

Space arrangement, construction element and method for climate regulating the space.

The present invention relates to a spatial arrangement in accordance with the preamble of claim 1, a building element in connection to said spatial arrangement as well as a method for local control of the climate within a building element. Thus, the present invention relates to such a spatial arrangement which comprises a basin, such as a water pool or the like which is essentially limited with respect to its edge as well as a cupola-like structure which is arranged over said basin. According to the aforesaid the present invention also relates to a cupola-like structure which is to be arranged over a basin having an essentially limited edge or rim, and further a method for controlling or regulating such a climate which prevails over a basin which is essentially limited with respect to its rim.

Such spaces intended mainly for recreation are known, which as a more or less central element include a basin, especially a water basin such as a jacuzzi, swimming pool or even a bath tub. Such spaces can constitute a part of a larger recreation establishment or they can be associated with, e.g., a home sauna, in which cases, however, the basin element constitutes a kind of functional center into which one or several individuals find their way mainly for recreational purposes.

The recreational value is increased by details such as statues, plants or a pleasant furniture which are arranged mainly as decoration in the vicinity of the basin. The recreational value is also increased by heating the water, bubble arrangements etc. which are mainly applied to the water.

International patent application No. PCT/FI99/009354 discloses an arrangement wherein several separate spaces are arranged within a common structure and wherein said separate spaces can be separately controlled. The object of the present appli-

cation is mainly to complement such an arrangement in a manner disclosed by the appended claims. Thus, a spatial arrangement according to the present invention is characterized in that one or several cupola-like structure is arranged so that its rim essentially follows the rim of the respective corresponding basin relating to the respective cupola. An apparatus for controlling the climate is adapted to the spatial arrangement which is constituted in this manner, and by means of said control arrangement the climate between the water surface of the basin and the structural element located over the basin can be locally controlled within the cupola-like structure. Correspondingly, a structural element according to the present invention is characterized in that a control apparatus for the climate which prevails under the cupola is integrally connected to the structural element which is essentially open at its bottom end. The method according to the present invention is characterized in covering the basin with a cupola-like structural element and bringing said element to follow, at the rim thereof, the rim of the water basin, and in controlling, as desired, the climate prevailing between said structural element and the water surface, by means of an apparatus for locally controlling the climate, wherein said apparatus is arranged in connection with said structural element or the basin's rim structure. In this connection controlling the climate is intended to mean that the climate prevailing in the space is changed, in a comprehensive manner, to correspond to certain pre-defined climatological properties also in other respects than through heating. Thus, the invention also includes a dropping of the temperature and/or a regulation of the air humidity so that the climate prevailing in the space corresponds to, e.g., an arctic climate, a desert climate or the climate prevailing in the Mediterranean region, regardless of which type of climate in which the basin space as such is physically located. The controlling of the climate further includes that a basic regulation of the climate is performed in accordance with a certain geographical region and that the climate is regulated to differ from said basic

regulation to correspond to, e.g., the differing seasons for said region. Further favorable embodiments of the present invention are disclosed in the appended dependent claims.

An arrangement according to the present invention is especially suitable for use in connection with existing basins such as pools or the like. The arrangement is also especially useful for such relatively small-sized basins which often are arranged in conventional sanitary cabins or in open air in a courtyard. The area of such basins may vary from just over a square meter to a few tens of square meters. By means of an arrangement according to the present invention the recreational value of such a basin or a space connected thereto can in an easy manner be erected also at a later stage, i.e. considerably later than the completion of the basin. It should also be noted, in this connection, that the expression that the edge or rim "essentially follows" is intended to mean that between the edge of the basin and the inner rim of the cupola-like structure remains maximally a couple of meters, suitably 0.5 to 1.5 meters.

The invention will now be explained in more detail with reference to the appended drawing, wherein

Figure 1 is a perspective view of a general arrangement in accordance with one embodiment of the present invention,

Figure 2 in an exemplifying manner seen from above generally discloses how structural elements according to one embodiment of the present invention can be interconnected to constitute larger entities, and

Figure 3 also seen from above in a corresponding manner discloses an alternative interconnecting arrangement.

In accordance with Figure 1 a general arrangement according to

the present invention includes a cupola-like structural element 2 which favorably is arranged over and above a water pool or the like basin 1. With respect to its edge or rim 3 said basin 1 is limited so as to define an area which clearly can be distinguished from the rest of the spatial structures. Over such an area the cupola structure can be arranged in a manner which essentially follows the rims of the basin 1. In the Figure it can be seen that this expression is intended to cover also such an arrangement wherein a couple of meters can remain between the rim 3 of the basin 1 and the lower rim 4 of the cupola structure, for example so that around the basin remains a space for users, i.e. persons 5 seeking recreation. As such, the arrangement following the basin's edge guarantees that the regulation of the climate will be exact and the apparatus small in size.

According to the present invention such an apparatus 6 is arranged in connection with the overall arrangement of the space, i.e. suitably to the cupola-like structural element, by means of which apparatus the climate defined by the basin 1 and the cupola 2 can be exactly controlled or in a controlled manner brought into accordance with desired properties, with respect to at least one property or favorably simultaneously several properties or parameters. In the Figure an air control apparatus 6, such as an air cooling device and/or a heating device, a humidity regulator, a scent generator or some other such device which has an effect on the properties of the climate is arranged, in a favorable manner directly connecting to said cupola-like space, whereby the apparatus without any complicated piping can have an impact directly on the climate. Such a structure can be accomplished so that the cupola-like structural element 2 as such and including a climate regulator 6 can be hoisted or in some other manner transported from one location to another. Again, in some other cases the apparatus can be placed at a distance from the actual cupola, in which case the apparatus acts on the climate prevailing within the cupola 2 via, e.g., pipes (not shown).

Especially favorably the climate regulating apparatus 6 includes means known, as such, for regulating the surrounding and overlaying air space to correspond to the different seasons. Herein the water temperature in the basin 1 can be maintained either at a temperature which depicts the season, or, e.g., at an "opposite" temperature so that the basin is warm when the climate is cool or even very cold, while the basin 1 is maintained covered by ice at the same time when the climate is regulated to depict a tropical heat. According to an especially favorable embodiment the climate regulator apparatus 6 is arranged to function in connection with a heating and/or cooling apparatus for the water in the basin 1, suitably in an interaction so that the energy required for heating the water at least partially is recovered from the waste heat emanating from the cooling of the air space, or *vice versa*.

As such, the cupola-like structural element is favorably arranged in the manner disclosed in the Figure, so that at least a part of its walls 7 and/or roof portion 8 is arranged as a transparent structure, in which case the cupola and people 5 inside it and/or decorations arranged therein, such as plants 9, pieces of art (not shown) or the like add to the recreational value of the arrangement also outside the cupola 2. In other embodiments for example the walls 7 are deliberately made non-transparent so that people 5 around the pool 1 remain screened from public view. As is schematically indicated in the Figures the cupola-like structural element usually includes a door structure 10, unless a passage within the cupola is arranged, e.g., via a staircase (not shown) in connection with the basin.

Besides a regulation of climatological properties the space formed by said cupola can also in other ways be made to correspond to, e.g., a desired season or a certain geographical location. In such a case acoustic effects related to the

season in question can be generated within the cupola-like structure, such as the roar of wind, howling of animals found in arctic conditions, the noise of streaming water, clatter of ice or other sounds of nature, by using means integrally related to the climate regulation apparatus or using separate audio system means. Correspondingly, also other elements for presenting a special climate, especially arctic conditions, can be produced into the space defined by the cupola-like structure 2 and the basin 1, such as structures formed by ice in accordance with some earlier patents by the same applicant. Suitably, the effect of such and other decorative elements can be enhanced by an appropriate illumination within the cupola or favorably by fixed or mobile patterns projected from outside the cupola, etc. By means of sound reproducing systems one can also produce conventional music into the space defined by the cupola, and further forward information to the users, such as information concerning the use of the facilities or, e.g., concerning an incoming telephone call.

Especially in connection with Finnish sauna culture the present invention can be implemented so that within the cupola-like structure is provided, e.g., drifts of snow (not shown) or a coating of ice covering the water surface of the basin 1, into which ice coat a hole has been cut for winter swimming in connection with the sauna bath. Such a climate is associated with, e.g., means for producing scurries of snow, which means favorably can be both structurally and functionally connected to said means 6 for regulating the climate. A sauna, which in a natural manner associates with the arrangement, can be arranged integrally with the cupola-like structure, be located within it or, e.g., favorably be located at the end of an interconnecting tunnel-like passage 15 arranged at an entrance opening 10, as disclosed in Figure 3.

Thus, Figures 2 and 3 schematically show that cupola-like structures of the same or different shapes can be suitably combined to constitute larger entities.

Thus, Figure 2 discloses, seen from above, cupola-like elements arranged into connection with, e.g., a sauna 11 in such a manner that a space 12 constituted by one cupola-like structure 2 includes a warm pool 1 around which tropical elements 13 are arranged, while another space 12a, on the other hand, includes an arctic climate where the surface of a pool 1a is covered with ice into which a hole 14 is cut. In this space the means 6 for regulating the climate favorably also include a snow generator (not separately shown) by means of which a layer of snow is generated in order to render possible a rolling in snow. A third space 12b connecting to the sauna 11 can correspond to a Finnish summer evening, which respect to climate and decorations, in which case a pool 1b is cool and fresh. In this manner the user of the sauna can choose the environs where he goes for cooling off.

Figure 3, on the other hand, shows that cupola-like spaces 2, 12c, 12d, 12e and 12f can be combined in other ways as well, e.g., so that one passes from one space to another. In this case a first space 12c can include, in a space connecting to a pool 1c, for example a rain forest or the conditions prevailing in a Finnish summer rain. From there one can go either directly, or via an interconnecting passage 15 shown in the Figure, to a next space 12d where the water in a pool 1d is, e.g., warm but in which space otherwise prevails the conditions during a snowfall. A next space 12e may, again, be arctic in such a way that at least a major portion of a pool 1e is covered by ice.

Between relatively cold spaces 12d and 12e a separate structure acting as an air lock may not necessarily be required, but when one goes to the next space 12f having tropical conditions it is appropriate that the user passes through a structure 16 such as an air lock or at least a strip curtain which separates the climates. In the tropical space 12f the water in a pool 1f can be quite warm, in which case

even living tropical fish or the like can dwell in the actual pool 1f or, more appropriately, in a favorably annular outer basin 1f' which is separated from the pool 1f by means of an intermediate wall.

Although Figure 3 discloses several cupola-like spaces 12c, 12d, 12e and 12f arranged essentially subsequently it is clear that the spaces and the passages 10, 15, 16 between them can be arranged also in a different manner. Especially, in case the cupola-like structural elements 2 as such are made structurally relatively light so that they at the same time include a climate regulating apparatus 6 which is integrally included in the element 2, the mutual location of the different spaces 12c, 12d, 12e and 12f can be rather easily changed, e.g., in relation to basins 1c, 1d, 1e, 1f arranged in a uniform surface and in relation to possible other basins 1g. In this case a re-arrangement is facilitated by a structure wherein a cupola-like structural element 2 in accordance with Figure 1 comprises separate individual walls 7, 7a which favorably can be easily interchanged, in which case door openings 10 can be arranged as desired.

Above some favorable and appropriate objects of the present invention have been disclosed, but for the person skilled in the art it is clear that the present invention can be utilized also in many other ways within the scope of the appended claims. In the same manner, the shape of the cupola disclosed in the Figures is only schematic, and the cupola can, of course, also be realized in another shape, e.g., in the shape of a cone, a pyramid, a semi-sphere, cube or some other such shape. It is also clear that some smaller portion of a basin 1, e.g., an interconnecting channel to another basin may extend also outside the cupola-like structure 2. In the same way one embodiment includes a solution mainly intended for home conditions so that it can favorably be adapted, e.g., in connection with a common bath tub in a bathroom.

Claims

1. A spatial arrangement which includes a basin (1) such as a water pool which with respect to its edges (3) is essentially defined, as well as a generally cupola-like structure (2) which is to be arranged over said basin and which essentially follows the edge of the basin, in which structure the temperature of the interior space can be regulated as such, characterized in that one or several cupola-like structure(s) (2) is arranged so that its edges (4) essentially follow the edge (3) of the respective basin (1) and that an apparatus (6) for regulating the local climate is connected with the space arrangement thus provided, by means of which apparatus the climate prevailing between the cupola-like structural element (2) arranged over the basin (1) and the water surface of said basin (1) can be locally regulated in a controlled manner within the cupola-like structure (2).

2. An arrangement as defined in claim 1, characterized in that the apparatus (6) for regulating the climate includes means for cooling the air space between the basin's water surface and/or, correspondingly, the basin's (1) edge structures (3) and the structural element (2), and/or for heating said space, for regulating the humidity therein or for manipulating other properties of the air therein to correspond especially to some defined natural area and/or a defined season of the year.

3. An arrangement as defined in claim 1 or 2, characterized in that to said spatial arrangement is connected means (6) for heating and/or cooling the actual water and/or the basin's (1) structures (3) in order to increase the temperature difference between the water and/or the structure and, correspondingly, the climate.

4. A cupola-like structural element (2) provided to be arranged over a basin (1) which is essentially defined with

respect to its edges (3), such as a water basin, characterized in that for each cupola a specific apparatus (6) for regulating the air space prevailing under the cupola is integrally arranged at the structural element (2) which is essentially open at its lower end (4).

5. A structural element as defined in claim 4, characterized in that said regulating apparatus (6) includes an air cooler which suitably is implemented as a heat pump, so that the temperature of the climate prevailing under the cupola (2) can be regulated especially to correspond to arctic conditions.

6. A structural element as defined in claim 4 or 5, characterized in that to said structural element (2) is connected also other means which affect the climatological conditions such as air moisteners, smell generators or the like means.

7. A structural element as defined any of claims 4 to 6, characterized in that the cupola-like structural element (2) is arranged essentially to follow, by means of its edges (4), the edges or rim (3) of said basin (1), where the structural element (2) as such is favorably arranged as an at least partially transparent structure.

8. A method for regulating the climate prevailing over a basin (1) such as a water basin which is essentially defined with respect to its edges and is covered by a corresponding cupola-like structural element (2), characterized in bringing the covering structural element (2) to follow, by its edges, essentially an edge or rim (3) of the basin (1) and in regulating, in a controlled manner in accordance with desired properties, the climate prevailing between this structural element (2) and the water surface of the basin (1), by means of an apparatus (6) for regulating the local climate, which apparatus is arranged at said structural element (2) or

at the basin's (1) rim structure (3).

9. A method as defined in claim 8, c h a r a c t e r i z e d in that the regulation of the climate includes a cooling of the air and/or heating thereof, a change of the humidity and/or oxygen level therein or some other change of the air under the cupola-like structure, e.g., by means of perfumes.

10. A method as defined in claim 8 or 9, c h a r a c t e - r i z e d in that to the regulation of the climate connects a generation of acoustic effects into the space within said cupola-like structure (2), which effects are related to a corresponding natural climate, such as a whine of wind, howling of animals or the like.