

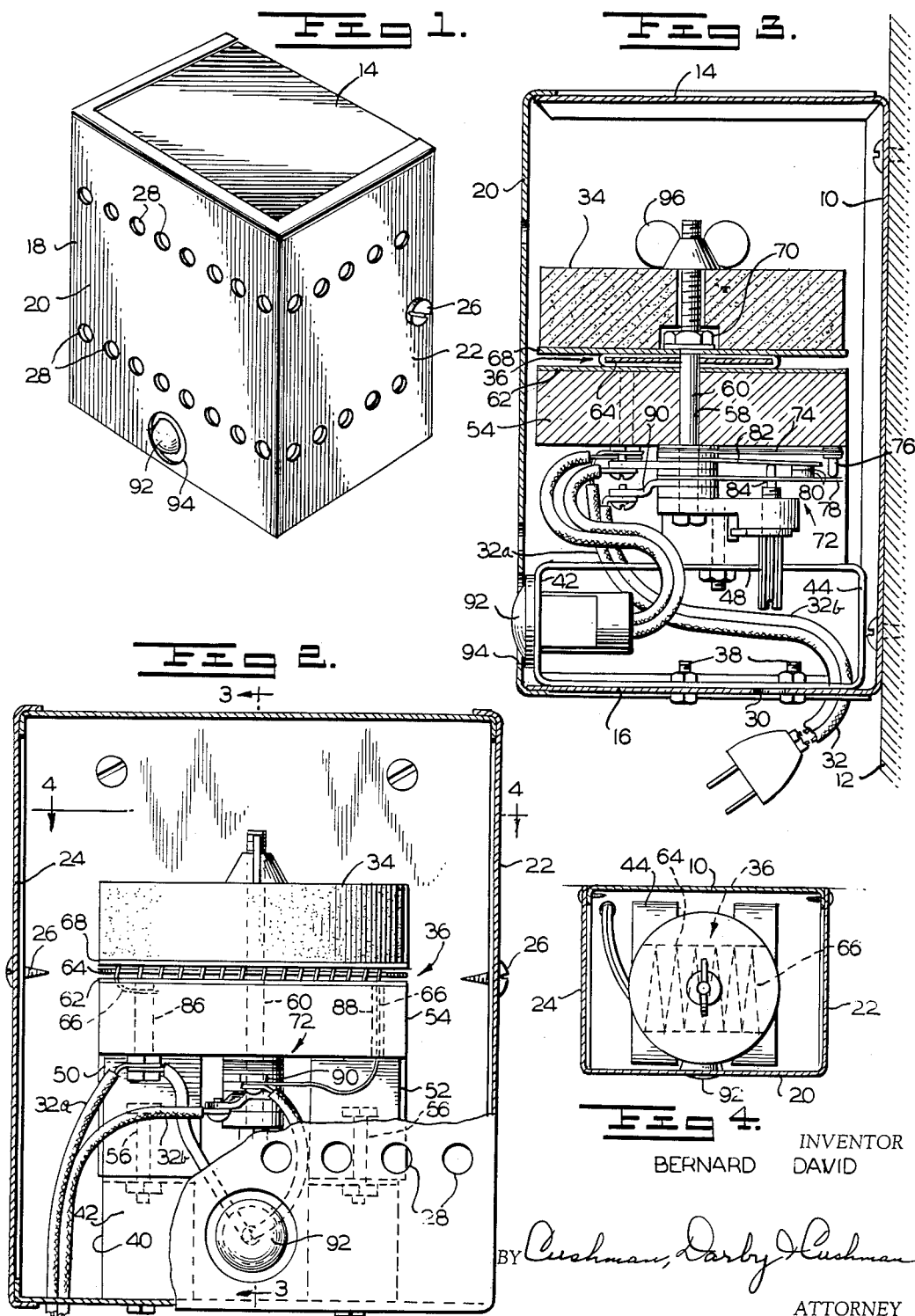
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B. DAVID

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APPARATUS FOR THE CONDITIONING OF AIR

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APPARATUS FOR THE CONDITIONING OF AIR

Bernard David, Charlottesville, Va.

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3 Claims. (Cl. 21—74)

This invention relates to an apparatus for the conditioning of air and particularly to an apparatus for introducing vapors into the air to cause persons breathing the air to be unaware of undesirable odors.

At the present time there is a considerable demand for devices which may be placed in rooms of various types for diffusing into the atmosphere certain materials which will either actually deteriorate organisms in the atmosphere which are creating offensive odors, or will supplement the atmosphere to effectively mask from the human senses the presence of the offensive odors.

There are devices of the general type above referred to in use at this time, one such line of devices comprising a block of porcelain or other similar highly porous material which has been impregnated with various perfumed oils or other materials which are intended to slowly reach the surface of the porcelain or other block by capillary action and to then liberate certain of the impregnated materials by way of evaporation. A serious drawback to such arrangements has been found to exist in the fact that only a relatively limited amount of the impregnated material actually evaporates into the air. That is, for 100 parts of material originally applied to and absorbed in the porous block, only perhaps 60 parts of the material is actually liberated by the vaporization process. The remaining 40 parts have been found to remain in the block. Since the use of units of the type being referred to are usually based on a servicing program, with maintenance personnel having to visit the units periodically to replace the impregnated blocks, it will be appreciated that the retention of 40 parts of material within the block requires more frequent servicing, with resulting increased cost to the user.

One attempt to overcome the above mentioned difficulties has been to place the porous blocks within a passage in which a small fan is caused to operate, theoretically to slowly move air through the block to thus cause all of the impregnated material to be liberated. However, with that type of device it has been found that invariably the air contains certain amounts of dust which quickly collect on the "upwind" side of the block to clog the outlets of the capillary pores and thus stop circulation of air through the block. As a consequence, again, only a limited amount of the impregnated materials are eventually liberated.

According to the present invention, an apparatus is provided for liberating substantially all of the impregnated materials. That is, under the present invention it has been found that less than 1% of the impregnated materials remain in the blocks. The basis of the present invention is that heat applied to the impregnated block by one means or another will apparently cause the capillary action to be expedited in such fashion that substantially all of the impregnated material is liberated.

Accordingly, it is a primary object of this invention to provide an apparatus for causing substantially complete liberation of impregnated materials from porous blocks

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employed in apparatus for conditioning air against offensive odors.

It is a further object of this invention to provide apparatus for causing relatively small amounts of electric current to provide heat for application to porous blocks in apparatus of the character described.

It is a further object of this invention to provide apparatus including an electrical resistance coil in series with a controlling thermostat and indicating lamp for applying heat to a porous block in apparatus of the type described herein.

It is a further object of this invention to provide in an apparatus of the type described a rectangular or oval-shaped porous block to substantially coincide with the contour of a readily formed electrical resistance coil.

Further objects and the entire scope of the invention will become more fully apparent from the following detailed description and from the appended claims. It will be understood that the following description generally pertains to one illustrative example of suitable apparatus for carrying out the present invention. Since many other specific forms of apparatus will become apparent to those reading this specification, no limitation to the described embodiment is intended. On the contrary, it is intended that the scope of the invention be understood from the appended claims.

The invention may be best understood with reference to the accompanying drawings, in which:

Figure 1 shows an assembled view of a unit according to the present invention.

Figure 2 shows a front elevational view of the interior of the units shown in Figure 1.

Figure 3 shows a side elevational view of the unit taken substantially along the line 3—3 of Figure 2, and

Figure 4 shows a top view of the unit in reduced scale taken substantially along the line 4—4 of Figure 2.

Referring now to the drawings, the unit comprises a rear supporting panel 10 adapted for connection by any suitable means to a wall or other support 12. The panel 10 is provided with an upper panel 14 and a lower panel 16 extending at right angles from panel 10, the panels 14 and 16 respectively forming top and bottom covers. Arranged to fit around the panels 14 and 16 and extend therebetween on three sides is a removable box-like structure 18 having a front panel 20 and side panels 22 and 24. The panels 10, 14, 16, 20, 22 and 24 may have their respective edges bent at right angles to provide overlapping areas at the various edges and suitable screws 26 may be employed as a means for retaining the removable structure 18 on the panel 10 mounted to the supporting wall 12.

The unit may be conveniently provided with apertures 28 for providing suitable air circulation through the unit. There may also be one or more apertures 30 in the bottom panel 16 for permitting circulation of air upwardly through the unit and for permitting entry of an electric cord 32. Within the unit there may be mounted the impregnated porous block 34 in proximity to a heating element designated generally as 36. The mounting for the block 34 and element 36 is as follows: On the bottom panel 16 there is supported by means of bolts 38 an open box-like structure 40 comprising a front panel 42 extending substantially across the front of the unit and having two spaced rings 44 extending rearwardly of the panel 42 for supporting further structure to be described.

Resting on the upper legs 48 of the support rings 44 are posts 50 and 52 preferably made of material which is an electrical insulator and also has low heat transfer characteristics. Resting in turn upon the upper surfaces of posts 50 and 52 is a base block 54 which may preferably be made of the same material (except not impregnated) as

block 36. The block 54 and posts 50 and 52 may be integral, or they may be separate and joined together by bolts, cementing or other means. In Figure 2 there are illustrated two bolts 56 embedded within the posts 50 and 52 for the purpose of attaching the latter to the support rings 44.

As best shown in Figure 3, the block 54 is drilled as at 58 to receive a bolt 60 extending therethrough. On the upper surface of block 54 there is provided a first sheet of mica or similar electrical insulating and heat resistant material 62 upon which rests a flat card 64, also of insulating material, about which is wound an electrical resistance wire 66. Above the card 64 and wire 66 wound thereon is placed a second sheet of mica or similar material 68. The just-mentioned components are retained against the upper surface of block 54 by means of a nut 70 turned down on the bolt 60.

In the drawings, the vertical dimensions of the mica sheets 62 and 68 and the card 64 with wire 66 wound thereon are greatly exaggerated for purposes of illustration. Actually, the mica sheets and card will be quite thin, and the wire 66 in the form of a flat ribbon, so that there is practically no waste space between the facing sides of the mica sheets 62 and 68.

At the lower surface of block 54, between the posts 50 and 52, the bolt 60 extends downwardly to support a thermostat unit designated generally as 72. The thermostat 72 comprises a bi-metallic arm 74 lying immediately adjacent the lower surface of block 54 and this bi-metal arm acts through an operating button 76 to flex a lower contact leaf 78 to engage or separate contacts 80. The upper of the contacts 80 is mounted on an upper contact leaf 82, which may be adjusted in position relative to the bi-metal arm 74 by means of a conventional screw-threaded adjustment post 84 operable by a screw driver which may be extended through one of the apertures 30 in the lower panel 16.

The incoming electrical circuit consisting of two-conductor line 32 will extend through one lead 32a to a binding post 86 extending through the block 54. A connection may be made between upper end of post 86 and one end of the heating wire 66, with the opposite end of the heating wire 66 extending downwardly through an aperture 88 in block 54 and to a binding post 90 on the thermostat 72, so that an electrical circuit is completed to the contact leaf 82. The contact leaf 78 is in turn connected to the opposite side of electrical line 32, this being designated line 32b, to complete a circuit including the thermostat contacts 80.

To provide a visual indication of the time intervals during which electrical current is flowing through the heater coil 66, there is provided in the previously mentioned support panel 42 an indicating lamp or so-called pilot lamp 92 visible through an aperture 94 in front cover panel 20. This lamp is connected in parallel with the heater element by connection at one side to the binding post 86 and at the opposite side to the binding post 90 of the thermostat 72.

In operation, when the complete unit is at room temperature the bi-metal element 74 will be flexed upwardly to lie against the bottom of block 54 and the contacts 80 will be engaged to complete an electrical circuit through the resistance coil 66 and also through the indicating lamp 92. As electric current continues to flow through the resistance coil 66, the temperature in the surrounding blocks 34 and 54 will increase and eventually heat will be absorbed by bi-metal 74, causing the latter to flex downwardly to drive the low contact 80 out of engagement with the upper contact. Thus, the temperature in the block 54 will be closely regulated and there will be a corresponding regulation of the impregnated block 34.

It will be understood that many other means of applying heat to the block 34 may be relied upon, including means not requiring the presence of block 54. The reason for the use of block 54, which preferably is of the same mate-

rial and same size as block 34, is simply to provide a convenient means for having the thermostat permanently adjacent to a mass of material which will usually be of substantially the same heat conducting characteristics as the impregnated block, whereby when the impregnated block may be removed for servicing and the like, there will not be any extreme change of conditions which might cause extreme fluctuations in the heat generated in coil 66 so as to damage the coil itself or the thermostat.

It is contemplated that heat may be applied without use of coils, as by infra-red radiation and the like.

The block 34 may be conveniently clamped to the structure by means of wing nut 96 turned down on the bolt 60.

As best shown in Figure 4, for the convenient and accurate winding of the heating wire 66 on the card 64, it is preferable that the card 64 be of rectangular or oval configuration. That is, to wind the wire on a circular card would be extremely complicated. Accordingly, the use of a circular block as illustrated with a rectangular or oval heating coil causes some areas of the block 34 to remain unheated. To more effectively heat the entire block, it is an important aspect of this invention that the structure as shown in the drawings be modified to have at least block 34 correspond in configuration to the heating element. That is, the block 34 would assume a rectangular or oval shape. In this connection, the single bolt 60 could be replaced with two or more bolts, or other suitable indexing arrangements could be employed to properly orient the block 34 on the remainder of the structure.

Using impregnated blocks of about two and one-half inches in diameter and five-eighths inches thick, it has been found that very modest amounts of electric current will maintain the temperature of the impregnated blocks at about 115° F., which extends the action of the blocks up to one month or more of continuous performance. This is a marked improvement over previously known practices.

From the foregoing it will be apparent that by the present invention there is provided an apparatus for effectively liberating substantially all of the impregnated materials in a porous block of the type above described. Thus this invention so far extends the life of the impregnated blocks that the necessary servicing of the units is materially reduced, permitting the user to enjoy correspondingly decreased costs and providing increased markets for such devices.

I claim:

1. Apparatus for liberating substantially all of vaporizable substances distributed throughout a mass of material having pores providing capillary tubes throughout the material, said apparatus comprising means for supporting a block of the porous material having vaporizable substances therein, means including electrical means for applying heat to the block, a thermostat having contacts connected in electrical series relation with the heat applying means, a companion block mounted on the supporting means and positioned to place the heat applying means between the blocks, the thermostat being mounted to respond to the temperature of the companion block.

2. Apparatus for liberating substantially all of vaporizable substances distributed throughout a mass of material having pores providing capillary tubes throughout the material, said apparatus comprising means for supporting a block of the porous material having vaporizable substances therein, means including electrical resistance means for applying heat to the block, a thermostat having contacts connected in electrical series relation with the heat applying means, a companion block mounted on the supporting means and positioned to place the heat applying means between the blocks, the thermostat being mounted to respond to the temperature of the companion block.

3. Apparatus for liberating substantially all of vaporizable substances distributed throughout a mass of material having pores providing capillary tubes throughout the

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material, said apparatus comprising a rear panel for mounting the apparatus on a convenient support, a cover structure arranged to interengage with said rear panel, upper and lower panels extending from the rear panel, a pair of mounting posts extending upwardly from mounting means on the just-mentioned lower panel, a block of material having low heat transfer characteristics mounted on the upper ends of the posts, a flat card having electrical resistance wire wound thereabout supported on the upper surface of said block, means to attach a block of porous material impregnated with vaporizable substances so that said porous block will rest on the upper surface of the electrical resistance coil, means to support a thermostat adjacent the undersurface of the first-mentioned block and between said supporting posts, an indicating lamp mounted from the said lower panel in position to be viewable through an aperture in the front of the cover structure, means to supply electric potential to the resistance coil and the indicating lamp through the thermostat, and a plurality of apertures in the cover structure for permitting circulation of air within the zone confined by the cover

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structure, the upper and lower panels and the rear panel, the arrangement being such that limited amounts of heat applied to the porous block by the resistance means under control of the thermostat will cause said liberation of substances from within the porous block.

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