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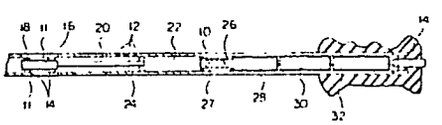
(54) Safety ski stick.

(57) A safety ski stick (10) incorporating a warning indicator (24,16) which produces a periodic warning sound (24) or periodic flashes of high intensity light (16) and is powered by self-contained batteries.

Fig 2



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This invention relates to a safety ski stick which incorporates warning indication means, and in particular to a safety ski stick in which periodic generation of a warning sound or of flashes of high intensity light can be actuated by the user.

In recent years , skiing has become an increasingly popular sport in many parts of the world. As a result, ski grounds have become extremely crowded in some cases. Due to such crowded conditions, and the varying degrees of experience of the skiers at these grounds, injuries caused by collisions between skiers have become increasingly frequent. The present invention is intended to alleviate this problem, by providing a skier with a ski stick which can be used to generate a warning signal, such as a loud periodic sound or a flashing light, or a combination of both of such warning signals. In this way, a skier who is moving at high speed, and therefore cannot stop within a very short distance, can provide a warning to another skier who has come into his path, to indicate to the other skier that there is a danger of a collision between them. The present invention is therefore a valuable safety measure for reducing the incidence of injuries which occur during skiing.

It is therefore an object of the present invention to provide a ski stick which enables a warning signal to be generated by the user.

Other objects, features and advantages of the present invention will be made more apparent from the following description, when taken in conjunction with the attached drawings, whose scope is given by the appended claims.

In the drawings:

Fig. 1 illustrates the outer appearance of an embodiment of a ski stick in accordance with the present invention;

Fig. 2 is a partial cross-sectional diagram of the embodiment shown in Fig. 1; and

Fig. 3 is a circuit diagram of an electronic circuit module used in the embodiment of Fig. 1 and Fig. 2.

Referring now to Fig. 1, the external appearance of an embodiment of a ski stick in accordance with the present invention is shown therein. Numeral 10 indicates a casing, made of material such as aluminum or aluminum alloy. Transparent or translucent areas 11 are provided, through which a flashing warning light can appear. Apertures 12 are provided, from which a warning sound signal is emitted. A switch 14 is provided on the handle of the ski pole, which the user can actuate

in order to cause a warning signal to be produced.

Referring now to Fig. 2, a partial crosssectional view of the embodiment of the present invention shown in Fig. 1 is given. A flash tube 16 is provided within casing 10. This can be, for example, a xenon flash tube. Flash tube 16 is connected by conductors 20 to an electronic circuit module 22. An acoustic device 24 is also provided within casing 10, and is connected to electronic circuit module 22. Electronic circuit module 22 is fixed within casing 10, and a spring 20 is located between electronic circuit module 22 and three batteries 28, 30 and 32, which are connected in series to provide power to electronic circuit module 22. Spring 20 provides electrical connection between the negative potential end of batteries 28, 30 and 32, and circuit module 22, and is insulated from casing 10 by means of an insulating sleeve 27.

One terminal of switch 14 is connected to the positive end of batteries 28, 30 and 32, and the other terminal of switch 14 is connected to casing 10. Thus, when switch 14 is actuated, power is applied from batteries 28, 30 and 32 to electronic circuit module 22, since a power supply terminal of electronic circuit module 22 is electrically connected to casing 10.

Referring now to Fig. 3, a circuit diagram is shown therein of electronic circuit module 22, flash tube 16 and acoustic device 24.Numeral 38 denotes a DC to DC converter circuit, which operates in conjunction with a transistor 40. When switch 14 is actuated, battery 34 (denoting, collectively, batteries 28, 30 and 32) is connected to the center tap of primary winding 36 of a transformer 35. One end of primary winding 36 is connected to the collector of transistor 40, while the other end is connected through a series-connected capacitor 44 and resistor 45 to the base of transistor 40. A bias resistor 43 is also connected to the base of transistor 40, from the center tap of primary winding 36.

When battery 34 is connected by actuation of switch 14, then transistor 40 functions as an oscillator, in conjunction with the primary winding 36 of transformer 35. The oscillation frequency can be modified by adjusting the value of reisistor 45 or capacitor 44. One end of the secondary winding 48 of transformer 35 is connected to a diode 50, which performs half-wave rectification of the voltage appearing across secondary winding 48. The output of diode 50 is applied to an energy-storage capacitor 56, which is of relatively high capacity. The positive terminal of

capacitor 56 is connected to a resistor 58 and to an electrode 72 of flash tube 16. The other end of resistor 58 is connected to one terminal of a potentiometer 60, the other end of which is connected to the negative terminal of capacitor 56 and the other end of secondary winding 48. The slider of potentiometer 60 is connected to a terminal of a trigger diode known as a DIAC, the other terminal of which is connected to the gate terminal of a silicon controlled rectifier (referred to hereinafter as an SCR). The anode terminal of SCR 64 is connected to the junction of resistor 58 and potentiometer 60, and to one terminal of a capacitor 66. The other terminal of capacitor 66 is connected to a tap on a voltage step-up coil 68. One end of voltage step-up coil 68 is connected to an electrode 70 of flash tube 16. The high voltage generation portion of electronic circuit module 22 is indicated by the broken-line rectangle 76.

The operation of this high-voltage generation portion 76 is as follows. If we assume that capacitor 66 is initially in an uncharged state, then if switch 14 has been actuated, the voltage across the ends of potentiometer 60 will gradually rise as capacitor 66 is charged through resistor 58. When the voltage

applied to trigger diode 62 from the slider of potentiometer 60 reaches a certain value, then trigger diode 62 will enter a low resistance state, causing SCR 64 to be triggered into conduction. Capacitor 66 is thereby rapidly discharged through SCR 64, causing a large current to flow momentarily through the portion of voltage step-up coil 68 which is connected between the cathode electrode of SCR 64 and capacitor 66. As a result, a very high voltage is generated across the ends of voltage step-up coil 68, causing a spark to be produced in flash tube 16. The resultant ionization of gas within flash tube 16 causes a state of low resistance to be developed between electrodes 72 and 74 of flash tube 16. The energy-storage capacitor 56 is thereby rapidly discharged through flash tube 16, causing a flash of high-intensity light to be generated.

Both capacitors 56 and 66 are now discharged. After a period of time, whose duration is determined by the values of resistor 58 and capacitor 66, the sequence of events described above will occur once more and another flash of light will be generated by flash tube 16, so that such flashes are generated in a periodic manner.

Transistors 78 and 80, together with collector

resistors 82 and 84 , base resistors 86 and 90 and coupling capacitors 88 and 92, constitute a first astable multivibrator circuit 77, which generates an output signal of approximately square waveform across collector resistance 94. This signal is applied to the base of PNP transistor 96, which has an emitter resistor 96 connected between its emitter and the high potential of battery 34. The collector of transistor 94 is connected to the base of a transistor 98, which serves as a switch. When the collector of transistor 80 is at the high potential of battery 34, then transistor 94 is cut off, i.e. no current flows between its collector and base. When the collector of transistor 80 goes to the low potential of battery 34, then transistor 94 is set in a conducting condition, in which a current flows from the emitter to collector, with the value of this current being determined primarily by the value of resistor 96. This current flows into the base of transistor 98, causing transistor 98 to saturate,so that the impedance between the emitter and collector of transis tor 98 attains a very low value. Transistors 100 and 102, together with collector resistors 104 and 106, base resistors 108 and 112, and coupling capacitors 110 and 114,

constitute a second astable multivibrator 99, which produces a signal having a frequency which is within the audio range of frequencies, and which is of much higher frequency than the output signal of the first astable multivibrator described above. The output signal from this second astable multivibrator, which appears across resistor 106, is applied to the base of a PNP transistor 116, the emitter of which is connected to the high potential of battery 34 by an emitter resistor 118. The collector of transistor 116 is connected to the base of an NPN transistor 119, the collector of which is connected to the base of an output transistor 122, and is also connected to the high potential of battery 34 through a resistor 120. An acoustic device, such as a miniature moving armature type of loudspeaker or buzzer, is connected between the collector of output transistor 122 and the high potential of battery 34.

The operation of this circuit is as follows. When switch 14 has been actuated, first astable multivibrator circuit 77 begins to oscillate, causing switching transistor 98 to be alternately set into saturation and into the cut-off state. The duty cycle of this switching is determined by the relationship between the time constants of resistor 86 and

capacitor 88, and resistor 90 and capacitor 92. While switching transistor 98 is in the high impedance, i.e. cut-off state, the second multivibrator circuit is allowed to oscillate, causing a current to periodically flow into the base of transistor 119, the value of this current being defined by resistor 118. Transistor 119 is thereby alternately switched between the saturated and the cut-off states. When transistor 119 is in the cut-off state, a current flows from resistor 120 into the base of transistor 122, thereby causing a current to flow between the emitter and collector of transistor 122, and therefore through the acoustic device 24. When transistor 119 enters the saturated state, the current which previously flowed into the base of transistor 122 flows from the collector to the emitter of transistor 119, since the saturation collector-to-emitter voltage of transistor 119 is much lower than the base-to-emitter turn-on voltage of transistor 122. Transistor 122 is therefore now cut off, so that no current flows in acoustic device 24. In this way, current is periodically passed through acoustic device 24, with a frequency which is determined by second astable multivibrator 99. A buzzing sound is thereby generated by acoustic device 24.

When switching transistor 98 now enters the saturated state, the collector of transistor 100 is held at the low potential of battery 34, so that oscillation by the second multivibrator is inhibited. In this condition, transistor 102 enters a continuous saturated state, causing a current to flow continuously from the collector of transistor 116 into the base of transistor 119. Transistor 119 is therefore held in a saturated condition, so that the current which flows in resistor 120 is by-passed from the base of transistor 122. As a result, no current flows through acoustic device 24 while switching transistor 98 is in the saturated state.

From the above description, it will be apparent that acoustic device 24 will be periodically actuated to generate a buzzing sound, in accordance with the frequencies of signals produced by first and second astable multivibrators 77 and 99. It will also be apparent that the power consumed by acoustic device 24 can be reduced, if desired, by decreasing the duty cycle of switching second astable multivibrator 99 on and off, i.e. by switching this multivibrator on for relatively short periods of time. While second astable multivibrator 99 is switched off, no current flows in acoustic device 24, and the current

drawn by the electronic circuit components can be made extremely low.

Although in the above description of this embodiment of the present invention, the use of discrete circuit components has been assumed, it should be noted that it is equally possible to use integrated circuits, for example for first and/or second astable multivibrators 77 and 79. An integrated circuit type of driver could also be used in place of transistors 119 and 122. Also, a piezo-electric type of buzzer could be used as acoustic device 24, with appropriate circuit modifications.

Moreover, although the described embodiment incorporates both audible and visible warning means, it is equally possible to produce a ski stick in accordance with the present invention in which only audible warning means or only visible warning means are provided.

It should also be noted that, although in the described embodiment the use of a metal as the material of casing 10 has been assumed, it is equally possible to utilize a plastic type of material, such as a glass-fibre reinforced plastic for this material. It is also possible to construct casing 10 entirely of a transparent or translucent material, so

that provision of separate transparent or translucent areas as denoted by numeral 11 in Fig. 1 becomes unnecessary.

Thus, while the present invention has been shown and described with relation to a specific embodiment, various changes and modifications to this embodiment are possible, which are within the scope claimed for the present invention.

WHAT WE CLAIM IS:

1. A safety ski stick to provide a warning indication, comprising:

a tubular casing;

a battery disposed within said tubular casing;

switch means;

electronic circuit means disposed within said tubular casing and responsive to actuation of said switch means for producing an output signal; and

means for producing said warning indication in response to said output signal.

2. A safety ski stick according to claim 1, wherein said warning indication comprises periodically generated flashes of light and wherein said means for producing said warning indication comprises a flash tube.

3. A safety ski stick according to claim 1 or 2, wherein said waning indication comprises anaudible sound, and wherein said means for producing said warning indication comprises an acoustic device.

4. A safety ski stick according to claim 3, wherein said audible sound is generated periodically.

5. A safety ski stick according to claim 2, whrein at least a part of said tubular casing is translucent.

6. A safety ski stick according to claim 5, wherein said at least a part of said tubular casing which is translucent is tinted in a suitable color.

Fig. 1

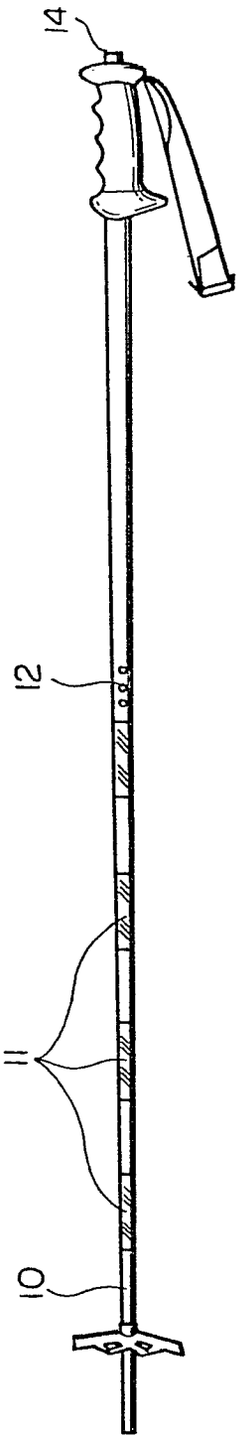
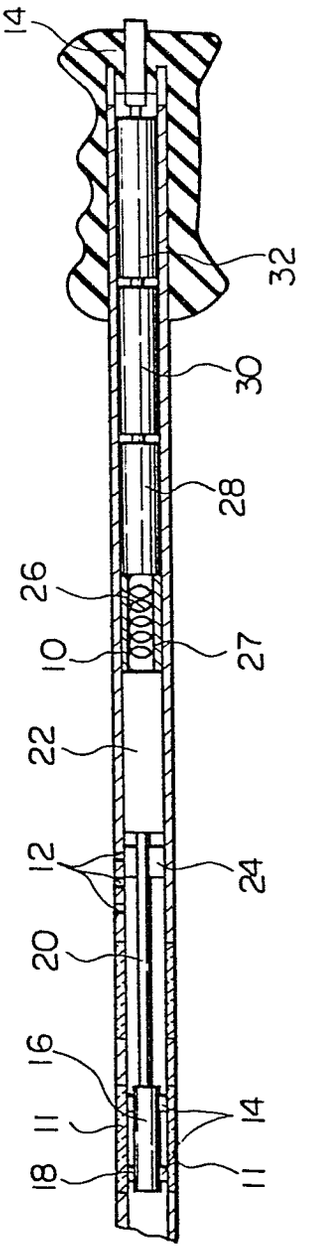


Fig. 2



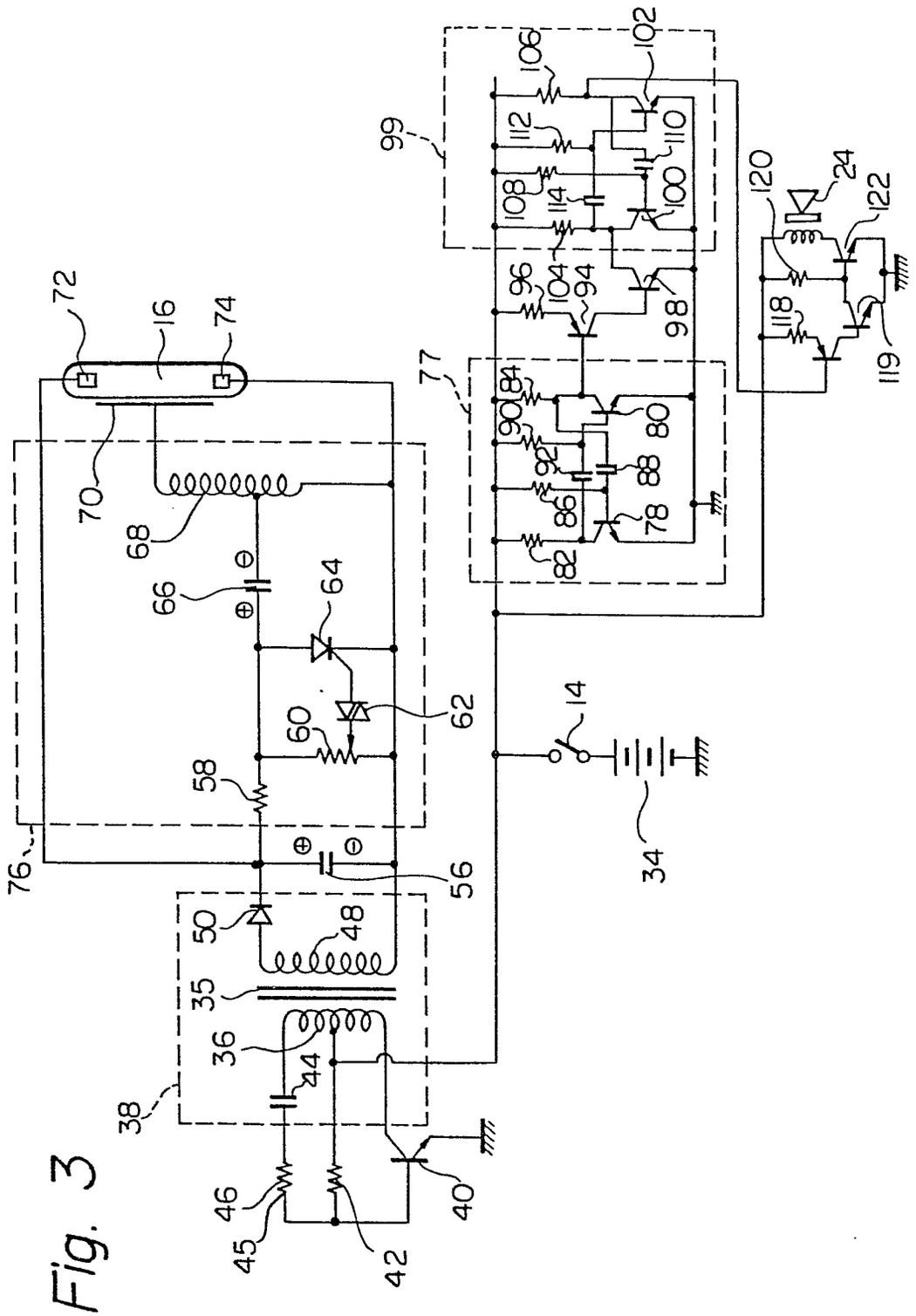


Fig. 3

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EUROPEAN SEARCH REPORT

Application number: 0013281

EP 79 10 0025

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	US - A - 4 129 311 (INTERNATIONAL POWER POLE LTD.) * Figures 1 to 3; columns 1 to 4 *	1,2,5,6
	US - A - 4 066 889 (INTERNATIONAL POWER POLE LTD.) * Figures 1 to 5; columns 1 to 2 *	1,2,5,6
	US - A - 4 023 817 (LAH) * Figures 1 to 8; columns 1 to 6 *	1-6
	IT - A - 642 554 (COLOMBO) * Figures 1 to 3; pages 1 to 2 *	1,3,4

CLASSIFICATION OF THE APPLICATION (Int. Cl.3)

A 63 C 11/22
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TECHNICAL FIELDS SEARCHED (Int.Cl.3)

A 63 C

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23-08-1979	NOESEN

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