Oct. 8, 1946. F. J. LONGBOTTOM 2,408,864

FLASH SYNCHRONIZER FOR FOCAL PLANE SHUTTERS

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FIG. 1.

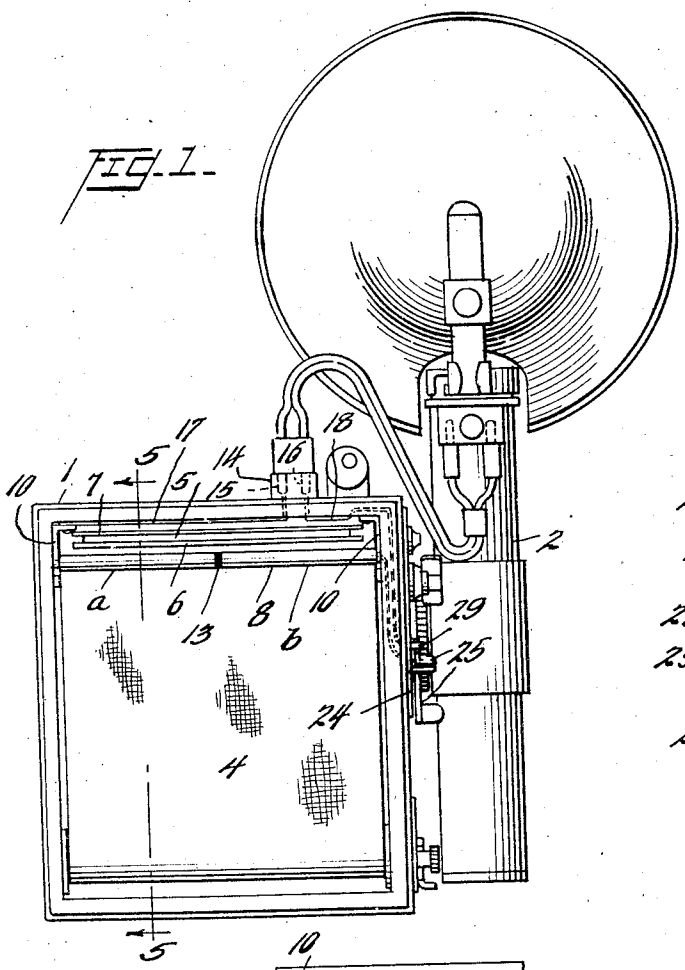


FIG. 2.

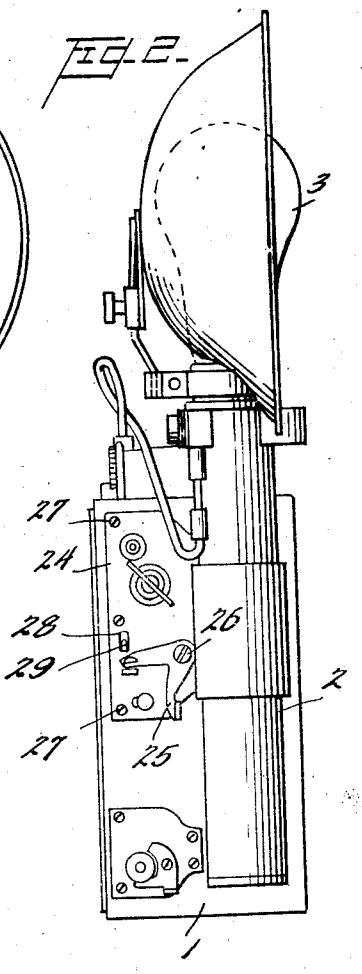


FIG. 3.

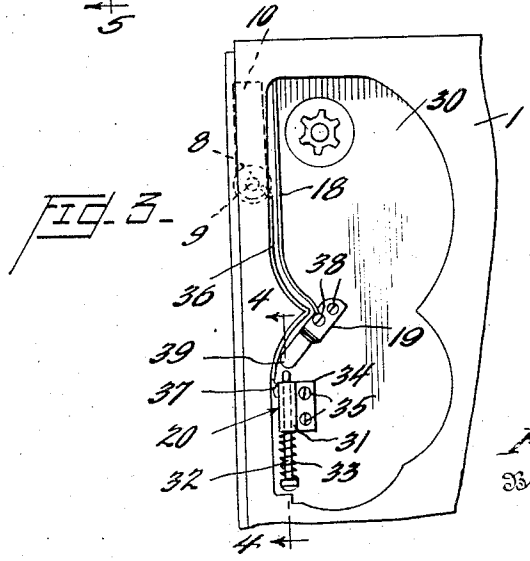
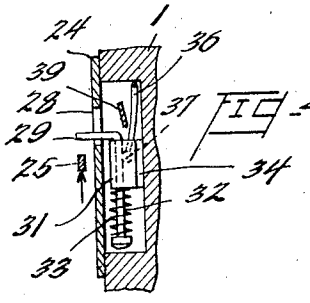


FIG. 4.



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FIG. 5.

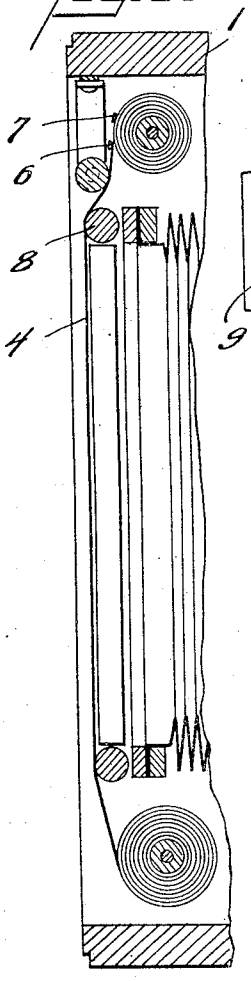
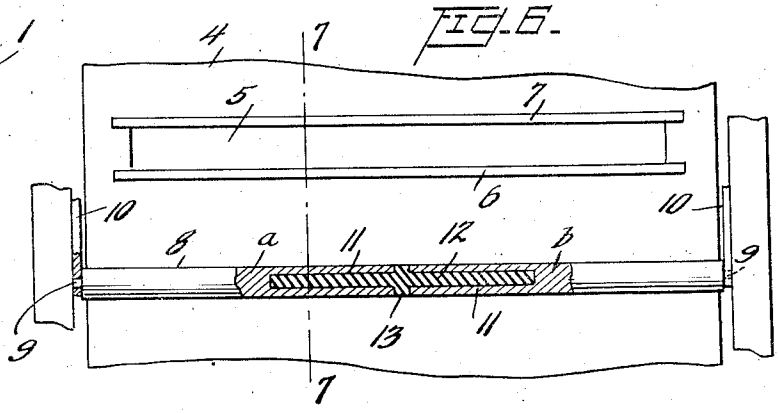


FIG. 6.



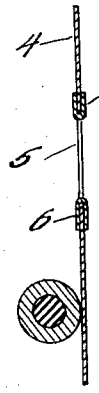
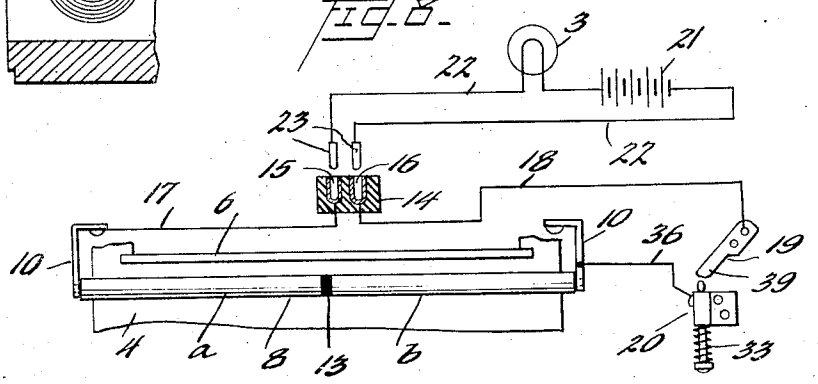


FIG. 7.

FIG. 8.



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FLASH SYNCHRONIZER FOR FOCAL-PLANE SHUTTERS

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6 Claims. (Cl. 67—29)

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My invention relates to new and useful improvements in photoflash synchronization and especially for a photoflash to be used in conjunction with a focal plane shutter of the Graflex or Speed Graphic type of camera.

As is well known to those skilled in the art, this focal plane shutter consists of a curtain having a plurality of windows of different width formed therein so that when the curtain travels downwardly in back of the lens, the width of the window plus, of course, the rate at which the curtain travels, will determine the duration of the exposure.

As is also well known to those skilled in the art, the forward and trailing edge of each window of the curtain is reinforced with a metal U shaped strip to prevent the curtain from tearing, and one of the objects of the invention is to utilize these metal U shaped strips together with certain mechanisms and parts about to be described to form an electrical contact to fire or activate the flash gun.

Still another object of the invention is to provide an inexpensive and reliable flash synchronizing mechanism that may be quickly and readily attached to the Speed Graphic and Graflex camera so that whenever the flash bulb is in the gun and the trigger for making the exposure is released, the trigger will first close a safety switch and then as the preselected window passes in back of the lens, the U shaped strip on the leading edge of the window will come in contact with a roller (which is insulated midway between its ends to in fact form two rollers) which will cause an electric circuit to bridge the insulated gap between the two halves of the roller and fire the flash gun.

Still another object of the invention is to provide a synchronized flash for a focal plane shutter as utilized in a Speed Graphic or Graflex type of camera which consists of relatively few parts and may be attached by a skilled workman in a very short time, the parts consisting simply of an insulated gap roller, a safety switch and a plug in which to fasten the leads from the flash gun.

Still another object of the invention is to provide a synchronized flash mechanism that does not in any way depend on the tension of the roller nor upon the size of the window selected nor the amount of curtain on the roller.

Still another object of the invention is to provide an efficient and simple photoflash mechanism for synchronized shutters that will in no way shorten the life of the roller curtain, which

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happens in some of the conventional type of synchronized flash mechanisms, as the clips or other attachments placed on the curtain have a tendency to tear or rip away from the curtain when the curtain is extensively used, and thus the life of the focal plane curtain is a relatively short one.

Still another object of the invention consists in attaching a simple mechanism that only necessitates scraping the lacquer off the U shaped clamp on the several windows, applying an insulated gap roller in the back of the camera to contact with these U shaped reinforcing edges, cutting a small hole in the trigger plate of the camera, installing the safety switch, and securing the socket for the leads from the flash gun.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts as will be hereinafter more fully described and pointed out in the claims.

Referring now to the drawings showing a preferred embodiment:

Fig. 1 is a rear view of a Speed Graphic or Graflex type of camera with the flash gun in position and the back of the camera removed to show the focal plane shutter curtain;

Fig. 2 is a side elevation of the same;

Fig. 3 is a fragmentary detailed view of the safety switch, the trigger plate being removed for the sake of clearness;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is an enlarged vertical sectional view taken on line 5—5 of Fig. 1;

Fig. 6 is an enlarged fragmentary view showing the bridge in the form of a roller having its two halves insulated from each other;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6 on an enlarged scale;

Fig. 8 is a diagrammatical view showing the roller, safety switch, circuit and the socket for the leads from the electric flash gun.

At the outset it is noted that I have shown only that much of a Speed Graphic or Graflex type camera as thought necessary to illustrate the present invention and its manner of attachment or installation in the above type camera.

Referring now to the several views and for the moment to Figs. 1 and 2, there is shown a camera 1 of the Speed Graphic type while secured to the side thereof in the usual manner, is the flash gun 2, in the barrel of which, as is well known, is carried the flash light cells necessary to fire the bulb 3.

As is well known also to those skilled in photography, the flash bulbs used with focal plane shutters have what is known as "extra long flash duration" or "long peak" so that the duration of the flash will last during the time that the window travels from its upper position past the lens to its lowermost position. This may take about thirty milliseconds (.030) and commercial bulbs to be used with these focal plane shutters are available with these desired characteristics.

Referring for the moment to Figs. 6 and 7, there are shown fragmentary portions of the focal plane curtain **4**, and there may be seen one of the four windows **5**, while along the leading edge of the window may also be seen the U-shaped reinforcing strip **6**, and along the trailing edge may be seen the similar reinforcing U shaped strip **7**.

These reinforcing strips are common to all of the focal plane curtains of the Speed Graphic and Graflex type camera as they prevent the edge from becoming frayed or torn. They are generally made of bronze and are painted or japanned black.

To be sure that they make a good electrical contact with the roller soon to be described, I preferably take a knife and remove the japan or black paint so that the roller will come in direct contact with the bronze body of the reinforcing strip. It is not absolutely necessary that this be done but it will insure a good electrical contact with the roller now to be described.

Mounted across the back of the camera—that is, just directly in back of the focal plane shutter **4** and in contact therewith is the metal roller **8** with its small trunnions **9** that fit in the respective bracket **10**.

This roller **8** is in reality made of two halves and glancing at Fig. 6 it will be seen in the left hand portion *a* and the right hand portion *b*. These metal portions *a* and *b* of the roller are then each cored at their coterminous ends at **11** and a Bakelite or other desirable form of insulating strip is fitted within the cored portions. The center of the insulated strip **12** has the small central flange **13** so that when the two parts *a* and *b* of the roller are assembled with the insulating strip **12**, there is the gap but no sharp edges formed by the insulating flange **13** between the two adjacent ends of the roller.

The brackets **10** are made of metal so that they will conduct the current to these two parts of the roller **8**.

As far as this application has proceeded it will be seen that when the window **5** passes beneath the roller **8**, as illustrated in Figs. 5, 6, and 7, as soon as the metal U shaped strip **6** comes in contact with the roller **8**, the current may bridge through the metal reinforcing strips **6** and thus provide a circuit from one bracket **10** to the other and around the insulated gap in the roller.

Referring for the moment to Figs. 1 and 8, there will be seen mounted on the top of the camera a small electrical socket **14** with its two metal pin receiver sockets **15** and **16**, and it will be noticed that the left bracket **10** is connected by the lead wire **17** to the one pin socket **15**, while the other pin socket **16** is connected by the lead **18** to the switch **19**, while to the other part of the switch **20** is connected the lead **36** which is in turn connected also to the remaining bracket **10**.

Also in Fig. 8 there is diagrammatically shown the bulb **3** in circuit with the battery **21**, the bulb and the battery being electrically connected by the leads **22** to the two pins **23** that fit in the respective pin sockets **15** and **16**.

Thus far, it will be seen that when the pins **23** are in their sockets there will be a break in the circuit between the parts of the switch **19** and **20** and there will also be a break in the circuit due to the two halves of the roller being insulated. However, when the switch (**19—20**) is closed and the U shaped reinforcing strip **6** contacts with the two halves of the roller **8**, the circuit will bridge the gap between the halves of the roller and pass through the metal strip **6** to complete the circuit and fire the gun, or in other words, flash the bulb.

It will also be seen that if for any reason not foreseen the leading U shaped strip did not bridge the current and fire the gun, the trailing U shaped strip in its movement will also contact with the roller and bridge the gap so that the firing of the gun is doubly insured.

Now glancing for the moment at Fig. 2, there may be seen the trigger plate **24** on which is the hand-operated trigger **25** that is pivoted as at **26**.

In the installation of the synchronizing mechanism this trigger plate **24** is removed by loosening the screws **27** and the plate **24** is then provided with a relatively small U shaped aperture **28** through which projects the end of the arm **29** of a plunger **32** forming a part of the half **20** of the switch mechanism.

As may be seen in Fig. 3, right beneath the plate **24** the wood is routed out as at **30**, and mounted in the chamber may be seen the half **20** of the switch mechanism which consists of the small barrel **31** through which extends the plunger **32** with its arm **29** as heretofore mentioned. About the plunger **32** may be seen the small spring **33** to normally hold the plunger and its arm **29** in a retracted position.

The barrel **31** may be on the small plate **34** and the plate fastened in place by the screws **35**.

The lead wire **36** that extends from the one bracket **10** is soldered or otherwise electrically connected to the switch portion **20** as may be seen at **37**.

The other half of the switch **19** is mounted in the chamber and in close proximity to this cooperating half **20**, and may consist of a small copper plate which is held in position by the screws **38**, while the tongue or contacting portion **39** is flexible so that it will frictionally engage the plunger **32** when the latter is advanced.

It will be seen from Fig. 2 that when the trigger **25** is pressed by the thumb to release the curtain **4**, one arm of the trigger will immediately contact the arm **29** of the switch to advance (raise) the same in its slot **28**, and this advancing of the arm **29** and its plunger **32** will cause the same to contact with the tongue **39** of the cooperating part of the switch to thus close the circuit at this point.

It will be seen that it is a simple matter to install the switch under the trigger plate. Also, the lead wires extend, one wire **36** to the one bracket **10** from the part **20** of the switch, while from the other part of the switch **19**, the lead wire **18** extends to the socket **16**. The lead wire to the socket **15** extends directly across the camera to the other bracket **10**.

The operation is extremely simple and to reiterate, it will be seen that when the trigger **25** is first actuated and before it releases the curtain, it will actuate the switch **19—20** so

that the small plunger **32** will contact with the tongue **39** of the opposite part of the switch and thus leave the only break in the circuit in the roller **8**.

On the continued movement of the trigger, it will release the curtain by a mechanism (not shown) and the metal reinforcing strip **6** on the leading edge of the preselected window, will quickly contact with the metal roller **8**, as this roller **8**, it will be remembered, is positioned at the top of the camera and just below the rewind curtain roller. Then on contact, the current will bridge the gap between the two sections of the roller **8** and pass through the reinforcing strip **6**, which will fire the flash gun to provide the necessary illumination as the window travels down in front of the photographic plate or film.

If for any reason which cannot be foreseen this first strip **6** would not cause the current to bridge the gap, then the strip **7** in bridging the gap will cause the circuit to be completed and fire the gun.

Immediately on the release and return of the operating trigger **25**, the small plunger **32** will be retracted under its spring pressure so that when the curtain is again being re-wound, there will be no current passing through the roller. Thus, even though the operator placed a flash bulb in the gun before re-winding the curtain, the gun will not be fired.

From the foregoing it will be seen that I have provided a simple and inexpensive mechanism that may be quickly and readily installed in cameras in utilizing focal plane shutters.

Many slight changes might be made without in any way departing from the spirit or scope of the invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A synchronized flash mechanism for a camera having a focal plane curtain with metal protecting strips extending along the edges of its several windows and a flash gun mounted on the camera; together with a metal roller provided with an insulated gap between its ends, said roller mounted near the top of the camera and in contact with said curtain, an electric socket mounted on the camera and also in circuit with both ends of said roller, said socket adapted to receive the lead wires from the flash gun, the leading metal strip extending along the edge of a window and adapted to electrically bridge the gap in the roller when contacting the same on a functioning movement of the curtain to thus complete the circuit through the gun and fire the same.

2. A synchronized flash mechanism for a focal plane camera having metal protecting strips along the edges of its several windows and a flash gun; in combination with a metal roller mounted near the top of the camera and in physical contact with the back of the focal plane curtain, the roller provided with an insulated gap between its ends, an electric socket, and the ends of the roller electrically connected with said socket, the socket adapted to receive the lead wires from the flash gun, an electric safety switch also in the

circuit between the roller and the flash gun, the said switch adapted to be automatically closed on the release of the curtain and the leading metal strip extending along the edge of a pre-determined window and adapted to electrically bridge the gap in the roller when contacting the same on its downward movement with the curtain to thus complete the circuit through the gun and fire the same.

3. In an attachment for focal plane cameras of the Speed Graphic type having a flash gun associated therewith; an electric socket to receive the leads of the flash gun, a metal roller provided with an insulated gap in an open circuit with said socket, a safety switch also in the circuit between the roller and the socket, the said safety switch adapted to be closed on the release of the curtain by the operator and the gap in the roller electrically bridged on contact with a reinforcing strip conventional to the windows of a focal plane shutter to thereby fire the gun as the window passes the exposure opening.

4. An attachment for flash synchronization in cameras of the Speed Graphic and Graflex type including a metal roller provided with an insulated gap, brackets for supporting the ends of the roller, an electric socket to receive the lead wires of a flash gun, said socket electrically connected with the respective ends of the roller, a safety switch also in the circuit between the roller and socket, the safety switch adapted to be closed on the release of the focal plane shutter and the gap in the roller adapted to be bridged by a contacting reinforcement on the window of the focal plane shutter as the focal plane shutter and its reinforcing window edge slides past the rear of the lens.

5. In an attachment for flash synchronization for cameras of the Speed Graphic type having a focal plane shutter with metal reenforcement extending along the edges of the several windows, a flash gun, a metal roller provided with an insulated gap between its ends and adapted to be positioned in physical contact with the curtain and near the upper edge of the camera, a socket to receive the lead wires of the flash gun and in circuit with the respective ends of the roller, a safety switch having an arm extending within the path of the curtain release trigger whereby on the operation of the trigger the safety switch will be closed while on the movement of the curtain the reenforcing strip about the edge of a window will bridge the gap in the roller to operate the flash gun.

6. In an attachment for flash synchronization for cameras provided with a focal plane curtain having a plurality of windows with reinforcing metal strips along the edges of said windows; a photo flash gun associated with the camera, a metal roller provided with an insulated gap, the roller bearing against the curtain so that on the travel of the curtain and contact of the roller with the metal reenforcing strip an electric circuit is closed to thereby fire the gun when the window is opposite the exposure opening of the camera.

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