

PATENT SPECIFICATION

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- (21) Application No. 35728/73 (22) Filed 26 July 1973
 (31) Convention Application No. 275 689 (32) Filed 27 July 1972 in
 (33) United States of America (US)
 (44) Complete Specification published 9 June 1976
 (51) INT. CL.² G03B 17/18
 G04C 21/00
 (52) Index at acceptance
 G2E A20A1 A20B1 A20C7 A20C8 A20C9



(54) MOVIE CAMERAS

(71) We, PONDER & BEST, INC., a corporation organized under the laws of the State of California, United States of America, of 1630 Stewart Street, Santa Monica, California 90406, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be described in and by the following statement:—

This invention relates to movie film cameras.

Movie camera operators desire to achieve smooth scene continuity. In order to achieve this continuity, camera operators have resorted to timers external to their movie camera equipment or, as is more common, to approximations of time.

It is also desirous for the movie camera operator to have an indication when the film has come to the end of the reel, without braking his or her eye contact with the viewfinder in order to look at a footage counter or waiting for a mechanical stoppage.

According to the present invention there is provided a movie film camera including means for producing an audible alert signal, and/or a visual alert signal visible by the camera operator without breaking eye contact with the viewfinder, to inform the operator that a certain film running event has occurred, the alert signal being electrically generated and the means for producing it being arranged for activation through electrical switching means, the camera including for this purpose time-delay switching means capable of being activated at the start of a film run so as to operate when a predetermined running time has elapsed and/or switching means associated with the film drive mechanism so as to operate when the film reaches a predetermined point in its run.

For the visual alert signal a visual indi-

cator is preferably provided in the line of sight of the viewfinder. Such an indicator may comprize a light emitting diode.

The invention, both as to its organization and principles of operation together with further advantages thereof, may better be understood by reference to the following description of an embodiment of the invention given by way of example, and with reference to the accompanying drawings in which:

Figure 1 is a circuit diagram illustrating an exemplary embodiment of the basic concepts of providing a visual indicator and an audible alert signal to both alert a movie camera operator that he has been filming for a specific length of time and that the film has come to the end of the reel, all in accordance with the invention.

Figure 2 is an internal view of an exemplary embodiment of a movie camera in accordance with the invention.

Referring to Figure 1, the circuit comprises a control unit or circuitry 11 which activates an alert signal unit 12 usually in the form of a transducer such as a buzzer or audio oscillator and a visual indicator, by controlling a source voltage applied to unit 12. This source voltage (not shown) is applied at terminal 13 of upper conductor 15 and at terminal 14 of lower conductor 16 to provide the proper voltage to circuitry 11 and to unit 12.

Circuitry 11 includes switching means or transistor 17 with a biasing resistor 18 connected between the emitter of transistor 17 and lower conductor 16. A capacitor 20 is connected between the base of transistor 17 and lower conductor 16 to provide a time delay for voltage which is introduced to capacitor 20 from the voltage source through fixed resistor 22 and variable resistor 21. Since resistor 21 which is mechanically coupled with on-off switch 30 is variable, the rate of charge time for

capacitor 20 determines when transistor 17 is biased properly and therefore when it conducts.

5 A normally closed switch 19 coupled with a pistol grip trigger switch of a movie camera is connected between the base of transistor 17 and lower conductor 16 in a position to short capacitor 20 when switch 19 is closed. When switch 19 is opened, usually by the starting of an associated movie camera, capacitor 20 will charge and, after a delay determined by the charge time of capacitor 20, transistor 17 will be biased to a state of conduction and 15 will apply a positive voltage through coupling resistor 23 to bias "on" transistor 24 in unit 12.

Circuitry 11 as described above, is one embodiment of a control unit which may be utilized. Another embodiment is an integrated circuit which is activated after a selectable time delay following operation of switch 19 by the trigger of the pistol grip.

25 In unit 12 transistor 24 and its associated ceramic transducer element 25, which may be of the type designated as PZT/UNIMORPH manufactured by Vernitron Corp., comprise an audio oscillator connected in a well-known electrical configuration to provide audio oscillations when transistor 24 is properly biased. Biasing resistor 26 is connected between the collector of transistor 24 and a visual indicator or 35 light emitting diode 33 which is in turn connected to upper conductor 15. Biasing resistor 27 is connected between the emitter of transistor 24 and the lower conductor 16 (through ceramic transducer element 25).

40 Diode 33 and an associated viewfinder 34 are positioned internal to a movie camera to give the camera operator a visual indication whenever unit 12 is activated by circuitry 11.

45 A switch 28 is provided to initiate an audio signal when the film has come to the end of the reel or reached a predetermined length. The audio oscillator comprising transistor 24 and ceramic transducer element 25 is activated when the base of transistor 24 receives a positive voltage (supplied at terminal 13) through switch 28 (normally open), fixed resistor 29 and coupling resistor 23. Fixed resistor 29 is connected 55 to switch 28 at one end, and to a point between the emitter of transistor 17 and coupling resistor 23 at the other end.

An on-off switch 30, mechanically coupled with variable resistor 21, is provided in circuitry 11 in series in upper conductor 15 between the collector of transistor 17 and switch 28. Switch 30 when opened, provides means to disengage from operation the time delayed audible alert signal 65 and the visual indicator, either prior to

filming or once the time has expired and the alert signals have been activated. Switch 30 is arranged to be in its open state when resistor 21 is at one end of its travel (its extreme setting) and this setting of the resistor 21 may correspond to the maximum rate of charge time of capacitor 20.

70 A zener diode 31 is connected across unit 12 between upper conductor 15 and lower conductor 16, and a resistor 32 is connected in series at terminal 13, to provide voltage regulation in a manner well-known in the art.

Turning now to Figure 2, a movie camera 35 is illustrated with selected internal components exposed. The camera 35 basically comprises a housing 36, a main lens assembly 37, a viewfinder 34 and a pistol grip trigger 38. Trigger 38, when depressed, causes the opening of normally closed switch 19 or other suitable start contacts. Control unit 11 provides the circuitry to control the activation of an audible transducer unit 39 and a visual indicator such as a light emitting diode 33. 80

Diode 33 is positioned in the line of sight of the viewfinder 34 to visually indicate that an elapsed time for filming has expired or that the film has reached a predetermined length, such as the end of the reel. The elapsed time for filming is controlled by potentiometer or variable resistor 21 which determines the rate of charge time for capacitor 20 as shown in Figure 1. 90

The alert signal which indicates that the film has reached a predetermined length is controlled by a footage counter assembly 40 driven by the film. Assembly 40 includes a footage wheel, a cam drive and a film switch 28. The film switch 28 includes contacts which are mechanically connected to the wheel of assembly 40, and these contacts close when the film has reached a predetermined point, such as the end of the reel. When switch 28 closes, the alert unit 12 will be activated and thus an audible and a visual alert indication will be given to the camera operator. 100

Further features which may be incorporated in camera 35 are an adjustable exposure meter 41, a film speed indicator 42 and a battery condition indicator 43. 115

In operation, the switch 30 is placed in its on or closed state. When an associated movie camera start switch is activated, normally closed switch 19, which is ganged to the movie camera switch, is opened, thus allowing a capacitor 20 to receive a charge from the voltage source through resistors 32, 22 and 21. When the charge on capacitor 20 is sufficient to provide proper bias to transistor 17, conduction will occur and a positive output at the emitter of transistor 17 will result in a manner well- 120 125 130



known in the art. Capacitor 20 will offer a time delay starting from when switch 19 is opened. Since resistor 21 is adjustable, the rate of charge time for capacitor 20 determines when transistor 17 will conduct and thus the filming time delay.

The positive voltage appearing at the output of transistor 17, in its conduction state, will be applied through coupling resistor 23 to bias "on" transistor 24. This produces audio oscillations preferably of approximately 2 kHz due to the particular phase characteristics and relationship in a single transistor ceramic transducer element audio oscillation unit, as is well-known in the art.

The operator will be able to stop the alert signal produced when a specific time for filming has expired by disengaging switch 19, or allowing switch 19 to return to its normally closed position and thus short capacitor 20. This removes the proper bias applied to the base of transistor 17 and switches transistor 17 into its non-conducting state. When transistor 17 is in a non-conducting state, the proper bias is not applied to the base of the transistor 24 in unit 12 and audio oscillations cease. When filming is commenced for the next scene, the sequence of events previously mentioned will occur over again.

When the film switch 28 closes, because the film has come to the end or at a predetermined length from the end of the reel, transistor 24 is biased into a conduction state to achieve audio oscillations by closing normally open switch 28 to allow a voltage to be applied to the base of transistor 24 to bias this transistor "on" and thus cause transistor 24 to conduct and produce audio oscillations.

Diode 33 will be activated (emit light) when unit 12 is activated and will therefore serve as a visual indicator in combination with an accompanying audible signal from the ceramic transducer 25. Of course the transducer may alternatively be replaced by suitable non-audible components and the diode 33 utilized as the sole indicator. The diode 33 is placed in the line of sight of the viewfinder 34 internal to the movie camera. Thus diode 33 will allow a camera operator to retain his eye contact while filming and still be alerted that a predetermined time of filming has elapsed or that a predetermined amount of film remains on the reel.

Values utilized in the preferred embodiment of this invention which allows a signal variation up to approximately thirty seconds are as follows: capacitor 20 — 2,000 — microfarads

resistor 18 — 22,000 ohms

resistor 21 — 50,000 ohms

resistor 22 — 10,000 ohms
resistor 23 — 15,000 ohms
resistor 26 — 1,500 ohms
resistor 27 — 330 ohms
resistor 29 — 47,000 ohms
transistor 17 — Type 2N2926
transistor 24 — Type 2N2926
applied at terminal 13 — 6V
applied at terminal 14 — 0V
zener diode 31 — 5V

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It has been shown that by providing an audio oscillator comprising a single transistor and a ceramic transducer element and a visual indicator such as a light emitting diode that reliable alert signals can be accomplished in a movie camera environment to alert the camera operator that a specific length of time for filming has expired or that the film has come to the end of the reel or that a specific length of film has been used or remains on the reel.

While an embodiment and application of this invention has been shown and described, it will be apparent to those skilled in the art that many modifications are possible without departing from the inventive concepts herein described.

WHAT WE CLAIM IS:—

1. A movie film camera including means for producing an audible alert signal, and/or a visual alert signal visible by the camera operator without breaking eye contact with the viewfinder, to inform the operator that a certain film running event has occurred, the alert signal being electrically generated and the means for producing it being arranged for activation through electrical switching means, the camera including for this purpose time-delay switching means capable of being activated at the start of a film run so as to operate when a predetermined running time has elapsed and/or switching means associated with the film drive mechanism so as to operate when the film reaches a predetermined point in its run.

2. A camera as claimed in Claim 1 with such time-delay switching means including a capacitor, said predetermined time being determined by the charge time of said capacitor.

3. A camera as claimed in Claim 1 or Claim 2 further including means for terminating the alert signal.

4. A camera as claimed in any one of Claims 1 to 3 with such means for producing an audible alert signal being an audio oscillator.

5. A camera as claimed in any one of Claims 1 to 4 with such switching means associated with the film drive mechanism so as to operate when the film comes to the end of its reel.

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6. A camera as claimed in any one of Claims 1 to 5 with such time-delay switching means arranged to be activated at the same time as a start switch provided for initiating the running of the film.

7. A camera as claimed in any one of Claims 1 to 6 with means for producing such visual alert signal comprising an electrical-to-visual transducer.

8. A camera as claimed in any one of Claims 1 to 7 with such means for producing a visual alert signal including a visual indicator positioned internal to the camera and in the line of sight of the viewer.

9. A camera as claimed in Claim 8 wherein the visual indicator is a light emitting diode.

10. A camera as claimed in any one of Claims 1 to 9 with such switching means associated with the film drive mechanism, more specifically associated with counter

means for indicating the length of the film remaining on its reel, the switching means being arranged to operate at a predetermined count of the counter means.

11. A movie camera including a circuit substantially as described herein with reference to Fig. 1 of the accompanying drawings.

12. A movie camera substantially as described herein with reference to Fig. 2 of the accompanying drawings.

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3. A camera as claimed in Claim 1 or Claim 2 further including means for terminating the alert signal.

4. A camera as claimed in any one of Claims 1 to 3 with such means for producing an audible alert signal being an audio oscillator.

5. A camera as claimed in any one of Claims 1 to 4 with such switching means associated with the film drive mechanism so as to operate when the film comes to the end of its reel.