United States Patent [19]

Den Boer

[11] **3,719,033**

[45] **March 6, 1973**

[54] **DEVICE FOR REGULATING THE HUMIDITY OF THE AIR IN A MUSICAL INSTRUMENT**

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[22] Filed: **July 19, 1971**

[21] Appl. No.: **163,745**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 668,483, Sept. 18, 1967, abandoned.

[30] **Foreign Application Priority Data**

Sept. 22, 1966 Netherlands 66/13380

[52] **U.S. Cl.** **55/387**

[51] **Int. Cl.** **B01d 53/04**

[58] **Field of Search** 210/282; 55/35, 387; 252/94

[56] **References Cited**

UNITED STATES PATENTS

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[57] **ABSTRACT**

A device for regulating the humidity of the air in a piano, comprising a container with apertures, filled with a moisture absorbing material, said material being a mixture of diatomaceous earth, asbestos powder and viscose sponge and being saturated with water by immersing the container in water, whereafter the container is mounted in the piano. The apertures are characterized by the presence of two larger openings connected by a slot of capillary size.

7 Claims, 3 Drawing Figures

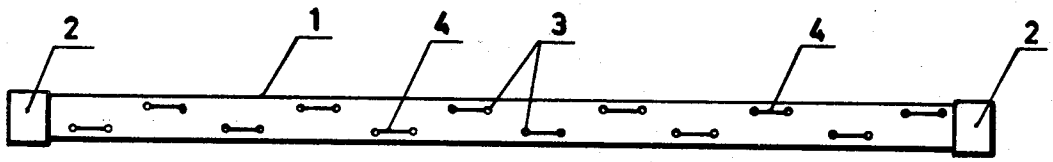


FIG.1

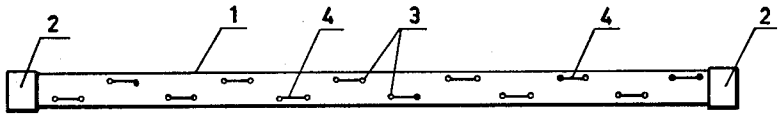


FIG.2

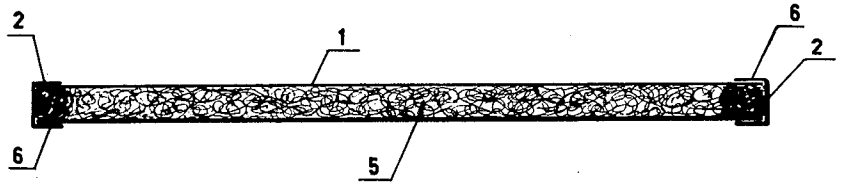
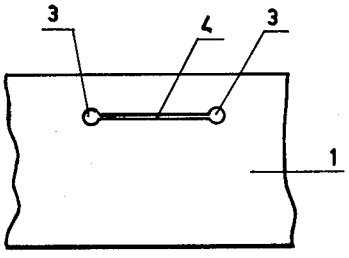


FIG.3



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DEVICE FOR REGULATING THE HUMIDITY OF THE AIR IN A MUSICAL INSTRUMENT

This is a continuation-in-part of my co-pending application Ser. No. 668,483, filed Sept. 18, 1967 and now abandoned.

This invention relates to a device for regulating the humidity of the air in the interior of a piano or similar musical instrument.

It is a well-known fact that dry and warm air in a room unfavorably affects the persons and objects present therein, in particular wooden objects which consequently start warping and even splitting. This also applies to musical instruments such as a piano, a grand piano, an harmonium, a clavicembalo, etc. which, moreover, get out of tune on account of the dry heat as a result of connections coming loose and which produce a deterioration of the sound.

Endeavors have been made to remove this drawback by the placing within the piano of small cisterns with water, but these do not produce a sufficient result in that the air circulating in the room cannot flow past the water surface itself so that the evaporation takes place at an insufficient rate. Perforated humidifying containers have also been suggested, but these have been unsatisfactory in that they have had either insufficiently large openings to provide sufficient vapor transfer or the openings were large and water dropping from the holes provided a warpage problem.

The invention aims at providing a device which overcomes the defects of the prior devices and meets the requirements in a better way.

According to the invention this is accomplished in that the device consists of a closed hollow container, preferably of cylindrical configuration, in a wall of which uniformly spaced apertures are provided each formed by two or more preferably substantially circular apertures interconnected by a slot which is narrow relative to the diameters of the apertures, the hollow space within the container being entirely filled up with a moisture absorbing mixture of diatomaceous earth, asbestos powder and viscose sponge.

The composition of the moisture absorbing material insures a strong and very uniform absorption of moisture so that, also as a result of the uniformly arranged apertures in the container, the moisture may be uniformly supplied to the air flowing past.

The slots connecting the apertures are of capillary thickness and thereby prevent, by breaking up the surface tension, the formation of drops at the apertures. In particular in a musical instrument no drops can be allowed to fall down, since as a consequence thereof corrosion of the metal parts and warpage of wooden parts would occur.

It is preferable for the moisture absorbing mixture to have approximately the following compositions:

2 parts by volume of diatomaceous earth,

2 parts by volume of viscose sponge, and

1 part by volume of asbestos powder.

It is preferable if at the ends of the container there are located plugs of viscose sponge, the moisture absorbing mixture being enclosed between said plugs and the container wall. In absorbing water such end plugs expand so that the mixture located in the container is subjected to some additional pressure. This assists in entirely filling the container with the mixture so that no spaces remain in which exclusively water may collect

which would give rise to leakage of the container with the aforementioned risk of corrosion and warpage.

For mounting the device in a piano or similar instrument it is of advantage if the container is tubular, since it may then easily find a place in the instrument and, moreover, a spreading of the moisture over the entire width of the instrument is obtained, it being understood that the container may be of such length as to extend substantially the entire width of the instrument.

The invention will be further explained below with reference to the accompanying drawings showing by way of example an embodiment of the device according to the invention.

FIG. 1 shows a view of the container;

FIG. 2 is a longitudinal section of the container of FIG. 1; and

FIG. 3 shows a detail on a larger scale.

The container 1 shown in the drawings is tubular and is closed at the ends with covers 2. In the wall of the container 1 there are provided circular apertures 3 which each time are interconnected two and two by a capillary slot 4 which is shown on a larger scale in FIG. 3.

The container 1 contains the moisture absorbing mixture 5. The powdery mixture consists of diatomaceous earth, asbestos powder and viscose sponge. The viscose sponge is divided into small pieces. The ratio is preferably 2 parts of diatomaceous earth, 2 parts of viscose sponge and 1 part of asbestos powder. The diatomaceous earth may consist for example of 1 part of Standard Supercel and 1 part of Hyflow Supercel, the last-mentioned substance having a smaller grain size than the first-mentioned kind of diatomaceous earth. After having been well mixed previously the mixture is pressed very uniformly into the container so that no spaces remain therein which are not or not quite filled up. At each end this container 1 is closed with a plug of viscose sponge 6.

Filling the container with water may be done by immersing it into a reservoir with water and letting it stay therein during about 5 minutes. Filling may also be done by arranging the container in an envelope of plastics material filled with water, said envelope being delivered along with the container and also serving as a commercial packing for said container. Dependent on the moisture requirement of the instrument in which the container is located said container may be replenished with water once in 2 to 4 weeks.

If in contrast with dry air the room would contain very moist air, then a dry container may serve to withdraw moisture from the air and said moisture may be removed again by drying the container periodically. The container 1, which may also have a shape different from the shape shown in the drawings, may be arranged within a musical instrument such as a piano and in connection with the possibility of delivery of moisture as well as absorption of moisture it may serve to regulate the humidity of the air in a wide sense.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

What is claimed is:

1. A device for regulating the humidity of the air in the interior of a piano or other musical instrument, said device consisting of a closed hollow container having a wall provided with a plurality of apertures, said apertures consisting of groups of at least two large apertures interconnected by means to prevent the formation of water drops at the apertures, said means comprising a capillary slot which is narrow relative to the diameter of the apertures, said hollow container being entirely filled with means for absorbing moisture from a damp atmosphere and for giving up moisture to a dry atmosphere, said last-mentioned means comprising a wettable material which when dry has an affinity for moisture and when wetted comprises such an amount of water that it may humidify the air in the musical instrument.

2. A device according to claim 1, wherein the wettable material comprises a mixture of diatomaceous earth, asbestos powder and viscose sponge.

3. A device according to claim 2, wherein the wettable material is composed of two parts by volume of diatomaceous earth, 2 parts by volume of viscose sponge and 1 part by volume of asbestos powder.

4. A device according to claim 3, wherein said container is an elongated cylinder and at the ends of the container there are located plugs of viscose sponge, the wettable material being enclosed between said plugs and the container wall.

5. A device for regulating the humidity of the air in the interior of a piano or other musical instrument, said device consisting of a closed hollow container having a wall provided with a plurality of apertures, said apertures consisting of groups of at least two circular apertures interconnected by a slot which is narrow relative to the diameter of the apertures, said hollow container being entirely filled with means for absorbing moisture from a damp atmosphere and for giving up moisture to a dry atmosphere, said means comprising a wettable material which when dry has an affinity for moisture and when wetted comprises such an amount of water that it may humidify the air in the musical instrument.

6. A device according to claim 5, wherein the wettable material comprises a mixture of diatomaceous earth, asbestos powder and viscose sponge.

7. A device according to claim 6, wherein the wettable material is composed of 2 parts by volume of diatomaceous earth, 2 parts by volume of viscose sponge and 1 part by volume of asbestos powder.

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