

**The Constricted Mercury Arc.**—The usefulness of the highly intense constricted mercury arc has been seriously limited by its rapid rate of deterioration.<sup>1</sup> The arc described here has been designed to balance the various factors so that it can be burned at a constant high intensity.

A quartz capillary  $2 \times 8 \times 50$  mm. was ground on the side away from the slit until a wall of about 0.5 mm. remained. The other side was ground until a face of about 3 mm. width was obtained, thus reducing the apparent size of the capillary. A very satisfactory polish was then obtained on both sides by cleaning with hydrofluoric acid and heating carefully with a sharp flame. A piece of glass tubing was ground open the length of the capillary and fitted to the rear flat side of the lamp in order to cool with running water. The lower electrode was sealed in with de Khotinsky cement. The lamp was wrapped with strips of cloth so that cooling of the cement and electrodes could be efficient and convenient. A stream of air was passed around the front face. By this arrangement the lamp could be run at 4–5.5 amperes and 20–25 volts per sq. cm. for upward of thirty hours with fairly constant intensity. At the expense of rapid devitrification (fifteen to twenty hours) the intensity can be kept constant by no air cooling on the front face, which prevents the formation of silica patches. A fairly constant intensity can be maintained by an intermittent air stream easily arranged by a long lag relay circuit. In case any deposit forms on the front side it can be removed quickly by stopping the air stream and moderately increasing the amperage.

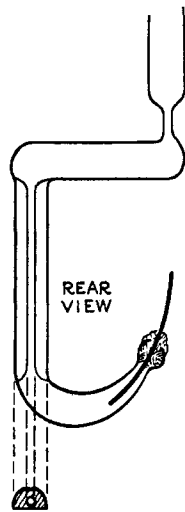


Fig. 1.—Lower electrode is sealed in with de Khotinsky cement. Constriction at upper electrode fits inserted iron wire or is packed with additional pieces to steady the upper meniscus.

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<sup>1</sup> Forbes and Harrison, *THIS JOURNAL*, **47**, 2449 (1925); Langer and Meggers, *Bur. Sids. J. Res.*, [5] **4**, 711 (1930).