

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Photographic Flash Devices

WE, EASTMAN KODAK COMPANY, a Company organised under the Laws of the State of New Jersey, United States of America, of 343 State Street, Rochester, New York 14650, United States of America, (Assignees of Dean McCormack Peterson, Charles Edward Pickering and Franklin Delano Kotler) 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 flash devices for incorporation into or for attachment to photographic cameras.

There has been developed a disposable flashlamp unit comprising a plurality of flashlamps, each having its own reflector, and arranged in angularly spaced relation about an axis of rotation of the unit. Such a flashlamp unit will, hereinafter, be referred to as 'of the kind defined'. An object of the present invention, is the provision of a flash device having an improved socket arrangement and designed to accept and make full use of such disposable flashlamp units.

According to the present invention, there is provided a flash device for receiving a flashlamp unit of the kind defined, comprising a socket adapted to receive a centering spigot of the flashlamp, resilient contact terminals arranged to be engaged in sequence by respective lead-in contacts of the flashlamps, and a spring means serving to locate the spigot of the flashlamp unit in the socket and resiliently to urge the flashlamp unit to positions corresponding to presentation of one of the flashlamps for taking a photograph.

The invention will be described further, by way of example, with reference to the

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accompanying drawings, wherein:

Figure 1 is a partially sectioned perspective view of a flash device according to the present invention, shown together with a disposable flashlamp unit suitable for use therewith.

Figure 2 is a sectional side view taken on line II-II of Figure 1;

Figure 3 is a sectional view taken on line III-III of Figure 2;

Figure 4 is an underneath plan view of the device of Figures 1, 2 and 3;

Figure 5 is a fragmentary vertical section showing a camera contact element co-operating with a separable co-axial pin, for use with photographic cameras having co-axial pin and socket plugs for connecting a flash device so as to operate in timed relation with the camera's shutter;

Figure 6 is a perspective view of an embodiment of a photographic camera having a built in flash device according to the present invention, and a modified form of the disposable flashlamp unit, inserted in a receiving socket thereof;

Figure 7 is a perspective view of the camera and the flashlamp unit shown in Figure 6, with the unit being removed from the receiving socket of the camera;

Figure 8 is a perspective view of the camera with a front cover thereof removed to show the various elements of the flash device as incorporated in the camera;

Figure 9 is an underneath perspective view of the top cover of the photographic camera, showing the retaining means for releasably holding a disposable flashlamp unit in the receiving socket; and

Figure 10 is a partial sectional view taken on line X-X of Figure 6.

Referring firstly to Figures 1 to 5 of the accompanying drawings, a flash device of the present invention is in the form of a

flash attachment for attachment to a photographic camera and comprises a small cylindrical body portion 11 and a camera attaching portion 12 for insertion in known types of camera accessory shoes. Within the body portion 11 are the elements forming the part of the flash circuit normally associated with a separate flash attachment and a socket portion 13 for receiving a disposable flashlamp unit 14 as hereinbefore defined.

The disposable flashlamp unit comprises a disposable unit 14 containing a plurality (four) of photoflash lamps 15 ordinally mounted in a vertical position and equiangularly spaced about an axis of rotation, on a base portion 16. Individual reflector surfaces 17 controlling the direction of light emission from the lamps 15 and a transparent or light transmitting protective cover 18 over the lamps 15 complete the unit.

The base portion 16 defines four lamp sides and includes a depending centre post 19 having four engagement lugs 20 each extending radially outwardly toward a respective lamp side. The engagement lugs 20 each define upper and lower ramped surfaces to enable ready insertion and removal of the unit from the receiving socket. The centre post 19 defines the vertical axis about which the unit 14 is rotated, and the post 19 may also define a central opening 21 for receiving a corresponding stabilising spindle 35 in a receiving socket 39 of the flash attachment.

Surrounding the centre post 19 of the unit 14 and co-axial therewith is a depending electrical contact ring 22. A pair of electrical lead-in contacts in the form of wires 23 and 24 extending to the interior of the photoflash lamps 15 for ignition thereof in a known manner are wrapped by bending vertically around the contact ring 22 in the manner shown.

The flash device of the present invention, as shown in Figures 1 to 5, is arranged to receive such a flashlamp unit and comprises a camera attaching portion 12 having an attaching foot 25 insertable in the accessory shoes of many known types of photographic cameras. The foot 25 is made of electrically conductive material and includes a centrally located and vertically arranged opening having a vertically slidable centre contact 26 which is also made of electrically conductive material. Thus, the attaching portion 12 is suitable for electrical contact with known types of accessory shoes which are designed with corresponding electrical terminals, for completion of a photoflash circuit through a camera shutter synchronising switch. Separating the foot 25 and the centre contact 26 is a sleeve 27 of electrically insulative material. An annular shoulder 28 which is engageable with an annular stop surface 29

on the centre contact 26 is defined by the foot 25 and sleeve 27 in order to limit outward movement of the contact 26 to the position shown in Figure 2.

The body portion 11 is formed by a hollow cylindrical housing member 30 of electrically conductive material. The housing member 30 is electrically connected to the foot 25 and this may be accomplished by forming the member 30 integrally with the foot 25. An insulating tube or sleeve 31 lines the interior of the cylindrical member 30, and a pair of vertically aligned miniaturized cylindrical batteries 32 of a known type are electrically connected in series to provide the required source of electrical potential. A U-spring 33 of electrically conductive material engages both the lower pole (positive) of the batteries 32 and the upper end of the centre contact 26 to urge the contact outwardly against the shoulder 28 to ensure positive engagement with the centre electrical terminal of an accessory shoe.

Located above and engaging the upper pole (negative) of the batteries 32 for electrical contact therewith is a disc 34 of electrically conductive material. A stabilising spindle 35 shaped to fit within the opening 21 of the flashlamp unit 14 is affixed to the top of disc 34. A substantially U-shaped flashlamp unit retaining spring 36 is mounted in a fixed position between the top of disc 34 and a collar provided at the lower end of spindle 35. The spring 36 includes upright inwardly curved or spiralled ends 37 which are outwardly flexible so as to be engageable with the ramped surfaces of the lugs 20 of a unit 14. A central hole in the cross arm or base portion of the spring 36 is provided in order that the portion of the post 35 below the collar may extend therethrough to retain the spring 36 in the position shown. The spring 36 is made of a resilient web material which has a width sufficient to enable each spring end 37 to engage and override a pair of adjacent lugs 20 of a unit 14 whenever the lugs are at a 45° angle to the longitudinal axis of the spring as shown in Figure 3.

Covering the top of the cylindrical housing member 30 is a preshaped, moulded cover 38 made of an electrically insulative material such as a thermoplastic material. A substantially X-shaped access opening 39 is located at the centre of the cover 38 and is located to permit insertion of a unit 14 in any one of four positions in which adjacent retaining lugs 20 simultaneously engage a spring end 37 as shown in Figure 3. A circular groove 40 surrounding the opening 39 is also moulded into the cover 38, the groove 40 having an effective diameter and width which will enable it to receive the contact ring 22 of a unit 14 as

shown, in phantom, in Figure 2.

To complete the electrical circuit to a selected one of the photoflash lamp 15, there is provided a pair of electrical leads 41, 42 having respective contact terminals 43, 44 situated on the periphery of the groove 40 through suitable openings in the groove walls. The terminals 43, 44 are positioned such that they are disposed at the side of the attachment facing forwardly in the direction of the camera objective axis, whenever the attachment is inserted into an accessory shoe. The terminals thus provide electrical contact with the corresponding lead-in wires of one of the photoflash lamps 15 when a unit 14 has been inserted in any one of its four insertion positions, the longitudinal axis of spring 36 being 45° to the direction of the terminal position. The first lead 41 engages the disc 34 for electrical contact therewith whereas the second lead 42 is held in electrical engagement with the inner wall of the cylindrical member 30 as shown in Figure 3. Thus, the electrical circuit of the photoflash arrangement extends from one of the lead-in wires of that photoflash lamp 15 facing in the direction of the camera objective axis, through the terminal 43 and the electrical lead 41 to the disc 34 and through the batteries 32 and the spring 33 to the contact 26 for electrical connection with a contact terminal of the associated camera circuit. Completion of the circuit from the other camera contact terminal is through the attaching foot 25 to the cylindrical member 30 and thence from electrical lead 42 to the other lamp lead-in wire.

For use with photographic cameras not having accessory shoes, or with photographic cameras having accessory shoes without electrical contact terminals, there is provided as shown in Figs. 4 and 5, a separate electrical co-axial cable or cord 45 which may be used to connect the flash attachment to another socket arrangement in the camera for timed operation therewith. The cord 45 is comprised of a co-axial cable of two conductors, the end of the cord not shown being connectable to the camera by the inclusion of a usual co-axial plug designed to fit a conventional flash-synchronizing and receiving socket on the body of the camera. Referring to Figure 5, the cord end shown has an outer conductor 47 of tubular shape which is split along a longitudinal line thereof to permit a frictional fit within a receiving socket 48 formed in the foot portion 25 to provide an electrical connection between the conductor 47 and the member 30 through the attaching foot 25. The inner conductor 49 is separated from the outer conductor 47 by insulation and extends beyond the conductor 47 for engagement with the annular stop surface 29 of the centre

contact 26. The end of the conductor 49 has a conical shape which causes the contact 26 to be moved upwardly and retracted into the foot portion 25 whenever the cable cord 45 is inserted into the receiving socket 48, thereby preventing the centre contact 26 from engaging a metallic accessory shoe not having terminals or otherwise being exposed to an accidental touching simultaneously with foot 25 to effectively by-pass the switch mechanism provided in the camera for flash synchronisation.

In operation, the attachment, without the cord 45, is placed in an accessory shoe having an electrical contact arrangement with the terminals 43, 44 being positioned in the front i.e. in the direction of the picture-taking or camera objective axis. A disposable flashlamp unit 14 is then inserted through the socket access opening 39 with any one of the unused photoflash lamps 15 facing in the direction of the picture-taking axis. As the unit is inserted, the lower ramp surfaces of the lugs 20 urge the upper spiral portion of the spring ends 37 outwardly against the spring bias to permit the unit 14 to be fully seated. When the unit 14 is fully seated as shown in phantom in Figure 2, the lower spiral portion of the spring ends 37 are urged radially inwardly against the upper ramped surfaces of the lugs 20 by the resilience of the spring 36, each spring end 37 engaging a pair of adjacent lugs (Figures 2 and 3). As will be apparent, the urging of the spring ends 37 against the upper ramped surfaces of the lugs 20 provide a downward force which tends to provide a firmer seating of the unit 14 in the socket portion 13.

When the unit 14 is fully seated, the contact ring 22 is positioned in the groove 40, and the outer vertical portions of the lead-in wires of the forward facing photoflash lamp 15 each engage one of the terminals 43, 44 for completion of the flash circuit to the lamp. Ignition of the photoflash lamp 15 in timed relation with camera operation may then be accomplished in the usual way.

Following ignition of the forward facing photoflash lamp during camera operation, the unit 14 is then indexed by rotating it 90° about its vertical axis to position the subsequent photoflash lamp 15 in the flash circuit. During the initial stage of rotation, the ends 37 of the spring 36 are flexed outwardly as opposing lugs 20 pass through a position of axial alignment with the spring ends 37. As rotation is continued beyond this stage, the spring ends are then felt to return toward their inward unit retaining positions in which pairs of adjacent lugs 20 are engaged by each spring end 37. As can be seen, this lateral action of the lugs 20 by the spring end 37 urge the unit 14 toward



and tend to maintain the unit 14 in proper alignment with the socket portion 13. The flash attachment and unit are now in position for the taking of a subsequent picture with an augmenting photoflash.

By the provision of the spring 36, a unit 14 inserted in the socket portion 13 may be rotated as desired in any one of its four operating positions without the necessity of removing and reinserting the unit 14 in another position and without disturbing or otherwise injuring the various parts of the flash attachment.

Whilst the invention has been described with respect to one particular embodiment, it is obvious that other arrangements and forms can be resorted to without departing from the spirit of the invention or the scope of the subjoined claims. Thus, the invention has been shown as a separate flash attachment, but it is possible to have the entire structure integrally built within the body of a photographic camera. Additionally, it is possible for the attaching foot to be so formed as to be insertable in a flashlamp socket so as to adapt a conventional flash device for use with units 14.

For example, and as shown in Figures 6 to 10, a photographic camera embodying the present invention includes a housing 110 and an objective or picture-taking axis 111 on which the camera elements such as a lens, diaphragm aperture and a frame of light sensitive photographic film normally are disposed. There may also be a typical viewfinder 112 and a body release member 113 used to initiate the picture-taking operation. However, the present description will be limited to those elements forming a part of or co-operating directly with the flash device of the present invention, those elements not shown here being understood to be selected from those known in the photographic art.

Detachably connectable with the camera is a disposable flashlamp unit 114 of slightly different form to that shown in Figure 1. The unit 114 comprises a plurality (four) of photoflash lamps 115 of known manufacture such as an AG (all glass) variety orthogonally disposed in a vertical position on respective sides of a substantially square horizontal base 116 about a central vertical axis thereof. Behind each photoflash lamp 115 is an individual dished reflector 117 sufficient to provide the proper light emission pattern without the need for additional reflector surfaces. A transparent or light transmitting protective cover 118 of cubic shape having a top and four side walls is permanently sealed to the upper surface of the base 116. The cover 118 functions as a flash guard and it permits easy handling of the unit 114 by eliminating the need for handling miniature or hot lamps etc.

Each photoflash lamp 115 includes a pair of lead-in contacts in the form of wires 119, 120 extending to the interior of the hermetically sealed glass envelope of the respective lamp in a known manner in order to ignite a charge of combustible material therein whenever an electrical potential is applied to the lead-in wires. The ends of the lead-in wires 119, 120 pass downwardly through suitable openings in the base 116 and are bent at their respective ends to form stirrups in a manner similar to that of existing AG photoflash lamps, the U-ends of the stirrups all facing in a clockwise direction when looking at the base 116 from below.

Underlying the stirrup ends of the lead-in wires 119, 120 of each of the photoflash lamps 115 is a curved support 121 for the wires 119, 120 extending radially outwardly to the centre of the respective side of the unit 114 from a central boss 122.

The base 116 further includes a depending centre post 123 of cylindrical shape and four equally spaced retaining lugs 124 extending radially outwardly from the post 123 at its lower end.

To provide for flash operation, the unit 114 is inserted into a receiving socket 125 having an opening with a central bore and extended slots designed to receive the centre post 123 and lugs 124. A movable socket cover 126 fits within the central bore of the socket and is engageable with the bottom edge of the post 123 to be moved downwardly thereby when the unit 114 is inserted into the receiving socket.

Because each of the lugs 124 extend radially outwardly in a direction corresponding to the axis of light emission of one of the lamps 115, the socket 125 is similarly positioned so that, upon insertion of the unit 114 into the socket 125 in any one of four positions as determined by the position of extended slots, one of the photoflash lamps 115 will be facing forwardly i.e. in the direction of the objective axis 111. Correspondingly, exposed contact terminals 127, 128 of a photoflash circuit in the housing 110 are positioned in front of the receiving socket 125 such that electrical contact is made between the terminals 127, 128 and the respective lead-in wires 119, 120 of the forward facing photoflash lamp 115.

A unit ejector button 129, which pops out of the camera housing 110 when a unit 114 is inserted (Figure 6) is also provided to permit ready ejection of the unit 114, by pushing, when flash operation of the camera is not desired.

Referring now to Figure 8, the camera includes a flash circuit which is comprised of a source of electrical potential such as a pair of batteries 130 connected in series at their lower terminals by a shorting bar. The

159 by its resilient construction. A tension spring 160 which is stronger than the resilience of the stop plate 145, urges the arm 159 and the stop plate 145 clockwise to the position in which it arrests movement of the shutter blade to limit the shutter opening time. In like manner, the spring 160, by way of the ejector lever 156, urges the spindle 126 upwardly against the stop 10- 157.

As stated, each disposable flashlamp unit 114 comprises a connecting centre post 123 having a plurality of radially extending retaining lugs 124. Each lug 124 is shaped 15 to include upper and lower ramped surfaces 161, 162. The lower ramped surfaces 162 of the opposing front and back lugs 124, tend to urge the spring legs 150, 151 outwardly as the unit 114 is inserted. When 20 the unit 114 is inserted sufficiently, the curved portions of the legs 150, 151 spring back over the opposing lugs 124. By reason of the force acting on the upper ramped surfaces 161 of the opposing lugs 124, the 25 unit 114 is urged downwardly to achieve a firm contact between the terminals 127, 128 and the lead-in wires 119, 120 of the forward facing photoflash lamp 115.

In operation, the top surfaces of the 30 spindle 125 and ejector button 129 are flush with the camera top surfaces due to the action of the spring 160, which also sets the camera for daylight operation by reason of the stop 145 being in the path of movement 35 of the ear 143 of the impact shutter blade 144 to arrest movement of the shutter blade and thereby limit shutter speed.

A disposable flashlamp unit 114 is then inserted into the socket 125, with one of the 40 unused photoflash lamps 115 facing forward, until the curved portions of spring legs 150, 151 override the lugs 123 to retain the unit 114 in the socket 125. Simultaneously, the spindle 126 is moved downwardly by the 45 centre post 123, causing the lever 156 to be rotated in a counterclockwise direction about the pin 158. Thus, ejector button 129 is moved upwardly, and the stop 145 by its resilience, is moved out of the path of 50 movement of the ear 143 to permit the shutter blade 144 to operate at its full or flash duration. A photographic picture with augmenting flash is then taken by depressing the body release 113 to operate the shutter 55 and ignite the forward facing photoflash lamp 115. After the flash picture has been taken, unit 114 is rotated in a clockwise direction about its axis of rotation represented by centre post 123, until the next 60 succeeding photoflash lamp 115 is facing forward with its corresponding lead-in wires 119, 120 engaging the terminals 127, 128. As is now evident the curved portions of the spring legs 150, 151 maintain engagement 65 with the upper ramped surfaces 161 of the

at least two opposing lugs 124 during the rotation.

Upon completion of the taking of four successive flash pictures in the manner described, the used unit 114 is removed by 70 depressing the ejector button 129, causing the spindle 126 to move upwardly against the base of the post 123. During the upward movement, the upper ramped surfaces 161 push the spring legs 150, 151 apart to release 75 the lugs 124 and permit the unit 114 to be removed. Of course, the unit can be removed after taking none, one, or more than one flash pictures, and the unit reinserted with one of the remaining unused 80 photoflash lamp 115 facing forwardly.

Whilst this invention has been described with reference to a preferred embodiment of flash devices, it is obvious that minor variations and changes can be resorted to 85 without departing from the scope of the subjoined claims.

For instance, the flash device of Figures 1 to 5 may be built into a camera, or the flash device of Figures 6 to 10 may be built 90 as a separate device attachable to a camera. Either device may be modified to receive either of the flashlamp units illustrated. Such changes and modifications would only require design skill and not inventiveness. 95

WHAT WE CLAIM IS:—

1. A flash device for receiving a flashlamp unit of the kind defined, comprising a socket adapted to receive a centering spigot of the flashlamp, resilient contact terminals 100 arranged to be engaged in sequence by respective lead-in contacts of the flashlamps, and a spring means serving to locate the spigot of the flashlamp unit in the socket and resiliently to urge the flashlamp unit to 105 positions corresponding to presentation of one of the flashlamps for taking a photograph.

2. A flash device as claimed in claim 1 in the form of a flash attachment comprising 110 a body portion and a camera attaching portion for reception in a camera accessory shoe, characterised in that the camera attaching portion has a resiliently loaded contact for engaging a contact of a camera's 115 flash circuit located in the camera accessory shoe.

3. A device as claimed in claim 2 wherein the camera attaching portion has a socket arranged to receive a co-axial plug 120 and wherein the co-axial plug is so shaped as to co-operate with the resiliently loaded contact to retract the same into the body portion on insertion of the plug into the socket. 125

4. A device as claimed in claim 1, 2 or 3 wherein the body portion serves for the reception of batteries, one terminal of which is connected to one of the resilient flash contacts. 130

negative terminal 131 of the batteries 130 is electrically earthed by way of a fixed contact plate 132, and positive terminal 133 of the batteries 130 is electrically connected to a spring contact element 134 which is suitably anchored at its left end, the right end 135 of contact element 134 being biased in an upward direction against a stop (not shown) in the position shown in Figure 8.

10 The body release 113 forms a part of a shutter release trigger lever 136 which is pivotably mounted on pin 137 and biased upwardly (in a counterclockwise direction) by a spring against a suitable stop (not shown).

15 A latching bar 138 of electrically conductive material is attached to the inside of shutter trigger lever 136 by means of adjustable screws or the like and is separated therefrom by insulation. In its 'up' position, as shown in Figure 8, the camera shutter mechanism is cocked and ready to respond to depression of body release 113. In this position, the latching bar 138 is spaced from the end 135 of the contact element 134, and a shutter striking plate 139, which is rotatably mounted about pivot 140, is strongly biased for movement to the right. A detent 141 forming a part of the latching bar 138 holds the striking plate 139 against movement until the body release 113 is depressed to move the detent 141 out of the path of movement of the striking plate 139. This permits the striking plate 139 to be moved rapidly to the right such that a finger 142 on the end of the striking plate 139 strikes an ear 143 of a pivoted impact shutter blade 144, thereby causing the blade 144 to be moved to the left out of alignment with the axis 111, and momentarily opening or uncapping the film exposure aperture. The shutter blade 144 is then returned automatically to its capping position, after a predetermined period of time, by a spring (not shown) which is known in the art.

45 A predetermined shutter operating time, for example 1/40 sec., is made use of during camera operation with photoflash, whereas a resilient stop plate 145 is placed in the path of movement of ear 143 to arrest the motion of the shutter blade 144, thereby returning the blade to its capping position in a shorter period of time, say 1/80 sec., for daylight operation. The operation of the stop 145 is controlled by insertion of a unit as described later.

50 To complete the flash circuit of the camera 110, one terminal 127 is electrically earthed. The striking plate 139 is also electrically earthed to provide a direct connection to the terminal 127. The other terminal 128 is electrically connected to a fixed brush contact 146 (shown as being formed integrally therewith) which is designed to make electrical contact at all

times with a switch arm 147. The switch arm 147 is made of electrically conductive material and is electrically connected to latching bar 138, this being accomplished by forming switch arm 147 integrally with latching bar 138. Switch arm 147 is designed to make electric contact with the right end 135 of spring contact element 134, whenever lever 136 is depressed by operation of body release 113.

75 The operation of the flash circuit is such that a shunt is provided by the electrical contact of the arm 147 with the contact element 134 immediately upon initial depression of the lever 136 but prior to movement of the detent 141 fully out of the path of movement of the striking plate 139. Upon full depression of the lever 136, the detent 141 breaks electrical contact with the plate 139 by movement out of its path, thereby breaking the short circuit bypassing that photoflash lamp 115 in engagement with terminals 127, 128, and igniting the photoflash lamp.

Referring to Figure 9, the flash unit retaining means according to the present invention comprises a hairpin spring 148 bent around a pin 149 and having a pair of legs 150, 151 extending longitudinally on either of two sides of the central bore opening of the socket 125 with the portions thereof adjacent the socket opening overlying the front and back extended slots and each being curved on an arc of at least 90° with a radius equivalent to the radius of the spindle 126 and the central bore. The free ends of spring legs 150, 151 bias away from each other and are held by limiting stop pins 152, 153 and an overlying U-shaped yoke 154 connecting the pins 149 and 152, 153. By means of the stop pins 152, 153 the curved portions of the spring legs 150, 151 tend to return to the position shown in Figure 9, whether they are pulled apart or pushed together.

110 The centre spindle 126, Fig. 10, includes a stepped or collar portion 155 which is engaged from below by an ejector lever 156. A further stop 157 is provided to engage the upper surface of collar portion 155 to limit outward movement of spindle 126 to a portion flush with the top surface of socket 125. The ejector lever 156 is mounted for pivotal movement about a pivot pin 158, Fig. 8, and the ejector button 129 is mounted on the end of the lever 156 opposite to the spindle 126. As can be seen, downward movement of spindle 126 causes the ejector button 129 to pop out of the camera 110.

Integral with the ejector lever 156 is a shutter control arm 159 which correspondingly pivots about the pin 158 whenever the ejector lever 156 is moved. The stop plate 145 is urged against the free end of the arm

159 by its resilient construction. A tension spring 160 which is stronger than the resilience of the stop plate 145, urges the arm 159 and the stop plate 145 clockwise to the position in which it arrests movement of the shutter blade to limit the shutter opening time. In like manner, the spring 160, by way of the ejector lever 156, urges the spindle 126 upwardly against the stop 10 157.

As stated, each disposable flashlamp unit 114 comprises a connecting centre post 123 having a plurality of radially extending retaining lugs 124. Each lug 124 is shaped to include upper and lower ramped surfaces 15 161, 162. The lower ramped surfaces 162 of the opposing front and back lugs 124, tend to urge the spring legs 150, 151 outwardly as the unit 114 is inserted. When the unit 114 is inserted sufficiently, the curved portions of the legs 150, 151 spring back over the opposing lugs 124. By reason of the force acting on the upper ramped surfaces 161 of the opposing lugs 124, the unit 114 is urged downwardly to achieve a firm contact between the terminals 127, 128 and the lead-in wires 119, 120 of the forward facing photoflash lamp 115.

In operation, the top surfaces of the spindle 125 and ejector button 129 are flush with the camera top surfaces due to the action of the spring 160, which also sets the camera for daylight operation by reason of the stop 145 being in the path of movement of the ear 143 of the impact shutter blade 144 to arrest movement of the shutter blade and thereby limit shutter speed.

A disposable flashlamp unit 114 is then inserted into the socket 125, with one of the unused photoflash lamps 115 facing forward, until the curved portions of spring legs 150, 151 override the lugs 123 to retain the unit 114 in the socket 125. Simultaneously, the spindle 126 is moved downwardly by the centre post 123, causing the lever 156 to be rotated in a counterclockwise direction about the pin 158. Thus, ejector button 129 is moved upwardly, and the stop 145 by its resilience, is moved out of the path of movement of the ear 143 to permit the shutter blade 144 to operate at its full or flash duration. A photographic picture with augmenting flash is then taken by depressing the body release 113 to operate the shutter and ignite the forward facing photoflash lamp 115. After the flash picture has been taken, unit 114 is rotated in a clockwise direction about its axis of rotation represented by centre post 123, until the next succeeding photoflash lamp 115 is facing forward with its corresponding lead-in wires 119, 120 engaging the terminals 127, 128. As is now evident the curved portions of the spring legs 150, 151 maintain engagement with the upper ramped surfaces 161 of the

at least two opposing lugs 124 during the rotation.

Upon completion of the taking of four successive flash pictures in the manner described, the used unit 114 is removed by depressing the ejector button 129, causing the spindle 126 to move upwardly against the base of the post 123. During the upward movement, the upper ramped surfaces 161 push the spring legs 150, 151 apart to release the lugs 124 and permit the unit 114 to be removed. Of course, the unit can be removed after taking none, one, or more than one flash pictures, and the unit reinserted with one of the remaining unused photoflash lamp 115 facing forwardly.

Whilst this invention has been described with reference to a preferred embodiment of flash devices, it is obvious that minor variations and changes can be resorted to without departing from the scope of the subjoined claims.

For instance, the flash device of Figures 1 to 5 may be built into a camera, or the flash device of Figures 6 to 10 may be built as a separate device attachable to a camera. Either device may be modified to receive either of the flashlamp units illustrated. Such changes and modifications would only require design skill and not inventiveness.

WHAT WE CLAIM IS:—

1. A flash device for receiving a flashlamp unit of the kind defined, comprising a socket adapted to receive a centering spigot of the flashlamp, resilient contact terminals arranged to be engaged in sequence by respective lead-in contacts of the flashlamps, and a spring means serving to locate the spigot of the flashlamp unit in the socket and resiliently to urge the flashlamp unit to positions corresponding to presentation of one of the flashlamps for taking a photograph.

2. A flash device as claimed in claim 1 in the form of a flash attachment comprising a body portion and a camera attaching portion for reception in a camera accessory shoe characterised in that the camera attaching portion has a resiliently loaded contact for engaging a contact of a camera's flash circuit located in the camera accessory shoe.

3. A device as claimed in claim 2 wherein the camera attaching portion has a socket arranged to receive a co-axial plug and wherein the co-axial plug is so shaped as to co-operate with the resiliently loaded contact to retract the same into the body portion on insertion of the plug into the socket.

4. A device as claimed in claim 1, 2 or 3 wherein the body portion serves for the reception of batteries, one terminal of which is connected to one of the resilient flash contacts.



5. A device as claimed in claim 2 or in any claim appendant thereto, wherein the body portion is of a conducting material and is connected to one of the respective flash contacts.

6. A device as claimed in any preceding claim, wherein the body portion comprises a spindle arranged to receive the hollow spigot of a flashlamp unit thereover and has a groove co-axial with the spigot on the upper surface of the body portion for receiving an electrical contact ring of the flashlamp unit.

7. A device as claimed in any preceding claim, wherein the spring means comprises a substantially U-shaped retaining spring the arms of the 'U' being inwardly curved at their free ends and wherein the flashlamp unit has ramp surfaces equiangularly spaced around the spigot thereof, the ramp surfaces co-operating with the inwardly curved ends of the spring to retain the unit in the socket and to locate the unit in its positions corresponding to the presentation of one of the flashlamps for taking photographs.

8. A device as claimed in claim 1 incorporated into a photographic camera and wherein the socket includes a socket

cover engageable by the spigot of a flashlamp unit on insertion of the flashlamp unit into the socket and serving simultaneously to present a unit ejector and to adjust a shutter speed of the camera to a value suitable for flashlamp photography.

9. A device as claimed in claim 8 wherein the resilient contact terminals are located at spaced positions on a radius centred on the socket and are arranged to co-operate with correspondingly spaced lead-in contacts of the flashlamps.

10. A device as claimed in claim 8 or 9 wherein the spring means comprises a U-shaped spring arranged to co-operate with ramp surfaces equiangularly spaced of the spigot of a flashlamp unit to urge the flashlamp unit to positions corresponding to presentation of one of the flashlamps for taking a photograph.

11. A flash device arranged to receive a flashlamp unit of the kind defined and, substantially as hereinbefore described, with reference to and as illustrated in Figures 1 to 5 or Figures 6 to 10 of the accompanying drawings.

L. A. TRANGMAR,
Agent for the Applicants.

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