Nov. 25, 1958 G. B. DAVIS, JR 2,862,145

FLASHER LAMP

Filed June 30, 1955

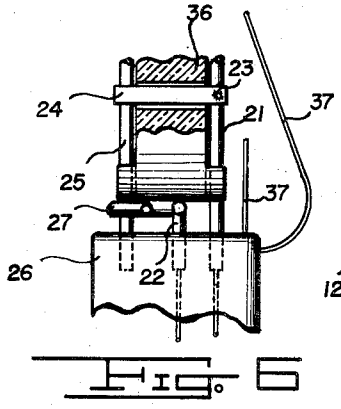


Fig. 6

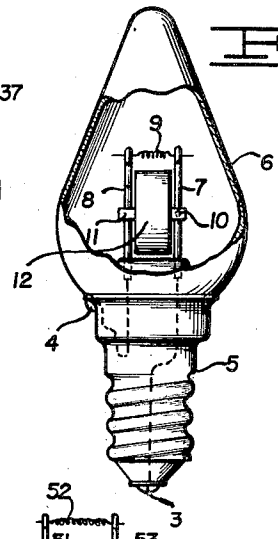


Fig. 1

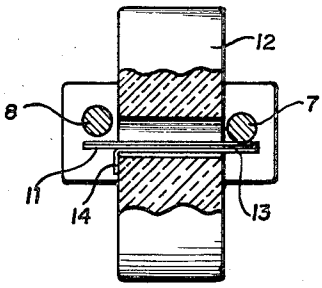


Fig. 2

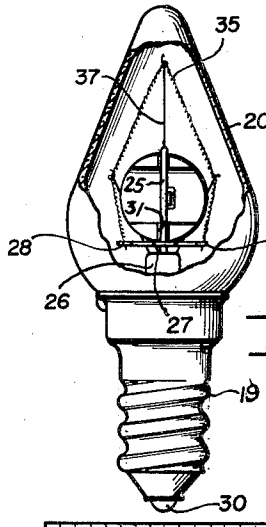


Fig. 4

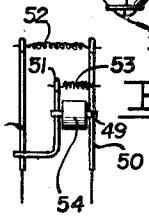


Fig. 8

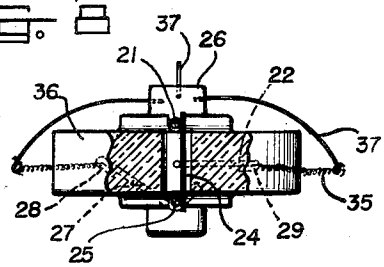


Fig. 5

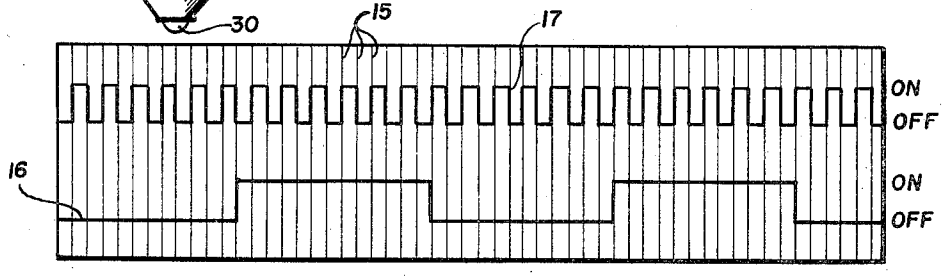


Fig. 3

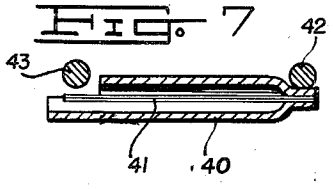


Fig. 7

Inventor

George B. Davis Jr.

United States Patent Office 2,862,145
Patented Nov. 25, 1958

2,862,145

FLASHER LAMP

George B. Davis, Jr., Glen Mar Park, Md.

Application June 30, 1955, Serial No. 519,199
3 Claims. (Cl. 315—47)

This invention relates generally to flasher lamps and more particularly to an improvement in a lamp of this type wherein by the arrangement of a relatively large heat absorbing mass about the thermal responsive circuit controlling element of the lamp, the flashing rate of the lamp is materially reduced in addition to providing a lamp unusually dependable and positive in operation.

With lamps of the flasher type wherein the circuit controlling element of the lamp is activated by heat from the lighted filament, regulation of the flashing interval has, heretofore, been most difficult to control. One reason therefor being that all adjustment of the thermal element must be completed prior to assembly of the mechanism within the sealed glass envelope of the lamp. Primarily, however, the unusually frequent failure of such lamps can be attributed directly to the heating rate of the thermal control when exposed to direct radiation from the filament. When heating and cooling of the element occurs too rapidly, the element lacks the necessary over-travel to maintain it at either of its circuit controlling positions the time required to produce the positive flashing effect desired.

Additionally, for the aforementioned reason, prior lamps of this type are frequently highly position sensitive often to the extent of being spasmatic in operation in one position while completely inoperative in another. When the arrangement of the lamp in use is such as to place the filament above the element, the heat biasing force on the element often is insufficient to positively drive the element to either of its circuit controlling stations but leaves the element oscillating just at its making and breaking point instantaneously responding to the heating and cooling of the filament to result in a flickering of the lamp most annoying to the observer.

While the arrangement of the present invention retains all the advantages of prior such devices, the aforementioned disadvantages are alleviated by inclosing the thermal control of the lamp with a sufficiently large heat absorbing mass applicable during operation of the filament to shield the element until the mass, relatively close to the filament, has absorbed the necessary heat to maintain the element in operated position long after heat is no longer forthcoming from the filament. By this arrangement, operation of the thermal control becomes relatively independent of the operating interval of the filament to result in a lamp considerably more positive in function in addition to possessing the highly desirable characteristic of being abnormally slow in operation, a feature long sought after in a lamp of this type.

It is an object of the present invention to provide a new and improved lamp of the flasher type unusually slow and positive in operation.

A further object is to provide an improved flasher lamp wherein by the arrangement of a relatively large heat absorbing mass about the circuit controlling thermal responsive element of the lamp the rate of heating and cooling of the element is materially reduced.

An additional object is to provide an improved flasher

lamp wherein the flashing rate is regulated by controlling the rate of heating and cooling of the thermal responsive circuit controlling element of the lamp.

A still further object is to provide a new and improved flasher lamp inexpensive to manufacture, rugged in construction in addition to being completely reliable and positive in operation.

This invention will be better understood by reading the following detailed description with reference to the accompanying drawings wherein:

Fig. 1 is a view in elevation of the mechanism of the invention as mounted within the glass envelope of the lamp shown partly cut away;

Fig. 2 is a fragmentary sectional view, partly cut away, of the heat absorbing mass and thermal element of Fig. 1 as arranged between the filament leads of the lamp;

Fig. 3 is a plan view of a graph comparatively illustrating the cycling rate of the present invention with respect to the flashing rate of conventional flasher lamps of this type;

Fig. 4 is a side view in elevation of an alternate form of the invention as viewed through the partly cut away section of the glass envelope of the lamp;

Fig. 5 is an enlarged fragmentary view partly in section of the invention as shown in Fig. 4 looking down upon the assembly.

Fig. 6 is an enlarged fragmentary view partly in section of the invention of Fig. 4 and rotated clockwise 45°;

Fig. 7 is a view in section of an alternate form of the invention as supported between the leads of the lamp, and

Fig. 8 is a side view in elevation showing an arrangement of the invention as used in combination with a multiple filament lamp.

Referring now to the drawings and more particularly to Fig. 1 thereof, the lamp of the present invention is shown as including an inserting screw shell **5** suitably formed for being received within the usual incandescent lamp receiving sockets not shown. Upon the shell **5** is conventionally mounted a glass envelope **6** wherein is substantially centrally supported by leads **7** and **8** a length of coiled filament **9**. From the filament, the leads **7** and **8** extend downwardly through the envelope to connect in the usual manner with the shell and base terminals **3** and **4** of the inserting shell **5** whereby operating current is supplied to the filament of the lamp.

Spot welded, as at **10**, to the lead **7** is a strip of bimetallic element **11** preferably of the high temperature low deflection type. The free end of this strip is initially spaced from the lead **8** but so arranged with respect thereto as to deflect into electrical contact with this lead at such time as the strip becomes sufficiently heated. Incircling the strip **11** over substantially its entire length is an annular insulating mass **12** preferably formed from ceramic, however, variously constructed masses of other materials have proven completely satisfactory for the purpose. Commonly secured with the strip **11** to the lead **7** is a metallic bar **13** so formed at **14** as to engage and forcibly maintain the mass **12** snugly against the lead **7** leaving the unattached end of the strip free to flex into contact the lead **8** during operation of the lamp, as will now be described.

As current is applied to the terminal surfaces **3** and **4** of the inserting screw shell **5** to pass by way of leads **7** and **8** to the filament **9**, the latter is heated to a state of incandescence referred to generally as the "on" interval of the lamp. Instead of heat from the filament being applied directly to the thermal strip **11**, as commonly is the case with flasher lamps of this type, heat from the filament is first communicated to the mass **12** which functions to absorb this heat at a rate depending upon

the characteristics of the material from which the mass is formed. As the temperature of the mass rises a portion of this absorbed heat is communicated therethrough to the strip **11** causing its gradual rise in temperature and deflection toward the lead **8**. When the mass becomes sufficiently heat saturated as to effect movement of the strip into contact with the lead **8** a greater portion of the current, previously passing through the filament **9**, is now shunted therefrom through the strip **11** with the resultant cooling of the filament and consequential interruption of the heat source to the mass. However, before this shunting operation occurs, the mass **12** will have taken on considerable heat which thereafter continues to pass to the thermal strip **11** maintaining the latter in operated position against the lead **8** long after the strip would normally have cooled and moved from its shunting position. When the mass has sufficiently cooled to allow separation of the strip from the lead **8** permitting current to again resume its course through the filament, the mass **12**, acting as before, serves to shield the strip from the filament heat that normally would immediately drive the strip back into contact with the lead **8** thusly to effect a slow equally spaced flashing of the lamp heretofore unobtainable with lamps of this type.

Fig. 3 is a graph illustrating comparatively the difference in cycling rates between conventional flasher lamps and the device of the present invention. The vertical lines **15** indicating time in seconds with **16** representing the cycling rate of the present lamp as compared with **17** representative of the operating cycle of previous flasher lamps of the incandescent type.

The advantages of this slow operating feature of the present device is more apparent when employed in combination with strings of ornamental lights such as the type frequently used for Christmas tree lighting wherein the slow positive flashing produces an effect in the order of a shimmering or twinkling of the lights rather than the expectant rapid flashing customarily associated with conventional flasher apparatus of this kind. When a sufficient delay, as provided by the present device, follows the operation of a lamp, it is only with difficulty and careful observation that an observer can distinguish which lamp is actually flashing. Generally, when several of such lamps are so used, one is only aware of a restful shifting of the light from one position on the tree to another. Additionally, when such a lamp as shown in Fig. 1 is connected in a series of ornamental lights of the type specified, current from the flashed lamp is shunted to the remaining lamps of the series to slightly increase their brightness. As the strip **11** cools and separates from the lead **8** allowing current to again resume its course through the filament, the remaining lamps deminish in brightness to their normal state. The effect produced, particularly when sufficiently slow and positive, is distinctly different and pleasing from that obtainable with conventional flasher arrangements that operate to simultaneously flash all the lamps of a series wherein such apparatus is connected.

Fig. 4 is an alternate form of the invention preferably for use in a multiple connected circuit as compared to the device of Fig. 1 which is specifically designed for use in combination with series connected assemblies such as hereinbefore described. Fig. 4 shows the inserting screw shell **19** as supporting the glass envelope **20**. Leads **21** and **22**, extending upwardly from the terminals of the shell, pass through the envelope to connect with the circuit controlling mechanism of the lamp as shown to advantage in Figs. 5 and 6.

Spot welded at **23** to the lead **21** is a strip of bimetallic element **24**. By reason of the confined space within which this element must operate, this strip, like strip **11** of Fig. 1, should be of a high temperature low deflection type. The initial positioning of the strip is such as to bear against a dummy lead **25** mounted with leads **21** and **22** within the pinch **26**. A laterally extending bar **27**, secured as by welding to the dummy lead **25**, is arranged for connecting with one end of the filament **35** at **28** with the other end of the filament similarly connected at **29** to the lead **22**. The filament **35** is shown as closely supported about the heat absorbing mass **36** of the lamp by radially extending members **37**, however, it will be readily understood that divers other methods of arranging and supporting the filament about the mass **36** may be resorted to with equally satisfactory results.

The mass **36** is so formed with grooves **31**, Fig. 5, as to closely fit between leads **21** and **22** whereupon as the short end portions **32** of the leads are thereafter formed over the mass, as shown to advantage in Fig. 4, the mass is properly maintained in spaced relation with respect to the strip **24** leaving the latter free to flex into and out of electrical contact with the lead **25** during operation of the lamp, as will now be described.

Current admitted to the lamp by way of terminal **30** of the inserting screw shell **19**, passes through the lead **21** to the bimetallic strip **24** and on to the dummy lead **25** against which the strip normally rests. From the lead **25** the circuit continues through the bar **27**, the filament **35** and back to the lead **22** and to the other terminal **31** of the shell. As current is applied in this manner to the filament to effect the heating thereof, a portion of the heat from the filament passes to the mass **36** and from thence to the strip **24** to effect the heating thereof. As the temperature of the strip gradually rises to overcome its initial bias toward the lead **25** and separates from the lead, circuit through the filament thereupon is interrupted to effect an extinguishing of the lamp and consequently a cooling of the filament. However, with cooling of the filament, the stored heat in the mass continues to pass to the strip maintaining the latter in open circuit position with respect to the lead **25**, long after the strip would normally have cooled and returned to contacting position with the lead **25** again to effect the lighting of the lamp. By such an arrangement the flashing rate of the lamp is materially reduced while the operating characteristics are preportionally improved.

Fig. 7 is an alternate form of the invention wherein the mass **40** is in the form of a length of metallic tubing of any size or shape suitable for the purpose. The bimetallic element or strip **41**, after being secured as by pinching within one end of the tube as herein shown, is then fastened with the tube to the lead **42** in such a manner that the free end of the strip is positioned for deflecting into electrical engagement with the lead **43**. When such occurs, current is shunted from the filament in a manner to effect a flashing of the lamp. By the arrangement herein shown, the strip is completely shielded from radiated heat from the filament in addition to possessing certain other advantages obtained by closing one end of the tube which serves to some extent to increase the efficiency of the mass **40**. The functioning of a lamp when so constructed closely corresponds to that of Fig. 1 even though the mass of the tube **40** is considerably less than the masses **12** and **36**.

Fig. 8 shows an alternate form of the invention suitable for use within either a multiple or series connected assembly. In the device of Fig. 8, the thermal element **49** secured as by welding to lead **50**, is initially arranged in open circuit with lead **51** thereby allowing energization of both filament sections **52** and **53** as a source of current is applied to the leads. During such time as both filament sections are energized, heat is applied to the mass **54** mainly by the filament section **53** whereupon the strip **49** is gradually heated to the extent of deflecting into electrical contact with the lead **51**. When such occurs, the portion **53** of the filament is shorted out causing a diminishing of the light output of the lamp corresponding to that produced by the filament section **53**. As the strip and mass gradually cool allowing the strip to separate from the lead **51**, the filament section **53** is again

energized to result in a maximum brightness of the lamp. By such an arrangement, instead of the usual "on" and "off" flashing, as may commonly be expected from a lamp of this type, a pleasant twinkling affect is produced as the result of the continually changing light intensity of the lamp.

It is understood that with the device of Fig. 8, the filament sections **52** and **53** may be of any length suitable for the purpose and positioned as necessary with respect to the mass **54** to produce the particular effect desired. Further, the mass **54**, as with masses **12** and **36**, may be of any shape or size required to produce the delayed reaction intended.

While herein has been illustrated and described certain preferred embodiments of the present invention, it will be understood that various changes in the construction, operation, and characteristics of the parts may be resorted to without departing from either the spirit or scope of the invention as now claimed.

I claim:

1. A flasher lamp including in combination a filament, leads to the terminal ends of said filament to effect the energization and heating thereof, a thermal strip disposed for intermittently shunting the filament to effect the periodic cooling of the filament, and a heat absorbing member surrounding said thermal strip in spaced relationship

and heated by the filament to control the radiant heating and cooling of said strip.

2. In a flasher lamp the combination of a filament, lead means to the terminals of said filament for energizing and heating the latter, a bimetallic strip movable when heated to interrupt current flow through said filament to effect the cooling thereof, and a heat absorbing member substantially inclosing said bimetallic strip and heated by the filament for controlling the rate of heating and cooling of said bimetallic strip.

3. In a flasher lamp a filament, leads for supplying energizing current to the filament, a bimetallic strip mounted for electrically interrupting current flow through the leads for controlling the heating and cooling of the filament, and a heat absorbing member positioned for receiving heat from said filament substantially inclosing said bimetallic strip for applying radiant heat uniformly to the strip over substantially its entire length to effect the controlled heating and cooling of the bimetallic strip.

References Cited in the file of this patent

UNITED STATES PATENTS

2,235,360	Davis	Mar. 18, 1941
2,442,845	Davis	June 8, 1948