May 19, 1959 B. J. PETTER 2,886,855

BUILDINGS WITH MULTANGULAR ROOMS, THE GROUND PLAN OF WHICH IS COMBINED FROM HEXAGONAL ELEMENTS

Filed Aug. 30, 1954 2 Sheets-Sheet 1

Fig. 1

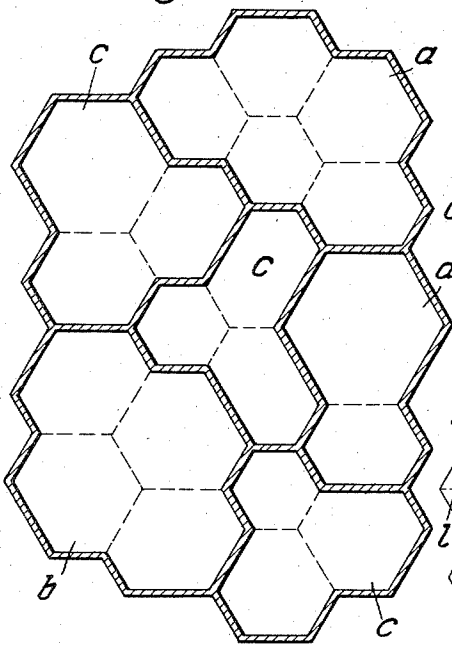


Fig. 2

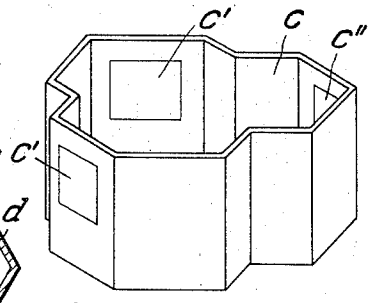


Fig. 3a

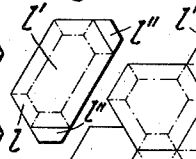


Fig. 3

Fig. 4

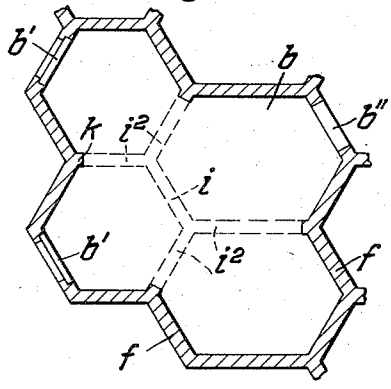
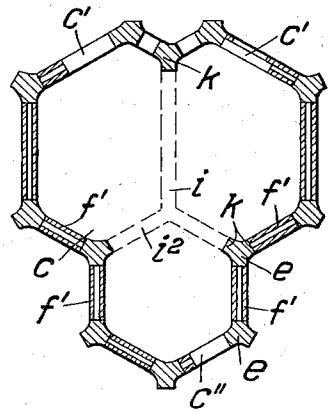


Fig. 5



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Fig. 8

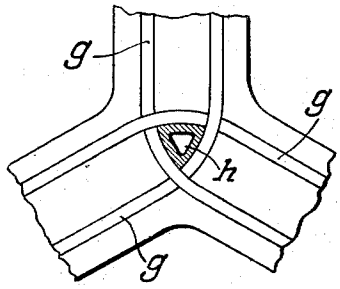


Fig. 6

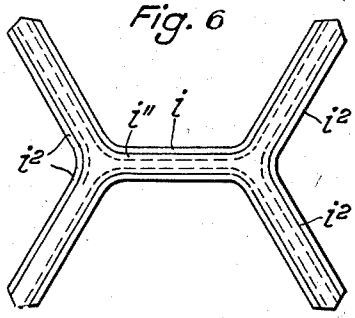


Fig. 9

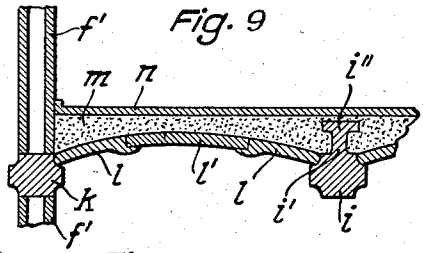
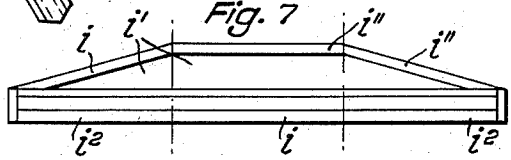


Fig. 7



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United States Patent Office 2,886,855
Patented May 19, 1959

2,886,855

BUILDINGS WITH MULTANGULAR ROOMS, THE GROUND PLAN OF WHICH IS COMBINED FROM HEXAGONAL ELEMENTS

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Application August 30, 1954, Serial No. 452,833

3 Claims. (Cl. 20—1.1)

Buildings, the individual rooms of which have a hexagonal or polygonal basal surface, are known, but have not been generally adopted. Small and large rooms of such shape, with no re-entrant angles cannot be put together to form a useful ground plan of a building.

Far better possibilities present themselves, if the separate rooms are not only given hexagonal form, but if their basal surface be composed from several hexagons so that the rooms have re-entrant angles. Through such an arrangement a room built in this way will have 10 to 18 or more wall angles of 120 and 240°, according to the number of hexagons of which the basal surface consists. In this way optionally large and small rooms may be formed, although the total basal area is composed of only a few hexagonal forms. Such rooms are very cosy and have particularly good lighting, owing to an advantageous arrangement of the windows which can be built in according to the desired incidence of the light. In consequence of the many angles of 240°, the room is very conveniently divided up. This mode of building can be carried out with a few standardised building parts and nevertheless allows of the greatest freedom from the architectural point of view. Owing to the constant recurrence of the wall angles of 120°, the whole structure offers great resistance to lateral pressure. The pleating of the external walls prevents shrinkage cracks forming, when the structure is made of concrete.

The accompanying drawings illustrate the principle and some constructional examples.

Fig. 1 shows diagrammatically the plan of a building with separate rooms, the basal surface of which is composed of 2, 3, 4 and 5 hexagons.

Fig. 2 shows a perspective view of a room erected over a basal surface composed of three hexagons.

Fig. 3 shows a selection of hexagonal forms similar to Fig. 1, which are particularly suitable for the combination or aggregation of basal surfaces, and Fig. 3*a* shows a modified hexagonal form.

Fig. 4 shows the plan of a single room with a basal surface composed of four hexagons with solid walls.

Fig. 5 shows the plan of a room with a basal surface composed of three hexagons with insulating walls.

Fig. 6 is the plan view of a ceiling-supporting frame and

Fig. 7, the corresponding side view in developed form.

Fig. 8 shows a part section through the branching place of such a ceiling-supporting frame and illustrates the position of the tension members, when the structure is carried out in concrete.

Fig. 9 shows a vertical cross-section through a hexagonal part ceiling.

In the diagrammatic plan according to Fig. 1, 5 hexagons are in the first instance combined to form the basal area of a room *a*, next to them are twice 3 hexagons, each set forming a room *c*, and in addition 4 hexagons forming a room *b*. On the right hand there follow 2 hexagons forming a room *d* and once again 3 hexagons

forming a room *c*. Smaller rooms extending over two or even only one hexagon may conveniently be used for secondary rooms; but these have no importance for the invention. The broken form of the outer walls enables the windows to be arranged in the most favourable manner for facing the light or sunny side. The doors can also be placed in any suitable manner, of which Fig. 2 gives an example. In this case two windows *c'* and one door *c''* are indicated, for a case where this room is an outside room.

Fig. 3 represents an example of a collection of hexagons, such as may be used for forming the ground plan. The construction of the hexagonal part ceilings is also indicated, each consisting of six sheets *l* and a capping piece *l'*.

Fig. 3*a* indicates how the hexagons may be extended by additional trapezoidal pieces *l''*, should the form of ground plan require it. Fresh hexagonal forms are thus obtained.

Fig. 4 shows a room similar to the room *b* of Fig. 1 to a larger scale. In this case solid walls *f* with two windows *b'* and one door *b''* are indicated. The re-entrant wall angles of 240° are provided with projecting shafts or pilasters *k* which act as supports for the ceiling-supporting framework *i*, i^2. In this example the latter is indicated by dashlines and consists of a branched trussing frame, such as that shown in Figs. 6 and 7.

Similarly, Fig. 5 shows a three-section room *c* from Fig. 1 in skeleton construction with insulating walls *f'* between the shafts or pillars *e*. The ceiling-supporting framework which supports three hexagonal part ceilings consists of a three-armed girder *i* with two arms i^2, which rests on the projecting shafts *k*. The insulating walls *f'* are let into the shafts *e*.

When the ceiling-supporting framework is made in one piece of concrete, the tension members *g* may, as shown in Fig. 8, be bent at an angle at the branching places round an inserted or suspended iron core *h*.

The entire ceiling covering a form of room according to the invention thus consists of the branched ceiling-supporting framework and the hexagonal part ceilings. The ceiling-supporting framework replaces the eliminated walls and shafts or pillars and extends in every case over the lines of contact of the hexagons, from which the ground plan of the room is composed. According to the number of the part ceilings supported by the framework the form of the latter varies. When there are only three part ceilings as in Fig. 5, it consists of three arms only. When there are four part ceilings, as in Fig. 4, it has a centre girder *i* and four arms i^2 which branch away at 120°. It is always constructed as a trussing frame, that is with an ascending upper chord *i''* and the main girder *i* with lower chord, which supports the part ceilings.

Figs. 6 and 7 show by way of example a ceiling-supporting framework for four part ceilings. The main girder *i* extends with its horizontal upper chord *i''* almost to the plaster floor *n* (Fig. 9), whilst the upper chord *i''* of the branching arms i^2 rises up to the level of the main girder. All ceiling-supporting frameworks may be made in one piece. The part ceilings *l*, *l'* according to Fig. 3 rest partly on the outer walls *f*, *f'* and partly on the ceiling-supporting framework *i* in the form of a domed capping, as shown in Fig. 9. After the usual ballast *m* has been filled in, the plaster floor *n* or the floor boarding is placed in position. The converging arms i^2 form at their place of junction with the main girder *i* the truss joints of the ceiling-supporting framework.

The described mode of construction is applicable on a suitably reduced scale for toy building outfits, as the whole construction consists of standardised individual parts.

I claim:

1. A building comprising equiangular hexagonal elements of which at least one is an irregular hexagon and at least two differ from one another in size and form, and which are combined to form a polygonal ground plan of a room, a wall forming angles of 120 and 240 degrees and surrounding only the said polygonal ground plan, and a polygonal ceiling covering the space enclosed by the wall, so that an undivided spatial unit is obtained over a plurality of hexagonal elements.

2. A building comprising equiangular hexagonal elements of which at least one is an irregular hexagon and at least two differ from one another in size and form, and which are combined to form a polygonal ground plan of a room, a plurality of hexagonal ceiling sections corresponding to the ground plan elements and combined to form a polygonal ceiling covering the space enclosed by the wall, and a trussing framework branched at least

once at three equal angles, whereby the tension forces and also the pressure forces meet at the branching place and act in three directions making equal angles with one another.

3. A building as claimed in claim 1, comprising projecting shafts disposed at the interior re-entrant angles and supporting the ceiling.

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