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HALL'S PATENT "PARALENS" ANTI-DAZZLE MOTOR LAMP

By JOHN I. HALL.

THE Paralens is a device which, when substituted for the ordinary glass in a standard pattern motor headlight, eliminates glare and dazzle. It forms a sectional part of a plano-spherical lens or of other lenses which give the same result in working. It is obtained, geometrically, by taking the vertical radius above the horizontal diameter of a plano-spherical lens as its diameter. The optical axis of the Paralens is on the periphery, and rays of light after converging to its focus diverge below the optical axis only, no rays being projected above. Hence with parallel incident light on the back of the Paralens no light is projected upwards and there can therefore be no dazzle produced.

In order to increase the intensity of the upper part of the beam the Paralens is made up of sections, each of which gives a shallow beam of light parallel to the geometrical axis of the lamp. The number of sections obtainable is limited by the diameter of the lens and practical considerations of construction. The beam from such a sectionally constructed lens is rectangular in cross-section.

The Paralens can be made to give any desired horizontal divergence. The simple lenses give a divergence of 5 degrees, but for motor cars sectional lenses are needed, as they give a beam complying with the requirements of the Ministry of Transport, who suggest a beam 60 feet wide 300 feet in front of the car.

With regard to the illumination of the roadway, Mr Lock of Messrs Smith & Sons, Cricklewood Works, very kindly carried out some photometrical tests on sectional lenses. The first test was with a lens consisting of five sections, the horizontal divergence of which is 11.5 degrees and the vertical divergence 2.3 degrees. At 300 feet ahead of the car the beam is 60 feet wide. The particulars of the test are: diameter of lens, 5.5 ins.; height of lamp from ground, 3 ft.; distance ahead at which measurements were made, 214 ft. About 2 ft. above ground level the illumination extended evenly across the beam for 25 ft. The illumination, as measured by the photometer, was 0.075 foot-candle.

The second test was with a facet covered lens in a lamp made by Messrs A. H. Hunt, Ltd., of Croydon. The horizontal divergence is 10 degrees and the vertical divergence 5 degrees. The lens gives 11 partial beams, the total beam being 52 ft. wide 300 ft. ahead. The horizontal illumination was uniform over a width of approximately 30 ft., or nearly the whole width of the beam 214 ft. ahead. The illumination was 0.06 foot-candle.

Two lamps, therefore, would give 214 ft. ahead an illumination of 0.15 foot-candles in the first case and 0.12 foot-candles in the second case. By way of comparison it may be mentioned that the illumination in Oxford Street mid-way between lamps is 0.02 foot-candles. Thus two Paralens lamps give, at a distance of 214 ft. ahead, approximately seven times the minimum illumination provided in Oxford Street.

In conclusion, I would say that, although diminishing dazzle, the lenses tried

so far do not eliminate it altogether. This is due to the large dimensions of the source of light compared with those of the reflector, and to the aberration of the beam; aberration causes loss of efficiency in ground illumination.

I have found that it is quite possible to eliminate dazzle if moderate candle power is used, but with the large candle power electric lamps used by some motorists a certain amount of glare will occur, although not sufficient to cause unpleasantness.

By means of the semicircular construction used inside the lamp no rays from the source of light are emitted above the horizontal diameter of the lamp. Thus in misty or foggy weather observation is not restricted by illumination of the mist or fog above the lamp.

Note added later. Since the meeting on 11th May Messrs Siemens Bros. & Co., Ltd., have made some special electric lamps for me, of a type not previously employed in motor headlights. They provide a close approach to point sources. In combination with a Paralens headlight this type of lamp is very effective; the vertical aberration of the beam is so much reduced that the intensity of the beam is increased by approximately 30 per cent., and dazzle above the top of the beam is entirely eliminated.

ANTI-DAZZLE LENS FOR MOTOR CAR LAMPS*

By C. G. SMITH, A.M.I.E.E.

THE purpose governing the design of the usual type of motor lamps is to project rays of light of fairly high illuminating intensity to a sufficient distance in front of the car to enable the driver to see and have time to avoid any obstruction or danger. In presenting his own design of a lens for the purpose, the writer's contention is that apart from the objectionable dazzling nature of the light projected by the lamps in question its quality as an efficient illuminant is by no means beyond criticism. The very intensity of concentration required under ordinary conditions, to project a beam of light the required distance, militates against the diffusion necessary for effective illuminating purposes, and as a consequence a very disagreeable and confusing effect of high lights and deep shadows is produced.

In the course of his experiments the writer has found that by interposing in the path of the beam, near its source, a screen consisting of a number of small interruptions of the direct rays, equally interspaced on a clear glass disc, the actual projective power of the beam is but slightly impaired, although of course the amount of light transmitted is reduced in proportion to the number of interruptions introduced. By "thinning out" the condensed rays in this manner, the character of the light transmitted is greatly modified. Its intensely dazzling effect is almost entirely eliminated, by reason of the fact that the collective effect of the group of obstructions in front of and quite near to the electric lamp or other source of light is partially to obscure such source from the view of anyone approaching from the opposite direction. There is also a marked increase in the extent of its diffusion along the whole length of the beam.

In designing the lamp glass, however, the writer recognised the desirability of

* Patent No. 169779/21.