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Ambient-Light-Absorbing Screen for Front Projection

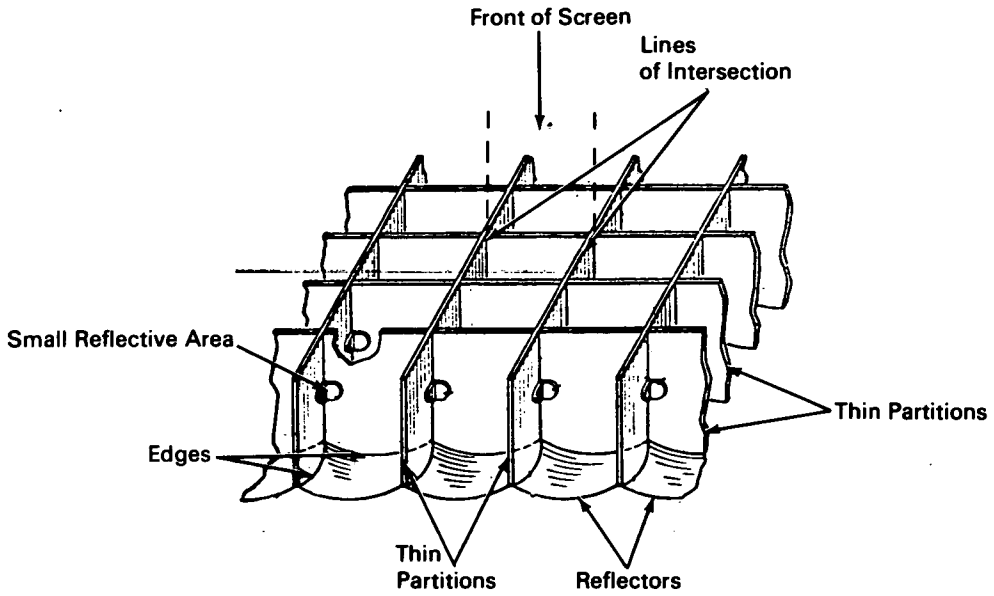

Figure 1. Basic Structure of the Screen

The problem:

To design a screen that works in brightly illuminated rooms without degrading the projected image.

The solution:

An improved screen has been developed for front surface projection of a collimated light beam under conditions of high extraneous illumination. This screen has a high reflective efficiency over any desired and precalculated viewing area. Its optical properties can be maintained even when degraded by the presence of moisture droplets on the external front planar surface. Among its many desirable features is the ease with which its planar surface can be cleaned and maintained.

How it's done:

The basic structure of this device is illustrated in Figure 1. Details and the optical principles employed are shown in Figures 2 and 3. A plurality of thin partitions, which are constructed of, or are coated with, light-energy-absorbing material, is mounted in a perpendicular intersecting or crossed array. The lines of intersection are parallel to one another and perpendicular to a common plane. In addition, discrete parabolic reflectors are arranged in close array on a plane substantially parallel to the common plane for imaging rays of the collimated light beam at the focus of each reflector. The concave surfaces of the reflector elements are in contact with the edges of the partitions. The principal axis of each reflector is coincident with

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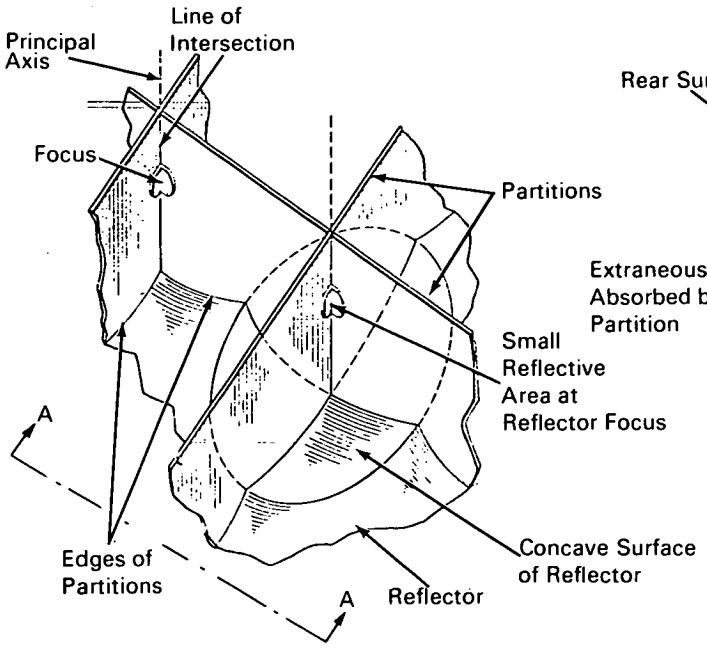

Figure 2. Detail of One Section of the Array

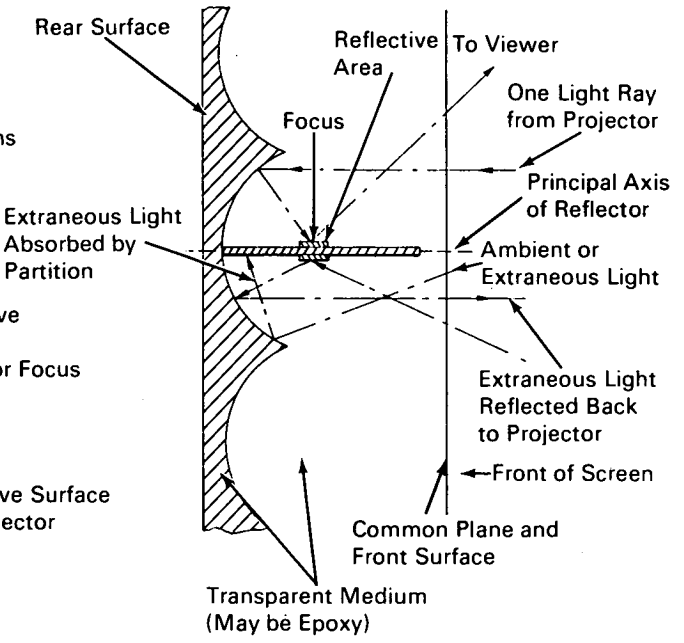

Figure 3. Cross Section A-A of Detail in Figure 2

one particular line of intersection. A small area of highly reflective material, which is disposed on the partitions substantially at the focus of each parabolic reflector, is provided to reflect the light. The entire structure described above may be embedded in a transparent material (epoxy may be used) in such a way that a substantially planar front surface is presented to the viewer.

This invention is subject to various modifications and changes that would make possible its adaptation to embodiments other than that generally described above. The concept of the design is novel and represents a significant improvement in screen surfaces for front projection, as compared with completely diffuse screens and semireflective beaded and metallic screens.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Headquarters
National Aeronautics
and Space Administration
Washington, D. C. 20546
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Patent status:

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