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DIELECTRIC HEATING ELECTRODES

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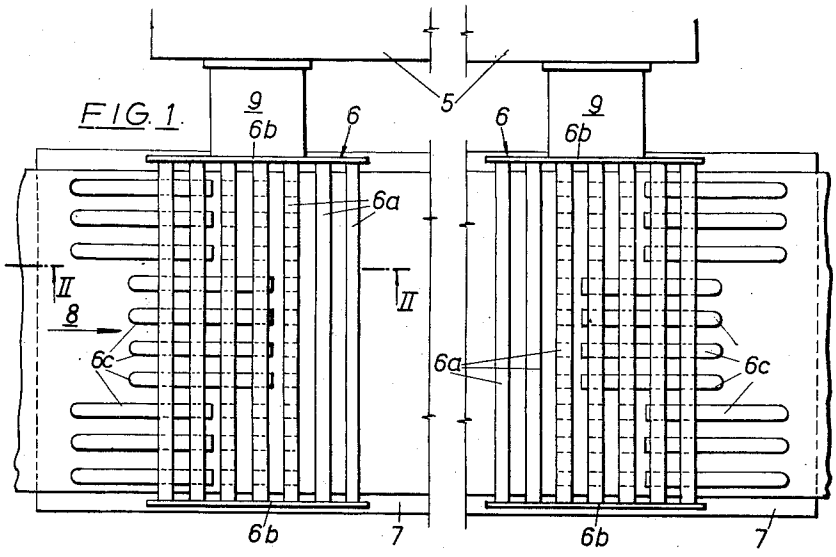
FIG. 1.



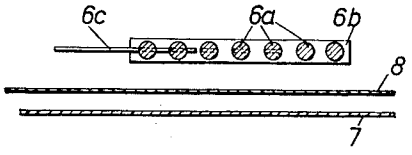


FIG. 2.

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DIELECTRIC HEATING ELECTRODES

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2 Claims. (Cl. 219—10.69)

The present invention concerns dielectric heating electrodes and more particularly relates to such electrodes designed to ensure a heating effect distributed in a desired manner across a wide moving surface.

Dielectric heating has been applied to many problems, including those in which articles on a moving surface such as a conveyor have to be treated; for instance the baking of biscuits, cakes, all classes of confectionery and bread and the drying of felt, carpets, textile and other goods. Such applications have suffered from the disadvantage of unequal heating across the width of the conveyor due to unequal voltage distribution across the electrodes of the system. With a product that required baking or drying across its whole width, this was a serious disadvantage, as it was with a product that only required treatment over certain specified regions of the width when such regions did not coincide with those parts of the electrodes which exhibited a maximum voltage potential.

The disadvantage is particularly pronounced in cases where the width of the conveyor is large compared with the wavelength of the generator employed i. e. long electrodes operating at high frequencies, and is due to standing waves in the electrode array in addition to other incidentals causing irregularities in the field strength.

It has previously been proposed to overcome this disadvantage by using electrodes shaped to intricate contours, so that the time of passage of the article being treated underneath the electrode was proportional to the field strength at any particular point. In this way a shorter length of travel (beneath the electrode) was obtained in those regions where the field strength of the electrode or the applied voltage was at its greatest, which regions are normally at the ends of the electrodes remote from the generator. This solution was not altogether suitable however as the electrodes were difficult to produce because of their shape, and once produced could only be used on one particular wavelength and one specified operation i. e. that for which they were designed.

The object of the present invention is to provide an electrode array which is adjustable to enable the heating effect of the electric field, throughout the length of the array, to be regulated as desired.

According to the present invention, then, a dielectric heating electrode array for the treatment of articles moving through the field of the array comprises a plurality of adjustable elements by means of which the effective area of the electrodes can be varied at different points along the length of the array.

This may conveniently be effected by providing fingers of suitable material, which fingers are slidable within slots formed in one or more transverse electrode members extending across the whole width of the array, so that movement of the fingers alters the external shape of the array in the plane thereof.

Suitable material for the adjustable elements would be aluminum, brass, copper, silver or any other metal or alloy of high electrical conductivity.

The invention will now be further described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a diagrammatic plan view of one form of electrode array for dielectric heating of articles moving through the field of the array, and

Fig. 2 is a partial sectional elevation on the line II—II of Fig. 1.

In the drawings a balanced output circuit is illustrated, the R. F. generator 5 being "floating". As may be seen from Fig. 1, two arrays (generally designated 6) are provided, the circuit being completed by a plain metal electrode 7 which is not physically connected in circuit. It will be readily understood that the invention is equally applicable to unbalanced circuits, in which case one of the output terminals of the generator would be connected to the plain electrode.

Each array 6 comprises a number of fixed transverse electrodes 6*a* extending throughout the whole length of the array between end pieces 6*b*, and a plurality of fingers 6*c* mounted in slots in electrodes 6*a* so as to be adjustable in a direction across the width of the array.

A conveyor band 8 is shown travelling between arrays 6 and electrode 7, and articles to be treated, i. e. dried or baked, would be carried on this conveyor. For a continuous article, such as a carpet or a felt, the conveyor could be dispensed with, but even in such cases the support of a conveyor band or belt is desirable. If conveyor 8 is constructed of metal it could replace electrode 7.

The arrays 6 are connected to the R. F. generator 5 by means of metal strips 9 of substantial width.

It will be appreciated that adjustment of fingers 6*c* will vary the area of array 6, and this variation will determine the length of time any particular portion of conveyor 8 (and any article thereon) is subjected to the electric field. In this manner local drying or heating effects can be controlled (the speed of movement of conveyor 8 being constant across its width).

With the arrangement shown and described an infinite variation of local heating or drying effects across the width of the moving surface is readily obtainable.

We claim:

1. A dielectric heating electrode array for the treatment of articles moving through the field of the array, comprising a series of fixed electrodes, a pair of end plates and a plurality of displaceable fingers, said fixed electrodes being disposed transversely between said end plates to form therewith a framework, and said fingers being mounted within slots formed in at least some of said transverse electrodes so as to be individually slidable therein, thereby to vary the effective area of said electrodes at different points along the length of the array.

2. A dielectric heating electrode array as set forth in claim 1 wherein said fingers are formed of metal of high electrical conductivity.

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