

United States Patent

[11] **3,559,548**

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Continuation-in-part of application Ser. No.
643,088, June 2, 1967, Patent No.
3,364,829.

2,609,523	9/1952	Stein et al.	95/11.5X
3,134,547	5/1964	Kapteyn et al.	95/11.5X
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3,364,829	1/1968	Ackerman.	95/11.5

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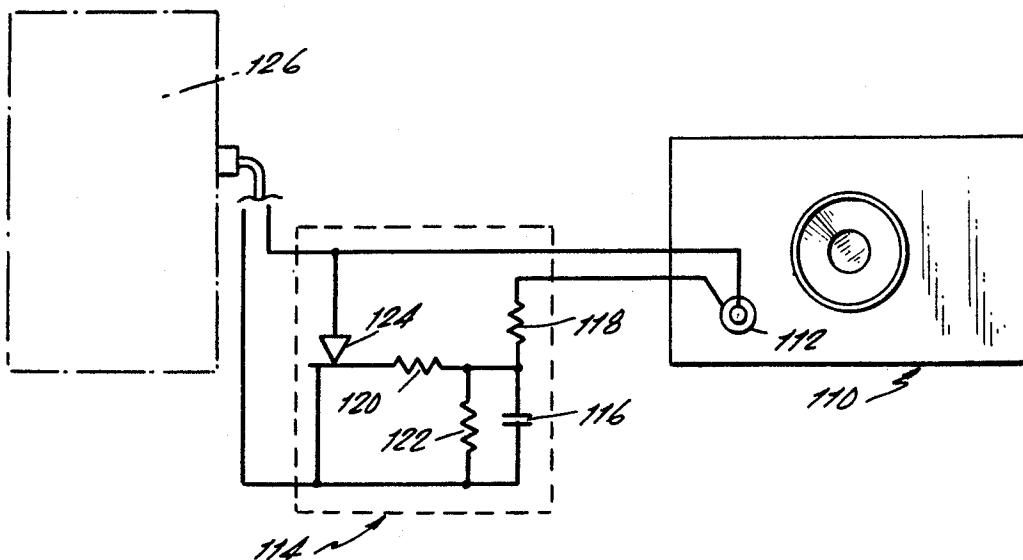
[54] TIME-DELAY MEANS FOR RECHARGEABLE STROBOSCOPIC FLASH ATTACHMENT
1 Claim, 12 Drawing Figs.

[52] **U.S. Cl.**..... **95/11.5,**
315/241
[51] **Int. Cl.**..... **G03b 9/70**
[50] **Field of Search**..... 95/11
(Lamp), 11 (Digest), 11.5; 240/1.3; 315/241P;
307/293, 305

[56] **References Cited**
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2,519,535 8/1950 Atwood..... 315/241P

ABSTRACT: A rechargeable stroboscopic flash attachment adapted to be connected to a flashcube-receiving receptacle of a camera for actuating the shutter control mechanism. Contact members are also secured to the housing for engaging the electric contacts in the receptacle. An electronic time-delay for the circuit stroboscopic flashlamp effectively delays actuation of the flash unit so as to synchronize the flash unit with the timing induced by the shutter control mechanism. The time-delay circuit consists of a first resistor and capacitor connected in series, a second resistor shunted across the capacitor, and a third resistor connected between one terminal of the capacitor and a silicon control rectifier whereby a time delay in the operation of the flash unit is produced.



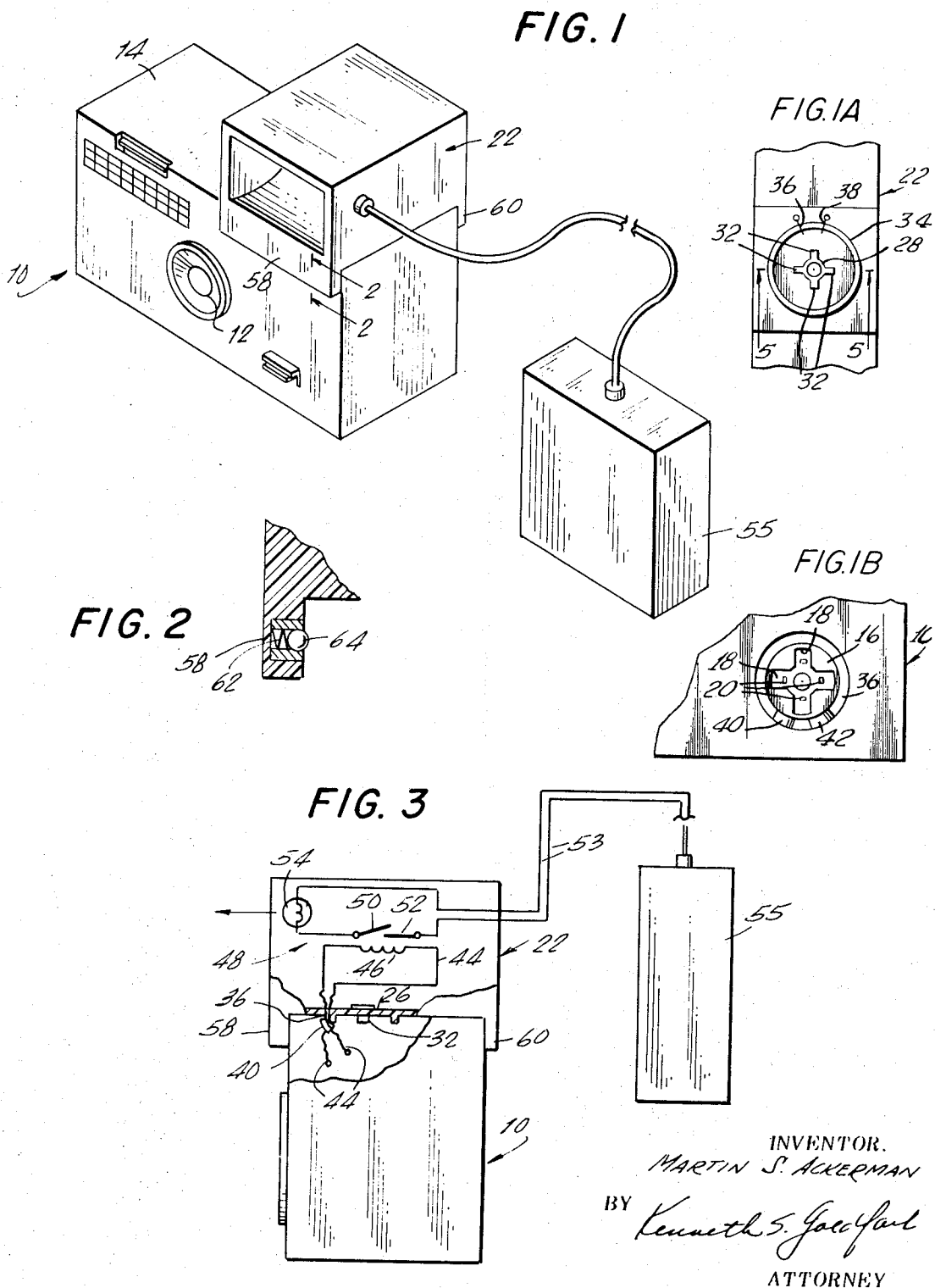


FIG. 4

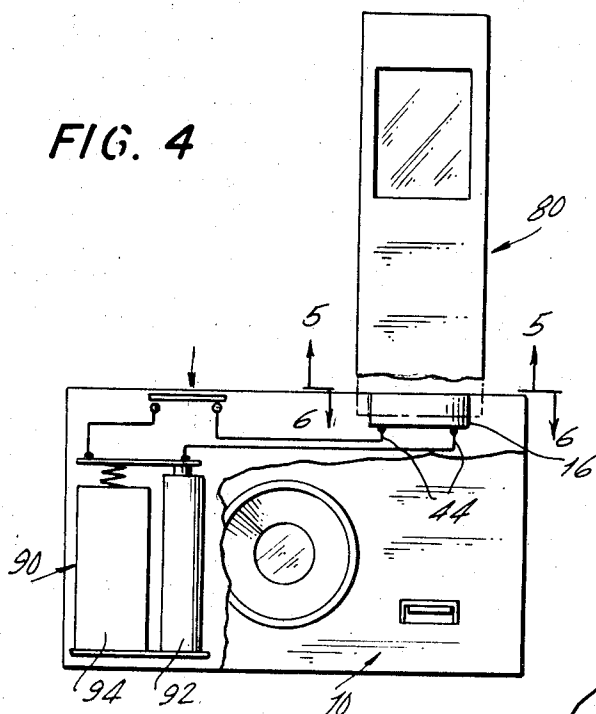


FIG. 5

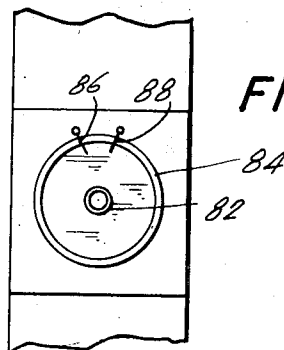


FIG. 6

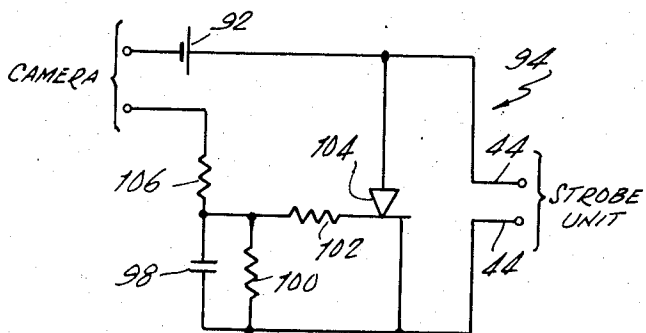
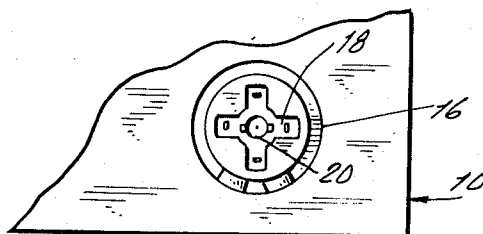


FIG. 7

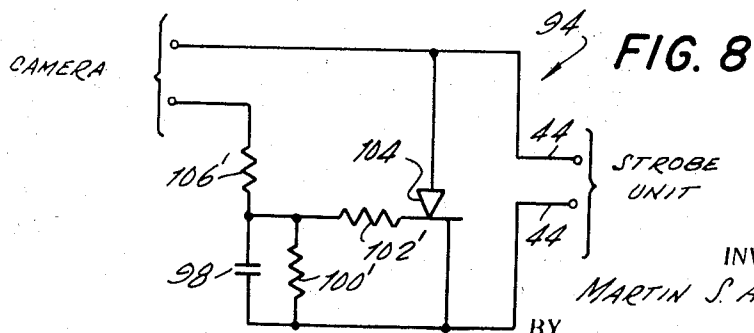


FIG. 8

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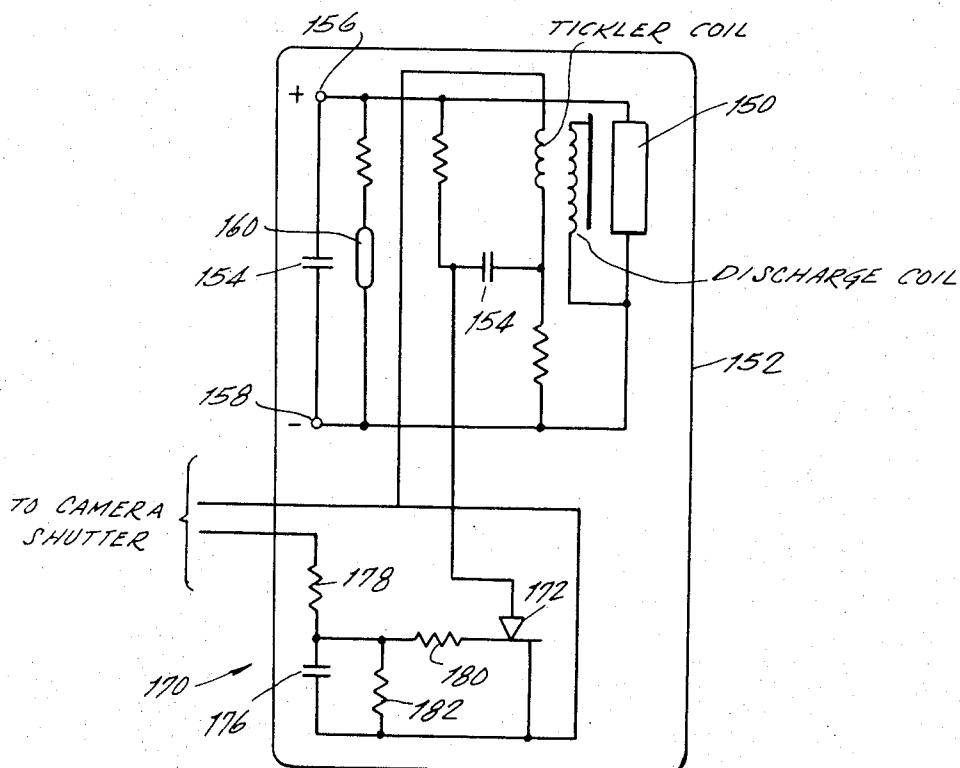
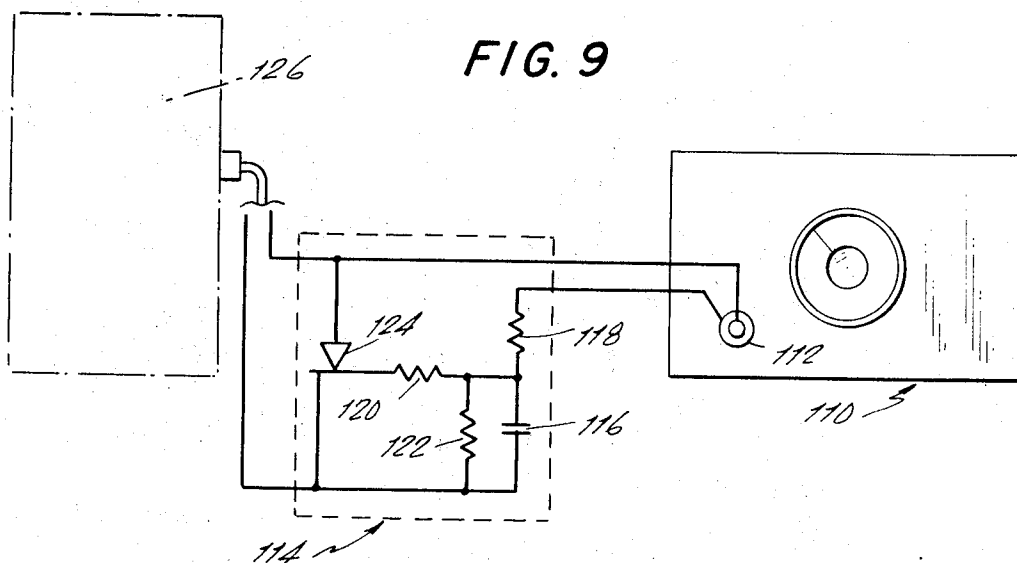


FIG. 10

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TIME-DELAY MEANS FOR RECHARGEABLE STROBOSCOPIC FLASH ATTACHMENT

This application is a continuation-in-part of application Ser. No. 643,088, now U.S. Pat. No. 3,364,829, filed Jun. 2, 1967, and entitled "Rechargeable Stroboscopic Flash Attachment."

This invention relates to a rechargeable stroboscopic flash attachment for a camera having a flashbulb or flashcube-operating circuit.

Various types of cameras have been devised which are adapted for either daylight photography or flashbulb or flash cube photography. Such cameras may be of the type disclosed in the U.S. Pat. to L.F. Anderson et al., No. 3,244,087, and employ a shutter mechanism which operates without any time-delay during daylight photography, but which camera is provided with a flashlamp synchronizing mechanism for producing a delay when flashlamps or flash cubes are employed. This is necessitated because of the delay in reaching the peak light intensity of the flashlight flashlamp or flash cube. Such a synchronizing mechanism is disclosed in the U.S. Pat. to D. M. Petersen, No. 3,139,805.

In the U.S. Pat. to O. T. Casebeer et al., No. 3,312,086, there is disclosed an indexing mechanism used in connection with flash cubes for rotating the flash cube so as to prevent an unused flashbulb in the front of the camera for successive firing.

Briefly, the concept of this invention is to provide a rechargeable stroboscopic flash attachment adapted to be mounted in a simple manner on a camera employing a flash-cube-receiving receptacle having a pair of electrical contacts connected to the flash cube operating circuit on the camera and having a shutter control mechanism and having the flash cube indexing mechanism. In accomplishing the purpose of the invention, stroboscopic flash unit is attached to the camera and has a fitting rotatably mounted and extending therebelow for insertion in the flash-cube-receiving receptacle. Contact means also depend from the flash unit for engaging the contacts in the flash-cube-receiving receptacle which are connected to the flash cube or flashlamp operating circuit. An important feature of the invention is the provision of electronic-delay means which may be used in a single housing with the stroboscopic flash unit or in a separate battery pack adapted to be carried in a pocket of a garment, on a neckband, or connected to the carrying case for the camera.

Another object of the invention resides in the provision of means for mounting an electronic flash attachment of the rechargeable type on a camera so as to eliminate the necessity for the repeated purchase and use of flashbulbs or flash cubes, thus greatly reducing the cost to the user of flash photography.

Still further objects and features of the present invention reside in the provision of a rechargeable electronic stroboscopic flash attachment for various types and models of cameras now in existence and to be produced in the future that employ time-delay means which is simple in construction and inexpensive to manufacture.

These, together with the various ancillary objects and features of the present invention, which will become apparent as the following description proceeds, are attained by the time-delay means for an electronic flash attachment, a preferred embodiment of which is shown in the accompanying drawing, by way of example only, wherein:

FIG. 1 is a perspective view showing the flash attachment as mounted on a camera in conjunction with a separate battery pack; and

FIGS. 1A and 1B are partial plan views illustrating a fitting and receptacle use in this invention;

FIG. 2 is a sectional detail view taken along the plane of line 2-2 in FIG. 1;

FIG. 3 is a side elevational view of the flash attachment with portions broken away showing schematically the circuitry of the flash attachment;

FIG. 4 is a front elevational view showing the flash attachment mounted on a camera, with portions of the camera being broken away to show one form of time-delay circuit;

FIG. 5 is a bottom plan view of the flash attachment looking along the plane of line 5-5 in FIG. 4;

FIG. 6 is a plan view of a portion of the camera showing the flash-cube-receiving receptacle;

FIG. 7 is a schematic circuit diagram of the time-delay means shown in FIG. 4;

FIG. 8 is a schematic circuit diagram of a modified circuit similar to that of FIG. 7;

FIG. 9 is a schematic circuit diagram of a time-delay circuit arrangement adapted to be connected to an M synch circuit of a camera; and

FIG. 10 is a schematic circuit diagram illustrating connections in a single assembly with the stroboscopic flash unit.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 is used to generally designate a camera having a lens opening 12, which is provided with a shutter mechanism, not shown. The camera 10 has its top 14 provided with a flash-cube-receiving receptacle 16, FIG. 6, having therein prong-receiving sections 18 and a mechanism 20 of the type disclosed in U.S. Pat. No. 3,364,829. This mechanism is for the purpose of delaying the operation of the shutter mechanism until the flash cube or flashlamp normally used with the camera has reached its peak light intensity.

In carrying out the present invention, the flash attachment generally indicated by reference numeral 22 is encased in a suitable housing 24 in which a fitting 28 is rotatably mounted and journaled as described in the copending application Ser. No. 643,088, filed Jun. 2, 1967, entitled RECHARGEABLE STROBOSCOPIC FLASH ATTACHMENT. The fitting 28 includes four actuating prongs 32 adapted to fit in the spaces 18 and the fitting 28 actuates the mechanism 20. The plate has integrally formed therewith a ring 34 and mounted on the ring are a pair of contacts 36 and 38 which are adapted to cooperate with the contacts 40 and 42 provided in the receptacle 16. The contacts 40 and 42 are electrically connected by conductors 44 to the flash cube or flashlamp-actuating circuit of the camera 10 while the contacts 36 and 38 are connected through conductors 44 to the coil 46 of a time-delay operation means generally indicated at 48 and which may be in the form of a relay having an armature 50 operating upon excitation of the coil 46. The armature 50 when it engages contact 52 completes an operative electrical circuit to a rechargeable stroboscopic flash unit 54. The flash unit 54 is connected by conductors 53 to a battery pack 55 adapted to be carried separately in a pocket of the user, or around the neck of the user. The battery pack may be buttoned or connected to a carrying case, not shown, for the camera 10. The contact 52 may be adjustable so that the travel of the armature 50 can be varied to provide suitable adjustments for permitting synchronization of the time-delay operating means to conform to the shutter delay induced by the mechanism 20 and the natural variations that will occur in shutter operation due to wear, exposure to the elements, inclusion of foreign matter, and manufacturing tolerances. The contact 52 is made accessible through a screwdriver-receiving aperture so that the contact 52 may be rotated to adjust the position of the contact 52.

The housing 24 is provided with suitable mounting brackets 58 and 60. The bracket 58 may be provided with springs 62 pressing ball detents 64 clampingly against the camera 10. Of course, other suitable mounting arrangements including the fastening means or clamping arrangements may be utilized instead of the brackets for embracing the camera 10 such as a limit spring or clip engaging the forward face of the camera since the fitting holds the flash attachment at least in part on the camera.

In operation, the attachment 22 is fitted on the camera with the brackets 58 and 60 embracing the camera and with the fitting 28 extending into the receptacle and with the ring engaged in its corresponding recess 34, and contacts 36 and 38 engaging contacts 40 and 42 respectively. Then, actuation of the shutter release will cause the shutter mechanism, not shown, to open the lens opening 12. At the same time, the mechanism 20 will delay operation of the shutter. To compen-

sate for this delay, the time-delay operating means 48 will delay operations of the stroboscopic unit 54 so that the stroboscopic flash 54 is in synchronization with the operation of the shutter.

Referring now to the embodiment of the invention as shown in FIGS. 4 through 7, wherein there is disclosed a flash attachment generally designated by reference numeral 80 similar in concept and structure to the arrangement shown in FIG. 1. However, herein a modified arrangement for actuating the mechanism 20 is provided. The lugs 32 are eliminated and the fitting 82 is tubular in shape and extends into the socket in a rotatable manner. However, a ring 84 similar to the ring 32 is provided and has contacts 86 and 88 mounted thereon for connection to the conductors which are connected to the battery housing generally indicated at 90 of the camera 10.

In lieu of the pair of batteries that is normally provided in the battery housing 90 of the conventional camera, one battery 92 and a circuit assembly 94 are inserted. The circuit assembly 94 is shown in detail in FIG. 7 and includes a time-delay resistor capacitor circuit including a capacitor 98 of the order of 80 to 150 microfarads operating on 6 volts direct current. The capacitor is connected across a resistance network of a resistance 100 in the order of 100,000 ohms and a resistor 102 in the order of 10 ohms. A silicone control rectifier 104 in the form of a transistor, type 2N1559 is provided. The resistor capacitor circuit is connected in series with a resistor 106 in the order of 500 ohms.

A similar arrangement to the circuit shown in FIG. 7 is shown in FIG. 8 in which the battery 92 is eliminated. This is possible when the capacitance and resistance of the circuit are changed so that the resistance 100' is in the order of 100,000 ohms, resistance 102' is in the order of 100 ohms and resistance 106' is in the order of 10,000 ohms.

Referring to the embodiment as shown in FIG. 9, herein there is shown a camera 110 provided with socket means 112 for attaching a rechargeable stroboscopic flash unit. This socket 112 is of the type known as M synch socket and a time-delay circuit generally indicated at 114 is provided. Herein, the capacitance 116 is connected in a series with a resistor 118 and connected in parallel therewith are resistors 120 and 122. A silicon control rectifier 124 is also provided for connection to the stroboscopic flash attachment 126 which may be formed in a single piece or in two pieces including the strobe adapted to be fitted on the camera 110 and a pocket battery pack.

In FIG. 10 there is shown a circuit arrangement for a similar system adapted to be connected to the camera shutter through conductors. In this arrangement a stroboscopic light-emitting tube 150 is disposed in a housing 152 and is fed by a resistor capacitor circuit 154 connected to a battery pack or adapted to be connected through recharging terminals 156 and 158 to an alternating current supply. A neon glow tube 160 is con-

nected across the resistance capacitance circuit to indicate whether the capacitance circuit is charged. A delay circuit generally indicated by reference numeral 170 and similar to the delay circuits previously described is provided. Herein, the silicon control resistor or transistor of the type 2m1559 and indicated at 172 is connected to the capacitor circuit 154 for actuation upon actuation of the camera shutter. A resistor capacitor network including a capacitor 176 of between 80 to 150 microfarads is connected in series with a resistor 178 of approximately 10,000 ohms. The resistor network further includes resistors 180 in the order of 100 ohms and resistor of 182 in the order of 100,000 ohms. The time-delay circuits as shown in FIGS. 7 through 10 perform substantially the same function as does the mechanical relay so as to synchronize the operation of the stroboscopic lamp with the shutter.

A latitude of modification, substitution and change is intended in the foregoing disclosures, and in some instances, some features of the invention may be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. A rechargeable stroboscopic flash attachment on a camera having a flash cube operating circuit and a flash-cube-receiving receptacle provided with a pair of electrical contacts connected to said flash cube operating circuit and having a shutter control mechanism and a flash cube indexing mechanism, comprising a housing having a rechargeable stroboscopic flash unit therein, means fixedly securing said housing to said camera and including a fitting at least partially disposed in said housing and being rotatably mounted thereon, said fitting extending into said receptacle for actuating said shutter control mechanism, contact means secured to said housing engaging said pair of electrical contacts, time-delay operating means in said housing electrically connected to said contact means for time delaying a signal from said flash cube operating circuit, said rechargeable stroboscopic flash unit being operatively electrically connected to said time-delay operating means so that said time-delay operating means effectively delays actuation of said flash unit, said time-delay operating means comprising a resistance capacitance circuit, including first and second connector legs, a first resistor and a capacitor connected in series along said first connector leg, a second resistor shunted across the terminals of said capacitor, and a third resistor connected to one of the terminals of said capacitor and the second connector through a silicon control rectifier, said silicon control rectifier connecting said second connector leg to the other terminal of said capacitor for providing a time-delay in the operation of said rechargeable stroboscopic flash unit.

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