May 5, 1942. S. F. ESSIG 2,282,123

MOSAIC SCREEN

Filed Jan. 23, 1941

FIG. 1

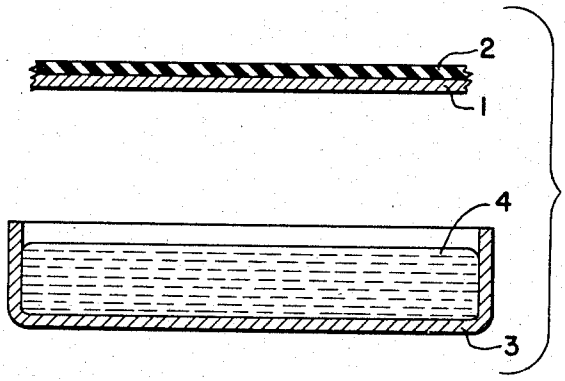
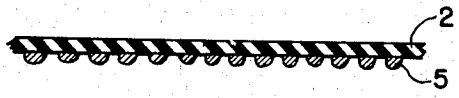


FIG. 2



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MOSAIC SCREEN

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4 Claims. (Cl. 250—167)

This invention relates to an improved mosaic of discrete particles and a method of producing the same, and more particularly relates to a mosaic screen of discrete metallic particles suitable for use in cathode-ray tubes in television and similar apparatus.

In the past such mosaics have usually been made by producing a metallic film on a surface of an insulating or semi-conducting foundation and disrupting this film by heating. However, the manufacture of these mosaics by previously known methods either has required the use of excessively high temperatures resulting in injury to other parts of the tube employing the mosaic, or in the mosaics not being entirely satisfactory, due to the imperfect separation between the metallic particles with consequent leakage of electrical charges from certain particles to other adjacent particles.

It is an object of the present invention to provide an improved mosaic of the character above referred to.

A further object is to provide an improved method for producing mosaics requiring only moderate temperatures and rendering mosaics which are highly satisfactory in performance due to the distinct separation between the particles thereof.

In accordance with the present invention, the method of producing a mosaic of discrete particles comprises the steps of applying a metallic film to a surface of a foundation, and subjecting the film to the vapor of a metal different from that of said film, thereby to lower its viscosity. The treated film is then heated to cause its disruption into discrete particles thereby producing the improved mosaic structure. In accordance with a further feature of the invention, the disrupted film is retained at an elevated temperature for a predetermined length of time in order to expel the metallic vapor from the disrupted film.

In accordance with a preferred embodiment of the present invention, a metallic film is produced on a surface of an insulating or semi-conducting foundation plate in any suitable manner which provides thereon a substantially uniform film, as for example by evaporation or sputtering. This film is then exposed to an atmosphere of metallic vapor. As a consequence thereof, the metallic film changes its viscosity due to amalgamation with the metallic vapor. After the film has been treated in this manner, it is subjected to heat for the purpose of causing its disruption into discrete metallic particles. The fact that the metallic film is in the form of an amalgam greatly facilitates the formation of well-spaced particles of bead-like shape. The heating can be continued until practically all of the metallic vapor is expelled from the disrupted film, leaving substantially pure metallic particles.

For a better understanding of the invention, together with other and further objects thereof, reference is made to the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 illustrates the treatment of a metallic film in accordance with the present invention, while Fig. 2 shows a cross-section through the finished mosaic of discrete particles.

Referring now more particularly to Fig. 1 of the drawing there is shown in cross-section a thin metallic film 1, preferably of silver, deposited by evaporation or sputtering on a foundation 2 of insulating material, such as mica, glass or the like. The foundation can also consist of semi-conducting material and is preferably resistive to the metallic vapor to which the film 1 is to be exposed. In the simplest manner in which this invention can be exercised, there is provided a receptacle 3 containing a pool of mercury 4, above which the film 1 is suspended and exposed to the mercury vapor emanating from the pool 4.

After a sufficient exposure of the film 1 to the mercury vapor, which is best determined experimentally, the film 1 together with its foundation 2 is subjected to a heat treatment as is conventional for disruption of thin metallic films into discrete particles. However, due to the previous exposure of the film to mercury vapor the temperature required for disruption is much lower than that hitherto necessary. In fact, temperatures in the order of only 200 centigrades are only required, as compared with 800 centigrades generally employed. It will be obvious to those skilled in the art that the use of a much lower temperature is of great advantage since it permits the disruption of the film without endangering the foundation or elements of an electron discharge tube of which the film may be a part at the time of the heat treatment.

The disrupted film is preferably retained at an elevated temperature for a predetermined length of time, sufficient to expel the mercury vapor from the disrupted film and to obtain substantially pure metallic silver particles.

Fig. 2 shows a cross-section through the mosaic of particles 5 on the foundation 2. The surfaces of the particles are then ready for oxidation and treatment with photosensitive material, such as caesium, to produce a photosensitive mosaic screen of the type employed in television picture signal generating tubes.

Examination by microscope of mosaic screens produced in accordance with the present invention indicates that the metallic particles of these screens are substantially circular in configuration and separated from each other by a distance roughly corresponding to their diameters. It is apparent, therefore, that such a screen is particularly well adapted for use in high-definition television systems due to its low surface leakage, resulting in improved definition of the television pictures produced therein.

While there has been described what is at present considered the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. The method of producing a mosaic electrode of discrete metallic particles, comprising the steps of producing a metallic film on a surface of a foundation, exposing said film to the vapor of a metal different from that of said film, and heating said film after exposure to said vapor to cause its disruption into discrete particles.

2. The method of producing a mosaic electrode of discrete metallic particles, comprising the steps of producing a metallic film on a surface of a foundation, exposing said film to the vapor of a metal different from that of said film to lower its viscosity, heating said film after exposure to said vapor to cause its disruption into discrete particles, and retaining the disrupted film at an elevated temperature for a predetermined length of time for expulsion of said vapor from said disrupted film.

3. The method of producing a mosaic electrode of discrete metallic particles, comprising the steps of producing a metallic film on a surface of a foundation, exposing said film to mercury vapor to lower its viscosity, and heating said film after exposure to said vapor to cause its disruption into discrete particles.

4. The method of producing a mosaic electrode of discrete silver particles, comprising the steps of producing a silver film on a surface of a foundation resistive to mercury vapor, exposing said film to mercury vapor to lower is viscosity, and heating said film after exposure to said vapor to cause its disruption into discrete particles.

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