

April 13, 1954

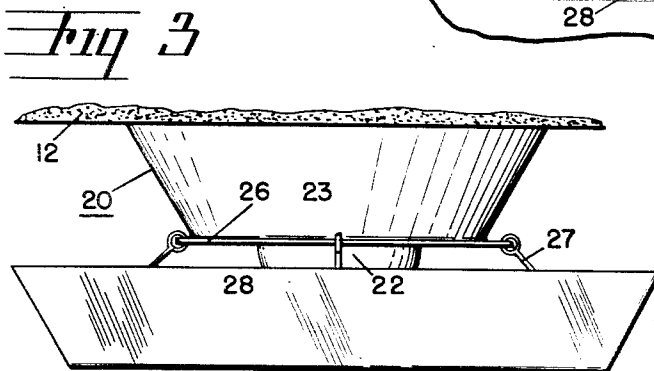
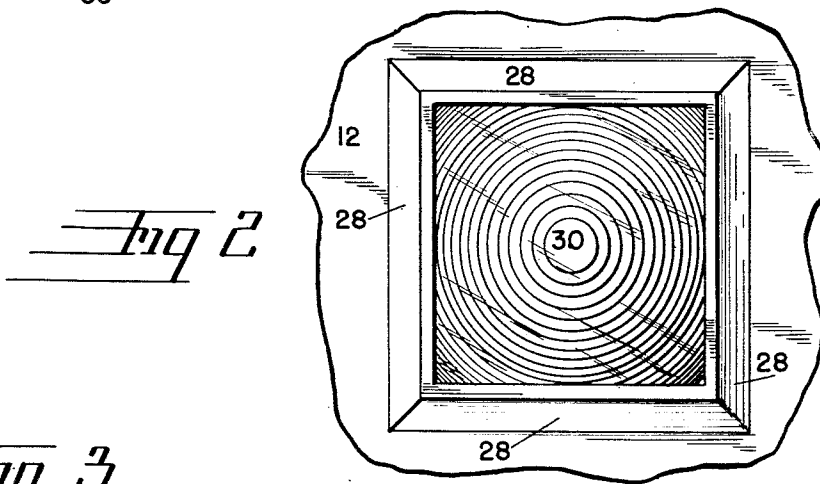
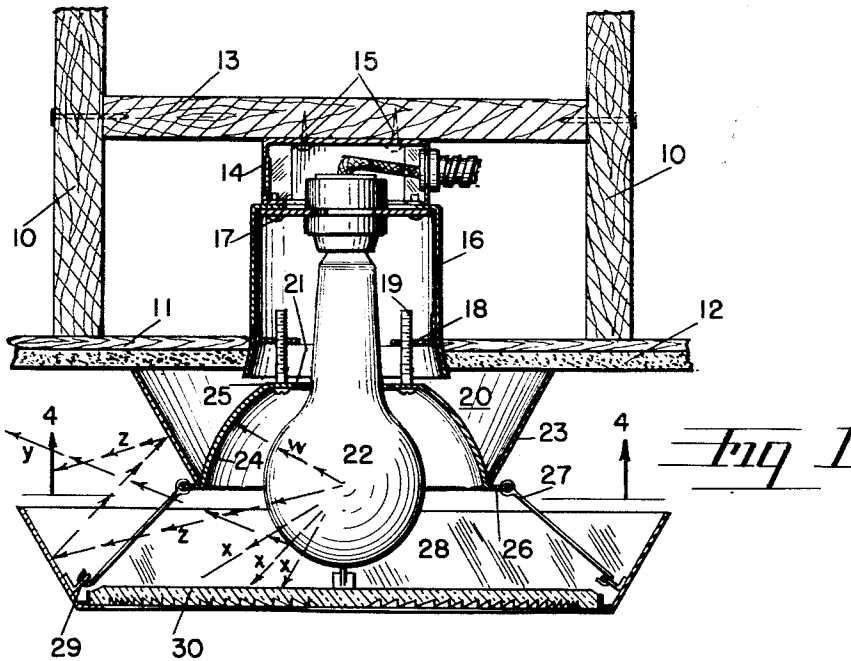
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2,675,466

CEILING LIGHTING FIXTURE

Filed Jan. 9, 1951

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

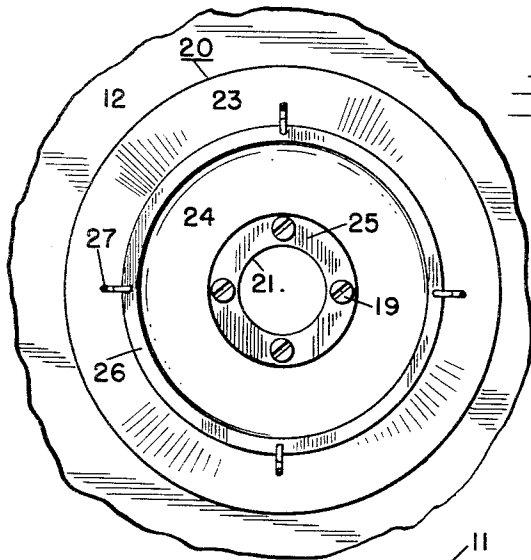


Fig 4

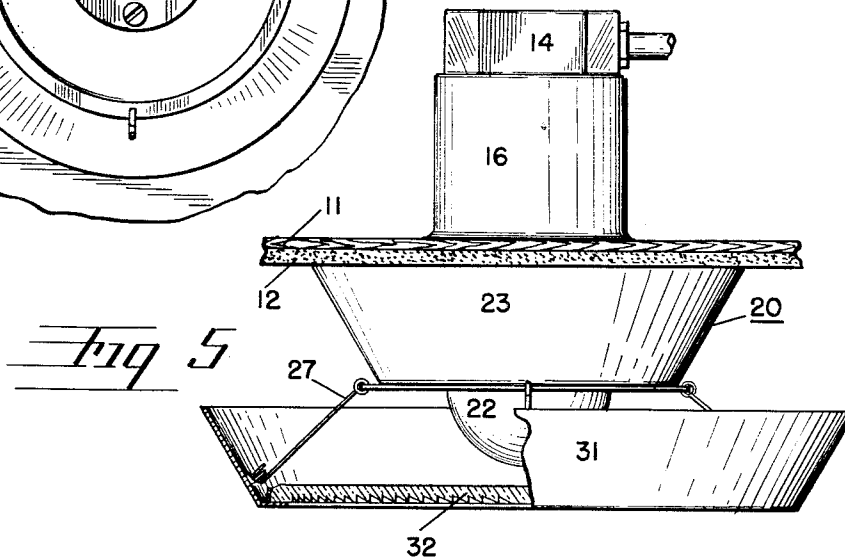


Fig 5

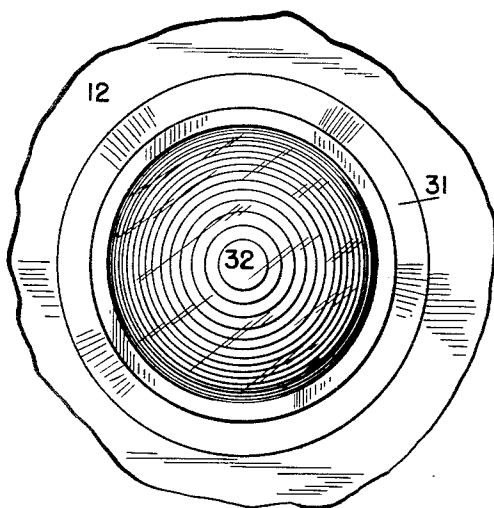


Fig 6

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CEILING LIGHTING FIXTURE

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3 Claims. (Cl. 240—78)

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This invention relates to lighting fixtures mounted in, or close to, the ceiling of a room, and also to semi-indirect fixtures capable of providing indirect as well as direct lighting.

In rooms having a low ceiling, in which it is not possible to have the lighting fixtures suspended at any customary or appreciable distance below the ceiling, a difficult lighting problem is involved in obtaining satisfactory and maximum diffusion of light. While fixtures mounted entirely within the ceiling, thus with the bottom of the fixture substantially flush with the ceiling, are commonly used under such conditions, there are two principal disadvantages with such lighting installations. One disadvantage is that, since the light must all be direct or directed or reflected downwardly from the ceiling fixture, the surrounding ceiling area remains dark. Another difficulty is that such fixture must extend a considerable distance upwardly within the ceiling. In small houses, where joists of small size are used in the ceiling construction, there is often insufficient space within the ceiling for such a fixture.

An object of the present invention is to provide an improved lighting fixture which will be located partly within the ceiling wall but which will extend only a short distance above the ceiling and also only a short distance below the ceiling into the room.

Another object of this invention is to provide an improved lighting fixture which will be capable of furnishing indirect light as well as direct lighting in a room without having the fixture extend more than a few inches below the ceiling of the room.

An additional object of the invention is to provide an improved lighting fixture especially adapted to low-ceiling rooms which will enable the light to be diffused satisfactorily throughout the room, although the fixture takes up only a minimum amount of space.

A further object of the invention is to provide a semi-indirect lighting fixture adapted to be mounted close to the ceiling which will be simple and practical in construction, and suitable for use in small rooms in moderate priced house construction, as well as in other types of buildings and rooms, where small ceiling lighting fixtures may be desirable.

The manner in which my improved lighting fixture is constructed, the manner in which it is mounted in the ceiling, and the manner in which it functions to diffuse the light by direct and indirect rays, will be briefly described with refer-

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ence to the accompanying drawings, in which:

Fig. 1 is a sectional elevation of the entire lighting fixture including the light socket mounting and the outlet box located within the ceiling;

Fig. 2 is a bottom plan view of the fixture of Fig. 1, but drawn to a smaller scale;

Fig. 3 is a side elevation of the visible portion of the fixture itself when mounted in position, thus showing only the members of the fixture assembly which are positioned below the ceiling line, this figure being drawn to the same scale as Fig. 1;

Fig. 4 is a plan section on line 4—4 of Fig. 1, looking upwardly as indicated by the arrows in Fig. 1;

Fig. 5 is an elevation of a slightly modified form in which the fixture may optionally be made, with a portion of the lower part of the fixture itself broken away for the sake of clarity; and

Fig. 6 is a bottom plan view of the fixture of Fig. 5, drawn to a smaller scale.

Referring first to Fig. 1, the ceiling in and below which my improved fixture is mounted, is assumed for the purpose of illustration, to be of the type customary in wooden frame building construction, as for example in ordinary home construction. Consequently wooden ceiling joists are indicated at 10, with laths 11 for the ceiling nailed to the bottom of the joists and the plaster 12 applied to the laths as usual. A cross bar 13 extends between, and has its ends secured, to the pair of joists on both sides of the fixture, the cross bar 13 being of sufficient size and strength to provide a firm support for the various elements of the fixture. This cross bar has its ends secured to the joists 10 in any suitable manner, for example by nailing.

An outlet box 14 for the customary connection to the electric wiring installation is secured to the cross bar 13 by suitable screws 15. A socket housing 16, preferably cylindrical, open at the bottom, is suspended from and firmly attached to the outlet box 14 by means of screws 17 extending through the top of the housing into threaded apertures provided in inwardly-extending flanges at the bottom of the outlet box 14. The socket for the electric light bulb 22 is mounted in the top of the housing 16 as shown.

The bottom of the socket housing 16 extends to the under side of the ceiling plaster, or may extend a fraction of an inch below the face of the plaster and preferably, though not necessarily, the bottom rim of this housing 16 is flared outwardly slightly. The outlet box 14 and socket housing 16 are of course secured in place in the

ceiling structure before the lathing and plastering about the outlet box are completed, and the plastering 12 is then finished up to the bottom rim of the socket housing 16 so that the socket housing is permanently embodied in the ceiling.

As will be apparent from Fig. 1, the light bulb 22, which is used in the fixture, extends part way above and part way below the ceiling of the room. Consequently the socket housing 16 is only a few inches in height, and since an ordinary outlet box, such as that shown at 14, need not be more than a couple of inches in height, the cross bar 13 is not located very far above the ceiling line. This is an important feature in my fixture because in some types of small, single-story building constructions, relatively small joists may be used in the ceiling which would not provide enough space within the ceiling construction for the common types of ceiling light fixtures. However, as will be apparent from Fig. 1, even under such conditions there will be ample space above the ceiling line for the socket housing 16 and outlet box 14 of my improved fixture, and no further space within the ceiling is required.

A main reflector member 20 (Figs. 1 and 3), is formed with an outer frusto-conical reflecting surface 23 and an inner reflecting surface 24, which inner reflecting surface slopes oppositely, that is upwardly and inwardly, and may be either frusto-conical or curved as shown in Fig. 1. The inner reflecting surface 24 terminates at the top in an annular inwardly-extending flange 25, and screws 18, extending through apertures in the flange 25, engage threaded openings in bracket arms 19 secured on the inside of the socket housing 16 and thus hold the reflector member 20 firmly in position with the top rim of the outer reflecting surface 23 flush with the face of the ceiling. The flange 25 in the top of the reflector 20 provides a circular opening 21 in the center of the fixture and the stem of the light bulb 22 is inserted through this opening 21 and up into the housing 16 and screws into place in the socket after the reflector member 20 is in place. Thus the large portion of the light bulb 22 will be entirely below the ceiling line while the neck or stem portion will be positioned up in the ceiling.

A narrow, annular, horizontal flange 26 (Figs. 1 and 4) extends outwardly from the bottom rim of the reflector member 20. The two reflecting surfaces 23 and 24 meet at the bottom rim of the reflecting member 20 from which the flange 26 extends. A plurality of equally-spaced links 27, the upper ends of which are pivotally attached to the flange 25, serve as suspension means for the bottom portion of the fixture now to be described.

The bottom portion of the fixture consists of a diffusing and reflecting shield, and, in the form in which the fixture is illustrated in Figs. 1 and 2, this diffusing and reflecting shield includes a square frame having a bottom lens 30. The wall of this bottom portion consists of four sides 28 which slope upwardly and outwardly. The inner face of each side of the wall has a reflecting surface, preferably similar to the inner and outer surfaces 24 and 23 of the upper reflector member 20. The links 27 have their lower ends bent into hooks so as to engage eyelet brackets 29 attached to the lower portion of the sides 28. This simple suspension means enables the diffusing and reflecting shield of the fixture to be easily detached and subsequently again attached

in place whenever the light bulb 22 requires replacing.

As will be apparent from Fig. 1, the lower portion of the diffusing and reflecting shield of the fixture is so positioned that the bottom lens 30 is only a very slight distance below the bottom of the light bulb 22, and inasmuch as only part of the light bulb extends below the ceiling light, the lens 30 will be located only a few inches below the ceiling. Thus the entire fixture extends only a minimum distance below the ceiling in the room, while the socket box 16 and outlet box 14 extend only a very short distance up to the ceiling. In the preferred form in which the fixture is shown in the drawings, the top of the side wall of the diffusing and reflecting shield is located in a horizontal plane placed a very slight distance below the horizontal plane determined by the bottom rim of the main reflector 20.

Due to this arrangement, relative position, and the relative size of the upper reflector member 20 and the lower diffusing and reflecting shield of the fixture, and due also to the fact that the inner surface of the side wall of the diffusing and reflecting shield and both inner and outer surfaces of the reflector member 20 constitute reflecting surfaces, it will be apparent that rays of light from the light bulb 22 will be reflected in various ways, as well as being transmitted downwardly through the bottom lens 30. Thus, referring to Fig. 1, the arrows x indicate the direction of some of the light rays transmitted directly to and through the bottom lens 30. The line w indicates some of the rays which will be directed upwardly against the inner reflecting surface 24 and thence these rays would of course be reflected downwardly through the lens 30.

The line y indicates some of the rays which will pass upwardly and outwardly from the light bulb directly to the ceiling, thus causing the ceiling to be illuminated for some distance about the fixture. In this way the fixture, although very close to the ceiling, does not cause the ceiling to appear dark around the fixture as is the case with fixtures which are mounted entirely within the ceiling.

Finally, the line z indicates rays which, after being reflected from the side wall 28 and the reflecting surface 23 of the upper reflector 20 pass outwardly and downwardly above the top line of the diffusing and reflecting shield.

From these examples of various ways in which the rays of light from the light bulb will be directed, transmitted, and reflected, it will become apparent that the light from the bulb and fixture will be diffused over a wide area both above and below the fixture. All this desired broad diffusion of light is accomplished with a fixture located at a maximum height in the room and taking up only a minimum amount of space, thus meeting the requirements for a fixture for a low-ceiling room.

In Figs. 5 and 6 I show a slight modification in the fixture in that the lower half of the fixture is circular instead of square. Thus a frusto-conical upwardly and outwardly sloping wall 31 is substituted for the four walls 28 of the square shield in Figs. 1 and 2 and a round lens 32 takes the place of the square lens 30. The upper reflector member 20, however, is not changed. Obviously the light rays are directed, transmitted and reflected in substantially the same manner as described with reference to Fig. 1.

Further slight modifications in the fixture would be possible within the scope of the inven-

tion. I prefer to have the fixture made in either of the two ways illustrated in the drawings since the fixture when so constructed is simple, relatively inexpensive to manufacture, and I have found the same to be very efficient from the light standpoint.

While as mentioned, the ceiling structure illustrated in Fig. 1 is of the wooden frame type, my improved lighting fixture obviously can be mounted in any ceiling. Thus in a metal ceiling construction, where I-beams or channel members take the place of wooden joists and other metal members are used, the socket housing 16 could obviously be secured to brackets or a yoke which in turn could be attached to the metal members in the ceiling in any suitable manner. No change in the fixture itself would be necessary.

I claim:

1. In a ceiling lighting fixture, a light socket, means for supporting said socket within the ceiling above the bottom face of the ceiling, a passageway through said ceiling to said light socket, a light bulb in said light socket, the distance of said socket above the bottom face of the ceiling being such that the main light producing portion of said light bulb will be immediately below said bottom face of the ceiling, a main reflector positioned on said ceiling around said passageway, said reflector having an outer upwardly and outwardly sloping reflecting surface and an inner upwardly and inwardly sloping reflecting surface, said outer and said inner reflecting surfaces having their top edges located substantially in said bottom face of the ceiling and said outer and said inner surfaces meeting at the bottom of said reflector, said bottom of said reflector extending about and spaced from said bulb and located in a horizontal plane between the bottom of said bulb and the ceiling, means for securing said reflector in position against the ceiling, a diffusing and reflecting shield located below said reflector, an upwardly and outwardly sloping wall in said shield, the top of said wall terminating a spaced distance below said ceiling, the bottom of said wall located at a greater distance laterally in all directions from the vertical center line of said light bulb than the bottom of said reflector and the top of said wall located at a greater distance laterally from said vertical center line than the top of said outer reflecting surface of said reflector, the inside face of said wall having a reflecting surface, the bottom of said shield located in a plane slightly below the bottom of said bulb, and means for suspending said shield in position.

2. In a ceiling lighting fixture, a light socket, means for supporting said socket within the ceiling, a passageway through said ceiling to said light socket, a light bulb in said light socket, the distance of said socket above the bottom face of the ceiling being such that the main light producing portion of said light bulb will be immediately below said bottom face of the ceiling, a main circular reflector positioned on said ceiling around said passageway, said reflector having an outer upwardly and outwardly sloping reflecting surface and an inner upwardly and inwardly sloping reflecting surface, said outer and said

inner reflecting surfaces having their top edges located substantially in the bottom face of the ceiling and said outer and said inner surfaces meeting at the bottom rim of said reflector, said bottom rim of said reflector encompassing and spaced from said bulb and located in a horizontal plane between the bottom of said bulb and the ceiling, means for securing said reflector in position against the ceiling, a diffusing and reflecting shield located below said reflector, an upwardly and outwardly sloping wall in said shield, the top of said wall terminating in a horizontal plane located slightly below the plane of said bottom rim of said reflector, the bottom of said wall spaced outwardly further from the center line of said bulb than said bottom rim of said reflector, the top of said wall spaced outwardly further from said center line of said bulb than the top of said outer reflecting surface of said reflector, the inside face of said wall having a reflecting surface, the bottom of said shield having a light diffusing lens and located in a plane slightly below the bottom of said bulb, and means for removably suspending said diffusing and reflecting shield from said reflector.

3. A ceiling lighting fixture of the character described including a socket housing mounted in the ceiling and open at the bottom, a light socket in said housing, a light bulb in said socket, the distance of said socket above the bottom face of the ceiling being such that the main light producing portion of said light bulb will be immediately below said bottom face of the ceiling, a main reflector positioned on said ceiling around said bottom opening in said housing, said reflector having an outer upwardly and outwardly sloping reflecting surface and an inner upwardly and inwardly sloping reflecting surface, said outer and said inner reflecting surfaces meeting at the bottom of said reflector, said bottom of said reflector extending about and spaced from said bulb and located in a horizontal plane between the bottom of said bulb and the ceiling, means for securing said reflector to said socket housing with the top edge of said outer reflecting surface against said bottom face of the ceiling, a diffusing and reflecting shield located below said reflector, an upwardly and outwardly sloping wall in said shield, the top of said wall terminating a spaced distance below said ceiling in a horizontal plane, the bottom of said wall spaced a greater distance laterally from the center line of said bulb than said top edge of said outer reflecting surface of said reflector, the inside face of said wall having a reflecting surface similar to the reflecting surfaces on said reflector, the bottom of said shield consisting of a light diffusing lens and located in a plane slightly below the bottom of said bulb, and means for removably suspending said shield in position.

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