United States Patent [19]

Chao

[11] **3,918,184**

[45] **Nov. 11, 1975**

[54] **MINI-ELECTRONIC BLINKING COMPARTMENT**

[76] Inventor: **Albert L. Chao,** 407 Glendale Road, Flushing, N.Y. 07647

[22] Filed: **July 11, 1974**

[21] Appl. No.: **487,792**

[52] **U.S. Cl.** ..... **40/52 R;** 40/130 L; 315/200 A; 340/331

[51] **Int. Cl.²** **G09F 13/00**

[58] **Field of Search** ..... 40/52 R, 130 R, 130 L, 40/129 A, 129 C, 132 R, 132 D, 130 F, 133 R, 133 A; 315/200 A, 209 R; 340/83, 331, 340, 341

[56] **References Cited**

UNITED STATES PATENTS

1,990,826	2/1935	Hodgkin	40/130 F
2,557,663	6/1951	Knode	40/129 A X
2,825,799	3/1958	Julien	40/129 C X
3,493,813	2/1970	Seidler	340/331 X
3,553,870	1/1971	Rudolph	40/130 R
3,765,006	10/1973	Takahashi et al.	340/331 X

Primary Examiner—Anton O. Oechsle
Assistant Examiner—Vance Y. Hum
Attorney, Agent, or Firm—Richard L. Miller

[57] **ABSTRACT**

A blinking device including a voltage source, a main operating circuit, and at least two indicator lights. The main operating circuit includes a first and second switching transistor of the same type, each connected in parallel across the voltage source. One of the indicator lights is serially coupled to the collector of the first switching transistor and the other indicator light is serially connected to the emitter of the second switching transistor. The base of the second switching transistor is connected to the collector of the first switching transistor. A control transistor of a type complementary to the switching transistors, is also connected in parallel across the voltage source. The collector of the control transistor is coupled to the base of the first switching transistor. A potentiometer connects the base of the control transistor to the voltage source. A regenerative feedback circuit includes a resistor and capacitor in series arrangement. The feedback circuit couples the base of the control transistor to the collector of the first switching transistor.

10 Claims, 8 Drawing Figures

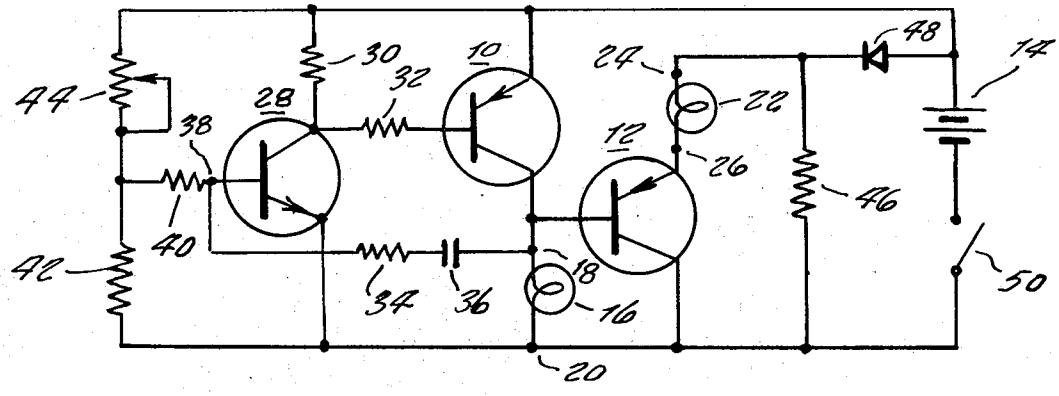


Fig. 1

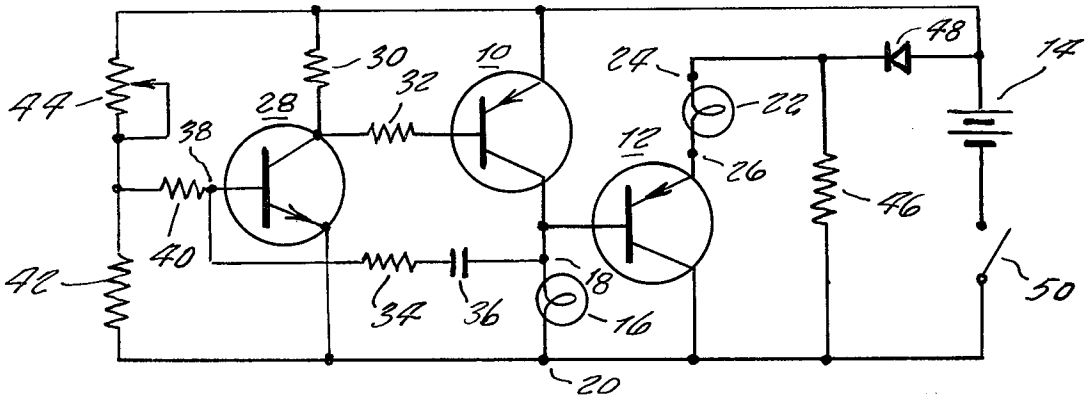


Fig. 2

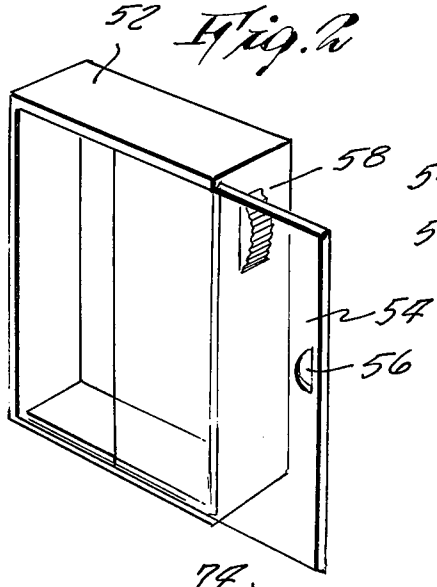


Fig. 3

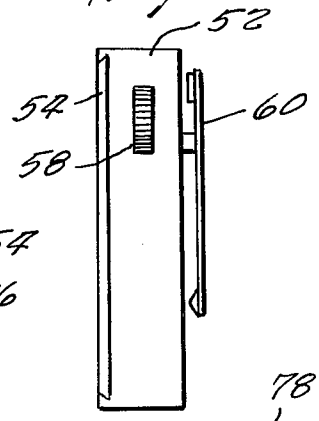
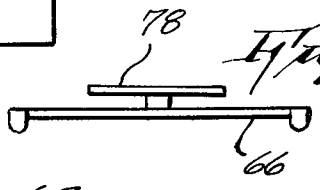


Fig. 6



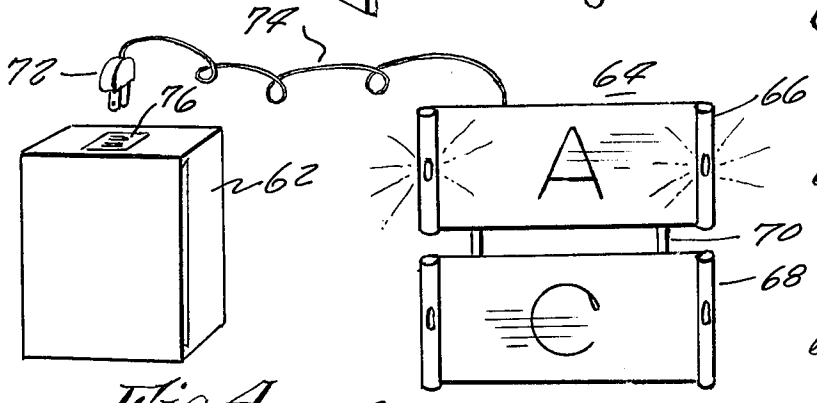


Fig. 4

Fig. 5

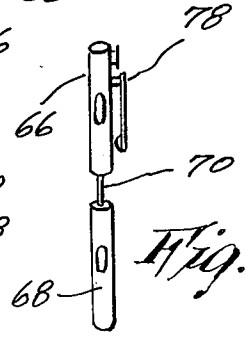


Fig. 7

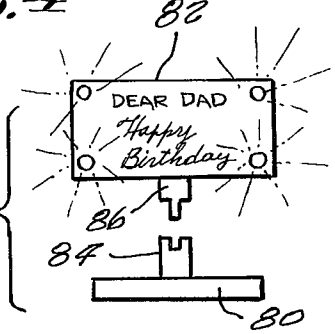
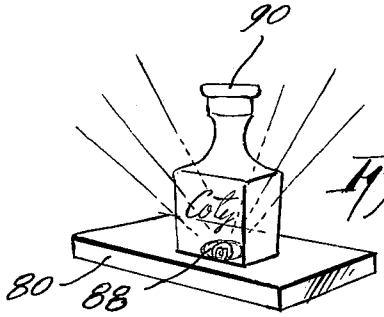


Fig. 8



MINI-ELECTRONIC BLINKING COMPARTMENT

BACKGROUND OF THE INVENTION

This invention relates to a blinking device, and more particularly to a blinker circuit arrangement in a compartment and operating alternating indicator lights.

Electronic blinking devices are available for numerous applications, for example, advertising signs, as well as decorations to attract attention or aesthetic works of art. Some of the blinking devices include complex timing circuits and require numerous transistors and other circuit components. As a result, the space required for the blinking device is relatively large and it is difficult to utilize such devices for miniaturized signs or in connection with very limited space requirements. Some of the devices which are available for limited space requirements, are frequently restricted to operating a single blinker light. One such device includes a circuit arrangement which uses two transistors as part of a direct coupled amplifier with the indicator light as the load output of one of the transistors. However, if alternating lights are required, more complex circuitry is utilized, typically including a multivibrator and other switching elements. However, these more complex circuits for controlling alternating lights require larger circuit space and are not feasible for use with miniaturized signs or limited circuit space requirements.

SUMMARY OF THE INVENTION

It is accordingly an object of the present invention to provide a blinking device which avoids the aforementioned problems of prior art devices.

It is a further object of the present invention to provide a blinker device for controlling alternating lights and utilizing a simplified circuit arrangement.

Yet another object of the present invention is to provide a blinker device for alternating lights which can be enclosed within a miniaturized compartment.

Still a further object of the present invention is to provide a miniaturized electronic blinker device which can be encased within a small housing and including a clip-on unit for use as a badge.

A further object of the present invention is to provide a blinker device having the electronic circuitry and voltage supply enclosed within a miniature housing and having an interconnection switch through which a sign, having illuminating lights, can be plugged into the miniaturized housing.

Still a further object of the present invention is to provide a blinker device for controlling alternating lights which can be easily adjusted to control the on and off time of the alternating lights.

Yet another object of the present invention is to provide a blinker device which is simple, inexpensive to construct, and efficient in its operation.

Briefly, the invention describes a blinker device comprising a voltage source, first and second indicator means, and a main operating circuit. The main operating circuit includes first and second switching transistors of the same type, each connected in parallel circuit arrangement across the voltage source. The first indicator means is serially coupled to the collector of the first switching transistor. The second indicator means is serially coupled to the emitted of the second switching transistor. The base of the second switching transistor is coupled to the collector of the first switching transistor. The main operating circuit also includes a control

transistor of a type complementary to the switching transistors. The control transistor is also connected in parallel circuit arrangement across the voltage source. The collector of the control transistor is coupled to the base of the first switching transistor. A potentiometer interconnects the base of the control transistor with the voltage source. A regenerative feedback circuit including a resistor in series with a capacitor, is coupled between the base of the control transistor and the collector of the first switching transistor.

These and other object, features and advantages of the invention, will, in part, be pointed out with particularity, and will, in part, become obvious from the following more detailed description of the invention, taken in conjunction with the accompanying drawing, which forms an integral part thereof.

BRIEF DESCRIPTION OF DRAWING

In the Drawing:

FIG. **1** shows an electronic circuit for the blinker device of the present invention;

FIG. **2** is a perspective view of one embodiment of the blinking compartment for the blinker device of the present invention;

FIG. **3** is a side view of the embodiment shown in FIG. **2**;

FIG. **4** shows an arrangement utilizing the blinker device in accordance with the present invention;

FIG. **5** is an edge view of the arrangement shown in FIG. **4**;

FIG. **6** is a top edge view of the arrangement shown in FIG. **5**; and

FIGS. **7** and **8** show examples of other arrangements of the blinker device in accordance with the present invention.

In the various Figures of the Drawing, like reference characters designate like parts.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. **1**, there is described the electric circuit for use with the blinker device of the present invention. A first switching transistor **10** and a second switching transistor **12**, both of the same type, are connected in parallel circuit arrangement across a voltage source **14**. A first indicator light **16** is connected in series with the collector of the transistor **10** and is interconnected between the terminals **18** and **20**. A second indicator light **22** is connected in series with the emitter of the transistor **12** and is interconnected between the terminals **24** and **26**. A control transistor **28** of a type complementary to that of the switching transistor **10** and **12**, is also connected in parallel circuit arrangement across the voltage source **14**. The collector of the transistor **28** is connected to one end of the voltage source through the collector resistor **30**, while the emitter of transistor **28** is directly coupled to the opposite end of the voltage source. The collector of the control transistor **28** is coupled to the base of the first switching transistor **10** through the resistor **32** which serves to limit the base current flowing to the transistor **10**. The base of the second switching transistor **12** is coupled to the collector of the first switching transistor **10** at the terminal **18**. A regenerative feedback loop including resistor **34** and capacitor **36** is interconnected between the collector of the first switching transistor **10** at the

terminal **18**, and the base of the control transistor **28** at the terminal **38**.

The base of the control transistor **28** includes a base current limiting resistor **40** and a voltage divider arrangement including the fixed resistor **42** and the potentiometer **44**. Resistor **42** is serially connected to the potentiometer **44** and the series arrangement is connected in parallel across the voltage source **14**. The arrangement is such that by controlling the potentiometer **44**, the voltage at the base of transistor **28** can be controlled.

A resistor **46** is connected in parallel with the second switching transistor **12** and the indicator means **22**. A diode **48** is coupled between the voltage source **14** and the parallel arrangement of the resistor **46** on the one hand and the transistor **12** and indicator light **22** on the other hand. A main control switch **50** is serially connected with the voltage source **14**.

The operation of the circuit shown in FIG. **1** is as follows. If the indicator light **16** is initially OFF, the indicator light **22** is ON. The potentiometer **44** is initially advanced to cause the control transistor **28** to conduct slightly, whereby the first switching transistor **10** will also begin to conduct slightly. The voltage across the indicator light **16** increases and this voltage is coupled to the base of the control transistor **28** through the regenerative feedback loop including the resistor **34** and the capacitor **36**. This serves to make the base even more positive and make the transistor **28** conduct more heavily. As a result, the first switching transistor **10** will also conduct more heavily until both transistors **28** and **10** are saturated and nearly all of the battery voltage is across the light **16** causing it to turn ON. At this point, there is insufficient base-emitter voltage on transistor **12** to maintain its conduction and transistor **12** will turn OFF thereby extinguishing the illumination light **22**.

When the indicator light **16** is ON, capacitor **36** charges and the current applied to the base of the control transistor **28** through the resistor **34** and capacitor **36** is reduced. As capacitor **36** becomes sufficiently charged, the current supplied to the base of the control transistor **28** will reduce sufficiently so that it will no longer be in saturation, and likewise transistor **10** will also drop from its saturation state. At this time, the voltage across the indicator light **16** begins to drop. As the voltage across the indicator light **16** reduces, the base current to the conrol transistor **28** also decreases causing the voltage across the indicator light **16** to even further decrease. This latch-up arrangement results in the indicator light **16** being quickly extinguished and the base of the control transistor **28** driven negative due to the charge accumulated on the capacitor **36** during the period that the indicator light **16** is ON. Finally both the control transistor **28** and the switching transistor **10** are cutoff. During this time, the transistor **12** is ON and the indicator light **22** remians ON.

The charge on the capacitor **36** is the leaked off through the base resistor **40**, the resistor **42**, the resistor **34** and the indicator light **16**. Then, the base voltage at the control transistor **28** will rise towards the positive value determined by the setting of the potentiometer **44**. When the base of the control transistor **28** becomes slightly positive, the control transistor **28**, as well as the switching transistor **10**, begins to conduct. The cycle is then repeated. Thus, the indicator lights **16** and **22** will alternately blink ON and OFF.

The circuit is adjusted by means of the potentiometer **44**. If the potentiometer **44** is set too near the positive end, indicator light **16** will generally remain ON with indicator light **22** generally in an OFF state. If, on the other hand, the potentiometer **44** is set too near its low end, the time interval during which indicator light **16** will remain ON will be extremely short. However, resistor **42** will always insure the fact that some alternating of the blinking arrangement will take place. The control of the ON-OFF time of the two lights **16** and **22** can be determined by the setting of the potentiometer **44** as well as by the values of the resistor **34** and the capacitor **36**.

The diode **48** is placed in the circuit to insure the proper flow of the current through the switching transistor **12**. Furthermore, the resistor **46** is available for flow of battery current during the time that the indicator light **22** is not illuminated. Although the circuit shown in FIG. **1** utilizes PNP transistors for the switching transistors, and NPN transistors for the control transistor, it is understood that these types of transistors could be reversed with a corresponding reversal of the voltage source, as is known in the art. In order to energize the circuit, switch **50** is initially closed.

The circuit arrangement as shown in FIG. **1** is both simple and compact and can therefore be included within a miniaturized compartment for providing the proper blinking arrangement. Referring now to FIGS. **2** and **3**, there is shown a housing **52** having a slidable cover **54** closing one side of the housing **52**. The slidable cover **54** can be made of transparent or translucent material and can include a message thereon which will be illuminated by the blinking circuit arrangement shown in FIG. **1**. A notched groove **56** is available in the slidable cover to facilitate easy sliding of the cover on the housing. A thumbnail switch **58** is shown which would operate the switch **50** shown in FIG. **1** for turning ON and OFF the entire blinker device. On the back of the housing is shown a clip-on arrangement to facilitate attaching the housing onto a surface.

With the arrangement shown in FIGS. **2** and **3**, the entire circuitry of FIG. **1** including the indicator lights would be enclosed within the housing. The housing could be formed into a badge or a miniaturized sign and the clip-on **60** could either be used to clip on to a part of the clothing, in the case of a badge, or onto a wall or other flat surface in the case of a miniaturized sign. The cover **54** containing the message could have two sections thereon and the indicator lights could be respectively splaced adjacent each of the two sections to alternately illuminate these sections.

Referring now to FIGS. **4**, **5** and **6**, there is shown an alternate arrangement utilizing the present invention. A first housing **62** includes the voltage souce **14**, shown in FIG. **1** as well as all of the circuit components of FIG. **1** with the exception of the indicator lights **16** and **22**. The indicator lights would be placed in a second housing unit, shown generally at **64** and including a first portion **66** having one of the indicator lights and a second portion **68** having another of the indicator lights. The two portions are interconnected electrically by means of the connection **70**. A male plug **72** is connected by means of wire **74** to the second housing **64** and mates with the female plug **76** located in the first housing **62**. The femal plug **76** would include the terminals **18**, **20**, **24** and **26** of FIG. **1** which are terminals for interconnecting the indicator lights. When the male plug **72** is

inserted into the female plug **76,** the indicator lgiths in section **66** and **68** will alternately blink ON and OFF. Each of the sections **66** and **68** could include a separate message and these would alternately blink ON and OFF. As is shown, one section **66** contains the letter A and the other section **68** contains the letter C. Alternately, the two sections could each include the indicator lights and the sections could be connected in parallel whereby instead of the signs alternately switching ON and OFF, both signs will work in conjunction and have bulbs in each section alternating ON and OFF. A clip-on arrangement **78** can also be included on the section **66** wherein it can also be used as a badge or a miniaturized sign.

Referring now to FIGS. **7** and **8,** there are shown further arrangements utilizing the present invention. The voltage source and main operating circuit is included in a first housing unit **80** which forms a flat base for a sign. The indicator lights would be included in a second housing unit **82** which forms a sign to be illuminated. A plug and jack arrangement **84** and **86** is included between the two housing units **82** and **80.** When the sign portion **82** is inserted into the base **84,** the indicator lights in the sign **82** will alternately illuminate.

The embodiment shown in FIG. **8,** has all of the circuitry in the base portion **80** as well as the light **88** also included within the base **80.**

It will be appreciated, that numerous other embodiments can utilize the simple circuitry of the blinking device for alternating lights in accordance with the present invention.

While certain novel features of this invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. An alternating blinking display device having a housing means and a message area thereon comprising: a voltage source, first and second indicator means, and main operating circuit means including; first and second switching transistors of the same type, said first indicator means serially coupled to the collector of said first switching transistor forming a first series circuit branch, said second indicator means serially connected to the emitter of said second switching transistor forming a second series circuit branch, said first and second series circuit branches each connected directly across said voltage source, the base of said second switching transistor coupled to the collector of said first switching transistor, a control transistor of a type complementary to said switching transistors also connected in parallel circuit arrangement across said voltage source, the collector of said control transistor coupled to the base of said first switching transistor, potentiometer means independent of said first and second switching transistors, interconnecting the base of said control transistor with said voltage source for biasing said control transistors, and a regenerative feedback circuit including in series circuit arrangement, resistor means and capacitor means, said feedback circuit coupled between the base of said control transistor and the collector of said first switching transistor whereby said indicator means are alternatingly operative.

2. The blinker device as in claim **1** and wherein said main operating circuit means further includes diode means serially coupled to the emitter of said second switching transistor.

3. The blinker device as in claim **2** and wherein said main operating circuit means further includes second resistor means coupled in parallel arrangement across said second indicator means and said second switching means.

4. The blinker device as in claim **1** and wherein said switching transistors are of the PNP type and said control transistor is of the NPN type.

5. The blinker device as in claim **1** and wherein said both said indicator means includes illumination lights.

6. The blinker device as in claim **5** wherein said housing means has a removable cover adapted to receive a message to be illuminated, said voltage source, said first and second indicator means and said main operating circuit means all enclosed within said housing means, whereby said indicator means alternately illuminates said message on said cover.

7. The blinker device as in claim **6** and further comprising clasping means coupled to said housing means for providing easy attachment of said housing onto a surface.

8. The blinker device as in claim **5** wherein said housing means comprises first and second housing means, said second housing means including a message area thereon, said first housing means enclosing said voltage source and said main operating circuit means, said second housing means enclosing said indicator means and positioning said indicator means adjacent to said message area, and further comprising interconnection means electrically inter connecting said first and second housing means.

9. The arrangement as in claim **8** and wherein said interconnecting means includes a plug and receptacle arrangement.

10. The arrangement as in claim **1** and wherein said potentrometer means interconnect the base of said control transistor with one side of said voltage source, and further comprising fixed resistor means interconnecting the base of said control transistor with the other side of said voltage source.

* * * * *