

[72] Inventors **Hans Schmidt**
Bad Mingolsheim;
Alfons Oestreicher, Helmsheim, both of
Germany
 [21] Appl. No. **876,230**
 [22] Filed **Nov. 13, 1969**
 [45] Patented **Nov. 30, 1971**
 [73] Assignee **Hans Schmidt jun**
Bad Mingolsheim, Germany
 [32] Priority **Nov. 22, 1968**
 [33] **Germany**
 [31] **G 68 08 094.4**

[56]

References Cited

UNITED STATES PATENTS

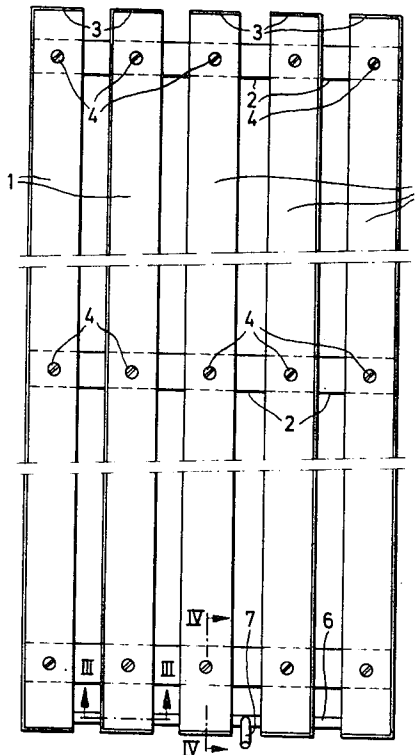
727,425	5/1903	Orth	4/180
3,111,686	11/1963	Sierant	4/180
3,443,560	5/1969	Munroe et al.	128/66

Primary Examiner—L. W. Trapp
 Attorney—Craig, Antonelli & Hill

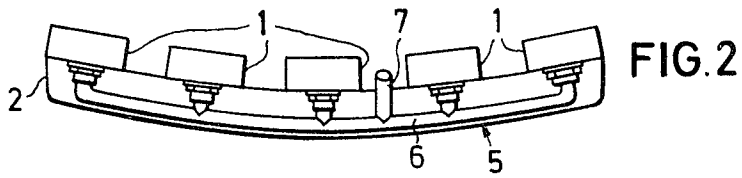
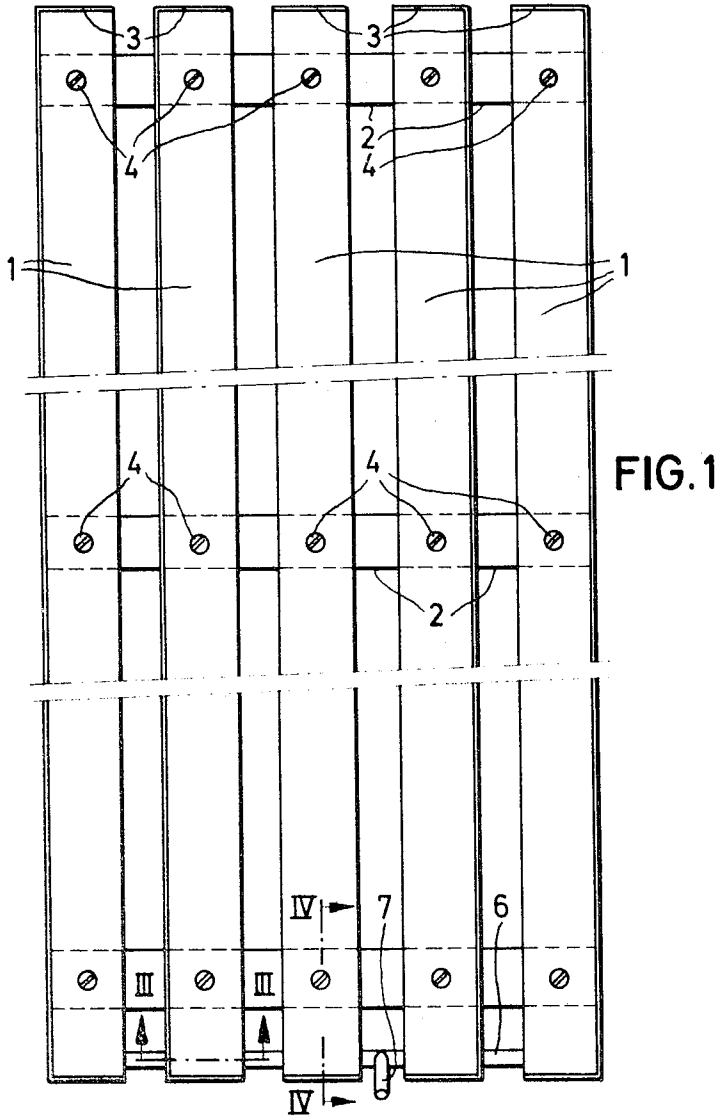
[54] **GAS-PERCOLATING DEVICE FOR THERAPEUTIC BATH TREATMENTS**
 10 Claims, 7 Drawing Figs.

[52] U.S. Cl. **128/66,**
4/180
 [51] Int. Cl. **A61h 9/00**
 [50] Field of Search **128/66,**
369; 4/178, 180

ABSTRACT: A device for passing a treatment gas into a bathtub or similar container consisting of a grate of plastic at least the upper grate boards of which have a hollow cross section to serve as gas-conducting chambers for passing the treatment gas to and through nozzle openings which are provided in the sidewalls of the adjacent upper grate boards facing each other. The gas may be conducted from a gas source under pressure to the individual upper grate boards either through a pipe which is connected to all of the upper boards or through one of the lower cross boards which likewise has a hollow cross section and is connected by resilient plugs with axial bores to each of the upper boards.



SHEET 1 OF 3



INVENTORS

HANS SCHMIEDT and ALFONS OESTREICHER

BY

Craig Antonelli, Stewart & Hill
Attorneys

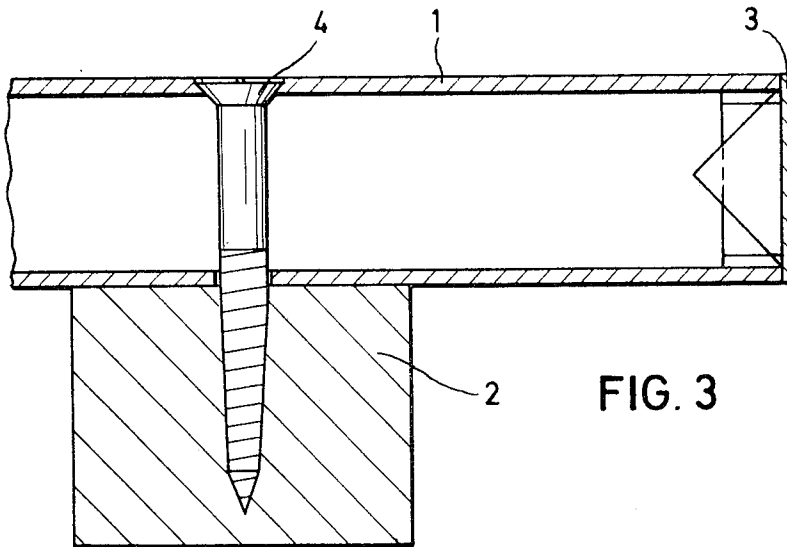


FIG. 3

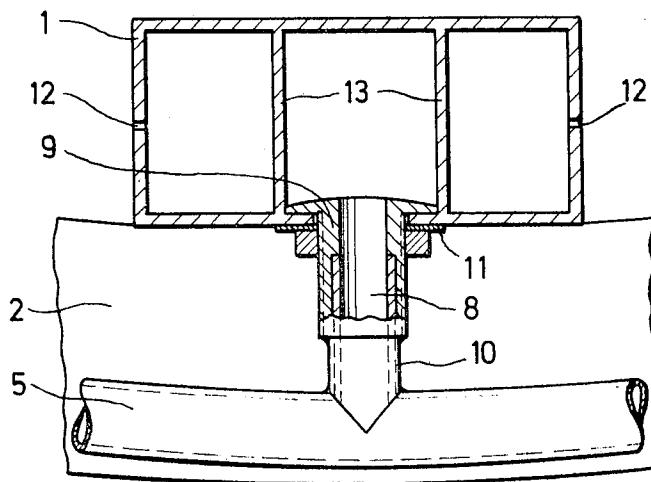


FIG. 4

INVENTORS

HANS SCHMIDT and ALFONS OESTERRECHER

BY

Craig Antonelli, Stewart & Hill
Attorneys

SHEET 3 OF 3

FIG. 6

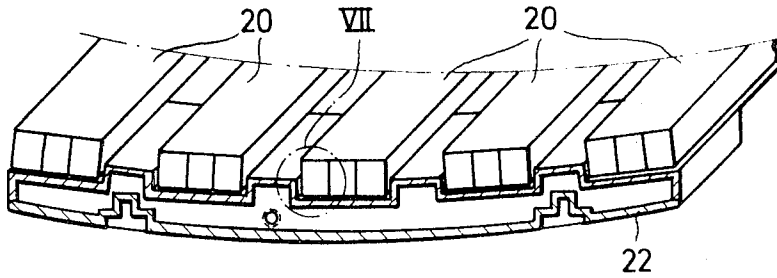
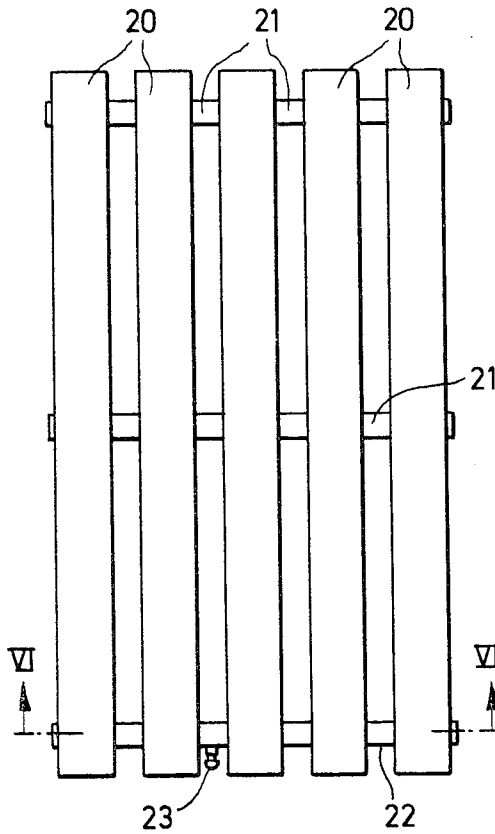
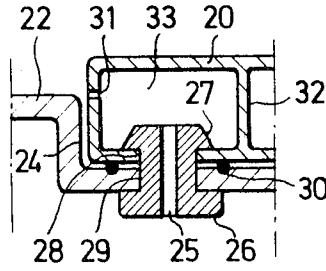


FIG. 7

FIG. 5

INVENTORS

HANS SCHMIDT and ALFONS OESTREICHER
BY

Craig, Antonelli, Stewart & Hill

Attorneys

GAS-PERCOLATING DEVICE FOR THERAPEUTIC BATH TREATMENTS

The present invention relates to a gas-percolating device for therapeutic bath treatments which comprises a grate of plastic which is adapted to be placed upon the bottom of a bathtub or similar container and consists of a plurality of parallel upper boards which are spaced from each other and are secured to each other by lower cross boards, and means for passing a treatment gas from this grate into the bath liquid.

Such grates are usually inserted into bathtubs, foot baths or other containers for taking up the weight of a human body or body portion to be treated and for supporting the same at a suitable distance from the bottom of the tub so as to provide for the space which is required for the device for passing the treatment gas into the water or other liquid of the bath. The grates which are conventionally used for this purpose usually consist of boards or strips of wood which are spaced from each other sufficiently so that rigid or flexible tubes of metal, rubber or the like which are provided with nozzle openings may be inserted between them so that a treatment gas may be conducted through these tubes and from their nozzle openings into the water or other liquid of the bath. These tubes including the nozzle openings therefore form parts separate from the grate itself.

All of the known gas-percolating devices of this kind have the disadvantages that they require too many separate parts, that unless special provisions are made it is difficult to keep their nozzle openings in an open position, that their cost of manufacture and thus also their purchase cost is too high, and that their manipulation is often too complicated. These disadvantages are also the reason why such therapeutic devices have so far been limited almost entirely to professional use and why they have hardly ever been sold for use in private homes.

It is an object of the present invention to provide a therapeutic device of the type as described at the beginning which is designed so as to be of a simple and inexpensive construction, to form a single unit when assembled, and to be easily manipulated and very reliable in operation.

According to the present invention this object is attained by providing a grate at least the main upper boards of which consist of plastic and have a hollow cross-sectional shape so that the insides of these boards form channels for conducting the treatment gas to the nozzle openings, and in providing these nozzle openings in the walls of these boards and in such positions that they will always be free during a treatment to pass the gas into the bath liquid.

The device according to the invention has therefore the considerable advantage over the grate-like structures as were previously employed for the same purpose that the different functions of the device, namely, the weight supporting function of the grate, and the functions of conducting the treatment gas to the position of the grate and of passing the gas through nozzle openings in the grate position into the bath liquid are all carried out by a single component, namely, the grate itself. The plastic which is employed for producing the grate should preferably have a certain amount of elasticity so that under the weight of the body portion to be treated it will adapt itself to the shape of the bottom of the tub into which it is inserted, but while yielding slightly under such a weight, it will have an adequate stability to support this weight.

According to a preferred embodiment of the invention, the nozzle openings are provided in the lateral walls of the hollow upper boards of the grate which face each other. Thus, no special means have to be provided to prevent these nozzle openings from being closed during a treatment since their positions in the gaps between the adjacent upper grate boards always remain free.

According to another feature of the invention, at least one of the lower cross boards which secure the main upper boards to each other is likewise made of a hollow cross section and its inside communicates by connecting channels with the inside of each of the upper boards. This hollow cross board therefore serves as a conduit for the treatment gas and for distributing

the same to the inside of each of the upper boards. These cross boards preferably also consist of plastic which, if necessary, may be reinforced.

For mounting the upper grate boards in the proper position relative to each other and for simplifying the manner of securing them to the cross boards, these cross boards are preferably provided with recesses into each of which one of the upper grate boards is inserted. Thus, the upper grate boards do not merely rest on the upper surfaces of the cross boards but they are also gripped by the lateral walls of these recesses.

In order to insure that the treatment gas will only emerge from the nozzle openings which are provided in the lateral walls of the upper grate boards and may be of any desired number and cross section, suitable sealing means are inserted between the upper grate boards and the lower cross board through which the gas is conducted.

The connecting channels between this gas-conducting cross board and the upper grate boards are preferably provided in the form of bores in resilient plugs each of which has a flange on each end for connecting this cross board to one of the upper grate boards by projecting through their adjacent walls and clamping them to each other while compressing the intermediate sealing means which are mentioned above. These plugs therefore also carry out several functions, namely, to conduct the gas from the hollow cross board to the inside of the individual upper grate boards, to clamp this cross board together with the upper boards, and either alone or in cooperation with the sealing means to prevent the gas from leaking out of the joints between this cross board and the upper boards. The installation of these resilient plugs is very simple because the flange on one end of such a plug is tapered so as to permit it to be easily pushed through corresponding bores in the walls of the two boards which are to be connected. Therefore it requires only one simple manipulation to attain all of the results as stated above.

Especially the main upper boards of the grate are preferably reinforced by being provided at the inside of each board with several partitions so as to form, for example, three longitudinal chambers or channels. While these partitions may be provided with apertures so as to connect these channels to each other, they may also be solid and only the two outer channels may be in communication by the connecting plugs with the gas-conducting cross board. This latter embodiment of the invention has the advantage that by the provision of these two reinforcing partitions in each upper grate board the effective gas-conducting cross section of the hollow inside of the board is considerably reduced and the treatment gas will therefore not expand excessively and diminish in pressure when passing into these two channels. Of course, if the upper grate boards are made of a greater width, it is also possible to provide more than two longitudinal partitions in each upper board or to make these two partitions of a greater thickness.

The features and advantages of the present invention will become more clearly apparent from the following detailed description thereof which is to be read with reference to the accompanying drawings, in which

FIG. 1 shows, partly broken away, a top view of the grate according to one embodiment of the invention;

FIG. 2 shows an end view of the grate according to FIG. 1;

FIG. 3 shows a cross section which is taken along the line III—III of FIG. 1;

FIG. 4 shows a cross section which is taken along the line IV—IV of FIG. 1;

FIG. 5 shows a top view of another embodiment of the invention in which the grate is shown on a smaller scale than that shown in FIG. 1;

FIG. 6 shows a cross section which is taken along the line VI—VI of FIG. 5; while

FIG. 7 shows a cross section of a part of the grate illustrated in FIG. 6.

The therapeutic device according to the first embodiment of the invention as illustrated in FIGS. 1 to 4 comprises a grate which consists of a plurality of parallel longitudinal upper

boards 1 and of several lower cross boards 2 which secure the adjacent upper boards with intervening gaps to each other. The upper boards 1 consist of plastic and have a hollow cross-sectional shape and may be produced, for example, by extrusion. The chamber which is formed in each board 1 is closed toward the outside by cover plates 3 on the opposite ends of the board. These cover plates 3 may be secured to each board by gluing or welding.

The upper boards 1 are secured by screws 4 to the cross boards 2 which may consist of wood or any other suitable material. As shown particularly in FIG. 2, these boards 2 are curved substantially in accordance with the shape of the bottom of the bathtub or the like into which the grate is to be inserted.

This grate is associated with a gas-percolating apparatus of which only the gas distributor 5 is illustrated and which may further comprise a compressor (not shown) from which the gas is conducted through a suitable connecting line to the distributor 5 under an adjustable pressure which may be regulated by suitable control means.

The gas distributor for the grate as illustrated in FIGS. 1 to 4 consists of a pipe 6 which is bent in accordance with the curvature of the cross strips 2 and is provided with a connecting piece 7 for the line leading to the compressor. As shown particularly in FIG. 4, this pipe 6 is connected to the lower side of one end of the upper boards 1 by short pipe pieces 10 on pipe 6 and by headed sockets 9 which are screwed upon the pipe pieces 10 and are clamped by nuts to the lower walls of the boards 1 to which they are also sealed by gaskets 11. The axial bores in the sockets 9 and in the associated pipe pieces 10 then form channels 8 which connect the inside of pipe 6 with the insides of the chambers in the upper boards 1.

The gas required for the desired treatment, for example, carbonic acid gas, oxygen, or the like, which is supplied, for example, by a compressor passes through the distributor 5 and the channels 8 into the chambers within the board 1. It then penetrates through the nozzles 12, which are preferably provided in the lateral walls of the boards 1 facing each other, into the bath liquid and produces therein the desired percolating or bubbling effect.

In FIG. 4 it may be seen that the chamber in each board 1 is reinforced by longitudinal partitions 13 which are provided with the required apertures for the free passage of the treating gas through the chamber and to the nozzle openings 12 in its lateral walls. These reinforcing partitions are adapted to take up and distribute the weight of the body or body parts to be treated which are resting on the grate and they prevent the boards and the chambers therein from being compressed under such a weight.

FIGS. 5 to 7 illustrate another and very preferred embodiment of the invention. The grate again consists of longitudinal hollow upper boards 20 of plastic which are connected to each other by cross boards 21 which in this embodiment likewise consist of plastic. One of these cross boards, the board 22 near one end of the upper boards 20, has a hollow cross section, as shown particularly in FIG. 6, since it serves not only for securing the upper boards 1 to each other but also as a gas conducting and distributing channel so that a separate gas pipe 5 as shown in FIGS. 1, 2 and 4 becomes unnecessary. This hollow cross board 22 is for this purpose provided with a connecting nipple 23 which may be connected, for example, by a hose, to the source of the desired gas under pressure. Cross board 22 is further provided with parallel recesses 24 into which the upper boards 20 are inserted.

For connecting the distributing channel at the inside of cross board 22 with the insides of the upper boards 20, connecting channels 25 are provided which, as shown particularly in FIG. 7, are formed by axial bores in plugs 26. These plugs 26 consist of a suitable resilient material and each of them has a conical flange 27 at one end. These plugs serve for the double purpose of mechanically connecting the cross board 22 to the upper boards 20 and of passing the treatment gas from the distributing channel at the inside of cross board 22 to the

channels at the insides of the upper boards 20. When the grate is being assembled, it is merely necessary to insert the upper boards 20 in such positions into the associated recesses 24 in the cross board 22 that each opening 28 in the upper boards 20 is in exact alignment with the corresponding opening 29 in the cross board 22. Before this insertion of the upper boards 20, sealing rings 30 are inserted into the recesses 24 around the openings 29. Thereafter the resilient plugs 26 are pushed from below through the associated openings 28 and 29 until the flanges 27 snap over the lower walls of upper boards 20. The upper boards 20 are thus resiliently clamped together with the cross board 22 and at the same time a gastight connection is formed between the channels in the cross board 22 and in the upper boards 20. The gas flowing into the channels in the upper boards 20 then passes through the nozzle openings 31 in the lateral walls of these channels into the bath liquid.

As indicated in FIG. 6, the inside of each board 20 is also divided into three longitudinal channels or chambers by being provided with reinforcing partitions 32 which in this embodiment of the invention are preferably solid and not provided with any apertures. The connecting plugs 26 are then inserted into corresponding apertures 28 and 29 in the upper wall of cross board 22 and in the lower wall of the two outer channels 33 so that the gas will only pass through these two channels and then out of the nozzle 31 in the outer wall of each of these channels, while no gas enters the central channel between the channels 33.

Although our invention has been illustrated and described with reference to the preferred embodiments thereof, we wish to have it understood that it is in no way limited to the details of such embodiments but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed our invention, what we claim is:

1. A gas-percolating device for therapeutic bath treatments comprising a grate consisting of a plurality of parallel upper boards laterally spaced from each other and consisting of plastic and each having a hollow cross section so as to form a chamber, said chamber having an upper wall portion adapted to engage with and directly support a human body or body part to be treated and other wall portions with which said body is normally not capable of engaging when resting on said upper wall portion, said other wall portions having nozzle bores therein, and a plurality of lower boards extending transverse to said upper boards and secured thereto so as to connect said upper boards to each other, and gas conducting means connected to each of said upper boards for passing a treatment gas under pressure into and through each of said chambers and out of said nozzle openings.

2. A device as defined in claim 1, in which each of said upper boards has a substantially rectangular cross section with sidewalls facing those of the adjacent upper boards, said nozzle openings being provided in said sidewalls.

3. A device as defined in claim 1, in which said gas conducting means comprise at least one of said lower boards which likewise has a hollow cross section and is adapted to conduct said gas channel means connecting the inside of said lower board to the inside of said chamber in each of said upper boards, and means for connecting said lower board to a source of treatment gas under pressure.

4. A device as defined in claim 3, in which each of said lower boards has recesses in its upper surface into each of which one of said upper boards is inserted.

5. A device as defined in claim 3, further comprising sealing means inserted around said channel means between said upper board and said gas-conducting lower board.

6. A device as defined in claim 5, in which the upper wall of said gas-conducting lower board has a plurality of apertures and the lower wall of each of said upper boards has at least one aperture in axial alignment with one of said apertures in said lower board, each of said channel means comprising a plug of a resilient material having an axial bore, said plug being adapted to be inserted into said aligned aperture of said

5

upper and lower boards and when so inserted resiliently clamping said lower board to one of said upper boards and also compressing said sealing means between said upper and lower boards so that no gas passed into said lower board can escape to the outside except through said nozzle bores.

7. A device as defined in claim 6, in which each of said upper boards contains a plurality of reinforcing partitions dividing said chamber in said upper board into at least three adjacent longitudinal channels, said apertures in the lower walls of said upper boards through which said plugs are inserted extending only through the lower walls of the two outer channels of each upper board, said nozzle openings being provided only in the outer sidewalls of each of said outer channels facing the outer sidewalls of the adjacent upper boards.

6

8. A device as defined in claim 1, in which each of said upper boards contains a plurality of reinforcing partitions.

9. A device as defined in claim 8 in which said partitions divide said chamber in each of said upper boards into at least three adjacent longitudinal channels, said partitions having apertures for connecting said channels with each other.

10. A device as defined in claim 8 in which said partitions divide said chamber in each of said upper boards into at least three adjacent longitudinal channels, said nozzle openings being provided only in said other wall portions of the outer channels, and said gas conducting means being connected only to said two outer channels.

* * * * *

15

20

25

30

35

40

45

50

55

60

65

70

75