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Raith

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[54] **ELEVATED FLOORING SYSTEM AND PANEL THEREFOR**

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[51] **Int. Cl.** **E04b 5/48,** E04c 2/52

[58] **Field of Search** 52/263, 126, 71, 613, 273, 52/608, 479, 480, 390, 508

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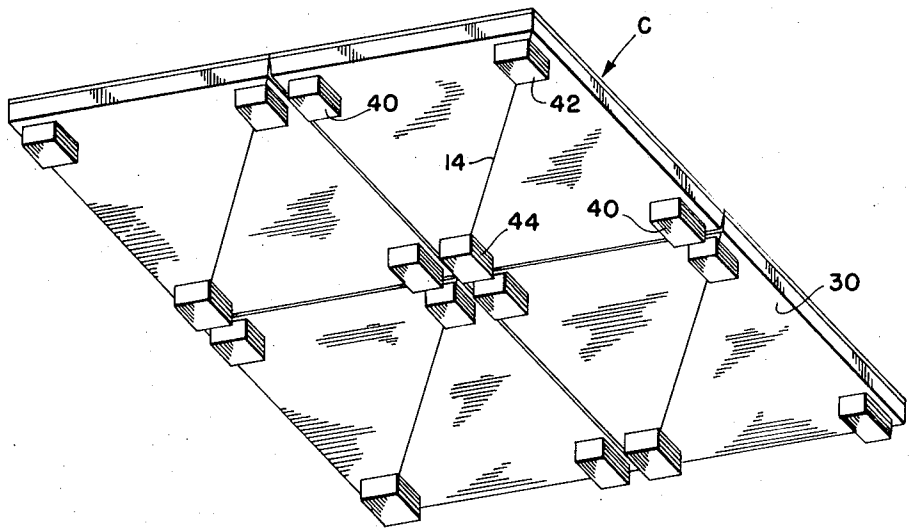
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[57] **ABSTRACT**

A substantially rectangular panel is hinged across diagonally opposite corners. Elevating supports extend downwardly from the opposite corners and the remaining corners on the panel. The hinge and the location of the elevating supports prevent the panel from rocking on an uneven subfloor.

16 Claims, 5 Drawing Figures



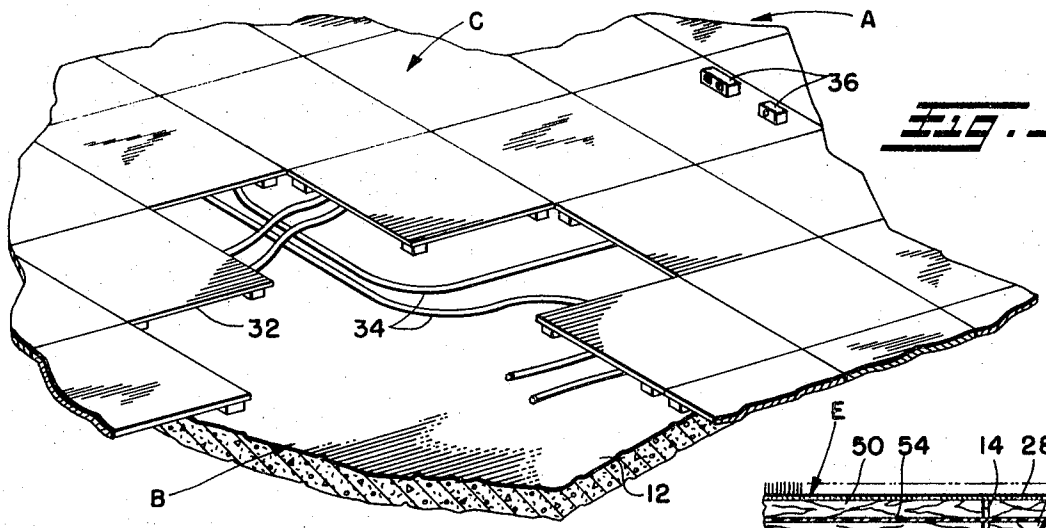


Fig. 1

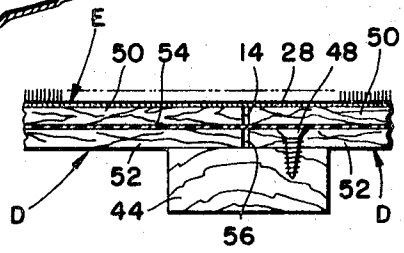


Fig. 4

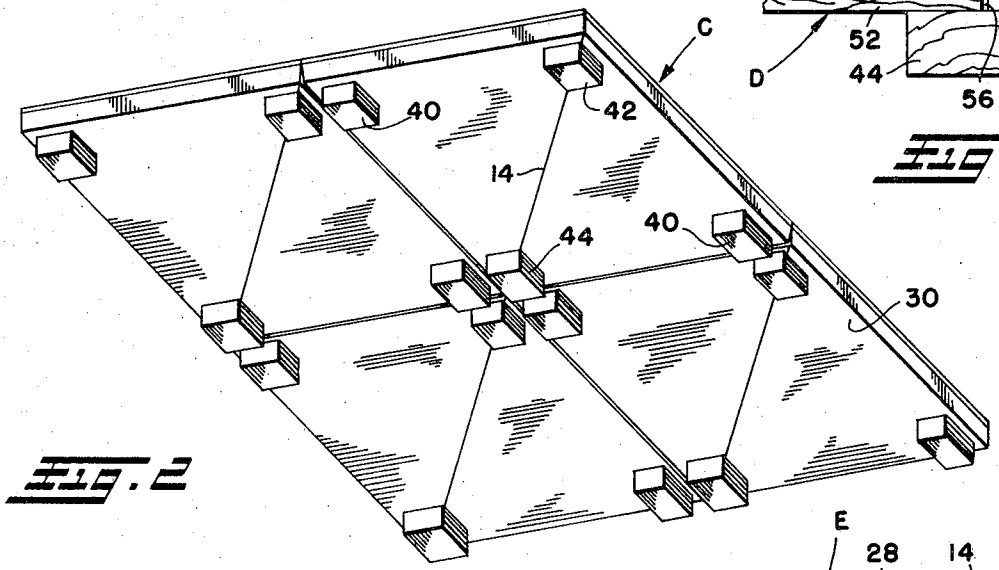


Fig. 2

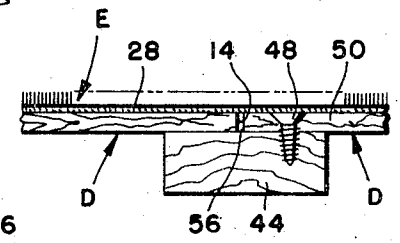


Fig. 5

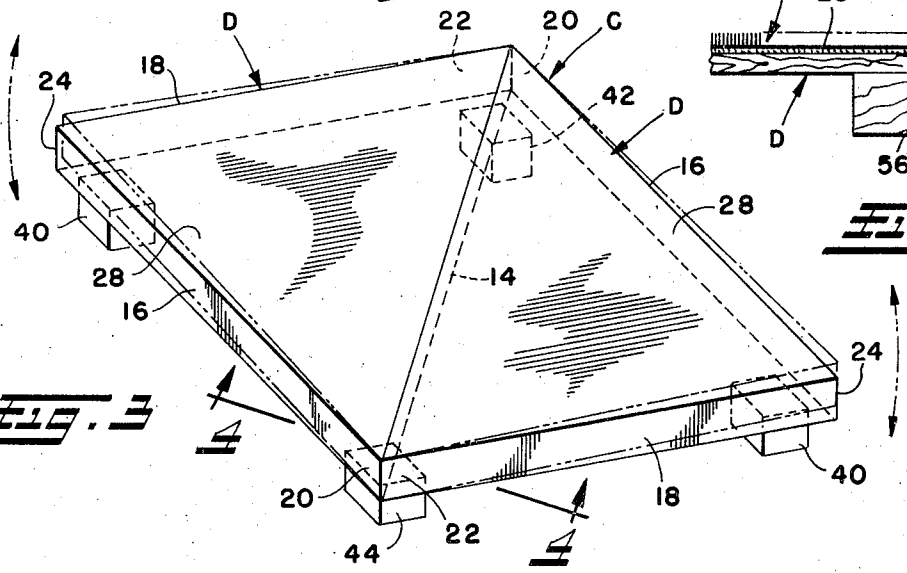


Fig. 3

ELEVATED FLOORING SYSTEM AND PANEL THEREFOR

Elevated flooring systems are commonly constructed by positioning a plurality of panels on a substantially horizontal supporting surface. The panels have a plurality of elevating supports extending downwardly from the lower surface thereof for supporting the panels in a substantially horizontal position above the supporting surface to define a hollow space between the panels and the supporting surface. Electrical wiring, pipes and ducts may extend through the space.

In elevated flooring systems of the type described, slight irregularities in the supporting surface often prevent all of the elevating supports from making firm contact with the supporting surface. If one or more of the elevating supports is not in firm engagement with the supporting surface, the panel will wobble. Such wobbling is a hazard and a nuisance to persons walking across the panels.

In accordance with the present invention, an elevated flooring system of the type described is assembled with substantially rectangular panels, each of which is hinged across diagonally opposite corners. The hinge divides each rectangular panel into a pair of triangular panels. Each triangular panel includes a base edge face intersecting opposite side edge faces at side corners. The side edge faces extend substantially perpendicular to one another and intersect at a central corner. The pair of triangular panels are positioned with their base edge faces adjacent one another.

In accordance with an important aspect of the invention, the rectangular panel is provided with elevating supports extending downwardly from the corners thereof. The elevating supports define a three-point support for each triangular panel. With a three-point elevating support arrangement, all of the elevating supports will be in firm engagement with the supporting surface despite irregularities in the supporting surface.

In accordance with another aspect of the invention, the pair of triangular panels are connected together along their base edge faces by hinge means so that the triangular panels may swing relative to one another along their base edge faces.

Panels constructed in accordance with the present invention may be formed from any suitable structural material. The panels may be formed of synthetic plastic material, plywood or particle board. The panels could also be metal stampings or castings.

The hinge means for connecting the base edge faces of the triangular panels in spaced-apart relationship may take many forms. The hinge means may be defined by a covering, such as carpeting or tile, secured to the upper surface of the panels and spanning the base edges. The hinge means could also be integral with the triangular panels. The hinge means could also be secured to the lower surfaces of the panels and span the base edges thereof.

It is a principal object of the present invention to provide an improved elevated flooring system.

It is another object of the present invention to provide an improved panel for use in elevated flooring systems.

It is an additional object of the present invention to provide a panel which will not wobble when positioned on an uneven subfloor.

The invention may take form in certain parts and arrangements of parts, preferred embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof.

FIG. **1** is a perspective illustration of an elevated flooring system;

FIG. **2** is a bottom perspective illustration of a plurality of panels constructed in accordance with the present invention;

FIG. **3** is an upper perspective illustration of an improved panel constructed in accordance with the present invention;

FIG. **4** is a cross-sectional elevational view looking generally in the direction of arrows **4**—**4** of FIG. **3**; and

FIG. **5** is a cross-sectional elevational view similar to FIG. **4** and showing another hinge arrangement.

Referring now to the drawings, wherein the showings are for purposes of illustrating a preferred embodiment of the invention only and not for purposes of limiting same, FIG. **1** shows an elevated flooring system A constructed in accordance with the present invention. A concrete slab B defines a substantially horizontal supporting surface **12** for supporting a plurality of rectangular panels C.

In accordance with a preferred arrangement, each rectangular panel C is hinged across diagonally opposite corners. The hinge divides the rectangular panel into a pair of substantially identical triangular panels D. Each triangular panel D includes a base edge face **14** intersecting opposite side edge faces **16** and **18** at side corners **20** and **22.** Side edge faces **16** and **18** extend substantially perpendicular to one another and intersect at a central corner **24.** In the preferred arrangement, side edge faces **16** and **18** intersect base edge face **14** at 45° angles. With such an arrangement, rectangular panels C will be square. Each pair of side corners **20** and **22** on triangular panels D cooperate to define diagonally opposite corners on rectangular panel C. Central corners **24** define the remaining corners on rectangular panel C. Each triangular panel D includes upper and lower surfaces **28** and **30.**

In accordance with one arrangement, a plurality of elevating supports are secured to each rectangular panel C for supporting panel C in elevated position above supporting surface **12** on concrete slab B. This provides a space generally indicated at **32** in FIG. **1.** Electrical wiring is generally indicated at **34** extending through space **32.** Such wiring may be connected to electrical outlets as at **36,** and to machines or the like. Water pipes and air ducts for heating and cooling systems may also extend through space **32.**

In one arrangement, elevating supports **40** are secured to lower surface **30** of each triangular panel D beneath central corners **24.** Elevating supports **42** and **44** are secured to lower surface **30** beneath side edge corners **20** and **22.** Elevating supports **40, 42** and **44** may be secured to panels D by the use of adhesive or mechanical fasteners. Obviously, elevating supports **40, 42** and **44** may take many different forms and may be made of many different materials. In the arrangement shown, elevating supports **40, 42** and **44** are simply rectangular blocks of wood.

In a preferred arrangement, elevating supports **40** and **42** are secured to only one of triangular panels D. Each elevating support **40** and **42** then extends across

base edge faces 14 to support the other triangular panel at the side corners thereof. In the arrangement shown in FIG. 4, elevating support 44 is secured to only one triangular panel D as by screw 48. Elevating support 44 is not secured to the other triangular panel but simply extends across base edge faces 14 for supporting the other triangular panel. Elevating support 42 would be similarly secured to only one of triangular panels D. It is obvious that elevating supports 42 and 44 could also be adhesively secured to only one of panels D, or secured in any other suitable manner.

In the arrangement described, it will be recognized that each pair of triangular panels D may swing relative to one another about a longitudinal axis extending parallel to base edge faces 14. Such swinging movement is shown in FIG. 3 by solid line and shadow line positions. This swinging movement provides a three-point support means. With irregularities in surface 12 beneath any one of elevating supports 40, 42 or 44, panels D can swing and shift slightly relative to one another so that the elevating support at the irregularity or depression will move downward or upward into firm engagement with supporting surface 12. Instead of having single elevating supports 42 and 44 at the opposite corners of base edge faces 14, it is obvious that individual supports can also be provided beneath side edge corners 20 and 22 on each triangular panel D.

In the preferred arrangement, triangular panels D are hingedly connected together along base edge faces 14 thereof. With such an arrangement, rectangular panels D can be pre-assembled at a factory, and installation of such panels on a supporting surface 12 proceeds more rapidly and saves manpower.

In the arrangement shown in FIG. 4, each panel D includes upper and lower panel portions 50 and 52 laminated together with a thin flexible synthetic plastic material 54 therebetween. Base edge faces 14 are spaced-apart slightly to provide a gap as at 56 in FIG. 4. Plastic material 54 completely spans gap 56 for connecting triangular panels D across base edge faces 14 thereof. The portion of plastic material 54 spanning gap 56 defines a hinge integrally connecting panels D while allowing swinging and slight shifting movement of panels D relative to one another. A surface covering E may be secured to upper surfaces 28 of panels D and completely spans gap 56. Covering E may be in the form of any known flooring material, such as carpet, linoleum or other flooring tile.

In the arrangement shown in FIG. 5, covering E is bonded to upper surfaces 28 of panels D and spans gap 56 at the upper surfaces of panels D. Covering material E is relatively thin and flexible, and itself defines the integral hinge for swingably interconnecting panels D.

Obviously, many other arrangements are also possible for hingedly interconnecting panels D. For example, one or more strips of thin flexible plastic material or the like may be bonded or secured by mechanical fasteners to lower surfaces 30 of panels D across base edge faces 14. Base edge faces 14 may also be longitudinally grooved for receiving a thin flexible strip of material. When panels D are stamped or molded, they can also be formed with integral curved hinge sockets for loosely receiving a hinge pin. Where panels D are molded integrally with one another, the mold may be provided with one or more elongated projections for leaving a gap as at 56. The thin strip of material remaining across gap 56 would then define an integral hinge.

A rectangular panel could also be cut across diagonally opposite corners to leave a thin integral strip of panel material defining the hinge.

In the preferred arrangement, common elevating supports 42 and 44 are provided at the hinge for each pair of triangular panels. Instead of spanning edge faces 14, supports 42 and 44 could be located beneath only one triangular panel D. The other triangular panel would then be held in elevated position by the hinge connection.

Although the invention has been shown and described with respect to certain preferred embodiments, it is obvious that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification. The present invention includes all such equivalent alterations and modifications, and is limited only by the scope of the claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A substantially rectangular panel hinged across diagonally opposite corners, and including as a part thereof elevating supports extending downwardly from said opposite corners and the remaining corners on said panel, said panel being divided into triangular panels along a hinge line, and said elevating supports at said opposite corners being attached to only one of said triangular panels adjacent said hinge line.

2. The panel of claim **1** wherein said elevating supports at said opposite corners span said hinge line.

3. The panel of claim **1** wherein said rectangular panel is substantially square.

4. The panel of claim **1** wherein said triangular panels have base edge faces positioned adjacent one another along said hinge line.

5. The panel of claim **4** and including a covering secured to the upper surface of said rectangular panel and spanning said base edge faces to define hinge means.

6. The panel of claim **4** wherein said base edge faces are hingedly connected by hinge means integral with said triangular panels.

7. The panel of claim **4** wherein said panel is of laminated multi-layer construction including a thin flexible intermediate layer spanning across said base edge faces of said triangular panels to define hinge means.

8. The panel of claim **4** and including hinge means secured to the lower surface of said rectangular panel and spanning said base edge faces.

9. The panel of claim **8** wherein said hinge means comprises a thin strip of flexible material.

10. An elevated flooring system comprising: a plurality of triangular panels supported on a floor, each of said panels having a base edge face intersecting side edge faces at opposite corners, said side edge faces extending substantially perpendicular to one another and intersecting at a central corner, each of said panels having upper and lower surfaces, each of said panels having elevating supports on said lower surface thereof at said corners to provide a three-point support means for supporting said panels in elevated position above said floor, said panels being assembled in substantially abutting relationship on said floor, pairs of said panels being positioned with said base edge faces thereof adjacent one another to define substantially rectangular panels having rectangular panel edge faces defined by said

side edge faces of said triangular panels, and hinge means for hingedly connecting said base edge faces of said pairs of triangular panels.

11. The system of claim **10** wherein said rectangular panels have a covering secured to said upper surfaces thereof and spanning said base edge faces, said hinge means being defined by said covering.

12. The system of claim **10** wherein said hinge means is secured to said lower surfaces along said base edges of said pairs of panels.

13. The system of claim **10** wherein said triangular panels are of laminated multi-layer construction including a thin flexible intermediate layer spanning across said base edge faces of said pairs of triangular panels to define said hinge means.

14. The system of claim **10** wherein said hinge means is formed integrally with said pair of triangular panels.

15. The system of claim **14** wherein said pair of triangular panels are molded integral with one another and are integrally connected by flexible joining portion at said base edge faces thereof to define said hinge means.

16. The system of claim **10** wherein said elevating supports are attached to only one of each pair of triangular panels at said opposite corners.

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