Feb. 2, 1937. W. H. RICHARDS 2,069,272

INERTIA OPERATED ELECTRICAL SWITCH

Filed Aug. 17, 1934

FIG. 1.

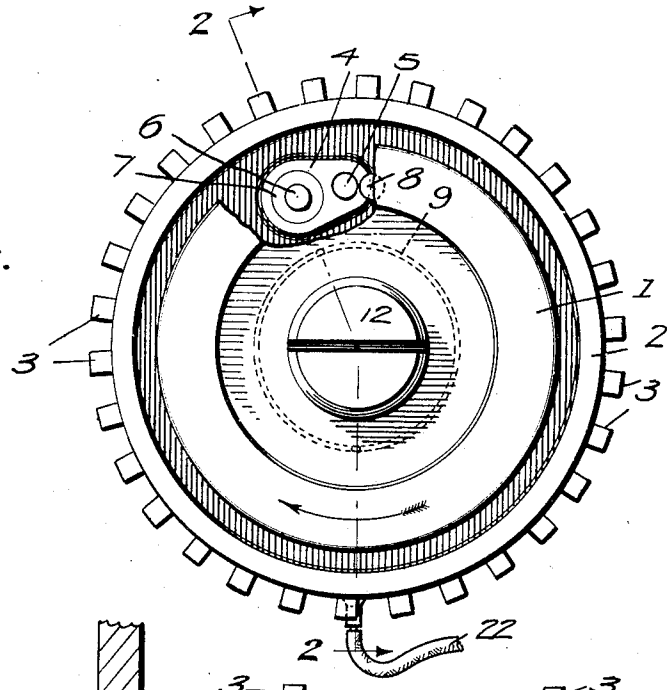
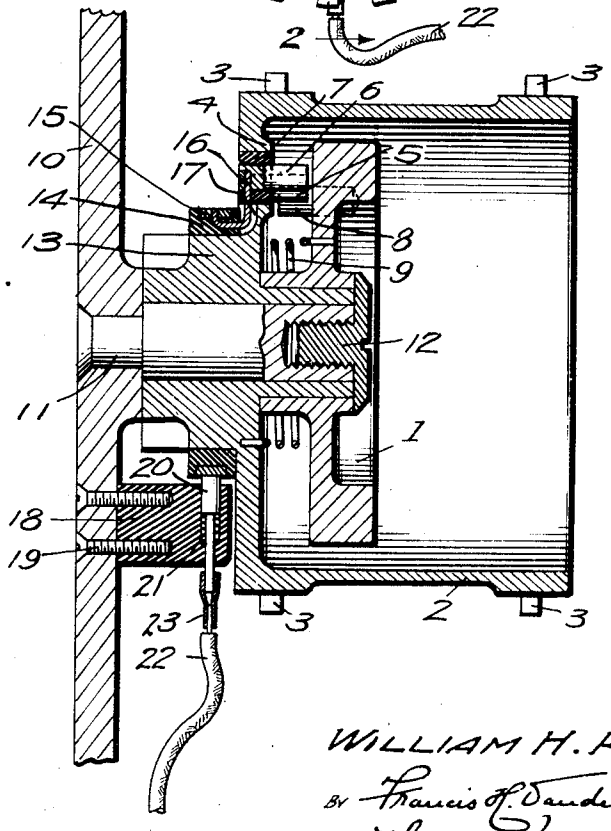


FIG. 2.



INVENTOR

WILLIAM H. RICHARDS

BY Francis H. Vanderwerken and Wade Crouty

ATTORNEYS

Patented Feb. 2, 1937

2,069,272

UNITED STATES PATENT OFFICE

2,069,272

INERTIA OPERATED ELECTRICAL SWITCH

William H. Richards, Dayton, Ohio

Application August 17, 1934, Serial No. 740,279

4 Claims. (Cl. 200—52)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

My invention pertains to an electrical switch so constructed that sudden deceleration of a body to which it is attached automatically closes the contact points thereof.

In one embodiment I have utilized my invention to accomplish predetermined flashings of an electric lamp installed within an aerial gun camera for the purpose of exposing the face of a time recording instrument upon the last exposure of any given "burst" taken during simulated aerial combat.

With the foregoing and other objects in view, which will appear as the description proceeds, my invention consists of certain new and novel improvements in inertia operated electrical switches, which will hereinafter be more fully illustrated and described in the accompanying drawing and more particularly pointed out in the appended claims.

Referring to the drawing, in which numerals of like character designate similar parts throughout the drawing;

Fig. 1 is a plan view of my invention applied to the feed sprocket of an aerial gun camera,

Fig. 2 is a cross-sectional view of Fig. 1 on the lines 2—2.

In Fig. 1, a flywheel 1 is coaxially and freely rotatably mounted upon a camera film feed sprocket 2, from which project the customary film engaging lugs 3. A portion of the flywheel 1 has been broken away to show elongated boss 4, forming part of the body portion of the sprocket 2, from which project a driving pin 5 and a contactor pin 6, imbedded in an insulator 7. A driven pin 8, normally held in contact with the driving pin 5 by means of a spiral spring 9, is fixedly secured to the back face of the flywheel 1. Constant clockwise rotation of the sprocket 2 will thus effect like constant clockwise rotation of the flywheel 1. If, however, the sprocket 2 is suddenly arrested, the flywheel 1 will continue its clockwise rotation until the driven pin 8 comes into contact with and is arrested by the contactor pin 6. In addition to maintaining initial contact between the driving and driven pins 5 and 8, the helical spring 9 further tends to lessen the engaging impact between the driven pin 8 and the contactor pin 6.

A more complete understanding of the aforementioned parts may be had from their side elevations, as shown in Fig. 2. It will be noted that the sprocket 2 is secured to a camera shutter housing 10 by means of a journal 11 and locking screw 12. The rear wall of the sprocket 2 is provided with a boss 13 having gear teeth at its outer end adapted to mesh with a drive gear not shown in the drawing. The inner end of the boss 13 is adapted to receive and fixedly secure a ring 14 of insulating material to which is affixed a contactor ring 15. A J-shaped conductor 16 is soldered fast at its lower extremity to the contactor ring 15 and at its upper extremity to the contactor pin 6. It will be noted that the contactor pin 6 is secured to the sprocket 2 by means of the insulator 7. To facilitate ready assembly of the aforementioned parts, the sprocket 2 is provided with a recess 17 of sufficient size to avoid all possibility of electrical contact between the body portion of the sprocket 2 and the contactor 16.

Immediately beneath the rings 14 and 15 is located an insulator 18 fixedly secured to the housing 10 by means of screws 19. A sliding contactor 20 is forced upwardly against the contactor ring 15 by means of a spring 21. A flexible cable 22 is fixed to the lower extremity of the contactor 20 by means of a ferrule 23.

Brief reference is made to certain characteristics inherent in aerial gun cameras prior to a description of the operation of the invention when applied to such cameras. Equipment of this type is made to closely approximate in generaal appearance the service weapon from which it derives its name. Gun sights, hand grips and triggers are maintained as nearly "standard" as possible. Likewise, the abrupt starting and stopping characteristics of the camera film feed sprocket 2 are maintained the same as those of a similar sprocket installed in an ordinary motion picture camera. On the other hand, gun cameras incorporating this invention must be provided with a special shutter mechanism which automatically blocks off the last exposure of any given "burst" and positions the unexposed portion of film in registration with a special secondary exposure mechanism which effects automatic exposure of the face of a time recording instrument upon the aforementioned portion of film. Artificial lighting is employed to accomplish the above single exposure and consists of a small dry battery and ordinary electric bulb concealed within the camera shutter housing 10. As shown in Figs. 1 and 2, the driven pin 8 is grounded to the housing 10. One terminal of the aforementioned electric bulb is similarly grounded, the other terminal thereof being con-

nected with a terminal of the aforementioned battery. The second terminal of said battery is in turn connected to the contactor 20 by means of the flexible cable 22. With termination of any camera "burst", the sprocket 2 abruptly comes to rest. The flywheel 1 continues to rotate until brought to rest by the combination of increasing tension in the spring 9 and impact between the driven pin 8 and the contactor pin 6. The aforesaid impact closes the electric circuit between dry battery and electric bulb, thereby projecting an image of the time recording instrument upon the unexposed portion of film.

It is at once obvious to those skilled in the art, upon reference to Fig. 1, that interchange of relative positions between the driving pin 5 and the contactor pin 6 and insulator 7 may be utilized to indicate, in combination with suitable recording instruments, sudden accelerations imparted to drive pulleys, gears, or the like.

I claim:

1. In combination, a camera film feed sprocket with offset cavity forming mounting flange, a freely rotatable flywheel spaced from but coaxially secured to the cavity surface of said flange, a driven pin secured to said flywheel and extending substantially to said cavity surface, a driving pin secured to said cavity surface and extending substantially to said flywheel, said driven and driving pins being parallel to and equidistant from the sprocket axis of rotation, means for yieldably securing initial contact between the aforesaid pins, and switching means associated with said sprocket and actuated upon predetermined angular separation between the aforesaid pins.

2. In combination, a camera film feed sprocket with offset cavity forming mounting flange, a freely rotatable flywheel spaced from but coaxially secured to the cavity surface of said flange, a driven pin secured to said flywheel and extending substantially to said cavity surface, a driving pin secured to said cavity surface and extending substantially to said flywheel, said driven and driving pins being parallel to and equidistant from the sprocket axis of rotation, a helical spring secured at one end to said cavity surface and at the other end to said flywheel for yieldably securing initial contact between the aforesaid pins, and switching means associated with said sprocket and actuated upon predetermined angular separation between the aforesaid pins.

3. In combination, a camera film feed sprocket with offset cavity forming mounting flange, a freely rotatable flywheel spaced from but coaxially secured to the cavity surface of said flange, a driven pin secured to said flywheel and extending substantially to said cavity surface, a driving pin secured to said cavity surface and extending substantially to said flywheel, a fixed and insulated contactor pin extending through said cavity surface substantially to said flywheel, the aforesaid pins being parallel to and equidistant from the sprocket axis of rotation, a helical spring secured at one end to said flange and at the other end to said flywheel for yieldably securing initial contact between said driven and said driving pins and thereby insuring initial angular separation between said driven and said contactor pins, and an insulated contactor ring secured to the exposed surface of said flange and electrically connected with said contactor pin such that contact of said driven pin and said contactor pin is utilized to complete an electric circuit.

4. In combination, a camera film feed sprocket with offset cavity forming mounting flange having predeterminately spaced driving and arresting pins projecting outwardly from the inner flanged surface thereof, a freely rotatable flywheel spaced from but coaxially secured to said inner flanged surface having a driven pin projecting inwardly between said driving and arresting pins, means for yieldably securing initial contact between said driving and driven pins and an open electrical circuit associated with said sprocket, said circuit being closed upon contact of said driven pin with said arresting pin.

WILLIAM H. RICHARDS.