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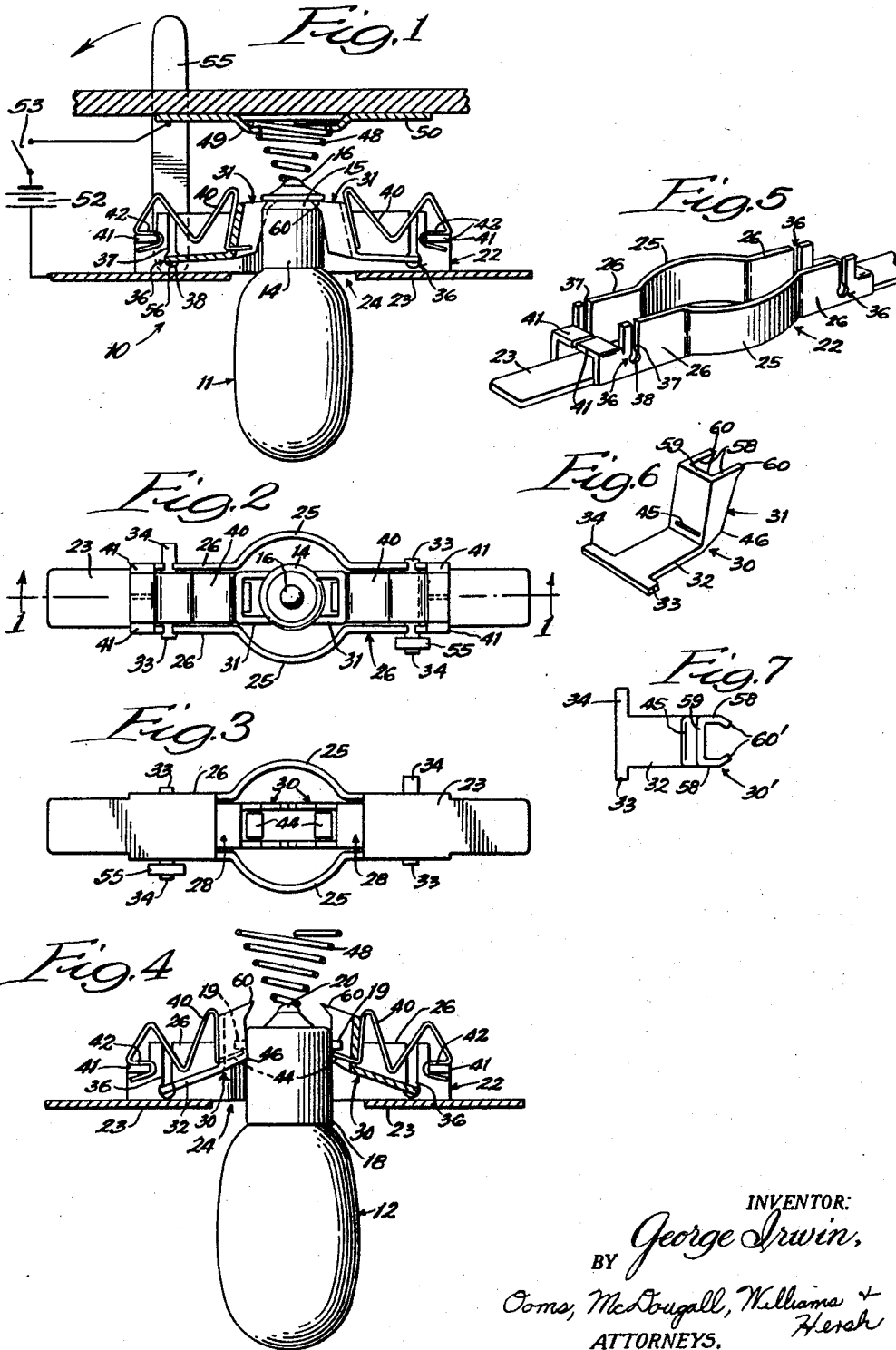
G. IRWIN

2,912,665

UNIVERSAL FLASH LAMP SOCKET

Filed Oct. 21, 1954

3 Sheets-Sheet 1



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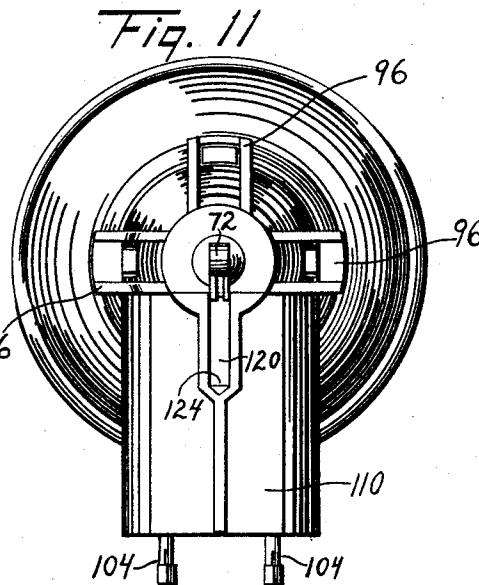
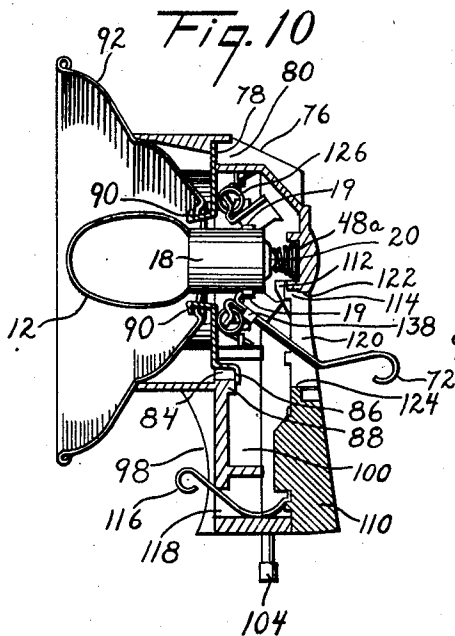
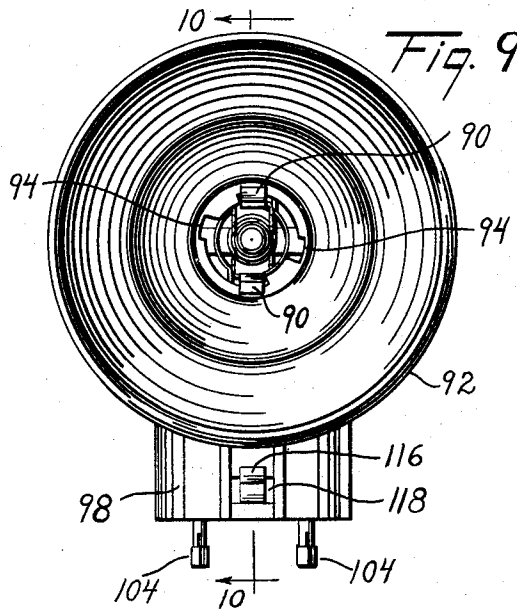
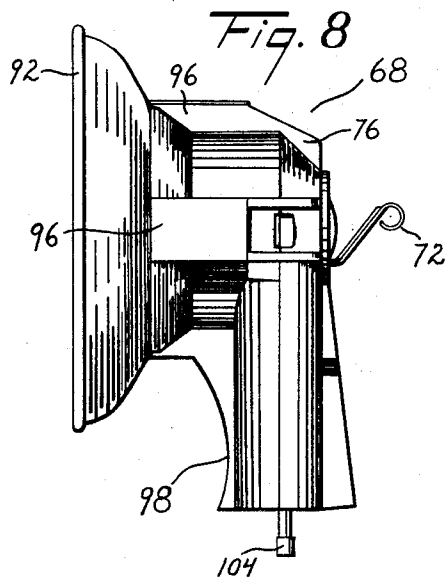
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3 Sheets-Sheet 2



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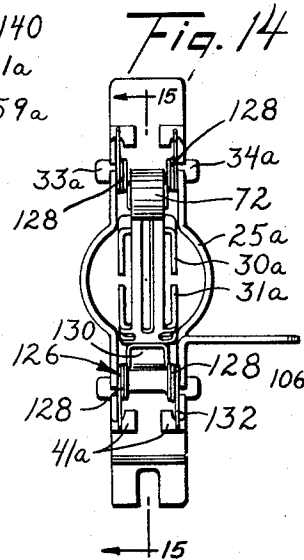
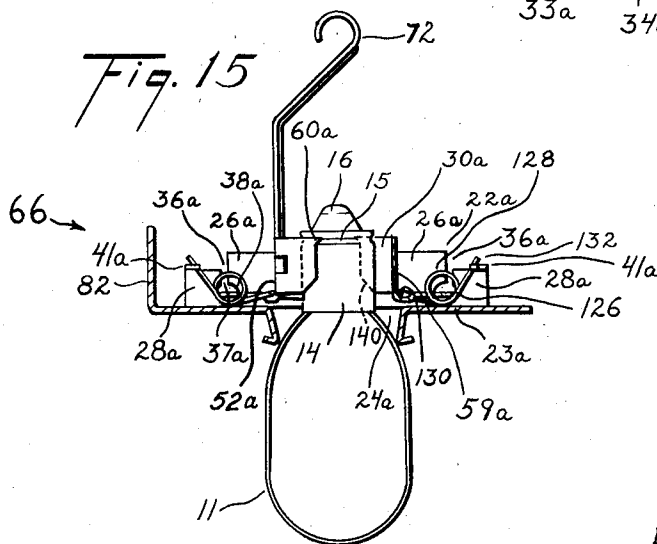
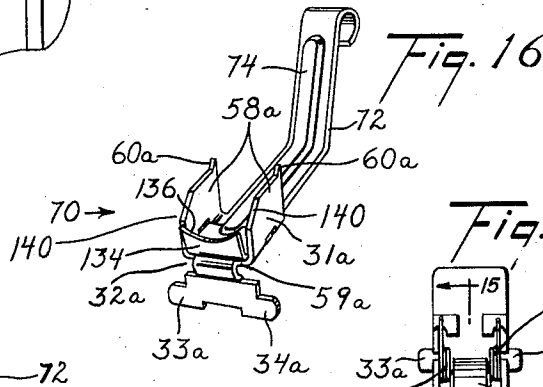
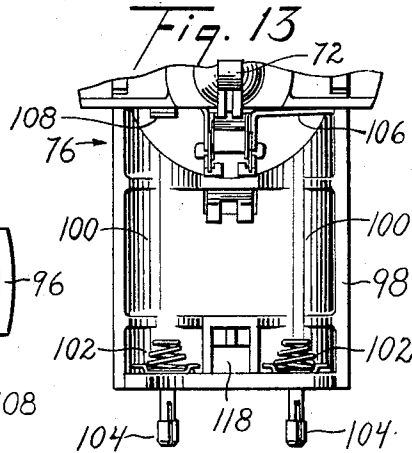
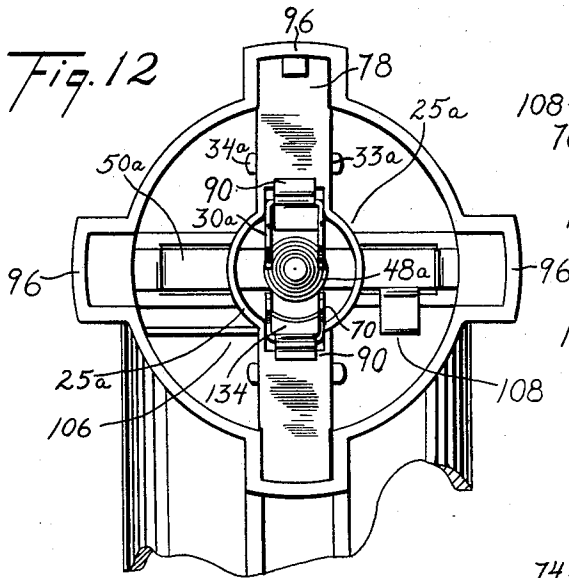
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3 Sheets-Sheet 3



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2,912,665

UNIVERSAL FLASH LAMP SOCKET

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Application October 21, 1954, Serial No. 463,750

5 Claims. (Cl. 339—33)

This invention relates to sockets for flash lamps or other small lamps.

This application is a continuation-in-part of the copending application of George Irwin, Serial No. 429,721, filed May 14, 1954, for Universal Flash Lamp Socket, now abandoned.

One principal object of the invention is to provide an improved universal flash lamp socket adapted to hold various types of flash lamps having different base diameters and different types of locking elements on their bases.

More particularly, it is an object of the invention to provide an improved universal socket adapted to hold either a relatively large based lamp having locking pins or other projections on its base, or a relatively small based lamp formed with a circumferential locking groove.

A further object is to provide a universal socket of the foregoing character which will securely retain either the large based or the small based lamp and will maintain proper axial alinement between the lamp and the socket.

It is another object of the invention to provide an improved universal socket into which either the large based or the small based lamp may be inserted by a quick and simple pushing movement, and from which the lamp may be instantly ejected without any necessity for grasping the spent lamp.

Still another object is to provide an improved flash lamp socket which will be simple in construction, low in cost, and dependable in operation.

Various other objects and advantages of the invention will appear from the following description, taken with the accompanying drawings, in which:

Figure 1 is a plan view of an illustrative flash lamp socket, constructed in accordance with the invention, shown partly in section along a line 1—1 shown in Fig. 2, a relatively small based lamp being shown in the socket;

Fig. 2 is a rear elevational view of the exemplary socket with certain parts removed for clarity of illustration;

Fig. 3 is a front elevational view of the socket of Fig. 1;

Fig. 4 is a view similar to Fig. 1, but with a relatively large based lamp inserted into the socket;

Fig. 5 is a perspective view of a body member embodied in the socket of Fig. 1;

Fig. 6 is a perspective view of a movable gripping member embodied in the socket of Fig. 1;

Fig. 7 is a rear view of a modified gripping member which may be substituted for the gripping member shown in Fig. 6;

Figs. 8 and 9 are side and front elevational views of a complete flash gun embodying a modified flash lamp socket constructed in accordance with this invention;

Fig. 10 is an elevational sectional view taken generally along a line 10—10 in Fig. 9, a flash bulb of the relatively large based type being shown mounted in the flash gun;

Fig. 11 is a rear elevational view of the flash gun shown in Figs. 8 and 9;

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Fig. 12 is an enlarged fragmentary front view of the flash gun, the reflector for the flash gun being removed to show details of the modified socket;

Fig. 13 is a fragmentary rear view of the flash gun with a battery compartment cover removed;

Fig. 14 is a rear view of the modified socket embodied in the flash gun of Figs. 8—13;

Fig. 15 is a longitudinal sectional view taken through the modified socket, generally along a line 15—15 in Fig. 14; and

Fig. 16 is an enlarged perspective view of a releasable jaw or gripping member embodied in the modified socket.

Considered in greater detail, Fig. 1 of the drawing illustrates a purely illustrative universal flash lamp socket 10, which in this instance is adapted to hold either of two types of flash lamps 11 and 12 shown respectively in Figs. 1 and 4. The lamp 11, which is relatively small and may be termed a sub-miniature lamp, is provided with a generally cylindrical metal base 14 which may have a diameter of about $\frac{7}{16}$ of an inch. A circumferential annular locking groove 15 is formed adjacent the rear end of the base 14. The end of the base 14 is provided with a center contact point 16.

The flash lamp 12 is somewhat larger than the flash lamp 11 and may be characterized as a miniature lamp. A generally cylindrical metal base 18 may be provided on the lamp 12. The illustrated base 18 may be about $\frac{9}{16}$ of an inch in diameter and may be equipped with diametrically opposite outwardly extending locking pins 19 or other locking projections. A center contact 20 is mounted on the base 18.

The illustrative flash lamp socket 10 is provided with a body member 22 which in this instance comprises a plate 23 formed with an aperture 24 to admit the bases of the flash lamps. In order to support and guide the bases 18 of the large lamps 12, the body member 22 is provided with sleeve elements 25 which in this instance consist of arcuate portions of flanges 26 bent rearwardly from the front plate 23. The flanges 26 define open slots 28 extending longitudinally between the arcuate sleeve elements 25. These slots 28 serve to locate the locking pins 19 when the large lamps 12 are inserted into the socket.

A pair of gripping elements or jaws 30 are provided to hold both the small based and the large based lamps 11 and 12. In this instance, the gripping elements 30 take the form of opposed channel-shaped half shells 31 mounted for outward and rearward swinging movement on the inner ends of laterally extending arms 32. Each of the arms 32 is provided with pivots 133 and 34 journaled in the flanges 26. To facilitate assembly and minimize the cost of the lamp socket 10, the gripping elements 30 may be formed of flat sheet metal stock so that the pivots 33 and 34 may readily be inserted into keyhole slots 36 formed in the flanges 26. Each of the slots 36 has a narrow entrance portion 37 through which the pivots 33 and 34 may be inserted edgewise, and an enlarged, generally circular portion 38 in which the pivots are free to rotate so as to support the gripping elements 30 for swinging movement.

To bias the gripping elements 30 forwardly and inwardly, a pair of springs 40 are arranged between the gripping elements and pairs of opposed lugs 41 formed from the flanges 26. In this instance, each spring 40 is formed from a thin strip of spring metal bent into a zig-zag shape so that the spring may be compressed to a considerable extent. One end of each spring is formed into a hook 42 which engages one set of the lugs. 41. For the purpose of retaining the large based lamp 12 in the socket 10, the other end of each spring 40 is formed into a prong or finger 44 which projects through a slot 45 formed in each of the half shells 31.

When one of the large based lamps 12 is inserted into the socket 10, the base 18 of the lamp is slidably guided and supported by the sleeve element 25. The lamp 12 may be inserted only when the locking pins 19 are aligned with the slots 28, which thus serves to align the locking pins 19 with the gripping elements 30. As the lamp 12 is pushed into the socket 10, the lamp base 18 engages the gripping elements 30 and swings them rearwardly until they are spaced widely enough apart so that the base 18 can move between them. The gripping elements 30 act as jaws to engage the opposite sides of the base 18 and thus tend to prevent accidental dislodgement of the lamp 12 from the socket 10. The effectiveness of this gripping action is enhanced by sharp corners 46 formed on the gripping elements 30 at their front edges. The corners 46 tend to abrade or dig into the metallic base 18 and thus tend to prevent outward movement of the lamp.

As the large based lamp 12 is pushed into the socket 10, the locking pins 19 snap behind the spring prongs 44, with the result that the prongs latch the bulb in the socket 10 against accidental dislodgement.

In order to make electrical contact with the center contact points 16 and 20 on the two types of lamps 11 and 12, the socket 10 is equipped with a spring contact in the form of a coiled, conically-shaped spring 48 supported by locating lugs 49 on a conductive mounting plate 50. To ignite the flash lamp held in the socket 10, a battery 52 and a switch 53 may be connected in series between the mounting plate 50 and the body member 22. Closing the switch 53 serves to flash the lamp. It will be understood that the switch 53 may be embodied in the synchronizing mechanism of a camera shutter.

Provision is made for ejecting the flash lamps from the socket 10. This is done by swinging at least one of the gripping elements 30 rearwardly and outwardly so as to release the lamp. The actual ejection of the lamp is then effected by the contact spring 48. In the illustrated construction, one of the gripping elements 30 may be swung rearwardly by means of a manually operable lever 55 mounted on the pivot 34, which is of rectangular or other suitable noncircular form. An aperture 56 of corresponding shape is formed in the lever to receive the pivot 34 so that the gripping element 30 will rotate with the lever. It is sufficient to release one of the gripping elements 30 since this permits the lamp to move laterally a sufficient distance to clear the other gripping element.

In order that the gripping elements 30 may serve not only to grip but also to guide and support the small based lamp 11, each of the half shells 31 is formed with a pair of flanges 58 joined by a web portion 59. It will be seen that the flanges 58 are adapted to straddle or partially embrace the small size lamp base 14 so as to hold the small base lamp 11 in properly centered and aligned relation to the socket 10.

In order to retain the small based lamp 11 in the socket 10, the flanges 58 are formed at their rear corners with opposed inwardly projecting prongs or lips 60. These prongs 60 enter into the annular groove 15 in the lamp base 14 when the small based lamp is inserted into the socket. The conical coil spring 48 serves to engage the center contact 16 and to eject the small based bulb 11 when the lever 55 is operated to swing the gripping element 30 rearwardly and outwardly.

Because of its conical conformation, the coil spring 48 may be compressed over a wide range so as to accommodate the large and small flash bulbs. There is no interference between adjacent coils of the spring 48 when it is compressed, nor is there any tendency for the spring to shift laterally.

Fig. 7 illustrates a modified gripping element 30' which may be substituted for the gripping element 30 in the illustrative socket 10 shown in Figs. 1-6. The modified gripping element 30' is the same as the gripping element 30 except that the modified gripping element 30' is formed with prongs 60' which are bent inwardly toward each other

so as to enter to a greater extent into the annular groove 15 formed in the small lamp base 14.

Figs. 8-16 illustrate a modified flash lamp socket 66 (Fig. 15) embodied in a complete flash gun unit 68 (Fig. 8). In most respects the modified socket 66 is similar to the socket 10 illustrated in Figs. 1-6. Accordingly, those components of the modified socket 66 which are substantially similar to corresponding components of the socket 10 have been given the same reference characters in Figs. 8-16, with the addition of the suffix "a."

Thus, it will be seen that the modified socket 66 includes a movable upper jaw or gripping element 30a which is substantially similar to the jaws 30 of the first embodiment, except for certain details to be pointed out presently. Acting in opposition to the upper movable jaw 30a is a lower movable jaw 70 which includes the arm 32a, the pivots 33a and 34a, the gripping flanges 58a, the interconnecting web 59a, and the prongs 60a of the upper jaw 30a. In addition, however, the web portion 52a of the lower jaw 70 is extended rearwardly to form a lever or handle 72 adapted to be swung downwardly to eject used flash lamps from the socket 66. A reinforcing rib 74 is formed centrally along the ejection lever 72. Since the ejection lever 72 is formed integrally with the lower jaw 70, rather than being mounted on the pivot for the jaw as in the first embodiment 10, the pivots 33a and 34a for both jaws 30a and 70 are made the same length.

As shown to best advantage in Figs. 10 and 12, the modified socket 66 is mounted in a housing 76, which preferably is molded from a resinous plastic material. The upper end of the body 22a of the modified socket 66 is in the form of a straight lug 78 which extends through a slot 80 formed in the housing 76. The socket 66 is secured in the housing by means of a rearwardly bent bifurcated lug 82 (Fig. 15) formed at the lower end of the body 22a so as to extend through a slot 84. In the exemplary form of the flash gun 68, the end of the lug 82 is bent downwardly to form flanges 86 which lock against a wall element 88 of the housing 76 adjacent the slot 84.

A pair of forwardly extending hooked prongs 90 are formed on the socket body 22a to lock a lamp reflector 92 in place on the housing 76. Bayonet type locking slots 94 are formed in the reflector to receive the hooked prongs 90. The rear side of the reflector 92 abuts against a plurality of radial buttresses 96 formed on the housing 76.

It will be seen that the lower portion of the housing 76 is in the form of a battery case 98 adapted to receive a pair of pen light cells (not shown) in a pair of recesses 100. Opposite ends of the pen light cells make contact with springs 102 connected to a pair of prongs 104 adapted to be plugged into a receptacle or socket on the body of a camera (not shown). It will be understood that the flash lamp held in the socket 66 is fired when the prongs 104 are connected together by means of a synchronizing switch (not shown) embodied in the shutter of the camera. The opposite ends of the pen light cells make contact with resilient arms 106 and 108 formed on the body 22a of the socket 66 and on the metallic strip 50a which supports the center contact spring 48a. In this way, the cells are connected to the base and the center contact of the flash lamp. The battery case 98 is normally closed by a cover 110 which is retained at its upper end on the housing 76 by means of a tongue 112 received in a slot 114 formed in the housing. At its lower end, the cover 110 is retained by a locking spring 116 adapted to be received in a slot 118.

It will be seen that the ejection lever 72 extends rearwardly from the socket 66 through a slot 120 which in this instance is formed in the battery case cover 110. The range of movement of the lever 72 is defined by shoulders 122 and 124 formed on the housing 76 and the cover 110 at the upper and lower ends of the slot 120.

To bias the jaws 30a and 70 forwardly so that they will grip a flash lamp inserted into the modified socket

66, the socket is provided with a pair of springs 126. In this instance, each spring comprises a length of wire formed into a pair of coiled portions 128 received over the pivots 33a and 34a and interconnected by means of a U-shaped loop 130. The opposite ends of the coils are formed into arms 132 which abut against the flanges 41a on the socket body 22a.

In order to engage one of the locking pins 19 on the large based type of flash lamp 12, the movable jaw 70 is provided with a flange 134 which projects upwardly between the gripping flanges 58a of the jaw. It will be seen that the flange 134 occupies generally the same position as the end portion 44 of the flat spring 40 employed in the embodiment of Figs. 1-6. The flange 134 is formed with an arcuate outer edge 136 adapted to hook behind one of the pins 19 on the lamp 12, as indicated in Fig. 10. The flange 134 may be secured to the jaw 70 by means of lugs 138 extending through suitable apertures in the web 59a. It has been found that the single flange 134 on the lower jaw 70 retains the lamp 12 securely and that it is not necessary to provide a similar flange on the upper jaw 30a.

In order to grip the large based lamps 12, the upper and lower jaws 30a and 70 are formed with beveled front, inner corners 140 on the gripping flanges 58a. These beveled corners 140 hold the lamp 12 securely while facilitating insertion of the lamp into the socket.

In operation, a flash lamp is inserted into the modified socket 66 simply by pushing the lamp into the opening formed by the sleeve elements 25a of the socket. In the case of the large based lamp 12, the upper and lower jaws 30a and 70 are thereby pushed rearwardly until the beveled corners 140 grip the base 18 of the lamp. The lower locking pin 19 snaps behind the flange 134, with the result that the lamp is retained in the socket. Electrical contact is established with the center contact point 20, by means of the conical contact spring 48a. After the lamp 12 has been fired, the lever 72 is swung downwardly, with the result that the gripping flanges 58a and the retaining flange 134 on the lower jaw 70 are disengaged from the base of the lamp. Accordingly, the contact spring 40a and the upper jaw 30a eject the lamp 12 out of the socket.

In the case of the small based lamp, the insertion of the lamp pushes the jaws 30a and 70 rearwardly until the prongs 60a on the gripping flanges 58a are seated in the locking groove 15. When the ejection lever 72 is swung downwardly, the lower jaw 70 is disengaged from the lamp base 14, with the result that the spring 48a ejects the lamp.

Various other modifications, alternative constructions, and equivalents may be provided without departing from the true spirit and scope of the invention as exemplified in the drawing and the foregoing specification, and as defined in the following claims.

I claim:

1. A universal flash lamp socket for selectively receiving either a relatively large lamp having a relatively large diameter base equipped with a pair of diametrically opposite outwardly projecting locking pins or a relatively small lamp having a relatively small diameter base formed with a circumferential locking groove, both the large and the small lamps having center contact points, said socket comprising, in combination, sleeve means for guidingly receiving the relatively large base, a pair of opposed jaws extending into said sleeve means, means mounting said jaws for rearward and outward swinging movement to receive a lamp of either the large or small type, means for biasing said jaws inwardly and forwardly, said jaws having spaced longitudinally extending guide flanges for guidingly receiving the relatively small base therebetween when inserted into the socket, said jaws having lips formed thereon for entering into the locking groove in the relatively small base and thereby retaining the relatively small lamp in the socket, a yieldable member for engaging the center contact point on either the

large or the small type of base, and means for swinging at least one of said jaws rearwardly and outwardly to release the lamp held thereby for ejection by said yieldable member.

2. A universal flash lamp socket for selectively receiving either a relatively large lamp having a relatively large diameter base equipped with a pair of diametrically opposite outwardly projecting locking pins or a relatively small lamp having a relatively small diameter base formed with a circumferential locking groove, both the large and the small lamps having center contact points, said socket comprising, in combination, sleeve means for guidingly receiving the relatively large base, said sleeve means having a pair of opposed arcuate guiding elements with a pair of longitudinal slots therebetween for locating the locking pins of the relatively large base, a pair of opposed arms extending generally radially inwardly through said slots, means pivotally supporting the outer ends of said arms for rearward and outward swinging movement, a pair of opposed channel-shaped jaws mounted on the inner ends of said arms for gripping the relatively large base therebetween, said jaws being adapted to swing rearwardly and outwardly when the relatively large base is inserted into the sleeve means, a pair of flat zig-zag springs for biasing said jaws forwardly and inwardly, said springs having inner end portions extending into said jaws for latching engagement with the locking pins on the large base, the pins being adapted to snap behind said inner end portions when the large base is inserted into the socket, said jaws having spaced longitudinally extending symmetrically disposed guide flanges for guidingly receiving the relatively small base therebetween when inserted into the socket, said flanges having prongs formed at their rear corners for entering into the locking groove in the relatively small base and thereby retaining the relatively small lamp in the socket, a coiled conically-shaped spring for engaging the center contact point on either the large or the small type of base, and a hand lever connected to one of said arms for swinging one of said jaws rearwardly and outwardly to release the lamp held thereby for ejection by the coiled spring.

3. A universal flash lamp socket for selectively receiving either a relatively large lamp having a relatively large diameter base equipped with a pair of diametrically opposite outwardly projecting locking pins or a relatively small lamp having a relatively small diameter base formed with a circumferential locking groove, both the large and the small lamps having center contact points, said socket comprising, in combination, sleeve means for guidingly receiving the relatively large base, said sleeve means having a pair of opposed arcuate guiding elements with a pair of longitudinal slots therebetween for locating the locking pins of the relatively large base, a pair of opposed arms extending generally radially inwardly through said slots, means pivotally supporting the outer ends of said arms for rearward and outward swinging movement, a pair of opposed channel-shaped jaws mounted on the inner ends of said arms for gripping the relatively large base therebetween, said jaws being adapted to swing rearwardly and outwardly when the relatively large base is inserted into the sleeve means, a pair of springs for biasing said jaws forwardly and inwardly, one of said jaws having an inwardly extending flange element thereon for latching engagement with one of the locking pins on the large base, the pin being adapted to snap behind said flange element when the large base is inserted into the socket, said jaws having spaced longitudinally extending symmetrically disposed guide flanges for guidingly receiving the relatively small base therebetween when inserted into the socket, said flanges having prongs formed at their rear corners for entering into the locking groove in the relatively small base and thereby retaining the relatively small lamp in the socket, a coiled conically-shaped spring for engaging the center contact point on either the large or the small type of base, and a hand lever on one of

said jaws for swinging said jaw rearwardly and outwardly to release the lamp held thereby for ejection by the coiled spring.

4. In a flash lamp socket for selectively receiving individual lamps with bases differing in size from relatively large to relatively small, the combination comprising socket shell means having an opening therein for guidingly receiving individual bases of relatively large size, said opening being of a size corresponding to the bases of relatively large size a plurality of jaws extending a substantial distance into said shell means and spaced at substantially equal angles around the axis thereof, said jaws when at rest defining an opening therebetween of a size less than the size of said relatively small bases, means mounting said jaws for free swinging movement outwardly of said shell means to admit individual lamp bases of relatively large and small sizes, resilient means biasing said jaws inwardly to grip the individual lamp bases, each of said jaws having a pair of spaced longitudinally extending guide flanges for guidingly receiving individual bases of a size smaller than said large size, a yieldable member for engaging the rear ends of the individual bases, and means for swinging at least one of said jaws outwardly to release the lamp held thereby for ejection by said yieldable member.

5. In a flash lamp socket for selectively receiving individual lamps with bases differing in size from relatively large to relatively small, the combination comprising

socket shell means having an opening therein for guidingly receiving individual bases of relatively large size, said opening being of a size corresponding to the bases of relatively large size a plurality of jaws extending a substantial distance into said shell means and spaced at substantially equal angles around the axis thereof, said jaws when at rest defining an opening therebetween of a size less than the size of said relatively small bases, means mounting said jaws for free swinging movement outwardly of said shell means to admit individual lamp bases of relatively large and small sizes, and resilient means biasing said jaws inwardly to grip the individual lamp bases, each of said jaws having a channel extending from front to rear therein and of a size substantially less than the size of said relatively large bases for guidingly receiving individual bases of a size smaller than said large size.

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