

United States Patent

[11] 3,624,727

[72] Inventors **William H. Horton;**
Edward L. Sturm, both of Rochester, N.Y.
[21] Appl. No. **855,467**
[22] Filed **Sept. 2, 1969**
[45] Patented **Nov. 30, 1971**
[73] Assignee **Eastman Kodak Company**
Rochester, N.Y.

3,517,182 2/1968 Brooks et al. 240/1.3
Primary Examiner—John M. Horan
Assistant Examiner—Thomas A. Mauro
Attorneys—Robert W. Hampton and J. Addison Mathews

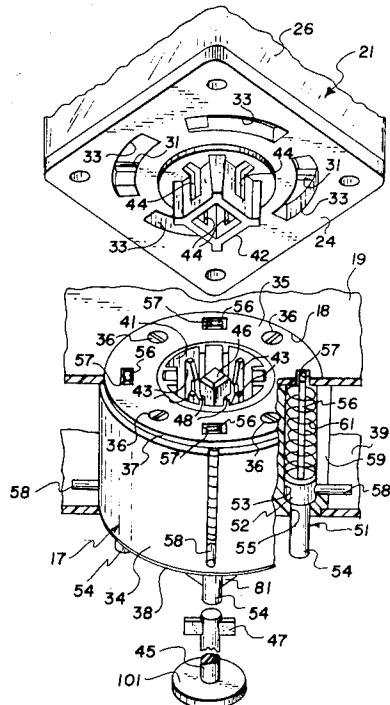
[54] **SOCKET FOR PERCUSSIVELY IGNITABLE
MULTIPLE-LAMP FLASHBULB UNITS**
13 Claims, 12 Drawing Figs.

[52] U.S. Cl. 95/11.5 R,
95/11 R, 240/1.3
[51] Int. Cl. G03b 9/70
[50] Field of Search 240/1.3;
431/92, 93, 94, 95; 95/11, 11.5

[56] **References Cited**
UNITED STATES PATENTS

590,204 9/1897 Blackmore 95/11.5
2,191,402 8/1939 Saffir et al. 431/93 X

ABSTRACT: The disclosure relates to the provision of a camera with a socket member for supporting a so-called flashcube or related multiple-flashbulb unit comprising a plurality of percussively ignitable flashbulbs, each of which is adapted to be fired in response to displacement of a corresponding percussion element within the flashbulb unit. The socket member can be rotatively indexed to transport each flashbulb to a predetermined firing position and includes a corresponding plurality of firing members which remain in alignment with the respective percussion elements and which are movable independently to effect displacement of those elements. An ignition member operated by the camera's shutter release mechanism is adapted to move the firing member associated with the flashbulb at the firing position, thereby causing that bulb to fire in predetermined synchronism with the opening of the camera shutter.



PATENTED NOV 30 1971

3,624,727

SHEET 1 OF 4

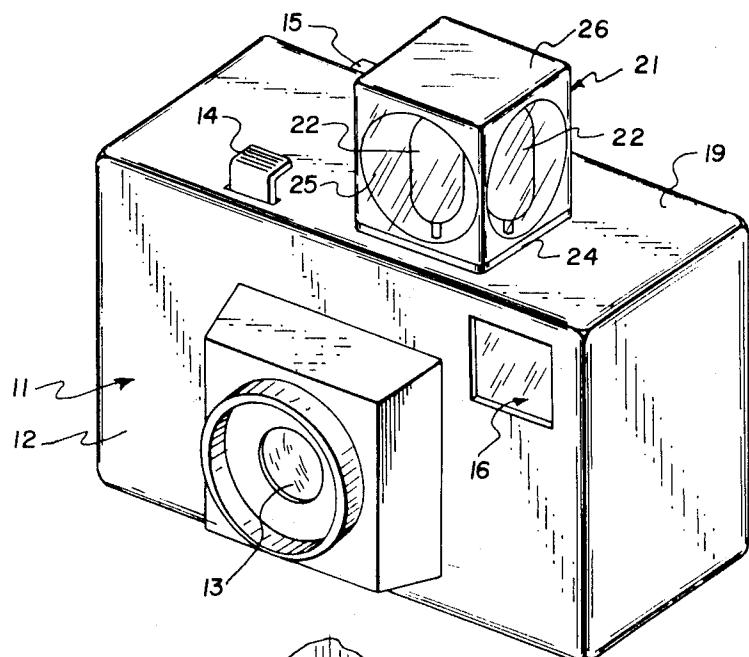


FIG. I

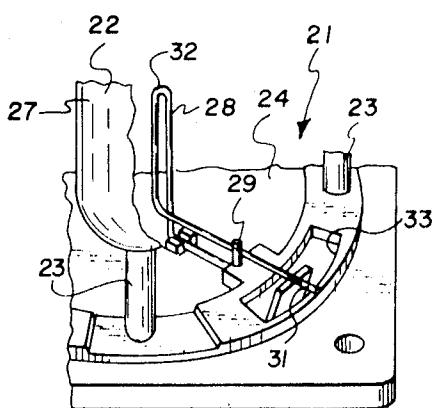
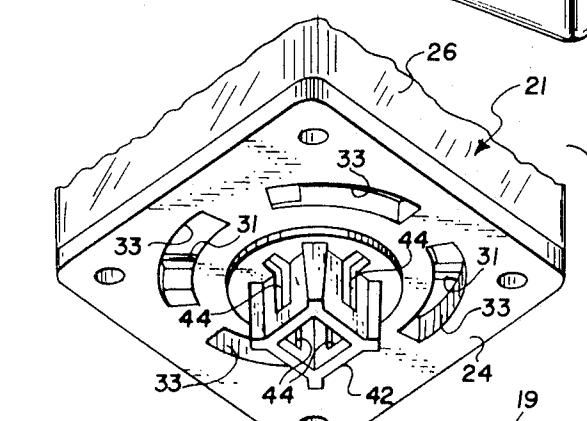
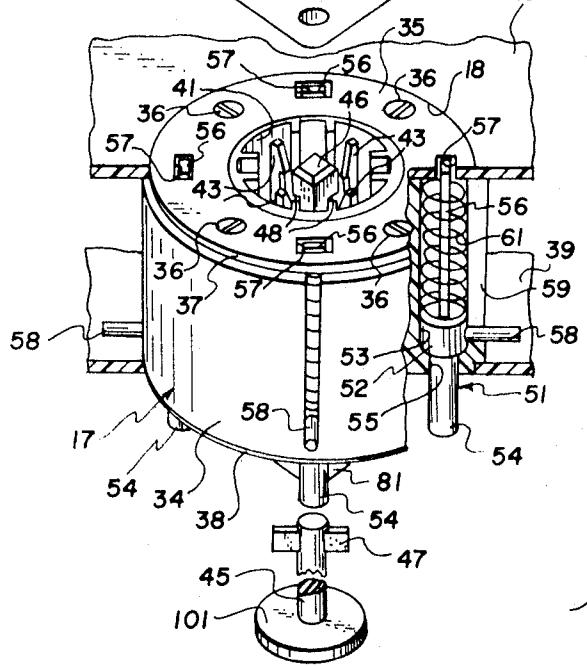


FIG. 3



-FIG. 2

WILLIAM H. HORTON
EDWARD L. STURM
INVENTORS

BY *J. Addison Mathews*
Robert W. Hampton
ATTORNEYS

PATENTED NOV 30 1971

3,624,727

SHEET 2 OF 4

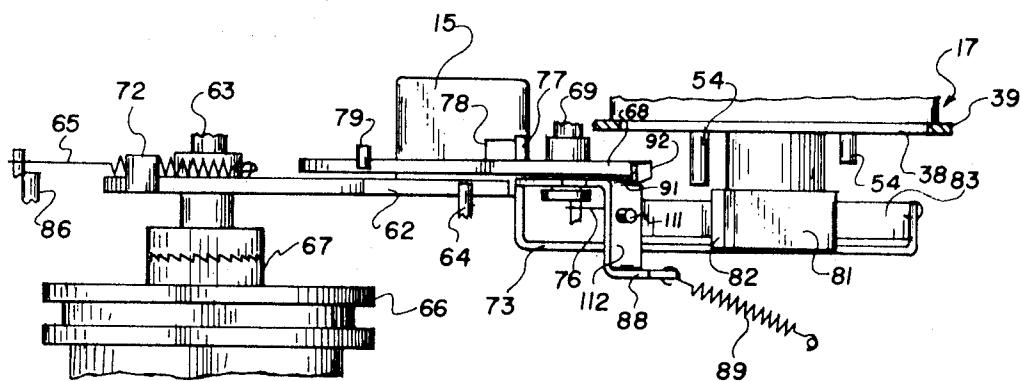
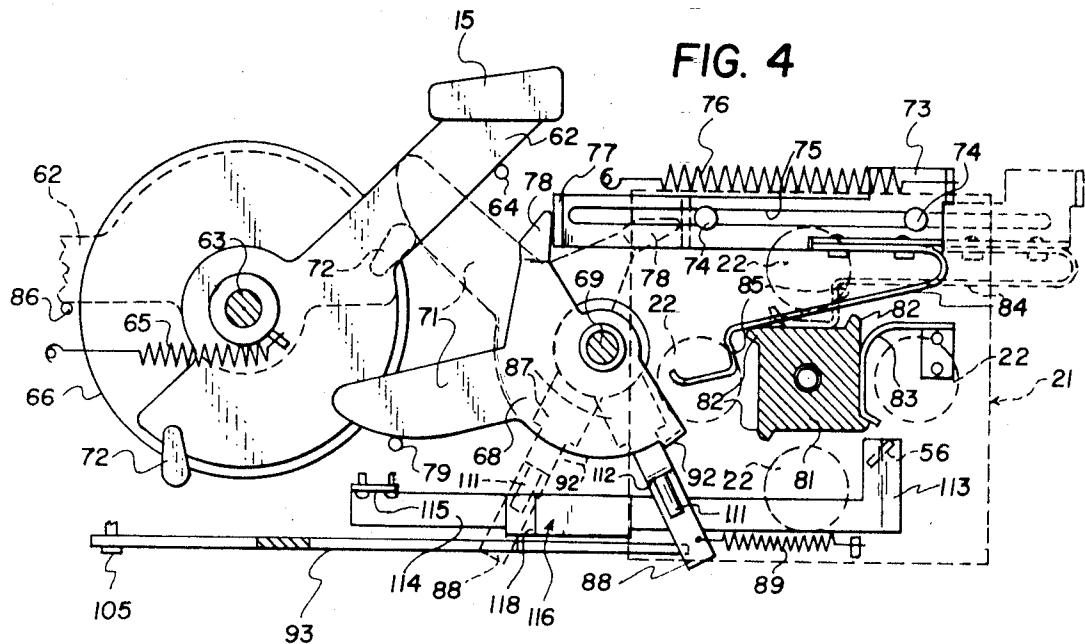


FIG. 5

WILLIAM H. HORTON
EDWARD L. STURM
INVENTORS

BY *J. Addison Matteson*
Robert W. Hampton

ATTORNEYS

PATENTED NOV 30 1971

3,624,727

SHEET 3 OF 4

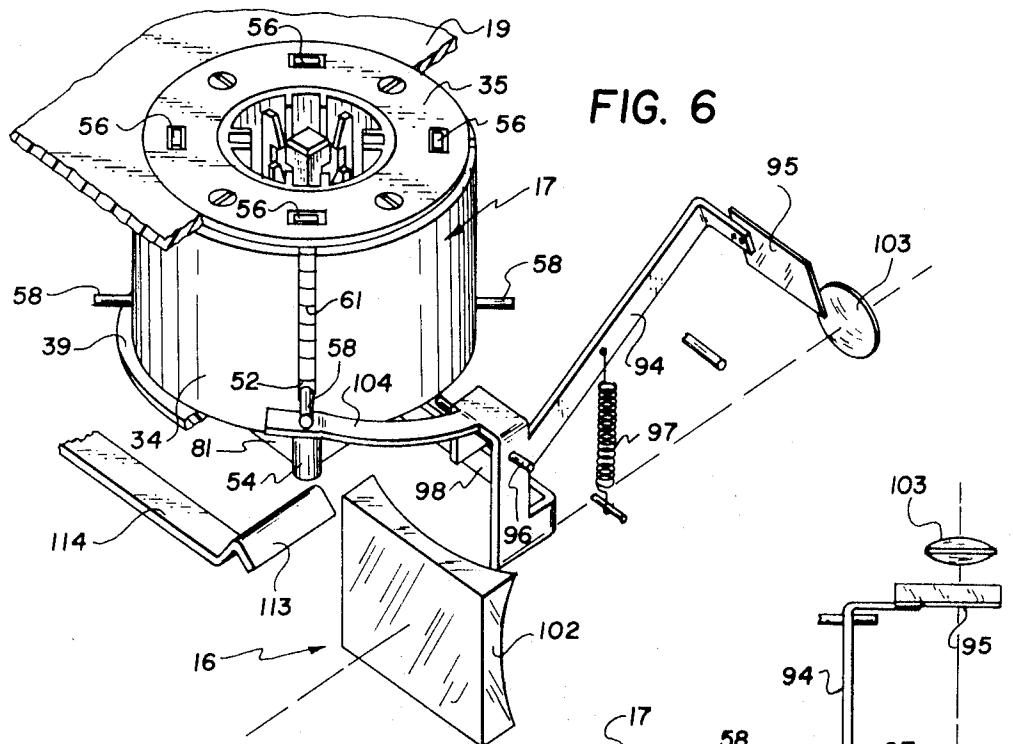


FIG. 7

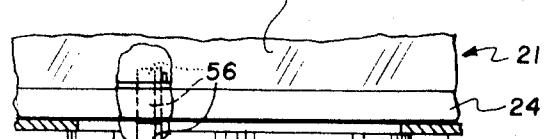
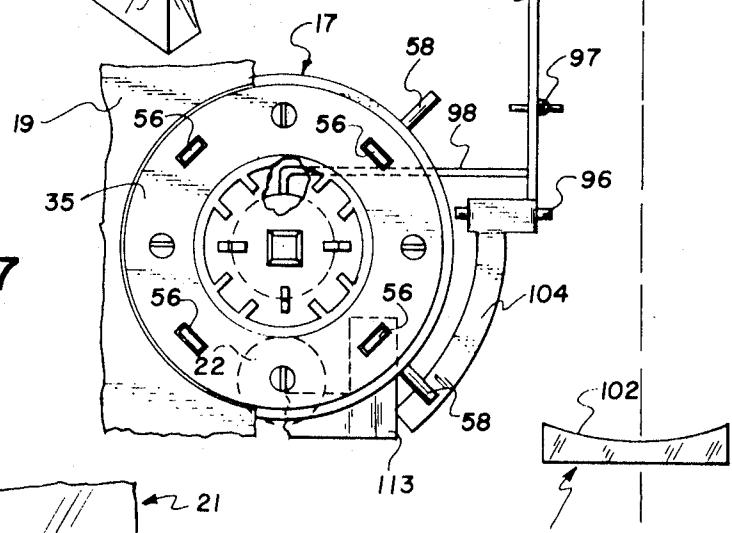
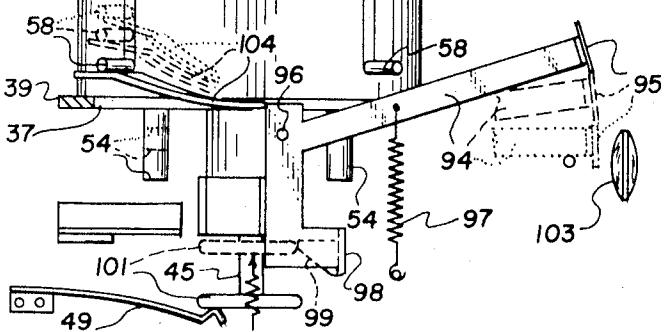


FIG. 8



WILLIAM H. HORTON
EDWARD L. STURM
INVENTORS

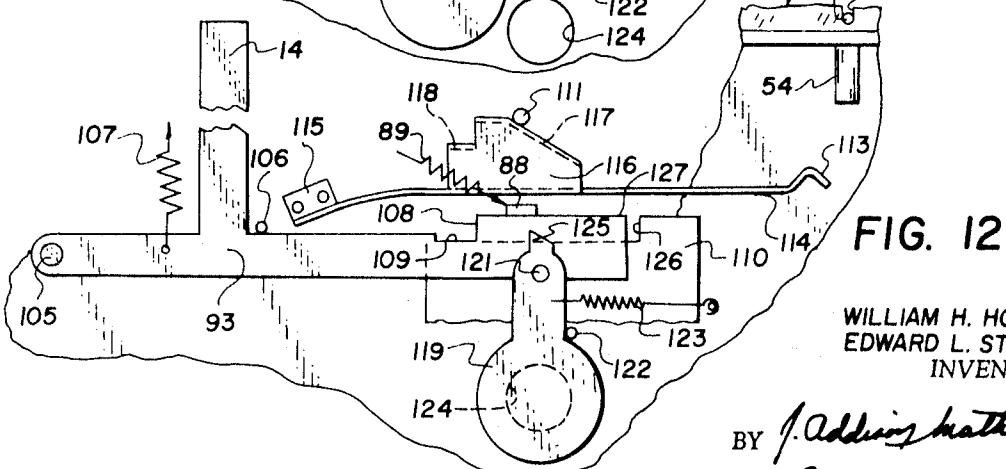
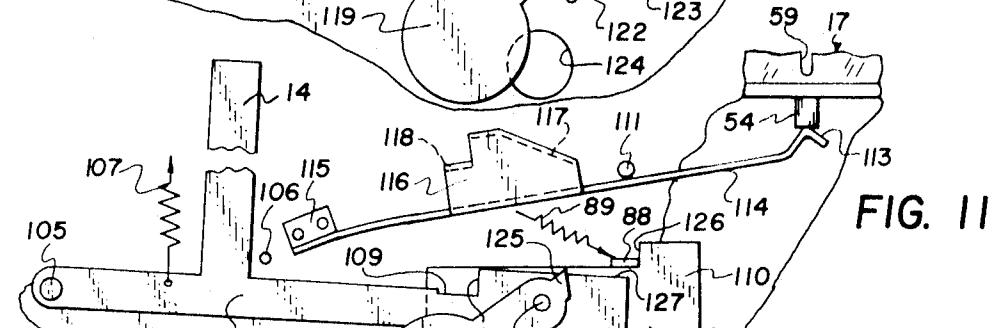
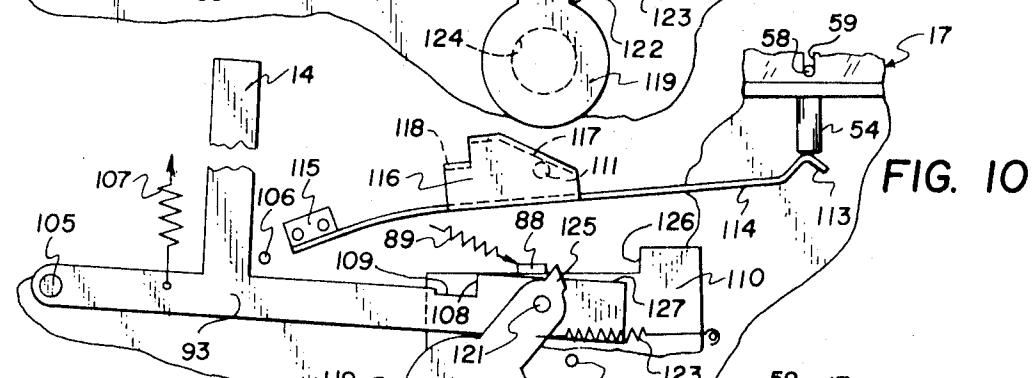
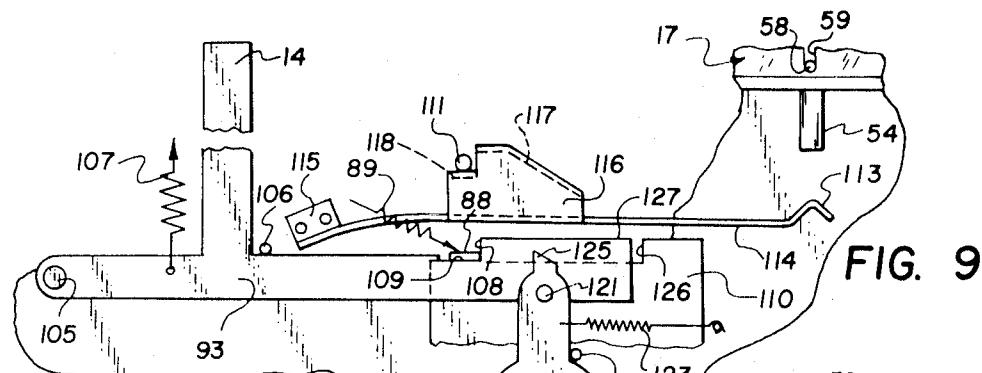
BY *J. Adkins, Jr.*
Robert W. Dauphin

ATTORNEYS

PATENTED NOV 30 1971

3,624,727

SHEET 4 OF 4



WILLIAM H. HORTON
EDWARD L. STURM
INVENTORS

BY J. Addison Mathews
Robert W. Hampton

ATTORNEYS

SOCKET FOR PERCUSSIVELY IGNITABLE MULTIPLE-LAMP FLASHBULB UNITS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to cameras adapted to use so-called flashcubes or other multiple-flashbulb units and more particularly to means for supporting and firing multiple-flashbulb units of the percussively ignitable type.

2. Description of the Prior Art

Many modern cameras are adapted to use so-called flashcubes, comprising four flashbulbs combined in a single-flashbulb unit which is received by a socket member that can be rotated to move each bulb, in turn, into firing position. In the past, the bulbs of such flashcubes have been fired by electrical means, but similar percussively fired flashcubes have recently been developed, as described, for example, in copending U.S. Pat. applications Ser. No. 766,751 entitled PERCUSSION IGNITABLE FLASH UNIT HAVING CONTACT ACTUATABLE PRE-ENERGIZED STRIKERS AND PHOTOGRAPHIC APPARATUS USING SUCH UNITS, filed in the name of J. Poweska et al. on Oct. 11, 1968, and Ser. No. 850,125 entitled FIRING MECHANISM FOR PERCUSSIVELY IGNITABLE FLASHLAMPS, filed concurrently herewith in the name of E. L. Sturm.

In a percussively fired flashcube of the type disclosed in the above-identified applications, each flashbulb is adapted to be fired in response to the physical movement of a percussion element associated with that bulb in the flashcube. For example, as specifically disclosed in the aforementioned concurrently filed Sturm U.S. application Ser. No. 850,125, each flashbulb may be associated with a corresponding precocked striker wire which strikes an impact-sensitive ignition tube of that bulb when the wire is moved out of engagement with a blocking member.

In order to minimize the possibility of accidental ignition of a flashbulb in a percussively ignitable flashcube, the percussion elements preferably are enclosed within the flashcube and are accessible only through relatively small corresponding openings in the base member thereof. As the flashcube socket member is indexed to bring successive bulbs into firing position, the base member opening aligned with the percussion element of the bulb at that position is accessible to a firing member built into the camera; thereby allowing the firing member to effect ignition of that bulb or to operate a signal device to alert the operator to the absence of a usable bulb at the firing position. To enable the flashcube to be indexed to its next position, the firing member must then be retracted from the opening in the base member and retained in its retracted position while the indexing movement is taking place. Various embodiments of flashcube sockets and percussive firing devices adapted to function in this manner are disclosed, for example, in the aforementioned applications and in concurrently filed U.S. Pat. applications Ser. No. 850,701 entitled FLASH FIRING AND SENSING MECHANISM FOR CAMERA OR ATTACHMENT ADAPTED TO USE PERCUSSIVELY FIRABLE FLASH LAMPS filed in the names of W. H. Horton and C. W. Michatek and U.S. Pat. application Ser. No. 854,567 entitled FLASHBULB INDEXING MECHANISM, filed in the name of D. M. Harvey, and U.S. Pat. application Ser. No. 767,145, filed Oct. 14, 1968, in the name of Edward L. Sturm, entitled CONTROL, SIGNAL AND ACTUATING MECHANISM FOR USE WITH PHOTOFLASH LAMP UNITS HAVING PRE-ENERGIZED STRIKERS.

SUMMARY OF THE INVENTION

By employing a single firing member to engage and displace each of the percussion elements of a percussively ignitable flashcube, in succession, the prior art mechanisms described above inherently involve the use of relatively complicated and expensive means for moving the firing member into and out of the flashcube in coordination with its indexing movement. To

eliminate this source of complication and expense, the present invention contemplates the provision of a similar camera with a rotatable flashcube socket member including a plurality of movable firing members which remain at all times in alignment with the corresponding openings in the base member of a flashcube carried by the socket member. To fire the flashbulb located at the firing position, an igniter member housed within the camera is engageable with the particular firing member associated with that bulb and is adapted to move that firing member in synchronism with the operation of the camera shutter to effect displacement of the corresponding percussion element. As mentioned above, that firing member can also be employed before the shutter release mechanism is operated to sense the condition of the operatively positioned flashbulb and to provide a warning signal if that particular bulb has already been fired. Since all of the firing members move with the socket member, the present invention therefore eliminates the need for retracting those members from the flashcube to allow the latter to be indexed; thus eliminating the mechanism heretofore required to perform that function.

Various means for practicing the invention and other advantages and novel features thereof will be apparent from the following detailed description of an illustrative preferred embodiment of the invention, reference being made to the accompanying drawings in which like reference numerals denote like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

30 In the accompanying drawings:
 FIG. 1 is a perspective view of a camera of a type adapted to utilize the present invention;
 FIG. 2 is a perspective view of the base of a percussively ignitable flashcube and of a camera socket member according to the present invention adapted to receive the same;
 FIG. 3 is a perspective fragmentary view of a percussively ignitable flashcube, partially depicting one of the flashbulbs therein and showing the percussive ignition means associated with that bulb;
 FIG. 4 is a somewhat schematic plan view of the drive mechanism of a camera comprising a preferred embodiment of the present invention;
 FIG. 5 is a front elevational view of the mechanism depicted in FIG. 4;
 FIG. 6 is a perspective illustration of the flashcube socket shown in FIG. 2, depicting the operative elements associated therewith in accordance with the present invention;
 FIG. 7 is a partially fragmented plan view of the structure depicted in FIG. 6;
 FIG. 8 is an end view of the structure shown in FIGS. 6 and 7, illustrating the means by which a signal is provided in the camera viewfinder to indicate the presence or absence of a usable bulb at the bulb-firing position; and
 FIGS. 9-12 are somewhat schematic front elevational views of the shutter and ignition-actuating means incorporated in the subject camera, illustrating the relative positions of the depicted components during successive stages of operation as the shutter-operating member is actuated and as the film is thereafter wound to prepare the camera for the next exposure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The camera shown in FIG. 1, designated by numeral 11, is 65 of generally conventional appearance, comprising a boxlike housing 12, an objective lens assembly 13, a shutter-operating member 14, a handle 15 of a film-winding lever, and a viewfinder 16. As shown in FIG. 2, a socket member 17 is located within the camera housing and is accessible through a circular opening 18 in the top housing wall 19 to allow a percussively ignitable flashcube 21 to be rotatably supported atop the camera.

As described more specifically in aforementioned concurrently filed Sturm U.S. Pat. application Ser. No. 850,125, the percussively ignitable flashcube comprises four flashbulbs 22,

which are supported by their respective ignition tubes 23 on a generally square base member 24. A reflector member 25 provides a concave reflecting surface behind each respective flashbulb, all of which are enclosed in a transparent housing 26 attached to the base member. As best shown in FIG. 3, each of the flashbulbs includes a glass envelope 27, which is partially filled with fine zirconium wire or some other combustible material adapted to provide illumination when ignited. The ignition tube 23 of each flashbulb is hollow and relatively thin and contains a percussion-sensitive primer material coated on a central anvil pin within the bore of the tube. As is also shown in FIG. 3, each of the flashbulbs is associated with a corresponding percussion element comprising a resilient striker wire 28, one end of which is supported to the base member and projects upwardly to provide a stop pin 29. The opposite free end of the striker wire is disposed horizontally as shown at 31, and is biased toward the ignition tube of the corresponding flashbulb by the torsional influence of the upwardly extending central loop 32 of the wire. Initially, the free end of the striker wire is trapped in a cocked position behind stop pin 29 above the corresponding arcuate slot 33 in the flashcube base member. If the free end of the striker wire is lifted beyond its stop pin, however, it will snap into percussive contact with the ignition tube of the corresponding bulb. The impact of the wire against the ignition tube locally pinches the tube against the anvil pin, causing the primer material to be exploded and thrown upwardly into the glass envelope to effect ignition of the combustible material within the bulb envelope.

The flashcube socket member 17 comprised a cylindrical body member 34 to which a cover ring 35 is secured by screws 36. The edge of ring 35 is of somewhat smaller diameter than the body member to provide an annular shoulder 37 received in opening 18 in the top wall of the camera. A similar shoulder 38 at the lower end of the body member is received in the same manner in a corresponding opening in support plate 39. Accordingly, the socket member is supported for rotation about its vertical axis with the top surface of ring 35 substantially flush with the surrounding upper surface of the camera housing.

As disclosed in greater detail in aforementioned concurrently filed Sturm application Ser. No. 850,125, the socket member is provided with a central opening 41 adapted to receive the generally rectangular base post 42 of a percussively ignitable flashcube to rotationally align the flashcube with the socket member. When the flashcube is thus installed in the socket, four resilient pawl fingers 43 in the latter engage corresponding openings 44 in the flashcube base post to hold the flashcube in its loaded position. Although the flashcube can be manually withdrawn from the socket in opposition to the resilient pawl fingers, the latter are of sufficient strength to prevent the flashcube from being dislodged by the upward pressure exerted on the ignition wires to fire the flashbulbs.

For purposes hereinafter described, a sensing pin 45 is received in the tubular central stud 46 of the socket member with its opposed wings 47 extending outwardly through stud slots 48 into socket opening 41. The sensing pin is urged upwardly by a leaf spring shown at 49 in FIG. 8, whereby the pin assumes a raised position when the socket is empty but is depressed by the base post of a flashcube loaded into the socket member.

Directly below the position assumed by each cocked striker wire of a flashcube mounted in the socket member, the latter is provided with a firing member 51 aligned with the corresponding flashcube base slot 33. As illustrated in FIG. 2, each firing member includes a central cylindrical flange 52 slidably received in a vertical hole 53 in the socket body member 34; a smaller diameter rod 54 extending below the socket body member through the correspondingly smaller lower end 55 of hole 53; a tongue 56 received in a mating rectangular slot 57 in ring 35; and a radial pin 58 projecting beyond the socket member through a corresponding vertical slot 59 intersecting hole 53. A relatively weak coil spring 61

5 encircles each tongue and is slightly compressed between the cover ring and the corresponding firing member flange to bias firing member downwardly to the position shown in FIG. 2, in which the upper tip of the tongue is flush with the top surface of the cover ring. By compressing spring 61, the firing member can therefore move upwardly, as later explained in detail, to bring the upper end of its tongue into engagement with the cocked firing wire aligned therewith.

10 Referring now to FIGS. 4 and 5 of the accompanying drawings, the subject camera will be seen to include a film-winding mechanism comprising a winding lever 62 carried by a rotatably supported vertical shaft 63 and biased in a clockwise direction against a stop pin 64 by a spring 65. The lower end of shaft 63 is connected to the film takeup spool 66 within the camera through a unidirectional clutch depicted at 67, thereby causing film to be wound onto the takeup spool in response to reciprocatory movement of the winding lever.

A transmission lever 68 is rotatably supported by vertical stud 69 and is provided with a radial arm 71 which overlaps the adjacent edge of the winding lever in the path of movement of drive lug 72 projecting upwardly therefrom. Slide member 73 is slidably supported by rivets 74 extending through elongate slot 75 and is biased toward the winding lever by a relatively strong spring 76. A vertical ear 77 at the end of the slide member adjacent the transmission lever engages the tip of a second arm 78 extending outwardly from the latter, thereby biasing lever 68 in a counterclockwise direction against stop pin 79 as shown in solid lines in FIG. 4.

20 30 A generally square socket drive member 81, provided with corner ears 82, depends from the socket member as illustrated in FIGS. 4 and 5. A leaf-type positioning spring 83 laterally engages the socket drive member and thereby tends to orient the socket member so that the flashcube therein is parallel to the 35 camera with its forwardly facing flashbulb in firing position. A similar leaf-type drive spring 84 is mounted to the slide member and is also laterally engaged with the socket drive member. Whenever the slide member is in the position shown in solid lines in FIG. 4, shoulder 85 near the free end of spring 40 84 is positioned beyond the socket drive member; thus relieving the tension of that spring sufficiently to prevent it from interfering with the the flashcube orientation established by 45 positioning spring 83. Upon manual movement of winding lever 62 into contact with stop pin 86, as shown in broken lines in FIG. 4, drive lug 72 engages arm 71 of the transmission lever and rotates the latter in a clockwise direction to the position likewise shown in broken lines. Consequently, the tip of transmission lever arm 78 moves slide member 73 and drive spring 84 to their respective similarly depicted positions in opposition to the resistance of spring 76. As the drive spring is so moved, its shoulder 85 encounters the adjacent corner ear of the socket member and rotates the latter through a 90° angle in a clockwise direction by temporarily overpowering the influence of positioning spring 83. When the winding lever is 50 released and is restored by spring 65 to its initial position, spring 76 likewise returns slide member 73, drive spring 84 and transmission lever 68 to their respective former positions. During this return movement of the drive spring, however, it 55 does not rotate the socket drive member, which is prevented from turning in a counterclockwise direction by positioning spring 83.

60 Drive lever 87 is rotatably supported on stud 69 below transmission lever 68 with its forwardly extending driving arm 65 88 biased both downwardly and in a counterclockwise direction by a spring 89. The sloped edge 91 of a depending lug 92 on the transmission lever engages the drive lever and rotates the latter in a clockwise direction in opposition to spring 89 as the transmission lever is driven in the same 70 direction by the winding lever. As will be described later, the end of arm 88 connected to spring 89 is held upwardly until it reaches the cocked position shown in broken lines in FIG. 4, whereupon it drops out of engagement with lug 92 and is latched in that position by latch bar 93. Consequently, during the return movement of the winding lever to its former posi-

tion by spring 65, arm 88 remains in its cocked position. Preferably, the camera is provided with a film-metering mechanism which arrests movement of the winding lever each time a film frame is moved into exposure position. Regardless of the manner in which the film winding is controlled, however, each successive winding operation requires at least one complete movement of the winding lever and not more than a subsequent partial movement of that lever through an angle less than that required to move drive stud 72 into engagement with arm 71 of the transmission lever. Thus, each successive film-winding operation will cause the flashcube to be rotated only once, in the manner just described.

A signal lever 94, provided with a translucent signal vane 95, is supported for rocking movement by a pivot stud 96 and is biased downwardly by a weak coil spring 97. An arm 98 extends from the signal lever beneath the socket member and is provided with a cam nose 99, shown in FIG. 8. As previously mentioned, when no flashcube is present in the socket member, sensing pin 45 is located in its raised position by leaf spring 49. Consequently, cam disc 101 at the bottom end of the sensing pin is likewise raised to the position shown in broken lines in FIG. 8. Therefore, disc 101 engages cam nose 99 and holds the signal lever in the position shown in solid lines in FIGS. 6 and 8 to maintain the signal vane above the field of view of the viewfinder comprising lenses 102 and 103. When a flashcube is installed in the socket member, its base post depresses the sensing pin so that the cam disc is located below the path of movement of cam nose 99, as shown in solid lines in FIG. 8, thus preventing cam disc 101 from influencing the position of the signal vane.

An arcuate sloped cam arm 104 is carried by lever 94 laterally adjacent the socket member and is adapted to be engaged by radial pin 58 of the firing member associated with the flashbulb at the firing position. When a flashbulb has been moved into its firing position, the firing member associated with that flashbulb is urged upwardly by the cam arm under the influence of spring 97, which is strong enough to overcome the downward force of the corresponding firing member spring 61 but not strong enough to dislodge a cocked firing wire engaged by the tongue of the firing member. Therefore, if a usable bulb is present at the firing position, the cam arm will assume its intermediate position shown in broken lines in FIG. 8 and will maintain the signal vane beyond the field of view of the viewfinder as shown in the same manner in that FIGURE. If the bulb at the firing position has already been fired, the failure of the firing member tongue to encounter the corresponding cocked firing wire will allow the radial pin to be raised to its uppermost position by the cam arm as shown in dotted lines in FIG. 8; thus allowing the signal vane to move downwardly into view as likewise depicted in dotted lines. Accordingly, whenever a flashcube is mounted on the camera, the signal vane will remain in view only if an unusable bulb is located at the firing position.

The mechanism employed to operate the camera shutter and to fire the forwardly facing flashbulb in synchronism therewith is schematically illustrated in FIGS. 9-12, but it will be understood that analogous previously devised firing and signal mechanisms for use with percussively ignitable flashcubes are likewise compatible with the present invention; e.g., the mechanism disclosed in aforementioned concurrently filed Sturm U.S. Pat. application Ser. No. 850,125.

In the mechanism shown in FIGS. 9-12, the aforementioned latch bar 93 is pivotally supported by stud 105 and is urged upwardly toward stop pin 106 by a relatively strong spring 107. After the film-winding and bulb-positioning operation has been completed, the latch bar and the shutter-operating member 14 extending therefrom are located as shown in FIG. 9; with the tip of the cocked driving arm 88 trapped by shoulder 108 of the latch bar and resting on horizontal top surface 109 of a stationary guide rail 110.

Above the tip of driving arm 88, a horizontal drive pin 111, also shown in FIGS. 4 and 5, is supported by vertical segment 112 of that arm. Igniter hammer 113 is carried by the free end 75

of a resilient igniter blade 114, rigidly supported at its opposite end by mounting ear 115. A cam member 116 is carried by the igniter blade and includes a rearwardly facing sloped upper lip 117 and a shorter rearwardly facing lower lip 118. When the camera is in the condition represented in FIG. 9, the lower lip 118 of the cam member is trapped below drive pin 111, thereby maintaining the igniter blade in its depicted position with igniter hammer 113 located directly below the firing member associated with the forwardly facing flashbulb. As previously explained, the relatively strong spring 89 urges the tip of driving arm 88 both laterally and also downwardly, thus maintaining that arm temporarily in contact with guide rail 110 in opposition to the weaker upward force exerted on drive pin 111 by the resiliency of the igniter blade 114.

The camera shutter, which is of the well-known impact type, comprises a shutter blade 119 pivotally supported by pivot stud 121 and is biased toward pin 122 by a weak spring 123 to maintain the blade normally in alignment with the objective lens aperture shown at 124. A drive lug 125 projects upwardly from the shutter blade beyond the top surface 109 of guide rail 110 and is adapted to be struck by the tip of the driving arm, thereby momentarily opening the shutter as explained below.

Upon manual depression of the shutter operating member to the position shown in FIGS. 10 and 11, in opposition to spring 107, shoulder 108 of the latch bar disengages the tip of driving arm 88, causing that arm to be driven rapidly along the top surface 109 of guide rail 110 by spring 89. During such movement of the driving arm, drive pin 111 passes below the sloped upper lip 117 of cam member 116 and cams the igniter blade upwardly as shown in FIG. 10, supplementing the resilient upward force of the blade itself. Consequently, igniter hammer 113 strikes the lower end of the firing member 35 aligned therewith and drives it upwardly to effect ignition of the operatively positioned flashbulb by dislodging the corresponding cocked firing wire. Concurrently, the tip of the driving arm strikes shutter blade drive lug 125 and pivots the shutter blade out of alignment with the objective lens aperture 40 to expose the camera film. Since both the operation of the igniter blade and the firing of the bulb are effected in response to the movement of the driving arm, the bulb therefore flashes in predetermined timed relation to the opening of the shutter. By the time the tip of driving arm 88 abuts against shoulder 45 126 of guide rail 110 as shown in FIG. 11, it has passed beyond engagement with the shutter blade, which is then returned to its initial position as soon as spring 123 overcomes the inertia 50 of the blade. Also, it will be seen from FIG. 11 that the arrival of the driving arm at the end of its movement path is accompanied by the movement of drive pin 111 beyond the cam member carried by the igniter blade, which remains temporarily in its uppermost position.

Upon the release of the shutter operating member, the latch bar is returned to its raised position shown in FIGS. 9 and 12, thereby lifting the tip of the driving arm above guide rail 110 to reengage that arm with the transmission lever. This upward movement of the tip of the driving arm also raises drive pin 111 to a position in horizontal alignment with the top sloped surface of the cam member. When the winding lever is again operated, the resulting cocking movement of the driving arm therefore causes drive pin 111 to cam the igniter blade downwardly while the tip of arm 88 rides along the upper edge surface 127 of the latch bar past drive lug 125 of the shutter blade, as illustrated in FIG. 12. As it approaches its initial cocked position, the tip of arm 88 drops past shoulder 108 at the end of latch bar surface 127, thus disengaging the driving arm from the sector lever and restoring the various components to their inoperative positions shown in FIG. 9.

The invention has been described in detail with particular reference to an illustrative preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove and as defined in the appended claims.

I claim:

1. A socket member adapted to receive a flash illumination unit including a plurality of percussively ignitable flashbulbs each of which is provided with a corresponding percussion-firing element, said socket member including:

- a. orientation means for positioning said illumination unit in predetermined relation to said socket member when said illumination unit is received by said socket member, and
- b. retention means for retaining said illumination unit in received relation with said socket member, characterized by;
- c. firing means including a plurality of firing members supported by said socket member, said firing members being operatively movable independently of each other into firing cooperation with the corresponding ones of said percussion firing elements of said illumination unit received by said socket member.

2. In a camera including:

- a. shutter means operable to effect exposure of film within said camera,
- b. a rotatable socket member adapted to receive a percussively ignitable flashcube including a plurality of flashbulbs each of which is provided with a corresponding percussion-firing element,
- c. socket-indexing means for incrementally rotating said socket member relative to said camera to thereby locate different ones of the flashbulbs of said flashcube received by said socket member at a predetermined firing position, and
- d. an igniter member operable in predetermined timed relation with the operation of said shutter means, the improvement comprising;
- e. firing means including a plurality of firing members carried by said socket member for respective movement into firing cooperation with the corresponding ones of said percussion elements of said flashcube received by said socket member, said igniter member being adapted upon operation thereof to effect such movement only of that one firing member cooperable with the percussion firing element of that flashbulb then located at said firing position to thereby effect ignition of that flashbulb in predetermined synchronism with the operation of said shutter means.

3. The invention defined by claim 2 including resilient means biasing said firing members in a predetermined direction relative to said socket member.

4. The invention defined by claim 3 in which said resilient means bias said firing members toward respective inoperative positions at which the portions of said firing members cooperable with said firing elements are retracted into said socket member.

5. The invention defined by claim 2 including signal means for sensing and indicating the condition of the one of said flashbulbs located at said firing position, said signal means comprising:

- a. spring means for biasing that one firing member cooperable with the firing element of the flashbulb located at said firing position toward firing cooperation with that firing element but with insufficient force to effect ignition of that flashbulb, and
- b. indicator means operated by that one firing member in accordance with the position assumed thereby under the influence of said spring means for providing a visible warning signal if the flashbulb located at said firing position has previously been fired.

6. A socket for receiving a flash unit on a photographic camera, the flash unit including a plurality of mechanically fireable flash devices, the socket comprising:

- a support member for receiving the flash unit on the camera with each of the respective flash devices at a predetermined position of orientation relative to the socket;
- a plurality of flash-firing members each at a predetermined position of orientation relative to the socket, the predetermined positions of said firing members being

5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

located relative to the predetermined positions of the flash devices to pair each firing member with a respective flash device when the flash unit is received by said support member, each of said firing members being movable between a retracted position, wherein said member will be spaced from a respective flash device paired with said member, and an extended position, wherein said member will engage a flash device paired with said member without firing the device, said member being actuatable in the extended position to fire the device, and means for moving said firing members to their retracted positions when no flash unit is received by said support member and for moving said firing members to their extended positions when a flash unit is received by said support member.

7. Photographic apparatus for receiving and firing a multidevice flash unit; each device including a mechanically fireable flashlamp, and a firing element having an energized position from which the element is releasable to fire the flashlamps; the apparatus comprising:

- a support member for receiving the flash unit on the camera with each of the respective flash devices at a predetermined position relative to the socket; and,
- a plurality of firing members each at a predetermined angular orientation relative to the socket, the predetermined orientations of said firing members and the predetermined positions of said flash devices being located to pair each of the firing members with a respective flash device when the flash unit is received by said support member; each of said firing members having a first extended position for nonreleasably engaging an energized firing element of a respective flash device, and a second extended position for releasing the respective energized firing element and for sensing the absence of an energized firing element;
- a signal device having a first condition indicative of an operative flash device and a second condition indicative of an inoperative flash device; and
- means for coupling said signal device to at least a respective one of said firing members to set the signal device to its first condition when the firing member is in its first extended position, and for setting said signal device to its second condition when the firing member is in its second extended position.

8. Photographic apparatus as claimed in claim 7, wherein said firing members further have a retracted position, wherein the socket includes means for moving said firing members to their retracted positions when no flash unit is received by said support member, and wherein said last-mentioned means is coupled to said signal device to set said device to its first condition when no flash unit is received by said support member.

9. Photographic apparatus for use with a multilamp flash unit of the type having a plurality of lamps fireable by striking, a striker for each lamp lodged in a preenergized position and dislodgable to fire its lamp and a base having an access opening for each striker through which the striker can be contacted for dislodging, said apparatus comprising:

- means for rotatably receiving such a multilamp unit;
- a plurality of actuating members mounted for rotation with a received multilamp unit, each of said members being aligned with a different one of the access openings of the received unit during such rotation; and
- means for applying a dislodging force to at least one of said actuating members to dislodge a striker of a received unit to fire the lamp associated with the striker.

10. Photographic apparatus for use with a multilamp flash unit of the type having a plurality of lamps fireable by striking, a striker for each lamp lodged in a preenergized position and dislodgable to fire its lamp and a base having an access opening for each striker through which the striker can be contacted for dislodging, said apparatus comprising:

- means for rotatably receiving such a multilamp unit;

a plurality of actuating members mounted for rotation with a received multilamp unit, each of said members being nonreleasably engageable with a different one of the strikers of the received unit during such rotation; and means for applying a dislodging force to at least one of said actuating members to dislodge a striker of a received unit to fire the lamp associated with the striker.

11. Photographic apparatus for use with a multilamp flash unit of the type having a plurality of lamps fireable by striking, a striker for each lamp lodged in a preenergized position and dislodgeable to fire its lamp and a base having an access opening for each striker through which the striker can be contacted for dislodging, said apparatus comprising:

means for rotatably receiving a multilamp unit of the type described;
a plurality of actuating members mounted for rotation with a received multilamp unit, each of said members being movable from a retracted first position through a different one of the access openings of the received unit into nonreleasing engagement with the striker associated with such opening; and

means for moving said actuating members into such non-releasing engagement with the strikers in response to receipt of a multilamp unit in said receiving means.

12. Photographic apparatus for use with a multilamp flash unit of the type having a plurality of lamps fireable by striking, a striker for each lamp lodged in a preenergized position and dislodgeable to fire its lamp and a base having an access opening for each striker through which the striker can be contacted for dislodging, said apparatus comprising:

means for rotatably receiving such a multilamp unit;
a plurality of actuating members mounted for rotation with a received multilamp unit, each of said members having a

5

10

15

10

first position in nonreleasing engagement with one of the strikers of a received unit and a second position to which said member is movable to either release a striker or sense the absence of a striker;

means for urging at least one of said members from said first position toward said second position with insufficient force to dislodge a striker but with sufficient force to sense the absence of a striker; and

means responsive to the presence of a member in its second position for indicating the absence of the striker to an operator.

13. Photographic apparatus for use with a multilamp flash unit of the type having a plurality of lamps fireable by striking, a striker for each lamp lodged in a preenergized position and dislodgeable to fire its lamp and a base having an access opening for each striker through which the striker can be contacted for dislodging, said apparatus comprising:

means for rotatably receiving such a multilamp unit;
a plurality of actuating members mounted for rotation with a received multilamp unit, each of said members having a first position in nonreleasing engagement with one of the strikers of a received unit and a second position to which said member is movable to either release a striker or sense the absence of a striker;

means for urging at least one of said members from said first position toward said second position with insufficient force to dislodge a striker but with sufficient force to sense the absence of a striker;

a controllable camera component; and

means responsive to the presence of a member in its second position for controlling the operation of said component.

* * * * *

35

40

45

50

55

60

65

70

75