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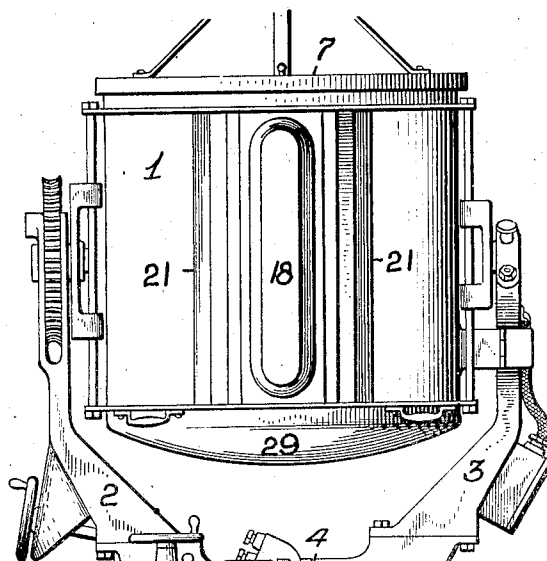
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E. A. SPERRY

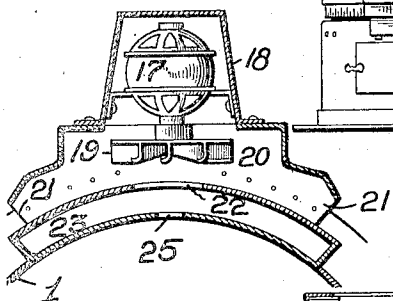
SEARCHLIGHT COOLING AND VENTILATING MEANS

Filed Aug. 30, 1921

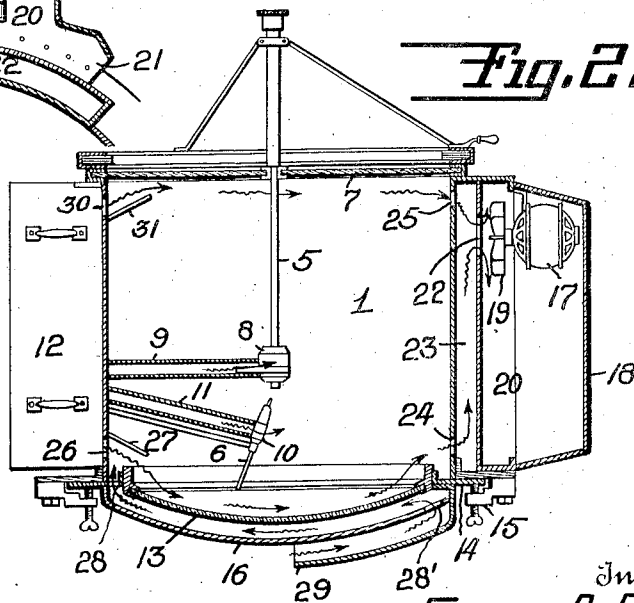
*Fig. 1.*



*Fig. 3.*



*Fig. 2.*



Inventor  
**ELMER A. SPERRY.**  
By his Attorney  
*Herbert H. Thompson*

# UNITED STATES PATENT OFFICE.

ELMER A. SPERRY, OF BROOKLYN, NEW YORK.

## SEARCHLIGHT COOLING AND VENTILATING MEANS.

Application filed August 30, 1921. Serial No. 496,808.

This invention relates to the ventilating and cooling of searchlights or flood lights or other projectors. Especially in searchlights employing a powerful light source, such as the high intensity arc, the light condenser or reflector of the searchlight is subjected to considerable heat, which, unless carried away, is likely to cause serious damage to said reflector. Accordingly, one of the objects of my invention is the provision of means for cooling the reflector or condenser. I accomplish this by causing air to flow along the reflector, preferably over both the inner and outer surfaces thereof.

Another object is to provide means for passing air along the glass front door of the searchlight drum. Where searchlights are used for spotting aircraft, the drum is frequently turned so that the front door thereof is above the arc and is thus exposed to considerably more heat than when the drum is turned to its horizontal position. Similarly, when flood lights are utilized to illuminate tall buildings, it is necessary to burn them in a more or less vertical position. Under these circumstances, it becomes especially desirable to cool said front door.

By causing air currents to flow over the reflector and the glass front door of the searchlight, said door and reflector are not only cooled, but are furthermore washed clean of any smoky deposits and particles that may collect thereon.

Other objects and advantages will become apparent as the description of the invention is hereinafter developed.

Referring to the drawings wherein I have shown what I now consider to be the preferred form of my invention:

Fig. 1 is a view in elevation of a searchlight embodying my invention, the searchlight drum being shown in vertical position.

Fig. 2 is a vertical sectional view through the searchlight drum of Fig. 1, certain parts appearing in elevation.

Fig. 3, is a detail sectional view, the motor and fan being shown in elevation.

The searchlight drum is shown at 1 pivotally mounted between standards 2, 3, for movement about a horizontal axis. The standards 2, 3, are carried by a base 4 which is rotatable about a vertical axis. The drum can be turned about said horizontal and vertical axes, through any of a variety of means well understood in the art and

which will not be described here. In Fig. 1 said drum is shown turned to point vertically upward.

Within the drum 1 are the positive and negative electrodes 5 and 6. The positive electrode 5 is shown extending through the glass front door 7 of the searchlight drum and adjacent its arcing end is supported in a holder 8 carried by a standard 9. An electrode holder 10 carried by a standard 11 serves to support the negative electrode 6. The standards 9 and 11 are supported by a control box 12, which is carried by the searchlight drum and contains mechanism for feeding the electrodes, as is known in the art. As shown, said standards may be hollow and air may be forced therethrough to cool the electrode holders and to remove fumes from the arc. This may be accomplished by a blower within the control box, as shown in my prior patent No. 1,282,133, October 22, 1918.

Mounted in the rear of the drum 1 is a reflector or condenser 13, which may be supported by an annular frame or casting 14 secured to the drum by suitable clamps 15. A dish shaped shield 16 is attached to frame 14 behind reflector 13 and serves to protect the latter. In order to prevent the intense heat of the arc from damaging the reflector, I have provided means for passing air in contact therewith. For this purpose I have shown a motor 17 mounted within a housing 18 mounted on the searchlight drum, said motor driving an exhaust fan 19. The latter may be mounted within a suitable chamber 20 which is shown open, at its ends 21, said chamber communicating through an opening 22 with another chamber 23. The latter chamber is shown communicating directly with the interior of the drum 1 through openings 24 and 25.

As fan 19 is rotated, air is drawn through suitable openings (not shown) in control box 12, thence through opening 26 in the drum, whereupon the air is directed by a baffle plate 27 against the inner surface of the reflector 13, thence along said reflector through opening 24, chamber 23, opening 22, chamber 20 and out through openings 21.

To aid in the cooling of the reflector, air may also be caused to flow over the rear or outer surface thereof. For this purpose, apertures 28, 28' may be provided in frame 14 and shield 16, respectively, and a curved

hood 29, open at one end, may be secured to frame 14, said hood extending over a portion of the shield 16. With this construction it will readily be seen that air will be drawn by fan 19 through hood 29, aperture 28', along the rear of the reflector and thence through aperture 28, whereupon said air joins the air that issues through aperture 26 and is drawn along the inner surface of the reflector and thence out through chamber 20. The air that is drawn through hood 29 thus serves to aid in cooling the inner surface of the reflector as well as the outside thereof.

I may employ fan 19 for the further purpose of drawing air along the front door 7. An aperture 30 is shown in the drum 1 adjacent the door 7 and a baffle plate 31 may be provided for directing the air that issues from said aperture into contact with said door. Hence, as fan 19 rotates, air is drawn along door 7, through aperture 25, aperture 22, and thence out through chamber 20.

The provision of the chamber 23 between the interior of the drum and the exhaust opening 25 renders more efficient the cooling of the reflector and front door. If the exhaust opening aforesaid communicated directly with the interior of the drum, it will be seen that while, by placing said opening adjacent the front door, a sufficient current of air could be maintained along said door, insufficient air might be drawn along the reflector. However, by means of chamber 23, a powerful suction may be maintained over both apertures 24 and 25, so that strong drafts of air over both the front door and the reflector result. Preferably, the opening 22 should be at least equal in size to openings 24 and 25 combined.

It will thus be seen that I have provided means for maintaining a flow of air simultaneously over both the reflector and the glass front door of the searchlight drum. This flow of air not only serves to cool said door and drum, but further washes away any smoky deposits that may collect there. The cooling of the front door becomes especially desirable when the searchlight is tilted to bring said door above the arc, since the door is then exposed to more of the heat of the arc, than when the searchlight is in horizontal position. It will be further apparent that the suction created by fan 19 aids in withdrawing from the drum, the air which is forced through standards 9 and 11.

This application is a continuation in part of my copending application which matured into Patent No. 1,412,757 on the 11th day of April, 1922, for "military searchlights".

As an example of the numerous modifications which may be made in my invention, it may be pointed out that chamber 23, instead of being exterior to the drum, might

be inside the latter, and that the number of air outlet openings may be varied.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus, which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use. It should be understood that by the term searchlight in the appended claims I do not limit myself to a lamp which projects parallel rays, but use the term to include flood lights which project diverging rays.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. In a searchlight having a drum, a reflector and a front door having a surface in direct contact with the heat of the light, means for ventilating and cooling said surface, comprising an air inlet adjacent said surface, and an air outlet adjacent said surface and positioned substantially diametrically opposite said inlet and power means for causing a flow of air between said inlet and outlet so that a stream of air is directed parallel to and in contact with said surface.

2. In a searchlight having a drum, a reflector and a front door having a surface in direct contact with the heat of the light, means for ventilating and cooling said surface, comprising means for directing a stream of air parallel to and in contact with said surface, and means positioned closely adjacent said surface substantially diametrically opposite said first means for withdrawing said air.

3. In a searchlight having a drum, a reflector and a front door having a surface in direct contact with the heat of the light, means for ventilating and cooling said surface, comprising an air inlet adjacent said surface, and an air outlet adjacent said surface and positioned substantially diametrically opposite said inlet so that a stream of air is directed parallel to and in contact with said surface, and a blower positioned adjacent one of said air passages.

4. In a searchlight having a drum, a reflector and a front door having a surface in direct contact with the heat of the light, means for ventilating and cooling said surface, comprising an air inlet adjacent said surface, means for directing the air from said inlet along said surface and for preventing passage of the air toward said light,

an air outlet adjacent said surface and positioned substantially diametrically opposite said inlet and power means for causing a continuous flow of air regardless of the position of the drum so that a stream of air is directed parallel to and in contact with said surface.

5. In a searchlight, a drum, a condenser at the rear of said drum, a door at the front thereof, an exhaust blower carried by said drum, and a chamber having an opening adjacent said blower and other openings adjacent the inner surface of said door and said condenser for causing currents to flow over the same.

6. In a searchlight having a front door the inner surface of which is in direct contact with the heat of said light, a drum having outlets and inlets adjacent the inner surface of said door and a blower for causing a current to flow from said inlets to said outlets over said door.

7. In a searchlight having a front door the inner surface of which is in direct contact with the heat of said light, a drum having

outlets and inlets adjacent the inner surface of said door located on a line parallel to said surface, and means for causing a current to flow from said inlets to said outlets.

8. A searchlight, comprising in combination a drum, a reflector, a front door, an arc lamp within said drum, a chamber on said drum located above said lamp, a second chamber above said first chamber in communication therewith, a blower in the latter chamber for drawing air from said first chamber, said drum having inlets on the side supporting the lamp and outlets communicating with said first chamber, said inlets and outlets being adjacent to the reflector and located on a line parallel to the edge thereof, said drum also having inlets on the side supporting the lamp and outlets communicating with said first chamber, said latter inlets and outlets being adjacent to the front door and located on a line parallel to the same.

In testimony whereof I have affixed my signature.

ELMER A. SPERRY.