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Ku et al.

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(54) **PROJECTION SCREEN CONFIGURED TO BE PROJECTED WITH MULTI-ANGLE IMAGES**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

1,568,023 A * 12/1925 McManus G03B 21/60 359/459
1,610,423 A * 12/1926 Cawley G03B 21/604 264/1.34

(Continued)

FOREIGN PATENT DOCUMENTS

CN 106054513 A 10/2016
JP 1999194424 * 1/1999 G03B 21/60

(Continued)

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(57) **ABSTRACT**

A projection screen configured to be projected with multi-angle images includes a base membrane and a coating layer. The base membrane includes a body layer and a plurality of toothed portions connected with the body layer. A profile of each of the toothed portions includes at least one first plane and at least one second plane, where the first plane and the second plane each has a reflection angle different from each other, for providing multi-angle images of projection. The coating layer includes a reflection layer and a light-absorbing layer, where the reflection layer is disposed on the profile of each of the toothed portions; whereas the light-absorbing layer is disposed on the reflection layer, such that, as viewed from a projection position, the coating layer is disposed behind the base membrane. Thereby, the projection screen not only can provide multi-angle images of projection under the circumstance of maintaining the capability of resisting ambient light, but also can prevent the coating layer from contact and abrasion by human behaviors when in use, and as such, the life of use can be prolonged.

7 Claims, 7 Drawing Sheets

