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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Photoflash Socket Structure

We, EASTMAN KODAK COMPANY, a Company organized 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 WILLIAM HOWARD HORTON, EDWARD LOUIS STURM, CHESTER WILLIAM, MICHATEK and LEON CRAWFORD SHEKELL) 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:—

The present invention relates to a photoflash socket structure in which a multilamp photoflash unit, such as disclosed in our copending application No. 52324/65 (Serial No. 1131106) is rotatably retained and from which such unit can be easily removed.

In accordance with the present invention there is provided a photoflash socket structure for receiving a multilamp flash unit having a plurality of ignitable photoflash lamps mounted on a base, comprising a support plate provided with an aperture, socket means including a sleeve mounted in the aperture and provided with a central opening through which the base can be inserted and a stabilizing spindle aligned with the opening for engaging the base and about which the unit is rotatable, resilient means arranged in the socket means for engaging the base to retain an inserted base in rotatable relation to the socket means and means coupled to the resilient means for disengaging the latter from the base to permit removal of the unit from the socket means.

In the accompanying drawings:—

Fig. 1 is an exploded perspective view of a socket structure constructed in accordance with one of form of the present invention;

Fig. 2 is a vertical sectional view through the socket structure shown in Fig. 1 and showing the relationship of the various elements prior to the insertion of a photoflash unit;

Fig. 3 is a view similar to Fig. 2 with a

photoflash unit fully inserted into the socket;

Fig. 4 is a view that is similar to Fig. 2 showing the parts in a position into which they have been moved by an ejector means for releasing the photoflash unit;

Fig. 5 is an exploded perspective view showing another embodiment of the socket structure; and

Fig. 6 is a plan of the embodiment shown in Fig. 5 showing particularly the relationship of the resilient member to the sleeve, the ring member and the ejector means.

Referring to Figs. 1—4 of the drawings, the socket structure comprises a supporting plate 10 having an annular recess 11 on which a socket structure to be described hereinafter is arranged for receiving a multilamp flash unit 12 as disclosed in our copending application No. 52324/65 (Serial No. 1131106). A sleeve 13 of an electric insulating material is arranged in an opening 14 in plate 10 and is provided with a central aperture 15 having radially extending slots as shown in Fig. 1.

The photoflash unit 12 is provided with a base 12' having an annular ring 16 over which spaced wire contacts designated as 17, 18 are arranged, a pair of such contacts being connected to each one of the flash bulbs arranged within the unit. A set of contact members 19, 20 are secured in the recess 11 and have spring ends 21 22 which engage a pair of contacts 17, 18 that are connected to the flash lamp that has been moved into a predetermined position for energization.

The photoflash unit 12 has a centre post 23 from which lugs 24 extend in a radial direction, the lugs being four in number and equiangularly spaced about the post 23. A member 36 arranged below the plate 10 is provided with a recess 37 in which a spindle 30 is slidably mounted. The spindle 30 comprises a circular flange 28, an intermediate circular-flat portion 38 and a stem 29, the latter engaging a hole (not shown) in the end of post 23. Between the flange 28 and the sleeve 13, a

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spring 25 is arranged so that a pair of parallel cross bars 27 thereof are in the path of a pair of oppositely disposed lugs 24 when a unit 12 is positioned relative to the aperture 15 for entry of post 13 into the socket. The configuration of spring 25 is best shown in Fig. 1, wherein the legs 26 are shown as being crossed so that pressure exerted against the spring at either the top or bottom will cause the legs 26 to move in a direction such that the distance between the cross bars 27 is increased.

A release means comprises a lever 31 that is pivotally mounted on a stud 32 and has one end in engagement with a slidable pin 33 that is journaled in member 36, as shown in Fig. 2. The lever 31 is biased in a counter-clockwise direction by means of a spring 34 on the stud 32 and has an extension 35 that lies in the path of the end 39 of a release button 40.

With reference to Fig. 2, it will be noted that the cross bars 27 of the springs 25 are arranged close to the aperture 15 in the sleeve 13. When a flash unit 12 is to be positioned in the socket, each of the lugs 24 is aligned with one of the slots extending radially from the aperture 15. The unit is then moved toward the sleeve 13 and the lugs 24 engage the cross arms 27 to force them outwardly to a position in which they ride over the end of the lugs and finally come to rest in engagement with the lugs near a flat surface adjacent the post 23, the stem 29 having entered the hole in the post 23. The unit 12 is then in a position as that shown in Fig. 3 with the contacts 17, 18 in engagement with contacts 21, 22 to provide a circuit connection, for example, with the flash circuit of a camera which is completed upon making an exposure, the annular ring 16 and contacts 17, 18 being within recess 11 and compressing contacts 21, 22. Since the arms 27 engage the lugs 24 along an edge thereof, the unit 12 can be rotated while it is still retained by the spring 25. Due to the position of the arms 27 relative to the lugs 24, any attempt that is made to remove the unit 12 by pulling it out of the socket only results in the unit 12 being more positively retained by the spring 25 in that such a force urges the arms 27 toward each other rather than to separate them. However, upon depression of button 40, the lever 31 is moved against the pin 33 which, in turn, engages the flange 28 to move it in an upward direction against the bottom of the spring 25. This action, as seen in Fig. 4, causes the arms 27 to move away from each other and into a position in which they are entirely free of the lugs 24. In this position, the flash unit 12 can then be removed. However, due to the resilient ends of contacts 19, 20, which were compressed when the unit 12 was inserted in the socket, the unit is partially ejected by the resiliency of the contacts 19, 20. From the foregoing description it can be

readily appreciated that the spring 25 provides resilient means for readily accepting a flash unit which is positively locked in the socket thereby, which though locked can be rotated, and which cannot be removed from the socket without first depressing button 40.

Referring now to Figs. 5 and 6 a release means 45 is rotatable with the flash unit so that the latter can be ejected at any time. As in the description relating to the embodiment described above, a plate 10 is provided with an annular recess 11 in which a contact ring 46 of the shape shown in Fig. 5 is mounted for engaging one of the contacts 17, 18 when a flash unit 12 is positioned relative thereto. A sleeve 47 is made of an electric insulating material and is rotatably mounted in the plate 10, the sleeve being provided with a central aperture 48 having radially-extending slots for receiving the lugs 24 and post 23 of a flash unit 12. The bottom portion of sleeve 47 is provided with opposed flats, shown at 49 in Figs. 5 and 6, of such an extent that an opposed pair of lugs 24 extend through their respective radial slots and are fully exposed, as shown in Fig. 5, when a unit 12 is fully inserted in the socket. A spring 50 comprises a substantially semi-circular base portion 51 and has the ends thereof formed into upward extensions 52, 53 and then in opposed directions to form a pair of spaced chordal arms 54, 55 which are in a plane spaced from and parallel to that of the base portion 51. The arms 54, 55 engage the pair of lugs 24 that extend outside of the flat portions 49 as seen in Fig. 5.

An ejector ring 60 is rotatably mounted on a plate 61 mounted below the plate 10. The ring 60 is provided with a pair of diametrically opposed upright lugs 62, 63 that are arranged between arms 54, 55 for engaging the latter as well as extensions 52, 53 of the spring 50, as described hereinafter. A release member 65 is slidably mounted on plate 61 and retained in a withdrawn position by means of a spring 66.

As in the previously described embodiment, a photoflash unit 12 is arranged with respect to aperture 48 so that the lugs 24 are aligned with the slots for insertion into the socket. As the lugs are moved downwardly along the slots, a pair of the lugs will engage the arms 54, 55 of spring 50 and cause the arms outwardly to a position in which they can return to engage over the lugs for holding the photoflash unit in the socket. Upon being inserted in the socket and upon each rotation of the photoflash unit 12 to position another one of the lamps in a flash position, one of the contacts 17 will be in engagement with a contact 68 on ring 46 and a contact 18 will be in engagement with a fixed contact 69 held in a slot 70 in the plate 10. Also, upon rotational movement of the flash unit 12, the spring 50 is moved therewith and the exten-

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sions 52, 53, thereof which lie in the path of movement of lugs 62, 63 impart the rotation of the unit 12 to ring 60 thereby positioning one of the radially extending arms 71 on said ring in the path of movement of the release member 65.

In order to remove the flash unit 12, the member 65 is moved in the direction of the arrow, as shown in Fig. 5, and engages the arm 71 previously positioned in its path, thereby rotating the ring 60 in a direction opposed to that in which it is moved by unit 12. With such rotation of the ring 60, the lugs 62, 63 engage the free ends of the arms 54, 55 of the spring 50 to spread them apart and into a position in which they are disengaged from the pair of lugs 24. When the arms 54, 55 of spring 50 are in this position, the flash unit 12 can be removed, and as previously described, the resiliency of contacts 68 serve to partially eject the unit.

WHAT WE CLAIM IS:—

1. A photoflash socket structure for receiving a multilamp flash unit having a plurality of ignitable photoflash lamps mounted on a base, comprising a support plate provided with an aperture, socket means including a sleeve mounted in the aperture and provided with a central opening through which the base can be inserted and a stabilizing spindle aligned with the opening for engaging the base and about which, the unit is rotatable, resilient means arranged in the socket means for engaging the base to retain an inserted base in rotatable relation to the socket means and means coupled to the resilient means for disengaging the latter from the base to permit removal of the unit from the socket means.

2. A socket structure according to claim 1, wherein the resilient means comprises a spring that is shaped to engage the base of a unit as it is moved in a direction to insert the base into the socket means and to positively engage the base to prevent movement of the unit in an opposite direction.

3. A socket structure according to claim 2, wherein the spring has a pair of parallel base-engaging cross bars, each of which is arranged perpendicular to at least one of a pair of crossed supporting legs.

4. A socket structure according to claim 1,

2 or 3, wherein the resilient means is arranged between a flange on the stabilizing spindle and the sleeve, and a manually operable member is movable into engagement with the flange for moving the spindle in an axial direction to urge the resilient means into the disengaged position.

5. A socket structure according to claim 2, wherein the spring comprises a substantially semi-circular base portion and a pair of parallel chordal arms arranged in a plane spaced from and parallel to that of said base portion and connected thereto by extensions thereof, said chordal arms engaging a pair of lugs on the post of an inserted unit to retain the latter in rotatable relation to said socket means.

6. A socket structure according to claim 5, including a ring member arranged in the socket means and including a plurality of radially-extending actuating arms corresponding in number to said lamps and a pair of diametrically opposed drive lugs, the drive lugs being engaged by the extensions for moving the ring member in one direction as said unit is rotated in the same direction and release means arranged adjacent to the socket means and including an actuating member movable into engagement with one of the actuating arms positioned in the path of movement of the actuating member, whereby the ring member is moved in a direction opposed to said one direction for moving the drive lugs into engagement with the free ends of the chordal arms to spread the latter, thereby permitting removal of the unit from the socket means.

7. A socket structure according to any one of the preceding claims, wherein the supporting plate is provided with an annular recess surrounding the aperture for receiving at least one member having at least one resilient contact arm which engages a contact on the base of an inserted unit and, upon disengagement of the resilient means from the base, causes at least partial ejection of the unit from the socket means.

8. A socket structure constructed substantially as hereinbefore described with reference to, and as shown in, Figs. 1 to 4 or Figs. 5 and 6 of the accompanying drawings.

L. A. TRANGMAR, BSc, C.P.A.
Agent for the Applicants.

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1. A photoflash socket structure for receiving a multilamp flash unit having a plurality of ignitable photoflash lamps mounted on a base, comprising a support plate provided with an aperture, socket means including a sleeve mounted in the aperture and provided with a central opening through which the base can be inserted and a stabilizing spindle aligned with the opening for engaging the base and about which the unit is rotatable, resilient means arranged in the socket means for engaging the base to retain an inserted base in rotatable relation to the socket means and means coupled to the resilient means for disengaging the latter from the base to permit removal of the unit from the socket means.

2. A socket structure according to claim 1, wherein the resilient means comprises a spring that is shaped to engage the base of a unit as it is moved in a direction to insert the base into the socket means and to positively engage the base to prevent movement of the unit in an opposite direction.

3. A socket structure according to claim 2, wherein the spring has a pair of parallel base-engaging cross bars, each of which is arranged perpendicular to at least one of a pair of crossed supporting legs.

4. A socket structure according to claim 1,

2 or 3, wherein the resilient means is arranged between a flange on the stabilizing spindle and the sleeve, and a manually operable member is movable into engagement with the flange for moving the spindle in an axial direction to urge the resilient means into the disengaged position.

5. A socket structure according to claim 2, wherein the spring comprises a substantially semi-circular base portion and a pair of parallel chordal arms arranged in a plane spaced from and parallel to that of said base portion and connected thereto by extensions thereof, said chordal arms engaging a pair of lugs on the post of an inserted unit to retain the latter in rotatable relation to said socket means.

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7. A socket structure according to any one of the preceding claims, wherein the supporting plate is provided with an annular recess surrounding the aperture for receiving at least one member having at least one resilient contact arm which engages a contact on the base of an inserted unit and, upon disengagement of the resilient means from the base, causes at least partial ejection of the unit from the socket means.

8. A socket structure constructed substantially as hereinbefore described with reference to, and as shown in, Figs. 1 to 4 or Figs. 5 and 6 of the accompanying drawings.

L. A. TRANGMAR, BSc, C.P.A.
Agent for the Applicants.

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