

Nov. 7, 1939.

H. E. HOLMAN

2,179,090

MOSAIC SCREEN STRUCTURE FOR TELEVISION AND LIKE PURPOSES

Filed Jan. 26, 1937

Fig. 1

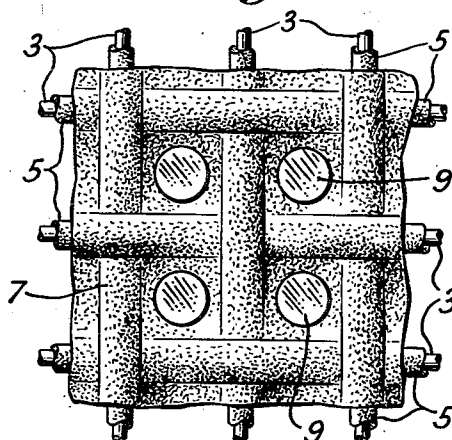
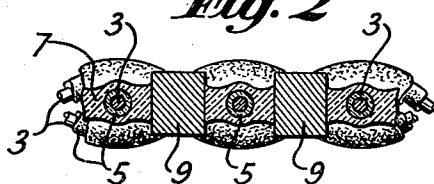


Fig. 2



BY

INVENTOR.
HERBERT EDWARD HOLMAN

H. E. Holman

ATTORNEY.

UNITED STATES PATENT OFFICE

2,179,090

MOSAIC SCREEN STRUCTURE FOR TELEVISION AND LIKE PURPOSES

Herbert Edward Holman, Hayes, England, assignor to Electric & Musical Industries Limited, Hayes, Middlesex, England, a company of Great Britain

Application January 26, 1937, Serial No. 122,481
In Great Britain February 1, 1936

7 Claims. (Cl. 250—27.5)

This invention relates to mosaic screen structures for television and like purposes.

A mosaic screen is often formed of a wire mesh, the wires constituting the mesh being coated with an insulating layer. Metallic globules are inserted in the interstices of the mesh. The insulating layer may be a vitreous enamel and the globules may be pressed into the interstices when the enamel has been softened by heating so that in the finished screen they are held in position by adhesion to the enamel.

The chief requirement of the enamel coating is that it should completely cover the metal so that it provides effective insulation for the metal globules. For this it is necessary that a process of "wetting" should take place when the enamel powder is fused as otherwise the enamel will melt into small globules which adhere only slightly to the metal grid.

An apparent "wetting" effect can be obtained by loading the enamel with an inert substance such as kaolin, which absorbs the enamel and causes it, to a large extent at least, to cover the metal wires.

In a modification of the above process, a light coating of kaolin is first applied to the wire mesh and this is covered by a coating of vitreous enamel. The enamel coating, when fused, permeates the kaolin layer, which is very porous, and in consequence a single layer of enamel and kaolin conglomerate covers the wire.

The proportion of vitreous enamel in the conglomerate is necessarily low if the wire is completely covered and the total thickness of the coating has to be made very small in practice, for example, about 0.01 mm.

The above mentioned processes are not, therefore, satisfactory, and processes in which the enamel itself "wets" the wire surfaces are much to be preferred. This true "wetting" effect can, however, only be obtained when the enamels have the power of absorbing metallic oxides and such absorption of oxide from the manner of the wire greatly reduces the electrical resistance of the coating. The reduction in resistance may not be very serious where relatively thick coatings are used, for example, of the order of 0.02 mm., because, provided that the enamel is not kept in the fused state for a long period, the absorbed oxide may penetrate to a depth of only about 0.005 mm. Where, on the other hand, the coating is of the order of 0.01 mm. the penetration is a large fraction of the total thickness of the coating.

The remaining thickness of unpenetrated enamel may even, in the latter case, be sufficient to give the desired insulation, but where metal globules are pressed into the interstices of the mesh it is clear that a serious loss of insulating properties may occur. It should be borne in mind that the screens contemplated in the present in-

vention are those in which the interstices are minute, there being in some types of mosaic screens two hundred meshes to the inch. The invention is, however, not limited in its application to such screens.

It is the object of the present invention to provide a process by which the above-mentioned difficulties can be overcome or at least greatly reduced.

According to one feature of the present invention, a mosaic screen structure is prepared by first applying to the metal grid a coating of enamel having a relatively high fusing point which, when fused, produces an enamel having good "wetting" properties, fusing the said enamel powder and applying to said enamel a second coating of an enamel powder having a lower fusing point than the enamel of the first powder and fusing said coating at a temperature lower than the fusing point of the first coating. The metal globules, which may be of silver, for example, are applied to the interstices of the mesh when the second coating is sufficiently hard, the second coating being softened by heating to enable the globules to bed themselves into the enamel. They may, therefore, penetrate the surface layer, but cannot penetrate the under layer which, therefore, provides the requisite insulating properties.

According to another aspect, the invention provides an insulating attachment between two bodies comprising first applying to one or both bodies an insulating coating of a vitreous enamel of relatively high fusing point and which in the fused state has good "wetting" properties with respect to the body or bodies to which it is applied, fusing said coating, applying thereafter to the enamelled body or bodies a further coating of an enamel having a fusing point lower than that of the first coating and heating said bodies whilst in contact with one another to a temperature sufficient to cause said bodies to adhere through the medium of said second coating but not sufficient to appreciably soften the first coating.

In describing the invention in detail reference will be made to the drawing, in which Figure 1 illustrates a portion of a mosaic screen built in accordance with the invention, while Figure 2 shows a sectional view of a portion of the mesh embodying the features of the invention. In Figure 1 the mosaic screen 1 is composed of the wires 3 coated with two layers of enamel, 5 and 7, respectively. In the interstices of the grid structure are placed electrically conducting plugs 9. A view in section is shown in Figure 2, in which the same numerals are used to designate the same components of the screen.

In one example, the grid is of nickel wire mesh and is provided with the first coating by applying a suitable enamel powder and heating

the grid to a suitable temperature. When the wire is completely covered and the enamel properly vitrified, the grid is removed from the oven and the second enamel is applied in powder form to the mesh. This second coating is now fused at a lower temperature than the first coating so that the first coating is not appreciably softened. The metal globules are then applied to the grid after the second coating has hardened, and then reheated to a sufficient temperature to soften the second coating and to allow the globules to bed themselves in the softer enamel surface.

Some eutectic combination of the two enamels takes place at the surface of contact between them but if due care is observed this will be confined to a very small depth insufficient to produce an undesirable loss of insulation.

As an example of an enamel powder having good "wetting" properties and of high fusing point, the following composition is suitable:

	Per cent		Per cent
Borax	31.6	Cryolite	8.2
Felspar	37.2	Potassium nitrate	3.1
Quartz	13.7	Soda	6.2

As an example of an enamel powder suitable for use as the second coating, the following may be mentioned:

	Per cent		Per cent
Borax	59.7	Felspar	23.0
Fluorspar	4.8	Quartz	5.5
Potassium nitrate	2.9	Manganese	
Soda	3.8	dioxide	0.3

The method of the present invention has the advantage that there is no need to take great care to adjust the degree of fusion to an exact value as is necessary where a single insulating layer is used and penetration of the metal globules into the contaminated zone has to be avoided. Thus the difference in the fusing points of the two enamels may be such that the outer coating can be made fluid whilst the metal globules are inserted. The enamel may then be arranged to flow around the globules to any desired extent and thus give good adhesion without risk of penetration into the oxidized portion of the first enamel layer with consequent loss of insulation.

The invention is not to be limited in its application to the insulation of metal screens, since it can be applied generally in cases where it is necessary to provide an insulating attachment between two bodies. In this respect the invention could, for example, be employed in the production of mosaic screens by first coating lengths of wire with enamel having good "wetting" properties and subsequently applying a second coating of enamel of lower fusing point than the first enamel and before the second coating is fused the wires are brought into the desired relationship so that the wires can adhere to one another through the medium of the second coating. The globules are thereafter applied as described above. Alternatively the wires may be brought into contact after the second coating is fused and the wires in this case are caused to adhere by subsequent heating.

Having described my invention, what I claim is:

1. A method of insulating a mosaic screen structure comprising applying to a metal grid a coating of enamel powder having a relatively high fusing point which, when fused, produces

an enamel having good wetting properties, fusing the said enamel powder, applying to said enamel a second coating of an enamel powder having a lower fusing point than the enamel of the first powder, fusing said second coating at a temperature lower than the fusing point of the first coating and only slightly different from the temperature at which substantial eutectic combining of the two enamels take place inserting electrically conducting bodies in the interstices of the grid and in intimate contact with the second coating while said coating is fluid and subsequently cooling the second coating.

2. A method of making a mosaic screen structure which comprises the steps of applying to a metal grid a coating of an enamel powder having a relatively high fusing point which, when fused, produces an enamel having good wetting properties, fusing the said enamel and applying to said coating a second coating of an enamel powder having a lower fusing point than the enamel of the first coating, fusing the second coating at a temperature lower than the fusing point of the first coating, allowing said second coating to harden, applying metal globules to the interstices of the said metal grid, softening the second coating to secure adhesion between the globules and the enamel, and thereafter allowing the second coating to cool.

3. The method of making a mosaic screen structure which comprises the steps of providing a metal grid, fusing an insulating coating onto the grid, fusing a second insulating coating on the first coating at a temperature lower than the fusing point of the first coating, inserting electrically conducting bodies in the interstices of the grid and in intimate contact with the second coating, softening the second coating to secure adhesion between the globules and the coating, and subsequently hardening the second coating.

4. A mosaic screen structure comprising a metallic mesh, a fused insulated layer coated on the mesh, a second insulating coating fused on the first coating, said second coating having a fusing temperature lower than the fusing point of the first coating, an electrically conducting bodies positioned in the interstices of the mesh and in intimate contact with the second coating.

5. A mosaic screen structure comprising a metal mesh, a fused insulated layer coated on the mesh, a second insulating coating fused on the first coating at a temperature lower than the fusing point of the first coating, and metal bodies positioned in the interstices of the mesh and in intimate contact with the second coating.

6. A mosaic screen structure comprising a metal mesh, a fused enamel layer coated on the mesh, a second enamel coating fused on the first coating at a temperature lower than the fusing point of the first coating, and metal bodies positioned in the interstices of the mesh and in intimate contact with the second coating.

7. A mosaic electrode comprising a nickel mesh, a first enamel coating fused on the mesh, a second enamel coating having a lower fusing point than the first coating fused on the second coating, and silver globules imbedded in the interstices of the mesh and in intimate contact with only the second coating.

HERBERT EDWARD HOLMAN.