United States Patent [19]

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[11] **3,711,702**

[45] **Jan. 16, 1973**

[54] **HEAVY DUTY FLOODLIGHT**

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[52] **U.S. Cl.** .....**240/47,** 240/41 R

[51] **Int. Cl.** **F21m**

[58] **Field of Search** .....240/47, 41 R, 41 BM, 41 SB, 240/25, 20

[56] **References Cited**

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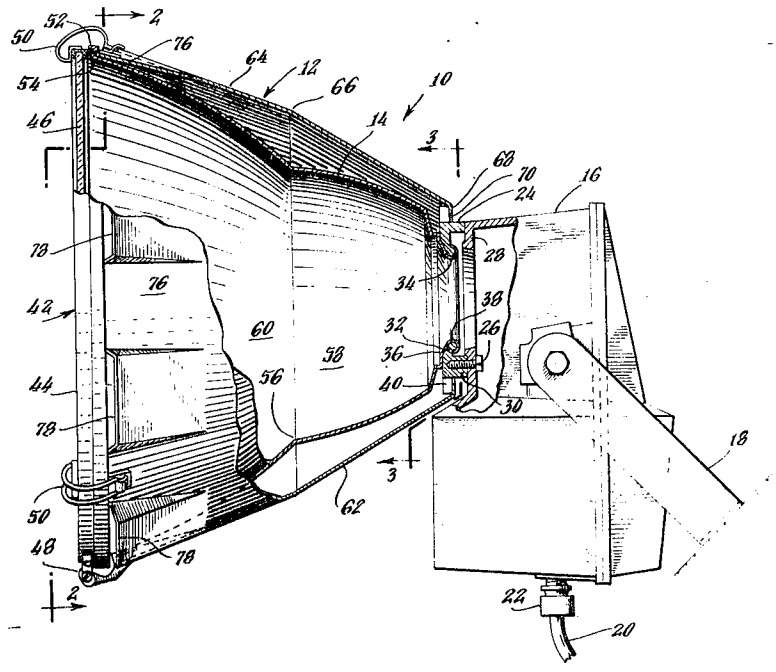
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Assistant Examiner—Richard L. Moses
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[57] **ABSTRACT**

A heavy duty floodlight having an outer housing or cowling and a separate inner housing or reflector with a lens cover adapted to tightly seal the inner housing. The cowling is provided with slots in a rear inwardly extending flange, and air scoops at the front edge extending radially beyond the frame of the lens cover to permit air to circulate through the space formed between the reflector and the cowling and the surrounding air. This circulation helps to cool the floodlight and the lamp mounted therein and prevents the building up of heat between the housings regardless of the orientation of the floodlight. The reflector and the cowling may be complementarily shaped to provide venturi sections to aid in the circulation of air therebetween.

5 Claims, 7 Drawing Figures



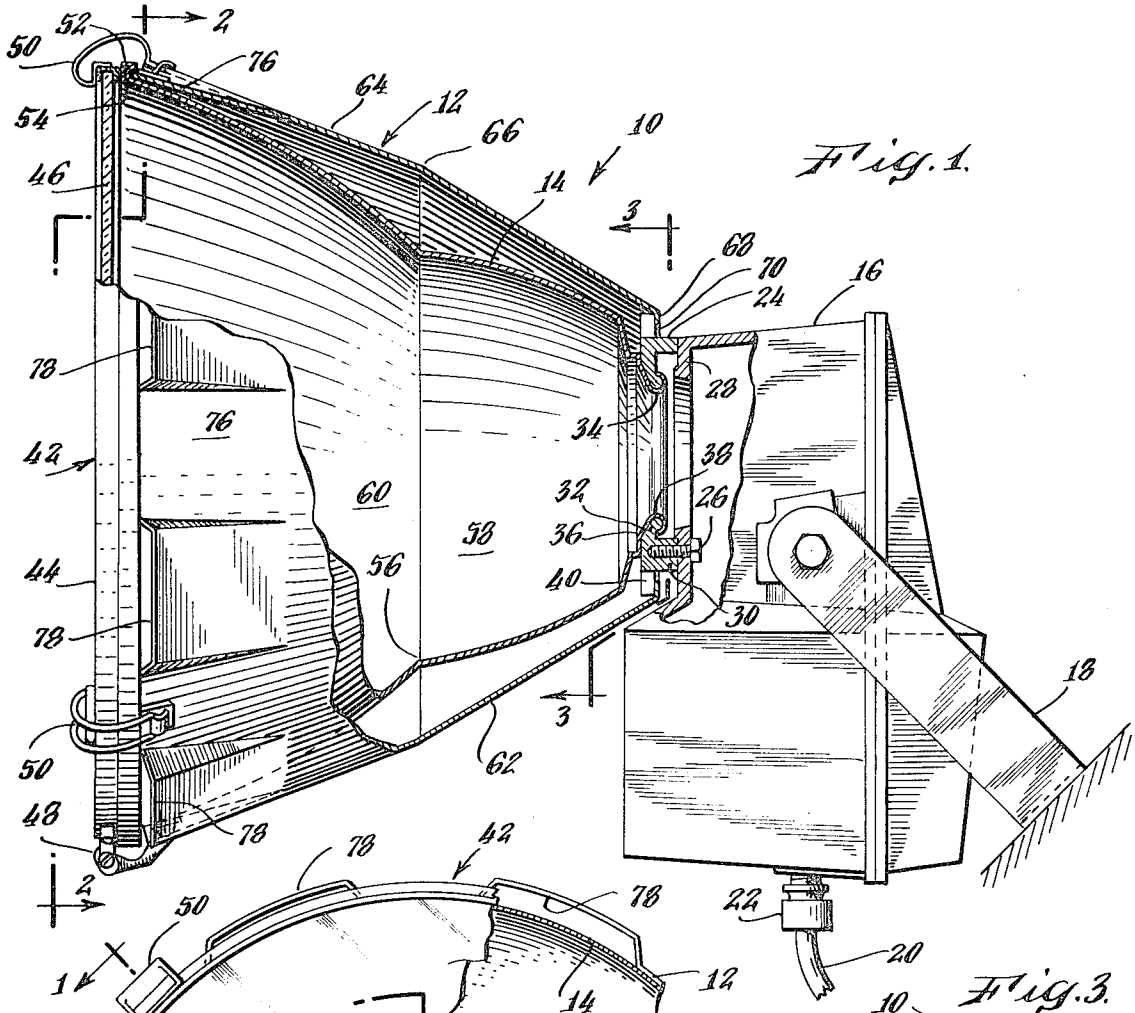


Fig. 1.

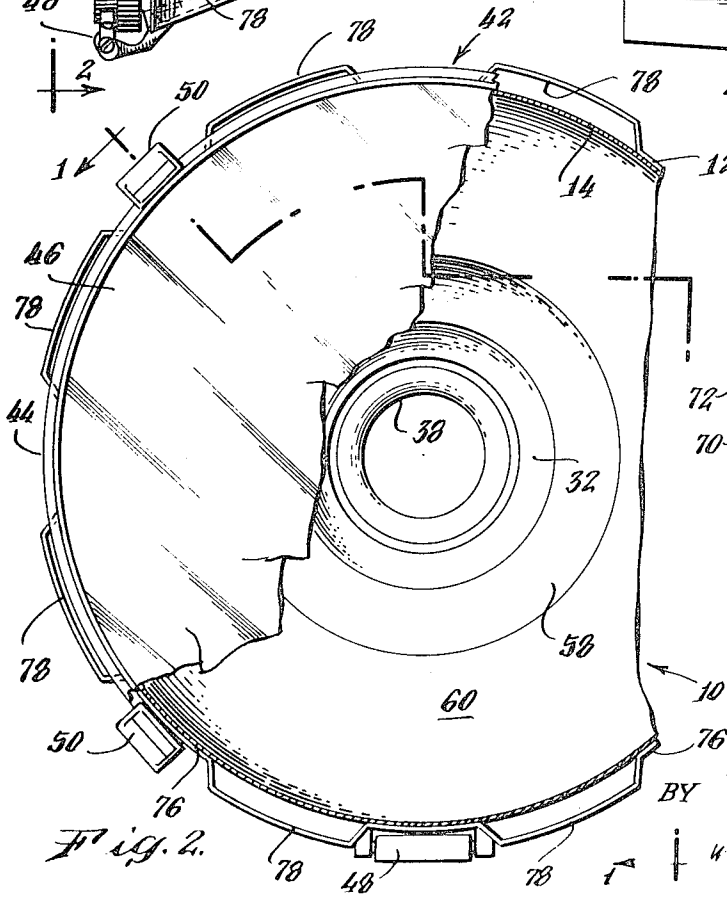


Fig. 2.

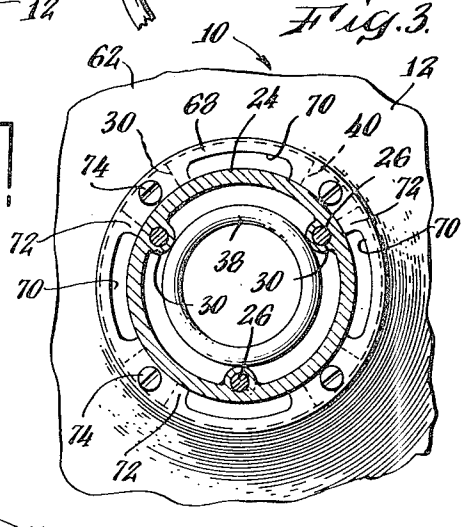


Fig. 3.

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Fig. 5.

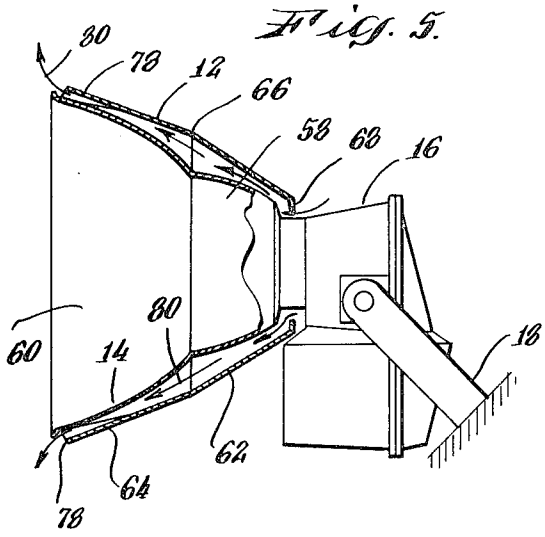


Fig. 7.

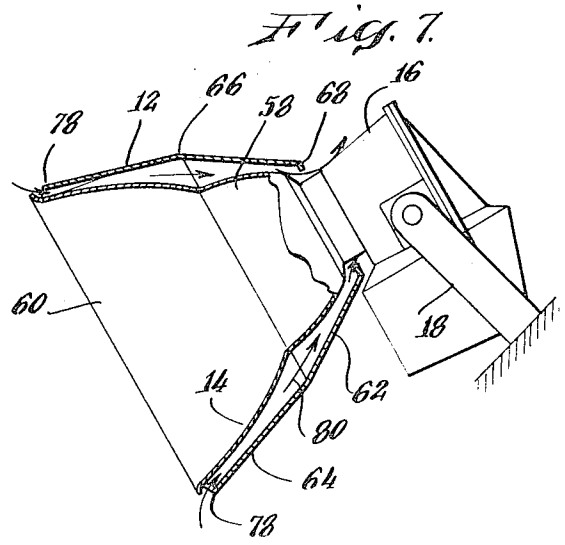
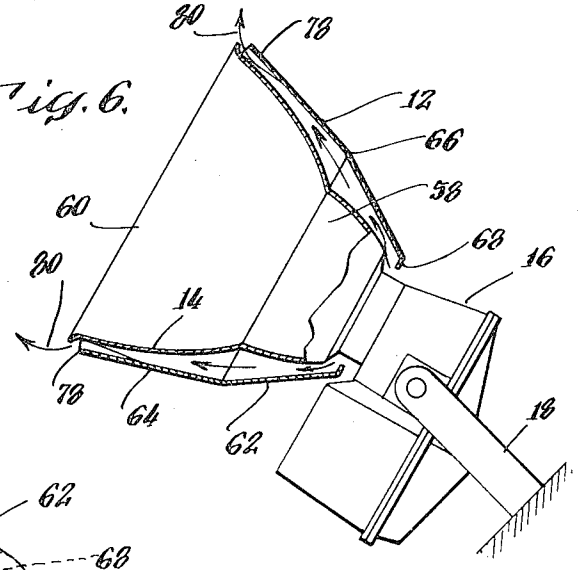


Fig. 6.



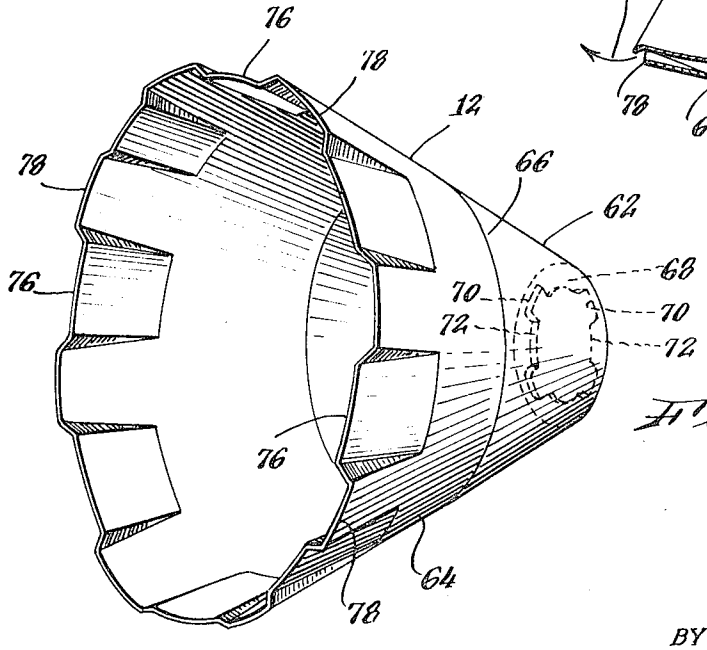


Fig. 4.

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HEAVY DUTY FLOODLIGHT

BACKGROUND OF THE INVENTION

This invention relates to floodlights and more particularly to heavy duty floodlights having inner and outer housings.

With the increasing use of floodlights especially in outdoor environments for use not only with sport fields but with shopping and parking areas to reduce the incidence of crime there has developed a need for a more reliable heavy duty floodlight which is weatherproof and has a longer useful life. One type of heavy duty floodlight which has been utilized especially in outdoor environments is the double housing type in which a separate outer housing or cowling and an inner housing or reflector are provided. The major difficulty with such floodlights has been the deterioration of the reflector coating and the overheating of the floodlights due to the extreme temperatures to which these floodlights are subjected. The extreme temperatures are due to the heat generated by the lamp being trapped inside the reflector by the thermos bottle effect created by the sealed cowling and reflector and the closed air space therebetween.

SUMMARY OF THE INVENTION

This problem is overcome by the present invention by a novel heavy duty double housing floodlight in which the cowling is provided with openings at the front and rear to allow air to circulate between it and the reflector. More specifically, a plurality of circumferentially spaced slots are provided in a radially extending flange at the rear of the cowling and a plurality of circumferentially displaced scoops are provided at the front end of the cowling to provide satisfactory air flow between the cowling and the reflector. In addition, the cowling and reflector are uniquely shaped so as to provide venturi sections to assure adequate circulation of the air regardless of the orientation of the floodlight.

It is therefore a primary object of the present invention to provide an improved heavy duty double housing floodlight which is more reliable and has a longer useful life.

It is another object of the present invention to provide a novel heavy duty double housing floodlight in which air is permitted to circulate through the space between the cowling and the reflector.

It is still another object of the present invention to provide a novel heavy duty double housing floodlight in which venturi sections are provided between the cowling and the reflector to facilitate and promote full circulation of air therebetween. It is a further object of the present invention to provide a novel heavy duty double housing floodlight having adequate circulation of air between the cowling and the reflector regardless of the orientation of the floodlight.

BRIEF DESCRIPTION OF THE DRAWINGS

These, as well as, other objects and advantages will become apparent from a perusal of the appended claims and the following description when read together with the accompanying drawings in which:

FIG. 1 is a side elevation of a preferred embodiment of the present invention, partially broken away to illustrate the unique configurations of the cowling and the reflector and their assembly;

FIG. 2 is a front elevation, partially broken away, taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a rear sectional view of the mounting of the cowling and the reflector to the socket and circuit element housing taken substantially along lines 3—3 of FIG. 1;

FIG. 4 is a perspective view of the novel cowling; and

FIGS. 5 through 7 are diagrammatic illustrations indicating the flow of air between the cowling and the reflector for various positions of the floodlight.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Now, referring to the drawings, and more particularly to FIGS. 1 through 4, the heavy duty double housing floodlight of the present invention, which is designated generally at 10, includes an outer housing or cowling 12 and an inner housing or reflector 14 mounted at their rear end to a socket and circuit element housing 16. The floodlight is mounted to a suitable support by means of a bracket 18 which may be a U-shaped bracket having the bight portion fixedly secured to the supporting means and the legs pivotally mounted to the housing 16. The mounting of the housing 16 to the bracket 18 is not shown in detail, however, it may be of the type illustrated in applicant's U.S. Pat. No. 3,505,515. Housing 16 includes a conventional lamp socket (not shown) which is connected to a suitable power source by power cord 20 connected to the housing 16 through a conventional sealing bushing assembly 22 which prevents entry of foreign matter into the housing 16.

The cowling 12 and the reflector 14 are rigidly secured to the housing 16 by means of a trunnion ring 24 which is rigidly secured to the housing 16 in a suitable manner such as cap screws 26. The cap screws 26 extend through an inwardly extending annular flange 28 on the housing 16 and threadably engage a plurality of bosses 30 integrally formed in the trunnion ring 24. The trunnion ring 24 includes an annular, angularly, inwardly directed flange 32 terminating in an annular, axially extending lip 34 having a smoothly curved surface. The reflector 14 is substantially conically shaped having a wide opening at the front end and a smaller opening at the rear end terminating in a similarly angled annular flange 36 which abuts the flange 32, and an axially extending collar 38 which is rolled over the lip 34 to rigidly secure the reflector 14 to the trunnion ring 24. The details of this mounting arrangement of the reflector 14 with the trunnion ring 24 is more specifically described in applicant's U.S. Pat. No. 3,476,925. The trunnion ring 24 also includes a plurality of outwardly extending bosses 40 circumferentially spaced about its periphery to which the cowling 12 is rigidly secured as will be described hereinafter.

A front lens cover 42 is provided to tightly seal the reflector 14 to prevent foreign matter from entering therein. The cover 42 includes an annular frame 44 which has a substantially U-shaped cross section for supporting a transparent lens 46 made of heat resistant glass or a suitable plastic. The cover is secured to the cowling 12 by a suitable hinge 48 and a plurality of overcenter toggle clamps 50. With the toggle clamps in closed position a sealing gasket 52 is urged into tight engagement with an S-shaped lip 54 at the flared end of the reflector 14.

The reflector **14** is suitably shaped to provide the desired beam type. To provide improved air circulation in the space formed between it and the cowling **12** it is provided with a necked-in portion **56** which effectively divides the reflector **14** into two sections, the rear section **58** having a substantially flared shape and a front section **60** having a wider flared section. The curvatures of these two sections **58** and **60** may be selected to provide the type of beam concentration desired.

The cowling **12** which is shown more clearly in FIG. **4** is substantially conical in cross section, and has a front portion **64** which is slightly less flared than a rear portion **62** to form a convex annular ridge **66**. The convex ridge **66** is positioned on the cowling **12** so as to be radially opposite from the necked-in portion **56** of the reflector **14** when the floodlight is assembled.

The rear portion **62** terminates in an inwardly extending radial flange **68** which is scalloped to provide a plurality of slots **70** and bosses **72** alternately disposed about its periphery. The bosses **72** are suitably apertured so that screws **74** may be extended therethrough and secured to the bosses **40** extending radially outward from the trunnion ring **24** to fixedly secure the cowling **12** to the trunnion ring **24**.

The front end of the front portion **64** has a diameter slightly larger than that of the diameter of a front end of the reflector **14**, and is provided with a plurality of depressed portions **76** having an inner diameter substantially the same as the outer diameter of the front end of the inner housing **14**. These depressed portions **76** engage the outer periphery of the reflector **14** and provide the surfaces of the cowling **12** to which the hinge **48** of the lens cover **42** is mounted and which the clamps **50** engage. Formed between each of the depressed portions **76** are air scoops **78** which extend radially beyond the frame of the lens cover **42** to insure an unobstructed opening from the space between the cowling **12** and the reflector **14** to the surrounding air.

As stated previously, the convex ridge **66** of the cowling **12** is radially opposite from the necked-in portion **56** of the reflector **14**. This structural configuration forms a space between the cowling **12** and the reflector **14** which is reduced at both the front and rear ends and substantially wider at the midsection. This unique configuration of the space is specifically provided to effectively create venturi sections in both the front and rear ends to aid in the circulation of air through the space.

The circulation of air from the space between the cowling **12** and the reflector **14** and the surrounding air through the scoops **78** and slots **70** is primarily due to the fact that hot air is lighter than relatively colder air and therefore tends to rise. The air in the space between the cowling **12** and the reflector **14** will be heated by the lamp and will tend to rise and exit either through the scoops **78** or the slots **70** depending on the orientation of the floodlight. This rising hot air aided by the venturi sections formed by the shapes of the cowling **12** and the reflector **14** not only eliminates the thermos bottle effect of a sealed double housing floodlight but will also function to cool the floodlight thereby avoiding the deleterious effect of extreme temperatures and increasing its useful life. This increased heat transfer will also tend to lengthen the useful life of the lamp itself.

As stated above, the direction of the airflow is dependent upon the orientation of the lamp and is effective whether the floodlight is directed horizontally or vertically up or down. The direction of such airflow for different orientations of the floodlight are illustrated in FIGS. **5** through **7**. For example, in FIG. **5** the floodlight is illustrated as being directed in a horizontal plane and the airflow as indicated by the arrows **80** is in through the rear slots **70** and out through the air scoops **78**. The same direction of airflow will also occur when the floodlight is directed upwardly as illustrated in FIG. **6**. When the floodlight is directed downwardly as illustrated in FIG. **7**, the flow of air would be in the opposite direction, namely, in through the air scoop **78** and out through the slots **70**.

Thus, the present invention provides an improved heavy duty double housing floodlight in which the extreme temperatures caused by the thermos bottle effect of previously known floodlights of this type are eliminated by providing full circulation of air between the housings. By this unique configuration the present invention provides a more reliable and longer lasting floodlight as well as increasing the useful life of the lamp.

Although the invention is described with reference to a preferred embodiment, it will be apparent to those skilled in the art that additions, deletions, modifications, substitutions and other changes not specifically described or illustrated may be made which will fall within the purview of the appended claims.

What is claimed is:

1. A heavy duty floodlight comprising:

a circuit element housing;

a reflector having a front end and a rear end mounted to said circuit element housing;

a cowling having a front end and a rear end mounted to said housing surrounding said reflector and defining rear openings at said rear end and front openings at said front end;

said cowling including a plurality of depressed portions which engage said front end of said reflector, said front openings being defined by spaces between said front end of said cowling and said front end of said reflector interposed between said depressed portions; and

said reflector and said cowling being dimensioned so as to provide an air space therebetween communicating with said front and rear openings to permit air to circulate therethrough, and being shaped to form at least one venturi section within said air space.

2. The floodlight of claim **1** further including cover means for sealing said reflector,

said cover means including a hinge connected to said cowling at one of said depressed portions and clamp means adapted to engage said cowling at another of said depressed portions for urging said cover means into sealing engagement with said reflector.

3. The floodlight of claim **2** wherein said reflector includes a necked-in portion between said front and rear ends thereof and said cowling includes a convex ridge between said front and rear ends thereof radially opposite from said necked-in portion to form an enlarged portion of said air space with smaller portions on either

side, said enlarged portion and said smaller portions cooperating to provide two venturi sections within said air space, and

wherein said cowling includes an inwardly extending flange at said rear end thereof, said rear openings being defined by said flange.

4. A heavy duty floodlight comprising:

a circuit element housing;

a reflector having a front end and a rear end mounted to said circuit element housing;

a cowling having a front end and a rear end mounted to said circuit element housing surrounding said reflector and defining rear openings at said rear end and front openings at said front end;

said reflector and said cowling being dimensioned so as to provide an air space therebetween communicating with said front and rear openings to permit air to circulate therethrough, and

said reflector including a necked-in portion between said front and rear ends thereof and said cowling including a convex ridge between said front and rear ends thereof radially opposite from said necked-in portion to form an enlarged portion of said air space with smaller portions on either side, said enlarged portion and said smaller portions cooperating to provide two venturi sections within said air space.

5. A heavy duty floodlight comprising:

a circuit element housing;

a reflector having a front end and a rear end mounted to said circuit element housing;

a cowling having a front end and a rear end mounted to said circuit element housing surrounding said reflector, and including an inwardly extending flange at said rear end, said cowling defining rear openings in said flange and front openings at said front end; and

said reflector and said cowling being dimensioned so as to provide an air space therebetween communicating with said front and rear openings to permit air to circulate therethrough, and being shaped to form at least one venturi section within said air space.

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