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METHOD OF AND APPARATUS FOR VENTILATING SEARCH LIGHT CASINGS.

APPLICATION FILED JAN. 9, 1917.

1,281,754. Patented Oct. 15, 1918.

Fig. 1.

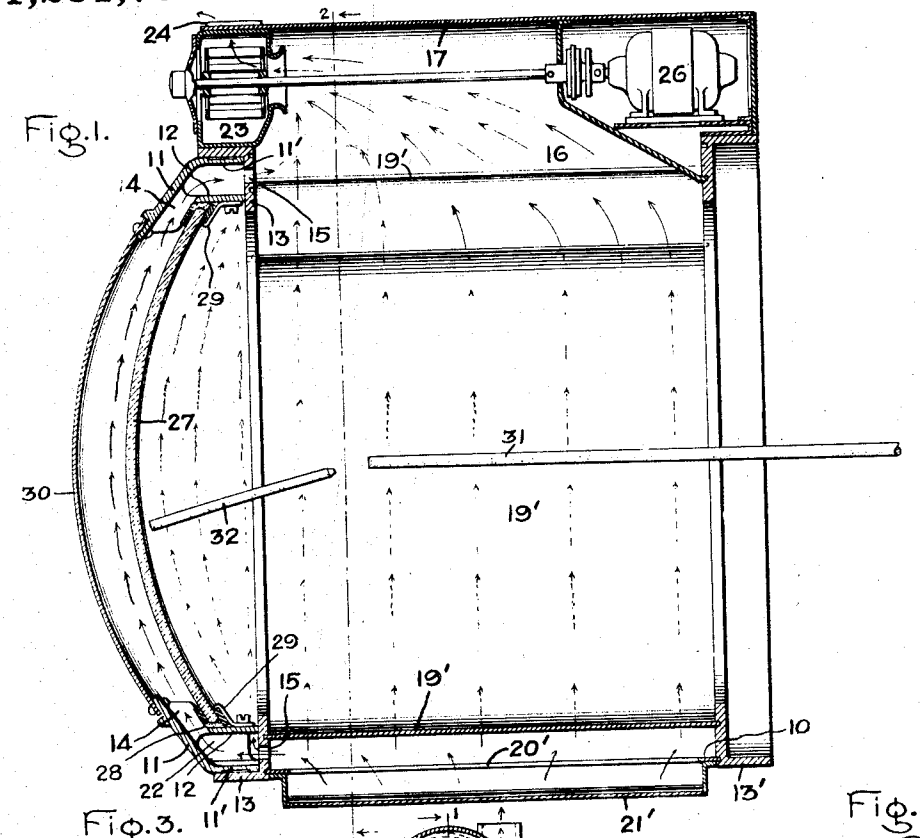



Fig. 3.

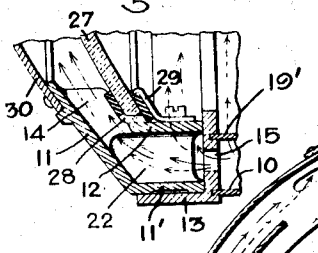



Fig. 4.

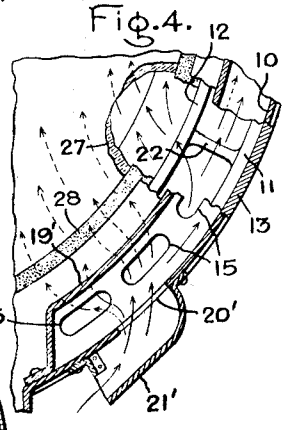



Fig. 2.




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by Albert G. Davis
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# UNITED STATES PATENT OFFICE.

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## METHOD OF AND APPARATUS FOR VENTILATING SEARCH-LIGHT CASINGS.

1,281,754. Specification of Letters Patent. Patented Oct. 15, 1918.

Application filed January 9, 1917. Serial No. 141,471.

*To all whom it may concern:*

Be it known that I, HEINRICH BECK, a subject of the German Emperor, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Methods of and Apparatus for Ventilating Search-Light Casings, of which the following is a specification.

My invention has reference to improvements in the method of and apparatus for ventilating searchlight casings within which a powerful arc lamp is maintained and which naturally evolves a great amount of heat which, unless it is dissipated or carried off is liable to injure the casing and particularly the reflector used as a part of the apparatus.

In carrying out my invention I use a power driven ventilating fan in such manner as to draw the heated air from all parts of the casing and the products of combustion from the neighborhood of the arc and expel them into the open air, while cool air is drawn in and is selectively distributed in multiple branches around the edge and behind the reflector, along the walls of the casing and through the arc space, so as to keep the apparatus at a sufficiently low temperature to avoid the danger of injury by heat to which it would otherwise be subjected. The apparatus used in accordance with my invention is illustrated in the accompanying drawing as follows:

Figure 1 is a section on the line 1—1, of Fig. 2, viewed from the left-hand side. Fig. 2 is a vertical section on line 2—2 of Fig. 1, viewed from the right-hand side. Fig. 3 is an enlarged view of the structure shown on the left hand lower corner of Fig. 1 and Fig. 4 is an enlarged view of the structure shown on the right-hand lower corner of Fig. 2 with some parts broken away. Like numerals of reference indicate like parts throughout the drawing.

The searchlight casing is here shown as having the general outline of a cylinder 10, which at one side, the left-hand side on the drawing, is secured to a hollow ring casting composed of two annular elements 11 and 12. The parts 11 and 12 are united by a number of cross-pieces 14, which are integral parts of the casting. The element 11, considered by itself, is an annular, angular flange having a cylindrical branch 11′. The element 13 is an independent flange, rectangular in cross-section, and its cylindrical member passes over and is secured to the cylindrical member of flange 11, while the flat annular member of flange 13, extends across the space between the elements 11 and 12, but has a number of oblong perforations 15 distributed in the manner shown in Fig. 2 which will be described farther on. One edge of the casing 10 is set into a groove in the flat annular member of flange 13 and at the other end the edge of the cylindrical casing is set into a like groove in the flat, annular member of flange 13′. In this manner the casing is held securely between the two flange structures 13, 13′. The flange 13′ also serves as a support for the front shutter and for the window of the searchlight; but this is not shown in the drawing, for the sake of simplicity of illustration and because this feature is well understood by those skilled in the art. It is well known that the window of the casing is made up of strips of glass with their edges in contact, so that admission of air to the arc space of the casing is there limited but not entirely prevented.

The cylindrical casing has a wide opening 16, in its top part and a dome 17 surmounts the casing as a roof over the opening 16. Within the dome 17 a ventilator and a motor for driving the same are housed, as will be described farther on. The lower part of the casing terminates in a recess 18 for the reception of the regulating mechanism of the arc lamp for the searchlight. This recess is as usual, practically air-tight but is shown in Fig. 2 as largely cut away; nor is the regulating mechanism shown, since this forms no part of my present invention. Inside of the cylindrical casing, concentric with and liberally spaced from the same are two curved baffle plates 19, 19′. These baffle plates are also set with their edges into groves in the flat annular members of the flanges 13, 13′, as indicated in Figs. 1 and 3; they extend from the upper side edges of the recess 18 in the lower part of the casing upwardly to within some distance from the dome 17, and thus form with the casing two channels for the passage of air.

In its lower part, on each side of the recess 18, the casing has a wide longitudinal slot 20 and 20′, respectively, and these slots

are covered by hoods 21, 21′ which open downwardly so as to prevent largely the entrance of dust through the slots.

As shown in the drawings, some of the elongated perforations 15 are in the lower parts of the flat annular member of flange 13 between the cylindrical casing and each of the curved baffle plates 19, 19′. Three such elongated perforations are shown in the drawing, on either side of the recess 18, but a greater or smaller number might be used. In the upper part of the flat member of flange 13, in the region of the dome 17, there is a greater number of elongated perforations, 15, seven of which are indicated in the drawing, but a greater or lesser number may be used.

Between the cylindrical branch of the angular flange 11 and the cylindrical element 12, beyond the last of the perforations 15 on either side of the recess 18, is a fender 22, which would effectually close the annular passage formed by the elements 11, 12, if it were not for the fact that this fender is slightly cut away at its top edge, as indicated in Figs. 1 and 3, so that only a limited passage is left open for the circulation of air, which enters by hoods 21 and 21′ and the elongated perforations 15. The air which there enters rises and passes out by the elongated perforations 15 at the top of the flat annular branch of the flange 13 and from there into the hood 17 and through the ventilator 23, and out by the exhaust pipe 24. The ventilator is located at one end (the left-hand end, as shown in Fig. 1) of the hood 17 in a housing 25. The ventilator is driven by an electric motor 26, mounted at the right-hand end of the hood 17 and is there housed in and protected against access of smoke and other products of combustion, as indicated in Fig. 1.

A reflector 27, usually of the parabolic form and made of glass, is mounted behind the flat annular branch of the flange 13. The edge of this reflector is seated in a gasket 28 of some soft yielding material, such as felt, leather or asbestos. This gasket is lodged at the angle between the elements 12, 14 and is held in place by suitable clips 29. Behind the reflector the latter is protected by a dished shield 30 of sheet metal, which is secured to the outwardly inclined branch of the flange 11, so that a free space between the reflector and shield is formed, through which the greater portion of the air which enters by the elongated perforations 15 passes, the cross pieces or braces 14 being so narrow that they offer no sensible obstruction.

The electrodes 31, 32 of the arc lamp supposed to be installed in the casing are indicated diagrammatically in Fig. 1, the positive electrode 31 being arranged horizontally, while the negative electrode 32 is at an angle thereto. It is understood that in operation the crater formed in the arcing end of the positive electrode is located and maintained in the focus of the reflector.

The arc between the electrodes generates a considerable amount of heat and produces smoke and vapors, which if not effectively dissipated and removed, respectively, would injure the reflector. The heat would tend to distort and crack the reflector and the smoke and vapors would tend to become deposited on the reflector and thus render it ineffective in a short time. With the arrangement shown and described these dangers and difficulties are avoided by creating cooling drafts of fresh air in the hollow ring formed by the elements 11, 12, 13 and in the channel behind the reflector, in the channels between the baffle plates and the casing and in the arc space, whereby the heat generated by the arc is dissipated and the smoke and vapors are removed by suction as follows:

When the arc is established and the ventilator is started, air is drawn into the casing through the downwardly directed openings of the hoods 21, 21′, and a portion of it, rises between the baffle plates 19 and 19′, respectively, and the casing 10 and passes by the opening 16 into the dome 17 and then through the ventilator 23 and out by its exhaust pipe 24. The draft thus created induces by injector action a gentle upward draft through the space in which the electrodes are situated, which carries the products of combustion together with a little fresh air sucked in between the edges of the glass strips which form the window of the casing, into the dome 17 and through the ventilator. Another branch of the current of air that enters by the slots 20, 20′ passes through the elongated perforations 15, on either side of the recess 18, directly through the space between the back of the reflector and the shield 30, and by the elongated perforations 15 in the region of the dome 17, into the dome, and through the ventilator. Two other, but restricted, branches of the air current entering by the elongated perforations 15 pass through the hollow ring formed by the elements 11, 12, 13 above the upper edges of the fenders 22 and issue by the elongated perforations 15 into the region of the hood 17.

From the foregoing it will be understood that only a small amount of air is drawn by injector action together with the products of combustion into the dome and through the ventilator; in fact only as much air as is easily replaced from the outside through the extremely small chinks between the edges of the glass strips which form the ordinary window of searchlights. Therefore, the upward draft within the arc chamber is sluggish and does not cause flickering or distortion of the arc. On the other hand, the air currents between the baffle plates and

the casing and the air current at the rear of the reflector are very vigorous; while the air currents through the hollow ring are less vigorous, owing to the presence within the ring of the fenders 22. I have found that this selective distribution of fresh air through the apparatus effectively prevents undue rise of temperature and effectively disposes of the products of combustion. The direction of the various air currents is indicated in the drawing by numerous arrows; those in dotted lines indicating air currents which pass behind or below the structural parts shown in the drawing, while the arrows in solid lines indicate air currents which pass in front of or above the structural parts shown.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of ventilating an arc searchlight casing which consists in drawing air into the casing and selectively distributing it in definite multiple branches around the edge and behind the searchlight reflector and along the inner walls of the casing, and inducing by the latter an injector action, whereby the products of combustion are drawn from the arc space and replaced by air from the outside, substantially as described.

2. The method of ventilating an arc searchlight casing which consists in causing two air currents to enter the casing, to divide each of them into unobstructed branches behind the searchlight reflector and along the inner walls of the casing and into two restricted branches around the edge of the reflector; gathering all these air currents into one and ejecting the united current from the apparatus.

3. An arch searchlight casing provided with a reflector and with two unrestricted ventilating channels in the interior and along the walls of the casing, two restricted ventilating channels around the edge of the reflector and an unrestricted ventilating channel behind the reflector, openings for the admission of air to and means for distributing the same through the different channels, and a ventilator for causing the flow of air through the channels and out of the casing, substantially as described.

In witness whereof I have hereunto set my hand this 8th day of January, 1916.

HEINRICH BECK.