

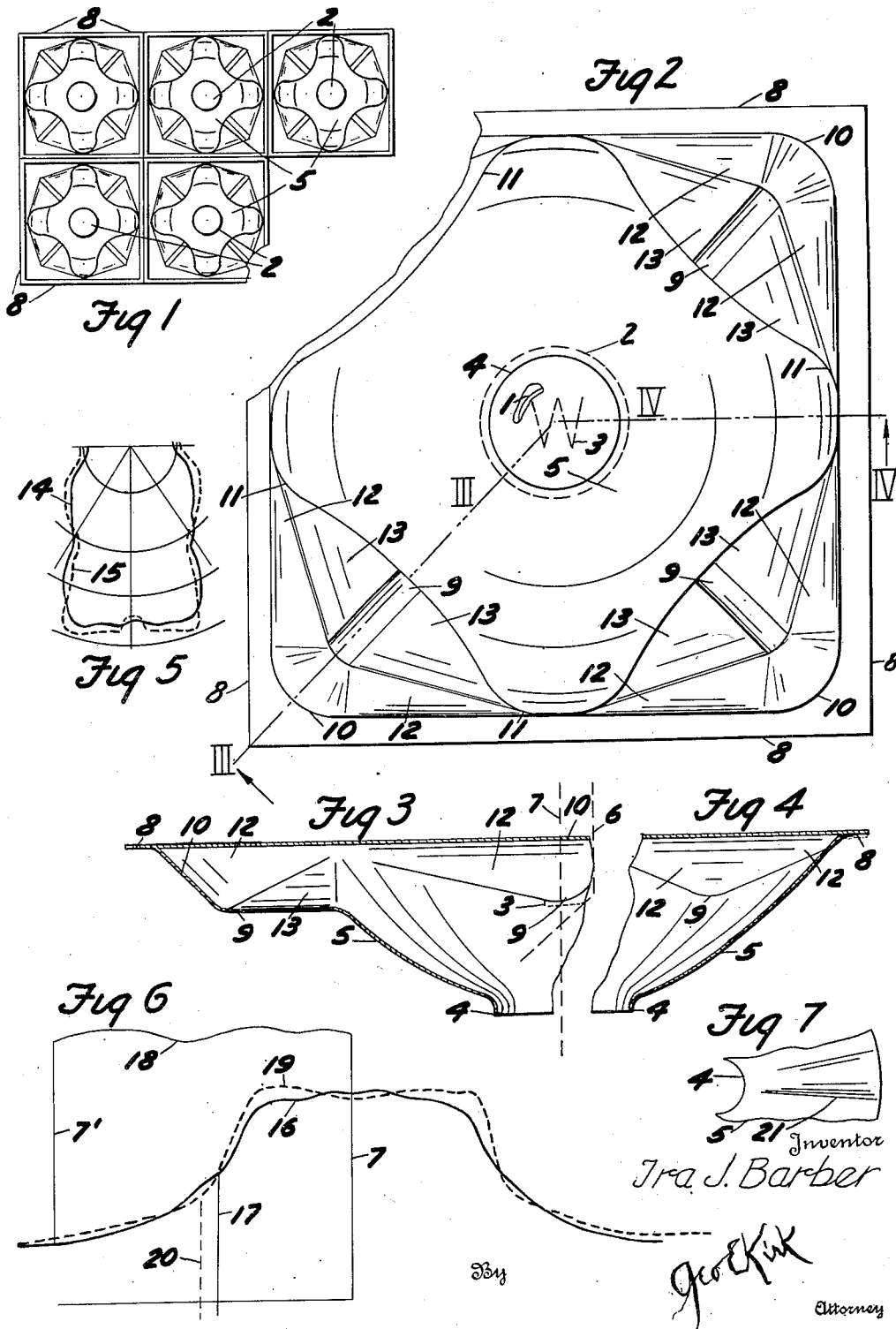
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I. J. BARBER

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PATTERN DENSITY RAY APPROXIMATING REFLECTOR

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PATTERN DENSITY RAY APPROXIMATING REFLECTOR

Ira J. Barber, Fostoria, Ohio, assignor to The Fostoria Pressed Steel Corporation, Fostoria, Ohio, a corporation of Ohio

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1

This invention relates to approximating symmetrical or uniform density for a ray pattern from a reflector, which in association with the energy source is in the range of the dimension of the projected bounds of the reflector.

This invention has utility when incorporated in conjunction with an incandescent lamp or electric bulb, preferably of a clear glass wall and the filament localized in a plane transverse of the axis of the bulb. The axis of the bulb desirably is coincident with the axis of the reflector; the reflector having its bounds slightly outward from the plane of the filament to allow for direct rays clear of the reflector in the range of 160°. In providing the reflectors as a gang to abut or adjoin at straight line sides in register, for an aligned square assembly, the dished reflectors have a concentric central region, disclosed as parabolic on a minus or eccentric focal floating axis. Toward the corners, extended radial distances are two pitched reflector face regions to have the diagonals of the squares of the reflectors provide faces to develop ray density approximating that of the face regions toward the midpoints of the sides of the squares of the reflectors.

An advantage practice has to do with the treatment of objects of work not at all times planar toward a reflector bank. For instance the work may pass thru a reflector walled tunnel or treatment region. Offset or end portions of the objects, under the disclosure herein, may have a region face at right angles to the plane of the reflectors receive a ray treatment up to 86% or more of that of a flat face of work at equal distance or spacing from the outer plane face of the reflectors.

Referring to the drawings:

Fig. 1 is a view looking into a gang or panel of reflectors configured under the invention herein;

Fig. 2 is a view, with a portion broken away, of a reflector unit or section;

Fig. 3 is a section on the line III—III, Fig. 2, showing the dished configuration of the reflector along a diagonal;

Fig. 4 is a section on the line IV—IV, Fig. 2, showing the dished configuration of the reflector along a diameter at right angles to the midpoint of the side of the square reflector;

Fig. 5 is a polar diagram from an energy source in a reflector unit, in solid line as to the minimum diameter and broken or dotted line as to the diagonal as to ray density;

Fig. 6 is a linear diagram from an energy source in a reflector unit, in solid line as to the minimum diameter and broken line as to the diagonal, illustrating the symmetry approximation for ray density pattern to extend uniformly thruout an area exposed for treatment; and

Fig. 7 is a fragmentary view of a further en-

2

croachment on the major or central parabolic reflector area, contoured to further supplement ray projection in the region diagonals of adjacent reflectors may intersect.

In a socket 1 may be mounted an incandescent bulb 2 having a filament 3, say of M form to lie in a plane transverse to the axis of the bulb 2 and socket 1.

For the bulb 2 to protrude therethru, a rectangular reflector is provided with a central opening 4, as a throat with slight clearance as to the bulb 2. A desirable contour hereunder as adapted to 250 watt type of infrared ray style of bulb, has a major central parabolic face area 5 contoured from a floating focus 6 in the range of $\frac{3}{4}$ " deficient diameter, or rather focal radius. This means that in developing the face 5, such is from a focal point $\frac{3}{4}$ " nearer the portion of the face 5 being developed by a radius thru the axis 7 of the socket 1 and the axis of the bulb 2. Upon this basis, there is developed a square reflector of $\frac{1}{2}$ " flat bounds, with the outer edges 11" long.

The $\frac{1}{2}$ " flat bounds 8 establish a plane below which 1" in the location of the filament 3, determines a range of approximately 160° for ray emergence from the filament 3 clear of the reflector to pass over the bounds 8 and outward therefrom. This 1" drop back of the plane of the bounds 8 is used to determine a trough base region 9 on the respective, to 1" radius, arc corners 10 having an inward pitch of about 45°. $\frac{3}{4}$ " off the diameter, arcs of $1\frac{1}{8}$ " radius initial a blunt end lobe portion 11 for the four diametrical portions of the face 5. Tangential with the adjacent side of the lobe portion 11, a riser line extends up from the junction of the region 9 with the lower in-taper of the corner 10, to provide upward therefrom toward the plane 8 diverging narrowing V- or wedge-shaped reflector faces 12 of longer radial distance than the face portions 5, 11. From mid diagonal region 9, between the face 5, 11, and the faces 10, 12, is region 13. While the region 9 is parallel to the plane 8, the region 13 as rising each way therefrom is of just such outward pitch to be under the line of the direction of direct rays to the faces 12. This means that the edges of the regions 13 as joining the faces 5, 11, has a somewhat greater spacing thruout than the line of junction between the face 12 and the outer edge of the region 13.

The contour relation set up as made possible say at 10" outward spacing from the plane of the bounds 8, to develop approximate constant or uniform ray density in the identical 11" square area of the reflector with the complementary advantage of the 160° direct rays from the energy source.

A polar diagram (Fig. 5) on a 10" radius from the axis 7 junction with the reflector 8, in the

3

direction of a diameter has a graph 14. The 180° has concentric circles at 100° F. intervals. A dotted or broken line graph 15 discloses the temperature readings at 10'' from the axis 7 in the plane 8 of the reflector bounds, taken along a diagonal.

A linear diagram graph 16 (Fig. 6) at 10'' outward from the plane of the bounds 8 on a diameter has its high and direct as well as reflective region between the axis 7 and region 17 as at the edge of the bounds 8. Diverging direct, as well as possible other stray rays are outward from the line 7 as beyond the line 17. In practice such out-region is in the high or direct for the adjacent reflector unit, whereby these may combine from a line 7' as the companion reflector axis to develop an efficient treatment line 18 as close to straight line character. A diagonal graph 19 discloses but slight variance from the diametrical line graph 16 to 11'' edge 20.

While the general contour of reflector under the instance taken is sufficiently of pattern ray density approximation to uniformity not to spot or irregularly treat a surface or work region undergoing service attention, extreme refinement may be achieved to pick-up or work-out, say a corner diagonal which may be short of ray intensity, by proportioning a rib 21 (Fig. 7), in taking from the normal face region of the lobe 11 to supplement the arc face 10 of the corner.

The ordinates on the linear graph, for the 250 watt bulb of the specific example taken, have the high in the range of 400° F. and the low around 220° for the solid or unbroken graph 16.

The mounting for the bulb socket 1 may be adjustable, thereby to shift the position for the filament away from the line of the plane determined by the regions 9. In the instance this adjustment be to bring the filament 3 into this plane, there is more close approximation for the ray control as set forth. A departure as inward, would mean less range of direct rays to clear the reflector unit; while contrariwise, a thrusting of the filament 3 to a position, even tho slight, outward from the regions 9, increases the proportion of direct rays not acted upon by the reflector.

Due to clear glass bulb and 160° ray proportion clear of the reflector unit, an object of work at a parallel plane region according to Fig. 6, would, for a local region at identical spacing, but perpendicular thereto, have such face ray treated at the range of 86% or more of that 100%, Fig. 6.

The course taken with the focal point 6 to describe a circle for longer focal distance across the axis 7, may be considered as flattening the parabolic reflector face portions 5, 11. The concave region of the reflector face 5 has encroachment thereupon to the filament plane region 9 as on the diagonals. The corner face portions 10 as inwardly slanting from the plane 8, determine from this 45° slant, and as outward from the region 9, slight outward divergence for the projected rays to fill in the corner intersection regions of the diametrical abutting reflectors. The faces 12 as fairing out in merging to tangential relation with the lobes 11, as diverging from the lobes, widen out to the corners 10 in conjunction with the inward slant. Under this combination, the face 12 replenishes the ray decrease toward the corner spacing. While the diagrams as discussed are at the limits, diametrical and diagonal, these faces 12 cooperate for approximation of uniformity in the ray density of the pattern at all angles thru the axis 7 of the reflector unit.

4

The offset to the faces 12 from the face 5, locates the region 13 as of relatively negligible reflective value, with the filament 3 in the plane of the regions 9. Should there be an adjustment of the filament outward, thus to bring the filament 3 above the ray line as clearing the face 5 to provide a face short of the face 12, additional rays therefrom may be directed to the fill-in portions of the spaced corners.

The hybrid features are present in the eccentric or flattened parabolic reflector face region 5, 11, as well as in the offset regions 10, 12, and in the case region 13 may function.

What is claimed and it is desired to secure by Letters Patent is:

1. For a light energy source, a projecting reflector of closed figure straight edge regions and connecting corners defining a plane, there being a central opening thru the reflector for the light energy source to be there mounted and protrude into the reflector, said reflector having a concentrically concave major face from the opening with portions of said face approaching mid portions of the straight edge regions, diverging from said mid portions there being minor faces more steep from said plane than the major face, converging pairs of said minor faces being connected at the corners by tapering concave portions.

2. For a light source to be assembled therein, a projecting reflector of closed straight edge regions and connecting corners defining a first plane, there being a central opening in the reflector out of which a light source as there mounted may extend, there being a throat at said opening approximating a second plane parallel to the first plane, said reflector having concentrically of said opening and rising from the second plane a concave major face of greater radial extent sections toward mid portions of the straight edge regions and lesser radial extent sections therebetween toward the corners, and offset regions outward from the lesser radial sections toward the corners, said offset regions being along radial lines from the corner therefor toward the opening and along adjacent lines parallel to said radial lines with said radial and adjacent parallel lines approaching parallelism to said first plane.

3. A peripherally square symmetrical bowl type of projecting reflector having the square sides and corners in a plane, a major concave concentric reflector face symmetrically extending toward mid portions of the sides with offset regions toward and short of extending to the corners, there being from the corners inwardly tapering minor reflector faces from the plane to the offset regions.

IRA J. BARBER:

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