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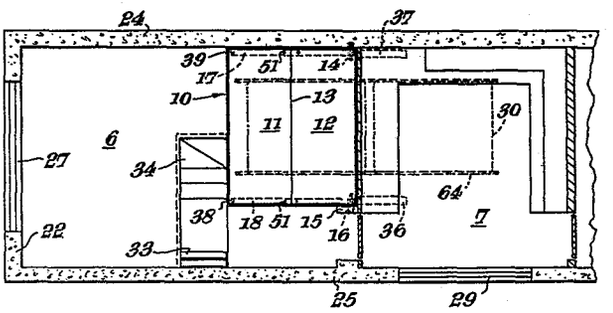
(71) Applicant: **Lewis, Thomas Maldwyn, 8 The Green Golden Square, Henfield Sussex (GB)**

(72) Inventor: **Lewis, Thomas Maldwyn, 8 The Green Golden Square, Henfield Sussex (GB)**

(74) Representative: **Kirby, Harold Douglas Benson et al, G.F. Redfern & Company Marlborough Lodge 14 Farncombe Road, Worthing West Sussex BN11 2BT (GB)**

(54) **Improvements in or relating to building units.**

(57) This invention relates to building units of the general kind described in United Kingdom Patent Specification No. 1 528 743. The building unit of the present invention differs from that of the prior Specification primarily in that the closure means (10) comprises at least two floor portions (11 and 12), one of which (12) is rotatable about a fixed axis (hinges 14 and 16) fixed relatively to the upper floor (26) and the other (11) of which is hingedly connected (13) to the first portion (11). The free edge of the second floor portion (11) is provided with rollers (38 and 39) which run in rails (17 and 18) fixed relatively to the floor.



IMPROVEMENTS IN OR RELATING TO BUILDING UNITS

This invention relates to building units, which term is used herein to include building modules, rooms or like portions of new or existing buildings, and also extensions to existing buildings.

In Patent Specification No. 1 528 743 there is disclosed and claimed a domestic room module comprising fixed wall structures enclosing a lower floor and an upper floor, the said upper floor being spaced from the lower floor at a height not exceeding one-third of the height of the wall structures, the said upper floor containing a portion rotatable-upwardly on an edge about a horizontal axis to form in a horizontal position an upper floor portion of the module and in a vertical position a wall dividing the room and whereby in the vertical position a portion of the lower floor is exposed, and optionally drive means to effect the said rotation of the said rotatable upper floor portion.

In a building module in accordance with the said Patent Specification the provision of the rotatable upper floor portion enables the module to be used both as a living room and also as a bedroom, or for storage purposes.

However, it has been found that the rotation of the floor portion from its horizontal position to its vertical

position presents certain disadvantages, in particular as regards safety and the force required to effect the rotation.

Accordingly it is an object of the present invention to provide a system which does not suffer from the disadvantages of the arrangement described in the said Patent Specification, and which is also applicable not only to building modules as such, but also to new and existing buildings.

From one aspect the invention consists in a building unit comprising fixed wall structures enclosing a lower floor and an upper floor, the said upper floor being spaced from the lower floor at a height not exceeding one third of the height of the wall structures, the said upper floor including an opening provided with closure means, said closure means comprising a first floor portion rotatable about a first axis substantially in, or parallel to, the plane of said upper floor, a second floor portion hingedly connected to said first floor portion so that it is rotatable relative thereto about a second axis parallel to said first axis, and guide means for supporting said second floor portion for sliding and tilting motion relative to said upper floor.

It is to be understood that, as in the case of the building module described in the said Patent Specification, the opening in the upper floor gives access to the lower

floor which may be provided with bedroom furniture, storage devices, heating equipment or the like.

In contrast to the arrangement of the said Patent Specification, the closure means of the present invention does not extend as far in the vertical direction as it does in the horizontal direction. Since it consists of two hinged portions, it effectively folds so that, when it is in the vertical position, its height is only a fraction of its length when it is in the horizontal position. It is to be understood that the invention is not restricted to the use of two floor portions for the closure means, but may extend to the use of three or more such portions which fold together in concertina fashion when access is required to the lower floor.

Preferably, counter-balance weights are provided on the first floor portion of the closure means to assist in rotating that floor portion from its horizontal to its vertical position.

In one form of the invention the opening is rectangular and the first axis is located at or near one of the larger ends of the rectangle. In the case in which there are only two floor portions, each of these has a length equal to the length of the rectangle and a width which is approximately half the width of the rectangle.

In the arrangement described in the preceding paragraph, the guide means comprise primarily rails located along

the shorter sides of the rectangular opening. These guides support the end of the second floor portion remote from the second axis for sliding motion while the closure means is being raised or lowered.

The counter-weight preferably consists of two relatively heavy members secured to the first floor portion so that they project in, or parallel to, the plane of the first floor portion on the side of the first axis opposite to the extent of the first floor portion.

Preferably the edge of the opening at which the first axis is located is adjacent to a wall of the unit or to a dividing wall located within the unit. In this case the wall or dividing wall is preferably constructed in such a way as to provide a space in which the first and second floor portions can be accommodated when they are in their vertical positions.

One method of performing the invention will now be described with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a perspective view of a building incorporating a number of building units in accordance with the invention;

Figure 2 is a plan view of a building unit in accordance with the invention;

Figure 3 is a sectional elevation of the building unit illustrated in Figure 2;

Figure 4 is a perspective view of a portion of the building unit illustrated in Figures 2 and 3;

Figure 5 is a perspective view of the hinge connection between the two floor portions used in the building unit illustrated in Figures 2 to 4;

Figure 6 is a perspective view showing one of the rollers on the second floor portion; and

Figure 7 is a perspective view showing the pivot means for the first floor portion.

Figure 1 illustrates the use of building units in accordance with the invention in a motel. The particular arrangement illustrated includes twelve units 1 in accordance with the invention, arranged above a corresponding number of garage units 2. The building units are arranged in two rows with an elevated passageway 3 therebetween. Steps 4 lead to this passageway which is covered by a barrel roof 5 and provides access to all twelve building units.

Each building unit includes an entrance porch, a passage, a bathroom and toilet, a fitted kitchen, and a lounge area which provides access to a bedroom area.

Referring particularly to Figures 2 to 4, it will be seen that the unit consists of a base 20, a top 21, end walls 22 and 23, side walls 24 and 25, and an intermediate floor 26. Windows 27 and 28 are provided respectively in the end walls 22 and 23, and a window 29 is provided in the side wall 25. The lounge area is shown at 6, the kitchen area at 7 and the bathroom and toilet at 8. The floor of the lounge area includes an opening provided with closure means 10. The closure means illustrated includes two floor portions 11 and 12 which are hingedly connected together at 13. The floor portion 12 is hingedly connected to the side wall 24 at 14, and to a supporting pillar 15 at 16. A rail 17 is mounted on the side wall 24 and a further rail 18 is carried by a beam 9 extending between the pillar 15 and a further pillar 19 (Figure 4). Secured to the righthand side of the floor portion 12 (as seen in the drawings) are two counter-weights 36 and 37, and mounted at the lefthand two corners of the floor portion 11 are two rollers

38 and 39. When the closure 10 is in its horizontal position, as shown in Figures 2 and 3, it provides a part of the lounge floor and conceals the space between the upper and lower floors which contains a bed 30 and storage devices 31 and 32.

A further removable portion 33 of the lounge floor provides access to a flight of steps 34 leading from the level of the upper floor to the level of the lower floor. When the portion 33 has been removed, access is provided to the free edge 35 of the floor portion 11. If a force is applied to this edge in the direction of the arrow 36 (Figure 4), the rollers 38 and 39 will travel along the rails 17 and 18, with the result that the hinge 13 will rise as the floor portion 12 rotates about the axis of the pivots 14 and 16. The wall 40, separating the lounge area from the kitchen, is constructed with a recess 41 designed to receive the two floor portions 11 and 12 as they are moved to their vertical positions. Thus the two portions are accommodated in this recess as shown in chain dotted lines in Figure 3. It will be seen that the counter-weights 36 and 37 tend to rotate the floor portion 12 in a clockwise direction (as seen in the drawings) as indicated by the arrow 42 (Figure 4). Accordingly, very little effort is required to cause the two floor portions 11 and 12 to rotate from their horizontal positions to their vertical positions. The greatest effort will be required at the commencement of the rotation, and accordingly a pair of spring loaded plungers 50 (Figure 5) are provided to initiate this rotation. To prevent the plungers 50 from raising the floor portions when the closure means 10 is required to be in its horizontal position, a pair of bolts 51 is provided in the portion 11 to cooperate with sockets in the beam 9 and in the wall 24 respectively. Each of the bolts 51 is controlled by a sliding

member 53 in the upper surface of the floor portion 11.

Figure 6 shows a portion of the rail 17 mounted on a platform 54 formed on the wall 24. This figure also shows the roller 39 mounted in a metal bracket 55 secured to a timber member 56 forming part of the frame of the floor portion. In this particular embodiment of the invention, each of the floor portions consists of a timber frame and a filling of fireproof foamed material 57 enclosed between upper and lower panels 58 and 59 consisting of chipboard or plywood.

Figure 7 shows the pivot 14 in the wall 24. This pivot consists of a solid nylon bush 60 set in the wall 24, and a pin 61 fitted to the timber frame of the floor portion 12.

In one particular embodiment of the invention the floor area of the lounge is approximately 5 metres by 3.5 metres, the area of the kitchen is 2.5 metres by 3 metres, and the bathroom and toilet is 2.5 metres by 2 metres. The height between the upper floor 26 and the underside of the top 21 is 2.4 metres, and the height between the upper and lower floors is 1 metre.

The unit described is designed to accommodate two people. If it is desired to provide additional accommodation, two units may be combined, and in this case the second unit is modified by replacing the kitchen area 7 by a further bedroom area.

When it is desired to use the bedroom area under the lounge 6, the cover 33 will be removed to provide access to the steps 34. This cover 33 may be in the form of a counter-balanced hatch which can be folded back against the wall.

The occupant can then walk down the steps, turn 90 degrees clockwise and push back the closure means 10 until it is folded into the recess 41 of the wall 40. This will provide access to a carpeted area of two metres by 2.5 metres. The space on two sides under the floor 26 will have a number of storage drawers. In addition, the bed 30 will be stored under the kitchen area. It is mounted on six wheels 63 which run on rails 64. Accordingly the bed can be pulled from its storage position shown in full lines in Figure 3 to the night position, shown in broken lines.

CLAIMS

1. A building unit comprising fixed wall structures enclosing a lower floor and an upper floor, the said upper floor being spaced from the lower floor at a height not exceeding one third of the height of the wall structures, the said upper floor including an opening provided with closure means, said closure means comprising a first floor portion rotatable about a first axis substantially in, or parallel to, the plane of said upper floor, a second floor portion hingedly connected to said first floor portion so that it is rotatable relative thereto about a second axis parallel to said first axis, and guide means for supporting said second floor portion for sliding and tilting motion relative to said upper floor.

2. A building unit as claimed in Claim 1, wherein counterbalance weights are provided on the first floor portion to assist in rotating that floor portion from its horizontal to its vertical position.

3. A building unit as claimed in Claim 1 or Claim 2, wherein the opening is rectangular, wherein the first axis is located at, or near, one of the larger ends of the rectangle and wherein there are only two floor portions, each of which has a length equal to the length of the rectangle and a width which is approximately half the width of the rectangle.

4. A building unit as claimed in Claim 3, wherein the guide means comprise rails located along the shorter sides of the rectangular opening, said rails supporting the end of the second floor portion remote from the second axis for sliding motion while the closure means is being raised or lowered.

5. A building unit as claimed in Claim 2, wherein each of the counterbalance weights consists of a relatively heavy member secured to the first floor portion so that it projects in, or parallel to, the plane of the first floor portion on the side of the first axis opposite to the second axis.

6. A building unit as claimed in any of the preceding Claims, wherein the first axis is located adjacent to a dividing wall located within the unit, and wherein said dividing wall is constructed in such a way as to provide a space in which the first and second floor portions are accommodated when they are in their vertical positions.

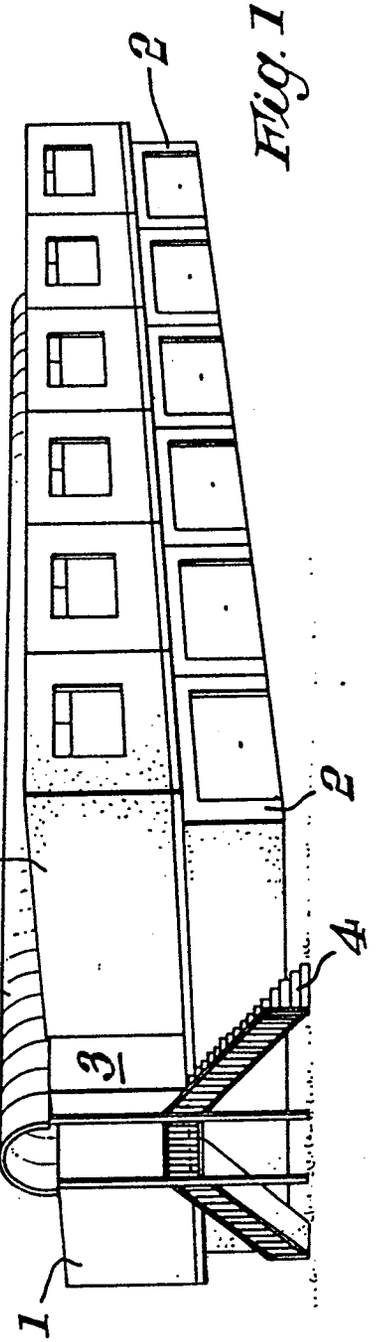

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Fig. 1

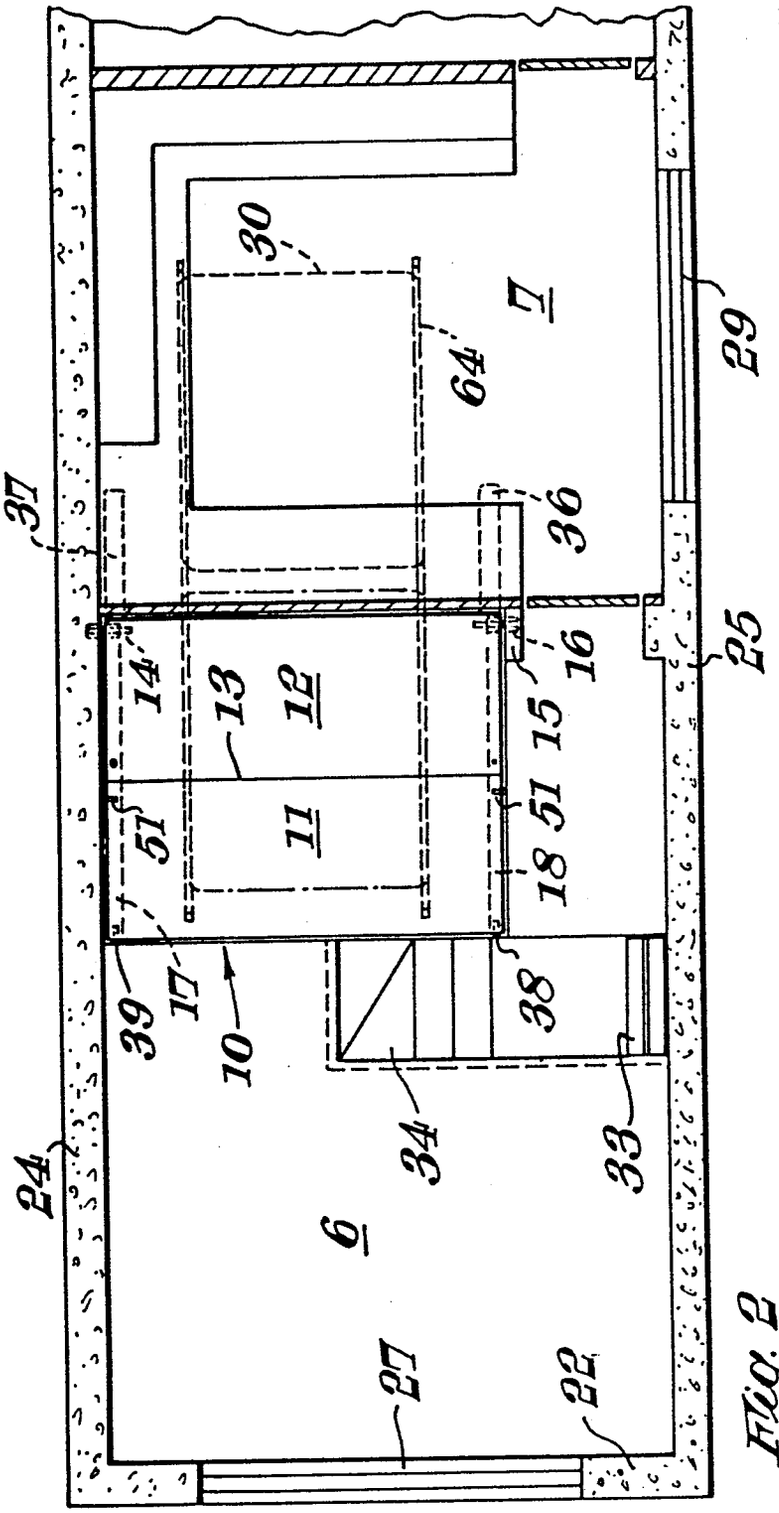
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Fig. 2

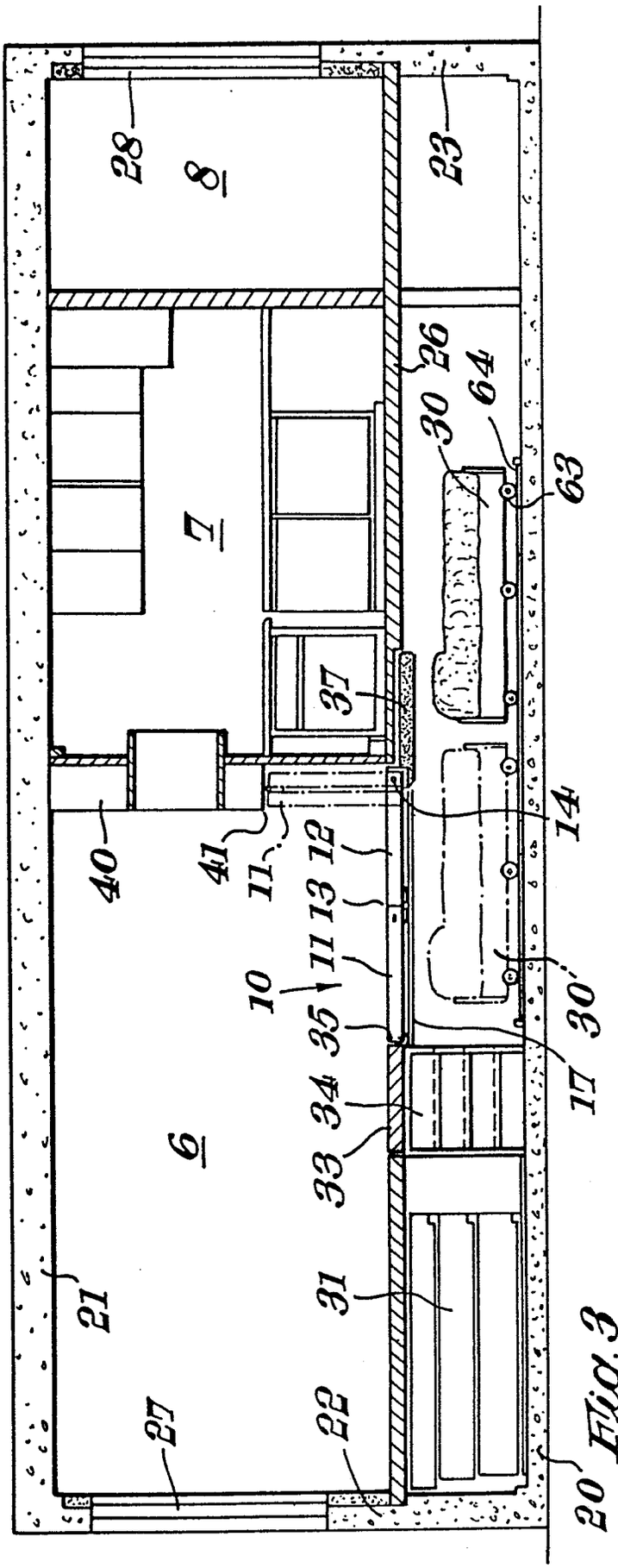
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Fig. 3

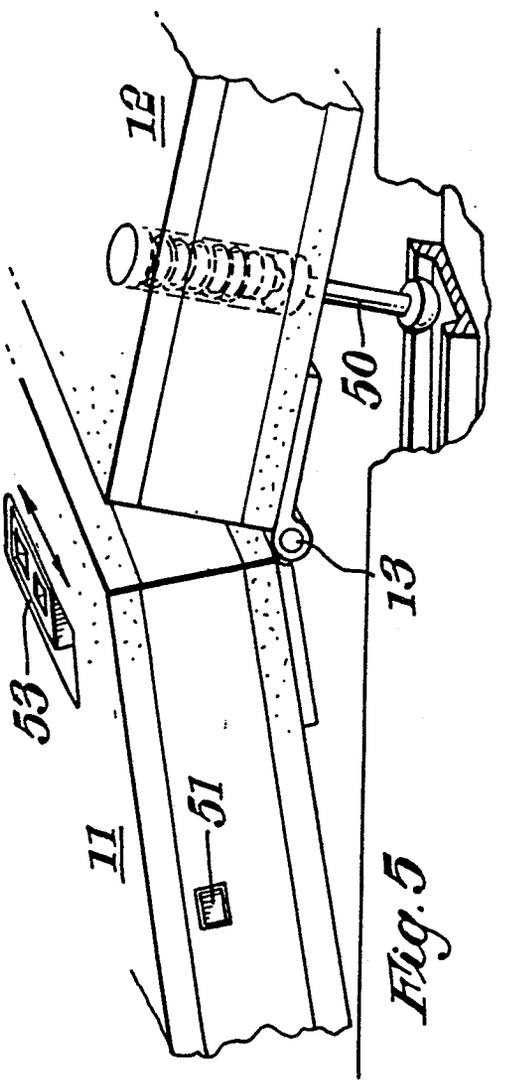
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Fig. 5

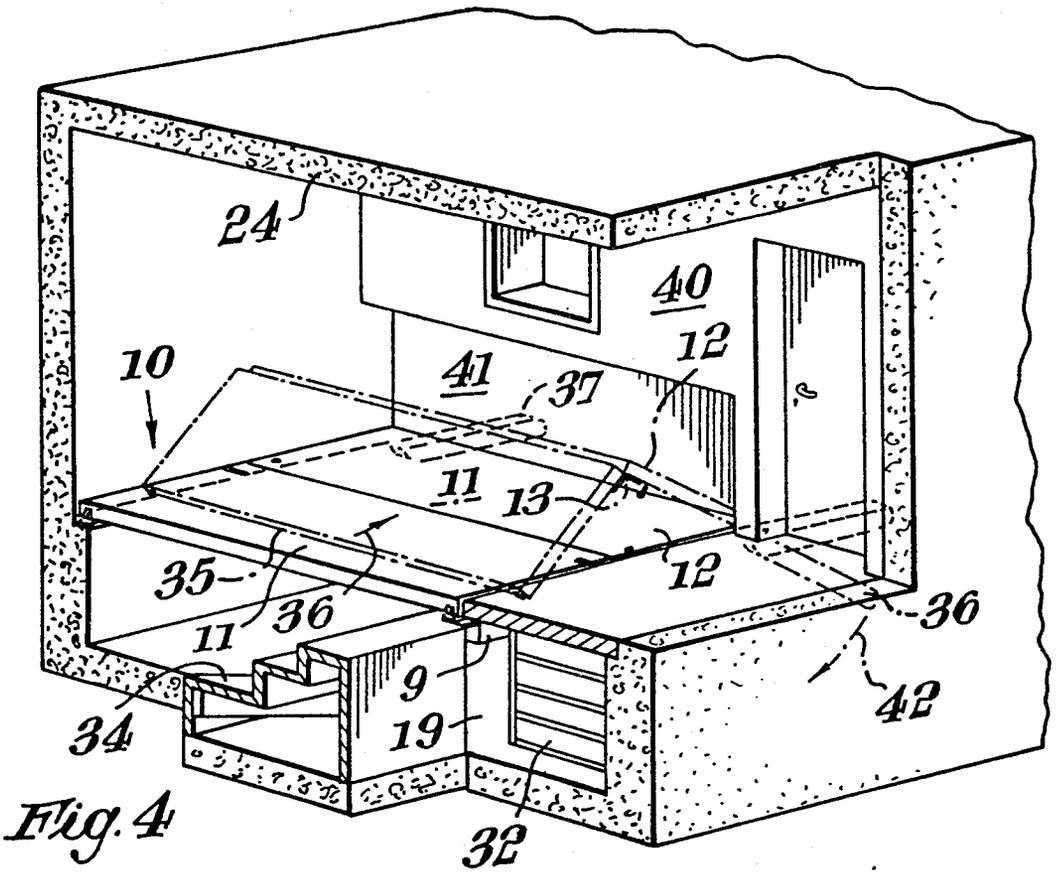

Fig. 4

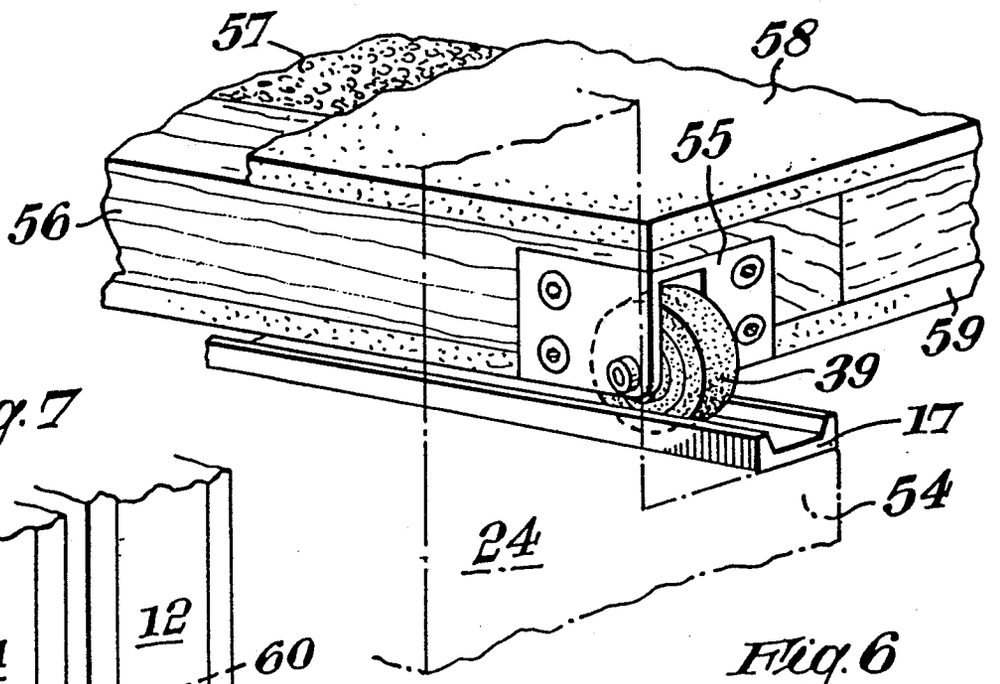

Fig. 7

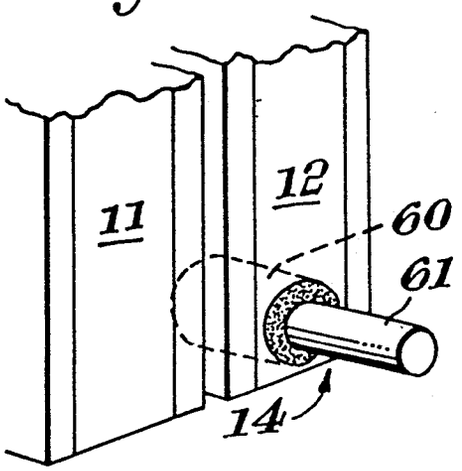

Fig. 6