June 13, 1961 W. J. MISKELLA 2,988,634

HOLDER FOR ELONGATED INFRARED HEATING LAMP

Filed Feb. 5, 1958 2 Sheets-Sheet 1

Fig. 1.

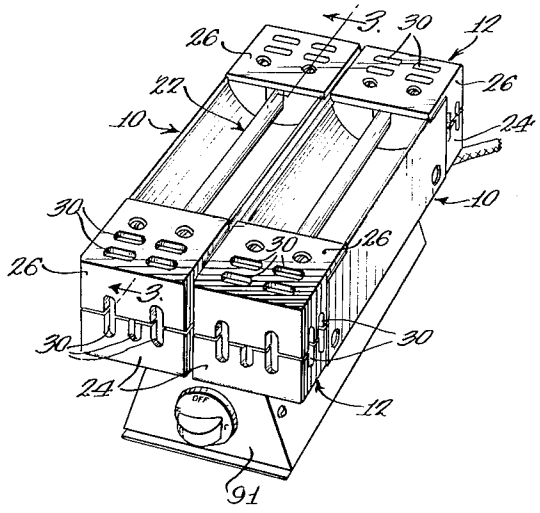


Fig. 2.

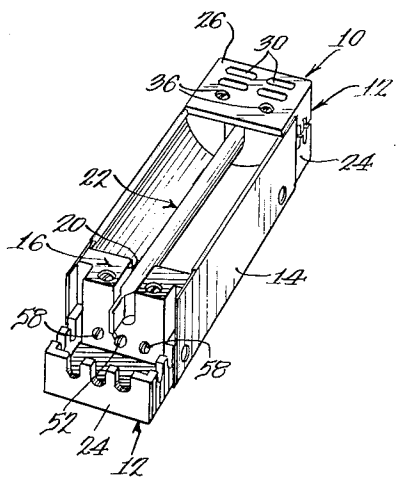


Fig. 7.

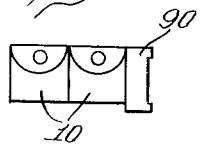


Fig. 8.

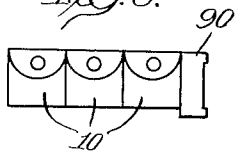


Fig. 9.

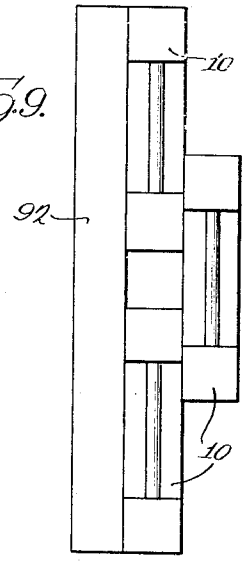


Fig. 10.

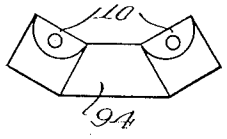
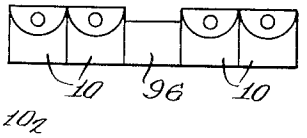


Fig. 11.



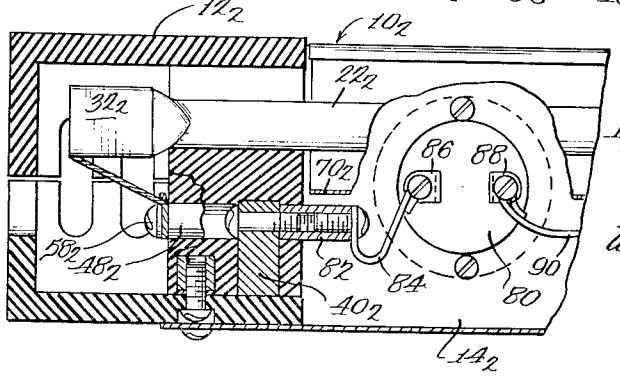


Fig. 13.

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HOLDER FOR ELONGATED INFRARED HEATING LAMP

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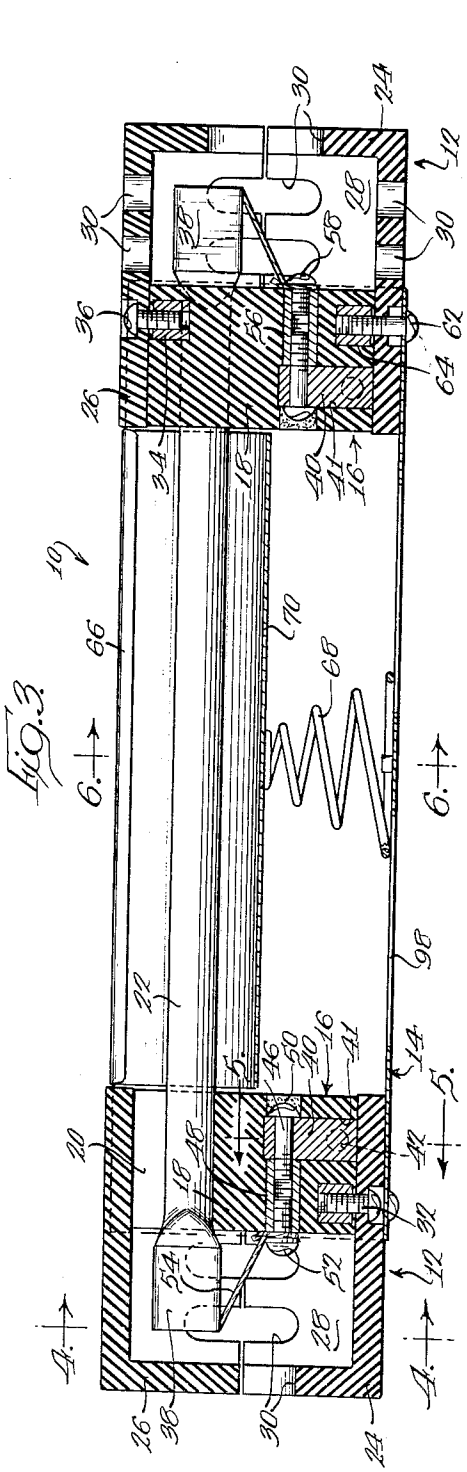


Fig. 3.

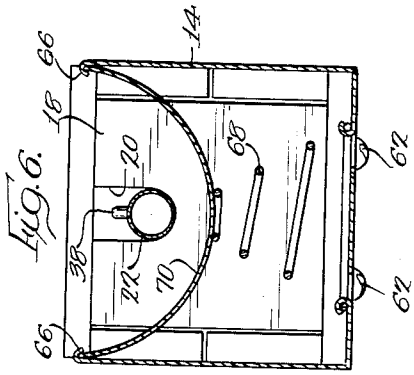


Fig. 6.

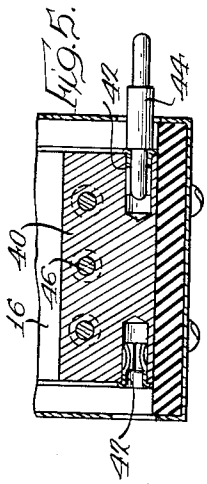


Fig. 5.

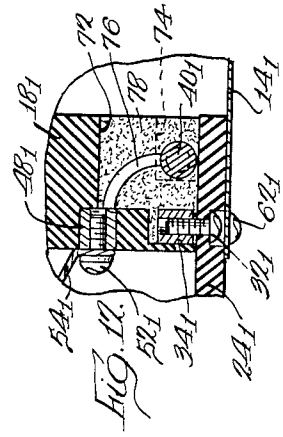


Fig. 17.

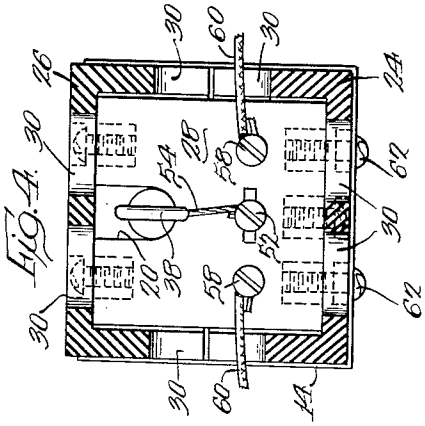


Fig. 4.

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United States Patent Office 2,988,634 Patented June 13, 1961

2,988,634

HOLDER FOR ELONGATED INFRARED HEATING LAMP

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Filed Feb. 5, 1958, Ser. No. 713,455
5 Claims. (Cl. 240—11.2)

The present invention relates to holders for elongated infrared heat lamps having terminals at opposite ends. A lamp holder of this general type is disclosed in my copending patent application Serial No. 514,016, filed June 8, 1955, now Patent No. 2,844,699.

Designed to support and to reflect heat from high intensity infrared heat lamps, such holders are well adapted for use individually and in banks in a wide variety of industrial applications in which radiant heat is applied to an object or a material for any number of purposes. The practice of using a lamp holder of this type in many different environments places a great premium on the inherent versatility of the holder and its adaptability for use in different arrangements of holders and with different holder supporting structures.

One object of the invention is to provide an improved lamp holder of the above character in which an improved construction increases the ease and facility with which the holder can be incorporated into different arrangements of holders and holder support structures to provide the optimum heating effect desired in a wide variety of installations for applying radiant heat.

Another object is to provide an improved and highly versatile lamp holder of the character recited in which insulation for all electrical conducting components of the holder is provided by ceramic barriers that mechanically shield the conducting parts from contact with the external environment.

A further object is to provide the above-mentioned advantages in an improved lamp holder in which the component structure is greatly simplified and made quite durable, while at the same time being adapted to afford ready access to the internal components of the holder from the front of the holder. A related object is to provide a lamp holder as recited which has an extremely low residual heat capacity so as effectively to eliminate the continued radiation of heat after the heating lamp in the holder has been deenergized.

An additional object is to provide a holder as recited in the previous objects which utilizes a heat reflector of simple construction, adapted for extremely economical manufacture, even from metals that are inherently difficult to work, and at the same time provides for quick removal from the holder and replacement without the use of tools.

Other objects and advantages will be apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view showing two lamp holders embodying the invention and mounted together on a support designed primarily for demonstration purposes;

FIG. 2 is a perspective view of a single holder in which one ceramic enclosure component at the near end of the holder has been removed to reveal internal structure;

FIG. 3 is a longitudinal sectional view of the improved holder taken along the line 3—3 of FIG. 1;

FIG. 4 is a transverse sectional view of the holder taken along the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 3;

FIG. 6 is a transverse sectional view of the holder taken along line 6—6 of FIG. 3;

FIG. 7 is a medial transverse sectional schematic view showing the side-by-side mounting of two holders alongside a conduit duct or "spine" for electrical leads and controls;

FIG. 8 is a view similar to FIG. 7 showing a larger number of holders mounted alongside a duct;

FIG. 9 is a plan view showing a staggered line of holders arranged alongside a duct;

FIG. 10 is a medial transverse sectional schematic view illustrating the manner in which holders may be mounted at an angle on opposite sides of a duct;

FIG. 11 is a medial transverse sectional schematic view of holders arranged on opposite sides of a duct;

FIG. 12 is a fragmentary sectional view showing a modification of a terminal element used in the improved holder; and

FIG. 13 illustrates a modification of the holder to include a twin plug connector in one side of the holder.

Well adapted to be mounted in contiguous parallel relation to a common stand, as shown in FIG. 1, a lamp holder **10** constructed in accordance with the present invention comprises two largely ceramic end units **12** forming opposite ends of the holder. The two end units **12** of each holder are of identical construction turned 180° relative to each other. As will be presently described in greater detail, the two end units **12** are supported in fixed spaced relation to each other by a lightweight metallic housing member **14** (FIGS 2, 3 and 6) formed by a U-shaped longitudinal channel of aluminum (also denoted by the numeral **14**) open along one longitudinal side at the front of the holder. It should be noted that the front side of the holder **10** faces upwardly in the drawings.

Each end unit **12** includes a transverse terminal core element **16** (FIGS. 2, 3, and 5) that has a ceramic body or block **18** of generally rectangular configuration, as viewed from one end, which is disposed in perpendicular relation to the elongated axis of the holder. A slot **20** in the forward marginal edge of each ceramic terminal element body **18** opens toward the front of the holder to receive one end of a standard infrared lamp tube **22**, which is inserted transversely into the slots **20** to occupy the position shown in the drawings.

The four side edges of each terminal element **16** are embraced by a ceramic enclosure formed in two half sections, a rear section **24** and a front section **26**. As shown in FIGS. 3 and 4, the rear half section **24** of the ceramic enclosure embraces the rear side edge of the terminal element **16** and extends forwardly along substantially one-half the length of the two opposite side edges of the terminal element. The forward enclosure half section **26** is substantially identical to the rearward half section **24** and embraces the front edge of the terminal element **16**, covering the slot **20** which receives the tube **22**. The forward half section **26** extends rearwardly in embracing relation to the forward half of the terminal element **16** and terminates slightly short of the rear half section **24** of the ceramic enclosure.

As shown in FIG. 3, the two enclosure sections **24**, **26** embracing each terminal element **16** protrude beyond the side of the terminal element opposite the other terminal element **16** to define with the adjacent terminal element a terminal compartment **28**, which is ventilated on five sides by the space between the two enclosure half sections **24**, **26** and by elongated slots **30** in the two enclosure half sections which open into the compartment.

The rear enclosure half sections **24** of the two end units **12** are detachably secured to the respective terminal elements **16** by screws **32**, FIG. 3, extending into threaded anchor members **34** embedded in the ceramic bodies **18** of the terminal elements. Similarly the forward enclosure half sections **26** are secured to the terminal ele-

ments 16 by screws 36 extending through the forward portions of the forward half sections into other threaded anchor members 34 embedded in the ceramic bodies 18 of the terminal elements. In this connection it will be appreciated that removal of the screws 36, which are fully accessible from the front of the holder 10, permits detachment of the forward enclosure sections 26. This provides full access to the terminal compartments 28 while at the same time uncovering the infrared lamp 22 for convenient removal from the holder, and replacement if necessary.

Electric power is supplied to the two terminals 38 on opposite ends of the heat lamp 22 by an improved construction, including a unique integration of conductors into the respective terminal elements 16, which provides a positive mechanical barrier of ceramic between all electrical conductors and the external environment while at the same time providing for an improved and exceptionally convenient means of connecting the holder electrically either to adjacent holders or to an external power supply.

Thus, as shown in FIGS. 2 and 5, a transverse bus bar 40, formed of a thick plate of copper, is embedded in a slot 41 in the rear portion of each terminal element body 18. Opposite ends of the bus bar 40 terminating at opposite sides of the terminal element 16, FIG. 5, define two sockets 42 which open outwardly through apertures in the adjacent enclosure structure and overlapping portions of the housing channel 14. A double ended plug 44 inserted into one of the bus bar sockets 42, as shown in FIG. 5, forms a convenient means of connecting the bus bar 40 to a similarly socketed bus bar of an adjacent lamp holder. With equal ease, a power line plug, similar to one end of the plug 44, can be inserted into the other bus bar socket 42 to energize the bus bar and any other electrical structure connected to the bus bar by the double plug 44, or otherwise.

As shown in FIG. 3, the inner edge of the bus bar 40 is connected by a screw 46 to a terminal sleeve 48 extending through the terminal element body 18 to the adjacent terminal compartment 28. Preferably the head of the screw 46 is covered with a deposit of cement 50. Another screw 52 is used to connect the outer or terminal compartment end of the sleeve 48 with a lead wire 54 from the adjacent lamp terminal 38. Two additional sleeves 56 and screws 58, substantially identical to the sleeve 48 and screw 52, are located on opposite sides of the sleeve 48 to extend from each bus bar 40 into the adjacent terminal compartment 28, as shown in FIGS. 3 and 4. The screws 58 and sleeves 56 form additional terminal connections which afford further versatility in electrically connecting the holder to adjacent holders or to power supply lines. For this purpose, wires 60 can be connected to the terminal screws 58 and led out through adjacent slots 30 in the ceramic enclosure means.

It will be appreciated that every electrically conducting component within each end unit 12, including the bus bar 40, sleeve 48, screws 46 and 52, lead 54, and terminal 38, are positively shielded mechanically from contact with the external environment by the ceramic structure of the end unit.

Opposite ends of the U-shaped housing channel 14 embrace the adjacent ends of the two end units, as shown in FIGS. 1 through 4. The housing channel is detachably secured to each end unit by two screws 62 extending through the rear of the channel and through the rear enclosure section 24 into threaded anchor members 64, FIG. 3, embedded in the adjacent terminal element body or block 18. This makes for extremely convenient attachment of the end units to the housing channel.

The forward marginal edges of the housing channel 14 are turned inwardly as shown in FIGS. 3 and 6 to form two narrow reflector retaining flanges 66 extending longitudinally between the two end units 12. It is noteworthy that each retaining flange 66 terminates flush with the forward enclosure sections 26 to stabilize the

adjacent end units 12, while at the same time providing for easy removal of the forward enclosure sections as previously described.

The two reflector retaining flanges 66 are used in conjunction with a compression spring 68 resting on the back side of the housing channel 14 to provide not only an extremely convenient detachable mounting for a concave metallic reflector 70, while at the same time making provision for simplifying the reflector to the extent that it can be readily fabricated with great ease from even those metals which are inherently difficult to work. To form the reflector 70, a simple rectangular blank is cut from a sheet of reflective metal. Completion of the reflector requires only that the blank be rolled or otherwise curved transversely to provide the transverse sectional shaping or curvature needed to produce the desired spread or convergence in the heat reflected from the lamp 22. While the reflector 70 thus formed may be fashioned from aluminum, it is particularly well suited to be formed from titanium or other metals which are inherently hard to work.

Shaped as shown in FIG. 6, the reflector 70 is inserted behind the lamp 22 to fit behind the retaining flanges 66 and rest against the compression spring 68, which firmly holds the reflector in engagement with the flanges. To remove the reflector 70 it is necessary merely to press it slightly rearwardly against the spring 68 and rotate it through a small angle to escape one of the flanges 66, whereupon the reflector can be easily lifted out of the front of the holder for polishing or replacement, if this should become necessary.

If desired, the internal construction of each terminal element 18 can be modified as shown in FIG. 12. In this figure, component elements, where possible, are denoted by the same reference numerals applied to the construction previously described, but with the addition of the subscript 1.

As shown, the bus bar 40_1 of this modified construction is a cylindrical rod or bar extending transversely through the rear edge of the terminal element body 18_1. Suitable recesses 72, 74 are formed in the rear portion of the terminal element body 18_1 to accommodate not only the bus bar 40_1 but also the anchor element 34_1 and terminal wires or conductors 76 connecting the bus bar 40_1 with the sleeves 48_1. After placement in the recesses 72, 74, the anchor members 34_1, bus bar 40_1, and connectors 76 are completely covered by cement 78 used to fill in the recesses.

If desired, power may be supplied to a holder by a two prong plug 80 mounted, as shown in FIG. 13, in one longitudinal side of the body channel 14_2 of a modified holder 10_2. Where appropriate, the description of this modification will use the same reference numerals used in the previous description but with the addition of the subscript 2. This form of the improved holder is similar to that shown in FIG. 1, with the addition of special power supply structure to be described. Thus, as shown in FIG. 13, an auxiliary conductor sleeve 82 is connected to each bus bar 40_2 to extend inwardly into the housing channel 14_2 rearwardly of the reflector 70_2. A wire 84 is used to connect the auxiliary conductor sleeve 82 to one terminal 86 of the two-prong plug 80. The other terminal 88 of the two-prong plug 80 is similarly connected by a wire 90 to the bus bar 40_2 in the opposite end unit 12_2 of the holder. The two-prong plug 80 is connected into a suitable power supply socket.

As shown in FIGS. 7 and 8, two or more lamp holders 10 constructed in accordance with the present invention can be readily assembled in contiguous parallel relationship alongside a conduit duct or "spine" 92 containing all the wiring and switches (not shown) of a conventional nature which may be found convenient in controlling any particular battery of lamp holders. FIG. 1 shows two holders 10 mounted on a power supply base 91 to form a unit suitable for demonstration purposes.

The versatility of the holders **10** facilitates arrangement of the holders in a staggered line alongside a power supply duct or conduit **92**, as shown in FIG. 9. This arrangement provides the effect of a continuous lamp which can be extended to any desired length. Moreover, the total voltage required for an installation of this type is limited to that needed to operate the lamp in a single holder. This can be provided without the necessity for supplying the special transformers required when longer individual lamps are used.

The versatility of the holders **10** is further illustrated in FIGS. 10 and 11. In FIG. 10, two holders **10** are mounted at an angle to each other on opposite sides of a "spine" **94** which supports the holders at the desired angle to each other. As shown in FIG. 11, a battery of holders **10** can be arranged with holders located in contiguous relation to each other on opposite sides of a "spine" **96**.

In this connection it is noteworthy that each of the holders described is well ventilated. The ventilation of the end units **12** of the holders has been previously mentioned. Large apertures **98** in the back side of the housing channel **14**, FIG. 3, provide excellent ventilation to the central portion of each holder **10** behind the reflector **70**.

With reference to the extremely low residual heat capacity of a holder **10**, previously mentioned, it is noteworthy that the inherently high thermal resistance of the ceramic components of the holder effectively eliminates troublesome radiation of absorbed heat from these components after the lamp **22** has been deenergized. As a matter of fact, the absorption of heat, which is emitted after deenergization of the lamp **22**, is substantially limited to that stored in the reflector **70**. Since this element is of very thin lightweight construction, it cools immediately, with the result that the overall radiant heat output from the holder is terminated almost immediately upon deenergization of the lamp **22**.

While I have shown preferred embodiments of my invention, it will be apparent that variations and modifications thereof may be made without departing from the underlying principles and scope of the invention. I therefore desire, by the following claims, to include all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. A holder for an elongated lamp having terminals at opposite ends thereof, comprising, in combination, two ceramic terminal elements disposed in spaced parallel relation to each other and defining slotted openings therein for receiving therethrough opposite ends of an elongated lamp, ceramic enclosure means detachably secured to each of said terminal elements and defining therewith a ventilated compartment at the side of the terminal element opposite from the other terminal element and into which a terminal end of the elongated lamp is adapted to project, electrical conductor means carried by each terminal element and located within each of said compartments for electrical connection with the lamp terminal extending into the compartment, a U-shaped housing element extending longitudinally between said terminal elements and opening along one longitudinal side at the front of the holder, and a longitudinal reflector disposed within said housing element and extending between said terminal elements rearwardly of said tube terminal openings in the latter.

2. In a holder for an elongated infrared lamp having terminals at opposite ends, the combination of a pair of spaced, parallel ceramic terminal blocks, each defining a slotted opening toward the front of the holder in alignment with the opening in the other element to receive opposite ends of the lamp, a pair of ceramic enclosure members embracing each terminal block and extending from the side thereof opposite the other terminal block to define a terminal compartment, said pair of each enclosure members forming front and rear half sections detachably

secured to the embraced terminal block and defining a plurality of ventilating openings into the enclosed compartment from a plurality of sides thereof, said front sections covering said slotted openings, housing means interconnecting said terminal blocks to hold the latter in fixed relation to each other, a concave reflector within said housing means extending between said terminal blocks rearwardly of said slotted openings, a bus member embedded in each of said terminal blocks, means forming a laterally open connecting socket in each bus member for electrically connecting said lamp holder with other like holders, and electrical connecting means connected with each bus member and disposed within the adjacent terminal compartment to connect with the terminal on the end of a lamp reposing within the adjacent terminal block opening.

3. A holder for an elongated infrared lamp having terminals at opposite ends thereof, comprising, in combination, two spaced parallel terminal elements each including a ceramic terminal block defining a slotted opening therein for receiving therethrough one end of an infrared lamp, a pair of ceramic enclosure members detachably secured to each terminal block and defining therewith a ventilated compartment at the side thereof opposite from the other terminal element, electrical conductor means carried by each said terminal block and located within each compartment for connection with a lamp terminal, one of each pair of ceramic enclosure members being removable from the front of the holder, a housing element extending longitudinally between and connecting said terminal blocks, and a longitudinal reflector extending between said terminal blocks rearwardly of said slotted terminal openings in the latter.

4. A holder for an elongated infrared lamp having terminals at opposite ends, comprising, in combination, a pair of spaced ceramic blocks defining notches therein opening toward the front of the holder to receive therethrough opposite terminal ends of an infrared lamp, anchor means embedded in each ceramic body, a pair of slotted ceramic enclosure members detachably secured in embracing relation to each ceramic block by means coacting with the anchor means in the block, said enclosure members defining with each said block a ventilated terminal compartment at the side of the coacting ceramic block opposite from the other ceramic block, one of each pair of enclosure members including a demountable front section removable from the front of the holder and normally covering the notch in the adjacent ceramic body, conductor means carried by each block and encased within each of said terminal compartments and adapted to connect with an adjacent lamp terminal, and means connecting said ceramic blocks and including a concave reflector spaced rearwardly from said lamp notches.

5. A holder for an elongated infrared lamp having terminals at opposite ends, comprising, in combination, two spaced ceramic terminal blocks each defining a slotted, forwardly facing opening therein for one end of an infrared lamp, a bus member embedded in each block, a pair of ceramic enclosure members detachably secured in embracing relation to each terminal block to define therewith a ventilated terminal compartment, conductor means in each terminal compartment connected electrically with the adjacent bus member and adapted to connect with the lamp terminal extending into the compartment, each bus member defining at least one electric supply socket therein exposed at one side of the holder through the adjacent enclosure member for electrically connecting said lamp holder with other like holders, housing means connected to support said terminal blocks in fixed relation to each other, and a reflector extending between said terminal blocks in rearwardly spaced relation to said lamp openings therein.

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