March 29, 1932. A. S. MACDONALD 1,851,916

ART OF BOOK STACK ILLUMINATION

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Fig. 1.

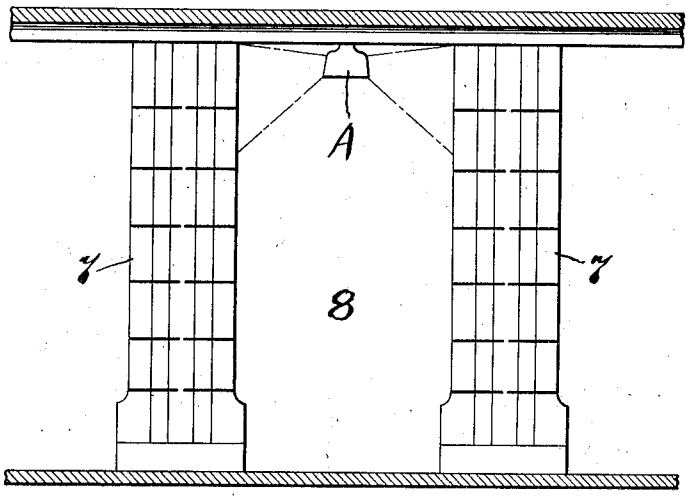

Fig. 2.

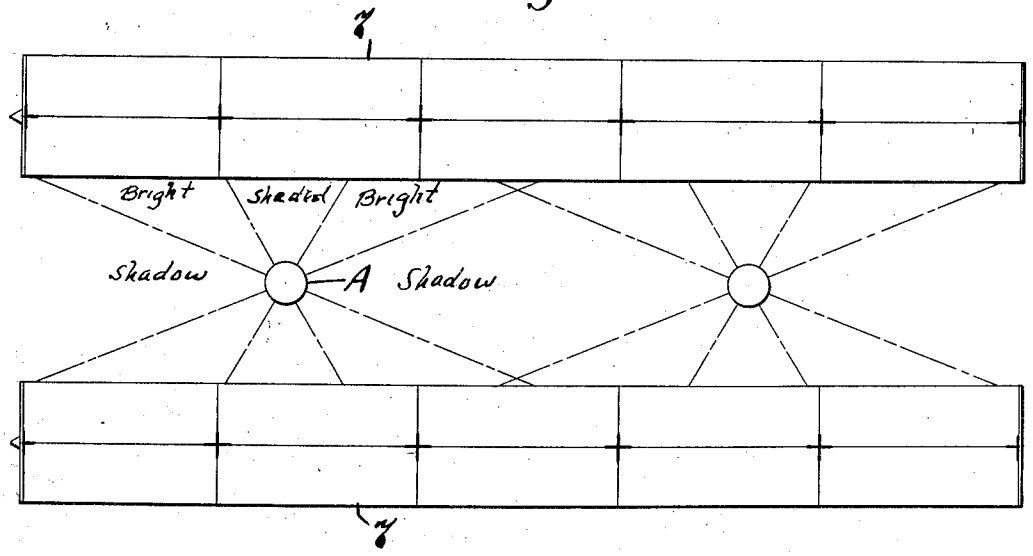

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Fig. 3.

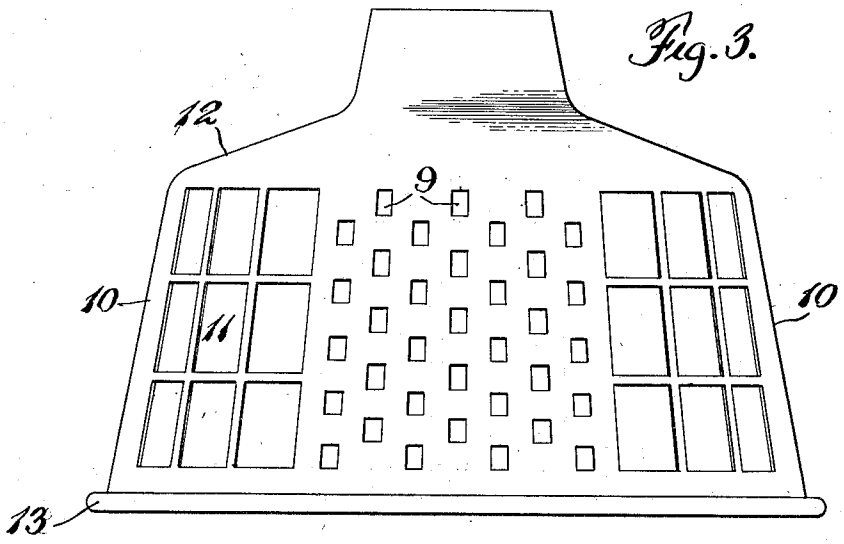
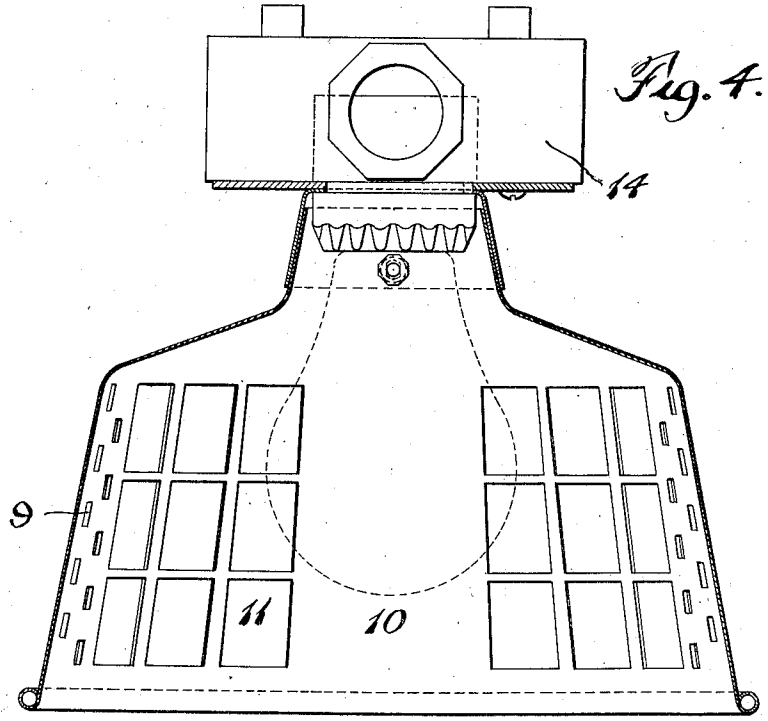


Fig. 4.



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ART OF BOOK STACK ILLUMINATION

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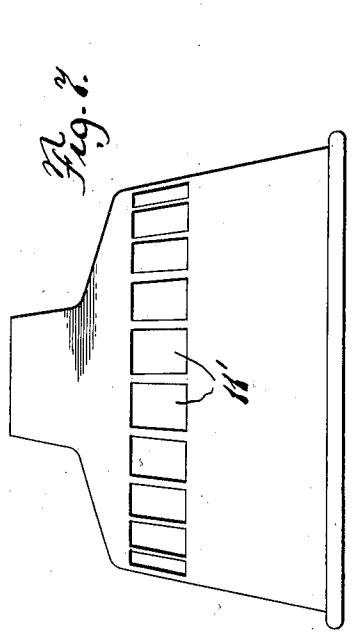

Fig. 4.

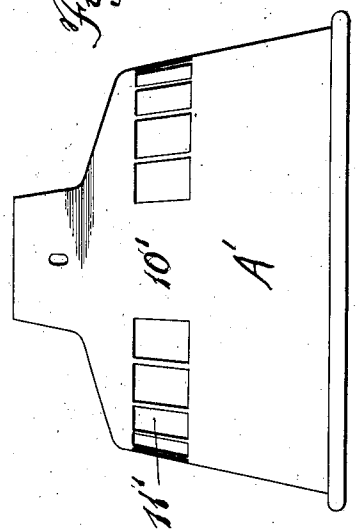

Fig. 6.

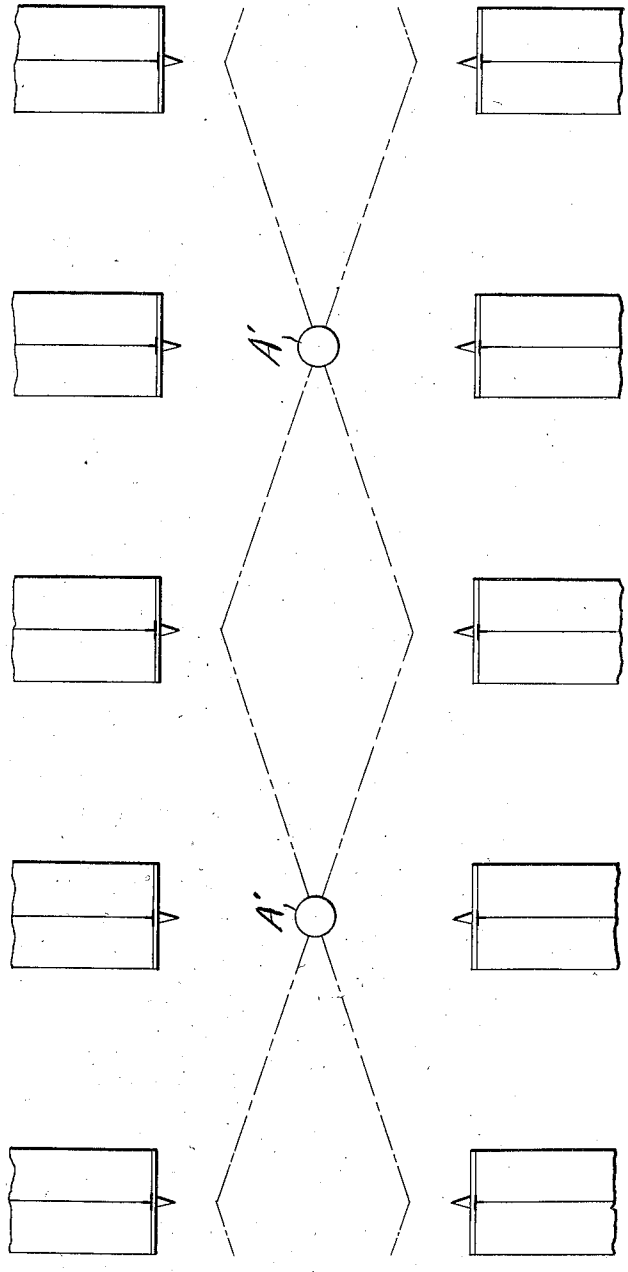

Fig. 5.

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ART OF BOOK STACK ILLUMINATION

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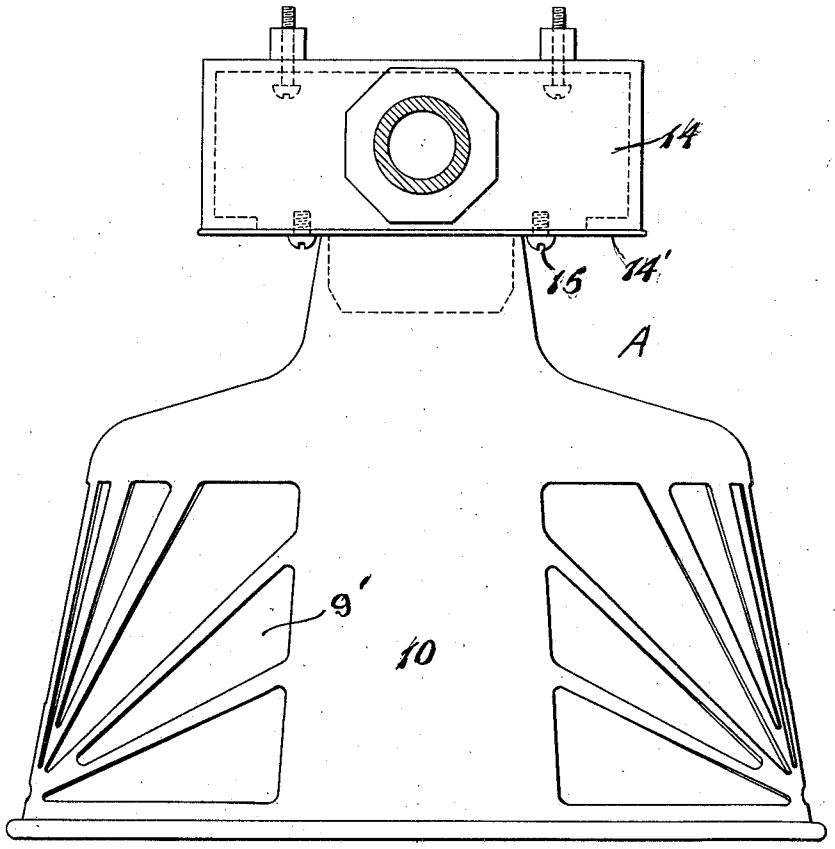
Fig. 8.



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ART OF BOOK STACK ILLUMINATION

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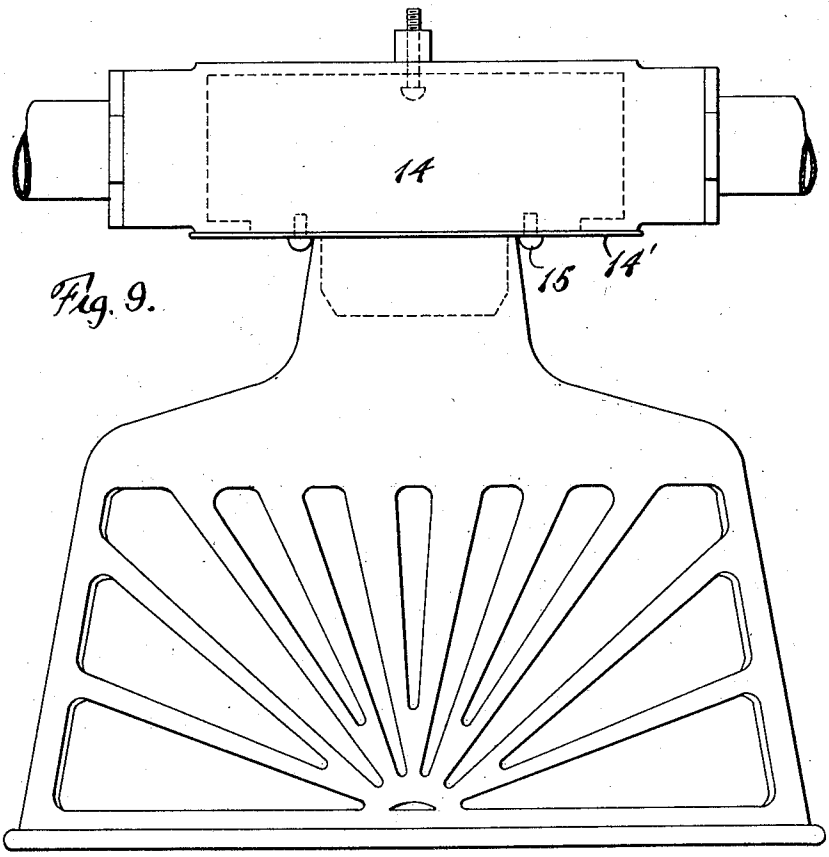

Fig. 9.

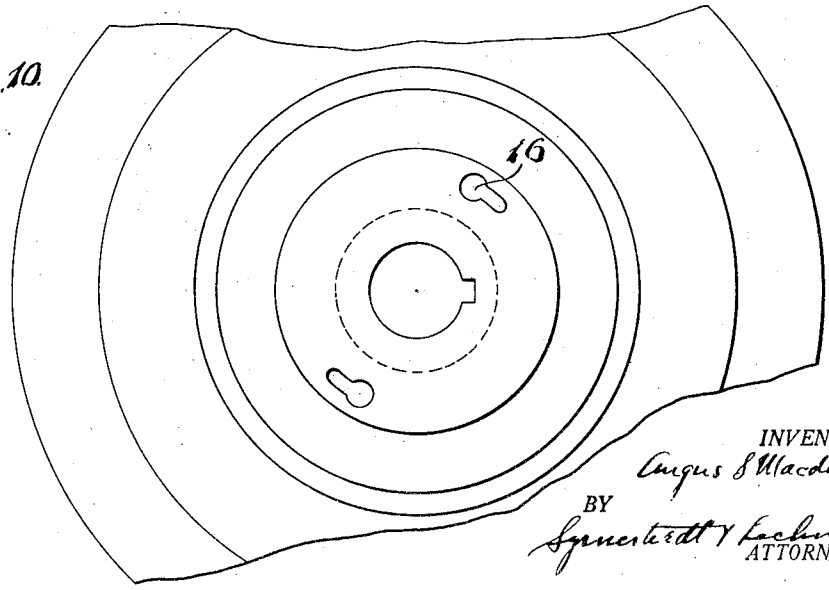

Fig. 10.

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UNITED STATES PATENT OFFICE

ANGUS S. MACDONALD, OF GREAT NECK, NEW YORK, ASSIGNOR TO SNEAD & COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY

ART OF BOOK-STACK ILLUMINATION

Application filed June 24, 1930. Serial No. 463,413.

This invention relates to the art of illuminating the aisles between book-stacks although it is useful in other places where it is desired to illuminate aisles or corridors. The invention will be described in connection with the illumination of book-stack aisles.

One of the primary objects of the invention is to secure such a distribution of light that the eye is guarded from any direct glare as one walks down a stack aisle. A further object of the invention is to reduce the amount of light that falls on those books nearest the source of light, in order to reduce the amount of accommodation of the eyes, in which connection in ordinary lighting arrangements the intensity of the illumination as between one portion of the shelving and another shows a very wide variation, sometimes in excess of 80 to 1, which of course requires an undue amount of accommodation of the eyes.

Generally, therefore, it is an object of the invention to produce a fairly uniform and soft illumination throughout and for the full height of the shelves, and this with a minimum number of lighting fixtures.

More specifically it is an object of the invention to provide a lighting fixture which, when placed in installations of the characters here involved, obtains the foregoing advantages.

How the foregoing, together with such other objects and advantages as may hereinafter appear or are incident to my invention, are obtained, is illustrated in the preferred form in the accompanying drawings; wherein

Figure 1 is a cross section through a portion of a tier of a library stack room;

Figure 2 is a diagrammatic plan view looking down on a stack aisle between two ranges;

Figure 3 is a side elevation of a reflector or shade which I employ in my invention;

Figure 4 is a cross section through the reflector of Fig. 3, and also illustrates an adapter for the attachment of the reflector;

Figure 5 is a diagrammatic plan view of a main aisle between range ends and shows the manner of controlling illumination;

Figure 6 is a side elevation of a reflector used in main aisles;

Figure 7 is a side elevation of the reflector of Fig. 6; and

Figures 8, 9 and 10 illustrate the modification of the reflector in which the angularly shaped slits 9′ take the place of the apertures 9 and 11, in other words, a series of angularly disposed slits, of angular shape, and of varying dimension, function to give the combined results of the apertures 9 and 11, but with a more gradual variation of illumination. Other arrangements giving similar effect may be employed.

Referring now to Figure 1, "7" are two ranges of a stack spaced apart to provide the aisle 8 therebetween. The aisle is illuminated by a number of fixtures or reflectors indicated as a whole by the reference character A.

On examination of Figures 3 and 4 it will be seen that this reflector is in the form of a shade, preferably metallic. This shade has a group or plurality of small apertures 9, on each of its two sides at right angles to the axis of the aisle 8. At each of its two sides, along the axis of the aisle, the reflector has imperforate or baffle portions 10, and intermediate of the imperforate portions and the groups of small apertures 9 there are groups of large apertures 11. All of the apertures are preferably rectangular, the small apertures being arranged in rows staggered with respect to one another and the large apertures being arranged in parallel rows both vertical and horizontal. The groups of apertures vertically considered, extend approximately from the crown 12 to a point short of the bead 13. There is, therefore, no direct glare on the eyes as one walks down the aisle. In regions opposite the small groups 9, the light is cut down so that there is no portion of the shelf faces which is sharply illuminated in comparison with the remaining portion. The light rays pass through the larger apertures at an angle and are diffused over a relatively large area. Thus it will be seen that the direct rays on the upper shelves are controlled, without reducing the direct rays that fall on the lower shelves while at the same time the amount of light on the lower shelves is

built up by the reflection of direct rays from the inner surfaces of the reflector of those rays that have not been allowed to pass through the openings.

Thus I have been enabled to obtain an illumination which is effective throughout the height of the shelves and also throughout their length but which is substantially uniform, soft, and devoid of marked contrasts in brightness.

I have found the best results to be obtained from steel reflectors finished with white vitreous enamel because of the ease and economy of production, durability, ease with which they can be kept clean and the high permanent reflecting value of the enamel. In addition, the shape of the reflector is such that dust will not collect quickly on any of the reflecting surfaces so that the reflector will retain its efficiency without the constant attention that is necessary with such types as prismatic reflectors.

To this end the neck, crown and side walls of the reflector are made to merge gradually one into the other, and the shade is round in cross section and tapering outwardly toward the bottom. Any suitable form of outlet box 14 can be employed for attaching the fixture.

Referring now to Figure 2 it will be seen that I have diagrammatically illustrated therein the manner in which the rays passing through the apertures are diffused.

It will be noted that the two fixtures are spaced sufficiently closely together as to cause some of the rays passing through the large apertures to cross one another near the shelf faces.

Referring now to Figures 5 to 7 inclusive, I have therein illustrated the illumination of a main or crossing aisle, i. e., an aisle leading to ranges. In this case, the reflector A′ is provided with a row of large openings 11′, near the bell and on each of the two sides at right angles to the axis of the aisle, the two rows being separated from one another by blank portions 10′ along the axis of the aisle. By this arrangement, the insignia on the ends of the ranges, approximately at the eye level, are lighted, and there is no direct glare on the eye as one walks along an aisle.

It is to be noted, however, that in all cases it is preferable to have the reflector of opaque material, unabsorbent as to light, with the holes arranged to give controlled and directed passage of light rays, and reflecting surfaces for the controlled and directed reflection of the light rays.

In the drawings, particularly Figures 3 and 4, the parts are drawn approximately to scale, and the reflector therein shown provides a shade for illumination with translucent portions and reflecting portions, in which the light transmitting and light reflecting qualities of the different areas vary in inverse ratio one to the other, whereby resulting in illumination as directed and controlled.

Again referring to Figures 8 to 10 inclusive, the reflector A is equipped with a flanged portion 14′ which co-operates to form a closure for the outlet box 14, the flange being attached to the outlet box by means of the screws 15 and the key hole slots 16, which make for ready attachment.

What I claim is:

1. An overhead lighting fixture for use in an aisle between spaced book-stack ranges, said fixture comprising a lamp and surrounding shade, the shade being relatively substantially opaque at its sides on the axis of the aisle, relatively less opaque and light transmitting on the sides at right angles to the axis of the aisle, and relatively freely light transmitting in those portions intermediate the aforementioned sides.

2. An overhead lighting fixture for use in an aisle between spaced book-stack ranges, said fixture comprising a lamp and surrounding shade, the shade being relatively substantially opaque at its sides on the axis of the aisle, relatively less opaque and light transmitting on the sides at right angles to the axis of the aisle, and relatively freely light transmitting in those portions intermediate the aforementioned sides, the said shade being opaque at the top and open at the bottom.

3. An overhead lighting fixture for use in an aisle between spaced book-stack ranges, said fixture comprising a lamp and surrounding opaque shade, the said shade having a plurality of small openings at the sides, at right angles to the axis of the aisle, and having a plurality of large openings adjacent to and on both sides of each group of small openings, and having imperforate portions of substantial dimension on the sides on the axis of the aisle intermediate groups of large openings.

4. A metallic shade for use in lighting aisles having a group of relatively closely spaced openings at each of two opposite sides and being substantially imperforate between said groups, the imperforate portions being of greater size than spaces between adjacent openings in a group.

5. A metallic shade for use in lighting aisles having a group of small openings at each of two opposite sides, the other sides being substantially imperforate, and having groups of large openings in intermediate portions.

6. A metallic shade for use in lighting aisles having a group of small openings at each of two opposite sides, the other sides being substantially imperforate, and having groups of large openings in intermediate portions, the small openings being staggered.

7. A metallic shade for use in lighting aisles having a group of small openings at

each of two opposite sides, the other sides being substantially imperforate, and having groups of large openings in intermediate portions, the small openings being staggered and the large openings being arranged in parallel rows vertically and horizontally.

8. A metallic shade for use in lighting aisles having a group of small openings at each of two opposite sides, the other sides being substantially imperforate, and having groups of large openings in intermediate portions, the small openings being staggered and the large openings being arranged in parallel rows vertically and horizontally, all of the openings being rectangular.

9. An overhead lighting fixture for use in an aisle between spaced book-stack ranges, said fixture comprising a lamp and surrounding shade, the shade being relatively substantially opaque at its sides on the axis of the aisle, relatively less opaque and light transmitting on the sides at right angles to the axis of the aisle, and relatively freely light transmitting in those portions intermediate the aforementioned sides, the shade being open at the bottom.

10. A metallic shade for use in lighting aisles having a group of relatively closely spaced openings at each of two opposite sides and being substantially imperforate between said groups and being lined with a highly permanent reflecting material, the imperforate portions being of greater size than spaces between adjacent openings in a group.

11. A shade for use in lighting having a group of openings at each of two opposite sides, and being substantially imperforate in portions therebetween and being light reflecting on the inside, the light transmitting and light reflecting portions of the different areas varying in inverse ratio one to the other.

12. A shade for use in lighting having a group of openings and being substantially imperforate therebetween and being light reflecting on the inside, the light transmitting and light reflecting portions of the different areas varying in inverse ratios one to the other.

In testimony whereof I have hereunto signed my name.

ANGUS S. MACDONALD.