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SWITCH FOR FLASH ATTACHMENTS

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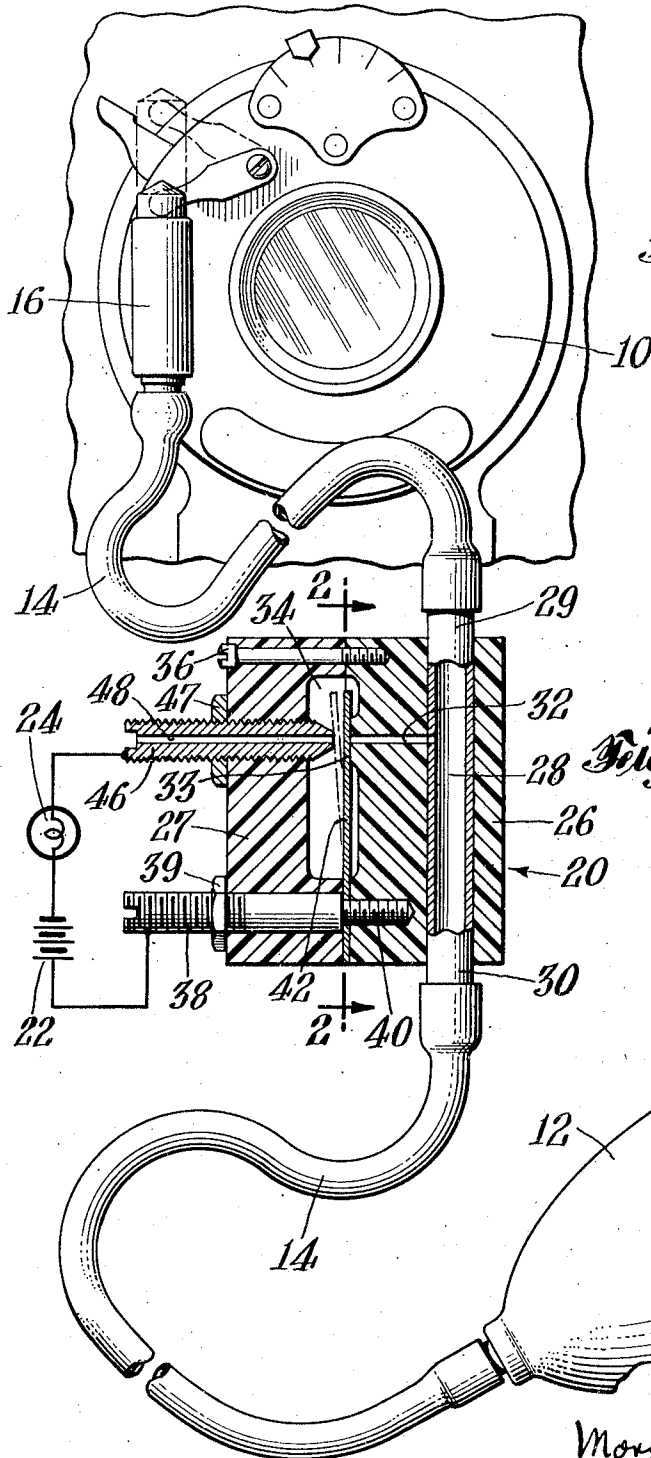
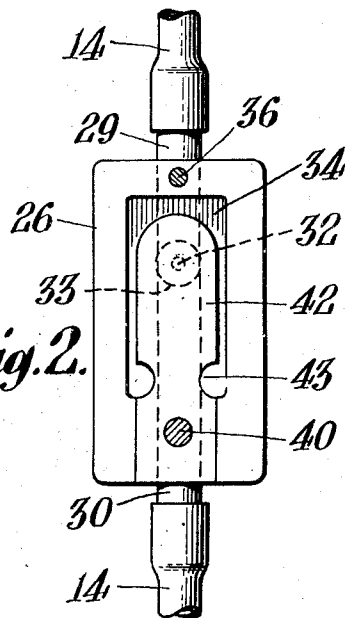
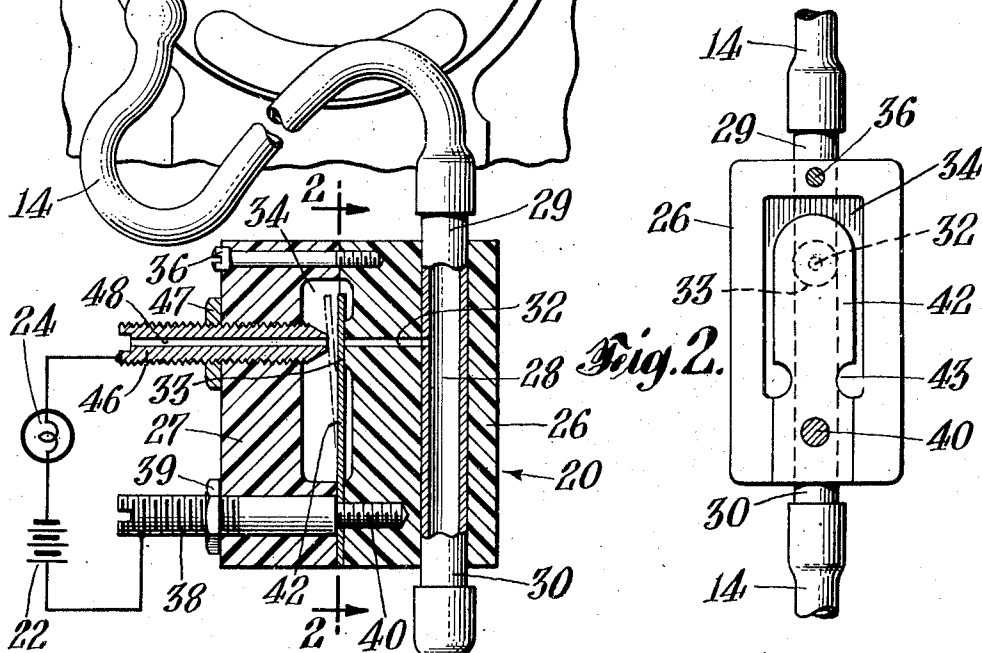


Fig. 1.



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SWITCH FOR FLASH ATTACHMENTS

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The present invention relates to new and useful improvements in photographic flash guns, and more particularly to a slow-speed synchronizer for use with studio shutters.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Figure 1 is a view, partly in section and partly schematic of the present preferred and illustrative embodiment of the present invention; and

Figure 2 is a detailed cross section taken on the line 2—2 of Figure 1.

The present invention has for its object the provision of a simple, efficient, easily manufactured and reliable flashlight synchronizing switch particularly adapted for use with pneumatic studio shutters which are usually of relatively slow operation. A further object of the invention is the provision of an improved flashlight synchronizing switch which allows the shutter to be opened and closed without closing the switch or firing the flash.

The present invention is adapted for use with pneumatic or fluid actuated camera shutters such as are generally used in connection with studio cameras, such shutters usually operating at relatively slow speeds, and ordinarily being used to provide exposures of considerable duration such as are usually given by a "bulb" setting.

In studio practice it is usual to open the shutter preliminary to the exposure for properly focusing the camera and for composing the picture, after which the shutter is closed. When the camera is ready for exposure, the shutter is to be opened and the flash should occur only during this second opening of the shutter. By the use of the present invention the flashlight apparatus may be completely readied for use before the first opening of the shutter, but is not fired until the shutter is opened for exposure.

In accordance with the preferred embodiment of the invention, the flashlight synchronized switch is interposed in the pneumatic connection

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between the shutter and its actuating bulb, and this switch comprises a contact member adapted to be moved to circuit closing position by a rapid change in pressure in the pneumatic tube, but also adapted to remain in open circuit position when the change in pressure in the pneumatic tube is less rapid but nevertheless sufficient to effect opening of the camera shutter.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the present preferred and illustrative embodiment of the invention as shown in the accompanying drawings, the camera shutter 10 is of conventional construction and may be any pneumatically actuated shutter, and is connected with the usual air bulb 12 by means of the flexible pneumatic tube 14 so that squeezing the bulb 12 causes operation of the pneumatic motor 16 to open the shutter, while release of the bulb 12 allows the shutter to close. Interposed between the ends of the pneumatic tube 14 is the flashlight synchronizing switch 20 of the present invention which is connected between the battery 22 and the flash bulb 24. Battery 22 and flash bulb 24 are shown in a purely diagrammatic manner and may be of any desired construction.

The synchronized switch 20 is preferably formed in two parts 26, 27 of insulating material such as a synthetic resin. One of the parts 26 is provided with a longitudinal passageway 28 from the ends of which extend short, rigid tube ends 29 and 30 over which the ends of the flexible airtight tube 14 may be slipped to form an airtight connection with the passageway 28 thus serving to conduct air under pressure from the bulb 12 to the motor 16. Communicating with the passageway 28 is a relatively fine aperture 32 leading to a smooth, flat face 33 formed on one surface of the member 26 and located within the internal airtight chamber 34 formed between the parts 26 and 27.

The parts 26 and 27 are normally held together in airtight relation by means of screw 36 passing through the part 27 and threaded into part 26, and by a metallic contact screw 38 which is provided with lock nut 39 passing through block 27 and has a reduced threaded portion 40 threaded into the block 26. Screw 38 also serves to firmly locate a relatively thin and flexible spring contact 42 which extends into the chamber 34 and normally rests against the flat surface 33, thereby closing the aperture 32.

The flexible spring contact 42 is preferably in

the form of a leaf spring and is notched near the point where it enters the chamber 34, as at 43, to increase its flexibility. While this spring may be made of various materials, it is preferably made of material having good spring characteristics and good electrical conductivity such as Phosphor bronze.

Alined with the aperture 32 and extending into the chamber 34, in a position where it may be contacted with the leaf spring 42, is an adjustable contact 46 locked in position by lock nut 47 having its exterior threadedly engaged in corresponding threads in the member 27. Screw threaded member 46 is provided with an axially extending aperture 48 which extends to both ends of the member 46, and provides a bleed duct bleeding the internal chamber 34 to the outside. Normally, and as shown, the internal end of screw member 46 is spaced from the face of leaf spring 42 a substantial distance, but not so much as to prevent contact of the leaf spring 42 with the internal end of the screw member 46, and when so contacted leaf spring 42 closes the inner end of the central bore 48 so as to prevent substantial leakage of air through this bleed duct.

Preferably the bores of apertures 32 and 48 are substantially equal, and are both much smaller than the diameter of the passageway 28 from which they receive their flow of air. The strength of spring 42 is such that an increase of air pressure within the passageway 28 more than sufficient to open the shutter, is required to unseat the leaf spring 42 from the flat seat 33 surrounding the aperture 32, thereby permitting the motor 16 to be actuated with certainty without movement of the leaf spring 42. However, leaf spring 42 is not so stiff, and the distance normally spacing it from the internal end of screw member 46 is not so great but that a sudden, large increase in the pressure within passage 28 will move the leaf spring 42 into contact with screw member 46, thereby establishing an electric circuit between the screw members 38 and 46, these members serving as the terminals of the switch in series with the flash bulb 24 and battery 22. When the leaf spring 42 is seated against the internal end of the screw member or contact 46, it closes the bore 48 thereby preventing escape of air from the chamber 34 and accordingly preventing accidental closure of the shutter before the bulb 12 is released.

The invention thus provides a switch mechanism in which the movable contact is not moved to circuit closing position except on a sudden large increase in pressure in the duct 32, at least sufficient to move the leaf spring 42 against the contact screw 46. This movement seals duct 48 and the pressure in duct 32 is then transferred to the chamber 34 serving to hold the leaf spring 42 seated in contact with the screw 46 to close duct 48, so that good electrical contact is established and leakage of air from the passage 28 is prevented.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims

without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. In a shutter synchronizing switch for photographic flash lamps, the combination of a passageway subject to increased fluid pressure when the shutter is to be opened, a restricted duct communicating with said passageway, a switch contact and a movable contact engageable with the first contact to close a circuit, the movable contact being normally in open circuit position and urged to close said duct, said switch contact being formed with a bleed duct to be closed by movement of the movable contact to circuit closing position.

2. In a shutter synchronizing switch for photographic flash lamps, the combination of a switch body, an air passage therethrough, an air chamber in said body closed except for a restricted duct connecting the passage with the chamber and a bleed duct connecting the chamber to atmosphere, a movable contact member in said chamber normally closing said restricted duct, and a fixed contact to be engaged by said movable contact when moved by air issuing through said restricted duct, said movable contact closing said bleed duct when engaged with said fixed contact.

3. In a shutter synchronizing switch for photographic flash lamps, the combination of a switch body, an air passage therethrough, an air chamber in said body, a restricted duct connecting the passage with the chamber, a movable contact member in said chamber and normally closing said duct and a fixed contact to be engaged by said movable contact when moved by air issuing through said duct, said fixed contact having an aperture therein to bleed air from the chamber, said aperture being closed by said movable contact when engaging said fixed contact.

4. In a shutter synchronizing switch for photographic flash lamps, the combination of a switch body, an air passage therethrough, an air chamber in said body, a restricted duct connecting the passage with the chamber, a movable contact member in said chamber and normally closing said duct and a fixed contact to be engaged by said movable contact when moved by air issuing through said duct, said fixed contact having an aperture therein to bleed air from the chamber, said aperture being closed by said movable contact when engaging said fixed contact, said duct and aperture being alined and positioned on opposite sides of said movable contact.

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