Oct. 28, 1941. J. R. PAINTER 2,261,073

BATTERYLESS PHOTOFLASH LAMP FLASHER

Filed April 22, 1938 2 Sheets-Sheet 1

Fig. 1.

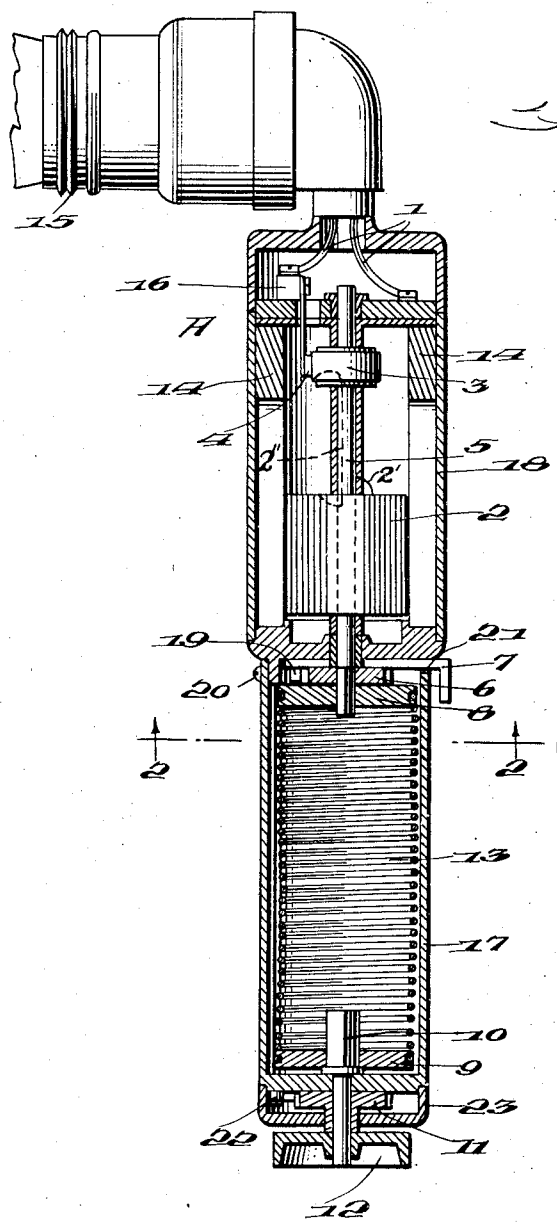

Fig. 2.

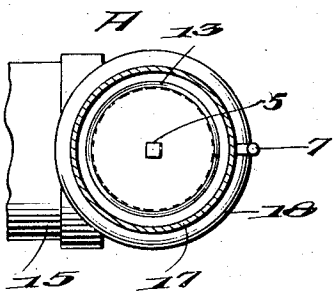

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Fig. 3.

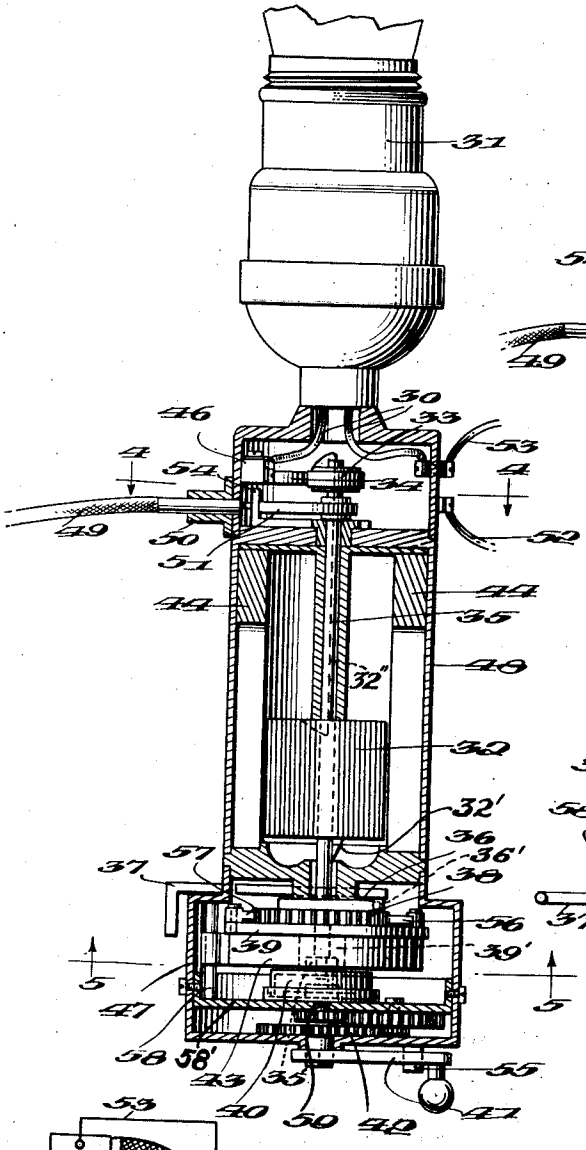


Fig. 4.

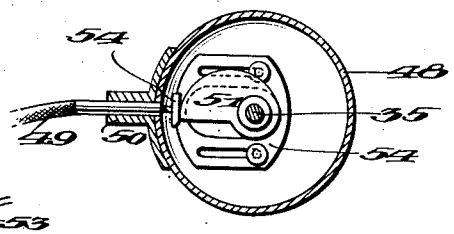


Fig. 5.

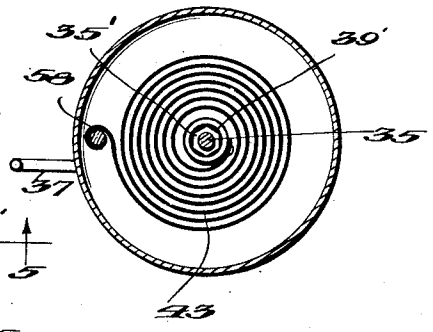
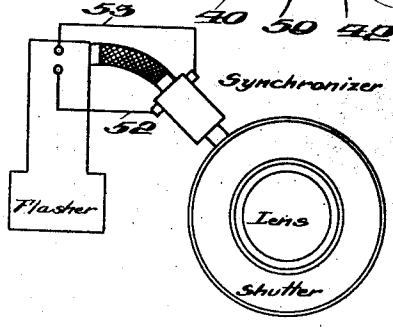


Fig. 6.



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UNITED STATES PATENT OFFICE

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BATTERYLESS PHOTOFLASH LAMP FLASHER

John Roy Painter, Chattanooga, Tenn.

Application April 22, 1938, Serial No. 203,685

4 Claims. (Cl. 67—29)

My invention relates to an improvement in batteryless photo flash lamp flashers.

The primary object of my invention is to provide a flasher designed to take the place of the present type of flasher in general use commonly equipped with dry cells, my present invention being a self-generating unit powered by a motor which rotates an armature in a surrounding magnetic field and generates enough electricity to ignite a photographic flash lamp.

The use for my improved batteryless photo flash lamp flasher is in taking flash light pictures and to entirely dispense with the use of dry cells and to make the use of photo flash lamps more certain. This invention is not subject to any more deterioration, gradual loss of magnetism, electric leakage etc., than any other magnets such as those used in internal combustion engines etc., or flash-light dry cells, as there is nothing about this instrument to deteriorate either by use or lack of use since sufficient current to flash the lamp is produced the instant the armature employed turns, and one revolution is all that is necessary to generate an adequate amount of energy to flash the lamp, although more than one revolution sometimes may be desirable since the maximum output of current is reached only at a certain speed, which, possibly, under some circumstances, cannot be attained in a single revolution starting from a standstill.

This instrument can be used continuously to flash a lamp just as fast as the operator can wind the motor, reload and flash the lamp, without the instrument showing any sign of fatigue. Also it can be laid aside for weeks, months, or even years, and still be ready for instant use.

In the accompanying drawings:

Fig. 1 is an elevation mainly in longitudinal section showing one form of my invention;

Fig. 2 is a horizontal section on line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a slightly modified form of the invention in section and elevation;

Fig. 4 is a horizontal section on line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 5 is a horizontal section on the line 5—5 of Fig. 3 looking in the direction of the arrows; and

Fig. 6 is a diagrammatic view showing the flasher, a synchronizer, a shutter and a camera lens connected together.

In the construction shown in Figs. 1 and 2, A, represents the flasher as a whole. The numeral 1 indicates wires to the lamp socket 15; 2 is an armature, one end of the winding thereof being grounded on the armature shaft 5 by the wire 2'; 3 is a commutator and which is electrically connected to the other end of the armature winding by the wire 2'', on the armature shaft 5; 4 is a commutator brush secured to the brush holder 16 and exerting spring pressure on the commutator as indicated in Fig. 1.

The numeral 6 represents a release ratchet wheel, and 8 is an upper spring connector, both of which are secured preferably, adjacent to each other, on the lower end of the armature shaft 5; and 7 indicates a release trigger extending outside of the instrument in convenient position to be depressed by the operator's thumb or finger. The stem of this release trigger conveniently straddles the armature shaft 5 where it is slidably mounted and spring-actuated to normally project it outwardly to the position shown in Fig. 1. The release ratchet 6 is controlled by a spring-actuated pawl 19, which normally engages and locks the release ratchet 6, but which is connected to the stem of the release trigger 7 and is disengaged from the teeth of the release ratchet 6 when the trigger 7 is pressed inwardly.

The lower spring connector 9 corresponds to the upper spring connector 8, and the spring motor 13 extends from one connector to the other and its opposite ends are secured to these connectors, and the spring motor is housed in the spring motor case 17, which may be conveniently grasped by the operator and used as a handle. This case 17 is secured at its upper end to the lower end of the generator case 18 by screws or other means 20. The outer end of the release 7 is guided by a notch 21 in the upper end of the spring case 17 and the lower end of the generator case 18.

The lower spring connector 9 has an angular hole in its center to receive the ratchet stem 10 of similar cross-section as a means for causing the lower spring connector 9 and stem 10 to turn together just as the upper spring connector 8 receives the angular lower end of armature shaft 5 to cause them to turn together.

A winding ratchet 11 is secured on the ratchet stem 10 and is adapted to turn with it, and this winding ratchet is allowed to turn in one direction by the spring-actuated pawl 22 which locks it against reverse movement. The winding ratchet 11 and the pawl 22 are confined within the cap 23, which latter is secured to the lower end of spring case 17 in any approved manner. A winding knob 12 is secured on the protruding end of ratchet-stem 10.

Magnets 14 are located within the generator case 18, as shown in Fig. 1.

From the foregoing, it will be understood that this instrument provides a small, compact generator built on the principle of a magneto, and by turning the winding knob 12 clockwise, energy is stored in the spring motor 13 by merely twisting it tightly and giving it extra tension.

The spring motor 13 is secured at one end thereof to the pawl controlled stem 10, and at the other end to the upper connector 8 and thereby to the armature shaft 5 and the armature 2. Thus by exerting pressure on the release trigger 7, the upper connector 8, the armature shaft 5 and armature 2 will be caused to revolve under the stored tension of the spring motor 13. The winding knob 12, secured on an end of the stem 10, may be given a complete revolution or as high as three or four complete turns if desired, and when the armature shaft 5 is released, the armature 2 will spin a sufficient number of times to generate more than enough electricity to easily flash the lamp. By using a three-way socket, as high as three lamps may be flashed at one time, and by this simple means no dry cells are used or required.

The reason that more than one revolution of the winding knob is sometimes made, is that the maximum output of current is reached only at a certain speed of the armature, which maximum may not always be reached by one revolution starting from a standstill.

The construction shown in Figs. 3, 4 and 5 is in the main the same as that shown in Figs. 1 and 2. The principle is precisely the same, and the difference is largely in details such as a slightly different arrangement of the spring which furnishes the power and the addition of a device for releasing a shutter on a camera, and for convenience this form of device is adapted to be fastened to the camera box in any approved manner, as for example this may be done by means of a thumb-screw, using the threaded hole in the side of the camera which is usually provided for the tripod.

The numeral 30 indicates the wires for the socket 31; 32, is the armature secured to the armature shaft 35 to which one end of the armature winding is grounded by the wire 32'; 33, is the collector ring also secured on the upper end of the armature shaft 35 and to which the other end of the armature winding is attached by the wire 32''; 34 is the collector brush secured to the brush holder 46. A single toothed release ratchet 36 is secured to the armature shaft 35 somewhere near its lower end, and a release trigger 37 is constructed and arranged like release trigger 7 in Fig. 1, to control the release ratchet 36. The armature is prevented from turning by this release ratchet 36. A driving ratchet 38 as well as release ratchet 36 are secured to the lower end of the armature shaft 35.

A plate 39 is loosely mounted on the shaft 35, which shaft passes through a tubular stub shaft 39' which is secured to the plate 39. The stub shaft is counter-bored to allow the nut 35' to be screwed on the shaft 35 to hold the plate 39 and its stub-shaft 39' in proper alignment on the shaft 35. The plate 39 carries pawls 56 and 57, by which it is locked to the driving ratchet 38 in one direction. A convolute spring 43 is wound around the lower end of the armature shaft 35 and the stub shaft 39', to which one end of the spring 43 is secured. The other end of the spring 43 is secured to a post 58 which is held between the spring motor case 47 and the plate 58'.

The upper portion of the overriding clutch 40 is secured to the stub shaft 39', while the lower portion thereof is secured to the stub shaft 59. The stub shaft 59 is connected through a chain of gears 42 to a winding lever 41 extending from one end of the spring motor case 47, which end is provided with a projecting stud 55 which serves as a stop for the winding lever.

The numeral 44 represents the magnets; 47, is the spring motor case; 48 is the generator case; 49 is the cable release; 50 is a cable release holder; 51 is a cable release cam secured on the armature shaft 35, in proper alignment with the one tooth 36' on the release ratchet 36, and in position to engage the cable release presser 54 as the cam traverses it with the turning of the armature shaft; and 52 is an electric connection leading to a synchronizer; and 53 is the return connection.

Thus the springs 13 and 43 are in effect motors for turning over or spinning the armature.

The wiring hook-up is as follows: One side of the line is taken off at collector ring 33 by brush 34 and then into one electrode of the socket 31. The other side is grounded to generator case 48, which side is taken off at synchronizer connection 52 and leads to the synchronizer (Fig. 6) and the return is connected to return-connection 53, which is insulated from the generator case 48, so that when the synchronizer contacts are closed, the circuit is completed and the current is conducted to flash-bulb socket 31, causing the bulb to flash. The armature winding at one end is grounded to the armature shaft. The other end passes into the shaft (which must be hollow) and to the collector ring 33.

The method of operation of the construction shown in Figs. 3, 4 and 5, is as follows:

As the operator prepares to make an exposure, he first winds the spring motor by winding lever 41 around to stop 55 which is approximately one revolution, which winds spring 43 four turns, through winding gears 42 designed to give a ratio of four to one. The armature 32 is kept from turning by release ratchet 36. This puts the machine in position for instant generation of current. Next, the flash bulb is installed; then the shutter is set. (If a Kalart synchronizer is used, it must also be set; but if a simple sliding contact synchronizer is used, it will need no setting.)

The picture may now be taken. As the operator sights the camera and is ready to "snap" the picture, he presses the release trigger 37 which releases the spring motor, which in turn spins the armature and generates electric current. When the motor is wound, the cam 51 automatically takes up its place just beyond the cable release presser 54 because of the cam's fixed relation to the one tooth on the ratchet 36, which latter automatically comes to bear against the release trigger 37.

The cable release is of conventional construction, such as those used on many standard cameras, and can be procured in many lengths at any camera shop. There is a spring in the cable release and this spring causes the cable release presser 54 to remain in contact with the cam 51.

When the release trigger 37 is pressed, the armature immediately turns, the cam 51 rotates in a clockwise direction and actuates the release presser 54, which leads to the shutter (Fig. 6)

and through the action of the synchronizer (Fig. 6) which can be used in connection with the cable release, or directly to the shutter (depending on the type used), the flash is made at the right instant. The armature **32** is allowed to make one revolution before releasing the shutter in order that the generator might have time to build up sufficient voltage.

I claim:

1. The combination with a case, an armature and armature shaft rotatably supported therein, a magnet located within the case, a spring motor connected directly to the armature shaft for transmitting rotary motion to the armature and shaft, a light socket, a flash lamp, a commutator on the armature shaft, a brush contacting said commutator, and wires leading from the socket one to the brush, and one being suitably grounded, a cable release, and means actuated by the armature shaft for automatically moving said cable release to cause the latter to actuate a camera shutter synchronizer, whereby the movement of the shutter and the flash are synchronized.

2. The combination with a case, an armature and armature shaft rotatably supported therein, a magnet located within the case, a spring motor connected directly to the armature shaft for transmitting rotary motion to the armature and shaft, a light socket flash lamp, a commutator on the armature shaft, a brush contacting said commutator, and a wire leading from the socket to the brush, a wire leading from the socket being suitably grounded, a cable release, means actuated by the armature shaft for moving said cable release to cause the latter to actuate a camera shutter synchronizer, whereby the movement of the shutter and the flash are synchronized, means connected with the spring motor for twisting and storing energy in the latter, and means for automatically releasing the spring motor whereby its energy is transmitted to the armature.

3. A self contained photographic flash bulb flasher including an outer case, a magnetic field within the case, an armature supported on a shaft within said magnetic field, a spring motor connected directly with said shaft, a flash bulb socket electrically connected with the said armature, a trigger adapted to hold the armature from turning, a camera shutter, a shutter cable, a shutter cable release cam mounted on the armature shaft, and means for winding the spring motor, said trigger adapted to release the armature shaft, whereby the armature rotates to energize the bulb, and the cable release cam rotates to operate the shutter cable.

4. A photographic flash bulb flasher including a case, a magnetic field within said case, a shaft and armature positioned within the case and holding the armature revolvably within the said magnetic field, a spring motor connected directly to the shaft, a flash bulb socket electrically connected to the armature, a release trigger adapted to hold the armature and shaft from revolving as the spring motor is wound, a shutter cable, a shutter cable release cam mounted on the armature shaft, and a camera shutter, the said trigger adapted to release the armature shaft, whereby the armature rotates to energize the bulb and the cable release cam rotates to operate the shutter cable.

JOHN ROY PAINTER.