[redacted] Folder 2 25X1

C #4908

1 April 1963

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Reference: Verbal Request for Quotation

Subject: An Approach to an Approved Projection System.
[redacted] Register No. 3-1303 25X1

[redacted] 25X1
request, we have originated two one-page proposals which describe our approach to the problems of producing a cool, high intensity film image projector and the associated viewing screen having a maximum (1000 foot Lambert) luminous radiance. Although [redacted] was initially asked to suggest an approach only to the projector problem, we believe that a proper solution to producing an optimum image lies in an integrated system which necessarily involves the response of the screen to the projected image. 25X1

Both proposals involve the use of some techniques which are not in general use since we believe that conventional means for production of intense high resolution images have been exhaustively pursued. These programs are estimated to occupy about six months time for three engineers with technical support.

[redacted] is qualified to pursue the suggested programs and will welcome any questions you may have. 25X1

Sincerely,

[redacted] 25X1

WDS:jw
Enclosures (2)

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AN APPROACH TO THE DESIGN OF A COOL, HIGH INTENSITY FILM PROJECTOR

The purpose of this approach is to provide a source of illumination for one of the presently available film movements or carriages used for film viewing, theodolite reading, ballistic camera film reading, etc. and, at the same time, accommodate the use of advanced image presentation techniques provided by control of the screen characteristics.

The most promising light source is that provided by the Xenon arc or Xenon mercury arc. The newest adaptations provide useable concentrated illumination, of up to 4000 lumens for 2000 watts input, under steady state conditions. Under pulse operation, considerable increases in light intensity can be obtained so long as the watt second capability is not exceeded. Three of these lamps pulsed by three phase excitation and extinguished in turn by their own magnetic field to provide a square wave cut off will provide a unique high intensity source divided into the three primary colors. Equal intensity time shared pulses of each primary color will produce an effective white light by depending on the chemiluminescence of the eye to retain the prior color. Variations of the primary intensities will produce color changes as desired.

Removal of the heat is simply accomplished with moving air. The optical systems are so arranged as to prevent the direct radiation of the lamp from falling on the film. All energy is reflected to the film by mirrors coated to allow the unwanted infrared radiation to pass through and provide only the useful UV and visible rays. Careful attention to the use of the U V spectrum will permit maximum excitation of the screen material.

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AN APPROACH TO THE DESIGN OF A HIGH INTENSITY, HIGH RESOLUTION SCREEN

The primary purpose of this approach is to transfer the maximum amount of information from a photographic image to the mind of an observer in as short a time as possible. The amount of detail assimilated is dependent upon the image resolution, but resolution is essentially an energy phenomenon and is strictly subjective since it is connected with the sensitive properties of the observer. CSC proposes to provide a screen which can be controlled to suit a maximum number of an observer's sensitivities.

Such a screen would be transparent and would reflect minimum light in a lighted room. It should have the property of extremely short persistence fluorescence when struck by light of limited wavelength from one direction. Multiple transparent coatings similar to cathode ray tube phosphors can produce the chromatic range. For black and white film projection, a screen of this type will produce a color separation of density values in addition to a gray scale to accommodate the observer's sensitivity to color as well as contrast. When observed as a black and white screen the intensity may be raised to the dazzling point where visual acuity begins to decrease. At this point color separation will provide additional acuity in that chromatic aberration is minimized and the observer's particular color sensitivity can be accommodated.

Illumination of the screen is possible in several ways; one, the steady state illumination from an arc source; two, by pulsed arc so the fluorescence can be observed during decay in narrow color bands to minimize solarization and dazzle; and three, by time shared millisecond pulses of light of alternate colors.

These techniques also lend themselves to the simulation of three dimensional images from two dimensional film by subliminal stimulation. If the retina of one eye receives a brighter image or a different colored image than the other eye, moving objects or objects which are changing in color stand out in the third dimension. This faculty accommodates a third important observer sensitivity in using his ability to detect perspective.

In the development of this system the control of the source of illumination is necessary to provide an integrated system. With reasonable success the resultant images will act on more of the observer's sensitivities and convey more information per unit of time than present conventional methods. Experiments will be required to eliminate any adverse physiological and psychological effects.

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