Feb. 13, 1968 R. V. NICOLOSI 3,369,117

MINIATURE HIGH INTENSITY LAMP

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FIG. 1

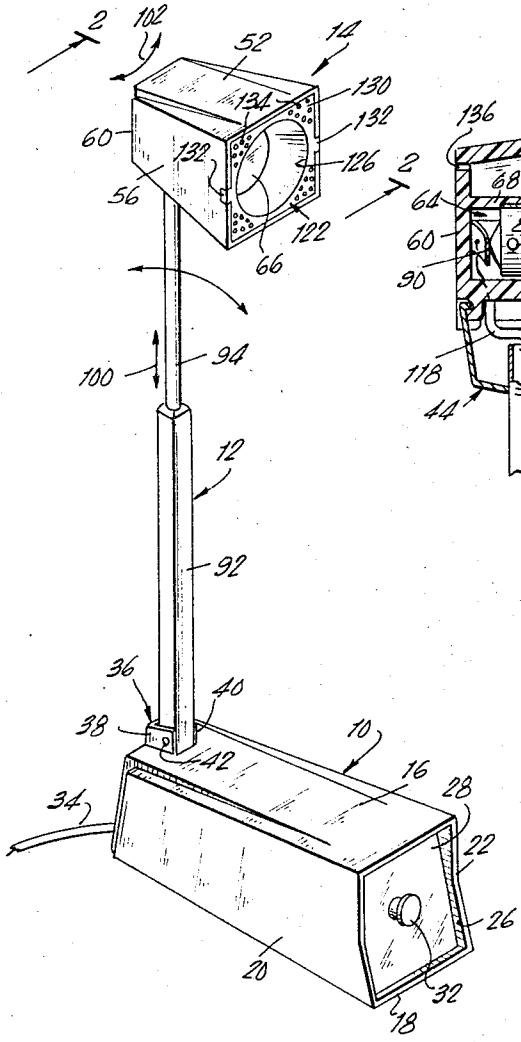
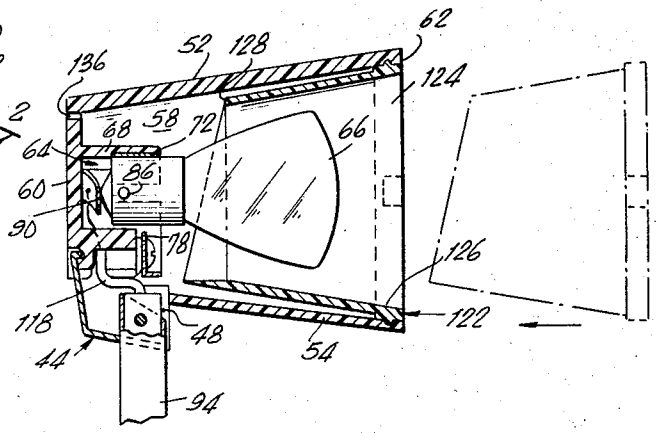


FIG. 2



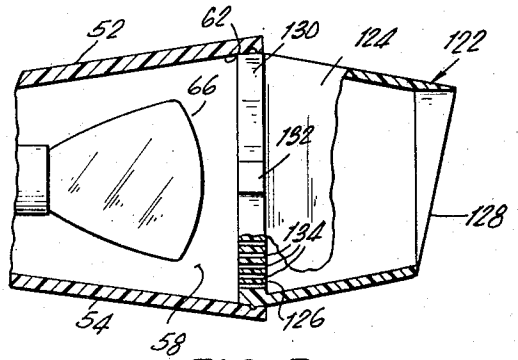


FIG. 3

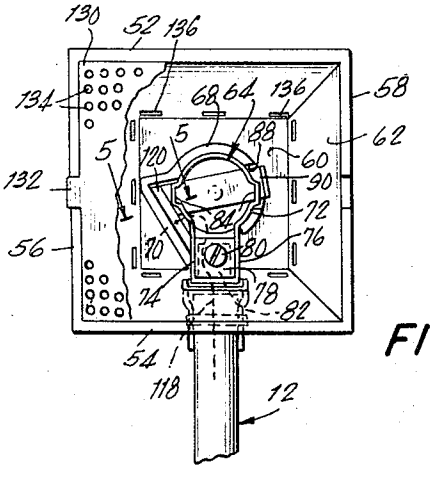


FIG. 4

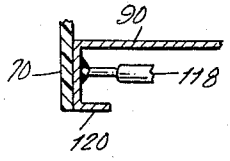


FIG. 5

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MINIATURE HIGH INTENSITY LAMP

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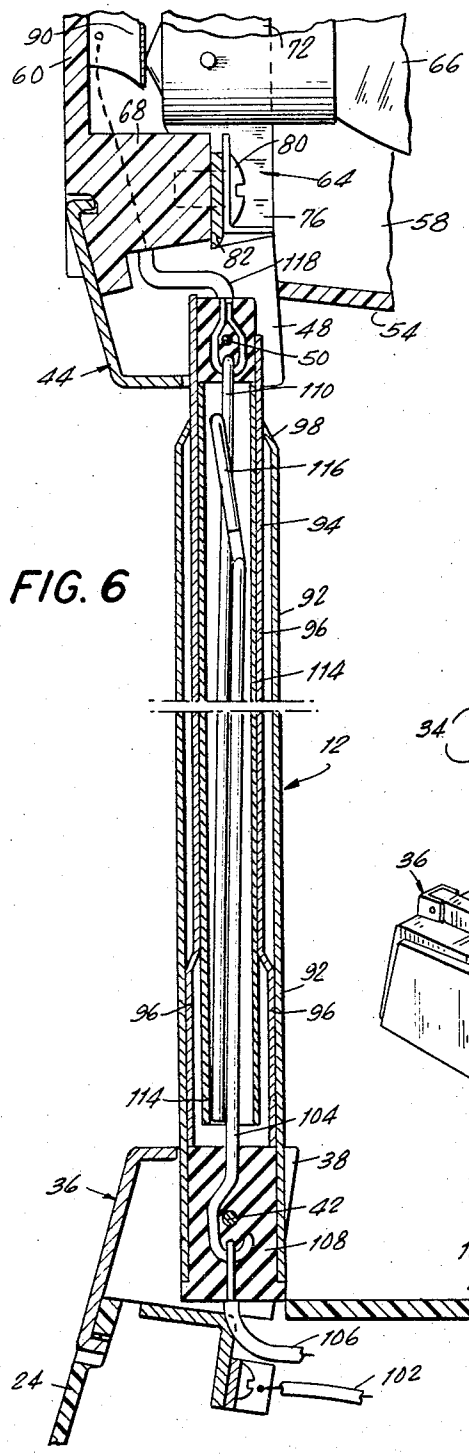


FIG. 6

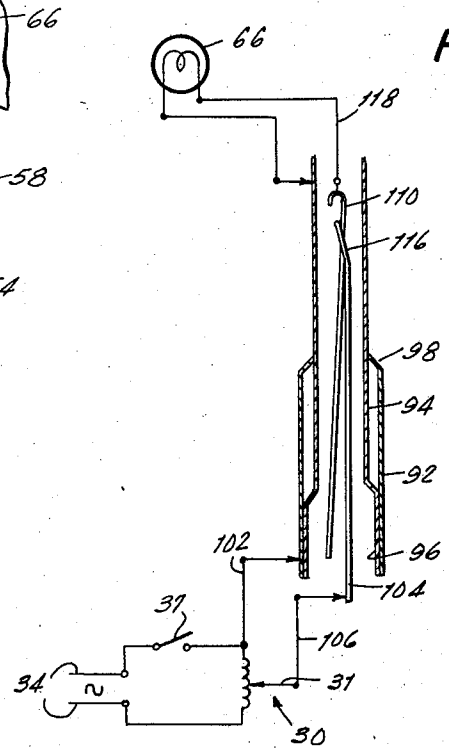


FIG. 7

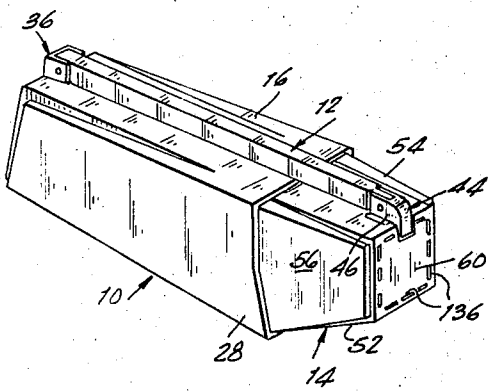


FIG. 8

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MINIATURE HIGH INTENSITY LAMP

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4 Claims. (Cl. 240—81)

This invention relates generally to miniature high intensity lamps of the portable compact type used to illuminate a selectively small area with a concentrated beam of light. More particularly, the invention relates to a novel and improved lamp of this type wherein the illumination may be varied in infinite steps, the diameter of the light beam emitted may be selectively adjusted, and the lamp head may be positioned in a wide variety of desirable positions through the use of telescoping arms and swivel joints in which internal wiring is omitted.

Miniature high intensity lamps are presently enjoying widespread popularity because they offer advantageous features not readily available in conventional table lamps. These lamps are small in size so that they may be readily moved from place to place and are normally capable of being folded into compact form for storage, shipping and transportation. In addition, the lamp head is usually so mounted that it may be set in a wide variety of adjusted positions to direct the concentrated beam on the work or reading area. Many of these inherent advantages, however, result in consequent drawbacks. Thus, in conventional lamps of this type, the intensity of the beam cannot be varied, or at most can be varied between maximum illumination and an intermediate illumination. Accordingly, the light beam may be too weak or too strong for a particular situation. Additionally, the head of the lamp is usually pivotally mounted on the base of the lamp by an arm. A wire extends through the arm to connect a light socket in the head to electric circuit elements in the base. Every time the head is pivoted, the wire is flexed accordingly. As a result, it has been found that these wires break after relatively short use of the lamp thereby necessitating expensive repairs.

An object of the present invention is to provide a miniature high intensity lamp having an extensible arm which pivotally mounts a head and contained bulb socket on a base, wherein an extensible conductor provides a path for the flow of current between the socket and electric circuit elements in the base. Thus, the present lamp is not subject to wire fatigue which would render the lamp inoperative as are lamps used heretofore.

Another object of the present invention is to provide a miniature high intensity lamp wherein the illumination produced by the lamp may be varied in infinite increments from no illumination to a maximum illumination to provide a highly versatile miniature lamp which can be used in a multitude of different situations.

Other objects and features of the present invention reside in the novel construction of the lamp head which is provided with a reversible reflector for varying the area illuminated by the emitted beam of light.

Additional objects and advantages of the present invention will become apparent from a consideration of the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a miniature high intensity lamp constructed according to the present invention; the lamp being shown in open condition with its telescoping arm extended;

FIG. 2 is a sectional view, to enlarged scale, of the head portion of the lamp taken along the line 2—2 of FIG. 1, the reflector being shown in full line in wide-beam inserted position, and in phantom to show the manner in which it is inserted;

FIG. 3 is a view similar to FIG. 2 illustrating the reflector portion of the head oriented in the narrow beam position;

FIG. 4 is a partial front elevational view of the head portion of the lamp with a portion of the reflector broken away to show the light socket;

FIG. 5 is a sectional, detail view, to enlarged scale, of the light socket connection, taken along the line 5—5 of FIG. 4;

FIG. 6 is a vertical section to enlarged scale, through the telescoping arm portion of the lamp, as well as through a portion of head and base thereof;

FIG. 7 is a partial schematic circuit diagram showing the electrical connections of the lamp shown in FIG. 1; and

FIG. 8 is a perspective view of the lamp shown in FIG. 1, in its fully closed position.

In a sense, the miniature high intensity lamp of the present invention includes a telescoping arm which pivotally mounts a head on a base. The head contains a light socket connected to electric circuit elements in the base by an extensible conductor that is received in the arm. The circuit elements include an autotransformer that varies the potential applied to the light socket in infinite steps to vary the illumination produced by the lamp from a minimum to a maximum. Additionally, as a feature of the present invention, a reversible reflector having a tapering bore is provided so that the area illuminated by the lamp may be increased or decreased by changing the orientation of the reflector.

Referring now in detail to the drawings, and in particular to FIG. 1, there is shown a miniature high intensity lamp made in accordance with the invention and generally comprising a base **10** pivotally mounting an arm **12** carrying a head **14**.

The base **10** has a top wall **16**, a bottom wall **18**, a pair of side walls **20** and **22**, and a rear end wall **24**. The top and bottom walls **16** and **18** and the side walls **20** and **22** all taper outwardly from the rear end wall **24** to the front end of the base **10**, providing an enlarged front open end **26**. As shown in FIG. 1, the front open end **26** is closed off by a cover panel **28** secured therein and recessed at a slight rearward inclination from its bottom edge to its top edge. The base **10** is normally adapted to lie in the horizontal position shown in FIG. 1, with the bottom wall **18** resting upon a flat support surface.

The base **10** is hollow, and within its front end portion contains an auto transformer **30** (shown schematically in FIG. 7), the movable secondary tap **31** of which is controlled by a manually-adjustable knob **32** rotatably mounted in the cover panel **28**. The rear end portion of base **10** is empty and forms a storage compartment for receiving a line cord **34** connected within base **10** to the primary winding of auto transformer **30** and terminating in the usual plug (not shown) adapted to be received in the standard socket of a source of line current. A single-pole single-throw switch **37** is serially connected between the line cord **34** and the auto transformer **30** as shown in FIG. 7, the switch **37** serving as an on-off switch to control the energization of the lamp. The switch **37** is advantageously operated by the knob **32**.

At its rear end, the base **10** mounts a metal bracket **36** comprising a pair of parallel plates **38** and **40**. Received between the plates **38** and **40** is the lower end of the arm **12** which is pivotally connected to the bracket **36** by a pivot pin **42**. Depending from the rear end of the head **14** is a metal bracket **44** comprising a pair of parallel plates **46** and **48**. Received between the plates **46** and **48** is the upper end of the arm **12** which is connected to the bracket **44** for pivotal movement with respect thereto by a pivot pin **50**.

The head 14 has a top wall 52, a bottom wall 54, a pair of side walls 56 and 58 and a rear end wall 60. Similarly to the base 10, the top and bottom walls 52 and 54 and the side walls 56 and 58 all taper outwardly from the rear end wall 60 to the front end of the head 14, providing an enlarged front open end 62. The front end of the head 14 is sized to fit within the open end 26 of the base 10. Thus, when the lamp is not in use, the head 14 may be pivoted about the axes of the pivot pins 42 and 50 and inserted in the opening 26, as shown in FIG. 8, to provide a compact unit. In this position, the lamp bulb is covered and protected from damage.

Mounted within the head 14 on the rear end wall 60 thereof is a socket 64 adapted to receive a high intensity light bulb 66. The socket 64 comprises a partially circular forwardly extending insulating support member 68 which may be integral with the rear wall 60 and which includes a downwardly and inwardly inclined wall 70. Received within the member 68 is a conducting ring 72, forming the body of the socket and communicating with a lower rectangular portion formed by parallel plates 74 and 76 connected by a traverse plate 78. The plate 78 overlies an arm 82 integral with and forming a part of the bracket. A screw 80 is received through apertures in the plate 78 and the arm 82 and is threadedly retained in the member 68 (FIG. 6) to maintain the ring 72 in good electrical contact with the bracket 44. The ring 72 is provided with diametrically opposed grooves 84 which receive respective radially projecting pins 86 on the base of the light bulb 66 to provide a conventional bayonet-type mounting for the light bulb. Provided on the rear end wall 60 of head 14 and received in a groove 88 in the member 68 is a spring metal contact strip 90 adapted to engage the central conductor in the base of the light bulb and provide good electrical contact therewith. Thus, the conducting ring 72 provides one electrical terminal connection to the light bulb 66 and the strip 90 provides the other, in the conventional manner.

Conventionally, in high intensity lamps, the light socket is usually connected to the electric circuit elements in the base through wires which extend through the arm 12. However, as noted above, these wires tend to break after repeated use of the lamp, thereby rendering the lamp completely inoperative. This disadvantage is avoided in the present invention by the elimination of wiring in the lamp arm through the provision of the novel construction described below.

The arm 12 is made of metal and forms one lead for the flow of current between the auto transformer 30 and the light socket 64. More particularly, the arm 12 comprises telescoping sections including a hollow lower arm 92 of square cross-section which is connected to the bracket 36, and a hollow upper arm 94 which is of circular cross-section and is connected to the bracket 44. The upper arm 94 is slidably received within the arm 92 and the lower portion thereof is flared outwardly at 96 (FIG. 6) into sliding engagement with the inner wall surfaces of the arm 92 to provide a good eelctrical contact therebetween. The upper end of the arm 92 is bent over at 98 and is adapted to engage the portion 96 to limit the outward telescoping movement of the arm 94 relative to the arm 92. Thus, the length of the arm 12 may be varied in the directions indicated by the double headed arrow 100 by sliding the arm 94 into or out of the arm 92. Additionally, the arm 94 may be rotated with respect to the arm 92 so that the head 14 may also be moved in the rotational direction indicated by the arrow 102.

One end of the transformer 30 is connected to the bracket 36 by a lead 102 (FIGS. 6 and 7). Since the brackets 36 and 44 and the arm 12 are metal, they provide a path for the flow of current from the transformer to the conducting ring 72, which is connected to the bracket 44. To insure a good electrical connection between the respective brackets 36 and 44 and the arm 12, the parallel plates 38 and 40 and the plates 46 and 48

grip the respective ends of the arm 12 in tight frictional engagement. This frictional engagement also maintains the arm 12 in any selected orientation with respect to the base 10 or the head 14.

The movable tap 31 of the transformer 30 is connected by a lead 106 to the end of a metal rod 104 which extends centrally within the lower arm 92. The lower end of the rod 104 is received in an insulating block 108 secured within the bottom end of the lower arm 92, the block 108 maintaining the rod 104 immovably centered in spaced relation to the walls of the arm 12 and, therefore, insulated therefrom. In a similar manner, a rod 110 extends centrally downward through the upper section 94 and at its upper end is securely mounted in an insulating block 112 which is secured within the upper end of arm section 94. A tube 114 of insulating material is mounted within the section 94 and prevents contact between the rod 110 and the conductive wall of section 94. The upper end of the rod 104 is provided with a hooked portion 116 which surrounds the rod 110 and is in slidable engagement therewith. Additionally, the rods 104 and 110 are coextensive with the respective sections 92 and 94 of the arm 12 so that the two rods are always in contact with each other regardless of the telescoped position of the arm 12. That is to say, when the upper arm section 94 is withdrawn from or retracted into the lower arm section 92, the upper rod 110 moves correspondingly relative to lower rod 104, but the hooked end 116 of the rod 104 makes wiping contact with the rod 110. The upper rod may also be freely rotated relative to the lower arm, without disrupting the electrical contact therebetween, so that the lamp head is provided with a wide degree of adjustment.

The end of rod 110 is connected within the insulating block 112 to a lead 118, which in turn is connected to the socket contact strip 90. As shown in FIGS. 4 and 5, the lead 118 extends along the wall 70 and is connected to the strip 90 as by soldering. An insulating member 120 overlies the lead 118 to maintain the lead immovably in position.

Accordingly, the potential across the secondary winding of the auto transformer 30 is applied across the light socket 64 through the circuit which includes the sections 92 and 94 of the arm 12 and the sliding conducting rods 104 and 110. Additionally, the amount of potential applied across the socket 64 may be varied in infinite steps by adjusting the movable tap 31 thereby to vary the illumination of the light 66 between zero and a maximum value in infinite increments.

In accordance with a further feature of the present invention, a reversible reflector 122 having a tapering bore is provided so that the diameter of the beam of light may be varied depending upon the area to be illuminated. More particularly, as shown in FIGS. 2, 3 and 4, the reflector 122 comprises a tapering frusto-conical wall 124 which defines a bore having an enlarged end 126 and an end 128 of smaller diameter. The edge of end 128 is inclined rearwardly from top to bottom as viewed in FIG. 2. Additionally, the end 126 of the reflector 122 is provided with an outwardly extending flange 130 sized to fit within the open end of the head 14 to close the same. Laterally extending tabs 132 are provided on the flange 130, these being sized for frictional insertion and retention within complementary formed grooves 134 in the respective side walls 56 and 58 of the head 14 to releasably connect the reflector 122 to the head. The flange 122 is provided with a plurality of vent holes 134 and the rear wall 60 of the head 14 is similarly provided with a plurality of vent holes 136 to allow the heat produced by the light bulb 66 to dissipate into the surrounding atmosphere.

When it is desired to illuminate a relatively large area, the reflector 122 is mounted on the head 14 with the wall 124 extending into the interior of the head and the small end 128 of the bore surrounding the light bulb 66, as

shown in FIG. 2. Thus, the light from said bulb will be directed through the outwardly tapering bore of the reflector to produce a wide beam having a relatively large diameter.

On the other hand, the reflector **122** may be reversed and the flange **130** mounted in the open end of the head **14** with the frusto-conical wall **124** projecting forwardly of the head, as shown in FIG. 3. In this instance, the beam of light produced by the light bulb **66** will be directed through the inwardly tapering bore of the reflector **122** to produce a beam of light having a relatively small diameter. This small spot of light is particularly advantageous for close work.

Accordingly, a compact miniature high intensity lamp has been provided wherein the illumination of the lamp may be varied in infinite steps to provide a versatile lamp that is adaptable for practically all uses. Additionally, the area of the beam produced by the lamp of the present invention may be varied simply by reversing the reflector to further increase the use of the lamp.

While a preferred embodiment of the invention has been shown and described herein, it will be obvious that numerous omissions, changes and additions may be made in such embodiment without departing from the spirit and scope of the present invention.

I claim:

1. A miniature high intensity lamp comprising a base, an arm having one end pivotally mounted on said base, said arm comprising telescoping sections whereby the total length of said arm may be varied, a head pivotally connected to the other end of said arm, a light socket in said head adapted to receive a high intensity light therein, hollow reflecting means having inclined side walls defining a conically-shaped reflector having a tapering bore, mounting means for releasably mounting said reflecting means on said head in a first position wherein the smaller end of said tapering bore is nearest said light socket and a second position wherein the enlarged end of said tapering bore is nearest said light socket, and circuit means for selectively connecting said light socket with a source of potential to illuminate a light received in said socket.

2. A miniature high intensity lamp according to claim **1** in which said head has a front open end and said conically-shaped reflector has an elongated body sized for insertion within the front open end of said head and to fit entirely recessed within said head surrounding said high intensity light when mounted in said second position, said reflector being also adapted to project forwardly of said head, remote from said light when reversed and mounted in said first position.

3. A miniature high intensity lamp according to claim **2** in which said mounting means includes an enlarged terminal peripheral flange at the enlarged end of said conically-shaped reflector, and said mounting means includes lateral tabs projecting from said flange and adapted to be frictionally and releasably retained in complimentary grooves in the front open end of said head in both the first and second mounted positions of said reflector.

4. A miniature high intensity lamp according to claim **2** in which said base has a recessed front panel defining a continuous forwardly-projecting marginal flange, said head being sized and adapted to be brought to a retracted position in which the front open end of said head is received within the recessed portion of the base defined by said marginal flange with said reflector mounted in said second position, whereby to provide a compact unit with said reflector and high intensity light enclosed and protected when said lamp is not in use.

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