

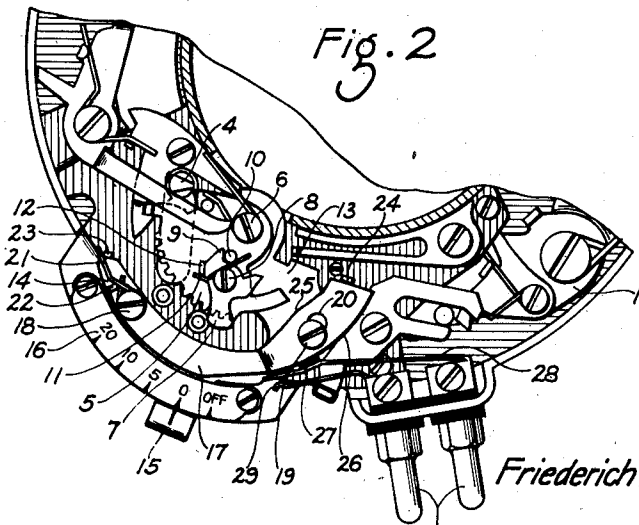
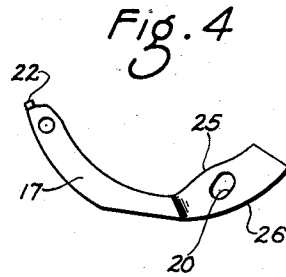
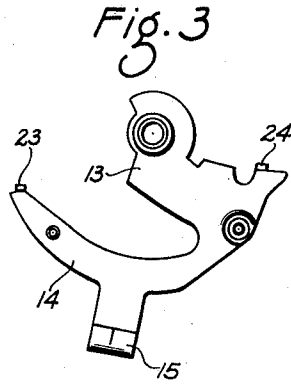
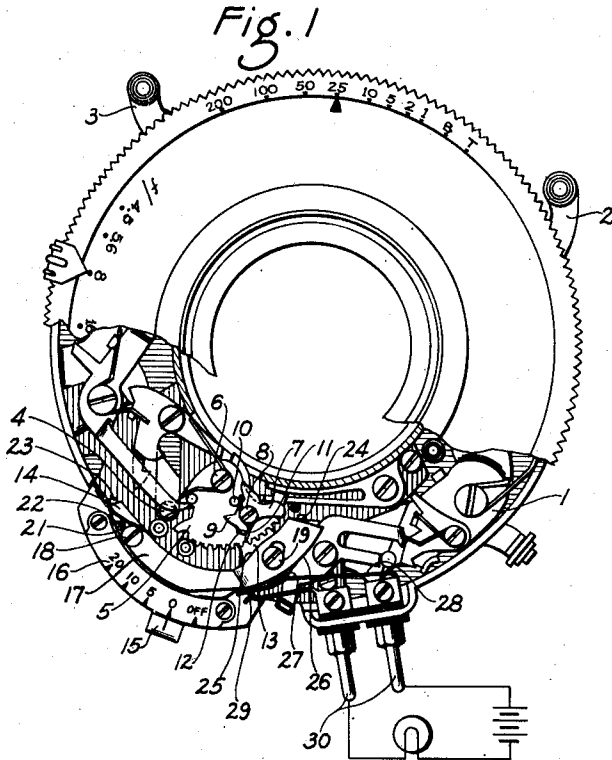
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F. A. G. PIRWITZ  
FLASHLIGHT AND SHUTTER SYNCHRONIZER HAVING  
ADJUSTABLE SWITCH ACTUATING MEMBER

2,483,023

Filed May 16, 1946

2 Sheets-Sheet 1



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Fig. 5

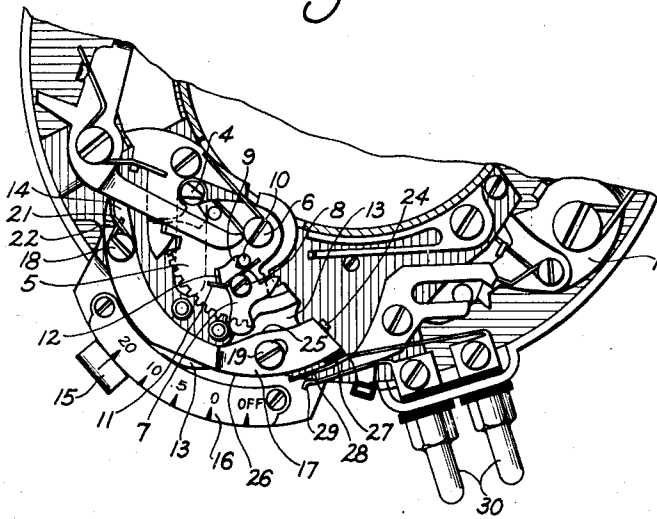
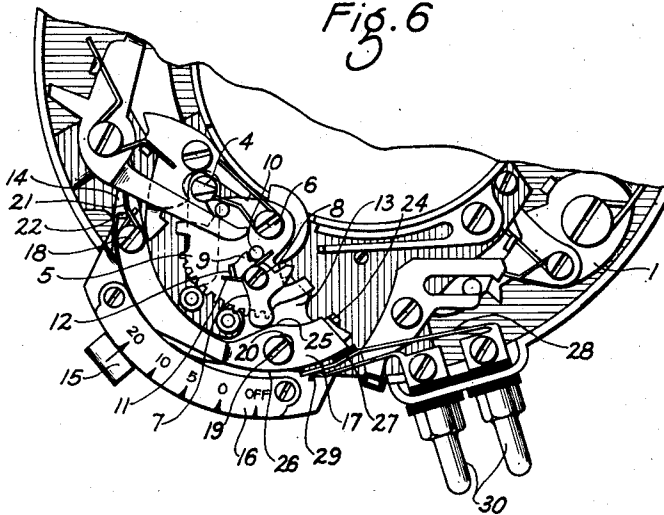


Fig. 6



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# UNITED STATES PATENT OFFICE

2,483,023

## FLASHLIGHT AND SHUTTER SYNCHRONIZER HAVING ADJUSTABLE SWITCH ACTUATING MEMBER

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5 Claims. (Cl. 95—11.5)

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This invention relates to a flashlight and shutter synchronizer, with more particular reference to the type of photographic shutter in which a flashlight circuit is closed by a spring-operated synchronizer that is set and released by a shutter master lever, and it has for its purpose to provide efficient and practical adjusting mechanism adapted to lamps having different lag characteristics, whereby the flashlight circuit can be closed at any predetermined point either before or after initiating opening of the shutter so as to insure maximum light intensity at the exact instant when the shutter is fully open.

More specifically, the invention has for its object to afford a simple, rugged, and durable mechanism that can be economically manufactured, and makes possible the required adjustability of the instant of flashlight circuit-closing in relation to shutter opening, while utilizing a switch that is fixedly mounted on the shutter housing and insulated therefrom, thus eliminating grounding of the electric circuit through the shutter mechanism and the resulting possibility of short-circuiting.

Another object of the invention is to afford a more positive and longer engagement between the circuit-closing contacts by the utilization of stiff spring contacts fixed at one end, with sufficiently powerful actuating means to insure bringing them into close engagement and holding them engaged for the necessary length of time to insure proper lighting action.

An additional purpose of the invention is to afford a mechanism that instead of adjusting the switch or switch contacts to vary the time of flashlight circuit-closing, accomplishes this objective through the instrumentality of an adjustable actuating element that engages a switch contact and is operated by the synchronizer in any position throughout its range of adjustment.

A further object of the invention is to afford an adjustable switch control mechanism that is of simple and economical construction, and which operates with uniform accuracy and dependability after the parts have been subjected to considerable wear, thus enhancing the life and reliability of the mechanism.

Still another purpose of the invention is to provide a mechanism with a minimum number of parts, in which an actuating lever is adjustable along the path of movement of a spring-operated synchronizer and has a cam surface located in the path of the synchronizer to be engaged and moved thereby, the lever having another surface engaging one of the switch contacts for actuating it to

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close the circuit when engaged by the synchronizer in any selected position of adjustment.

An additional object of the invention is to eliminate the use of elongated, highly flexible and delicate contacts, or other type of switch mounted on an adjustable insulated block, and to accomplish the objective through the use of a fixed switch consisting of more rigid contacts insulated from the housing and actuated by a relatively powerful lever that is adjustable to vary the instant of circuit closing in relation to opening the shutter.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a plan view, partially broken away, showing the application of the invention in a preferred embodiment to a photographic shutter, with the master lever and spring-operated synchronizer in normal position and the flashlight circuit switch actuating lever adjusted to zero position for a lamp having no appreciable lag;

Fig. 2 is an enlarged detail view, partially broken away, illustrating the position of the synchronizer when moved to set position and held by its locking device, ready for operation upon release, and with the actuating lever adjusted to zero position as in Fig. 1;

Fig. 3 is a detail view in elevation of the adjustable support on which the actuating lever is mounted;

Fig. 4 is a detail view in elevation of the actuating lever removed from the adjustable support;

Fig. 5 is a detail enlarged view with the synchronizer in set position as in Fig. 2, and with the actuating lever adjusted to operate the switch and close the flashlight circuit in advance of opening the shutter, to accommodate a 20 millisecond lamp, and

Fig. 6 is a view similar to Fig. 5, showing the position of the synchronizer and the actuating lever at the instant when the contacts are engaged and the flashlight circuit closed.

This invention is in the nature of an improvement on the mechanism disclosed in my Patent No. 2,404,526, July 23, 1946, in which there is a spring-operated master lever controlling the shutter and adapted to be cocked by a setting lever and released by a trigger, the master lever in turn controlling a pivoted spring-actuated synchronizer that is moved by the master lever to set position and held by a locking member

that in turn is released by the master lever during return movement of the latter. The structure of the present application is similar to the parts just described and it is therefore unnecessary to disclose in detail the arrangement and operation of the master lever or the manner in which it controls the synchronizer.

In the pending application above mentioned, a flashlight circuit-closing switch is mounted on an adjustable support for engagement by the synchronizer, and adjustment of the switch support changes the position of the switch in relation to the synchronizer so as to vary the time of closing the flashlight circuit in relation to opening of the shutter, whereas in the present invention, the switch is stationarily mounted on the shutter housing and the required variation in the time of circuit-closing is attained by adjusting an actuating lever in relation to the synchronizer, and this application has to do with the construction and arrangement of the switch actuating lever, the adjustable support on which it is mounted, and the stationary switch which it controls.

Referring more particularly to the drawings in which like reference numerals refer to the same parts throughout the several views, 1 designates the master lever that is cocked by the setting lever 2 and released by the trigger 3, while 4 designates the pin or projection on the master lever that engages the synchronizer and moves the latter to its set position where it is locked, as shown in Figs. 2 and 5, after which the synchronizer is released by the master lever, all in the same manner as in my patent referred to above.

The synchronizer includes the plate 5 that is pivoted on a post 6, and mounted on the synchronizer plate 5 is a pawl 7 pivotally mounted on the post 8 of the synchronizer plate 5. The pawl 7 includes a tail piece 9 engageable with a stop pin 10 on the synchronizer plate and actuated against the pin by a spring 11 coiled around the post 8 and having one end bearing against the pin 10 while its other end bears against a lug 12 carried by the pawl. When the synchronizer is released and returned to normal position, the tail piece 9 cannot move past stop pin 10, and pawl 7 engages the actuating lever in the manner that will now be described.

The actuating lever is mounted on a support or plate 13 that is mounted on the post 6 for adjustment concentrically of the synchronizer plate, and includes an elongated arcuate portion 14 provided with an outwardly extending finger portion 15 that underlies the indicating scale 16 on the housing and can be manipulated manually to adjust the support 13 to any position, where it is held by the frictional engagement of the supporting plate with the underlying scale.

Pivotally mounted on the adjustable supporting plate 13 is the actuating element that effects operation of the flashlight circuit-closing switch, and preferably this actuating element consists of an arcuate elongated lever 17 that is pivoted at one end on a post 18 carried by the supporting plate, which is also provided with a guide pin 19 extending through a slot 20 in the actuating lever for limiting movement of the latter. The switch actuating lever is held in normal position as shown in Fig. 2, with the contacts 28 and 29 separated by means of a spring 21 coiled around the post 18 and having one end engaging a stop 22 on the actuating lever and its other end engaging a lug 23 on the adjustable supporting

plate, the spring 21 acting to maintain the opposite end of the actuating lever normally against the upstanding lug or stop 24. 25 designates a cam surface on one edge of the actuating lever located in the path of the pawl 7, which engages the cam surface 25 during return movement of the synchronizer and rocks the actuating lever on its pivot 18 to close the flashlight circuit, while the pawl 7 swings on its pivot 8 away from the stop 10 and rides over the cam surface 25 during the setting movement of the synchronizer.

The actuating lever is also provided with an arcuate edge or surface 26 generally concentric with the synchronizer and arranged for engagement with an insulating button 27 carried by the spring contact 28, the outer end of which is arranged to engage the contact 29, the contacts 28 and 29 forming parts of a switch that is stationary mounted on and insulated from the housing as shown, the contacts being connected to the jacks 30 which are adapted to receive a connector and conductors leading to the usual flashlight circuit and lamps.

The arcuate surface 26 on the actuating lever is of such contour that it is always engaged with the insulating button 27 on contact 28, and as a consequence, the support 13 with the actuating lever movably mounted thereon can be adjusted to any position, depending upon the type of flashlight employed, and the surface 26 on the actuating lever is always in position to move contact 28 and close the circuit, whenever the synchronizer is released and the cam surface 25 on the actuating lever is engaged and moved by the pawl 7 to rock the actuating lever on its pivot.

In this manner, the flashlight circuit is closed by engagement of the contacts 28 and 29 at any desired instant in relation to the opening of the shutter. The contacts 28 and 29 and jacks 30 are insulated from the shutter housing and mechanism, and since engagement of the actuating lever with contact 28 is through the insulating button 27, there is no possibility of short-circuiting the current through the shutter mechanism. With this arrangement, the contacts 28 and 29 can be relatively short, stiff spring elements, and the actuating lever is of such length and so related as to exert sufficient leverage against the contact which it engages to move it into positive engagement with contact 29 and hold the contacts in close engagement for a sufficient time to insure proper functioning of the lighting elements. The duration of engagement between the contacts depends on the curvature of the cam surface 25 that is engaged by the pawl 7, while the curvature of the surface 25 is such as to insure uniform and accurate cooperation between the contacts of the switch, irrespective of the position in which the actuating lever may be adjusted or the amount of wear on the parts.

This arrangement enables closing the circuit to the flashlight early in the movement of the synchronizer mechanism for a lamp having a long lag characteristic, as illustrated in Fig. 5, or late in the travel of the synchronizer mechanism for a lamp having little or no lag and characterized by instantaneous lighting, as in Figs. 1 and 2, without disturbing the position of the electric switch which is fixedly mounted on the housing. The contacts can be of stiff, durable construction due to the structure and operation of the actuating lever which insures positive and effective engagement of the spring contacts. The synchronizer can be disengaged to permit operation of the shutter without closing the flashlight cir-

cuit or the flashlight circuit can be closed by the master lever independently of the synchronizer, the same as in my copending application referred to above, and the mechanism for performing these functions is no different and therefore need not be described.

The present structure makes it possible to employ a simpler, more rugged, and durable construction, having fewer parts than the mechanism of my copending application, and avoids the necessity of adjusting the switch or of utilizing delicate, flexible, extensible contacts, by utilizing instead a stationary switch insulated from the housing and having preferably heavy, stiff spring contacts in conjunction with an actuating lever that is quickly adjustable to any desired position in relation to the synchronizer and always functions with such powerful leverage as to actuate the contact which it engages into positive engagement with the other contact for sufficient time to insure proper lighting.

While the invention has been described in relation to the particular construction herein shown, it is not confined to the details disclosed, and this application is intended to cover such modifications or changes as may come within the purposes of the improvement and the scope of the following claims.

I claim:

1. In a photographic shutter, the combination with a spring-operated flashlight synchronizer and a flashlight circuit switch permanently positioned in relation to the synchronizer and including a pair of relatively movable contacts, of a switch actuating lever movable independently of the switch contacts toward one of the contacts to close the circuit, said lever having a cam surface located in the path of the synchronizer and being adjustable endwise to vary the position of said cam surface along said path.

2. In a photographic shutter, the combination with a pivotally mounted spring-operated flashlight synchronizer and a flashlight circuit switch permanently positioned in relation to the synchronizer and including a pair of relatively movable contacts, of a support adjustable in an arcuate path concentrically of the path of movement of the synchronizer, a switch actuating lever pivotally mounted on said support and movable independently of said switch contacts, and spring means holding the actuating lever out of operative position, the actuating lever having a cam surface in the path of the synchronizer and an arcuate surface engaging one of said contacts in any position of adjustment and acting to close the flashlight circuit upon engagement of the synchronizer with said cam surface.

3. In a photographic shutter, the combination with a spring-operated flashlight synchronizer and a flashlight circuit switch permanently positioned in relation to the synchronizer and including a pair of relatively movable contacts, of a support adjustable in an arcuate path concentrically

of the path of movement of the synchronizer, an elongated arcuate switch actuating lever pivoted at one end of the support and movable independently of said switch contacts, a stop at the opposite end of the support against which the actuating lever is held, and spring means engaging the actuating lever and maintaining it against said stop, the actuating lever having a cam surface located in the path of the synchronizer and an arcuate surface engaging one of said contacts in any position of adjustment and acting to close the flashlight circuit upon engagement of the synchronizer with said cam surface.

4. In a photographic shutter, the combination with a spring-operated flashlight synchronizer and a flashlight circuit switch permanently positioned in relation to the synchronizer and including a pair of relatively movable contacts, of a switch-actuating member movable independently of said switch contacts toward one of the contacts to close the circuit, said member having a cam surface located in the path of the synchronizer, and a support on which said switch-actuating member is movably mounted, said support being adjustable along the path of movement of the synchronizer and the actuating member being in engagement with said contact in any position of adjustment of the support.

5. In a photographic shutter, the combination with a spring-operated flashlight synchronizer and a flashlight circuit switch permanently positioned in relation to the synchronizer and including a pair of relatively movable contacts, of a pivoted switch-actuating lever movable independently of said switch contacts toward one of the contacts and in a direction transversely of the direction of movement of the synchronizer, said lever having a cam surface located in the path of the synchronizer, and a support on which the actuating lever is pivotally mounted, said support being adjustable along the path of movement of the synchronizer and the actuating member being in engagement with said contact in any position of adjustment of the support, the synchronizer having engagement during its movement with said lever to actuate it toward said contact.

FRIEDRICH A. GUSTAV PIRWITZ.

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