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3,180,979

WARNING LIGHT

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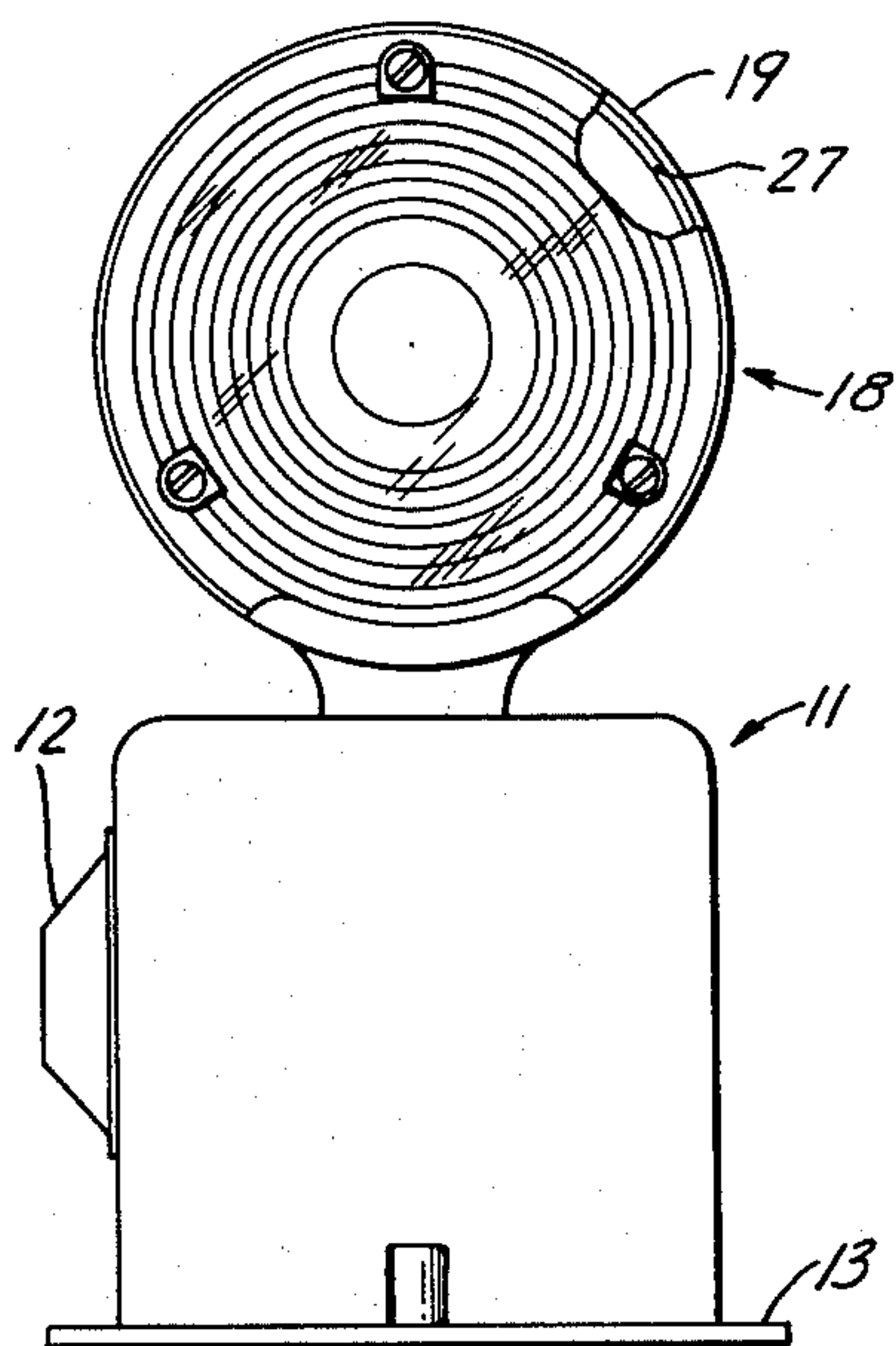


FIG. 1.

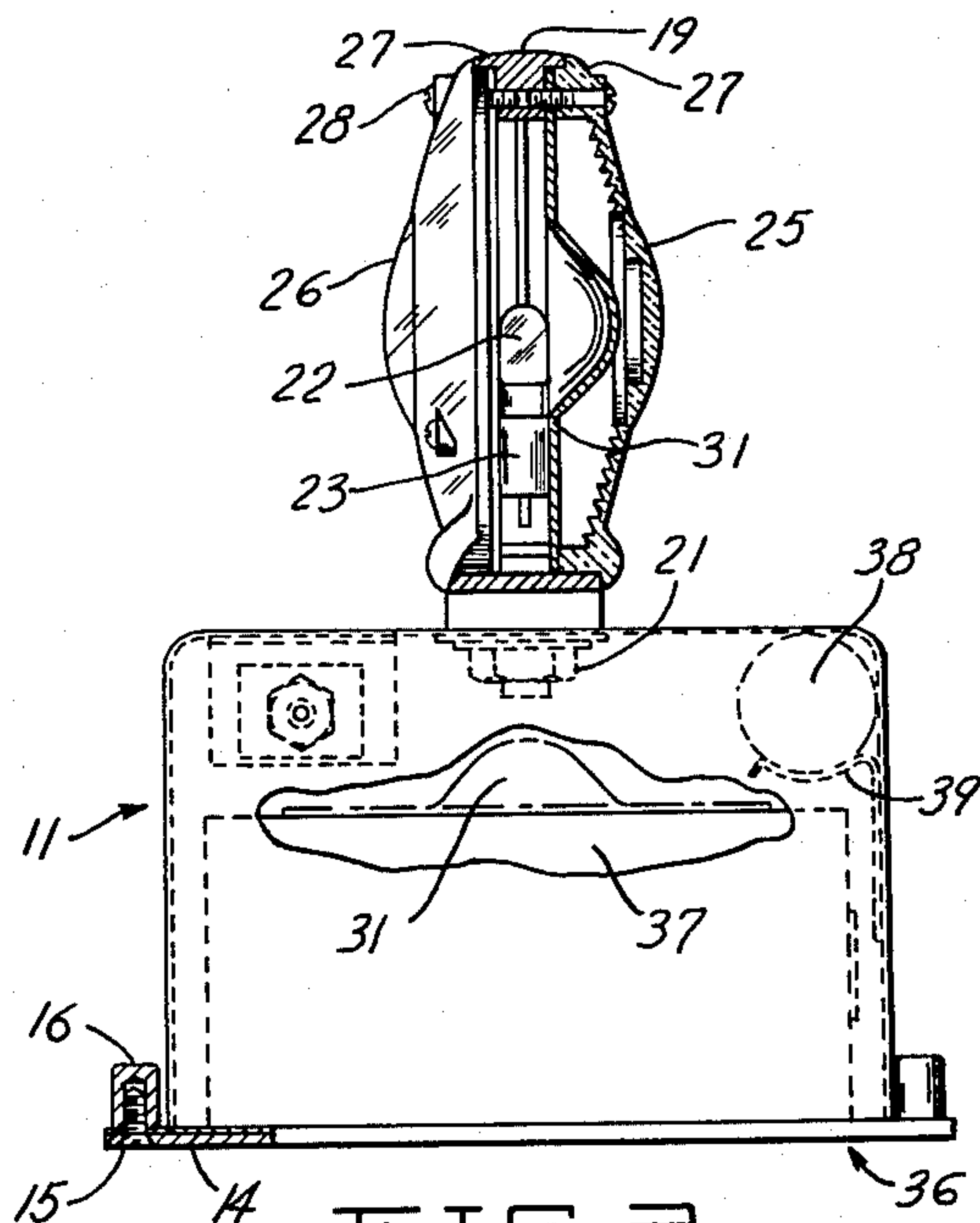


FIG. 2.

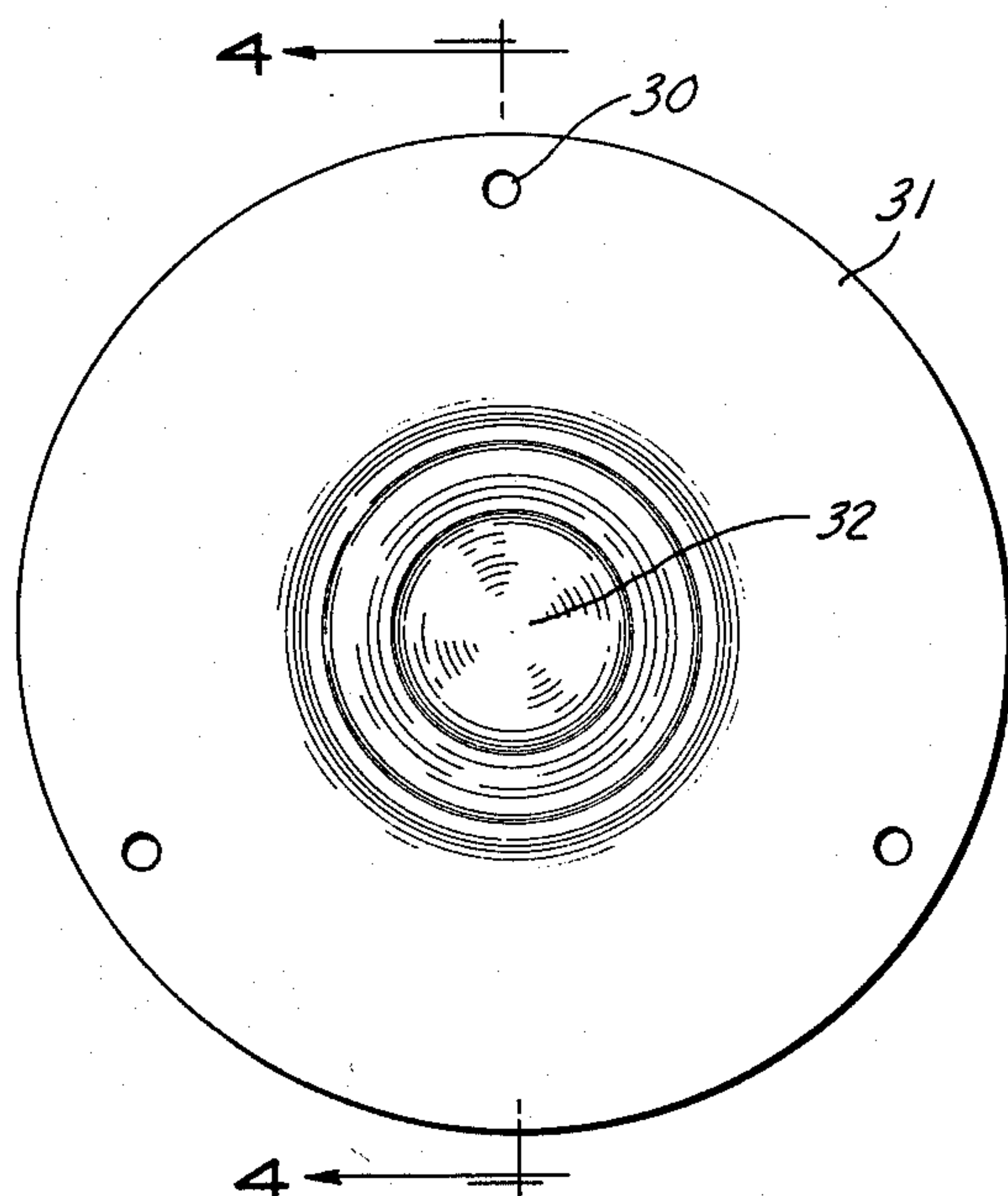


FIG. 3.

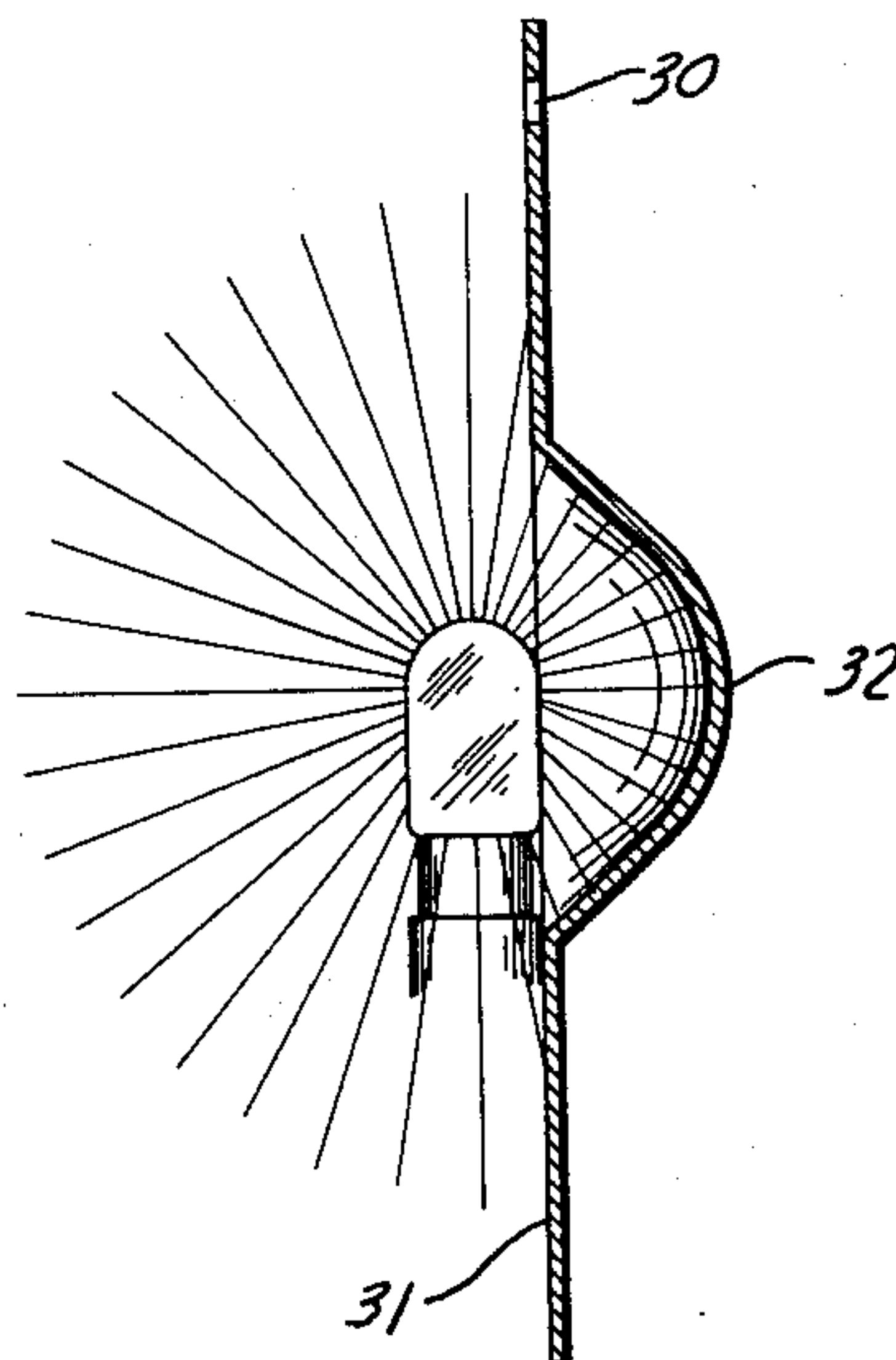


FIG. 4.

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WARNING LIGHT

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5 Claims. (Cl. 240-10.6)

This invention relates to a warning light and more particularly to a warning light which is convertible from a two-way light to a one-way light and vice versa.

Warning lights presently on the market have several disadvantages. One is that the brilliance of the lights utilized is so small that it is difficult to see the warning lights from a great distance. In addition, such warning lights also have a very short dwell time in order to conserve battery energy which also makes them more difficult to observe. Such lights have also been bidirectional which has often caused confusion when it is desired only to give a warning from one direction. There is, therefore, a need for a new and improved warning light which overcomes the above named difficulties.

In general, it is an object of the present invention to provide a warning light which overcomes the above named disadvantages.

Another object of the invention is to provide a warning light of the above character which has greatly increased brilliance.

Another object of the invention is to provide a warning light of the above character in which the light pattern is substantially broadened.

Another object of the invention is to provide a warning light of the above character which can be observed from much greater distances than conventional warning lights.

Another object of the invention is to provide a warning light of the above character which can be readily converted from unidirectional to bidirectional use.

Another object of the invention is to provide a warning light of the above character which can be readily converted from bidirectional use to unidirectional use.

Another object of the invention is to provide a warning light of the above character which has a removable reflector and in which the reflector can be stored in the case when it is not in use.

Another object of the invention is to provide a warning light of the above character which has greater physical strength.

Another object of the invention is to provide a warning light of the above character which can be readily and economically constructed.

Additional objects and features of the invention will appear from the following description in which the preferred embodiment is set forth in detail in conjunction with the accompanying drawings.

Referring to the drawings:

FIGURE 1 is a front elevational view of a warning light incorporating my invention with certain portions of the lens being broken away.

FIGURE 2 is a side elevational view of the warning light shown in FIGURE 1 partially in cross-section and with a portion of the case broken away.

FIGURE 3 is a front elevational view of the reflector utilized in the warning lamp.

FIGURE 4 is a cross-sectional view taken along the line 4-4 of FIGURE 3 and shows the light distribution from a lamp utilized with the reflector.

In general, my warning light consists of a case in which the power supply is mounted in the case. A head is mounted upon and supported by the case. The head consists of a substantially circular frame. A lamp is mounted in the center of the frame. At least one lens is provided on the frame on one side of the lamp. A removable reflector is also mounted on the frame on the

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other side of the lamp. The reflector has a planar outer margin and a semicircular recess disposed in the center of the reflector. The recess has a center which is substantially the center of the lamp. The diameter of the semi-circular recess is substantially less than the diameter of the reflector. Another lens may be also mounted on the other side of the frame to enclose the reflector. When the reflector is not in use, it can be stored within the case.

As shown in the drawings, my warning light consists of a rectangular case 11 which is provided with a supporting bracket 12 mounted on one side wall of the case. The case is also provided with an outwardly extending flange 13 which extends outwardly from the lower edge of the case and then downwardly to receive a plate 14 which is affixed to the plate by screws 15 extending upwardly into receptacles 16 provided in the case.

A head 18 is mounted on the upper portion of the case 11. The head consists of a substantially circular frame 19 which is affixed to the case 11 by suitable means such as by a nut 21. The frame 19 is formed in such a manner that it is substantially in the form of a ring or annulus which is open in both directions. A lamp 22 of a suitable type such as an incandescent lamp is supported within the frame 19 by a socket 23 in a position so that the center of the lamp is substantially in the center of the circular frame 19.

A lens 26 of a conventional type such as a Fresnel lens 26 is mounted on one side of the frame and on one side of the lamp 22. The lens 26 is seated in an annular groove 27 provided in the frame 19 and is held in place by suitable means such as screws 28 which are threaded into the frame. Another lens 25 of a conventional type and identical to the lens 26 is mounted on the other side of the frame and the other side of the lamp 22 in a similar manner to the lens 26.

The portion of the head hereinbefore described is substantially conventional except for the fact that the frame 19 has a larger opening for the same size frame than conventional heads. The warning light, when manufactured in this manner, is a bidirectional or two-way light because the light can shine in both directions from the lamp 22.

Now let it be assumed that it is desired to convert the head 18 into a unidirectional or one-way light. A reflector 31 of suitable material such as steel is then mounted on one side of the lamp. The reflector, as shown, is substantially circular and has a dimension such that it can fit within the groove 27 provided within the frame 19 so that it can be held in place by the same screws 28 which hold the lens in place. The reflector 31 is provided with holes 30 which are in alignment with the holes provided in the lenses 26 and 25 so that the screws 28 can be readily inserted through the same to hold the lens and reflector in place. When secured in this manner the reflector serves to strengthen the head assembly. The outer margin of the reflector, as shown particularly in FIGURES 3 and 4, is substantially planar as shown. A recess 32 is formed in the center of the reflector. As shown, it is substantially semi-circular and has substantially the same shape as a portion cut off of a sphere. The center of the recess 32 is substantially in the center of the lamp 22 when the reflector is in place. The diameter of the recess 32 is substantially less than the diameter of the reflector. The side of the reflector 31 facing the lamp is provided with a suitable reflecting surface such as a coating of aluminum.

A conventional power supply 36 is mounted within the case 11. The power supply includes a battery 37, a large capacitor 38 supported by a bracket 39, and other small components such as the transistors which are not shown. There is space provided between the upper part of the

battery and the upper part of the case 11 to receive the reflector 31 when it is not in use as shown particularly in FIGURE 2.

Operation and use of my warning light may now be briefly described as follows. Let it be assumed that the light has been utilized as a one-way or unidirectional light and that it is desired to convert the light to a bidirectional or two-way light.

The reflector 31 is removed by removing one of the lenses 25 by removing the screws 28. The reflector is then taken out from between the lens and the lamp, and the lens is then put back in place. The reflector is then stored within the case as shown particularly in FIGURE 2 by removing the two screws 15 provided in the receptacles 16 and removing the bottom plate and battery and placing the reflector 31 above it. By placing the reflector within the case, the user of the warning light is always assured that the reflector will be available so that it can be utilized at any time for converting the bidirectional light into a unidirectional light. In this way, it is not possible for the reflectors to become lost. The head is constructed in such a manner that the reflector can be mounted on either side of the lamp.

It has been found that the use of the reflector has many advantages. For example, it has been found that the use of the reflector at least doubles the light intensity from the warning light. This is primarily due to the fact that the semicircular recess 32 serves to concentrate the light from the lamp and reflect it out through the opposite lens in the manner shown in FIGURE 4. Also, it has been found that the use of the reflector broadens the light pattern from the warning light to provide a fuller pattern. This makes my warning light visible from much greater distances than conventional warning lights.

It is readily apparent that, if desired, the warning light can be constructed in such a manner that a lens is provided on one side only and a reflector of the type herein described is provided on the other side. The other lens can, therefore, be omitted to provide a light which is only unidirectional. Such unidirectional warning lights are very desirable because then the light will not serve to attract the attention of oncoming drivers approaching from an opposite direction.

I claim:

1. In a warning light, a case, a power supply mounted in the case, and a head mounted on the case, the head comprising a substantially circular frame, a lamp mounted in the frame, a lens mounted in one side of the frame and on one side of the lamp, a reflector mounted in the frame on the other side of the lamp and supported solely by said frame to provide an opaque partition coextensive with said frame, the outer annular margin of the reflector being substantially planar and having a width which constitutes a substantial portion of the reflector, the reflector also having a substantially hemispherical recess in the center thereof and having as its center the center of the lamp, the diameter of the recess being substantially less than the diameter of the reflector, the recess within the reflector serving

to concentrate the light rays of the lamp to reflect them through the lens, an additional lens, retaining means securing said additional lens to said frame on the side opposite the side on which the first named lens is mounted and enclosing said reflector, said retaining means serving also to secure said reflector to said frame.

2. In a warning light, a case, a power supply mounted in the case, a head mounted on the case, the head comprising a substantially circular frame, a lamp mounted in the frame, a lens mounted on each side of the frame and on opposite sides of the lamp, and a removable reflector mounted in the frame on one side of the lamp and between the lenses, the reflector having a substantially planar outer annular margin and a hemispherical recess in its central portion, the hemispherical recess having a diameter substantially less than the diameter of the reflector and having as its center the center of the lamp, the recess serving to concentrate the light rays from the lamp to reflect the same through the lens on the opposite side of the lamp, the outer annular portion having a width so that it constitutes a substantial portion of the reflector.

3. A warning light as in claim 2 wherein said case is provided with storage space within the same adapted to receive the removable reflector when it is not in use.

4. A warning light as in claim 2 wherein said frame has an inner open diameter substantially as great as the diameter of the reflector.

5. In a warning light, a case, a power supply mounted in the case, and a head mounted on the case, the head comprising a substantially circular frame, a lens mounted on each side of the frame, a lamp mounted between said lenses and disposed to direct light substantially equally toward each said lens, and a removable reflector mounted in the frame on one side of and free of the lamp and between the lenses, the reflector being opaque substantially coextensive with the lens mounted on the side of the lamp on which the reflector is mounted to prevent the passage of light therethrough to provide a one-way warning light, the reflector being disposed with respect to said lamp and said lenses that removal of said reflector serves to convert the head into a two-way warning light.

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