United States Patent [19]

Rochester et al.

[11] **3,720,822**

[45] **March 13, 1973**

[54] **XENON PHOTOGRAPHY LIGHT**

[75] Inventors: **James R. Rochester,** Chatsworth; **Fenton D. Hamilton; Felipe Navarro,** both of Los Angeles; **Neal R. McCurdy,** Granada Hills, all of Calif.

[73] Assignee: **Xenotech, Inc.,** Irvine, Calif.

[22] Filed: **Jan. 29, 1971**

[21] Appl. No.: **110,832**

[52] **U.S. Cl.** **240/1.3,** 240/11.4, 240/44.2, 240/47

[51] **Int. Cl.**.....**G03b 15/02**

[58] **Field of Search** .240/1.3, 2 C, 11.4 R, 20, 41.37, 240/44.2, 47

[56] **References Cited**

UNITED STATES PATENTS

3,375,366	3/1968	Scheppe	240/47
3,280,320	10/1966	Beaton et al.	240/1.3
3,174,067	3/1967	Bahrs	240/47 X
3,388,246	6/1968	Bailey	240/44.2
3,511,984	5/1970	Blaisdell et al.	240/11.4 R X

FOREIGN PATENTS OR APPLICATIONS

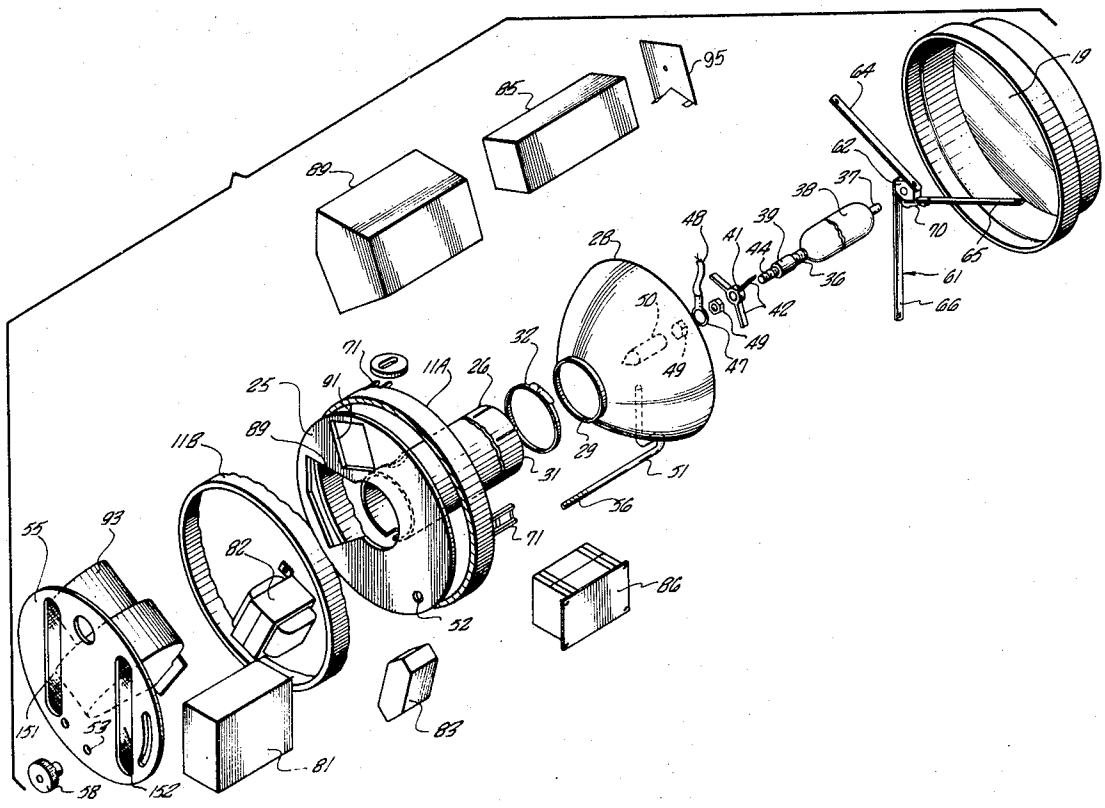
1,004,292	3/1957	Germany	240/11.4 R
1,114,707	10/1961	Germany	240/1.3

Primary Examiner—Louis J. Capozi
Assistant Examiner—Joseph W. Roskos
Attorney—Wm. Jacquet Gribble

[57] **ABSTRACT**

A D.C. cinematography light source of 85,000 lumens with a color temperature of approximately 6,000° Kelvin uses a xenon lamp mounted adjacent a ray collector so that collector and lamp are relatively movable to achieve focus. An air duct supports the lamp and an air blower discharges into the duct and about the lamp. A shroud at the front end of the lamp housing supports a light mixer or diffuser and directs exhaust air rearwardly, exteriorly of the housing. A central board in the housing supports air blowers and other electrical and electronic components away from the housing for efficient cooling air circulation to them and the ray collector. The ray collector has a reflective contour generated preferably by a modified skewed ellipse. The light mixer achieves controlled diffusion by means of a shallowly etched rear surface. The housing is supported from conventional lighting brackets and stands.

14 Claims, 7 Drawing Figures



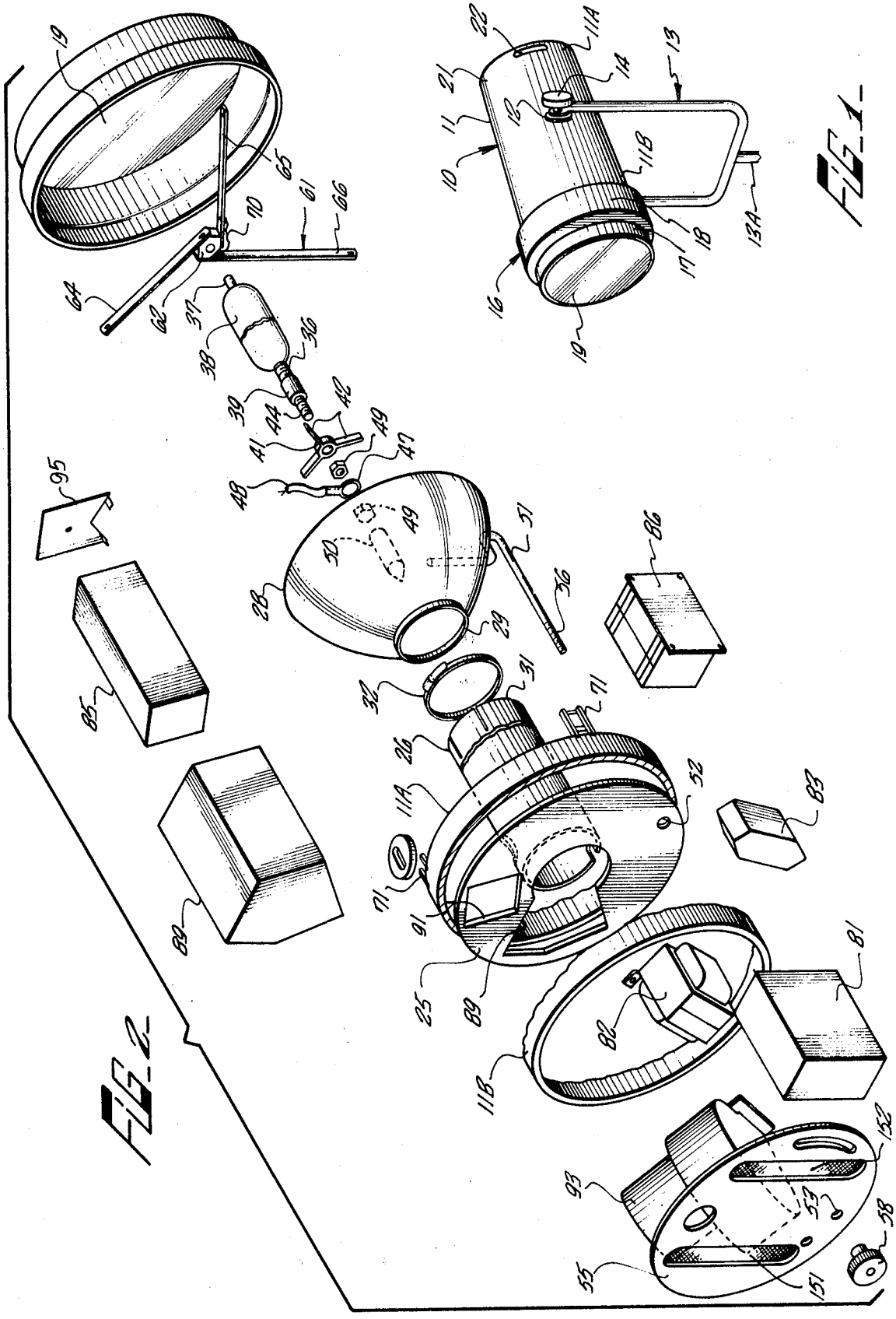


FIG. 2

FIG. 1

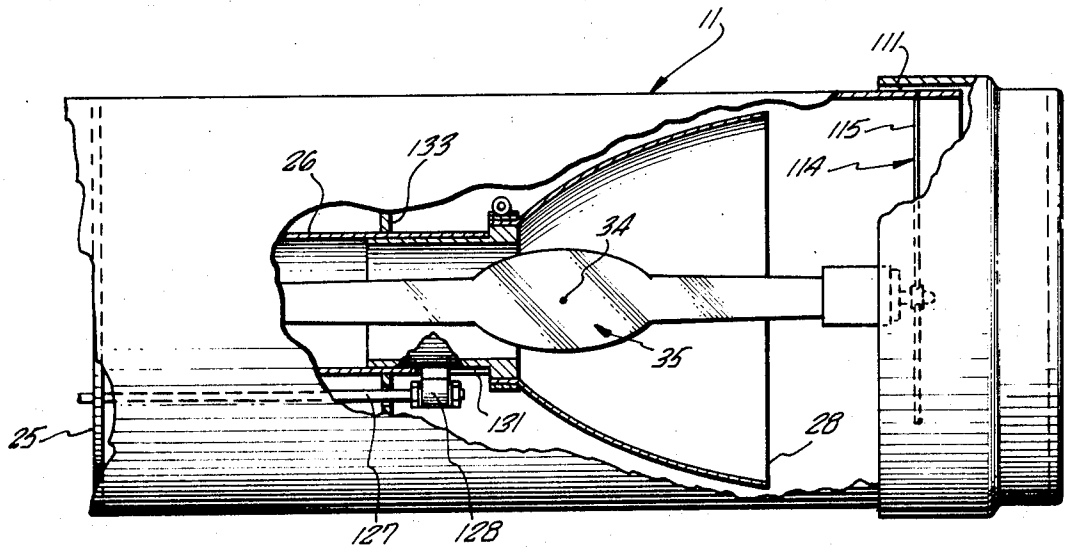


FIG. 1

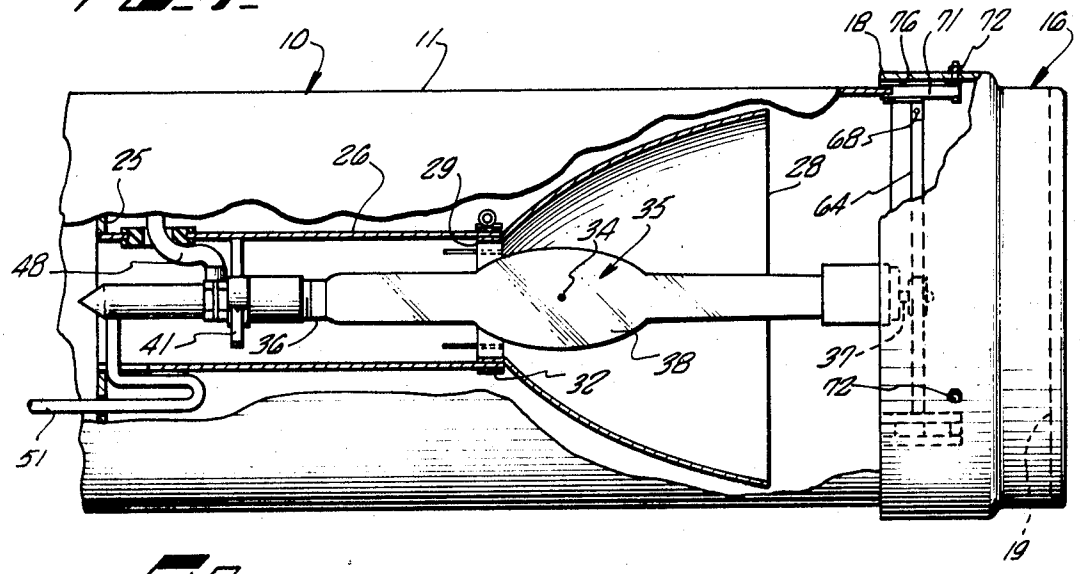


FIG. 3

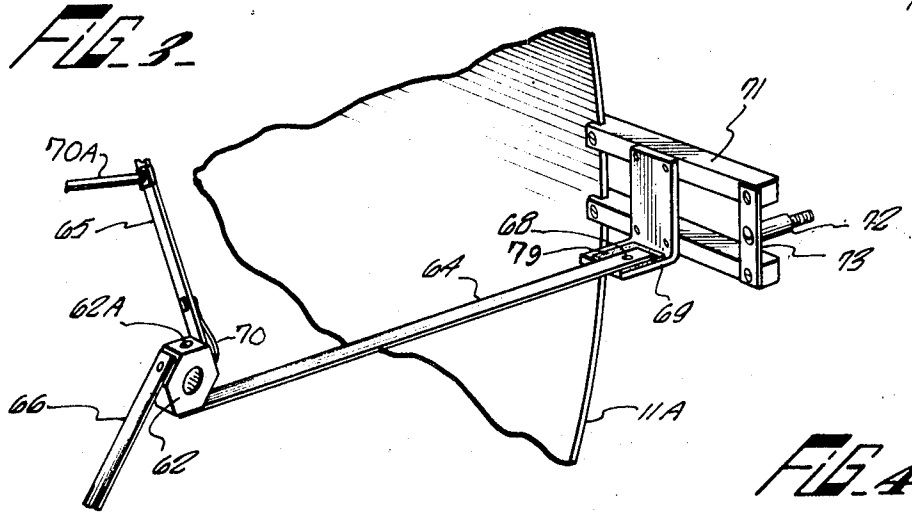


FIG. 4

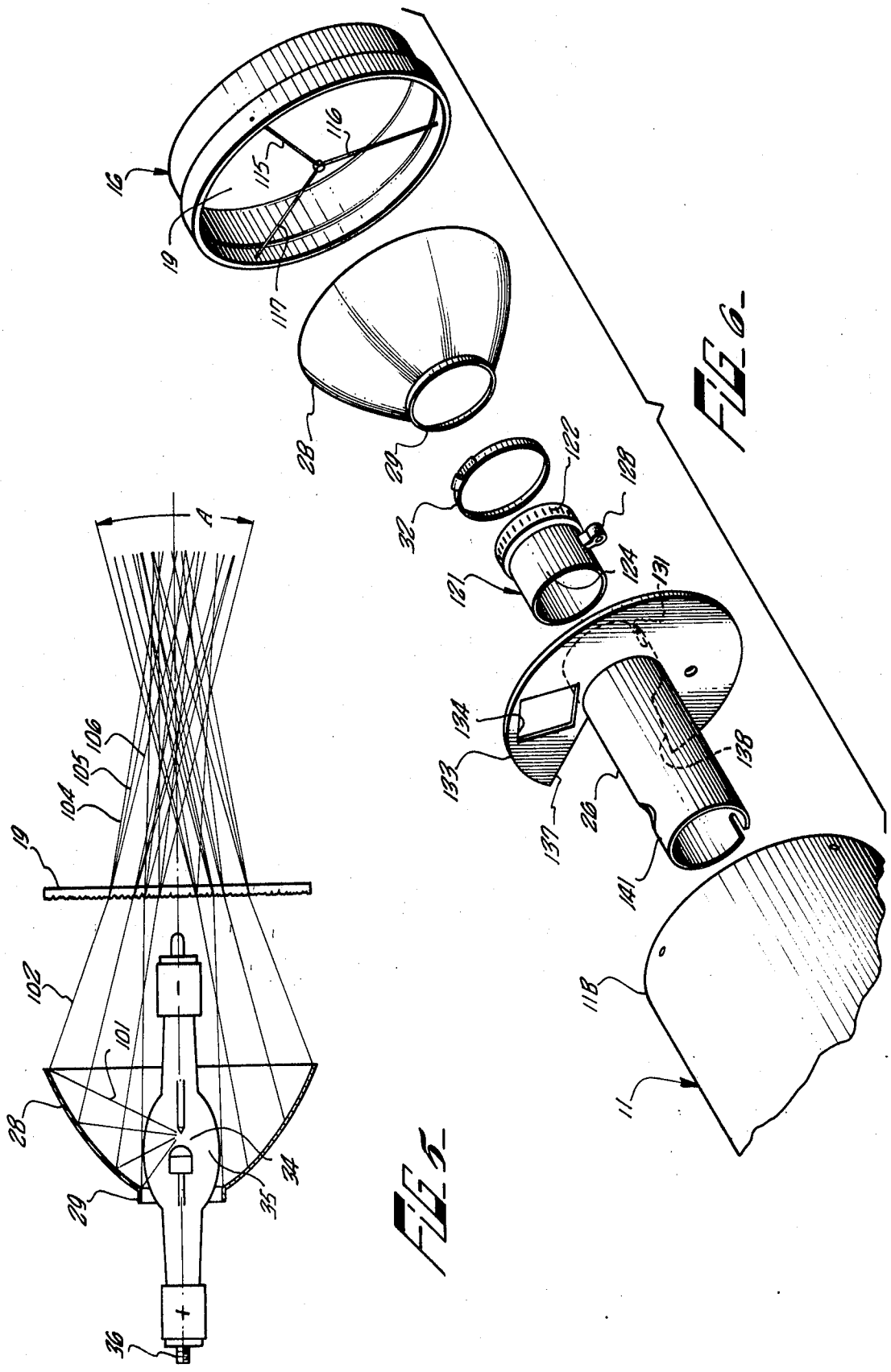

16
19
115
116
117
28
29
30
122
188
181
184
131
134
133
137
26
138
141
118
11
A
104
105
106
19
102
101
28
29
34
35
36

FIG 6

FIG 5

XENON PHOTOGRAPHY LIGHT

BACKGROUND OF THE INVENTION

The invention relates to artificial illumination for photography, particularly color cinematography, and to the light sources to achieve such illumination. Traditionally carbon arc lights have been the primary source of illumination to complement sunlight and to "fill" shadowed areas exteriorly and to light interior scenes. The carbon arc light is well adapted to color photography since the color temperature produced by the arc closely approximates that of sunlight. However, the carbon arc light weighs from 175 to 250 pounds and requires 300 additional pounds of auxiliary equipment, and must be carefully tended to keep the carbon elements in proper trim. These problems with carbon arc lights led to the development of the so-called "Fay-lite" using a tungsten iodide filament in batteries of six or nine lamps, each with a dichroic coated lens or reflector. However, the "Fay-lite" produces a color temperature between 4,500° and 4,800° Kelvin, requiring that color film exposed in sunlight be developed under differing processes than color film exposed in artificial light. Development problems multiply when Fay-lite lamps are used to fill a shadow area in naturally lighted exterior shooting, and the film is exposed to sun and artificial light at the same time.

Military requirements for lightweight, brilliant and enduring lights led to refinements in xenon lamps. Xenon lamps are gas filled lamps using xenon particles between lamp electrodes. The xenon molecules radiate at approximately the same part of the spectrum in spite of lamp input power fluctuations and the brightness and color temperature of the light therefore remains nearly constant despite wide power input variations.

Xenon lamps have performance characteristics which are well adapted to color cinematography, but have mechanical problems which must be overcome. For instance, xenon lamps generate high heat and must be cooled continuously to protect electrical components and the lamp end seals, which may leak and may cause explosion of the lamp or early circuit failure. Explosions have been minimized by recent improvements in blowing of quartz bulbs, but the heat problem still exists. The weight of the carbon arc lights and the manpower needs because of that weight have made desirable a lightweight light which can operate in the same color spectrum. We have invented a light which overcomes the above problems in the color cinematography field by better cooling and control and which has utility in other fields of illumination.

SUMMARY OF THE INVENTION

The invention contemplates a photography light having a xenon lamp with a pin terminal and a threaded terminal and comprising a housing, a light transmitting window closing the front of the housing and a transverse mounting board dividing the housing. An axial air duct fixed in the housing opens forwardly about the xenon lamp, and a light ray collector mounts on the duct. An air blower remote from the collector impels air through the duct to impinge upon the lamp. The invention includes means for imparting relative motion between the collector and the lamp, and, preferably, a second air blower within the housing adjacent the duct but volumetrically isolated therefrom. The other electrical and electronic components, such as the lamp igniter, fan transformer, control relay and a diode, all mount about the duct in the volume between the duct and the housing, exposed to moving air from the second blower. Air exhaust means directs air discharged from the front of the housing in a direction opposite to the direction of beamed light rays.

Preferably the threaded terminal of the xenon lamp is supported within the air duct and a front spider adjacent the front window suspends the pin terminal. Electrical continuity through the lamp may be achieved through a conductive portion of the spider.

A photography light in accordance with the invention has mobility, high heat dissipation, dependability, a color temperature in the range of sunlight, operates silently because of the direction of air discharge, and is capable of both long-throw and short-throw beams on the field of illumination. These and other advantages of the invention are apparent from the following detailed description and drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective view of a photography light in accordance with the invention supported upon a standard lighting pedestal;

FIG. **2** is an exploded perspective view of the various elements within the housing shown in FIG. **1**;

FIG. **3** is a fragmentary elevational view of the light of FIG. **2**, partly in section;

FIG. **4** is a fragmentary perspective elevation of the lamp spider of the embodiment of FIG. **2**;

FIG. **5** is a schematic diagram of the light ray paths from the collector through the light mixer;

FIG. **6** is a fragmentary exploded perspective view of the alternate illustrative embodiment of the invention; and

FIG. **7** is a fragmentary elevation, partly in section, of the embodiment of FIG. **6**.

In the various views like parts are designated by like reference characters.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1**, which is characteristic of both illustrative embodiments, shows a photography light **10** having a cylindrical outer housing **11** with a pair of opposed pinions of which pinion **12** is shown, which supports the housing upon a U-shaped yoke **13** and pedestal **13A**, conventional in the lighting equipment field. Hand screws, like hand screw **14**, secure the housing at the proper attitude with respect to the vertical yoke **13**.

A front shroud **16** is supported on the front end **11B** of housing **11**. The shroud has two cylindrical portions, the front portion **17** being smaller in diameter than the rear portion **18**. The front portion **17** supports a light window **19** which preferably performs three functions: as an ultraviolet filter, a safety barrier and a light ray diffuser.

Rear cylindrical portion **18** of the shroud is larger in diameter than cylindrical housing **11** and air being discharged about a xenon lamp (not shown) discharges rearwardly away from the direction the light is beamed to lessen the sound level at the area of illumination.

The rear end **21** of the housing **11** may have hand grips, such as a grip **22**, for controlling the attitude and placement of the light.

In FIG. 2 only front and rear ends 11A, 11B of the housing 11 are shown. The components of the photography light 10 are exploded both axially and radially. The assembled relationships of the elements of the embodiment of FIG. 2 are shown in elevation in FIG. 3. As can be seen from those Figures, a mounting board 25 within housing 11 supports an air duct 26 in cantilever fashion forwardly of the board. A ray collector 28 has a rear annulus 29 about which a forward end 31 of the air duct is secured by an adjustable tension band 32. The collector is thereby fixed removably to the duct 26.

In the embodiment of FIGS. 2 and 3 a xenon lamp 35 resides partly within the duct and collector such that a focal point 34 of the lamp radiance, about one-quarter of an inch long, is within the volume of the ray collector. The lamp may be of a standard 4,000-watt type, such as the xenon lamps made by Westinghouse, Uisho and others, having a rearward threaded terminal 36 and a forward pin terminal 37 extending oppositely from an elongate quartz envelope 38. A threaded adapter 39 receives the terminal 36 of the lamp and is, in turn, secured within a hub 41 of a duct spider 42. The duct spider is slidable in duct 26. The adapter has a threaded shank 44 which extends through the hub to be connected to an electrical connector 47 on a lamp wire 48 to the power source. Nuts 49 secure the connector to the shank ahead of an insulating internally threaded control arbor 50 also threadably secured to the shank.

An L-shaped control arm 51 passes through aligned holes 52 and 53, respectively, in the mounting board 25 and a vented back closure 55 of the housing, from its connection to the arbor. Arm 51 terminates rearwardly of the board in a threaded end 56 which extends partly from the closure exteriorly to receive a threaded control knob 58 by which the arm is positioned axially of the housing to change the location of the lamp with respect to the collector.

In the embodiment of FIGS. 2 and 3 the position of the xenon lamp is changed with respect to the collector to vary the focal distance of the resulting light beam. The lamp front support must accommodate axial displacement of the lamp and its terminal pin and still support the lamp and make unvarying electrical contact with the pin terminal. The invention therefore includes a front spider assembly 61 in which an apertured hexagonal retainer 62 of conductive material secures the pin terminal with a set screw 62A (FIG. 4). A plurality of slender spider arms 64, 65 and 66 which do not block an appreciable part of the radiated light are each pivoted at one end to a facet of the retainer hexagon and at the other end by a pivot pin 68 to an angle 69. Each arm is electrically connected to the retainer, but an electrical link 70 for heavy current connects between the retainer and one arm 65 to complete the circuit from wire 48 through the lamp and a return lead 70A from the arm 65.

Angle 69 of each arm is carried by one of three clips 71 fixed at spaced intervals to front 11A of the housing 11 in suitable fashion. The window-supporting shroud 16 surrounds the clips 71 and may be supported therefrom by spacer bolts 72 fixed in end bars 73 of each clip to maintain an annular air gap 76 (FIG. 3) between the large cylindrical rear portion 18 of the shroud and the exterior of housing 11. Each angle 69 is insulated from its respective clip by an insulated pad 79, and pivot pin 68 may itself be an insulator.

The movement of the lamp with respect to the collector is small, and, with provision for lost motion between the pivot pins 68 and angles 69 the front of the lamp is maintained in axial alignment and restrained from contact with the window despite the axial displacement.

The electrical and electronic elements of the photography light 10 are preferably compact and long-lived. While the elements themselves may be of conventional design and circuitry in the field of gas lamp power supplies, providing higher voltage ignition current and lower voltage continuous current, their mounting and cooling is unique to the invention.

The photography light of the invention is designed for operation on D.C. power to fit it for use with battery carts at locations remote from sources of A.C. power, and an inverter 81 is provided to power a blower transformer 82. A solenoid 83 is used to switch on and off the forward and rear cooling fans or blowers and an igniter 85 that initiates ionization of the xenon particles prior to arcing, and the relatively low main circuit 34 volts supply which maintains the arc in the lamp. Normal power rating is 125 amps. A heatsink-mounted diode 86 in the main circuit and the other elements described above are mounted to mounting board 25 in an order described later. Suitable conventional fasteners are used for mounting.

As can be seen from their outer configurations, the rear end of a forward blower 88 fits within an angular cavity 89 of the board and igniter 85 locates in a rectangular cavity 91 of the board to extend forwardly toward the collector in cantilever suspension. Diode 86 with its heatsink is fixed to the forward wall of the board 25 also, in the volume between the duct and housing wall and the board and collector, as is transformer 82. The inverter 81 and a rear blower 93, being of low heat output, reside in the volume between board 25 and closure 55 of the housing.

The duct is fixed at one end to board 25 and has the collector 28 secured to its other end, fixing most of the photography light elements in a single sub-assembly detachable from the housing 11 to accomplish tests and parts replacement simply and rapidly.

As set forth earlier, a critical problem in high intensity lights is the amount of heat generated by the electrical components which heat as a result of the power transfer through the electrical elements as well as from lamp radiance. It will be noted from FIG. 2 that those elements with low heat output are rearward of the mounting board 25 while those elements of higher heat output are located in front of mounting board 25, preferably extending away from the forward blower stream in the ascending order of heat output. For instance, the igniter 85 and the diode are mounted directly to the board, along with transformer 82, such that forward fan 88 directs cooling air at them. The forward fan discharges air tangentially with respect to the cylindrical interior of the housing 11. A cooling vortex results, swirling within the housing about the duct and the collector toward the air discharge annulus 76 at the juncture of the shroud 16 and the housing end 11B. The cooling air from the forward fan thus swirls about the elements of lesser heat output and to the collector 28 that is the greatest heat radiator exterior of duct 26.

Cooling efficiency is thereby established by the placement of heat radiating elements in the order of their heat output. It becomes apparent that the lamp **35**, by being independently cooled from rear fan **93**, which discharges directly through duct **26**, is more readily cooled than if it were the last element contacted by air from the forward fan, as its physical position dictates. Thus the invention provides two substantially independent air streams to combat the degenerative effects of high heat.

OPERATION

The embodiment of FIGS. **2** and **3**, exteriorly similar to the light **10** of FIG. **1**, is manipulated within yoke **13** to the proper attitude to light the desired area. The main power source, whether a battery cart or a rectified A.C. line, is electrically connected through solenoid **83** to actuate rear fan **93** and forward fan **88** which are in series with inverter **81** and fan transformer **82**. Standard 120 volt fan motors are preferred because of cost, reliability and availability.

Igniter **85** contains a transformer component to boost the normal **34** volt flow through diode **86** and a conventional capacitor (not shown) in series with the lamp. The igniter, which may be supported by bracket **95** on the forward portion of the duct **26**, supplies the initial ionization voltage to establish conductance in the xenon-filled lamp. Current from the capacitor warms the lamp electrodes to aid starting, with the diode preventing discharge of the capacitor back on the D.C. line. Once continuity exists through the lamp, inverter **81** cuts off igniter **85** and the lamp arc is maintained by the 34-volt power from the D.C. source.

Pin terminal **37**, which is electrically connected to retainer **62**, is in series with high current electrical link **70** between the retainer and spider arm **65**. The return link **70A** from arm **65** is connected to the circuit at the board **25** to complete the electrical path through the lamp. It is obvious that the ends of each spider arm, including arm **65**, must be electrically isolated from angle **69** or clip **71** to which the angle is fastened to preclude current flow to housing **11**.

With the lamp illuminated and delivering at least 85,000 lumens to the collector, control arm **51** is manipulated by suitable exterior means, such as the previously mentioned threaded knob **58**, to position the lamp **35** with respect to collector **28** such that the proper focus is achieved at the desired distance. Since power lead **48** passes through an insulating grommet **97** in duct **26**, with some slack in the lead, the axial motion of the lamp due to control arm **51** does not interrupt electrical continuity and the equal pivot motion of the spider arms **64, 65, 66** maintains the lamp in axial alignment within the collector.

As can be seen from FIG. **5**, the reflecting surface of the collector determines the path of the rays to the field. If the window **19** were smooth-surfaced the field would be lighted by a sharply defined circular spot. However, it is desirable to illuminate with a light circle whose border is irregular to de-emphasize the artificial aspect of the lighting, while at the same time filling the main circle area with an even brilliance, largely uniform in intensity within the circle. Therefore light window **19** is preferably roughened on its inner surface to cause a diffusion of the rays reflected by the collector. Proper design of the collector and the proper aberration of the window surface determines whether the focal distance of the light beam is short or long. A short focal length for a lamp of 4,000 watts is conventionally about 15 feet while proper coupling of collector contour and window faceting can result in an adequately lighted field 150 feet from the light. Even at this latter distance the light of the invention illuminates the field with approximately 85,000 lumens at a color temperature ideal for color photography.

THE COLLECTOR

The collector of the invention, is preferably of hydroformed aluminum. It may be formed over a shaped stainless steel mandrel and finished by the "Alzac" process, a tarnish-resistant finish of high reflectivity. The hydroforming process achieves a saving of 1,000 per cent over the conventional electroforming techniques.

The contour of the mandrel, and thus of the collector, is generated from a modified skewed ellipse whose configuration is computer-calculated from a program input of a series of focal points and constants related to the finite lamp arc or area of radiance such that the desired pattern through the window is achieved, with the constants being adjusted for either long throw or short throw window diffusion.

THE WINDOW

It is desirable that no more than 10 per cent of the beam from the collector be lost through the diffuser window because of "stray" light rays. To accomplish this object, the window of the invention is a heat-resistant glass disc mechanically roughened, as by abrasives, on one surface to achieve an irregular surface pattern. The surface is then partly polished to eliminate sharp ridges and lessen the diffusion effect to prevent random loss of light in transmission. Preferably the polishing process is chemical, using common etching compounds, the exposure of the roughened surface to etching solutions being carefully controlled. The resulting glass disc has resistance to impact, filters undesirable ultraviolet emissions and acts to diffuse rays from the collector in an orderly pattern.

FIG. **5** illustrates the ray pattern from the lamp arc **34** to the collector **28** and through the window **19**. The ray paths are idealized and the arc A represents 90 per cent of the rays transmitted through the window. The collector and window are contoured and faceted, respectively, such that the field illuminated on the plane of illumination is approximately 10 feet in diameter whether the focal length of the beam is 15 feet or 150 feet. In FIG. **5** a ray path **101** is reflected at the extreme of reflector **28** in a path **102** to the diffusing window **19**. The window transmits the representative single ray in a plurality of rays **104, 105, 106** whose paths do not diverge appreciably. In addition to controlling the diffusion of the beam, the collector and window combination directs the rays to the field of illumination in an even dispersal such that the light intensity and color temperature vary very little within the ten-foot diameter of the circle of illumination.

It is obvious from FIG. **5** that a change in the relative positions of the lamp arc focal point **34** and collector changes the distance at which the optimum illumina-

tion circle converges. The invention takes advantage of the relatively finite area of the lamp arc to achieve fine focus with little movement of the lamp or the collector.

The contour of the window interior surface necessary to give a long or short throw beam is empirically determined and the diffusion characteristics of a particular window are considered when the collector contour is programmed through computer calculations.

In the embodiments of FIGS. **6** and **7** the diffuser and the collector may be achieved in the same manner as described with respect to the embodiment of FIG. **2**. The embodiment of FIG. **6** likewise has an exterior appearance like that shown in FIG. **1**, with a cylindrical housing **11** having rear and front ends **11A**, **11B**, respectively, terminating in a front shroud **16** with stepped cylindrical portions **17** and **18** and carrying a window **19**. The shroud **16** of FIG. **6** may be secured to the housing in the manner shown in FIG. **3** or by any suitable means spacing the cylindrical portion **18** from the exterior of housing **11** to establish an air gap annulus **111**. This annulus is apparent from FIG. **7**. It should be noted that a front support spider **114** for the lamp **35** of FIG. **7** may be fixed at the insulated outer ends of the spider arms **115**, **116**, **117** either within the shroud as shown in FIG. **6** or directly to the housing, as shown in FIG. **7**.

The embodiment of FIG. **6** distinguishes from the embodiment of FIG. **2** in that the collector **28** is movable with respect to the lamp **35**. The lamp is therefore secured with respect to the duct **26** with a spider (not shown) such as the spider **41** of FIG. **2**. The rearwardly terminating ring **29** of the collector is secured by a clamp **32** to a sleeve **121** which has a front collar **122** about which band **32** tightens to fix ring **29** to the sleeve. Sleeve **121** has a barrel portion **124** which slides within duct **26** in response to movement of a control rod **127** (see FIG. **7**). The rod is secured in an eye **128** extending from barrel **124**. Duct **26** has a slot **131** to accommodate movement of the eye in response to axial motion of rod **127**.

Since the duct **26** of FIG. **6**, which, as in the embodiment of FIG. **2**, is cantilevered from a rearward mounting board **25**, is subject to forces near its cantilevered end due to the motion of the collector, it is preferred that a forward mounting board **133** support the forward end of the duct from the inner wall of the housing. The mounting board has a rectangular aperture **134** to receive the forward end of an igniter **85**, said igniter not needing the support bracket **95** of the embodiment of FIG. **2**. The second mounting board is further apertured by an air flow opening defined by radial edges **137**, **138**. The opening vents the warmed air proceeding from the vortex of a forward fan **89** around collector **28** and to exhaust through aperture **111**.

The rear end **141** of duct **26** is supported in a mounting board **25**, as in the first described embodiment.

Since lamp spider **114** need not accommodate axial motion of the lamp, it can be of lighter construction than the spider **61** of the embodiment of FIG. **2**. At least one arm must be electrically capable of **120** amps of current. However, to reduce interference with the beam, the arms **115–117** are oriented so that their major dimension is perpendicular to the light beam. As one spider arm is used to complete the circuit through the lamp, the spider arms are conveniently insulated from either the shroud or the housing, depending upon the mounting mode.

The embodiment of FIG. **6** operates in the same fashion as the embodiment of FIG. **2**, drawing duct air from a rear fan, such as the fan **93** of the first embodiment, and forcing air tangentially from a forward blower **89**, with two independent streams of air converging beyond the collector to exhaust through an annulus **111**.

Attention should be called to the fact that the rear fan draws air from screened vents **151**, **152** in the vent closure **55** of the housing. Fan noise is thereby radiated rearwardly, as is the noise from the emerging cooling air through annulus **111**.

Control rod **127** may be manipulated in any convenient fashion and fine adjustment may be achieved by a threaded end and an exterior control knob with a matching thread, as in the first described embodiment. The invention does not thereby preclude electrical or mechanical focusing by controls internal of or remote from the housing. However, such controls require components which add to the weight of the photography light of the invention and are not necessarily more accurate or more convenient than manual controls.

While other electrical elements than those described for the embodiment of FIG. **1** may be utilized in the embodiment of FIG. **6**, the described major components, being conventional and proven, will normally be utilized. The introduction of second mounting board **133** does not change the arrangement of the forward electrical components with respect to the flow of air from a forward fan **89**. In each of the illustrative embodiments the components are preferably arranged axially forward of the mounting board **25** and the air exhaust pattern in the order of their heat output.

The illustrative embodiments provide a photography light ideally suited to color photography and with utility in other illumination fields. The light of the invention is easily manipulated because of its lesser weight when compared to comparable sources of illumination and complements natural daylight in such a fashion that film development techniques need not vary from outdoor to indoor film exposures and affords a photography light of substantially reduced cost. The illustrative embodiments are not exhaustive of the invention and the modifications in the scope of the invention other than those suggested will occur to those skilled in this particular art. It is therefore desired that the invention be measured by the appended claims, rather than by the embodiments disclosed herein.

We claim:

1. In a photography light having a xenon lamp with a front terminal and a rear terminal, the combination comprising a housing, a light transmitting window at the front of the housing, a transverse mounting board dividing the housing, an air duct fixed in the housing and opening about the lamp, a light collector mounted on the duct, a first air source discharging into the duct; means for imparting relative motion between the collector and the xenon lamp; a second air source discharging air into the housing adjacent the duct and volumetrically isolated therefrom; lamp circuit components mounted about the duct in the volume between the duct and the housing such that air from the second source impinges upon them; and air exhaust

means directing air discharge from the housing front in a direction opposite to the direction of beamed light rays.

2. Apparatus in accordance with claim 1 further comprising means supporting one terminal of the xenon lamp within the duct, and a front spider adjacent the front window suspending the other terminal of the lamp.

3. Apparatus in accordance with claim 2 wherein the front spider comprises spider arms, a central lamp terminal retainer at the convergence of the spider arms, an electrical connector between the central retainer and a spider arm, and means suspending each spider arm from the housing at spaced points on the periphery of the housing.

4. Apparatus in accordance with claim 2 wherein the front spider comprises a plurality of spider arms, a central lamp terminal retainer at the convergence of the spider arms, pivot means securing each arm to the retainer, an electrical connector between the central retainer and a spider arm, and means movably suspending each spider arm from the housing at spaced points on the periphery of the housing.

5. A light in accordance with claim 1 wherein the means for imparting relative motion comprises means suspending the lamp for axial motion with respect to the collector, and a control arm linked to the lamp and extending exteriorly of the housing.

6. A light in accordance with claim 5 wherein the means suspending the lamp comprises a duct spider, a terminal adapter held in the duct spider, said spider being slidable in the duct, a front lamp terminal retainer, a plurality of radial arms extending from the retainer, each arm being pivotally secured to the retainer, an arm bracket securing each arm pivotally to the housing adjacent the front window, means insulating each arm from the housing, an electrical lead from a spider arm to the retainer, and a second electrical lead from the same arm to the lamp circuit terminus.

7. A photography light in accordance with claim 1 wherein the window comprises a heat-resistant glass disk, a smooth exterior surface and an irregular interior surface, said interior surface having a plurality of smoothed surface indentations and protuberances the majority of which are each defined by more curvilinear than planar facets such that few sharp lines of facet convergence exist in the interior surface.

8. A photography light in accordance with claim 1 wherein the means for imparting relative motion comprises means fixing the lamp with respect to the duct and housing, a sleeve slidable on the duct, means for attaching the collector to the sleeve, and a control arm fixed to the sleeve and extending exteriorly of the housing to be manually manipulated to change axially the position of the collector with respect to the fixed lamp.

9. In a photography light having a xenon lamp with a pin terminal and a threaded terminal, the combination comprising a housing, a vented back closure on the housing, a light transmitting window closing the front of the housing, a transverse mounting board dividing the housing, an axial air duct fixed in the housing and opening about the lamp, a light collector mounted on the duct, a first air blower discharging air into the duct remote from the collector; means for imparting relative motion between the collector and the lamp; a second air blower within the housing forward of the mounting board adjacent the duct and volumetrically isolated therefrom; an igniter, a blower transformer, a relay, and a diode in the lamp circuit, all mounted about the duct forward of the mounting board in the volume between the duct and the housing such that air from the second blower impinges upon them in substantially the order of their heat output, and air exhaust means directing air discharge from the housing in a direction opposite to the direction of beamed light rays.

10. A light in accordance with claim 9 further comprising means supporting the threaded terminal of the xenon lamp within the duct, and a front spider adjacent the front window suspending the pin terminal of the xenon lamp.

11. A photography light in accordance with claim 9 wherein the means for imparting relative motion comprises means suspending the lamp for axial motion with respect to the collector, and a control arm linked to the lamp and extending exteriorly of the housing.

12. A photography light in accordance with claim 11 wherein the means suspending the lamp comprises a duct spider slidable in the duct, a terminal adapter held in the duct spider, a front lamp terminal retainer, a plurality of radial arms extending from the retainer, each arm being pivotally secured to the retainer, an arm bracket securing each arm pivotally to the housing adjacent the front window, means insulating each arm from the housing, an electrical lead from a radial arm to the retainer, and a second electrical lead from the same arm to the lamp circuit terminus.

13. A photography light in accordance with claim 9 wherein the window comprises a heat-resistant glass disc, a smooth exterior surface and an irregular interior surface; said interior surface having a plurality of smoothed surface indentations and protuberances, the majority of which are each defined by more curvilinear than planar facets such that few sharp lines of facet convergence exist in the interior surface.

14. A photography light in accordance with claim 9 wherein the means for imparting relative motion comprises means fixing the lamp with respect to the duct and housing, a sleeve slidable on the duct, means for attaching the collector to the sleeve and a control arm fixed to the sleeve and extending exteriorly of the housing to be manually manipulated to change axially the position of the collector with respect to the fixed lamp.

* * * * *