

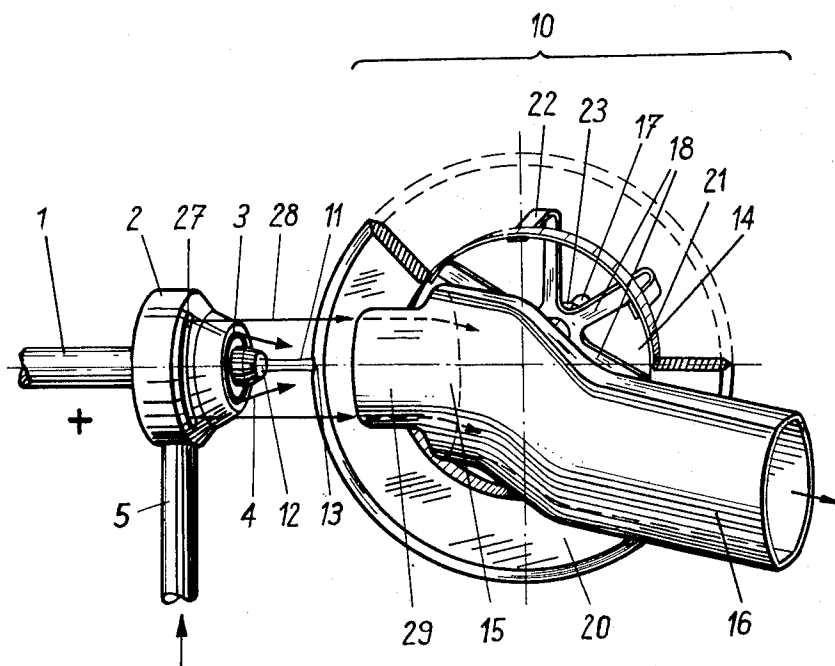
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ARC LAMPS

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1

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ARC LAMPS

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The invention relates to blown arc lamps, particularly to lamps for continuous operation.

In my U. S. Letters Patent No. 2,510,102 a blown arc lamp has been described wherein a rotating disk shaped negative electrode is employed. Such an arc is referred to as "blown arc" as means are employed adapted to provide an air current coaxially disposed with respect to the positive carbon and directed towards a fixed point occupied by the arcing spot on the negative electrode for the purpose of stabilising the arc.

It is an object of the present invention to remedy certain disturbing effects which may occur during operation of such an arc lamp and which will be referred to in detail below.

According to the present invention in a blown arc lamp a rotating ring shaped negative electrode is employed, the arc being struck between the tip of the positive electrode and a spot on the outer periphery of the ring, the central opening of said ring being large enough to accommodate the funnel of the exhaust pipe serving to remove the arc gases.

The present invention will now be explained and its advantages be discussed in detail in the following with the aid of an embodiment shown in the attached drawing.

In the figure the positive carbon 1 is guided in positive head 2 which incorporates the nozzle producing the coaxial air stream of the blown arc. For this purpose a circular slot 3 is located at the forepart of head 2 which is designed to produce a hollow conical air stream directed from the rear towards the tip of the positive electrode and slightly converging in direction of the flow. Air to produce this air stream is supplied with sufficient pressure through a tube 5 which at the same time supports head 2. The means for feeding the carbon and other structural elements of the lamp are not shown in the drawing as they are well known to anyone skilled in the art.

A ring shaped negative electrode 10 is located opposite to the positive head and the arc 11 is struck between the tip 12 of the positive carbon 1 and a spot 13 located opposite tip 12 on the periphery of ring electrode 10. The opening 14 left inside the ring electrode 10 is sufficient to accommodate the intake funnel 15 of the exhaust pipe 16. Through this pipe the air stream is led away carrying with it the arc gases and evaporation products. During operation ring electrode 10 is slowly rotated around its center. For this purpose it is mounted rotatably on a shaft 17 by means of a number of spokes 18.

As shown in the figure by ways of example the ring electrode 10 may consist of two separate parts, viz. an electrically active part which is consumed during operation, and a support part. The active part of the electrode is formed by ring 20 which may consist e. g. of graphite or any other suitable material and a part of which is cut away in the drawing for the sake of clarity. The outer edge of ring 20 may be sharpened as indicated in the drawing. Ring 20 is mounted on the support ring 21 which is held by the lateral extensions 22 of spokes 18. The spokes are mounted rotatably on shaft 17 by means

2

of a hub 23. Spokes 18 and support ring 21 are preferably made of metal so that they may serve as conductors for the arc current. The lateral extensions 21 are long enough to provide sufficient space inside the opening 14 to position the fore part of the intake funnel 15 in alignment with the air stream, which passes by both sides of the ring 20.

Rotation of the electrode during operation permits to operate the arc with short length and thus attain great brilliancy and uniformity of the right level. As has been explained in my above identified U. S. Letters Patent, the slow rotation of the negative electrode serves to continuously carry out of the arc evaporation products deposited on the negative spot which are thus burned in the fresh air. Thereby the arc may be operated with extremely high current loading of the positive carbon and a minimum arc length and still work continuously and safely.

In the blown arc the arc discharge column and the arc tail flame are aligned and concentrated by the concentric air stream into the cylindrical space, extending in front of the positive carbon. As the arc tail flame is substantially longer than the arc column, it is cut into two parts by the flat negative electrode. The gas flow inside these parted tail flames is rather turbulent and the flames are liable to flutter. This may cause parts of the tail flame and of the evaporated gases to pass by the intake funnel and deposit inside the lamphouse or damage elements of the lamp, particularly the optical system (condenser lenses, reflectors). Additional air jets may be employed to eliminate this defect and to insure that the entire air stream and the flame gases are taken up by the intake funnel. For this purpose an additional nozzle 27 may be provided on each side of the positive head 2 as is shown in Fig. 1. From these nozzles additional knife-shaped air jets 28 issue directed towards the side of the negative electrode in such a manner that they just enter the intake funnel 15. These additional air jets envelop the parted tail flames and urge them towards the sides of the negative electrode so that they will safely enter the intake funnel 15.

The employment of a ring shaped negative electrode offers certain advantages over a disk shaped one. The intake funnel of the exhaust pipe may be located nearer to the arc than if a disk shaped electrode be employed. The greater part of the arc tail flame will thus be located inside the exhaust funnel and disturbing radiation and other harmful effects thereof may thereby be eliminated. If the intake funnel is provided with a flange 29 reaching right up to the arcing spot at least on one side, as is shown in Fig. 1, the radiation of the arc tail flame is shielded off entirely towards that side. The bearing of the rotating disk and the means for admitting the arc current to the electrode may be located outside the train of hot and corrugating gases and no deposits will be formed on the rear part of the negative electrode. In contradistinction to a disk shaped electrode which may be burned down only to a certain diameter, employment of a ring shaped electrode furthermore permits practically full utilization of the active electrode part and thus reduces waste of material.

While there has been described what is at present considered to be the preferred embodiment of this invention, it will be obvious to those skilled in the art after seeing the present disclosure that various changes and modifications may be made therein without departing from the invention, and it is therefore the purpose of the appended claims to cover by generic terms such changes and modifications as fall within the true spirit and scope of the invention.

I claim:

1. In an arc lamp in combination a positive carbon

3

electrode, a rotating annular shaped negative electrode and means adapted to provide an air current coaxially to the positive carbon for stabilising the arc and directed toward a fixed point occupied by the negative arc spot and exhaust means positioned in part within the hole of said negative electrode, said exhaust means having an intake opening adjacent said negative arc spot and arranged to conduct arc gases and arc tail flames away from said lamp structure whereby tail flame turbulence is removed, turbulent back pressure build up is eliminated and the arc lamp structure is preserved from the effects of arc gases.

2. In an arc lamp in combination a positive carbon electrode, a rotating ring shaped negative electrode, nozzle means adapted to provide an air current coaxially disposed to the positive carbon for stabilising the arc and directed toward a fixed point occupied by the negative arc spot, and exhaust means located inside said ring shaped electrode and having arc intake opening adjacent said negative arc spot adapted to receive and lead away said air current.

3. In an arc lamp as claimed in claim 2, in which said exhaust means are provided with protrusion located sideways of said ring for shielding off radiation from the arc tail flame.

4. In an arc lamp as claimed in claim 2, the support means for said rotating disk comprising a bearing means located outside of said exhaust means and farther removed from said negative arc spot than said intake opening.

5. In an arc lamp as claimed in claim 2, wherein said ring shaped electrode comprises an active outer ring of electrode material, replaceably mounted on a support ring said support ring structure being shielded from the action of the exhaust gases by said exhaust means.

6. In an arc lamp as claimed in claim 2, wherein additional nozzle means are employed directing two air jets towards the opening intake of said exhaust means, enveloping the tail flame passing by the sides of said electrode and directing them substantially into said exhaust means.

7. In an arc lamp having a blown arc and an optical system, in combination a positive carbon electrode, a negative electrode having a central aperture, means to rotate said negative electrode comprising drive means and a mounting bearing, nozzle means arranged to provide an air current coaxially disposed with respect to said

4

carbon electrode and the arc for stabilizing said arc, said air current being directed toward a fixed point occupied by the negative arc spot, and exhaust means having an intake opening associated with said central aperture to remove arc gases effectively from the immediate vicinity of said negative arc spot and arranged to conduct arc gases and arc tail flames away from said drive means, said bearing and said optical system whereby tail flame turbulence is removed, turbulent back pressure build up is eliminated and the arc lamp structure is preserved from the deteriorating effects of arc gases.

8. The combination set forth in claim 7, the diameter of said central aperture being at least a third of the diameter of said negative electrode, mounting means for said negative electrode fitting in part within said central aperture and having a journal portion fitting in said mounting bearing, said negative electrode being a substantially flat disc with said intake opening of said exhaust means being positioned against the inner wall of said central aperture opposite said negative arc spot and extending on both sides of said negative electrode.

9. The combination set forth in claim 8, said exhaust means comprising a conduit having a lip portion extending toward said negative arc spot along the side of said disc-shaped negative electrode away from said mounting bearing therefor, said mounting means comprising a spider having a rim portion fitting within said central aperture to hold said negative electrode thereon and a plurality of arms connecting said rim to said journal portion.

10. The combination set forth in claim 9, the apertured disc comprising said negative electrode being readily replaceable on said mounting means and having a beveled peripheral edge to aid in localizing said negative arc spot, said arc gases drawn in by said exhaust intake acting to maintain said beveled edge and supplemental nozzle means associated with said nozzle means for directing at least two air jets towards the said intake opening and enveloping the tail flames passing by the sides of said negative electrode and directing said tail flames substantially into said intake opening of the exhaust means.

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