall portion 51 to which is secured the annular concave disc element 52, and rotatably disposed inside the annular disc element 52 is an additional concave annular element 53 formed with the cylindrical sleeve portion 54. Designated at 55 is a cylindrical housing which is rigidly secured to the vertical wall 51 and which extends axially relative to the bowl-shaped elements 53 and 52. As shown in Figure 5, the sleeve member 54 is rotatably mounted on the cylindrical housing 54'. The disc member 52 is formed with an annularly grooved collar element 56 in which is rotatably engaged a flat ring 57 to which is secured a headed pin element 58, said pin element being in turn threadedly engaged with the sleeve element 54, as shown in Figure 5. The disc element 53 may therefore be rotated relative to the bowl-shaped member 52 by rotating the pin member 58. Surrounding the sleeve element 54 is a coiled spring 59 which has one end 60 anchored in a recess in the disc member 52 and which has its other end 61 anchored in the sleeve member 54 to bias the disc member 52 counterclockwise, as viewed in Figure 3.

As shown in Figure 5, the cylindrical housing member 54' is reduced in diameter at its forward end, as shown at 62, and secured on the shoulder thus defined by a ring nut 63 is a central reflector disc 64. Pivoted to the peripheral portion of the reflector disc 64 at 65 are respective extensible reflector segments 66 which are connected to the

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rotatable disc member 53 by respective link arms 67. As shown in Figure 3, the link arms 67 are arranged to extend the reflector segment 66 outwardly responsive to the counterclockwise rotation of the disc member 53 relative to the stationary bracket structure 43. The coiled spring 59 biases the segments 66 to their extended positions, since said spring biases the disc member 53 counterclockwise, as viewed in Figure 3, as above explained.

As shown in Figure 5, the disc member 53 is disposed inwardly adjacent to the stationary bowl-shaped element 52, and the extensile reflector elements 66 are disposed between the peripheral portion of the central reflector member 64 and the inside surface of the bowl-shaped member 52, the link arms 67 being located in the space between the extensile elements 66 and said bowl-shaped member 52.

Rigidly secured to the rotatable disc member 53 is the depending arm 68 which is formed at its free end with the inclined flange 69. Secured to the bottom wall 70 of the bracket housing 43 is an upstanding post member 71 to the top end of which is pivoted a detent lever 72, said lever being biased in a counterclockwise direction, as viewed in Figure 6, by a coiled spring 73 surrounding the post element 71 and having its lower end secured to said post element and its upper end engaged in an aperture in the lever. The lever 72 has a first arm 74 which is lockingly engageable beneath the edge of the flange 69, as shown in Figure 8. When the arm 68 is lockingly engaged by the arm 74, as shown in Figure 8, the reflector elements 66 are locked in contracted positions. When the arm 68 is disengaged from the detent arm 74, the reflector elements 66 will expand to their extended positions, under the force of the biasing spring 59, as above explained.

Designated at 75 is a plate member formed at its lower portion with a vertical slot 76 and at its upper portion with a camming notch 77. One side edge of the plate member 75 is formed with a stiffening flange 78 and the body of the plate member is provided with a pin element 79 projecting in a direction opposite the flange 78, as shown in Figure 11. The plate member 75 is yieldably secured to the lower portion of the inside wall of the hollow side element 45 of the bracket structure 43 by a screw 80 which extends through the slot 76 and which is provided with a cushioning spring 81, whereby the head of the screw exerts a yieldable clamping action on the lower portion of the plate member 75. The plate member 75 is biased downwardly by a coiled spring 82 connecting the lower portion of the flange 78 to the bottom wall 70 of the bracket housing. The pin element 79 projects through a slot 83 formed in the inside wall of the vertical housing element 45, said inside wall having secured thereto a carrying plate 84 formed with a horizontal corrugation 85 against which the upper portion of the plate member 75 is engageable responsive to elevation of said plate member. The lever 72 is formed with an arm 86 which is received in the notch 77 and which is cammingly engaged thereby responsive to the elevation of the plate member 75 to rotate the lever member 72 in a clockwise direction, as viewed in Figure 6, sufficiently to release the flanged end 69 of the arm 68 responsive to the elevation of the plate member 75. The periphery of the top end portion of the arm 42 is formed with an abutment shoulder 87 which cammingly engages the pin 79 at the completion of the elevation of the

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housing 43 to its operative position, shown in Figure 1, whereby the plate member 75 is lifted to the position thereof shown in Figure 8, causing the arm 74 of lever 72 to be rotated out of engagement from the flange 69. Therefore, the control arm 68 of the rotary disc member 53 is automatically released when the bracket member 43 is elevated to its operative position shown in Figure 1.

Slidably engaged in the wall 51 for horizontal movement transverse to the housing elements 44 and 45 are the respective locking bars 88 and 89 which are lockingly engageable behind the vertical edges of the arms 41 and 42 to lock said arms in fully elevated positions. The inner ends of the arms 88 and 89 are provided with pins 90 and 91 which slidably engage in respective camming slots 92 and 93 in a rotatable plate member 94 pivotally connected at 95 to the vertical wall 51. The plate member 94 is formed with a camming surface which includes a cam notch 96, as shown in Figure 7, the control arm 68 having secured thereto a pin 97 which is cammingly engageable with the periphery of the camming plate 94. When the control arm 68 is released, as above described, at the completion of the elevation of the bracket housing 43 to its operative position, the counterclockwise rotation of the arm 68, as viewed in Figure 7, rotates the plate member 94 counterclockwise, whereby the camming notches 92 and 93 move the locking bars 88 and 89 outwardly into locking engagement with the respective arms 41 and 42. When the control arm 68 is rotated counterclockwise, as viewed in Figure 6, from its dotted view position to its full line position, the pin 97 engages the cam plate 94 and rotates the cam plate clockwise, causing the camming slots 92 and 93 to move the bars 88 and 89 inwardly, releasing the arms 41 and 42. This is accomplished by rotating the headed pin member 58 from its dotted view position, shown in Figure 7 to its full line position shown therein.

As shown in Figure 5, the outer edge of the ring 57 is retained by an arcuate retaining ring 98 secured to the outer flange 99 of the sleeve member 54'. The sleeve member 54' has secured therein a socket shell 100 in the end of which is mounted a bearing ring 101 against which one end of a coil spring 102 engages, the other end of the spring engaging against another ring 103. Ring 103 is provided with diametrically opposed peripheral lugs 103' slidably engaged in longitudinal grooves 104' formed in the inside surface of the socket shell 100, said grooves terminating short of the end of shell 100 to prevent ejection of the ring 103 when the bulb is ejected, as will be subsequently described.

Designated at 104 is the center terminal of the lamp socket which comprises the looped end of a strip of conductive metal adapted to engage the center terminal of a lamp bulb inserted in the socket sleeve 100. The contact 104 is connected by a suitable conductor 105 and through the contacts 49 and 50 to the flash bulb energizing means. A conventional flash bulb, such as the bulb shown at 106, having a base 107 of the "bayonet-pin" type may be inserted in the socket, the socket sleeve 100 being formed with opposed bayonet slots 108 for receiving the pins 109 of the lamp base. The socket shell is retained in position by the reduced inner portion 62 of the cylindrical housing 54. The socket shell 100 is therefore held stationary by its frictional engagement with the reduced portion 62 of the housing 54'. The reduced portion 62 of the housing 54' is formed

with the slot 62' providing clearance for the pins 109 of the lamp base 107. The socket shell 100 is formed inwardly of the slots 108 with respective rectangular enlarged apertured portions 110 defining shoulders 111 against which the pins 109 may be lockingly engaged when the lamp base 107 is inserted in the socket, the pins 109 first being moved through the slots 108 and then the lamp base being rotated to engage the pins 109 with the shouldered edges 11 of the apertures 110. Designated at 112 is a knurled knob member which is rotatably mounted on the outer end portion of the sleeve 54' and which is formed with diametrically opposed inwardly extending elongated fingers 113, 113, the ends of the fingers being formed with notches 114 in which the pins 109 are receivable. The knob 112 is retained on the end of the sleeve member 54' by a retaining screw 115 threaded through the wall of knob 112 and extending into a slot 115' formed in the sleeve 54' for preventing relative movement in an axial direction between knob 112 and sleeve 54', as shown in Figure 5. When the bulb is inserted, the knob 112 is arranged so that the notches 114 thereof are in registry with the slots 108 of the socket shell 100, whereby the base pins 109 of the lamp will enter the notches 114. When the lamp is rotated, the pins 109 lockingly engage with the shouldered portions 111 of apertures 110, as above described. When it is desired to eject the lamp, the knob 112 is rotated to return the pins 109 into positions of registry with the slots 108, whereby the coiled spring 102 expands to eject the lamp bulb from the socket. The lamp bulb may thus be ejected without necessitating manual contact of the operator therewith, which is a definite advantage since it is not necessary for the operator to wait until the bulb has cooled to a reasonable temperature when he wishes to remove the bulb from the attachment to fold the attachment to its inoperative position.

When the device is not in use, the housing portion 43 is received between the hollow post members 35 and 36, as shown in Figure 12. When it is desired to move the bracket portion 43 to its elevated operative position, such as shown in Figure 1, the operator pulls the bracket assembly 43 outwardly, as by grasping the top and bottom edges of the bracket assembly and pulling the bracket assembly rearwardly and upwardly to the elevated position thereof shown in Figure 1. As the bracket assembly 43 reaches its final position, the control arm 68 is released, as above described, allowing the reflector segments 66 to be extended by the expansion of the coiled spring 59 and at the same time the arms 41 and 42 are locked by the outward movement of the locking bars 88 and 89 resulting from the rotation of the plate member 94 caused by the releasing movement of the control arm 68, as above explained. A flash bulb may then be inserted in the socket and the necessary electrical connections made for the operation of the device. After the operation has been completed, the bulb is ejected, as above described, and the reflector segments 66 are retracted by rotating the pin member 58 from the dotted line position thereof in Figure 7 to the full line position thereof, as explained above, whereby the locking arms 88 and 89 are retracted. When the pin member 58 is in the full line position shown in Figure 7, the bracket assembly 43 may be moved rearwardly and downwardly to inoperative position. When the bracket assembly 43 is elevated to operative position, the shoulder 37 engages the pin element 79, causing the trip mem-

ber 75 to be elevated and rotated to the position shown in Figure 8, due to the camming cooperation thereof with corrugation 85, which causes member 86 to be rotated releasing arm 68. In said operative position, member 75 descends for the length of slot 76, with the pin element 79 engaging the side surface of arm 42. When the bracket assembly is moved toward inoperative lowered position the arm 42 disengages from pin element 79, allowing the member 75 to rotate inwardly relative to housing element 45, thus resetting the member 75 for subsequent tripping action on the member 74. The bracket assembly 43 may then be rotated downwardly and rearwardly to a position wherein it is housed between the hollow post elements 35 and 36, as above described.

It will thus be seen that by the procedure above described the attachment has been returned to the folded inoperative position shown in Figure 12.

It will be further apparent that the position of the attachment relative to the camera may be altered by adjusting the base bar 29 relative to the supporting angle bracket 28, the base bar 29 being locked in adjusted position by means of the clamping nut 30.

While described and illustrated in connection with a specific conventional type of camera, the device may be readily adapted for use on other cameras, such as on "reflex-type" cameras by the provision of suitable bracket means for securing the attachment to the camera, the bracket means preferably being provided with adjustable swivel means for positioning the attachment on either the right side or the left side of the camera, as desired.

While a specific embodiment of an improved flash bulb and reflector attachment for a camera has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. A flash bulb attachment for cameras comprising a frame member adapted to be secured to the rear portion of a camera, said frame member including a pair of upstanding spaced parallel supports and means rigidly connecting the lower portions of the supports, respective arms pivoted to the upper ends of the supports for parallel swinging movement from a position between said supports to an elevated position above the supports, bracket means pivotally connected to the top ends of said arms and being receivable between said arms, a flash light bulb socket mounted on said bracket means, a first reflector element rigidly secured to said bracket means around said bulb socket, a plurality of additional reflector elements pivoted to said first reflector element for outward swinging movement and being arranged to define extensions of said first reflector element, a control element rotatably mounted on said bracket means, means drivingly interconnecting said control element to said additional reflector elements, spring means biasing said control element for rotation in a direction to extend the additional reflector elements relative to the first reflector element, releasable detent means lockingly engaging said control element to prevent rotation thereof, and means on said arms releasing said detent means

responsive to movement of said arms to an elevated position above the supports.

2. A flash bulb attachment for cameras comprising a frame member adapted to be secured to the rear portion of a camera, said frame member including a pair of upstanding spaced parallel supports and means rigidly connecting the lower portions of the supports, respective arms pivoted to the upper ends of the supports for parallel swinging movement from a position between said supports to an elevated position above the supports, bracket means pivotally connected to the top ends of said arms and being receivable between said arms, a flash light bulb socket mounted on said bracket means, a first reflector element rigidly secured to said bracket means around said bulb socket, a plurality of additional reflector elements pivoted to said first reflector element for outward swinging movement and being arranged to define extensions of said first reflector element, a control element rotatably mounted on said bracket means, means drivingly interconnecting said control element to said additional reflector elements, spring means biasing said control element for rotation in a direction to extend the additional reflector elements relative to the first reflector element, releasable detent means lockingly engaging said control element to prevent rotation thereof, means on said arms releasing said detent means responsive to movement of said arms to an elevated position above the supports, a locking member movably mounted on said bracket means and being lockingly engageable with one of said arms, and means drivingly coupling said locking member to said control element.

3. A flash bulb attachment for cameras comprising a frame member adapted to be secured to the rear portion of a camera, said frame member including a pair of spaced parallel supports and means rigidly connecting the lower portions of the supports, respective arms pivoted to the upper ends of the supports for parallel swinging movement from a position between said supports to an extended position spaced from the supports, bracket means pivotally connected to the

top ends of said arms and being receivable between said arms, a flash light bulb socket mounted on said bracket means, a reflector secured to said bracket means around said bulb socket, a locking member movably mounted on said bracket means and being lockingly engageable with one of said arms, and means moving said locking member into locking engagement with said one arm responsive to the movement of said arms to the extended position relative to the supports.

4. A flash bulb attachment for cameras comprising a frame adapted to be secured to a camera, respective arms pivoted to said frame for parallel swinging movement from a lowered position to an elevated position, a bulb-supporting member pivotally mounted on said arms, a reflector mounted on said bulb-supporting member, means coupling said bulb-supporting member to said frame and being arranged to maintain constant orientation of said bulb-supporting member relative to said frame while the arms swing relative to the frame, a locking member movably mounted on said bulb-supporting member and being lockingly engageable with one of said arms, and means moving said locking member into engagement with said one arm responsive to the movement of said arms to said elevated position.

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