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(54) FLEXIBLE MODULAR CONSTRUCTION SYSTEM

FLEXIBLES MODULARES KONSTRUKTIONSSYSTEM

SYSTÈME DE CONSTRUCTION MODULAIRE ADAPTATIF

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(56) References cited:
WO-A1-00/01898
WO-A1-01/83902
GB-A- 1 246 178
US-A- 3 716 954
US-A- 3 835 601
US-A- 3 900 994
US-A- 4 592 175

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Description

Field of the Art

[0001] The present invention relates to the construction of dwellings formed by a distribution of enclosures intended for different functions or uses, proposing a system for constructing dwellings made up of one or several modules, each of which performs three functions of general communication, structural and installation support, and as a dwelling per se with the common enclosures, each module being able to be functionally and structurally configured as units which can be added to or removed from the master dwelling both horizontally and vertically to be incorporated with a minimum alteration to the adjoining dwelling both in a horizontal configuration and in a vertical configuration without changing the structural assembly of the original building.

State of the Art

[0002] The walls and thereby dwellings which are static as defined by their traditional configuration are witnesses to life and to the changes in the needs of the families living therein, on many occasions the inflexibility of the configured spaces prevents the normal development of the family and forces it to sell the dwelling and move to a new dwelling possibly in a new neighborhood to be able to adjust to all new family reality or, failing this, the members of the family are forced to live with unused rooms and spaces causing a series of needless expenses.

[0003] The inflexibility of the traditional dwelling means that sometimes the space of the dwelling is too big for the needs of the family unit, such as the case of families where the children leave home, couples who have one or several children or have an elderly person living with them, couples who separate, etc., such that the inflexibility of the dwelling design has conventionally prevented potentially selling or renting start of the dwelling to the advantage of its owners.

[0004] It is evident that, for a family, having to change dwelling and neighborhood involves uprooting which is a disadvantage for the family member especially in the case of the elderly.

[0005] In the construction field, modular construction techniques have been developed and put into practice, using prefabricated modules that only need to be assembled by placing them to form the building to be obtained, which allows constructing the independent dwellings or blocks of associated dwellings in a very fast and simple manner, achieving a significant cost reduction with respect to construction works based entirely on on-site masonry works.

[0006] Some of the solutions to these known modular construction techniques only allow constructing predetermined fixed buildings according to a configuration project, such that, the assembly of the building is simplified using specific modular elements generally prefabricated, according to the provided configuration and dimensions, without taking into account the initial configuration alternatives for future adaptations.

Object of the Invention

[0007] The invention proposes a modular and flexible construction system, whereby dwellings can be constructed with features making flexibly adapting the transformation of the initially erected dwellings possible over time without altering the structural and functional assembly of the block assembly in which they are integrated.

[0008] The flexible modular construction system object of the invention has, as a basic unit, a module formed as an element susceptible of being added or separated to provide flexibility to the building and to the configuration of the different possible dwellings. The modules can be formed by means of traditional construction on the sites of application, but they can also be prefabricated, without it altering the concept of the invention.

[0009] Each module comprises three differentiated parts: the first part is a horizontal communal communication area, the second part is a communal installation and structure functional area, and the third part is a private-space area partially or completely forming the dwellings.

[0010] Each private-space area of each module can form a minimum registrable unit, however, the minimum number of private spaces necessary for obtaining the qualification as being suitable for living will vary according to the planning legislation of each community.

[0011] These modules are arranged in parallel making all the three functional areas coincide, such that the construction by adding modules either in the horizontal direction and/or in the vertical direction for building large dwellings inside the originally erected overall building unit is facilitated.

[0012] Likewise, with module separation, there is a possibility of potentially separating a master dwelling into different module groupings, starting from an existing dwelling, each of them being able to be a dwelling per se or an element which can be added to another dwelling, such that the habitable feature of the new assembly formed is maintained.

[0013] In short, an initially constructed building is susceptible to countless modifications in terms of the number and dimension of the dwellings forming it, without altering to that end the appearance or the external dimensions.

[0014] The service area in the building is formed between the passage area and the dwelling area, the service area being established as a hollow space, through the interior of which the elements of light, water, gas, heating, ventilation, data installations, and in general all the mechanical installations necessary at that time or in the future are repeatedly arranged, given the width of the space intended for such purpose, in connection with respective general supply points of the different services serving the building, the entrances for accessing the

dwellings of the building from the passage area further being formed through the wall of said service area.

[0015] The installation elements provided in the service area are also configured in a modular, rational, repeated and serial manner, such that their future replacement or modification for adapting them to a new module configuration is immediate, in addition to having a low maintenance cost.

[0016] In this sense, an installation structure designed with the fundamental purpose of minimizing works to be performed on the building installations, in the interior renovations of the dwelling assemblies, in the transfer of modules between contiguous dwellings, in the creation of new dwellings by separating modules from the existing dwellings, or in the elimination of dwellings where their modules are absorbed by the contiguous dwellings, is envisaged.

[0017] To that end, the common service installations, which consumption does not need to be metered, such as ventilation installations, sanitation installations, fume extraction installations, or non-potable recovered water supply installations, are established through the hollows of the service areas, by means of vertical pipes including, bundled conduits of the different services to be channeled to each area of the building, branches starting from said vertical pipes to the dwellings, at the level of the different floors.

[0018] On the other hand, the private service installations, the individual consumption of the dwellings of which must be metered, such as the sanitary hot water installation, the potable cold water installation, the heating installation, the electric installation, the home automation installation or telecommunications installations, are established through the hollow of the service areas, by means of a central vertical pipe encompassing all the pipes for the different services, from which branches to trays extending throughout the different floors start, from which in turn branches to each of the dwellings on each floor start.

[0019] Therefore, each dwelling of the building can be formed with the desired dimension simply by using the construction modules necessary, using the corresponding connections for slight, water, gas installations, etc., of the service area, such that if the distribution of a dwelling is to be subsequently changed, it is only necessary to disconnect the connections to be changed from the service area and form the new connections necessary at the new corresponding points, the new installations being able to be made in an optimum and agile manner as the connection service area can be accessed from the passage areas.

[0020] In the same sense, in a building erected according to a specific dwelling distribution, when in the course of time under certain circumstances, one of the owners needs more space in his/her dwelling and the other owner has extra space, the owners of consecutive dwellings (both in the horizontal and vertical dimension) can transfer the space of one or more contiguous modules of the dwellings to one another, this means that the building is a result of flexibly adapting adjacent, horizontal or vertical dwellings, when desired, without altering the structural formation of the construction assembly.

[0021] Hence, the system of the invention has very advantageous features for building flexible modular dwellings, acquiring own identity and preferred character for said functions

Description of the Drawings

[0022]

Figure 1 schematically shows a module of the construction system according to the invention.

Figure 2 shows an elemental construction assembly with two modules, according to the invention.

Figure 3 schematically shows the construction of a dwelling with three private-space areas, by means of construction with three modules, according to the system of the invention.

Figure 4 is a diagram of the construction of two consecutive dwellings formed by four private-space areas, by means of respective constructions with four modules, according to the system of the invention.

Figure 5 is a diagram of the construction of two consecutive dwellings, formed buy six private-space areas with an equal distribution of private-space areas in each of them, according to the system of the invention.

Figure 6 is a diagram of the same construction as the preceding figure, one of the dwellings having transferred a private-space area to the other dwelling.

Figure 7 is a diagram of the construction of four consecutive dwellings with a common communication center.

Figure 8 is an example of the distribution of two rows of parallel dwellings, at the sides of a common passage area.

Figure 9 is an example of the distribution of two rows of dwellings in two opposite directions from a common communication module.

Figure 10 is an example of the distribution of four rows of dwellings in radial directions radiating from a common communication module.

Figure 11 is an example of the construction of consecutive dwellings in a circular row.

Figure 12 is an example of the construction of dwellings in two circular rows parallel to the sides of a common passage area.

Figure 13 is a plan view of two rows of dwellings parallel to the sides of a common passage area, with an embodiment of the interior distribution of the dwellings.

Figure 14 is a diagram of the vertical distribution of the common services installations in a building with several floors, according to the invention.

Figure 15 is a plan view of said distribution of the common service installations in a building, according to the invention.

Figure 16 is a diagram of the vertical distribution of the private service installations in a building with several floors, according to the invention.

Figure 17 is a plan view of said distribution of the private service installations in a building, according to the invention.

Detailed Description of the Invention

[0023] The object of the invention relates to a flexible modular construction system, thereby a series of consecutive dwellings is formed both horizontally and vertically, which are susceptible to a flexible dimensional variation through the exchange of private-space areas between the consecutive dwellings, without altering the general assembly of the building, the dwellings resulting from the transformation being suitable to be legalized as such.

[0024] The proposed system comprises arranging three functional areas built in parallel, one of which is a corridor area (1), another is a service area (2), and the third is the private-space area (4) forming the private habitable area of the dwellings, these three areas being formed by means of modules (3) which form the building of the construction when aligned horizontally and/or vertically.

[0025] Each of the dwellings. (5) can be formed with the same or different amount and distribution of private-space areas (4)

[0026] The corridor area (1) and the service area (2) are formed by sections that only need to be juxtaposed in them construction process, the service area (2) establishing a, continuous vertical hollow space, through which the doors for entering the dwellings (5) of the building are formed, the elements (tube, cables, etc.) of the service installations (water, light, gas, communications, television, etc.) provided in the building project being included in said hollow space.

[0027] The elements of the service installations are repeatedly arranged in the service area (2) in areas corresponding to the width of the modules (3) forming the dwellings (5), all those repeated installations which are inside the services area (2) being connected with respect to corresponding general supply points for the respective services, such that in each of the component modules (3) of the dwellings (5), the connections for the services needed can be formed directly on the section of the services area (2) corresponding with the respective module (3).

[0028] Therefore, the distribution of the dwellings. (5) of a building project can be made as desired, arranging the necessary modules (3) and forming the connections for the services of each space on the section of the service area (2) corresponding to the respective module (3) the distribution of the equipment being able to be changed later by only disconnecting the existing equipment from the connections on the sites where arse located, and forming new connections on the service area (2) at the points corresponding to the new location.

[0029] Likewise, given the sequential arrangement of the modules (3) in the formation of the dwellings (5), and the sequential arrangement of the dwellings (5) throughout the building, starting from a specific distribution of the buildings according to an original project according to the particular needs at that time, for example the construction of two consecutive dwellings (5), each of them formed by six modules (3) like the diagram of Figure 5, a dimensional redistribution to form several combinations between the dwellings (5) can then be performed, for example, one of them can transfer the private-space area (4) of a module (3) to the other, whereby the first dwelling (5) is now formed by five private-space areas (4) belonging to five modules (3) and the second dwelling (5) has seven private-space areas (4) belonging to seven modules (3), like the diagram of Figure 6, without needing to alter the structural assembly of the building due to variation of the dwellings (5).

[0030] The transfer of private-space areas (4) and the adaptation of the corresponding service areas (2), between the consecutive dwellings (5), both in horizontal and in vertical, can comprises one or more modules (3) which are found in the contiguous part of the dwellings (5).

[0031] In these conditions, with the modularity and flexibility concepts of the system of the invention, constructions can be carried out where the dwellings (5) are sequentially distributed in a row along a service area (2) and a corridor area (1), like the diagram of Figure 7, being able to be at different heights, in relation to a communication center (6) between the different heights.

[0032] Likewise, constructions can be carried out where the dwellings (5) are sequentially distributed in two parallel rows at either side of a central passage area (1), each of the rows of dwellings (5) being associated with a corresponding service area (2), like the diagram of Figure 8.

[0033] With the same concept buildings with different distributions of dwellings (5), at one or more heights, can be formed, for example according to two opposite rows from a communication center (6), like the diagram of Figure 9; according to several radial rows radiating from a communication center (6), like the diagram of Figure 10; according to a circular row, like the diagram of Figure 11; or according to two circular rows at them sides of a common passage area (1), like the diagram of Figure 12; these examples are non-limiting, since any other distribution in which at least one row of dwellings (5) formed with consecutive modules (3) attached on a service area 2), arranged in correlation with a passage area (1) in each case complying with the evacuation and fire safety legislation in force, may a so be possible.

[0034] In any case, regardless of the modular formation and of distribution of the dwellings (5) of the buildings

erected according to the system of the invention, to minimize the works to be performed on the installations of said buildings, a service installation structure broken down into common service installations, which consumption does not need to be metered, and private service installations, which need a control for counting the individual consumption of the dwellings (5), are envisaged.

[0035] The common service installations are established through the hollows of the service areas (2), by means of vertical pipes (7) including bundled individual conduits for the different common services to be channeled to each area, such as the ventilation installation, the sanitation installation, the fume extraction installation or the non-potable recovered water supply installation, with connections in the upper level of the building or in the basement area, where appropriate, as seen in Figures 14 and 15; branches starting from said vertical pipes (7) to the dwellings (5) on the different floors of the building.

[0036] The private service installations are in turn formed through the hollow of the service areas (2), by means of a central vertical pipe (8) encompassing all the general pipes of the different private services, such as the sanitary hot water installation, the potable cold water installation, the heating installation, the electric installation, the home automation installation or telecommunications installations, branches starting from said central vertical pipe (8) to trays (9) extending along the passage area (1) on every floor of the building, as seen in Figure 16, in turn respective branches starting from said trays (9) to trays (10) extending throughout the different dwellings (5), from which the corresponding connections in each dwelling (5) are formed, as seen in Figure 17; these connections of the dwellings (5) being provided by means of a respective particular connections cabinet, provided with fast connection systems for connecting the installations for the different services.

[0037] On the other hand, although the description of the system has been made in relation to the specific application for dwelling construction, under the same concept of the invention, as defined by the appended claims, the system is also applicable for forming other types of living spaces, such as offices, shops, etc.

Claims

1. A flexible modular construction system, of the type establishing the forming of the component spaces of dwellings or other living spaces by means of one or several modules associated with one another, **characterized in that** it comprises one or several modules (3) each of which has three established functional areas built in parallel, one of which is a corridor area (1), another is a service area (2), and the third is a private-space area (4), a series of consecutive dwellings (5) being formed by means of the modules (3), the service area (2) being formed by a hollow space, through which the entrances to the dwellings (5) from the corridor area (1) are established, whereas elements of the service installations to be incorporated are repeatedly arranged in said hollow space, which elements are connectable to respective general supply points correspondingly serving the building.

2. The flexible modular construction system according to claim 1, **characterized in that**, in the space of the service area (2), the elements of the service installations are arranged repeated in areas corresponding to the width of the modules (3) forming the dwellings

3. The flexible modular construction system according to claim 1, **characterized in that** the corridor area (1) and the service area (2) are formed by modular sections attached to one another.

4. The flexible modular construction system according to claim 1, **characterized in that** the series of dwellings (5) is arranged sequentially in a row with respect to a service area (2) and a corridor area (1).

5. The flexibly modular construction system according to claim 1, **characterized in that** the series of dwellings (5) is arranged sequentially in two parallel rows with respect to respective service areas (2) and a common intermediate corridor area (1).

6. The flexible modular construction system according to claim 1, **characterized in that** the series of dwellings (5) is arranged in two or more radial rows radiating from a communication center (6) for communicating with one another.

7. The flexible modular construction system according to claim 1, **characterized in that** the series of dwellings (5) is arranged in a circular distribution.

8. The flexible modular construction system according to any one of claims and 4 to 7, **characterized in that** the series of dwellings (5) is arranged in sequential rows at different heights, with a communication center (6) for communicating with one another.

9. The flexible modular construction system according to claim 1, **characterized in that** the common service installations are formed through the hollow spaces of the service areas (2), by means of vertical pipes (7) including, bundled individual conduits for the different common services to be channeled to each area.

10. The flexible modular construction system according to claim 1, **characterized in that** the private service

installations are formed by the hollow space of the service areas (2), by means of a central vertical pipe (8) encompassing all the general pipes for the different private services, branches starting from said central vertical pipe (8) to first trays (9) extending along the corridor area (1) on every floor of the building, in turn respective branches start from said first trays (9) to second trays (10) extending throughout the different dwellings (5), from which the corresponding connections in each dwelling (5) are formed.

Patentansprüche

1. Flexibles modulares Konstruktionssystem von der Art, die zum Bilden von Teilräumen von Wohnungen oder sonstiger bewohnter Räume mittels eines oder mehrere Module, die miteinander verbunden sind, dient, **dadurch gekennzeichnet, dass** das System ein oder mehrere Module (3) umfasst, von denen jedes drei fertige funktionelle Bereiche aufweist, die parallel gebaut sind, von denen einer ein Korridorbereich (1) ist, ein weiterer ein Versorgungsbereich (2) ist, und der dritte ein Privatbereich (4) ist, wobei mittels der Module (3) eine Reihe von aufeinanderfolgenden Wohnungen (5) gebildet sind, wobei der Versorgungsbereich (2) von einem Hohlraum gebildet ist, durch den hindurch die Eingänge von dem Korridorbereich (1) her zu den Wohnungen (5) errichtet sind, wohingegen Elemente der einzubauenden Versorgungsinstallationen wiederholt in dem Hohlraum angeordnet sind, wobei sich die Elemente mit entsprechenden allgemeinen Versorgungspunkten verbinden lassen, die dem Gebäude entsprechend dienen.

2. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Elemente der Versorgungsinstallationen in dem Raum des Versorgungsbereichs (2) wiederholt in Bereichen angeordnet sind, die der Breite der Module (3) entsprechen, die die Wohnungen (5) bilden.

3. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** der Korridorbereich (1) und der Versorgungsbereich (2) durch modulare Abschnitte gebildet sind, die aneinander befestigt sind.

4. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Reihe von Wohnungen (5) in Bezug auf den Versorgungsbereich (2) und einen Korridorbereich (1) aufeinanderfolgend in einer Reihe angeordnet ist.

5. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Reihe von Wohnungen (5) in Bezug auf entsprechende Versorgungsbereiche (2) und einen gemeinsamen dazwischenliegenden Korridorbereich (1) aufeinanderfolgend in zwei parallelen Reihen angeordnet ist.

6. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Reihe von Wohnungen (5) in zwei oder mehr radialen Reihen angeordnet ist, die sich von einem Verbindungszentrum (6) aus strahlenförmig erstrecken, so dass sie miteinander in Verbindung stehen.

7. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Reihe von Wohnungen (5) in einer kreisförmigen Verteilung angeordnet ist.

8. Flexibles modulares Konstruktionssystem nach einem beliebigen der Ansprüche 1 und 4 bis 7, **dadurch gekennzeichnet, dass** die Reihe von Wohnungen (5) in aufeinanderfolgenden Reihen auf unterschiedlichen Höhen angeordnet ist, wobei ein Verbindungszentrum (6) dazu dient, sie miteinander zu verbinden.

9. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die gemeinsamen Versorgungsinstallationen durch die Hohlräume der Versorgungsbereiche (2) hindurch mittels vertikaler Rohre (7) gebildet sind, die gebündelte einzelne Leitungen für die unterschiedlichen gemeinsamen Entsorgungen/Versorgungen beinhalten, die zu jedem Bereich zu leiten sind.

10. Flexibles modulares Konstruktionssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die privaten Versorgungsinstallationen durch den Hohlraum der Versorgungsbereiche (2) mittels eines zentralen vertikalen Rohrs (8) gebildet sind, das sämtliche allgemeinen Rohre für die unterschiedliche privaten Entsorgungen/Versorgungen umfasst, wobei von dem zentralen vertikalen Rohr (8) Zweige in Richtung erster Schächte (9) beginnen, die sich in jedem Stockwerk des Gebäudes entlang des Korridorbereichs (1) erstrecken, während entsprechende Zweige von den ersten Schächten (9) in Richtung zweiter Schächte (10) beginnen, die sich über die gesamten unterschiedlichen Wohnungen (5) hinweg erstrecken und von denen aus in jeder Wohnung (5) die entsprechenden Anschlüsse gebildet werden.

Revendications

1. Système de construction modulaire flexible, du type permettant la formation d'espaces de logements ou d'autres espaces de vie à l'aide d'un ou plusieurs module(s) associé(s) les uns aux autres, **caractérisé en ce qu'**il comprend un ou plusieurs module(s)

(3) qui possèdent chacun trois zones fonctionnelles créées en parallèle, dont l'une est une zone de couloir (1), une autre est une zone de service (2), et la troisième est une zone d'espace privé (4), une série de logements consécutifs (5) étant formée à l'aide des modules (3), la zone de service (2) étant formée par un espace creux, par lequel les entrées des logements (5) depuis la zone de couloir (1) sont créées, tandis que des éléments des installations de service à intégrer sont placés de manière répétée dans ledit espace creux, lesdits éléments pouvant être reliés à des points d'alimentation respectifs desservant l'immeuble.

2. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que**, dans l'espace de la zone de service (2), les éléments des installations de service sont placés de manière répétée dans des zones correspondant à la largeur des modules (3) formant les logements (5).

3. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** la zone de couloir (1) et la zone de service (2) sont formées de sections modulaires reliées les unes aux autres.

4. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** la série de logements (5) est disposée séquentiellement sur une rangée par rapport à une zone de service (2) et une zone de couloir (1).

5. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** la série de logements (5) est disposée séquentiellement sur deux rangées parallèles par rapport à des zones de service respectives (2) et à une zone de couloir intermédiaire commune (1).

6. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** la série de logements (5) est disposée sur deux rangées radiales ou plus qui partent d'un centre de communication (6) afin de communiquer les uns avec les autres.

7. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** la série de logements (5) est disposée selon une distribution circulaire.

8. Système de construction modulaire flexible selon l'une quelconque des revendications 1 et 4 à 7, **caractérisé en ce que** la série de logements (5) est disposée sur des rangées séquentielles à différentes hauteurs, avec un centre de communication (6) qui leur permet de communiquer les uns avec les autres.

9. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** les installations de service communes sont formées dans les espaces creux des zones de service (2), à l'aide de tubes verticaux (7) comprenant des conduits individuels groupés pour les différents services communs, à relier à chaque zone.

10. Système de construction modulaire flexible selon la revendication 1, **caractérisé en ce que** les installations de service privées sont formées par l'espace creux des zones de service (2), à l'aide d'un tube vertical central (8) contenant tous les conduits destinés aux différents services privés, des ramifications situées entre ledit tube vertical central (8) et des premiers plateaux (9) s'étendant le long de la zone de couloir (1) à chaque étage de l'immeuble, et des ramifications respectives situées entre lesdits premiers plateaux (9) et des seconds plateaux (10) s'étendant dans les différents logements (5), à partir desquelles sont formés les raccordements correspondants dans chaque logement (5).

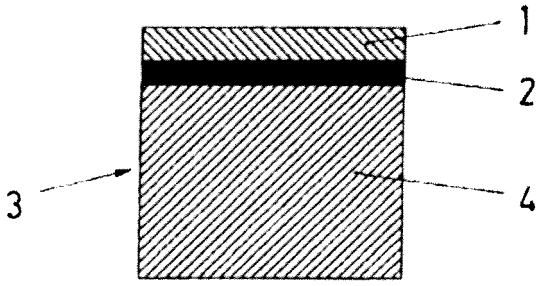


Fig.1

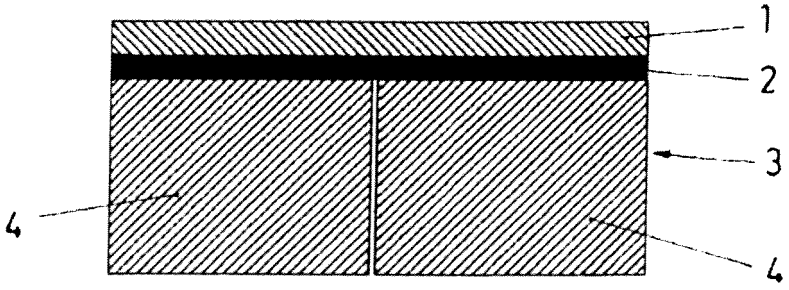


Fig.2

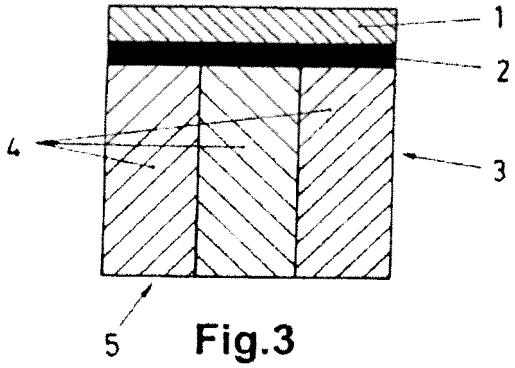


Fig.3

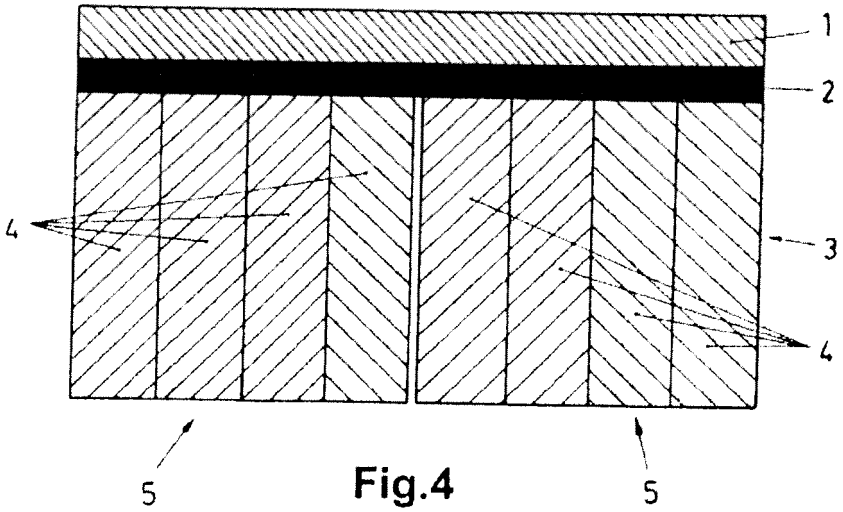


Fig.4

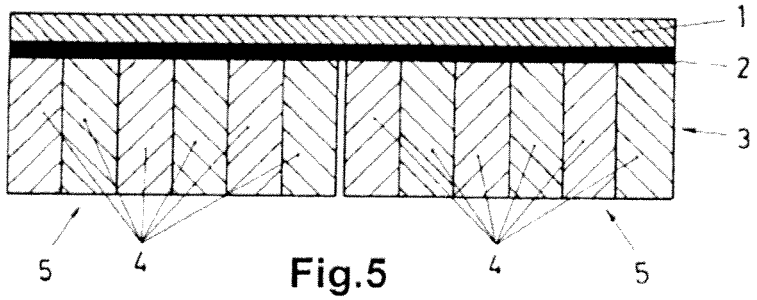


Fig.5

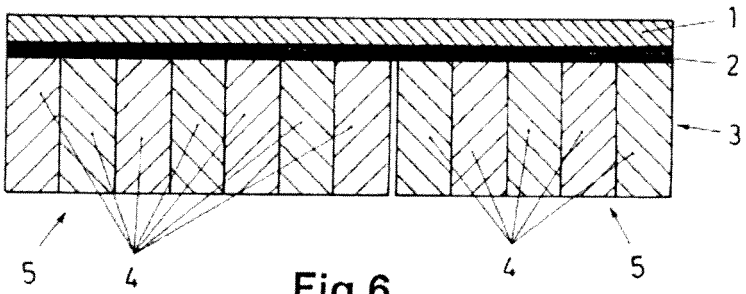


Fig.6

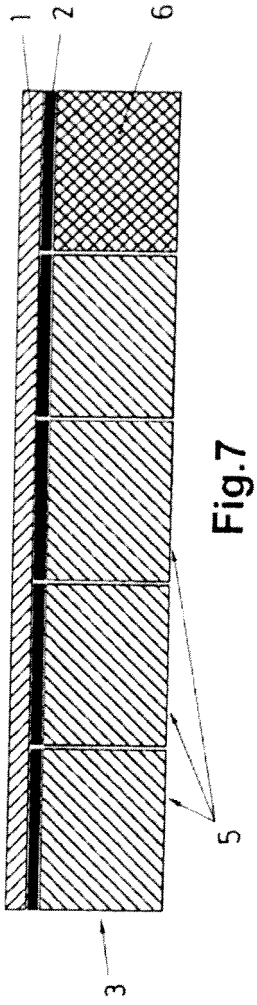


Fig.7

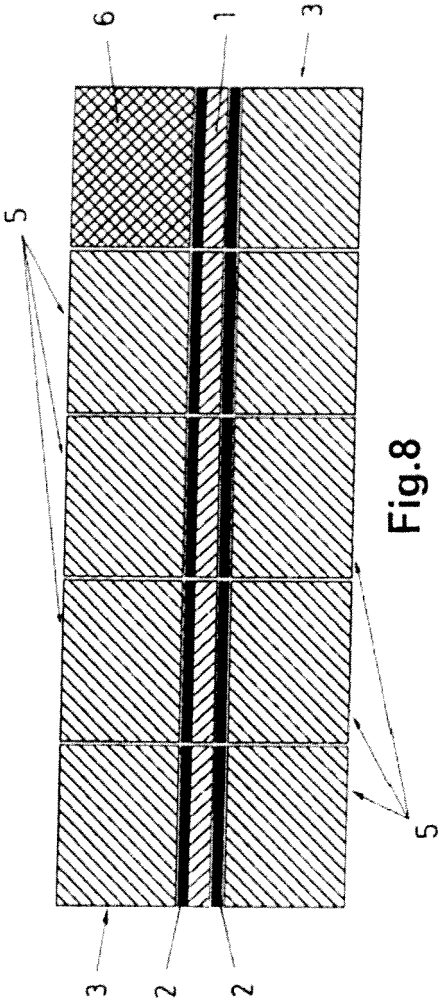


Fig.8

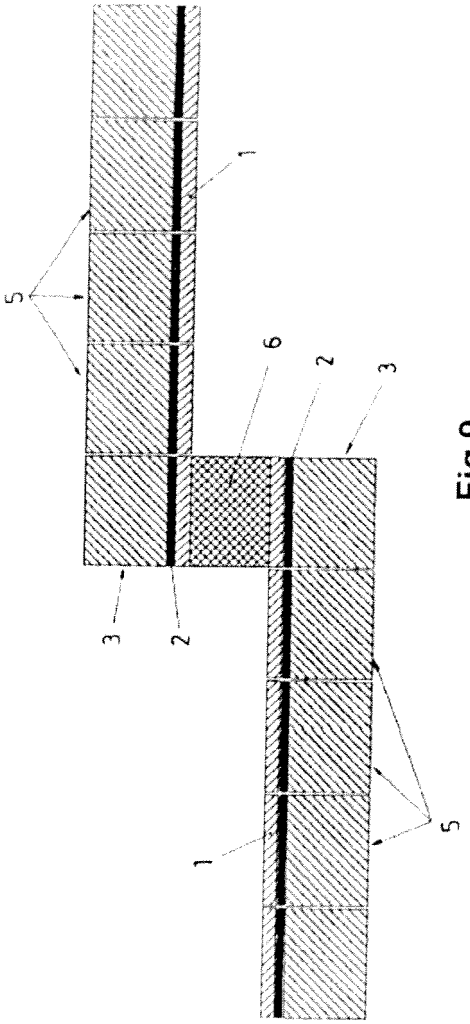


Fig.9

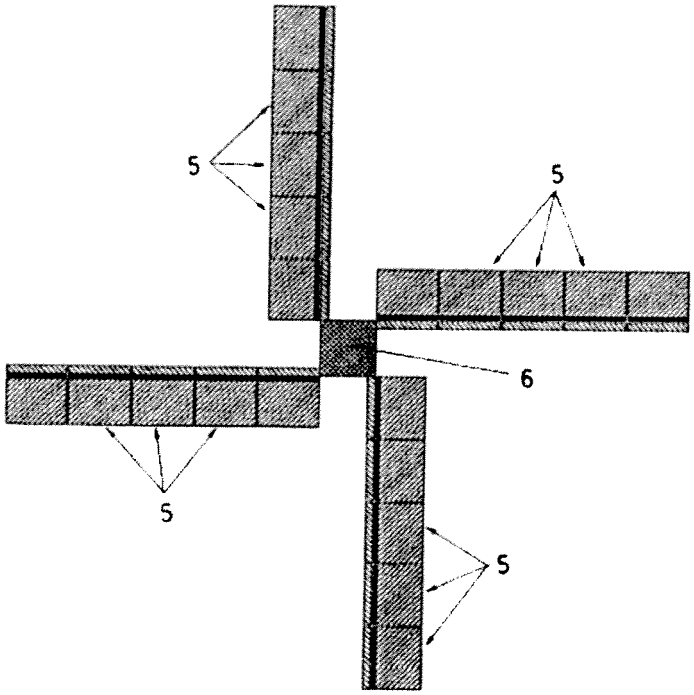


Fig.10

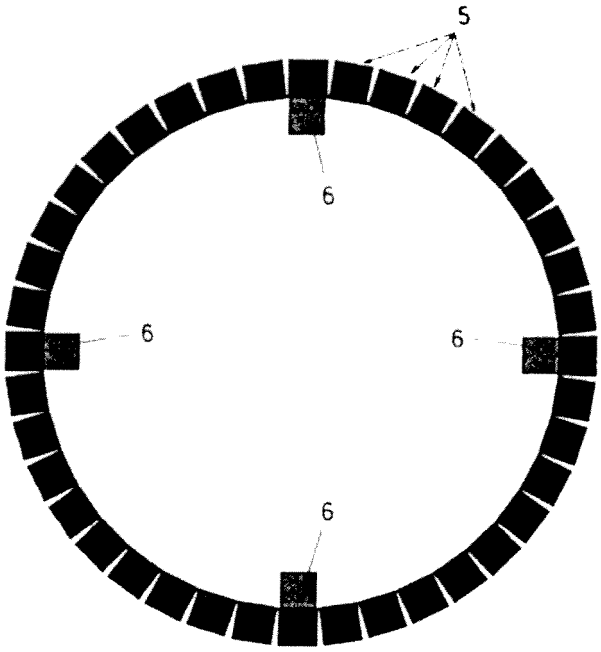


Fig.11

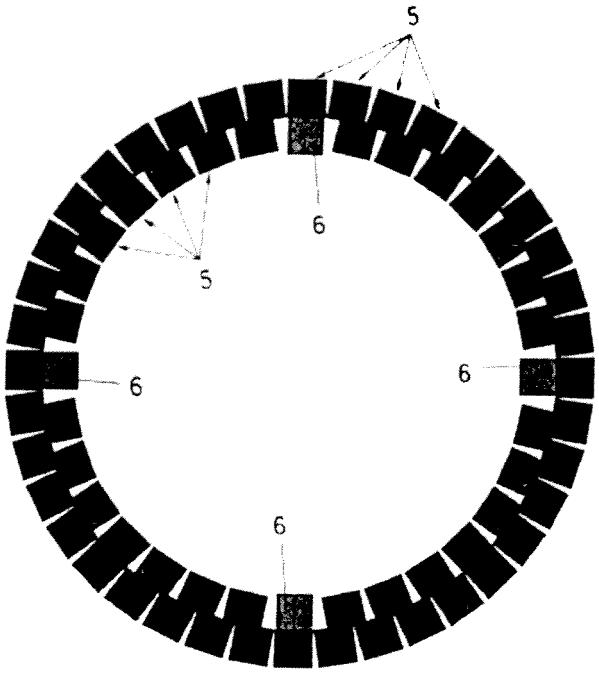


Fig.12

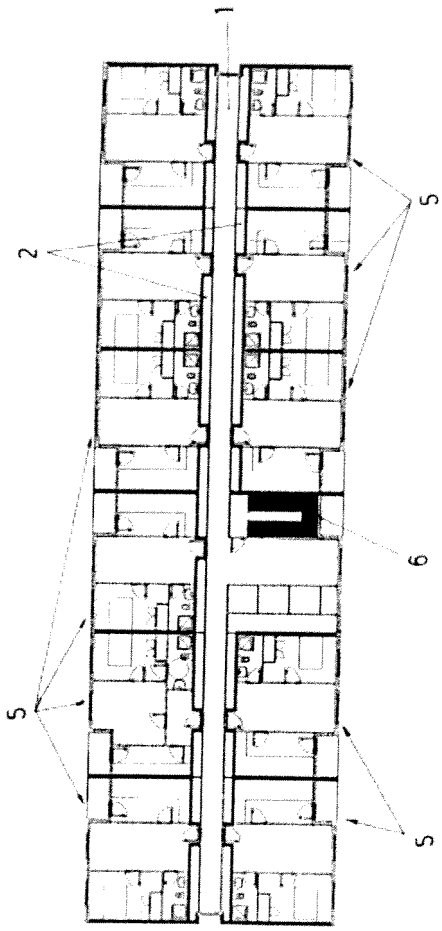


Fig.13

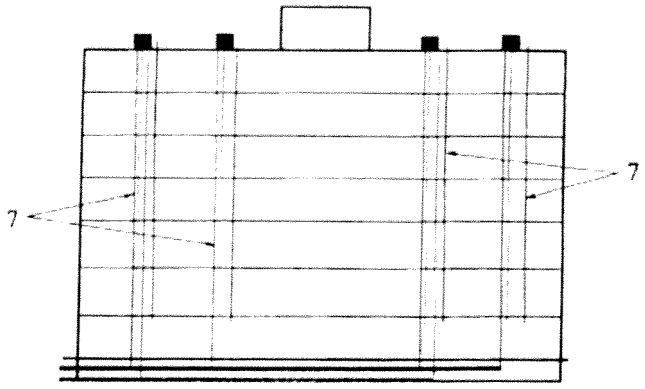


Fig.14

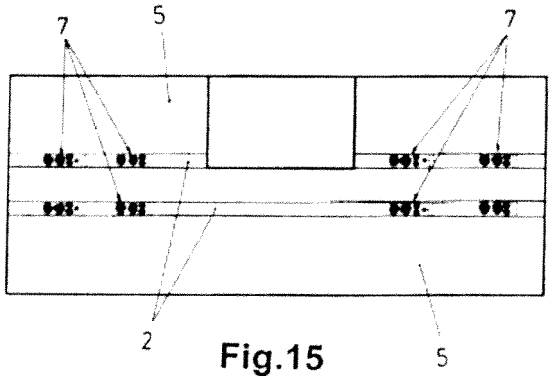


Fig.15

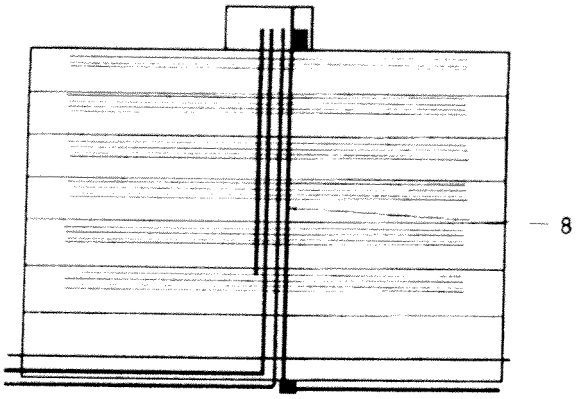


Fig.16

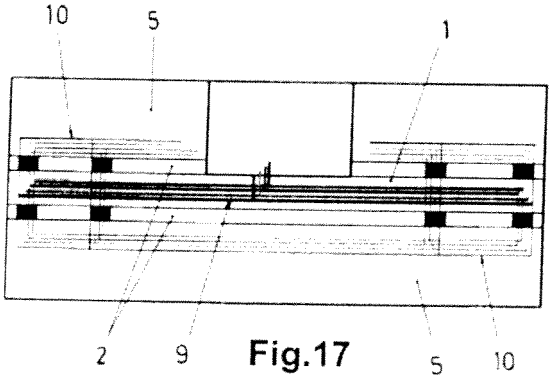


Fig.17