Abstract: Disclosed is a dome type structure inducing main wall parts (10), forming four walls and a portion of a ceiling, each of which is provided with a lower end fixed to or buried under the ground in each of four directions and an upper end bent in a dome shape toward the center of the upper portion of the structure such that both edges of the upper ends of the neighboring main wall parts contact each other; corner wall parts (20) disposed at four corners of the structure between the neighboring main wall parts (10), and thus forming dome type corners; and a central ceiling part (30) closing a hole formed at the ceiling by connecting the main wall parts (10) such that the central ceiling part contacts the upper surfaces of the main wall parts (10), thereby being simply and rapidly assembled and disassembled.
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, Published:
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
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— with international search report
Description

DOME TYPE STRUCTURE

Technical Field

[1] The present invention relates to a dome type structure, and more particularly to a dome type structure, in which main wall parts forming four walls and a portion of a ceiling and corner wall parts forming corners are separately manufactured and are assembled with each other so as to simply and rapidly assemble and disassemble the dome type structure, and the number of the main wall parts is changed and thus the length of the walls of the dome type structure is expanded and contracted so as to change the size of the space within the dome type structure and thus provide various-sized indoor spaces.

Background Art

[2] In general, a dome means a hemispheric roof, i.e., an upturned bowl shaped roof. A structure having the above shape refers to a dome type structure, which covers the roof of a circular stadium, such as a baseball ground or a soccer field.

[3] Such a conventional dome type structure was applied to architecture in the Middle Ages, such as Eskimo igloos and African honeycomb housing. As a method for constructing the conventional dome type structure, a ferroconcrete or a polygonal structural frame was used and reconstructed several times. Recently, a solid frame is applied, or a structure, into which air can be injected, is manufactured and air is injected into the structure, thus constructing a dome type structure.

[4] However, in these conventional dome type structures, since the frames forming the general shapes of the structures are mostly fixed, it is impossible to increase the inner area of the dome type structures. Further, if the inner area of the dome type structure is increased, the dome type structure is partially broken down and then reconstructed, or a new dome type structure is separately constructed, thereby requiring a high burden of time and cost and causing a difficulty in construction, and thus being incapable of being easily applied. The dome type structure manufactured by an air injection method is proper to be used for a medium or short time, but has many problems, such as a difficulty in changing the size of the structure and limitations on maintenance of the structure and application of interior and exterior decorative materials for construction.

Disclosure of Invention

Technical Problem

[5] Therefore, the present invention has been made in view of the above problems, and it
is an object of the present invention to provide a dome type structure, in which main
wall parts forming four walls and a portion of a ceiling and corner wall parts forming
corners are separately manufactured and are assembled with each other so as to simply
and rapidly assemble and disassemble the dome type structure, and the number of the
main wall parts is changed and thus the length of the walls of the dome type structure
is expanded and contracted so as to change the size of the space in the dome type
structure and thus provide various-sized indoor spaces.

Technical Solution

In accordance with an aspect of the present invention, the above and other objects
can be accomplished by the provision of a dome type structure comprising main wall
parts, forming four walls and a portion of a ceiling, each of which is provided with a
lower end fixed to or buried under the ground in each of four directions and an upper
end bent in a dome shape toward the center of the upper portion of the structure such
that both edges of the upper ends of the neighboring main wall parts contact each
other; and corner wall parts disposed at four corners of the structure between the
neighboring main wall parts, and thus forming dome type corners.

Advantageous Effects

The dome type structure of the present invention is completed by assembling the
main wall parts forming four walls and a portion of a ceiling and the corner wall parts
forming corners, which are separately manufactured, thereby being simply and rapidly
assembled and disassembled and thus being rapidly constructed as relief facilities or as
collective accommodations.

Further, since the number of the main wall parts is changed and thus the length of the
walls of the dome type structure is expanded and contracted, the dome type structure
can be changed in size of the inner space, thereby being economic and having various
constitutions and thus providing several kinds of convenient facilities and accommodations having various indoor spaces.

Moreover, the dome type structure has an excellent structural property of uniform
dispersion of load, thereby being capable of reducing the weights of various load
support units of a frame.

Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention
will be more clearly understood from the following detailed description taken in con-
junction with the accompanying drawings, in which:
FIG. 1 is a perspective view of a dome type structure in accordance with one embodiment of the present invention;

FIG. 2 is an exploded perspective view of the dome type structure in accordance with the embodiment of the present invention;

FIG. 3 is a perspective view of the state of the dome type structure in accordance with the embodiment of the present invention, in which an outer wall reinforcing material is applied to the outer wall surface of the dome type structure;

FIG. 4 is a perspective view of a dome type structure in accordance with another embodiment of the present invention; and

FIG. 5 is a perspective view of a dome type structure in accordance with yet another embodiment of the present invention.

Mode for the Invention

As shown in FIGs. 1 to 5, a dome type structure in accordance with the present invention includes main wall parts 10 forming four walls and a portion of a ceiling, corner wall parts 20 respectively disposed at corners between the neighboring main wall parts 10, and a central ceiling part 30 closing a hole 5 formed at the ceiling by connecting the main wall parts 10.

The main wall parts 10, which form the four walls and a portion of the ceiling of the dome type structure, have the shape of a rectangular bent board, which is provided with a lower end fixed to or buried under the ground and an upper end bent in a dome shape, i.e., in the shape of one quarter of a circular tube radially divided, toward the center of the upper portion of the dome type structure such that both edges of the upper ends of the neighboring main wall parts 10 contact each other so as to form the hole 5 at the center of the ceiling of the dome type structure.

Here, a saw-toothed engaging protrusion 10a is formed on each of both side surfaces of the main wall parts 10 such that the saw-toothed engaging protrusion 10a can be engaged with a saw-toothed engaging protrusion 20a of the corresponding one of the corner wall parts 20.

Further, a saw-toothed engaging protrusion may be formed on each of the upper surfaces of the main wall parts 10 such that the saw-toothed engaging protrusion can be engaged with a saw-toothed engaging protrusion of the corresponding one of the side surfaces of the central ceiling part 30.

A door hole 11 is formed through any one of the main wall parts 10, and a door 12,
which can be opened and closed, is connected to the door hole 11. Further, a window hole 13 is formed through any one of the main wall parts 10, and a window 14, which can be opened and closed, is connected to the window hole 13.

[22] Here, the main wall parts 10 provided with the door 12 and the window 14 are manufactured by a mold using a light-weight material, such as expanded polystyrene, aerated concrete, plaster, silicon, etc., or a heavy-weight material, such as concrete, polymer resin, a solidified material, etc.

[23] In accordance with another embodiment of the present invention, as shown in FIG. 4, a plurality of main wall parts 10 is arranged in the correspondent wall direction, thus forming a rectangular dome type structure. Although not shown, a plurality of the main wall parts 10 may be arranged in each of four wall directions.

[24] The corner wall parts 20, which are respectively disposed at four corners of the dome type structure between the neighboring main wall parts 10, have the shape of a triangular curved board, which is provided with a sharpened upper end and has the shape of one quarter of a hemisphere so as to form dome type corners.

[25] Each of the corner wall parts 20 may be manufactured in one body. However, in the present invention, each of the corner wall parts 20 includes first and second corner wall parts 22 and 24 having the same structure, prepared in a pair, which are divided from each other by a central line.

[26] Here, the saw-toothed engaging protrusion 20a is formed on each of both side surfaces of the corner wall parts 20 such that the saw-toothed engaging protrusion 20a can be engaged with the saw-toothed engaging protrusion 10a of the corresponding one of the main wall parts 10.

[27] In accordance with yet another embodiment of the present invention, as shown in FIG. 5, first and second former wall parts are respectively integrated with neighboring main wall parts, thus forming connection wall parts 50.

[28] The central ceiling part 30 has the shape of a rectangular board, which closes the rectangular hole 5 formed at the ceiling portion by connecting the four main wall parts 10 and contacts the upper surfaces of the main wall parts 10.

[29] More specifically, the central ceiling part 30 includes an outer frame 32, and a transparent window 34 installed in the outer frame 32.

[30] Here, the saw-toothed engaging protrusions (not shown), which are engaged with the saw-toothed engaging protrusions formed on the upper surfaces of the main wall parts 10, may be formed on the outer surface of the outer frame 32.

[31] Further, an outer wall reinforcing material 40 or 42 for reinforcing the outer walls of
the main wall parts 10 is provided (with reference to FIGs. 1 and 3).

[32] The outer wall reinforcing material 40 may be ceramic or mortar, which is applied to the outer walls of the main wall parts 10 at a designated thickness, and the thickness of the outer wall reinforcing material 40 is preferably in the range of 0.5-1.5 mm. Further, the outer wall reinforcing material 42 may be a mesh net having a lattice structure, which is buried in the main wall parts 10.

[33] In the case that a mesh net buried in the main wall parts 10 is used as the outer wall reinforcing material 42, the thickness of the main wall parts 10 is preferably in the range of 1-10 cm.

[34] The main wall parts 10, the corner wall parts 20, and the central ceiling part 30 may be connected by various connection units (for example, a combination of bolts/nuts) as long as these parts 10, 20 and 30 are easily assembled into the dome type structure or the dome type structure is easily disassembled into the parts 10, 20 and 30.

[35] Further, fastening brackets (not shown) required by the above connection may be properly selected.

[36] Hereinafter, a process for manufacturing the above dome type structure of the present invention will be described.

[37] First, a plurality of the main wall parts 10 forming each of four walls is disposed at a correspondent position.

[38] Here, the lower ends of the main wall parts 10 are fixed to the floor or the ground, or are buried under the floor or the ground so as to more firmly fix the main wall parts 10.

[39] When the disposition of the main wall parts 10 has been completed, as described above, the corner wall parts 20 are disposed at the corner portions between the main wall parts 10, thus completing the outline of the dome type structure provided with the hole 5 formed therethrough.

[40] Here, the main wall parts 10 and the corner wall parts 20 are firstly connected by engagement between the saw-toothed engaging protrusions 10a formed on both side surfaces of the main wall parts 10 and the saw-toothed engaging protrusions 20a formed on both side surfaces of the corner wall parts 20a. Then, under the above state, the main wall parts 10 and the corner wall parts 20 are firmly connected using separate fastening units, such as bolts and nuts.

[41] Thereafter, the central ceiling part 30 is connected to the hole 5, thus completing the dome type structure of the present invention.

[42] In order to protect the outer wall of the dome type structure, the outer wall reinforcing material 40, such as ceramic or mortar, is applied to the outer wall of the
dome type structure at a thickness of 1mm or more, and preferably 0.5-1.5mm.

Instead of the outer wall reinforcing material 40 applied to the outer wall of the dome type structure, the outer wall reinforcing material 42 having the structure of a mesh net buried in the main wall parts 10 is used to reinforce the outer wall of the dome type structure.

In order to change the size of the dome type structure, the connection of the main wall parts 10, the corner wall parts 20, and the central ceiling part 30 is released, and then additional main wall parts 10 required to occupy a space of a desired area are further provided and assembled with the existing parts 10, 20, and 30. Thereby, it is possible to construct a new rectangular dome type structure simply and rapidly.

As described above, the respective parts of the dome type structure of the present invention are manufactured in proper places, and are simply assembled at a construction site only using a small number of people and equipment. Thereafter, a finishing process is performed, thus completing the dome type structure.

**Industrial Applicability**

As apparent from the above description, the dome type structure of the present invention is completed by assembling the main wall parts forming four walls and a portion of a ceiling and the corner wall parts forming corners, which are separately manufactured, thereby being simply and rapidly assembled and disassembled and thus being rapidly constructed as relief facilities or as collective accommodations.

Further, since the number of the main wall parts is changed and thus the length of the walls of the dome type structure is expanded and contracted, the dome type structure can be changed in size of the inner space, thereby being economic and having various constitutions and thus providing several kinds of convenient facilities and accommodations having various indoor spaces.

Moreover, the dome type structure has an excellent structural property of uniform dispersion of load, thereby being capable of reducing the weights of various load support units of a frame.
Claims

[1] A dome type structure comprising:
main wall parts, forming four walls and a portion of a ceiling, each of is which
provided with a lower end fixed to or buried under the ground in each of four
directions and an upper end bent in a dome shape toward the center of the upper
portion of the structure such that both edges of the upper ends of the neighboring
main wall parts contact each other; and
corner wall parts disposed at four corners of the structure between the
neighboring main wall parts, and thus forming dome type corners.

[2] The dome type structure according to claim 1, further comprising:
a central ceiling part closing a hole formed at the ceiling by connecting the main
wall parts such that the central ceiling part contacts the upper surfaces of the
main wall parts.

[3] The dome type structure according to claim 2, wherein the central ceiling part
includes an outer frame, and a transparent window installed in the outer frame.

[4] The dome type structure according to any one of claims 1 to 3, wherein each of
the corner wall parts includes first and second corner wall parts having the same
structure, prepared in a pair, which are divided from each other by a central line.

[5] The dome type structure according to claim 4, wherein the first and second
corner wall parts are respectively integrated with the neighboring main wall
parts.

[6] The dome type structure according to any one of claims 1 to 3, wherein a
plurality of the main wall parts is arranged in the corresponding wall direction.

[7] The dome type structure according to any one of claims 1 to 3, wherein a door
hole is formed through any one of the main wall parts and a door, which can be
opened and closed, is connected to the door hole.

[8] The dome type structure according to any one of claims 1 to 3, wherein a
window hole is formed through any one of the main wall parts and a window,
which can be opened and closed, is connected to the window hole.

[9] The dome type structure according to any one of claims 1 to 3, wherein a saw-
toothed engaging protrusion is formed on each of the side surfaces of the main
wall parts and the corner wall parts such that the saw-toothed engaging
protrusion of each of the side surfaces of the main wall parts is engaged with the
saw-toothed engaging protrusion of the corresponding one of the side surfaces of
the corner wall parts.

[10] The dome type structure according to any one of claims 1 to 3, further comprising an outer wall reinforcing material for reinforcing the outer wall surfaces of the main wall parts.

[11] The dome type structure according to claim 10, wherein the outer wall reinforcing material is ceramic or mortar applied to the outer wall surfaces of the main wall parts at a designated thickness.

[12] The dome type structure according to claim 11, wherein the thickness of the outer wall reinforcing material is in the range of 0.5-1.5mm.

[13] The dome type structure according to claim 10, wherein the outer wall reinforcing material is a mesh net having a lattice structure buried in the main wall parts.
A. CLASSIFICATION OF SUBJECT MATTER

E04B 1/32(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 E04B 1/32

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR,JP IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO internal) "dome","structure"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No</th>
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Further documents are listed in the continuation of Box C

See patent family annex

*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

*X* document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

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Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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