

3 Sheets-Sheet 1



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F. GÜNTHER ET AL
OPERATING TABLE LAMP

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3 Sheets-Sheet 2

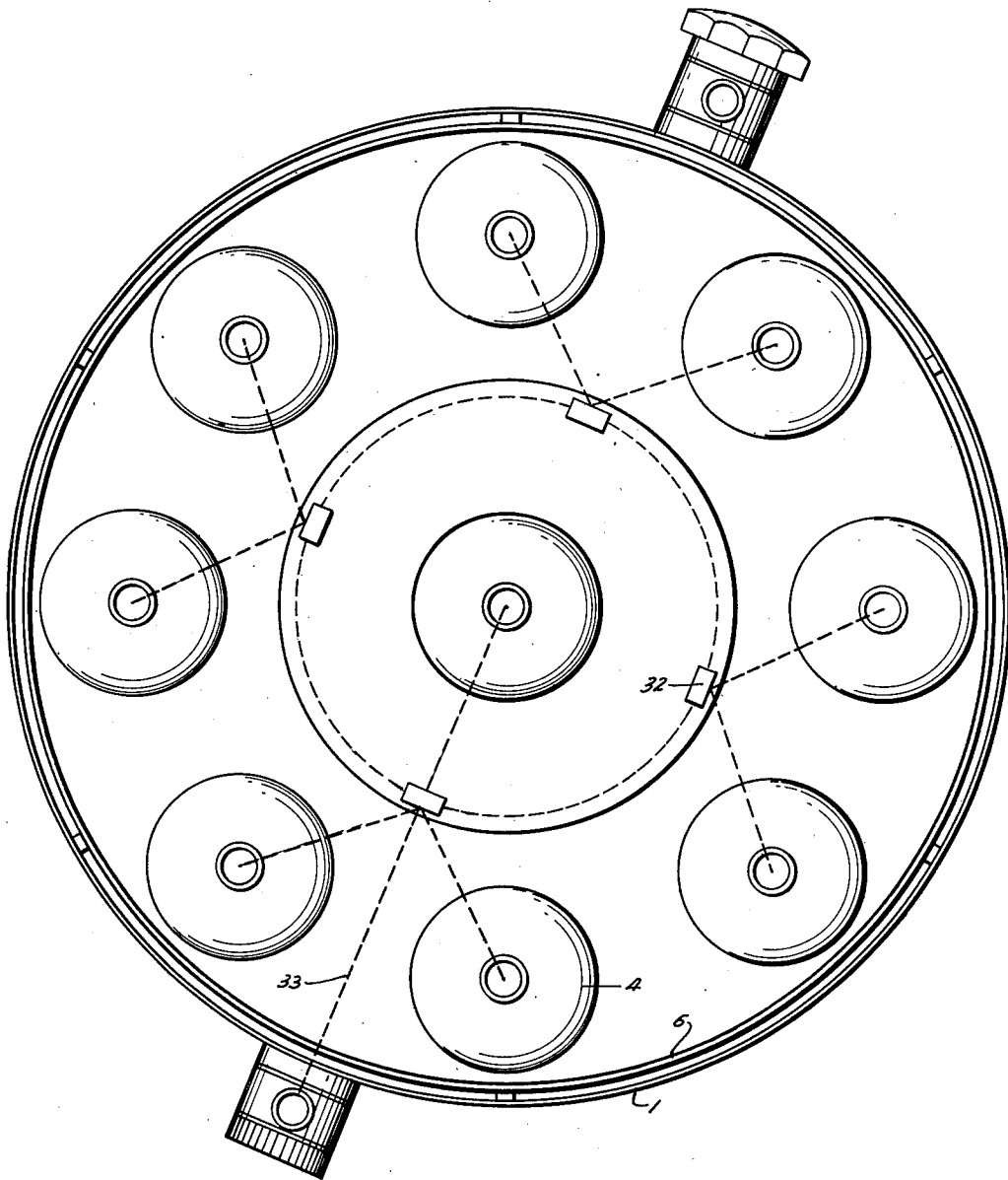


FIG. 2

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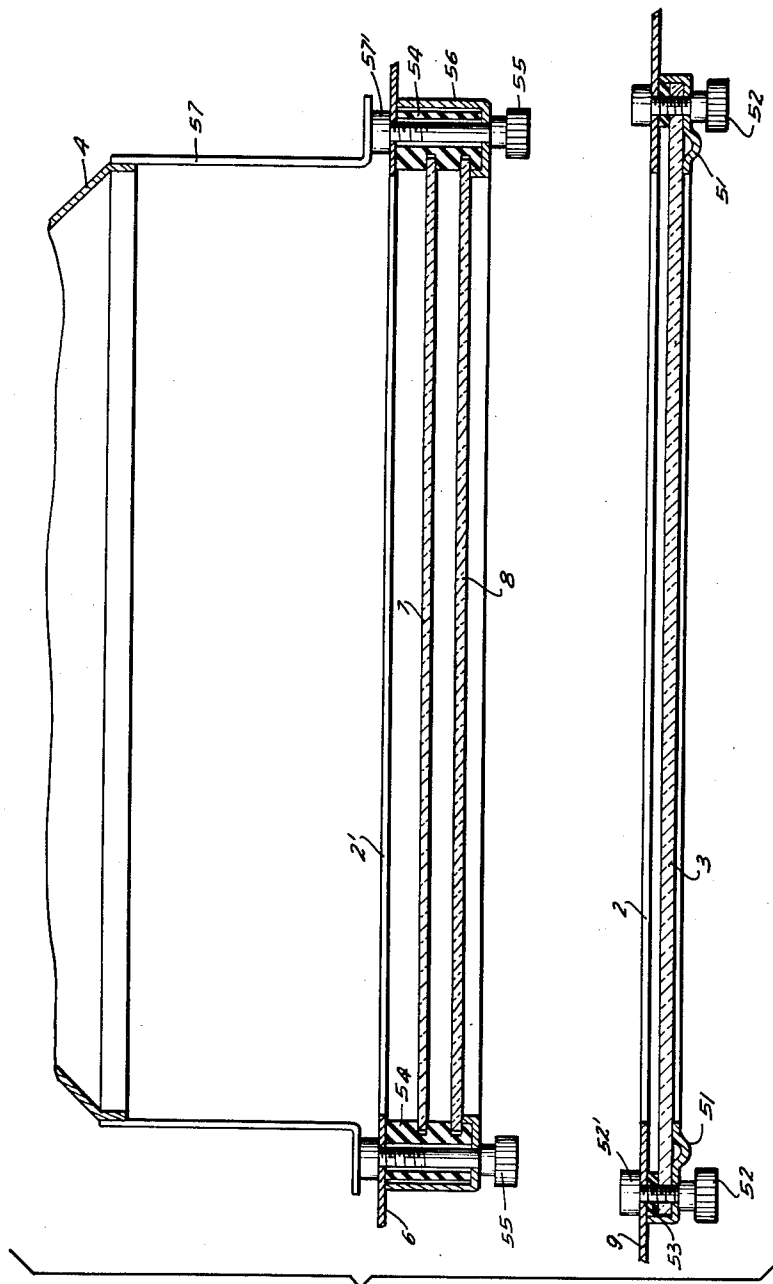
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OPERATING TABLE LAMP

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4 Claims. (Cl. 240—1.4)

The present invention relates to illuminating devices such as, for example, devices used to illuminate an operating table.

Such illuminating devices generate a considerable amount of heat, and since they are located relatively near to the doctors and other attendants at the operating table, these people are undesirably affected by the heat of the illuminating device which very often causes premature fatigue.

One of the objects of the present invention is to provide an illuminating device of the above type which does not direct undesirable amounts of heat toward the area illuminated by the device.

A further object of the present invention is to provide an illuminating device of the above type which causes the heat generated in the device to pass to the top wall of the device rather than the bottom wall so that the bottom wall, which is directed toward the operating table, will not cause the space adjacent the operating table to become undesirably heated.

An additional object of the present invention is to provide a structure capable of accomplishing all of the above objects and at the same time being made up of simple and ruggedly constructed parts which are very reliable in operation and which are very easy to assemble and disassemble.

With the above objects in view the present invention mainly consists of an illuminating device which includes a housing having a top wall, a bottom wall spaced from the top wall, and a side wall extending about the housing and interconnecting the top and bottom walls thereof, this bottom wall being formed with a plurality of openings through which light is adapted to pass. An intermediate wall is located between and is spaced from the top and bottom walls, this intermediate wall being fixed to the side wall and being formed with a plurality of openings respectively aligned with the openings of the bottom wall. A plurality of reflectors are carried by the intermediate wall respectively in alignment with the openings thereof and are located between the intermediate wall and top wall so that heat transmitted to the intermediate walls from the lamps respectively carried by the reflectors will not pass directly from the intermediate wall to the bottom wall. A pair of filters are located between each intermediate wall opening and the bottom wall opening aligned therewith and are connected to and carried by the intermediate wall so that heat is transferred from the filters to the intermediate wall. A plurality of transparent cover plates cover the bottom wall openings, respectively. Finally, a sealing means is located between the cover plates and bottom wall to prevent communication between the interior and exterior of the housing through the bottom wall openings thereof.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, to-

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gether with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a sectional elevational view showing an illuminating device constructed in accordance with the present invention;

Fig. 2 is a diagrammatic top plan view of the illuminating device of the invention with the top wall of the housing removed to show the parts therebeneath; and

Fig. 3 is a fragmentary view on an enlarged scale of the structure shown at the center of Fig. 1 within the housing of the device.

Referring now to the drawings it will be seen that the structure of the invention includes a housing 1 made up of a top wall 1', a bottom wall 9, and a side wall 30 made up of a first annular portion 30a extending downwardly from top wall 1' and a second annular portion 30b extending upwardly from the bottom wall 9 and fixed to the annular wall 30a. An intermediate wall 6 is located between top wall 1' and bottom wall 9 in the interior of the housing 1 and is substantially parallel to the bottom wall 9, the intermediate wall 6 being spaced from the top and bottom walls of the housing 1. Members 6' are distributed about the axis of the illuminating device of the invention, are fixed at their bottom ends to the upwardly extending periphery of wall 6, and are fixed at their top ends to the inner face of side wall 30, as shown in Fig. 1, and if desired insulating material, of low thermal conductivity, may be located between members 6' and side wall 30.

The intermediate wall 6 forms a support means for carrying reflectors 4, lamps 5, and filters 7 and 8, the arrangement being such that the heat from the lamps and reflectors passing to the wall 6 is not directly conveyed to the bottom wall 9 which is directed toward the area to be illuminated. Thus, as is evident from Fig. 1, the intermediate wall 6 is formed with a plurality of openings 2' and the reflectors 4 and lamps 5 are mounted on the top face of wall 6 respectively over the openings 2' so that the light from elements 4 and 5 may pass through the openings 2'. The intermediate wall 6 is further formed with openings 50 which allow hot air in the space between bottom wall 9 and intermediate wall 6 to pass through the openings 50 to the space between intermediate wall 6 and top wall 1'. A pair of filters 7 and 8 is located beneath each opening 2', the filter 7 being light in color and serving to filter out infra red while the filter 8 may simply be a clear glass. Each pair of filters 7 and 8 is carried by the intermediate wall 6, and since the light from the lamps 5 passes directly through these filters the latter will become heated to a considerable extent. The heat in these filters passes directly to the wall 6 which carries the same. The manner in which the wall 6 carries the reflectors and the filters is described in detail below in connection with Fig. 3.

The bottom wall 9 is formed with cutouts or openings 2 which are respectively aligned with the openings 2' and which are of a larger size than the openings 2'. The openings 2 are large enough to allow the light rays to pass freely therethrough without engaging the wall 9 so that in this way also the wall 9 is maintained cooler than would otherwise be the case. Transparent glass covers 3 are fixed in an airtight manner, as described below in connection with Fig. 3, to the bottom wall 9 and respectively cover the openings 2. In this manner the housing 1 is completely closed so that the danger of explosion of gases in the operating manner is avoided in this way.

The housing 1 is carried by the members 20 which are fixed to the housing 1 and to a stationary support above the housing 1, the members 20 being hollow to

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serve to guide leads to the lamps 5 in the manner indicated in Fig. 1 and described below in connection with Fig. 2. When in use, the bottom wall 9 is directed toward the illuminated area and the top wall is directed away from the illuminated area. The intermediate wall 6 prevents any direct heating of the bottom wall 9, and this effect is augmented by the size of the openings 2 in the manner described above. Thus, the bottom wall 9 can only be heated indirectly by heating of the side wall 30, and where heat insulation is located between elements 6' and side wall 30 this very small heating of the wall 9 is further diminished. Any hot air in the space between walls 6 and 9 passes upwardly through the wall 6 to the space above the same. The inclination of the filters 7 and 8 adjacent the periphery of the housing 1 also causes air heated by these filters to rise upwardly from the filters towards the top wall 1. Furthermore, the housing 1 when in use is almost always tilted so that the central filters 7 and 8 also are inclined with respect to a horizontal plane, and thus heat rises very easily from these filters toward the top wall 1'. The heat within the housing 1 is thus dissipated almost entirely through the top wall 1' to the space above the housing 1. In this way a minimum of heat is directed from the bottom wall 9 toward the illuminated area so that the comfort of the people located at the illuminated area is assured.

Fig. 2 shows the manner in which the reflectors 4 are distributed in the housing 1. The intermediate wall 6 carries terminals 32 to which the lead 33 is connected electrically, and pairs of lamps are respectively connected to the terminals 32 in the manner indicated in Fig. 2 so that the lamps located at the periphery of the housing 1 are electrically connected in pairs which are in parallel with each other and each of the pairs of lamps is in series, only the central lamp being connected in series with the remaining lamps.

Fig. 3 shows how angle members 57 are fixed to and extend downwardly from each reflector 4, these angle members 57 being fixed at their bottom ends to nuts 57' respectively located over openings of the wall 6 through which screw members 55 extend into threaded engagement with the nuts 57'. A ring 56 is located about each opening 2' and is formed with a bottom flange through which the screws 55 extend so that these screws 55 serve to maintain the ring 56 against the underside of wall 6. In each ring 56 a plurality of tubular rubber members 54, through which the screws 55 respectively extend, are located in the manner shown in Fig. 3, and each tubular member 54 is formed in a side wall portion thereof with a pair of grooves into which a peripheral portion of filters 7 and 8 extend so that the members 54 support the filters 7 and 8 in this manner.

Fig. 3 also shows the manner in which each cover plate 3 is carried by the bottom wall 9. Thus, screw members 52 extend through openings of wall 9 into threaded engagement with nuts 52' which may be fixed to the top face of wall 9 so as to prevent rotation of the nuts 52'. These screws 52 extend through openings of a ring 51, respectively and the plate 3 is supported at its periphery on the ring 51. Furthermore a rubber sealing ring 53 is located on the top side of plate 3 at the periphery thereof between this plate 3 and the bottom wall 9. The outer annular side wall of ring 51 has a width which is less than the total thickness of plate 3 and ring 53 when the latter is unstressed, so that clamping of ring 51 to the underside of bottom wall 9 compresses ring 53 to connect the plate 3 to the wall 9 in an airtight manner. The plate 3 and ring 53 are formed with aligned openings through which the screws 52 extend.

In addition to being large enough to allow light rays to pass through the wall 9 without contacting the latter, the openings 2, which are larger than the openings 2', allow the filters 7 and 8 to be easily passed through the wall 9 for assembly and disassembly purposes.

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It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of illuminating devices differing from the types described above.

While the invention has been illustrated and described as embodied in low heat illuminating devices, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. An illuminating device comprising, in combination, a housing having a top wall, a bottom wall spaced from said top wall, and a side wall extending about said housing and interconnecting said top and bottom walls thereof, said bottom wall being formed with a plurality of openings through which light is adapted to pass; an intermediate wall located between and being spaced from said top and bottom walls, said intermediate wall being fixed to said side wall and being formed with a plurality of openings respectively aligned with said openings of said bottom wall; and a plurality of reflectors carried by said intermediate wall respectively in alignment with said openings thereof and located between said intermediate wall and top wall so that heat transmitted to said intermediate wall from lamps respectively carried by said reflectors will not pass directly from said intermediate wall to said bottom wall.

2. An illuminating device comprising, in combination, a housing having a top wall, a bottom wall spaced from said top wall, and a side wall extending about said housing and interconnecting said top and bottom walls thereof, said bottom wall being formed with a plurality of openings through which light is adapted to pass; an intermediate wall located between and being spaced from said top and bottom walls, said intermediate wall being fixed to said side wall and being formed with a plurality of openings smaller than said bottom wall openings and respectively aligned with said openings of said bottom wall; and a plurality of reflectors carried by said intermediate wall respectively in alignment with said openings thereof and located between said intermediate wall and top wall so that heat transmitted to said intermediate wall from lamps respectively carried by said reflectors will not pass directly from said intermediate wall to said bottom wall, said openings in said bottom wall being large enough to allow light rays from each of said reflectors respectively to pass freely through said openings of said bottom wall without engaging the latter so that said bottom wall is maintained relatively cool.

3. An illuminating device comprising, in combination, a housing having a top wall, a bottom wall spaced from said top wall, and a side wall extending about said housing and interconnecting said top and bottom walls thereof, said bottom wall being formed with a plurality of openings through which light is adapted to pass; an intermediate wall located between and being spaced from said top and bottom walls, said intermediate wall being fixed to said side wall and being formed with a plurality of openings smaller than said bottom wall openings and respectively aligned with said openings of said bottom wall; and a plurality of reflectors carried by said intermediate wall respectively in alignment with said openings thereof and located between said intermediate wall and top wall so that heat transmitted to said intermediate

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wall from lamps respectively carried by said reflectors will not pass directly from said intermediate wall to said bottom wall, said bottom wall openings being large enough to allow the light rays to pass therethrough without engaging said bottom wall, so that said bottom wall is maintained relatively cool.

4. An illuminating device comprising, in combination, a housing having a top wall, a bottom wall spaced from said top wall, and a side wall extending about said housing and interconnecting said top and bottom walls thereof, said bottom wall being formed with a plurality of openings through which light is adapted to pass; an intermediate wall located between and being spaced from said top and bottom walls, said intermediate wall being fixed to said side wall and being formed with a plurality of openings respectively aligned with said openings of said bottom wall; a plurality of reflectors carried by said intermediate wall respectively in alignment with said openings thereof and located between said intermediate wall and top wall so that heat transmitted to said intermediate wall from lamps respectively carried by said re-

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flectors will not pass directly from said intermediate wall to said bottom wall; only one pair of filters located between each intermediate wall opening and the bottom wall opening aligned therewith and being connected to and carried by said intermediate wall so that heat is transferred from said filters to said intermediate wall; a plurality of transparent cover plates covering said bottom wall openings, respectively; and sealing means located between said cover plates and bottom wall to prevent communication between the interior and exterior of said housing through said bottom wall openings.

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