Dec. 19, 1967 B. KÖNIG 3,358,407

BUILDING HAVING A CENTRAL STAIR AND/OR LIFT SHAFT

Filed Nov. 3, 1964 5 Sheets-Sheet 1

Fig. 1

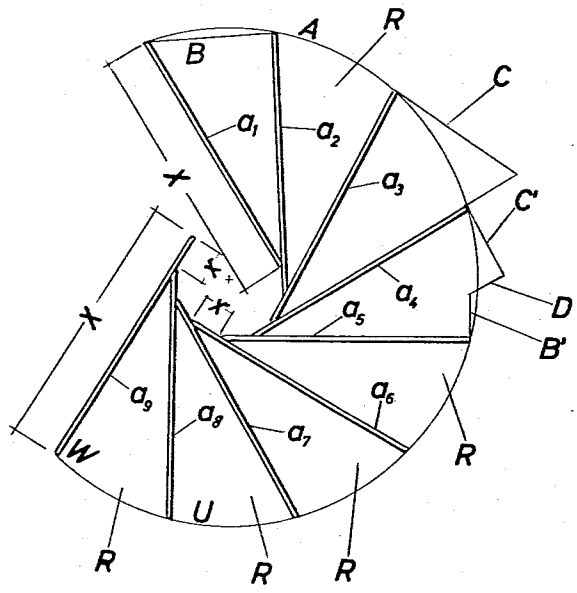
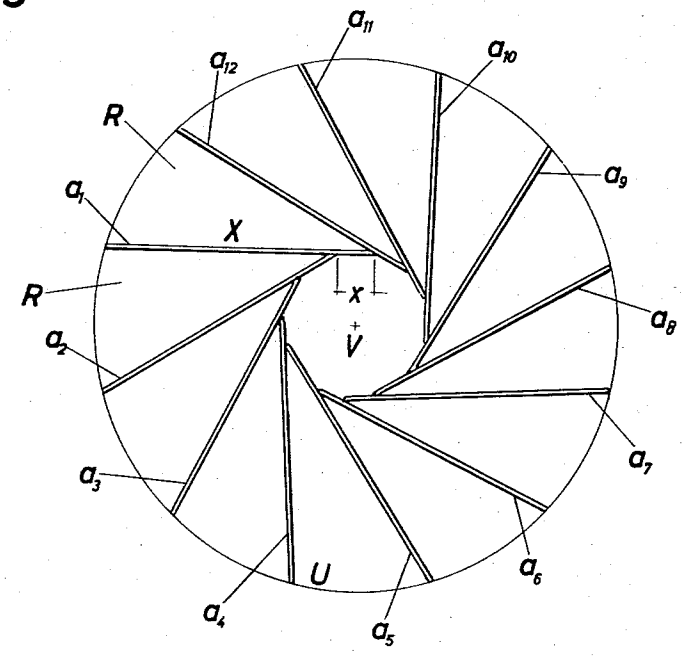


Fig. 2



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Fig. 3

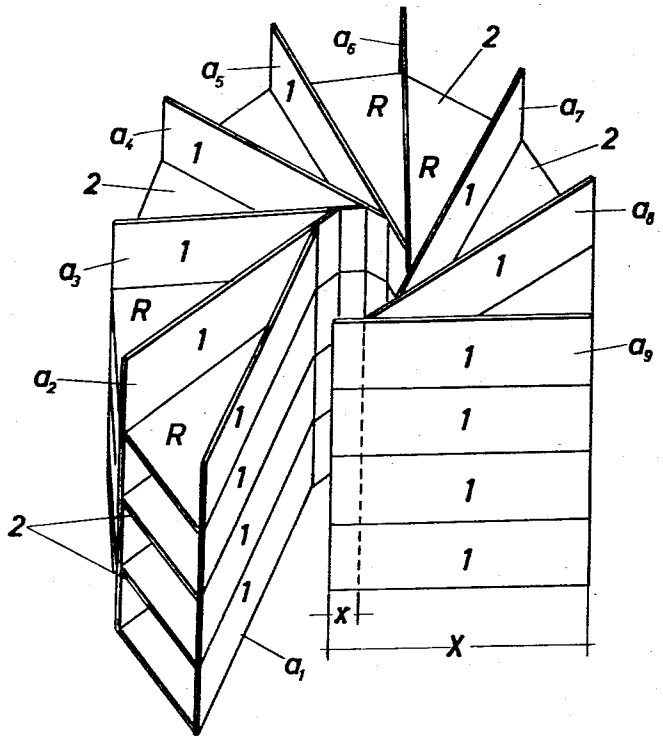


Fig. 3a

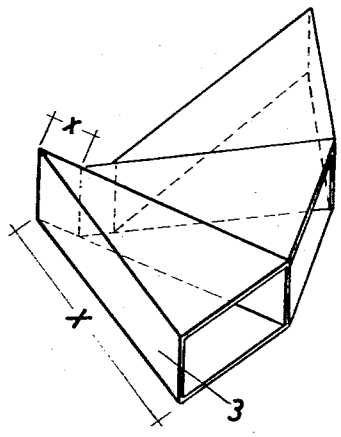
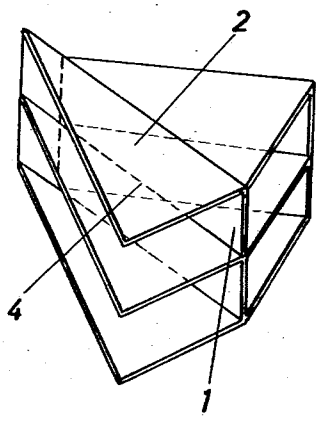


Fig. 3b



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Fig. 4

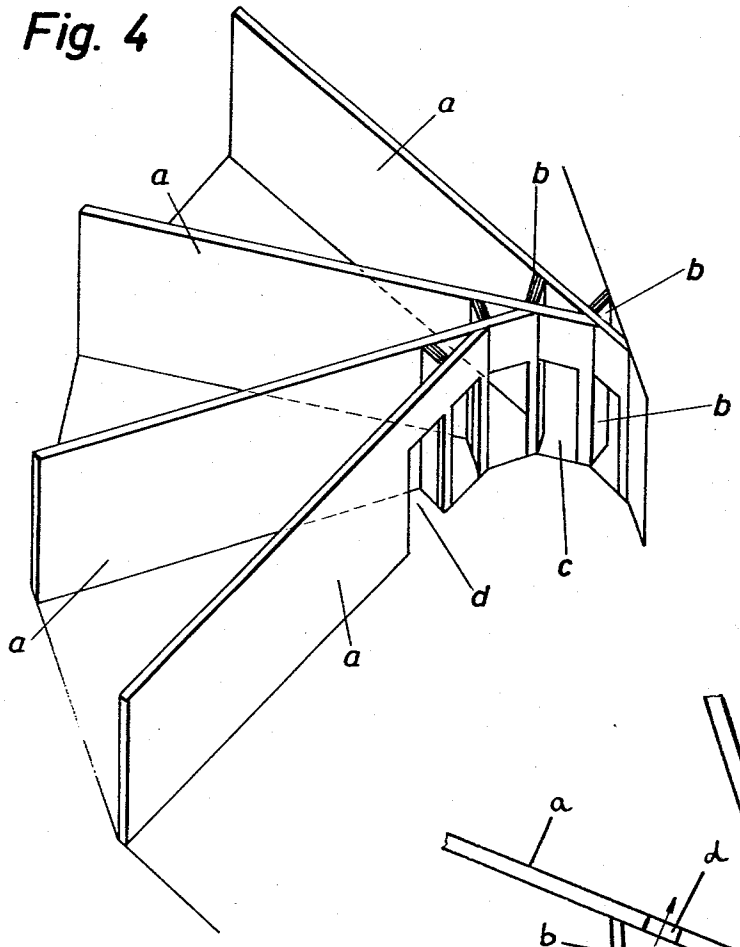
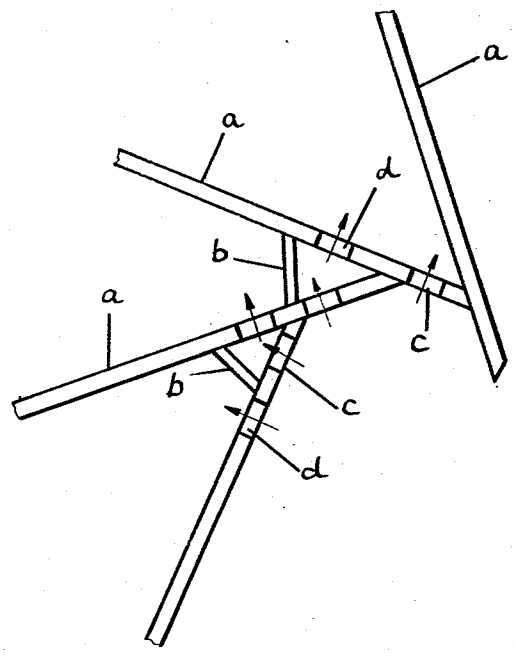


Fig. 5



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Fig. 6

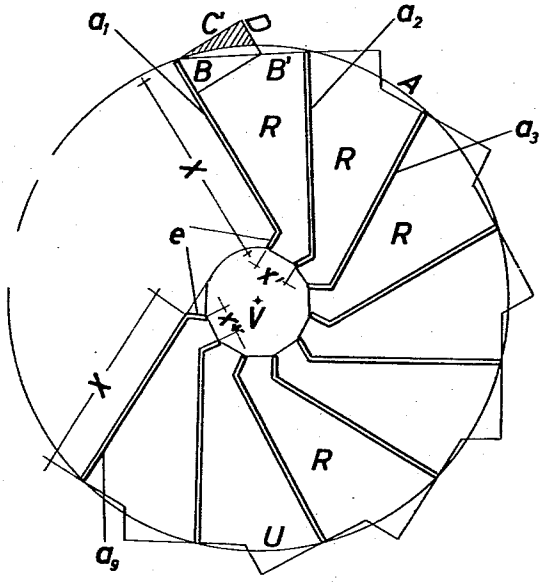


Fig. 7

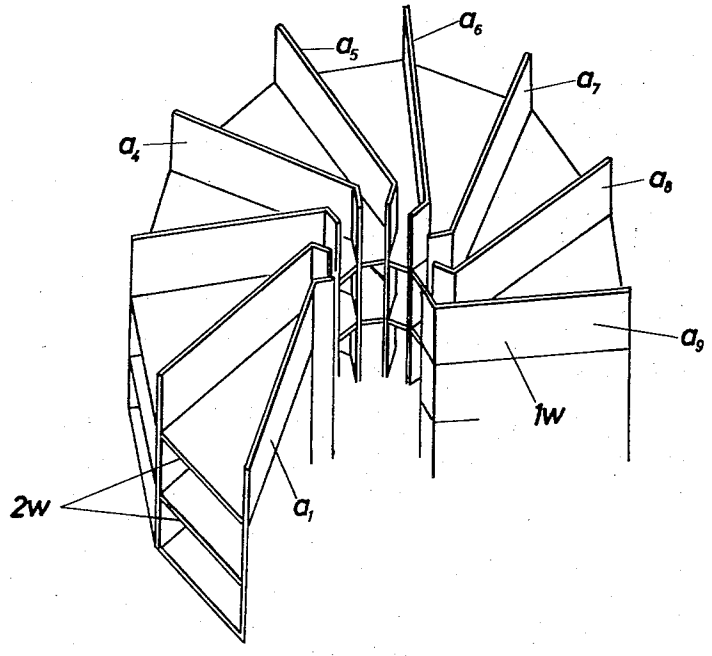


Fig. 8

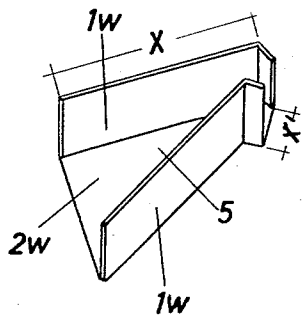


Fig. 9

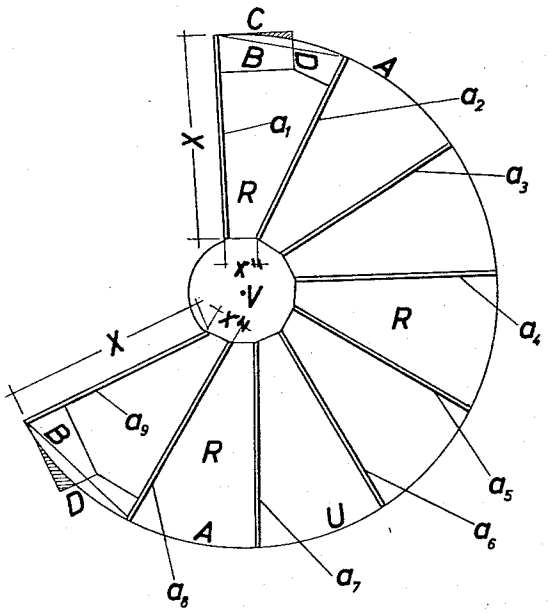
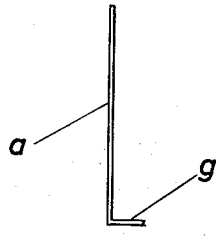


Fig. 9a



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3,358,407

BUILDING HAVING A CENTRAL STAIR AND/OR LIFT SHAFT

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Filed Nov. 3, 1964, Ser. No. 408,573
11 Claims. (Cl. 52—79)

The invention relates to a building having a central stair and/or lift shaft and substantially sector-plan room units which surround the said shaft and are divided from one another by partition walls.

Buildings of this kind are known which have a statically rigid inner core with a load-bearing wall surrounding the staircase, and wherein the rooms for habitation or other purposes are arranged in an annular arrangement which is fixed and surrounds a fixed inner core or is rotatable about the inner core. The ring of rooms must be closed apart from the necessary door and window apertures, since the load-bearing walls of the building are formed by the staircase wall and the outer peripheral wall of the ring ,and the building would not have adequate rigidity if for example the outer peripheral walls were not continuous or closed. Such buildings can be rationally erected only, for example, as poured concrete structures, but are scarcely suitable for being produced from prefabricated parts.

A building intended to be erected in a foundation pit is also known whose load-bearing walls are formed only by the outer walls and which can be constructed only with an octagonal plan form, since it is composed of prefabricated building units of identical triangular form and size.

In contrast, the present invention is intended to provide a building for office purposes, dwelling or other purposes, for example a hotel, which is suitable both for prefabricated construction and also for the use of the conventional building method using walls and ceilings constructed of masonry or concrete on site, but requires no load-bearing outer walls and special load-bearing staircase surrounds, and wherein the rooms for dwelling or other purposes may also be arranged, if desired, only over part of a ring without prejudicing the transverse rigidity of the building. When prefabricated parts are used, it is to be possible to use prefabricated parts both in slab or panel form and also in the form of 3-dimensional prefabricated parts or prefabricated parts in honeycomb form.

Accordingly, the invention consists primarily in that the load-bearing structure of the building is formed of the partition walls, which in plan view are arranged in the manner of the radiating elements of an iris diaphragm, forming a complete ring or part of a ring, and are stiffened by ceiling slabs.

In a preferred form of embodiment of the invention, the arrangement may be such that the partition walls are given a length somewhat exceeding the depth of the rooms and are so arranged that each partition wall at its inner end projects by the amount exceeding the room depth beyond the inner edge of the preceding partition wall, so that the inner ends of the partition walls form an enclosure for the stair and/or lift shaft.

In a building constructed in this way, the load-bearing partition walls running inwards into one another form a column-like supporting structure for accepting vertical loads which becomes stronger towards the interior of the building and is advantageously stiffened against horizontal forces by the ceilings, and wherein the partition walls, without having to be of particularly strong construction, are completely safe against buckling loads even in the case of very considerable building heights and very heavy building loads. These advantages are obtained in every case irrespective of whether the walls and/or ceilings are constructed in masonry or concrete in the usual way on site or whether prefabrication is used. The further advantage is obtained as the peripheral walls of the building can be constructed in any desired manner and form, since they no longer have to bear load.

If prefabrication is used to construct the building according to the present invention, the load-bearing walls may be formed of flat prefabricated slabs or panels or preferably single story height and of equal length to one another, which has an advantageous effect both as regards the prefabrication of the slabs or panels and also as regard the stacking and assembly of the prefabricated parts. If the enclosure for the stair or lift shaft is formed in the manner already mentioned by the projecting inner end of the various partition walls, a door aperture or other aperture can be arranged in these projecting portions of the prefabricated slabs for each partition wall or only for each second or third partition wall.

However, it is also possible in addition to a door aperture in the projecting portion of the particular partition wall to provide further outwards a second door aperture and to provide between these two door apertures a substantially radially directed partition wall consisting e.g. of a prefabricated slab which, maintaining access to the following room unit, divides-off the pointed corner of the preceding triangular room unit.

The partition walls whether they are produced on site or whether prefabrication is used may also be given a length corresponding approximately to the room depth and can be arranged with their inner ends, arranged at the periphery of the stair or lift aperture, side by side with a spacing corresponding approximately to the width of a door aperture.

In such a constructional form, the partition walls or the prefabricated parts forming them may be provided at their inner ends with an angled extension of wall height, the width of which corresponds to the spacing of the inner ends of the partition walls and which is so arranged that the angled extensions of neighboring partition walls also form an enclosure for the stair or lift aperture.

The partition walls or the prefabricated parts forming them may, instead, also be provided with an angled extension arranged in such a manner that the extensions of neighboring partition walls extend spaced from one another in a substantially radial manner or in the manner of the elements of an iris diaphragm towards the center of the stair or lift shaft.

When using prefabrication, the wall slabs or panels may in all the aforesaid cases be united by a ceiling or floor slab to form a three-dimensional prefabricated part which is open above or below.

Three-dimensional prefabricated parts may also be formed in all cases by combining in each case two wall slabs or panels bounding a room unit on the one hand and a ceiling slab and a floor slab on the other hand to form a triangular cell.

For simplification, several such triangular cells may also be combined to form a prefabricated part representing a multiple unit.

Finally, honeycomb construction comprising cells may also be achieved by using prefabricated parts consisting each of a wall slab or panel and a ceiling or floor slab combined therewith to form an angle member.

In all the illustrated forms of embodiment, moreover, the load-bearing partition walls or the slabs or panels forming them and the ceilings or ceiling slabs stiffening them may be varied in length at successive stories to form terraces or projections. If desired, the outer edges of the intermediate walls may also be bevelled-off.

The invention will be explained in more detail hereinafter with reference to the embodiments illustrated diagrammatically in the appended drawings.

In the drawings:

FIGURE 1 is a plan view of a building according to the invention wherein the load-bearing partition walls, irrespective of whether they and/or the ceilings are produced e.g. in masonry or concrete on site in the usual way or are produced by a prefabrication system, are arranged in a formation corresponding to part of a ring, and the stair or lift shaft is partly exposed to the exterior.

FIGURE 2 is a plan view corresponding to FIGURE 1 for a building in the form of a closed circle with a stair or lift shaft situated in its interior,

FIGURE 3 is a perspective view of a building having the plan view shown in FIGURE 1,

FIGURES 3*a* and 3*b* show prefabricated parts which can be used when using prefabrication for the form of embodiment shown in FIGURES 1 to 3;

FIGURES 4 and 5 are perspective views and a partial plan view showing a modified form of embodiment according to FIGURES 1 to 3, wherein the partition walls and/or ceilings may also be erected in the conventional manner on site or by using a prefabrication system,

FIGURE 6 shows a plan view slightly modified from that of FIGURE 1 for a building the partition walls of which are inflected towards the stair and/or lift shaft,

FIGURE 7 is a perspective view of a building having a plan view corresponding to FIGURE 6,

FIGURE 8 is a perspective view of a prefabricated part which can be used when prefabrication is used for constructing the building shown in FIGURES 6 and 7,

FIGURE 9 is a plan view illustrating a further possibility for arranging the partition walls and

FIGURE 9*a* is a modified plan for the partition walls of the form of the embodiment shown in FIGURE 9.

As is shown in the plan view represented in FIGURE 1, the building in a first form of embodiment, which is also illustrated in FIGURE 3, is provided with nine load-bearing walls a_1 to a_9, which are arranged side by side in the manner of the radiating elements of an iris diaphragm, forming a part-circle of about 250°. The load-bearing walls a_1 and a_9 form outer walls, but correspond in form and size and also in their course to the load-bearing walls a_2 to a_8, which form partition walls. The load-bearing walls a_1 to a_9 in plan view form substantially sector-shaped room units R with one another, and their inner ends are placed together in such a manner, that as FIGURES 1 and 3 show, each load-bearing wall following a load-bearing wall in the clockwise direction projects at its inner end by a constant amount x beyond the inner edge of the preceding load-bearing wall. For example, the load-bearing wall a_2 projects beyond the inner edge of the load-bearing wall a_1, the wall a_3 relatively to the wall a_2 etc., by the amount x in each case, which may be approximately equal to one door width. The load-bearing walls are all of an equal length X which is smaller than the depth of the room unit R by the amount of projection x of the load-bearing walls. With their projecting ends, the load-bearing walls form an enclosure for the stair and/or lift shaft V which also, since the plan view of the building occupies only part of a circle, may be without rigid enclosure at the side which is not built up.

In the case of a building constructed in this way, the outer walls can be constructed optionally as regards their form and type, since they do not have any load-bearing task to perform. As is shown at A in FIGURE 1, they may follow the peripheral line U, the length of the peripheral line for each room unit R being determined by the length of the radially disposed load-bearing walls a_1 to a_9. Alternatively, the outer walls may also be given a straight shape, with appropriate configuration of the supporting ceilings, and may follow substantially the lines B and C or a broken line C', D, D' in FIGURE 1.

FIGURE 2 shows another arrangement for the plan of

a building according to the invention. Here, the plan occupies a complete circle, and there are altogether 12 radiating load-bearing walls a_1 to a_{12}, which are arranged side by side in the same manner as in FIGURES 1 and 3 like radiating elements of an iris diaphragm. The portions at the inner ends of the load-bearing walls projecting by the amount x in each case, here again, form a complete enclosure for the stair and/or lift shaft V. In accordance with the twelve load-bearing walls a_1 to a_{12}, in this form of embodiment, there are twelve room units R provided the form of which corresponds to that of FIGURES 1 and 3 and the size and width of which at the periphery U are dependent on the length X of the load-bearing walls a.

If it is desired to avoid having the pointed inner corners used in the embodiments shown in FIGURES 1 to 3, while retaining the iris-diaphragm arrangement of the load-bearing walls with inner projecting ends, short transverse walls b (FIGURE 4) may be arranged or erected and in this case there is also provided near a door aperture c arranged in the projecting portion in each case, but further outwards, a second door aperture d in each wall a. This gives the constructional form which is represented in perspective in FIGURE 4 and in plan view in FIGURE 5.

A further solution for avoiding pointed inner corners is obtained if the partition walls a at their inner ends are angled as shown in FIGURES 6 and 7 or inflected towards the stair and/or lift shaft V, and are also so arranged, while retaining the iris-diaphragm plan, that the inner angled extensions e are spaced at a distance from one another corresponding to the value x'. Since the angles which these extensions e form with the remainder of the partition walls are all identical, the angled extensions e are also arranged in the manner of the radiating elements or an iris diaphragm. FIGURE 6 also indicates how balconies or loggias can be provided when the outer walls are constructed as shown by the broken line C', D, D'.

Finally, FIGURE 9 shows a plan form which also occupies a partial circle but wherein the illustrated load-bearing walls a_1 to a_9 as in the forms of embodiment shown in FIGURES 1, 3, 6 and 7 may also be used, in form and arrangement, for buildings having a plan configuration occupying a complete circle. Here, the load-bearing walls go right through to the stair or lift shaft V and are arranged in groups like radiating elements of an iris diaphragm, the group a_4, a_5, a_6 which follows the load-bearing wall group a_1, a_2, a_3 and the last group a_7, a_8, a_9, are slightly offset relatively to one another. The spacing of the inner ends of the load-bearing walls from one another corresponds to the value x''. With this form of embodiment also, the load-bearing walls a can be inflected or provided with angled etxensions at their inner ends. The width of these extensions which are designated as g in FIGURE 9*a* corresponds to the value x'', i.e. to the spacing of the inner ends of the load-bearing walls a, so that these extensions g, if the load-bearing walls are arranged in accordance with the plan view shown in FIGURE 9, also form an enclosure for the stair and/or lift aperture V.

In all the forms of embodiment which have been described and illustrated, the load-bearing walls a are stiffened relatively to one another by the ceilings which are constructed as slabs. The load-bearing walls a and the ceiling slabs can consist perefrably of prefabricated elements which may all be given the same form and the same dimensions for one building, or if appropriate for a plurality of buildings. Constructional examples for the production of such prefabricated elements are shown in FIGURES 3, 3*a*, 3*b*, 7 and 8. In the form of embodiment shown in FIGURE 3, the load-bearing walls are formed of wall slabs or panels **1** which are given a height corresponding to the height of one story and all have the same length. Depending on the building regulations to be observed, and static requirements, the wall slabs or panels **1** may also be given the same thickness and possibly the

same reinforcements or may be dimensioned for different load capabilities. The same applies to the ceiling slabs **2**.

According to FIGURE 3, prefabricated honeycomb compartments or cells **3** can be used for the construction of the building. These elements each comprise the wall slabs or panels **1** forming the load-bearing walls *a*, and the ceiling slabs **2** or only one of the ceiling slabs **2**. Alternatively, as is shown in FIGURE 3*a* it is also possible to prefabricate several such triangular cells **3** as a joint unit.

A further possibility of constructing prefabricated parts to be used for the form of embodiment shown in FIGURE 3 is illustrated in FIGURE 3*b*. In this case, prefabricated elements **4** are formed which in each case consist of a wall slab or panel **1** and a ceiling slab **2**, and these elements when assembled together form triangular cells.

For the form of embodiment shown in FIGURE 7, it is also possible as FIGURE 8 shows for single height wall slabs or panels 1_w to be used as prefabricated elements, but these are provided here with the angle extensions *e* shown in FIGURE 6. The ceiling slabs 2_w are angled correspondingly at the inner end. With this form of embodiment also, wall slabs or panels and ceiling slabs can be combined to form prefabricated parts. FIGURE 8 shows one possible form of embodiment for this. In this case two wall slabs or panels 1_w are combined with a ceiling slab 2_w to form a prefabricated part.

As regards the form and size of the prefabricated parts it is to be noted that for buildings with plans occupying only part of a circle e.g. as shown in FIGURE 1, or which occupy a complete circle as FIGURE 2 shows, prefabricated parts of identical size and form can be used provided that the plan configuration of the room unit R is identical.

I claim:

1. A building comprising a structure constituted by an assembly of a plurality of load bearing partition walls arranged in a radiating manner and cooperatively defining a central opening adapted for accommodating a stairway and/or an elevator, said load bearing partition walls extending in intersecting angular succession with the inner end portions projecting equal amounts beyond the intersection with the preceding load bearing partition wall and forming the boundary of said central opening, said load bearing partition walls further defining an outer periphery of the building and sector shaped rooms extending from said central opening to said outer periphery of the building, and a ceiling at each story of the building connected to the load bearing partition walls, said ceiling being a rigid slab furnishing transverse rigidity for said assembly.

2. A building as claimed in claim **1** wherein the rooms formed by the load bearing partition walls and the stiffening ceiling slab each has the shape in plan view of a portion of a circular ring.

3. A building as claimed in claim **1** wherein the rooms formed by the load bearing partition walls and the stiffening ceiling slab each has the shape in plan view of a closed ring.

4. A building as claimed in claim **1** wherein the load bearing partition walls are planar elements of equal length.

5. A building as claimed in claim **1** wherein the load bearing partition walls are planar elements, the length of each said inner end portion corresponding approximately to the width of a door.

6. A building as claimed in claim **1** wherein the load bearing partition walls are planar elements with the inner end portions extending the entire height of the walls and having a length corresponding approximately to the width of a door.

7. A building as claimed in claim **1** wherein said load bearing partition walls are constituted by prefabricated slabs of one story height and of identical length and shape.

8. A building as claimed in claim **1** wherein said load bearing partition walls are constituted by prefabricated slabs of one story height, two adjacent slabs being united by a ceiling slab to form a three-dimensional prefabricated unit which is open at one side.

9. A building as claimed in claim **4** wherein said load bearing partition walls are constituted by prefabricated slabs of one story height, two adjacent prefabricated slabs being united to form a three-dimensional prefabricated unit in the form of a triangular cell.

10. A building as claimed in claim **9** comprising a sub-assembly of a plurality of connected triangular cells.

11. A building as claimed in claim **4** wherein said load bearing partition walls are constituted by prefabricated slabs of one story height, one such prefabricated slab being connected with a ceiling slab to form a prefabricated unit of angle shape.

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