Dec. 5, 1967 W. N. BENNETT 3,355,812

DRYING BY HIGH FREQUENCY ELECTRIC FIELD

Filed Aug. 4, 1965

Fig. 1

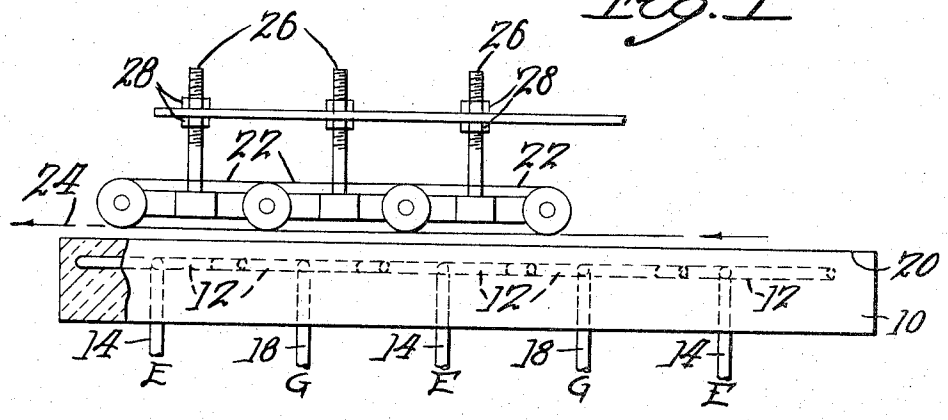
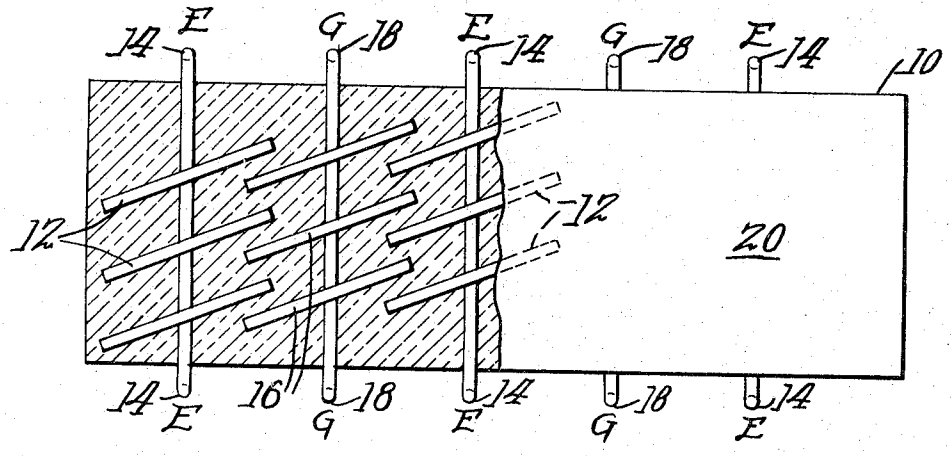


Fig. 2



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DRYING BY HIGH FREQUENCY ELECTRIC FIELD

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ABSTRACT OF THE DISCLOSURE

A high frequency dielectric drying device having both its energizable and grounded electrodes disposed in a ceramic block at an angle with respect to the sides thereof and in overlapping relationship each with the other. The upper surface of the ceramic block provides a smooth surface against which the material to be dried may be pressed by means of a belt disposed in juxtaposition with said upper surface.

This invention relates to a new and improved construction and method for dielectric drying of materials by means of a high frequency electric field and specific reference in this connection is made with respect to my copending application Ser. No. 270,370 filed Apr. 3, 1963 and now Patent 3,266,164 of Aug. 16, 1966.

It has been found that the apparatus and method with modifications can be applied advantageously to the very quick drying of fibroid materials as for instance leather as well as other materials by embedding a series of rods which are energized by high-frequency apparatus, in a ceramic i.e., porcelain jacket in the form of a block having a smooth uninterrupted surface over which the material to be dried is traveled.

In the case of fibroid material, i.e., leather, the hair side of the leather, i.e., the fine pore side, is in contacting relation with respect to the ceramic structure, and the flesh side of the leather or hide can be engaged by means for not only continuously moving it along the porcelain structure but also pressing it to varying degrees as may be found desirable to the porcelain member.

The drying time in this manner has been found in some cases to be reduced from a matter of days to a matter of minutes. Also this method can be used on the leather at any stage in the processing thereof. There are usually three stages for the production of leather from the hide and the particular apparatus and method herein described is advantageously utilized not only to greatly reduce the time of the drying action but also to improve the leather for the reason that this drying is of such a nature that additives do not migrate to the surfaces of the leather but remain uniformly distributed therethrough, thus resulting in the leather being of a much better quality and uniformity than is otherwise possible in the use of conventional drying methods.

Also other materials can be dried in the same manner, as distinct from my copending application above referred to in which a traveling web is moved substantially out of contact with the conductor bars. In this case of course a traveling web can also be treated and it is still out of contact with the conductor bars, but at the same time it moves over a smooth slick porcelain surface; and if desired or found advantageous can be pressed down onto it to any desired degree while the drying process is taking place.

The invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly set forth in the appended claims.

Reference is to be had to the accompanying drawings in which:

FIG. 1 is a view in side elevation partly in section illustrating the construction and method, and

FIG. 2 is a plan view of the ceramic rod embedded structure, parts being in section.

The present invention is illustrated as comprising a ceramic block **10**. This is preferably porcelain. In this block there are embedded a series of rods, those indicated at **12** being energized as by connections at **14**, **14** in a well known manner and those at **16** being generally the same but being grounded as at **18**, **18**. The actual energizing apparatus is not shown in this case because of the fact that it is adequately described elsewhere as for instance in my above identified application, but the effect is that a high frequency electric field is provided at and just above the top surface of the block **10**, this surface being indicated at **20** in FIG. 1. The rods **12** and **16** are generally coplanar and are located adjacent to the top surface **20** of the block **10**.

It will be noted that in the case shown herein the rods are inclined with relation to the side edges of the block over which the material to be dried passes, so that these rods are therefore inclined with respect to the path of the material being processed and the respective end portions thereof overlap. This arrangement has been found to avoid the production of any kind of striations or longitudinal variations in the drying weight so that the drying is uniform at all points.

The top surface of the block **20** of course can be made very smooth and slick and it acts as an ironing-board or platen or the like. As the material, whether in continuous web form or in piece form as would be the case of hides and leather pieces, pass over it, the material is actually ironed or smoothed in addition to being dried. This again results in a much improved leather, particularly in the second and third stages of leather processing where additives, etc. have been provided in order to improve the leather as is well known in the tanning art. The fine side of the leather will be applied to the porcelain block, i.e., the hair side, because this is the side which is to be presented externally in the case of most articles such as shoes, bags, etc., and it is desired to provide it with a very firm and uniform appearance, even though other modifications or formations may be applied to it as for ornamental purposes.

Other materials of course are also capable of being dried by the use of this invention. In many cases it is found desirable to support the materials as the same are being dried rather than to run them just over the electrodes, and many materials are found to be improved by pressing down onto the porcelain block or platen.

Any means can be utilized for the pressing action and in this case there have been shown a plurality of power driven aprons or the like in the form of continuous belts as indicated at **22**, **22**. The lower runs will of course be driven in the direction of travel of the material being processed which is indicated by the broken line **24**. The aprons can be supported on means such as shafts **26**, **26** which in turn can be adjusted as by nuts or any other device **28** to increase or decrease the pressing action or to allow for thicker or thinner materials.

The porcelain block is conveniently made by arranging the electrodes as shown in a form, and then filling in the form with ceramic or porcelain material, and then if necessary grinding the top surface to a slick and even finish.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. Apparatus for drying material in a high frequency electric field comprising a substantially solid block of ceramic material, at least one pair of electrodes including

an energizable electrode adapted to be energized from a suitable source of high frequency energy and a grounded electrode coacting therewith embedded in said block in a position to form a high frequency electric field at a surface of said surface of said block being smooth, and means for traveling material to be dried across said smooth surface and for pressing the material to be dried against said smooth surface.

2. The apparatus of claim 1 wherein there are a plurality of pairs of said electrodes.

3. The apparatus of claim 1 wherein said electrodes are arranged in inclined relationship with respect to a side edge of said ceramic block and to the direction of travel of the material being processed.

4. The apparatus of claim 1 wherein said electrodes are arranged in inclined relationship with respect to a side edge of said ceramic block and to the direction of travel of the material being processed, the ends of said electrodes overlapping.

5. The method of drying material by passing it along and over a smooth surface of a ceramic block and pressing it thereto while simultaneously impressing a high frequency electric field on said material.

6. The method of processing fibroid material having a coarse side and a fine side which comprises pressing the fine side of the fibroid material against a smooth surface of a ceramic block and at the same time impressing a high frequency electric field to said fibroid material.

7. The method of processing fibroid material having a coarse side and a fine side which comprises pressing the fine side of the fibroid material against a smooth surface of a ceramic block and at the same time impressing a high frequency electric field to said fibroid material and pressing the fibroid material against said smooth surface as it passes thereover.

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