

June 11, 1968

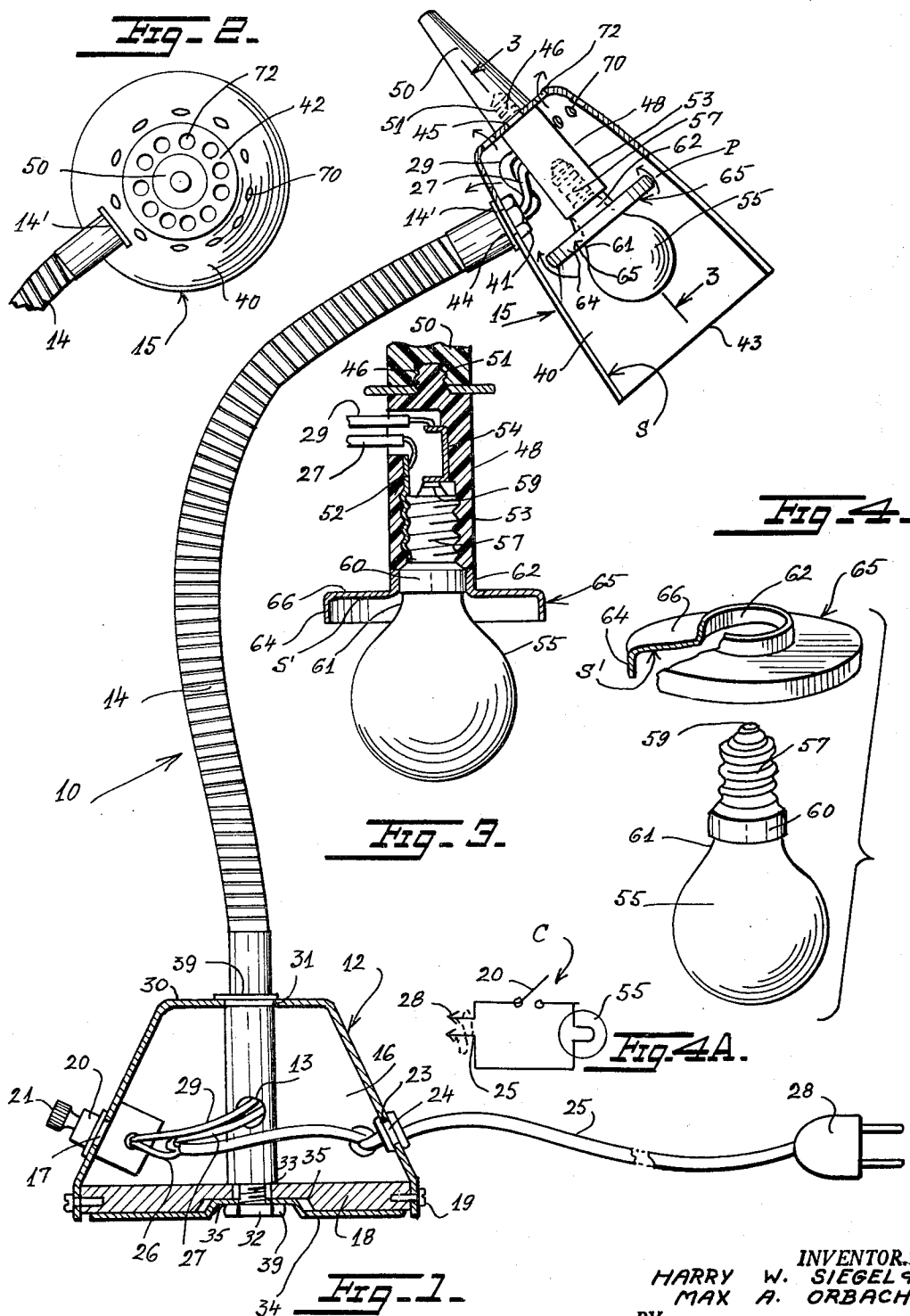
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3,388,249

HIGH INTENSITY LAMP BULB AND LAMP

Filed Feb. 5, 1965

4 Sheets-Sheet 1



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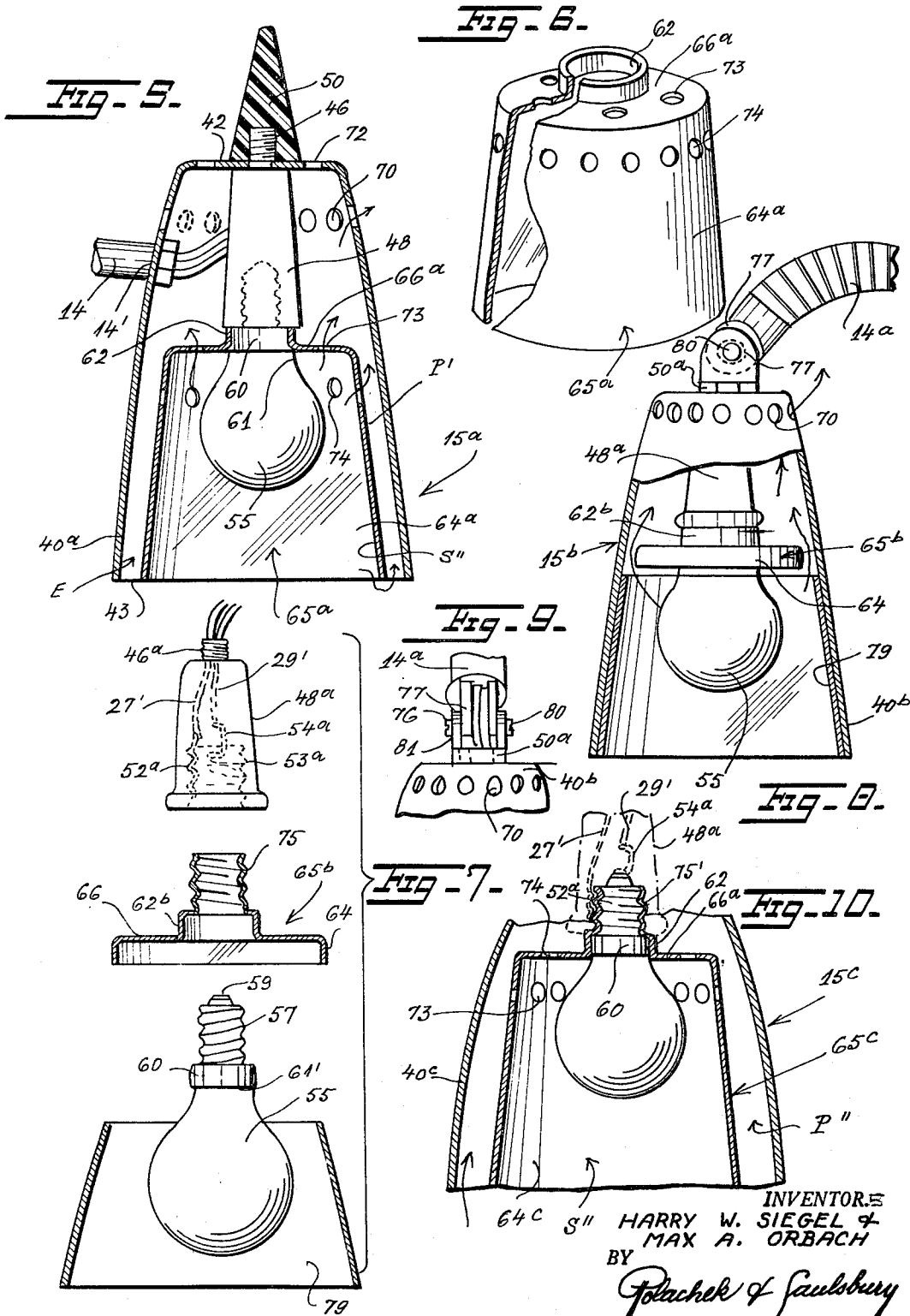
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4 Sheets-Sheet 2



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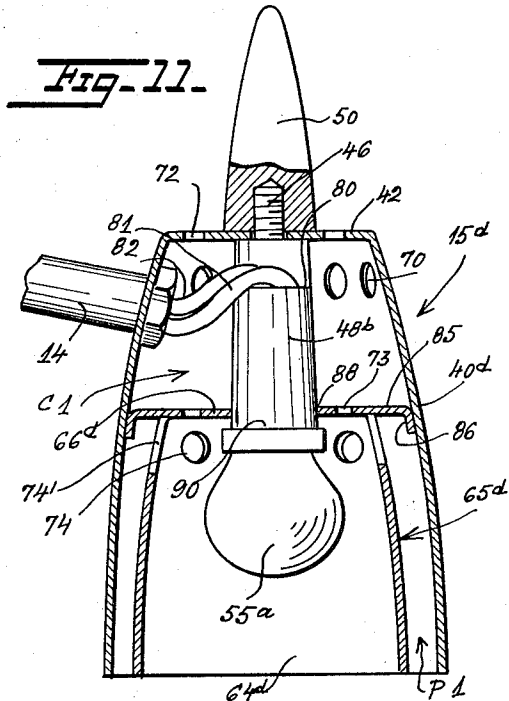
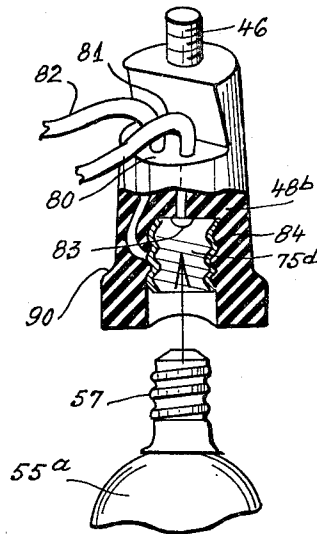
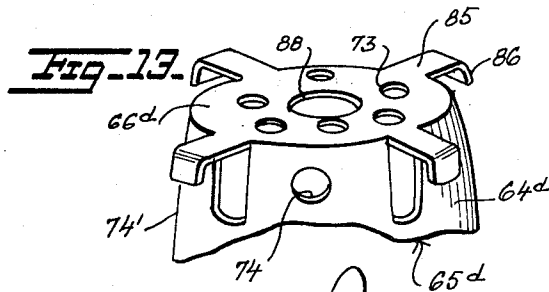
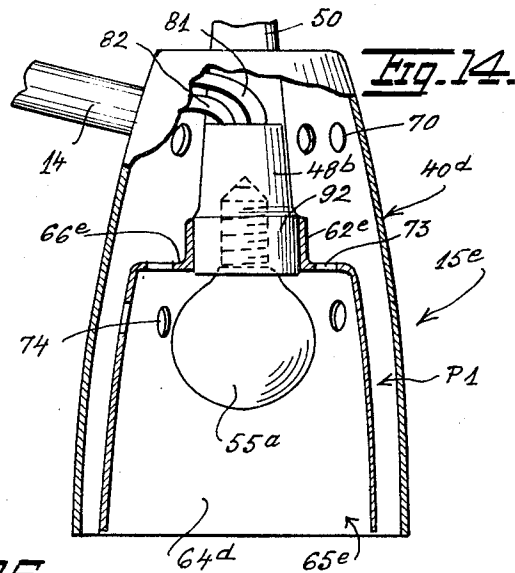
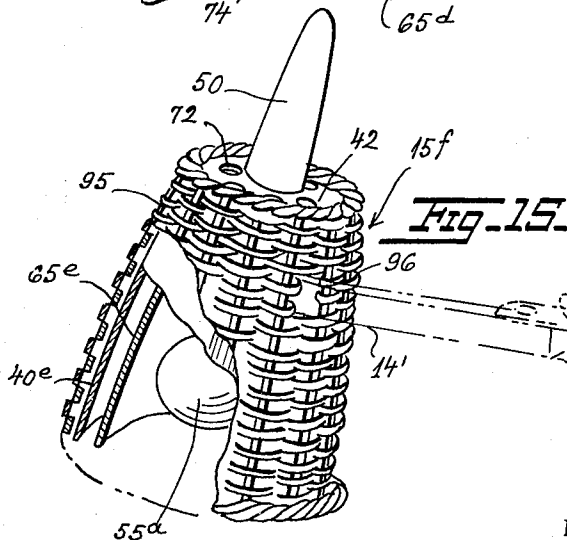
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4 Sheets-Sheet 4

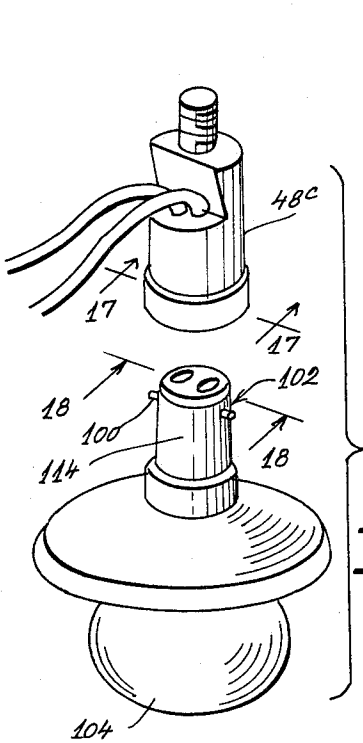
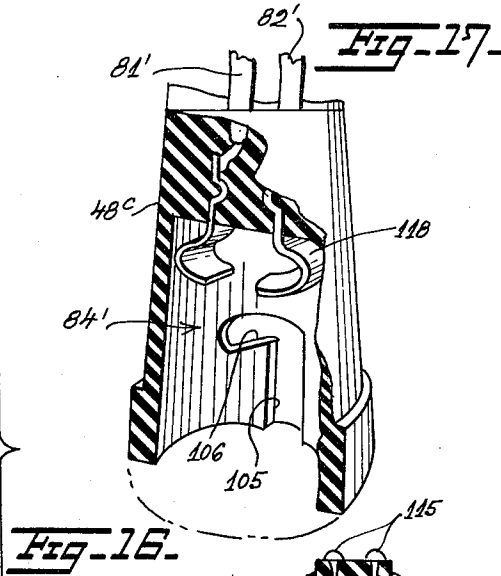
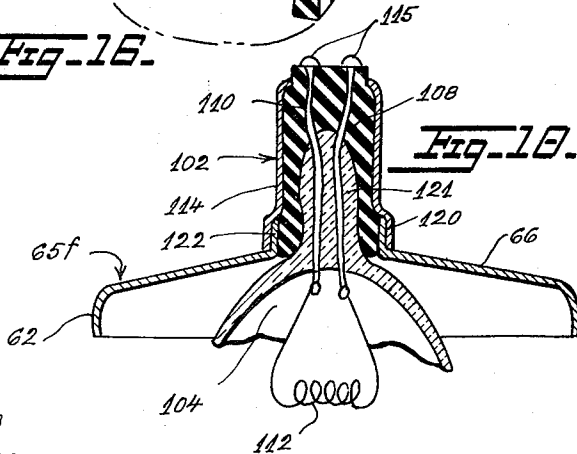
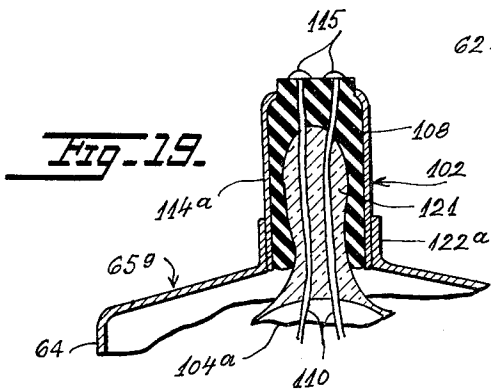
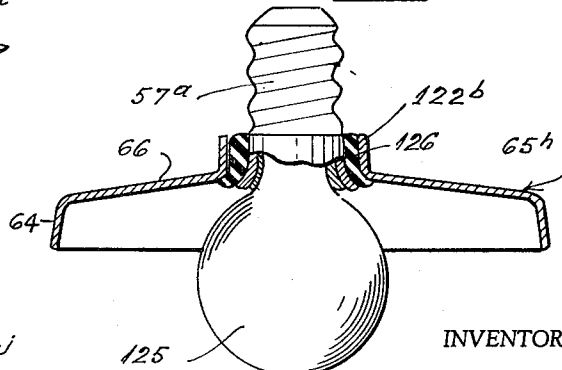
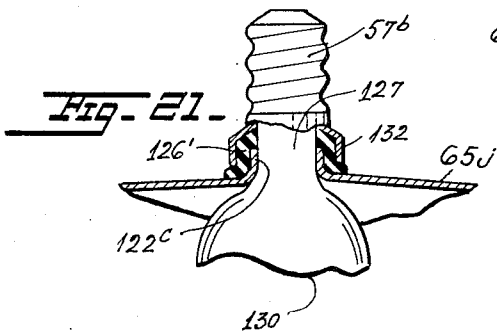


Fig. 20.



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**HIGH INTENSITY LAMP BULB AND LAMP**  
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3 Claims. (Cl. 240—81)

## ABSTRACT OF THE DISCLOSURE

A head for a portable miniature desk lamp, said head having a hollow tapered casing closed at its narrow end and serving as a lampshade. The casing has a reflecting inner surface. Means is provided for mounting a lamp bulb on the closed end inside the casing, and means is provided for connecting the lamp bulb to a source of electric motive force. A separate reflector device is supported by the neck of the lamp bulb.

This invention relates to the art of miniature projection lamps and more particularly concerns a transformerless projection lamp having novel heat and light reflection means.

Conventional projection lamps of the miniature type employ electric bulbs operating on twelve volts A.C. In order to operate such an electric bulb from 115-volts A.C. means a step-down transformer is installed in the base of the lamp. This transformer is objectionable for numbers of reasons. It adds to the cost of manufacture and to the weight of the lamp. The transformer heats up with continued use and wastes power. If it overheats it burns the table or desk top on which it rests causing serious damage to furniture. The transformer may burn out itself, making a costly replacement necessary. The transformer hums while the lamp is lighted which is objectionable. The lamp base must be made more massive than is otherwise necessary to accommodate the transformer.

The present invention is directed at overcoming the above and other difficulties and disadvantages in miniature projection lamps by providing an improved transformerless portable lamp.

An incandescent lamp bulb having a high light emission intensity also has a high level of heat dissipation. This heat must be safely conducted away from the lamp while it is in continuous operation. The problem of heat dissipation is especially severe when the lamp bulb is installed in a small lamp shade which is comparable in size with the lamp bulb itself. In the present invention this problem is solved by a novel construction of the base of the lamp bulb and by a novel construction of the internal reflector of the lamp.

One object of the invention is to provide a miniature portable projection lamp having a head in which is a lamp bulb having a miniature base surrounded by a reflector and supported in a socket carried by a parabolic perforated lamp shade.

Another object is to provide a miniature projection lamp as described wherein the internal reflector is spaced radially from the shade to provide a path for heat to escape through perforations in the shade.

A further object is to provide a lamp as described wherein the reflector includes a conical member inside the shade.

Still another object is to provide a lamp as described wherein the reflector includes a threaded bushing which receives the base of the lamp and which screws into the socket.

A further object is to provide a miniature projection lamp having a miniature base supported in a socket mounted in an insulated holder, the insulated holder

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being carried by a parabolic perforated lamp shade, with an internal reflector carried by the lamp shade and surrounding the lamp and holder.

Another object is to provide a miniature projection lamp with a lamp shade surrounded by a woven wicker heat shield.

Another object is to provide a miniature projection lamp having a miniature base supported in a socket mounted in an insulated holder, the lamp being surrounded by a reflector secured to the insulated holder, with a parabolic perforated lamp shade surrounding the insulated holder, lamp and reflector and engaged with the insulated holder.

Another object is to provide a miniature lamp having an insulated base portion with a reflector surrounding the lamp and secured to the insulated base portion.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a side view partially in section of a lamp embodying the invention.

FIG. 2 is a fragmentary top view of the lamp.

FIG. 3 is an enlarged sectional view taken on line 3—3 of FIG. 1.

FIG. 4 is an exploded perspective view of lamp bulb and reflector parts of the lamp, with a portion of the reflector being broken away.

FIG. 4A is a diagram of the electric circuit of the lamp.

FIG. 5 is a sectional view of the head of another lamp.

FIG. 6 is a perspective view, with parts broken away, of the reflector employed in the lamp head of FIG. 5.

FIG. 7 is an exploded perspective view of parts of another lamp.

FIG. 8 is a side view partially in section of a lamp head employing the parts of FIG. 7.

FIG. 9 is a fragmentary side view of the lamp head of FIG. 8.

FIG. 10 is a sectional view of part of another lamp head.

FIG. 11 is a sectional view similar to FIG. 5 of another lamp head.

FIG. 12 is an exploded perspective view of parts of the lamp head of FIG. 11 including portions of a lamp and lamp holder.

FIG. 13 is a perspective view of part of a reflector employed in the lamp head of FIG. 11.

FIG. 14 is a sectional view of another lamp head.

FIG. 15 is a perspective view of a further lamp head, parts being broken away, and part of a support being shown in dotted lines.

FIG. 16 is an exploded perspective view of another lamp holder and lamp, with attached reflector.

FIG. 17 is an enlarged fragmentary sectional view taken on line 17—17 of FIG. 16.

FIG. 18 is an enlarged fragmentary sectional view taken on line 18—18 of FIG. 16.

FIG. 19 is a fragmentary sectional view similar to FIG. 18 of another lamp.

FIG. 20 is a sectional view partially in side elevation, of still another lamp.

FIG. 21 is a fragmentary sectional view similar to a part of FIG. 20, of a further lamp.

Referring first to FIGS. 1—4, there is shown a miniature, portable, table or desk lamp 10 including a base 12, a conduit 14 such as a flexible gooseneck, and lamp head 15. The base includes a frustoconical shell 16 with closed top and open bottom. A massive circular base plate 13

is held in the wide open end of the shell by screws 19. In one side of the shell 16 is a hole 17 in which is mounted a switch 20 having an operating knob 21. At the opposite side of the shell is a hole 23 in which is a grommet 24 through which passes a power cord 25 having two wires 26, 27. The power cord terminates outside the base in a plug 28 which can be inserted into a suitable 110-220 volts power supply.

One wire 26 is connected to the switch 20. The other wire 27 along with wire 29 from the switch extends through hole 13 and the gooseneck 14. The gooseneck extends below flange 39 through a hole 31 in the top 30 of the base. The bottom end 33 of the gooseneck is threaded. A smooth bottom plate 34 is engaged under plate 18 by a nut 32 on end 33 of the gooseneck. Nut 32 is set in a recess 35 in plate 34.

The lamp head 15 has an outer parabolic shade 40 which has a closed narrower end 42 and a wider open end 43. The upper flanged end 14' of the gooseneck is connected to the side wall of the shade by a nut 41 which engages the end of the gooseneck extending through hole 44 in the shade. In the end 42 of the shade 40 is a central hole 45 through which extends a threaded bolt 46 secured to the upper end of a generally cylindrical insulated socket 48. An elongated nut 50 with a threaded recess 51 at one end engages the bolt and holds the socket securely in the shade.

Wires 27, 29 terminate at the socket and are connected to lateral contact member 52 and central contact member 54 seated inside the socket. The socket has an internally threaded seat 53 in which members 52 and 54 are exposed.

Lamp bulb 55 has a base with a narrow threaded plug portion 57. The plug portion screws into the socket seat 53. The electrically conductive plug portion contacts member 52. Central terminal 59 of the lamp bulb contacts the contact member 54. By this means electric power is applied to the lamp bulb. The lamp bulb is clear or frosted.

The lamp bulb is located forwardly of the socket near the open end of the shade. The internal surface S of the shade is aluminized, or coated with a highly polished material which is a good reflector of both light and heat rays. The lamp bulb base has a cylindrical shoulder 60 located just above the neck 61 of the bulb, and below the threaded plug portion 57. On this shoulder fits frictionally the cylindrical neck 62 of a reflector 65. Neck 62 is lined with insulation as indicated at 63. The reflector has a circular portion 66 which extends radially outward of the neck 62. A narrow cylindrical flange or skirt 64 is formed at the outer periphery of circular portion 66. The inner surface S' of the reflector is highly polished, aluminized, painted white or otherwise treated to be a good reflector of light and heat rays. The diameter of the reflector is slightly less than the internal diameter of the shade 40 at the point where the reflector is located axially of the shade. The space between the reflector and shade constitutes a cylindrical path P all around the reflector between the reflector and the lamp shade. Heated air can pass through path P upwardly in the shade to leave by holes 70 spaced circumferentially around the shade near its end 42. The heated air can also pass out of holes 72 disposed in a circle in the end 42 of the shade, around the nut 50.

FIG. 4A shows the electric circuit C of the lamp. The lamp bulb 55 is connected in series with switch 20, power cord 25 and plug 28.

During operation of the lamp 10, air heated by the lamp bulb, air heated by heat reflected from the surface S' of the reflector 65 and air heated by heat rays reflected from surface S of the shade 40 pass upwardly by convection through the cylindrical path P and out of the shade through holes 70 and 72. A certain amount of heat is also conducted away from the heated shade by air surrounding the shade. In any event the light re-

flected from the reflector surface S' along with light reflected from surface S of the shade pass out of the open end of the shade along with light radiated directly outward by the lamp bulb. Since part of the heat generated along with the light passes upwardly of the shade opposite to the direction along which the light is projected, the light is accompanied by less heat than if no reflection means were provided. The lamp base provides a convenient support for the internal reflector. The short skirt 64 of the reflector insures that no light passes rearwardly of the reflector while heated air can pass rearwardly through the path P.

In FIG. 5 is shown a lamp head 15a which is identical to lamp head 15 and corresponding parts are numbered alike. Shade 40a may extend different distances from the lamp bulb 55. The reflector 65a has an axially elongated skirt 64a which extends down to the open end of the shade; see FIG. 5. A cylindrical passage P' is provided around the skirt 64a for passing heated air upwardly to holes 70, 72 in the shade. Holes 73 are provided in the circular end 66a of the reflector and holes 74 are provided in the skirt 64a near end 66a to pass heated air outwardly and upwardly of the reflector opposite to the direction of light projection. The skirt 64a is generally conical or flaring in shape. The internal surface S' of the reflector 65a is highly polished to reflect light and heat rays with maximum efficiency. Since a draft of air enters the end E of path P heat rays projecting forwardly will heat this air so that a good deal of heat will pass up through the shade and out through holes 70, 72 and will not be projected forwardly. The lamp 10a thus projects less than conventional lamps without such a reflector.

In FIGS. 7-9 is shown a lamp head 15b in which reflector 65b is an electrically conductive member with a threaded bushing 75 extending upwardly from the cylindrical neck 62b. This bushing screws into the threaded recess 53a in insulated socket 48a. The threaded plug portion 57 of the lamp base screws into the bushing 75. The shoulder 60 of the lamp bulb seats in the neck 62b. Contact member 52a in the socket contacts bushing 75. Contact member 54a contacts the central terminal 59 of the lamp bulb. The wires 27' and 29' connected to the contact members pass out of the socket through a threaded fitting 46a at the upper end of the socket. Nut 50a engages this threaded fitting on top of reflector 40b. On top of the nut are two apertured ears 76 which engage apertured ears 77 extending from the end of gooseneck 14a. The head 15b is pivotable on a screw 80 engaging the ears 76, 77. Screw 80 is engaged by a nut 81. A highly polished internally reflecting flaring liner 79 is frictionally fitted inside shade 40b and terminates just short of reflector 65b. This liner is a very efficient reflector of light and heat rays. Other parts corresponding to those of lamp heads 15 and 15a are identically numbered.

In FIG. 10 is shown another reflector 65c which is similar to reflectors 65a and 65b and corresponding parts are identically numbered. Reflector 65c has an axially elongated skirt 64c which has a highly reflective internal surface S'' and is provided with hot air releasing holes 73, 74 as in reflector 65a. Reflector 65c has a threaded bushing 75' like bushing 75 of reflector 65b. The elongated skirt 64c of the reflector will serve like skirt 64a to reflect light and heat, but a considerable part of the heat will be used to heat the air passing through the reflector and around the reflector in passage P'' between the reflector and shade 40c.

In FIG. 11, lamp head 15d includes parabolic lamp shade 40d supported by conduit 14. The narrower end 42 of the lamp shade supports insulated socket 48b. This socket has a step 80 out of which extend wires 81, 82. Wire 81 terminates at a central terminal 83 in cavity 84. Wire 82 terminates at bushing 75d in cavity 84 spaced from the central terminal; see FIG. 12. The narrow threaded plug portion 57 of the lamp bulb 55a screws

into the bushing. Nut 50 engages bolt 46 and holds the socket and lamp bulb axially centered inside the lamp shade. Reflector 65d as best shown in FIGS. 11 and 13 has a tapered generally parabolic skirt 64d depending from prongs 85 struck out of the upper end of the reflector and extending radially outward. Ends 86 of the prongs are bent downwardly and frictionally engage the inner side of shade 40d. The prongs hold the reflector in spaced concentric radially spaced from the shade to define a path P1 for heated air around the reflector to the chamber C1 from which heated air passes out of holes 70 and 72 in the side and end of the lamp shade. A hole 88 is centrally formed in the end 66d of the reflector. The socket 48b receives the end 66d of the reflector with the rim of hole 88 engaging frictionally around the socket just above annular step 90, which prevents the reflector from coming off the tapered body of the socket. Heated air passing directly upward from the lamp bulb 55a passes through holes 73 at end 66d of the reflector and through lateral holes 74, 74' in the upper end of skirt 64d. Pins 100 are secured to the shell 114 near its upper end. (see FIG. 16.)

Lamp head 15e (FIG. 14) is similar to lamp head 15d and corresponding parts are identically numbered. Parabolic reflector 65e is formed with a neck 62e on end 66e. The neck fits on the enlarged base portion 92 of the socket 48b in the tight frictional engagement.

In FIG. 15 is shown a lamp head 15f which may employ any of the parabolic lamp shades 40-40d and reflectors 65a-65e heretofore described. Here lampshade 40e is enclosed in a woven wicker tube 95 which is open at bottom and top ends. The tube serves as a heat shield to prevent contact between a person's hand and the heated lampshade. A lateral opening 96 in the tube permits conduit 14 or a bar 14' to be attached to the lampshade. A clamp having two arcuate spring fingers 98 can be secured to the outer end of bar 14'. A wing screw 99 may be engaged near the attached ends of the clamp fingers to enable the tension in the clamp to be adjusted when the clamp is engaged on a suitable support.

FIGS. 16, 17 and 18 show another socket 48c which is similar to socket 48b and corresponding parts are identically numbered. The socket has a cavity 84' adapted to receive bayonet pins 100 extending radially outward of the cylindrical base end 102 of lamp bulb 104. Opposed axially extending slots 105 are formed in the inner wall of the socket. These slots communicated with short circumferentially extending slots 106. Thus the bayonet end of the lamp bulb can be inserted axially and then turned circumferentially to lock the base end of the lamp bulb in the socket.

The base end of the lamp bulb includes a generally cylindrical insulator 108 through which pass wires 110 from the lamp filament 112; see FIG. 18. Around the insulator is secured a generally cylindrical metal shell 114. The shell terminates at its upper end short of the upper end of the insulator where terminals 115 of the lamp wires are exposed. The terminals 115 contact the bent ends of spring fingers 118 exposed in cavity 84' of the socket. Upper ends of the spring fingers are connected to ends of wires 81', 82' embedded in the upper end of the socket.

The lower end of the shell 114 is formed with an annular flange 120 inside which is secured by welding or otherwise neck 122 formed at the upper end end of reflector 65f. The reflector is thus secured to and forms a fixed part of lamp bulb 104. The reflector has a short depending annular skirt 64 like that of reflector 65 shown in lamp 10. Stem 121 of the lamp bulb is embedded in the lower part of insulator 108.

Lamp bulb 104a (FIG. 10) has a bayonet end 102 which is like that of lamp bulb 104 in FIG. 18. This bayonet end can fit into socket 48c. Shell 114a surrounding insulator 108 is cylindrical at its lower end, and the neck 122a of reflector 65g is secured around the lower

end of the insulator. Other parts corresponding to those of lamp bulb 104 are identically numbered.

Lamp bulb 125 shown in FIG. 20 has an insulator ring 126 securely attached to the bottom end of the threaded plug portion 57a of the lamp bulb. Secured to the outer side of this ring is the neck 122b of reflector 65h so that the reflector forms a fixed part of the lamp bulb. Skirt 64 depends axially around the bulb from the top end circular top end 66 of the reflector.

Lamp bulb 130 shown in FIG. 21 has an annular flange 132 formed at the lower end of threaded plug portion 57b. This flange surrounds insulator ring 126'. The neck 122c of reflector 65j surrounds the neck 127 of the bulb. The inner side of the ring 126' is secured to neck 122c.

By the arrangements shown in each of FIGS. 16-19, the reflector is insulated electrically from wires in the base end of the lamp bulb. In the arrangements of FIGS. 20 and 21 the reflector is effectively insulated electrically from the metal screw plug portion of the lamp bulb.

In all forms of invention described, the lamp bulb is energized directly from the high voltage power supply mains, without requiring use of a local transformer in the base of the lamp. The lamp heads use the internal reflectors to project reflected light forwardly while passing air heated by absorbed and reflected heat rearwardly. Thus substantially full utilization of all light generated by the lamp is obtained while the heat is dissipated safely and efficiently. If desired, the switch 20 in lamp 10 can be mounted on the shade of the lamp instead of on the base.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

What is claimed is:

1. A portable, miniature desk lamp, comprising a hollow base, a tubular conduit having one end mounted on the base and extending upwardly therefrom, a switch, an electric cord having wires connected in direct circuit with the switch and extending through said conduit, said cord terminating outside the base for connection to a high voltage power supply, a tubular flaring lamp shade having open and closed opposite ends, said conduit having its other end connected to the shade, an insulated socket supported in said shade, said wires terminating at said socket, contact members in the socket connected to the wires respectively, said socket having a threaded recess therein, said contact members being exposed in said recess, an electric bulb having an electrically conductive threaded end plug portion removably engaged in said recess in the socket in contact with one of the contact members, said plug portion having a central terminal in contact with the other contact member, a cylindrical shoulder formed on said plug portion; a reflector having an annular neck frictionally engaged on said shoulder, a circular portion extending radially outward of said neck, and a cylindrical skirt at the periphery of said circular portion extending axially away from said neck, said reflector having an external diameter less than that of the internal diameter of the shade to define a cylindrical passage for heated air between the reflector and shade; said shade having circumferentially spaced holes at its closed end for passing heated air out of the shade, said reflector having a highly polished surface facing the open end of the reflector to reflect light and heat rays, said shade having an opening at its closed end, a threaded fitting at one end of the socket extending through said opening, a nut engaged on said threaded fitting, and means pivotally engaging said other end of the conduit with the shade at the nut, said wires passing through said fitting to the socket.

2. A portable, miniature desk lamp, comprising a hollow base, a tubular conduit having one end mounted on the base and extending upwardly therefrom, a switch, an electric cord having wires connected in direct circuit with the

switch and extending through said conduit, said cord terminating outside the base for connection to a high voltage power supply, a tubular flaring lamp shade having open and closed opposite ends, said conduit having its other end connected to the shade, an insulated socket supported in said shade, said wires terminating at said socket, contact members in the socket connected to the wires respectively, said socket having a threaded recess therein, said contact members being exposed in said recess, an electric bulb having an electrically conductive threaded end plug portion removably engaged in said recess in the socket in contact with one of the contact members, said plug portion having a central terminal in contact with the other contact member, a cylindrical shoulder formed on said plug portion; a reflector having an annular neck frictionally engaged on said shoulder, a circular portion extending radially outward of said neck, and a cylindrical skirt at the periphery of said circular portion of the neck extending axially away from said neck, said reflector having an external diameter less than that of the internal diameter of the shade to define a cylindrical passage for heated air between the reflector and shade, said shade having circumferentially spaced holes at its closed end for passing heated air out of the shade, said reflector having a highly polished surface facing the open end of the reflector to reflect light and heat rays, said shade having an opening at its closed end, a threaded fitting at one end of the socket extending through said opening, a nut engaged on said threaded conduit with the shade at the nut, said wires passing through said fitting to the socket, said reflector having a threaded bushing extending axially from said neck and seated in said recess, said threaded plug portion being engaged in said threaded bushing, said skirt being elongated and extending to the open end of the shade.

3. A head for a portable, miniature desk lamp, having a tubular conduit with wires passing through said member, comprising a tubular flaring lamp shade having open and closed opposite ends, means for securing one end of said conduit to said shade with said wires extending inside said shade, a generally cylindrical insulated

socket, means for supporting said socket inside said shade in central axial alignment therewith with said wires terminating at said socket, contact members in the socket connected to the wires respectively, said socket having a threaded recess therein, said contact members being exposed in said recess, an electric bulb having an electrically conductive threaded end plug portion removably engaged in said recess in the socket in contact with one of the contact members, said plug portion having a central terminal in contact with the other contact member, a cylindrical shoulder formed on said plug portion; a reflector having an annular neck frictionally engaged on said shoulder, a circular portion extending radially outward of said neck, and a cylindrical skirt at the periphery of said circular portion extending axially away from said neck, said reflector having an external diameter less than that of the internal diameter of the shade to define a cylindrical passage for heated air between the reflector and shade; said shade having circumferentially spaced holes at its closed end for passing heated air out of the shade, said reflector having a highly polished surface facing the open end of the reflector to reflect light and heat rays, and a woven wicker tube surrounding said shade to serve as a heat shield therefor.

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