

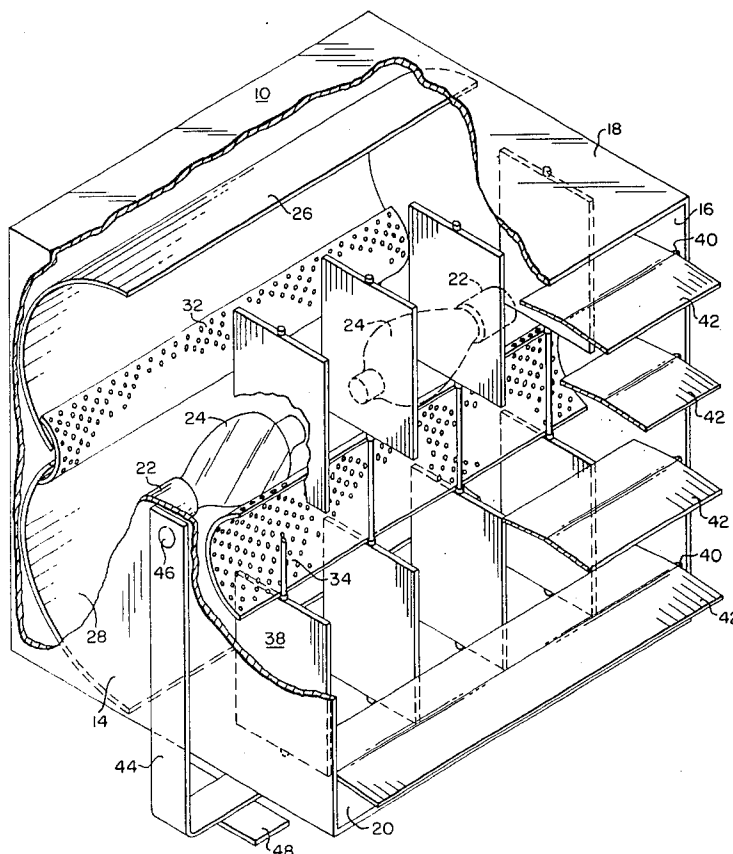
[54] **HIGH OUTPUT LOW BRIGHTNESS
VENTILATED LUMINAIRE**[75] Inventor: **Frank Van Steenhoven**, Hudson,
Ohio[73] Assignee: **Westinghouse Electric Corporation**,
Pittsburgh, Pa.[22] Filed: **Mar. 26, 1974**[21] Appl. No.: **454,984**[52] U.S. Cl. **240/47, 240/3, 240/41.35 R,**
240/46.07[51] Int. Cl. **F21v 29/00**[58] Field of Search **240/47, 41 R, 41.1, 41.15,**
240/41.35 R, 41.35 A, 41.35 P, 46.07, 46.31,
46.33, 46.37, 3, 103 R, 103 B[56] **References Cited****UNITED STATES PATENTS**

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[57] **ABSTRACT**

A multi-purpose, high output, low brightness luminaire employing a large open front box-like housing with opposed lamp sockets in the side walls adapted to accommodate high wattage, high intensity discharge (HID) lamps is disclosed. Upper and lower curved reflectors are mounted adjacent the back wall of the housing and an oppositely curved intermediate, perforated reflector overlies a space between the upper and lower reflectors. The perforated reflector directs air entering through the back wall both through the perforations to sweep the lamps as well as upwardly and downwardly over the upper and lower curved reflectors. A perforated reflector screen is also provided across the luminaire in front of the lamps to shield the lamp arcs from view and if desired, a plurality of vertically and horizontally oriented louvers are provided to selectively control light distribution.

14 Claims, 3 Drawing Figures

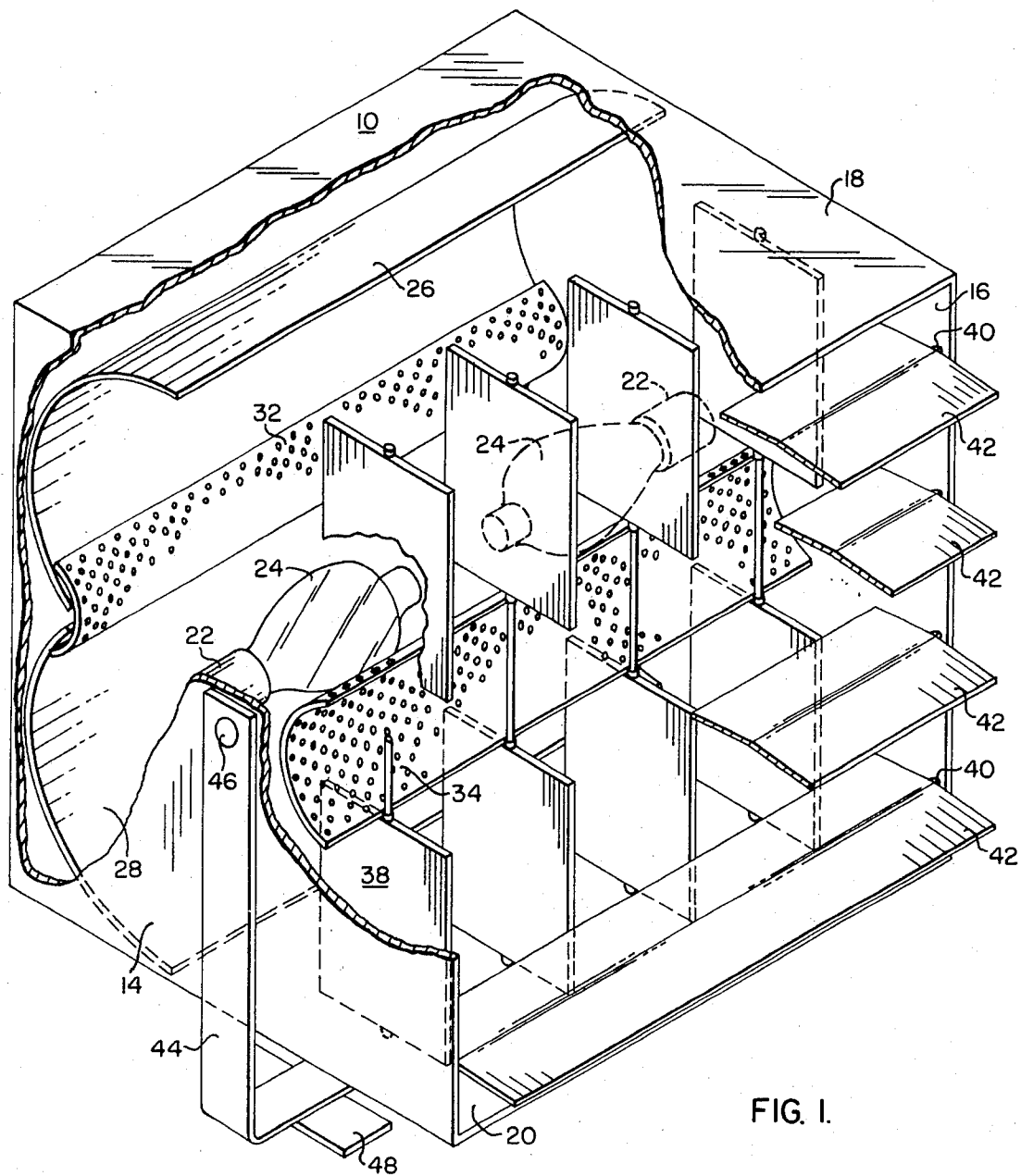


FIG. 1.

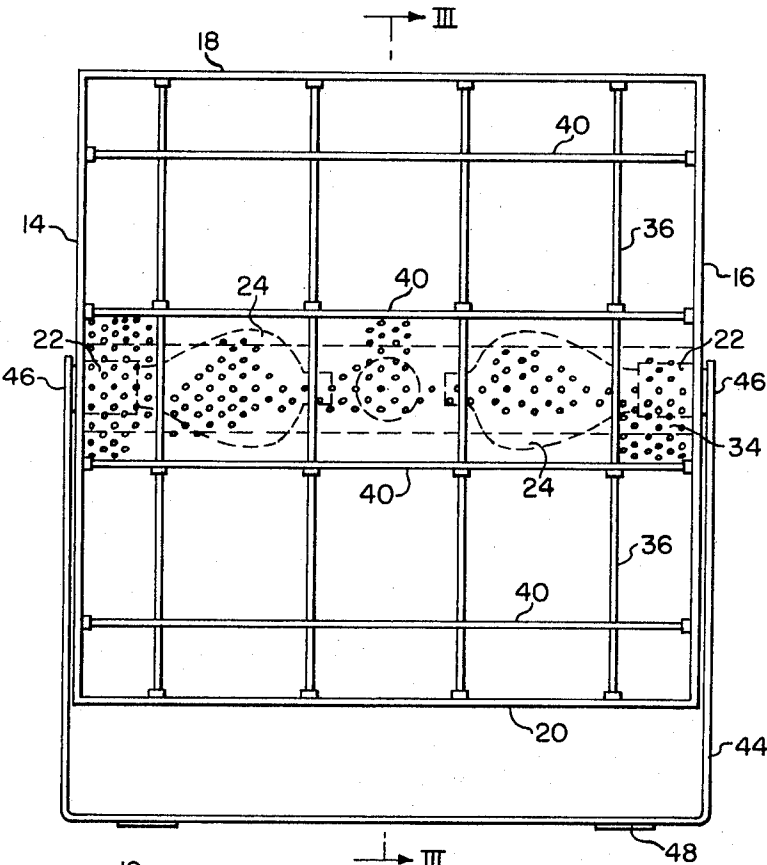


FIG. 2.

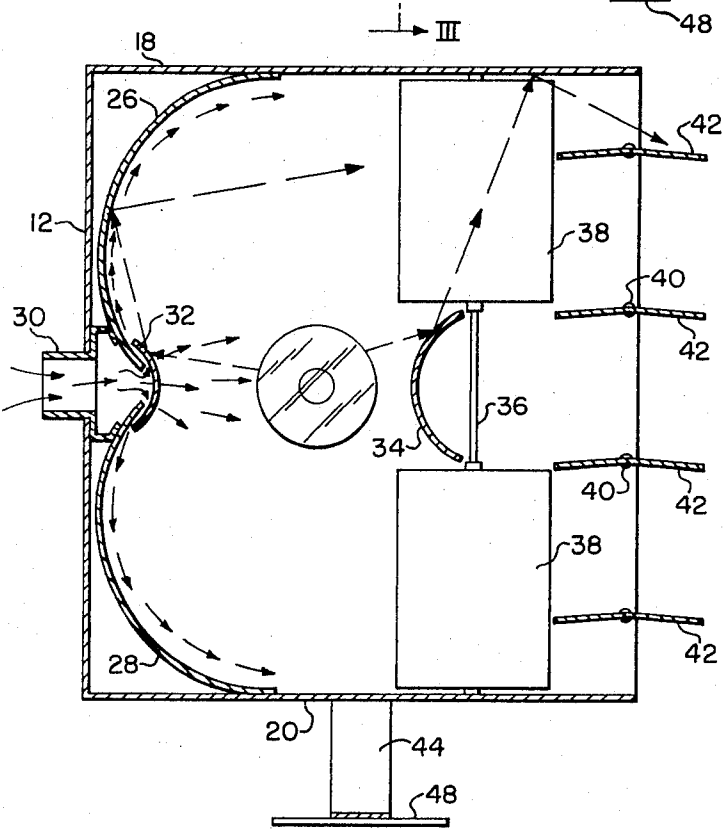


FIG. 3.

HIGH OUTPUT LOW BRIGHTNESS VENTILATED LUMINAIRE

BACKGROUND OF THE INVENTION

The application for a high output low brightness luminaire are many and varied and the number of such applications continues to rise. Unfortunately, these applications vary in their requirements to the extent several different kinds of luminaires are presently required to fulfill these many needs. Good color television of indoor athletic events require high output, color corrected, lighting generally with color corrected high intensity discharge lamps but visual brightness must be reduced for the comfort of the spectators present at the event. A multitude of industrial applications for high output low brightness luminaires also exist and many of these occur in somewhat dirty environments. Luminaire problems in dirty environment industrial applications are well known and the buildup of dirt and grime on open reflective surfaces and lamps has essentially precluded the use of open luminaires in these environments. Luminaires with sealed optical systems also have their drawbacks in terms of relamping the fixture as well as reduced light output from dirty refractors. Additionally, almost all of these fixtures provide significant brightness problems for people working in the environment when the luminaire is viewed directly. The need is clear for a high output luminaire which displays low brightness at normal viewing angles and has the facility to maintain clean optical surfaces even in dirty environments and in which the light distribution can be controlled based upon the particular illumination required.

SUMMARY OF THE INVENTION

The versatile high output, low brightness, ventilated luminaire of this invention fulfills many of the varied requirements of the lighting industry particularly in the areas of arena and industrial lighting situations. The high output, low brightness, ventilated luminaire of this invention includes an open front housing with a back wall, side walls, a top wall and a bottom wall with a discharge lamp socket mounted approximately midway between the top wall and the bottom wall in each of the side walls which discharge lamp sockets are arranged in facing relationship with respect to each other. Upper and lower curved reflectors are mounted adjacent the upper half and lower half of the back wall respectively with the upper edge of the lower reflector being slightly spaced from the bottom edge of the upper reflector. An oppositely curved perforated reflector overlies the lower edge of the upper reflector and the upper edge of the lower reflector and the space therebetween with the oppositely curved perforated reflector directing filtered air entering through an inlet in the back wall through the perforations to sweep the discharge lamps mounted in the sockets as well as upwardly and downwardly over the curved reflectors to sweep them clean and prevent dirt buildup on the reflector surfaces. A perforated shield is also mounted across the housing from one side wall to the other, approximately midway between the top wall and the bottom wall, forward of the discharge lamp sockets to shield the arc of the discharge lamp from view at normal viewing angles. Horizontally and vertically disposed baffles or louvers may be mounted in the front part of the luminaire housing, forward of the lamp sockets, which are individually and

selectively adjustable to control the particular light distribution of the luminaire.

BRIEF DESCRIPTION OF THE DRAWING

Many of the attendant advantages of this luminaire will become more readily apparent and better understood as the following detailed description is considered in connection with the accompanying drawing in which:

FIG. 1 is an isometric view of the luminaire of this invention with portions of the housing broken away;

FIG. 2 is a front elevation view thereof; and

FIG. 3 is a sectional view taken along the line III—III of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing, wherein like reference characters represent like parts throughout the several views, there is illustrated the versatile high output, low brightness, ventilated luminaire generally designated 10. The luminaire has a box-like, open front, housing including a back wall 12, side walls 14 and 16, a top wall 18 and a bottom wall 20. A lamp socket 22 is mounted on the interior surface of each of the side walls 14 and 16 approximately midway between the top wall 18 and the bottom wall 20. The sockets 22 are in an opposed relationship with respect to each other and are adapted to receive any of several types of high intensity discharge (HID) lamps such as, for example, the color corrected metal halide lamp or the high pressure sodium ceramic discharge lamp. A pair of such lamps are illustrated in the drawing at 24. Upper and lower curved reflectors 26 and 28 are mounted adjacent the back wall of the luminaire housing and are illustrated in FIG. 3 as being retained by an air inlet mounting bracket 30. Preferably three such air inlet brackets 30 are equidistantly spaced across the back wall 12. It should be understood that the upper and lower curved reflectors 26 and 28 may be mounted directly to the back wall in any conventional manner in nonventilated configurations of the luminaire of this invention. The upper of the lower reflector 28 and the bottom edge of the upper reflector 26 are spaced slightly from each other and an oppositely curved reflector 32 overlies that space as well as the bottom edge of the upper curved reflector and the upper edge of the bottom curved reflector 28. The oppositely curved reflector 32 is preferably perforated and serves both as an air screen and a reflector in a manner which will be later described.

A perforated shield or light screen 34 is mounted across the housing from the side wall 14 to the side wall 16 approximately midway between the top wall 18 and the bottom wall 20 slightly forward of the discharge lamp sockets. The perforated shield or screen 34 is curved and both transmits and reflects light emanating from the discharge lamps while shielding the arc of the discharge lamps from view at normal viewing angles.

If desired, particular light distribution patterns can be selectively controlled through a plurality of horizontally and vertically mounted louvers or baffles adjacent the front end of the luminaire housing. A plurality of vertical posts 36 have mounted thereon for rotation thereabout vertically disposed louvers or baffles 38. Each of the louvers or baffles 38 are independently rotatable through 180° about the rods 36. Forward of the

baffles 38 are a plurality of horizontally disposed rods 40 which extend from the side wall 14 to the side wall 16 and upon which are mounted horizontal louvers or baffles 42. Each of the horizontal baffles or louvers 42 is mounted for rotation about the horizontal rods 40 through 180° independently of each other and are selectively positionable along with the vertical baffles or louvers 38 to selectively distribute the light from the luminaire 10 in a selected light distribution pattern.

The luminaire 10 is primarily designed to accommodate a pair of oppositely disposed 1000 watt gas discharge lamps 24 but it will be readily apparent that the luminaire can accommodate lamps of higher or lower wattage. The perforated diffusing light screen 34 is less than 25 percent and preferably about 18 percent open perforated steel with a thin coating of baked enamel on the surface facing the discharge lamps in order to reflect light which does not pass through the screen back to the other reflective surfaces of the luminaire housing as illustrated by the arrow in FIG. 3.

The entire interior surface of the luminaire housing is preferably covered by a thin coat of baked white enamel including the concavely curved upper and lower reflectors 26 and 28. The oppositely, convexly curved perforated air screen 32 is also preferably coated with a thin coat of baked white enamel and the staggered perforations preferably render the screen less than 25 percent and about 18 percent open. The air screen 32 serves two ventilating functions. In the preferred embodiment three 1-inch diameter air inlet brackets 30 are equidistantly spaced across the back wall and are adapted to direct filtered air at the air screen 32 with a portion of the air stream flowing through the perforations which sweeps over the discharged lamps preventing dirt from settling and building up on the lamps. The air screen 32 also redirects a portion of the air stream upwardly and downwardly to sweep the curved reflectors 26 and 28 to blow away dirt from the reflective surfaces before it can settle thereon and reduce the reflectivity of those areas. A third function of the oppositely curved reflector, air screen 32 is to reflect light from the discharge lamps out of the luminaire housing by way of other reflective surfaces so that the light will not be reflected back through the arcs.

The luminaire is illustrated as being mounted rotatably on a gimbaled mounting bracket 44 at pivot points 46 which permits the mounting bracket to be mounted through cross braces 48 either vertically or horizontally with a wide range of variations in aiming directions being thus available.

As will be apparent from the foregoing, the multipurpose, high output, low brightness luminaire of this invention is highly versatile in its applications as a high light output luminaire. The curved perforated light diffusing screen 34 eliminates glare from the arcs of the discharge lamps at normal viewing angles while permitting light to pass directly from the luminaire housing while reflecting the remainder of the direct light output to various reflective surfaces of the interior of the luminaire housing to provide for maximum illumination with minimum glare. The rear reflective structure including the convexly curved perforated intermediate reflector or air screen 32 permits air entering through one or more inlets in the back wall of the housing to flow both directly over the lamps to keep their surfaces clean as well as redirecting the air in a manner which

causes it to sweep the primary reflective elements, curved reflectors 26 and 28, also eliminating any buildup of dirt on these surfaces. The plurality of vertically and horizontally disposed baffles or louvers 38 and 42 permit the luminaire light output to be selectively controlled in order to provide an optimum light distribution pattern and better fulfill the intended purpose of the luminaire.

What is claimed is:

1. A high output, low brightness luminaire comprising:

- a housing, including a back wall, side walls a top wall and a bottom wall;
- a pair of opposed discharge lamp sockets mounted in said side walls approximately midway between said top wall and said bottom wall,
- a pair of concave reflectors, one of said reflectors mounted adjacent the top half of said back wall and the other of said reflectors mounted adjacent the bottom half of said back wall,
- a convex reflector mounted between said concave reflectors and overlying the bottom edge of the upper reflector and the top edge of the lower reflector, and;
- a perforated shield extending across said housing from one side wall to the other side wall approximately midway between said top wall and said bottom wall forward of said opposed discharge lamp sockets, said perforated shield being constructed and arranged to shield the arc of discharge lamps mounted in said opposed sockets from view at normal viewing angles.

2. The high output, low brightness luminaire according to claim 1 wherein said perforated shield is curved and the side thereof facing said lamp sockets is reflective.

3. The high output low brightness luminaire according to claim 2 wherein said perforated shield is less than 25 percent open.

4. The high output low brightness luminaire according to claim 1 wherein at least one air inlet is provided in said back wall adjacent the center thereof and said convex reflector is perforated.

5. The high output low brightness luminaire of claim 1 wherein a plurality of light directing baffles are mounted in a vertical array between said top wall and said bottom wall adjacent said perforated screen, said light directing baffles being individually and selectively adjustable to control the light output pattern of said luminaire.

6. The high output, low brightness luminaire according to claim 1 wherein a plurality of light directing baffles are mounted in horizontal array between said side walls forward of said perforated screen, said light directing baffles being individually and selectively adjustable to control the light output pattern of said luminaire.

7. The high output low brightness luminaire according to claim 1 wherein two sets of light directing baffles are mounted in said luminaire, a first set mounted between the top and bottom walls and a second set mounted between said side walls with each baffle of each set being individually and selectively adjustable to control the light distribution of said luminaire.

8. A high output, low brightness, ventilated luminaire comprising:

an open front housing including a back wall, side walls, a top wall and a bottom wall;
 a discharge lamp socket mounted approximately midway between said top wall and said bottom wall in each of said side walls, said discharge lamp sockets being arranged in facing relationship one to the other;
 an upper curved reflector mounted adjacent to the upper half of said back wall;
 a lower curved reflector mounted adjacent the lower half of said back wall with the upper edge of said lower reflector being slightly spaced from the bottom edge of said upper reflector;
 an oppositely curved reflector overlying the lower edge of said upper curved reflector, the upper edge of said lower curved reflector and the space therebetween, said oppositely curved reflector being perforated; and
 at least one air inlet in said back wall proximate said space between said upper and lower curved reflectors, whereby air passing through said inlet in part passes through the perforations in said oppositely curved reflector to sweep discharge lamps mounted in said discharge lamps sockets and in part is redirected by said oppositely curved reflector to sweep said upper and lower reflectors.

9. The high output, low brightness, ventilated luminaire according to claim 8 wherein a perforated shield is mounted across said housing from one side wall to the other side wall approximately midway between said top wall and said bottom wall forward of said discharge lamp sockets, said perforated shield being constructed

and arranged to shield the arc of the discharge lamps mounted in said sockets from view at normal viewing angles.

10. The high output, low brightness, ventilated luminaire according to claim 9 wherein said perforated shield is curved and the side thereof facing said lamp socket is reflective.

11. The high output, low brightness, ventilated luminaire according to claim 10 wherein said perforated shield is less than 25 percent open.

12. The high output, low brightness, ventilated luminaire according to claim 9 wherein a plurality of light directing louvers are mounted in vertical array between said top wall and said bottom wall adjacent said perforated shield, said light directing louvers being individually and selectively adjustable to control the light output pattern of said luminaire.

13. The high output, low brightness, ventilated luminaire according to claim 9 wherein a plurality of light directing louvers are mounted in horizontal array between said side walls forward of said perforated shield, said light directing louvers being individually and selectively adjustable to control the light output pattern of said luminaire.

14. The high output, low brightness, ventilated luminaire according to claim 8 wherein two sets of light directing louvers are mounted in said luminaire, a first set mounted between the top and bottom walls and a second set mounted between said side walls with each louver of each set being individually and selectively adjustable to control the light distribution of said luminaire.

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