The present invention relates to an illuminating device and in particular relates to a lighting fixture which may be readily converted to give different types of illumination.

It is among the objects of the present invention to provide a novel lighting fixture of simple, inexpensive, durable sheet metal construction which without lens, reflectors or special lighting bulbs or attachments, will give a high degree of illumination either uniformly over a surface, showcase or in a display room or a spot-light illumination, all without generation of excessive heat and without need of special ventilating constructions.

Another object is to provide a novel illuminating fixture readily and inexpensively constructed of sheet metal which may either be recessed in a ceiling, a column, or a wall, or which may be mounted in an adjustable trough or casing which by way of a single electrical outlet may be provided with a fixed reflector bulb or a rotatable and adjustable spotlight construction, all in conformity with the fire prevention requirements and underwriters' regulations.

Another object is to provide a lighting fixture of small and compact construction designed to receive a fixed or adjustable conical reflector bulb within a dimension of less than 7 to 10" in diameter.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the objects, it has been found to be most satisfactory to form an outside cylindrical casing with a screw type recess at the top thereof for reception of a reflector bulb or for reception of a screw connection for an electrical conduit. In the latter case the lower part of the cylindrical casing is provided with a seat for a hollow ball member receiving a detachable screw recess member for a conical reflector bulb at the upper part thereof and a louver at the bottom thereof to give a directional beam effect and prevent side glare. The seat consists of a ring detachably mounted on the bottom of the casing.

The invention also consists in certain new and original features of construction and combination of parts hereinafter set forth and claimed and as to its other objects, features and advantages, the mode of operation and manner of its organization, these, inter alia, may be better understood by referring to the following description considered in connection with the accompanying drawings forming a part thereof in which:

Fig. 1 is a vertical transverse sectional view of a preferred form of illuminating device or lighting fixture according to the present invention;

Fig. 1a is a vertical transverse sectional view of the lighting fixture of Fig. 1 showing the light source in an alternative with an alternative closure;

Fig. 2 is a horizontal view looking upwardly upon the line 2-2 of Fig. 1, in partial section to show the interior construction;

Fig. 3 is an offset fragmentary side vertical sectional view upon the line 3-3 of Fig. 1;

Fig. 4 is a fragmentary side vertical sectional view upon the line 4-4 of Fig. 1;

Fig. 5 is a fragmentary side vertical sectional view upon the line 5-5 of Fig. 1;

Fig. 6 is a fragmentary vertical sectional view showing an alternate attachment to the wall;

Fig. 7 is a vertical, sectional view upon the line 7-7 of Fig. 6;

Fig. 8 is a transverse vertical sectional view of a trough or sheet metal carrier construction;

Fig. 9 is a transverse vertical sectional view upon the line 9-9 of Fig. 8;

Fig. 10 is a transverse vertical sectional view upon the line 10-10 of Fig. 8;

Fig. 11 is an end elevational view of the adjustable trough construction of the fixture shown in Figure 8;

Fig. 12 is a vertical sectional view of another alternative embodiment of lighting fixture showing the fixture suspended from the ceiling with an adjustable ball member detachably carried by an inverted bowl member;

Fig. 13 is a fragmentary side sectional view upon the line 13-13 of Fig. 12 showing the attachment between the adjustable ball and inverted bowl carrying member; and

Fig. 14 is a vertical sectional view of another alternative embodiment of lighting fixture with a reflector inserted in position around a reflector bulb.

Referring to Figs. 1 and 2, the main cylindrical casing A is mounted or recessed in the ceiling B. The casing A carries the main lighting connection C and is also designed to receive subsidiary lighting connection D. Between the connections C and D is positioned the electrical connection E, the light source F and the louver or grille G.

Referring particularly to Fig. 1, the casing A
may be formed of a cylinder or spinning 10 of relatively thin sheet metal, for example, of 18 to 20 gauge brass, copper, bronze, steel or aluminum, having the top integral portion 11 and vent holes. To the top 11 of the casing A by the screws 12 are attached the inturned flanges 13 of the cover casing H enclosing the socket structure C. The cylindrical side wall 14 of the casing H is provided with a flat base 15. The casing 14 has an opening 16 to which is attached the flexible cable 17 with the connector 18.

Mounted within the casing' C by the screws 19 is the porcelain socket 20 forming part of the element C which may carry the attachment screw plug 9.

The attachment plug 9 (see Fig. 1) carries the asbestos electrical conduit cord 21 leading to the socket arrangement E. The conduit connection 21 is connected to the bushing 22, which in turn connects to the porcelain socket 23. The bushing 22 is mounted in the base 24 of the cylindrical casing 25 forming part of the structure D. The porcelain socket 23 is mounted by the spider 26 which may be adjustably positioned in the cylinder 25. The cylinder 25 has the outturned flange portion 27 with the downturned edge portion 28 (see also Fig. 4).

Sealed from the flange 21 or depending edge portion 28 are the upper portions 29 of the ball 30. The portions 28 and 29 are held together by the brass screws 30 held in position by the nuts 31 positioned spaced intervals around the upper periphery of the ball 30, as shown best in Fig. 4.

As shown in Fig. 4 the flange 23 has a recess 32 and a slot 33 which receives the shank of the screw 34. By turning the ball in the direction 35 the ball 30 may be disconnected from the flange 27, while a reverse movement 36 will cause a tight connection as indicated in Fig. 4. When disconnected the bulb F may be removed from or inserted into the socket 23.

The ball 30 extends down to grille or louver G which is provided with an attachment sleeve 37 having the upturned flange 38 which engages the lower edge 39 of the ball 30. The ball 30 is made of thin sheet metal and for example a satisfactory construction is 20 gauge spun brass.

The spring clip 40 will fit in a recess 41 in the sleeve 31 and hold the grille or louver G in position in bottom of the ball 30. As shown there are about five louveres 42 in one direction and three louveres 43 in the other direction which may be braised to the ring or cylinder 37.

The ball 30 has brazed thereto a nut 60 through which screws the threaded shank 61 of the machine screw 62. This threaded shank 61 receives a lock nut 63 interiorly of the ball 30. The shank 61 fits in a slot 64 in the member 65. As shown the member 65 has a lower outturned flange 66 and an upper outturned flange 67. The flange 67 cooperates with the stop finger 68 of the angle member 69. The member 69 is welded at 70 to the sheet metal shell A. The stop finger 69 by contact with element 71 will prevent ball 30 from being rotated more than 360° and twisting cord 71, while permitting free swinging movement of ball 30 with shank 61 sliding up and down in slot 64.

The flange 66 is brazed to the spinning or ring 71 having upturned flange 72. The ring 71 is rotatable on the ceiling ring 73 having upturned outer flange 74.

Spots welded to the outer portion 75 of the ceiling ring 75 is the flange 76 of a spinning 77 having bayonet slots 78 (see Fig. 5). The slots 78 have entrance portions 79 to receive and lock the shanks 80 of the screws 81. The screws 81 extend into the vertical portion 82 of the straps 83. The upper portions 57 of the straps 58 extend into the plaster 86. The holes 56 will assist the attachment.

An alternative attachment to the wall B is also shown in Fig. 6. The plaster ring 82 is formed of the sections 83, 84 and 85 and is mounted directly in the plaster 86. The ceiling ring 73 with the flange 74 carries the L members 87 carrying the overhanging finger portions 88 and the overlapping flange portions 89 which are wedged to the spinning 73. The fingers 88 lock over the shanks 90 of the screws 91 which screw the flange 83 into the plaster 86.

By removing the screw plug 9, the cord 21, the rings 71 and 73, together with the sleeve 73, the stop element 66 and the ball 30 with cap D from assembly of Fig. 1, it is then possible to screw the reflector bulb F directly into the socket C to achieve uniform, non-adjustable illumination downwardly. The rings 71 and 73 may be removed by disengaging screw 60 from slot 58 or screw 90 from finger 68, which will permit ball 30 and retaining structure 34 of Figs. 1 and 6 or Figs. 6 and 7 to be dropped out of casing A together with ball 30.

To assemble the ball 30, the cover 27 is first removed by disengagement of screws or pins 34 from slot 33 (see Fig. 4). The conical reflector bulb F is then screwed into the socket C. The cover 27 is replaced by engagement of the screws 34 in the slots 33 (see Fig. 4). Then the structure C is engaged in the bottom of the ball 30 by snapping the recess 61 of the ring 71 onto the snap ring 60. The ring 71 is then placed on the ring 73 inside of the flange or sleeve 71 with the bracket 65 in position on ring 71. Then the ball 30 carrying grille G, lamp F, cord 21 and box D is dropped into the ring 73 as shown in Fig. 1. The screw 62 is attached and the lock nut 63 applied, removing cover 27 to do so if necessary.

Preferably the ball 30 is placed in assembled rings 71 and 73 and screw 62 and nut 63 attached before the cover 27 carrying the reflector bulb F is attached by the connection 33—34 of Fig. 4.

Then the plug 9 is screwed into the socket C and the connections 76—80 of Fig. 5 or 88—91 of Fig. 7 are made to assemble rings 71 and 73 into the bottom of the casing A. The casing A has previously been mounted into the ceiling, wall or column B with cap H and electrical connection 71.

The ball 30 may be turned horizontally 360° until the finger 69 is stopped by the flange 68 and rotated vertically the length of slot 64 of Figs. 1 and 3, as shown is 40° in length.

The openings 8 and 66, as well as the straps 57 will assure permanent connection into the plaster 86 of the wall B.

To give typical dimensions of one preferred embodiment which may be widely varied in practice, the bulb F may vary from 150 to 300 watts, the casing A may be 8½ inches in outside diameter and 7½ inches in height, and the ball 30 may be 6½ inches in diameter. The ring 73 may have an internal opening of 6½ inches in diameter and the grille structure G may be 4 inches in diameter. The bracket 65 may be 1 inch in width and ¾ inch in thickness with a ¾ inch slot.

Referring to the embodiment of Figs. 7, 8, 9, and 10, the trough 101 is provided with a top
The end plates 103 are mounted by the vertical brackets 104 on the pins 105. The vertical brackets 104 are attached to the wall or ceiling 99 by the flanges 96 and screws 97. The pins 105 fit into spaced holes 185 enabling adjustment of the height of the trough 103. The swivel adjustment 107 enables adjustment of the angular position of the trough 101. The sides of the trough 103 are provided with vertical walls 108 and 109 and the connecting oblique walls 110.

Interiorly there is a partition 111 which carries receptacles 112 for the lamps 113 or 116 for the plugs 114. The plugs 114 carry the conduits 115 leading to the receptacles 116 and balls 119 of similar construction and design as the box D and ball 39 as shown in Fig. 1. Switches 36 are mounted on the trough 102.

The separating portions 117 divide the trough up into a series of compartments 118 which may receive the lamps 113 or the ball units 116. The ball units 119 are held in position by the plates 120, mounted by the concealed hinges 121 and provided by the continuous lip 122. The lip is stopped by the flange 130 of the angle 129 at the uppermost position of the plates 120. The catches 123 will hold the plates 120 in said uppermost position. To release balls 119, the plates 120 are swung down into the dotted line position as indicated in 124 in Fig. 5.

The catches 123 are mounted on the leaf spring 125 riveted to the walls 109 at 126. The hinges 121 may be provided with a spring hinge 132 having coil spring 140 on pin 141 if desired for the flap member 133 as shown in Fig. 10. The flange 134 of the member 132 will engage under the plate 120.

When the plates 120 are in down position 124, the balls 119 may be removed. The balls 119 for example may be 7 inches in diameter as compared to opening 130 of 6 1/2 inches and a length of trough of 6 feet with eleven compartments 118 having three carrying balls 119 and the balance directly connected in adjustable lamps 113.

In Fig. 1a is shown the light source F of Fig. 1 screwed directly into ceiling element C with the ball structure 30 and restructure 33 and restructure 33 removed and replaced by a centrally open bottom closure ring R. The ring R has a base 150 with an upturned central vertical lip portion 151 around a central opening 157 through which the light from the reflector bulb 30 is thrown directly downwardly as indicated by the arrows 153. To the base 150 is welded the cylindrical ring 154 by the lower flange 155, said ring 154 forming the same function as the ring 88 in Fig. 6 or ring 77 in Fig. 1. The edge flange 156 performs the same function as the flanges 74 of Figs. 1 and 6.

The retaining structure M of Fig. 1 may be most readily replaced by the bottom ring structure R of Fig. 1a when the reflector bulb 30 is changed to alternative position as shown in Fig. 1a.

The reflector bulb 30 may be 4 1/2" in diameter where a 150 watt bulb (P. A. R. 38) is employed which will correspond to a 30 of about 6 1/2" in diameter.

The structure of Figs. 6 and 7 is advantageous in supporting greater weight for example 4 to 5 pounds as contrasted to the structure of Fig. 5 which would only support about 2 to 3 pounds.

In Figs. 12 and 13 the spun brass ball member 300 having the spaced louvres or grille 301 covered by a glass 302 is mounted in the shell 303 having the inturned edge 304. The shell 303 at its upper edge 305 telescopes around the lower edge 306 of the upper supporting shell 307. The connection between shells 303 and 307 is made by the hook 308 having the recess 309 receiving the inwardly directed lug 310 from the upper part of the tab 311. The hook 308 is fastened to the shell by the base 312.

The upper part of the shell 307 has a cylindrical portion 313 turned in at 314 above the washer 315 and then upwardly at 316 to fit within the suspension tube 318. The suspension tube 316 encloses the depending conduit pipe member 317 extending downwardly any desired distance from the ceiling (say for example about "15" to "25")

The pipe 317 carries the electrical connections.

The washer 315 rests upon the porcelain socket 320 into which may be screwed the plug 321 carrying the cord 322. The cord 322 extends through the bushing 323 into the socket 324 in the cylindrical metal cup 325 leaving the ventilating openings 326. The socket 324 is held in position by the supports 327 and carries the 150 watt reflector bulb 328.

If desired, the ball 300 may be removed and the lamp 325 screwed directly into the socket 320 and the substitute cover attached to the edge 304.

As an alternative construction shown in Fig. 14, the reflector bulb 350 is carried by the socket 351 which is suspended by the tube or pipe 352. The pipe 352 is encircled by the pipe 353. To the lower end 354 of the tube 353 is sweated the tubular extension 355 of the flared outside inverted bowl member 356. The inside reflector bulb member 357 has an upwardly extending collar 358 around the lower portion 359 of the reflector bulb 350 and is attached at its upwardly and outwardly rounded rim 360 by the screws 361 to the flared portion 362 of the bowl member 355. By having the reflector parabola 357 start at the widest section 359 of the bulb 350 maximum reflection is obtained.

As many changes could be made in the above illuminating device and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:
1. A lighting fixture adapted to be mounted in a ceiling comprising an external cylindrical casing, substantially completely recessed into the ceiling, said casing being provided with a lower peripheral supporting structure, a ball-shaped casing carried by said lower peripheral supporting structure and mounted for rotation in a horizontal plane thereon, said ball-shaped casing being also capable of rocking movement in a vertical plane in the external casing, the ball-shaped casing having a lower open portion, said peripheral supporting structure being substantially flush with the ceiling face, said ball-shaped casing having at the upper side thereof a mounting screw for a reflector bulb seated in said mounting socket so as to direct light outwardly through said lower open portion, said peripheral supporting structure including an inwardly directed annular ring, the inside diameter of the ring being less than the outer diameter of the ball-shaped casing, said annular ring serving as a rotating bearing for the ball-shaped casing, and cooperating stop means on the external cas-
ing and the ball-shaped casing for limiting the rotation of the ball-shaped casing in a horizontal plane, said stop means including a guide member projecting outwardly from the side of the ball-shaped casing, an upwardly extending vertically slotted and horizontally rotatable break in a guide member extending through the slot in the bracket, and an inwardly projecting stop element on the interior of the external casing adapted for engagement with a part of said bracket to limit the rotation thereof.

2. A lighting fixture adapted to be mounted in a ceiling comprising an external cylindrical casing, substantially completely recessed into the ceiling, said casing being provided with a lower peripheral supporting structure, a ball-shaped casing carried by said lower peripheral supporting structure and mounted for rotation in a horizontal plane therein, said ball-shaped casing being also capable of rocking movement in a vertical plane in the external casing, the ball-shaped casing having a lower open portion, said peripheral supporting structure being substantially flush with the ceiling face, said ball-shaped casing having integral with the upper edge thereof a mounting screw socket for a reflector bulb positioned in said socket as to direct light outwardly through said lower open portion, said peripheral supporting structure including an inwardly directed annular ring, the inside diameter of the ring being less than the outer diameter of the ball-shaped casing, said annular ring serving as a rotating bearing for the ball-shaped casing, and cooperating stop means on the external casing and the ball-shaped casing for limiting the rotation of the ball-shaped casing in a horizontal plane, said peripheral supporting structure at the lower end of said external casing in addition to said annular ring consisting of a plurality of nesting rings that are right angular in cross section, said external casing having a plurality of support hangers to attach said external casing to wire lam in the ceiling.

3. A lighting fixture adapted to be mounted in a ceiling comprising an external cylindrical casing, substantially completely recessed into the ceiling, said casing being provided with a lower peripheral supporting structure, a ball-shaped casing carried by said lower peripheral supporting structure and mounted for rotation in a horizontal plane therein, said ball-shaped casing being also capable of rocking movement in a vertical plane in the external casing, the ball-shaped casing having a lower open portion, said peripheral supporting structure being substantially flush with the ceiling face, said ball-shaped casing having at the upper side thereof a mounting screw socket for a reflector bulb positioned in said mounting socket so as to direct light outwardly through said lower open portion, said peripheral supporting structure including an inwardly directed annular ring, the inside diameter of the ring being less than the outer diameter of the ball-shaped casing, said annular ring serving as a rotating bearing for the ball-shaped casing, and cooperating stop means on the external casing and the ball-shaped casing for limiting the rotation of the ball-shaped casing in a horizontal plane, said peripheral supporting structure at the lower end of said external casing in addition to said annular ring consisting of a plurality of nesting rings that are right angular in cross section, with the outermost of said nested rings being mounted in the ceiling.

4. A ceiling lighting fixture having an outer cylindrical casing recessed into the ceiling, an inner spherical casing positioned within the outer cylindrical casing and projecting below the ceiling and the lower edge of the outer casing, the lower end of said outer casing having a mount for said inner spherical casing, an annular ring structure of right angular cross section aligned flush with the ceiling, said ring structure carrying said casings, said spherical casing being mounted upon said ring structure and capable of rotating and rocking movement, said casings having stop means to limit the rotary movement of the inner casing to about 360° and the rocking movement of the inner spherical casing, the top sides of the casings carrying electrical connections, and the top side of the inner spherical casing carrying a screw socket, and a flexible conductor between the electrical connections at the top of said casings, and a reflector lamp in said screw socket.

5. A ceiling lighting fixture having an outer cylindrical casing recessed into the ceiling, an inner spherical casing positioned within the outer cylindrical casing and projecting below the ceiling and the lower edge of the outer casing, the lower end of said outer casing having a mount for said inner spherical casing, an annular ring structure of right angular cross section aligned flush with the ceiling, said ring structure carrying said casings, said spherical casing being mounted upon said ring structure and capable of rotating and rocking movement, said casings having stop means to limit the rotary and rocking movement of the inner spherical casing, the top sides of the casings carrying electrical connections, and the top side of the inner spherical casing carrying a screw socket, and a flexible conductor between the electrical connections at the top of said casings, and an intermediate connector ring to mount said rotatable ring and to serve as a bearing for said inner ring.

6. A ceiling lighting fixture having an outer cylindrical casing recessed into the ceiling, an inner spherical casing positioned within the outer cylindrical casing and projecting below the ceiling and the lower edge of the outer casing, the lower end of said outer casing having a mount for said inner spherical casing, an annular ring structure of right angular cross section aligned flush with the ceiling, said ring structure carrying said casings, said spherical casing being mounted upon said ring structure and capable of rotating and rocking movement, said casings having stop means to limit the rotary and rocking movement of the inner spherical casing, the top sides of the casings carrying electrical connections, and the top side of the inner spherical casing carrying a screw socket, and a flexible conductor between the electrical connections at the top of said casings, and said ring structure including an outer plaster ring of right angular cross section mounted in the ceiling, an inner rotatable ring rotating with the spherical casing, and an intermediate connector ring to mount said rotatable ring and to serve as a bearing for said inner ring.

7. An adjustable ball type reflector bulb mounting light fixture comprising a cylindrical casing recessed into the ceiling of a room, a screw type electrical socket at the top of said casing, a peripheral rotatable bearing ring structure at the
lower edge of the cylindrical casing, a rotatable vertically slotted bracket extending upwardly from said ring structure, a stop for said bracket extending inwardly from the side wall of the casing, an inside ball member mounted on and projecting below said ring structure and having a screw socket at the top thereof, a reflector lamp having a screw connection plug mounted in said last-mentioned screw socket, a flexible electrical connection extending between the plug and the last mentioned socket, a pin projecting outwardly from said ball member and riding in said slot, said ring structure including an inner ring of right angular cross section carrying said bracket and moving with said pin, said ring structure also including an outer ring of right angular cross section detachably mounted upon the lower edge of the cylindrical casing, and serving as a bearing for said inner ring, said inner ring carrying said bracket being rotatable, said connection having a screw electrical connection plug screwed into said socket at the top of the casing.

8. The fixture of claim 7, in which the lower portion of said bracket is curved to conform to the shape of the side of the ball member, said bracket at its upper end having an outwards extending finger to contact said stop.

9. The fixture of claim 7, in which said pin consists of a screw threaded into the side of said ball member.

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References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,460,587</td>
<td>Newton</td>
<td>Oct. 2, 1923</td>
</tr>
<tr>
<td>1,670,241</td>
<td>Dorsey</td>
<td>Aug. 9, 1932</td>
</tr>
<tr>
<td>1,882,185</td>
<td>Graham</td>
<td>Oct. 11, 1932</td>
</tr>
<tr>
<td>2,152,197</td>
<td>Levy</td>
<td>Mar. 28, 1939</td>
</tr>
<tr>
<td>2,179,161</td>
<td>Rambusch et al.</td>
<td>Nov. 7, 1939</td>
</tr>
<tr>
<td>2,232,543</td>
<td>Logan</td>
<td>Feb. 18, 1941</td>
</tr>
<tr>
<td>2,383,010</td>
<td>Logan et al.</td>
<td>May 12, 1942</td>
</tr>
<tr>
<td>2,385,002</td>
<td>Wilson</td>
<td>June 2, 1942</td>
</tr>
<tr>
<td>2,390,487</td>
<td>Conteville</td>
<td>Nov. 3, 1942</td>
</tr>
<tr>
<td>2,321,099</td>
<td>Naysmith</td>
<td>June 8, 1943</td>
</tr>
<tr>
<td>2,434,108</td>
<td>Handler</td>
<td>Jan. 6, 1948</td>
</tr>
</tbody>
</table>