March 20, 1962 J. W. SPISELMAN ET AL 3,025,934

SECTIONAL FLOORING

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FIG. 1

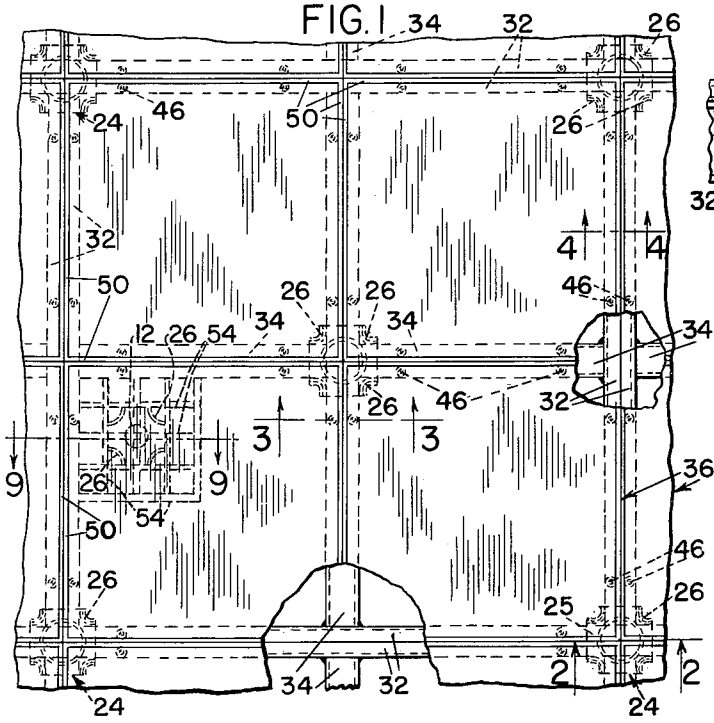


FIG. 2

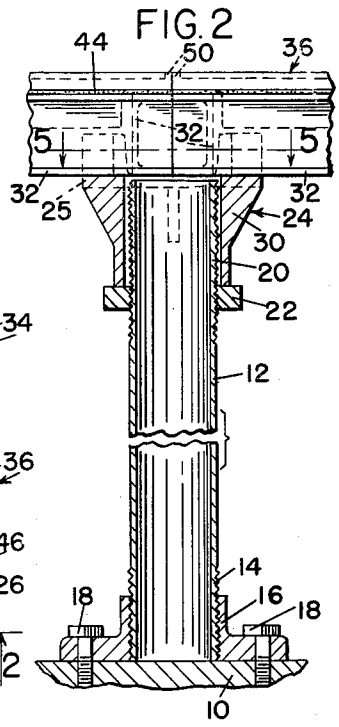


FIG. 3

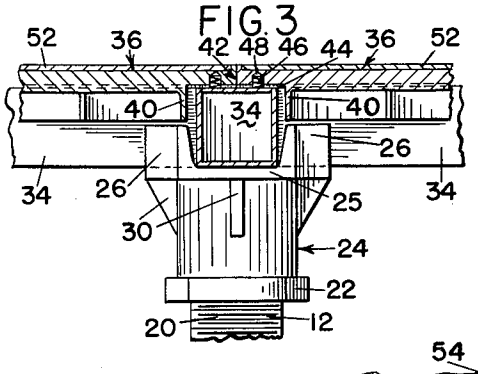


FIG. 4

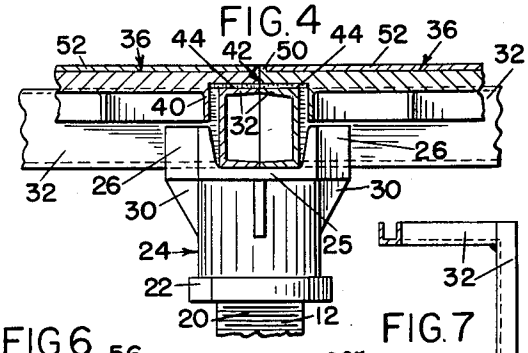


FIG. 5

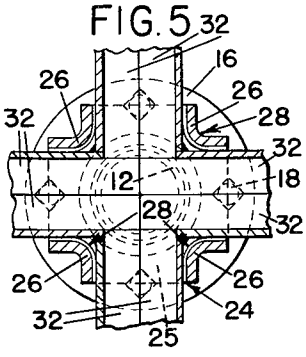


FIG. 6

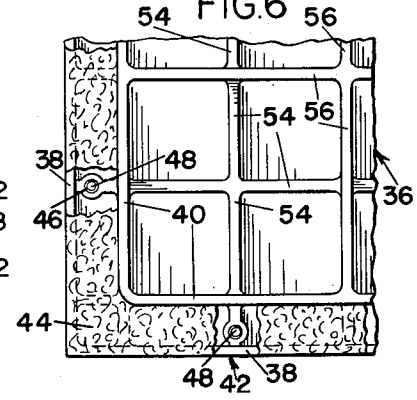
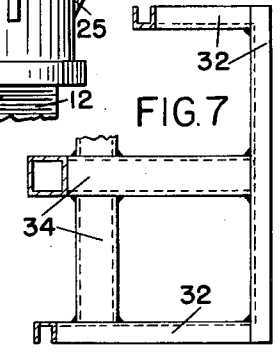


FIG. 7



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FIG. 8

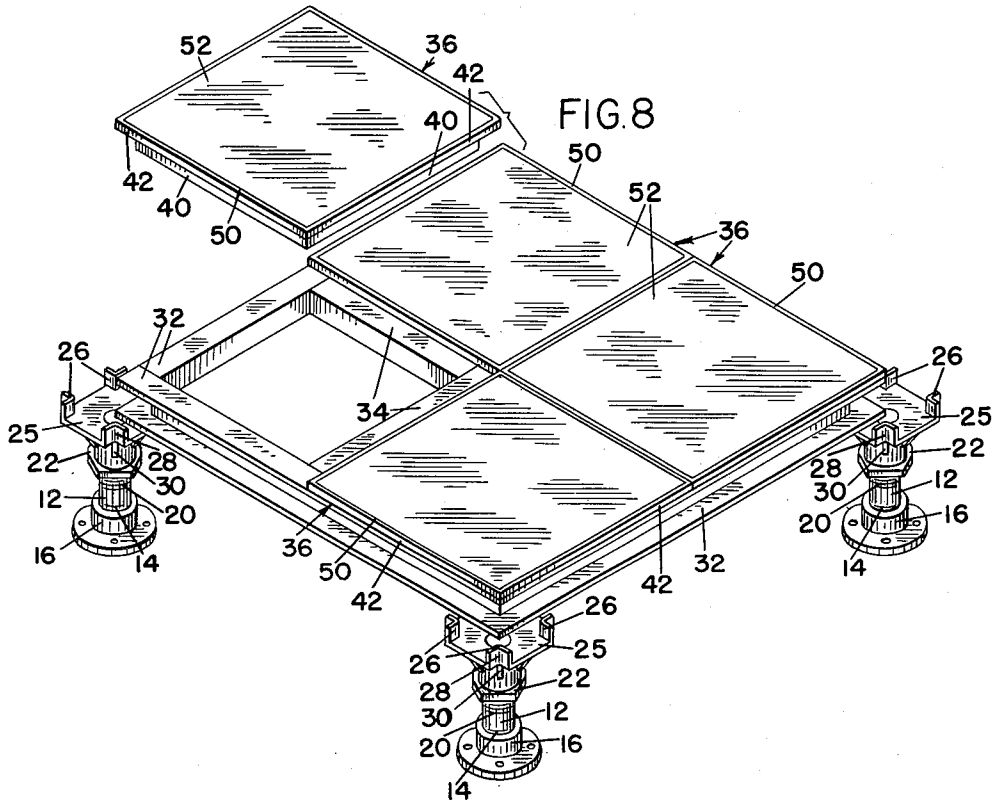
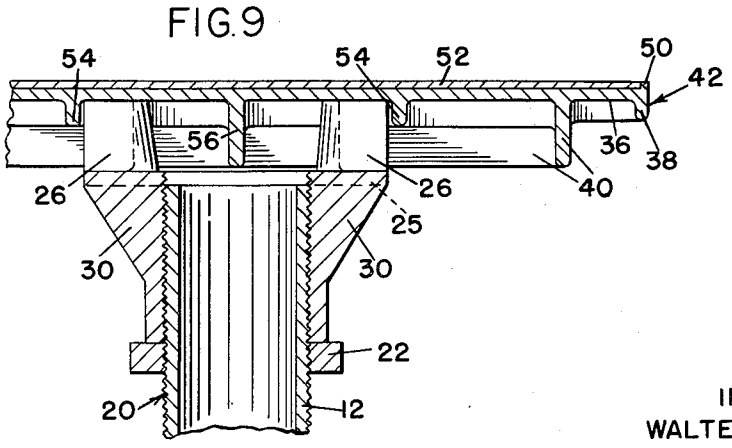


FIG. 9



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3,025,934
SECTIONAL FLOORING

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Filed Jan. 30, 1958, Ser. No. 712,271
5 Claims. (Cl. 189—34)

This invention relates to a new and improved elevated sectional flooring including spaced upright supporting standards or pedestals adapted to be mounted on a sub-floor, said sandards in turn supporting floor panels or plates, these floor panels being easily set in place and removed providing access to the space between the elevated flooring and the sub-floor, for the purposes enumerated in copending patent applications Serial No. 619,886, filed November 1, 1956, now Patent No. 2,830,332 and Serial No. 627,660 filed December 11, 1956.

The present invention provides a novel construction including the provision of an intermediate fabricated frame for disposition on the standards, the floor panels or plates being in turn disposed on the frames, resulting in the improvement that a greater span between the upright supporting standards is thereby made possible, and at the same time the elevated flooring has a lighter weight per installed square foot and is more economical with adequate load-carrying capacity, ease of manufacture, handling and installation; the invention also includes the provision of a novel elevated flooring construction comprising an intermediate fabricated open frame of relatively great area, which rests upon the upright standards, and provides for the application thereto of a plurality of lighter weight floor panels or plates per frame, each floor panel being provided with a waffle type cast beam structure on the under side thereof for lightness in weight but sufficient load-carrying capacity with minimum deflection, the panels or plates each being recessed at the under side thereof for accurate application to the intermediate frame at the open spaces thereof, minimizing over-all depth of the assembly, said panels or plates being in effect provided with recessed or in-set bottom flanges which locate the same in the openings in the intermediate frames.

Further objects of the invention include the provision of elevated sectional flooring as above described wherein the edges of the floor plates or panels are held to an accurate dimension and abut each other throughout the flooring so as to provide an accurately disposed and assembled floor having the advantages above described; and the provision of floor panels or plates as above described having raised lips at the edges thereof to contain tiles thereon and to protect the tile edges when the plates or panels are being handled, and in addition providing a decorative effect somewhat equivalent to the spacers in terrazo marble tile floors, the plates or panels being capable of being tiled at the factory, or on the job, if desired.

Other objects and advantages of the invention include gaskets of felt or plastic under the rims of the floor plates or panels providing a quieter construction and also a substantially sealed-off chamber between the elevated flooring and the sub-floor which may be made use of as a plenum chamber; special means for providing electrical grounding of the entire construction; alternatively the panels or plates may merely rest in position or they may be secured as for instance by being bolted or screwed to the intermediate frame; and the provision of an intermediate frame construction such that the supporting uprights or standards may be slid along certain cross members of the frame or along two contiguous side members of adjacent frames, said standards also fitting a central intersection of interior frame cross member, as desired,

when concentrated loads are expected, so that the uprights or standards may be placed substantially where desired.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

FIG. 1 is a top plan view of a completed floor, with parts broken away, illustrating the invention;

FIGS. 2, 3 and 4 are enlarged sections on the corresponding section lines of FIG. 1;

FIG. 5 is a section on line 5—5 of FIG. 2;

FIG. 6 is a partial bottom plan view of the flooring panels or plates;

FIG. 7 is a partial plan view on a smaller scale showing the intermediate frame, parts being in section to show the fabricated construction thereof;

FIG. 8 is a perspective view illustrating the invention; and

FIG. 9 is a sectional view illustrating the selective relationship of the supporting standards to the panels to support the same directly.

In carrying out the present invention, it is to be understood that the entire elevated flooring is based upon a sub-flooring which may be of concrete or the like and is indicated by the reference numeral **10** in FIG. 2, and is not shown in FIG. 1. Upon the sub-flooring at selected intervals, there are disposed tubular uprights, standards, or pedestals **12** which may be conveniently formed as a section of pipe threaded at the lower ends thereof at **14** for engagement with supporting flanges **16**. These flanges **16** may be bolted or screwed to the sub-floor **10** as for instance by bolts **18**.

The upper end of each upright or standard is threaded as at **20** for engagement with a large nut **22**, this nut being therefore easily vertically adjustable and supporting a tubular bracket or head generally indicated by the reference numeral **24**. The brackets **24** may be made of any suitable material and are in the general form of a cylinder, each having an upper flat laterally extending flange **25** thereon upon which the intermediate frames to be described rest. A series of, in this case four, upstanding lugs **26** are provided for a purpose to be described. These lugs will be seen to be generally angular in plan, see particularly FIG. 5, having internally rounded corners at **28**, and are arranged in mutually spaced relation leaving substantially equal flat supporting areas of the flange **25** between them.

It is to be understood that the brackets **24** being tubular, accommodate the upper end of the uprights or stands **12**, see FIG. 2, and the lugs **26** are arranged generally outboard thereof and are preferably provided with supporting buttresses **30** or the like. This construction provdes that light-weight material, such as aluminum, may be used to make the brackets **24** and the same may be most conveniently cast.

On the bracket **24** there is provided an intermediate supporting framework which is best shown in FIGS. 1 and 7. This framework comprises a series of separate open frames each composed of four external channel-irons **32** arranged on edge and joined at their corners, forming a square. Intermediate the ends of each channel-iron, the lips of which face outwardly, there are provided a pair of crossed box frame members **34**, one of which extends directly across the frame and the other of which is necessarily in two parts, welded at its ends to the cross member **34** and to the respective side channel frame member **32**. This is shown in FIG. 7. Each channel frame member **32** is one-half the width of the cross members **34**, while having the same height; and these dimensions are specifically arranged so that a pair of contiguous edge frame members **32** just occupy a space the distance between two lugs **26**, see FIG. 5; and the

cross frame members 34 have a width which just occupies the same space.

Since the lugs 26 are evenly spaced apart, see FIG. 5, it will become apparent that a standard 12 with bracket 24 thereon, may be placed at each corner of an entire frame 32, 34 and support at their corners, four adjacent corners of four separate intermediate frame members. On the other hand, a standard or upright may be placed centrally of the entire intermediate frame as indicated in FIG. 1 centrally thereof. In this case, the only members supported on this bracket are the cross members 34, and this bracket may be placed anywhere along the length of any member 34. Also, the uprights 12 may be placed not only at the corners of the frames 32, 34, but also at any point along two combined members 32 that are contiguous. In this way, the intermediate frames 32, 34 may be supported at any points desired along any of the frame members thereof, even though it has been demonstrated that it is ordinarily only necessary to support the intermediate frames in conjunction with continguous intermediate frames at the corners thereof.

Having placed the uprights 12 where desired and with the intermediate frames 32, 34 resting thereon as above described, the finish floor panels or plates each of which is generally indicated at 36, are then placed upon the intermediate frames covering the same completely, there being four such panels or plates for each intermediate frame as illustrated in the present invention. Clearly, however, the intermediate frames need not be square nor limited to four openings, in order to carry out the invention.

Each plate or panel 36 may be conveniently cast of light-weight metal such as aluminum or any other convenient or desirable metal or material. Each of these panels or plates is recessed at its lower surface forming a relatively shallow supporting edge member indicated at 38 see FIG. 9, and extending all around the same. This edge is defined by a continuous flange 40 depending from the lower surface of the respective plate or panel and in-set from the edge thereof which is indicated at 42 in FIGS. 3, 4 and 9. This flange forms a part of a cast waffle construction well illustrated in FIGS. 3, 4 and 6 and this waffle construction is made specifically for bearing maximum weight with due regard to total weight of the floor.

The edges of the floor plates or panels 36 are preferably machine finished for squareness and exact dimension, thus providing close tolerance on the installation so that each plate bears at its edges on the four surrounding plates and there is no looseness or motion possible between these plates. At the same time, they are clearly located accurately with regard to the four openings in each of the intermediate frames 32, 34, and it will be at once apparent that it is a simple matter to lay or raise these panels or plates as desired for providing installations of conduits or other devices under the floor between the elevated floor and the sub-floor.

In order to provide a seal between the plates 36 and the chamber between the elevated floor and the sub-floor, and also to provide a quieter installation, felt or plastic gaskets 44 may be provided; and if necessary, metal springs 46 may extend through these gaskets from holes 48 down to the intermediate frame as illustrated in FIG. 3 in order to provide for a complete electrical contact for grounding of the entire floor. It is of course clear that the plates or panels could also be screwed or bolted into the frame members 32 and 34 if this were desirable in any particular installation.

The present invention provides a supporting frame structure the members of which have adequate cross sectional moduli to carry concentrated loads without excessive deflection and serves to take the load distribution from light-weight cast aluminum floor plates which are mounted on the underlying or intermediate frame. The heads or brackets 24 serve to retain the intermediate frames 32, 34 in approximate alignment, but close tolerances in this respect have been found not to be necessary, and this feature decreases the cost of the manufacture of the flooring, close tolerances on installation being maintained by the machine finished edges of the plates themselves.

The panels 36 are also provided with raised edge lips 50 extending thereabout and providing for location and holding of tile of any kind 52 which can be installed at the factory so that flooring when laid as above described is completely finished and ready for use. These raised lips 50 abut each other closely and together form dividers and separating spacers of the kind normally found in terrazo flooring. However, the lips 50 are equally effective for holding cork, rubber, or any other kind of tile, as well as cast materials.

As shown in FIGS. 6 and 9, the under side of the panels or plates are reenforced not only by the flange 40 but by criss-crossing webs 54 and 56, the latter being of a depth preferably equal to that of flange 40 and the webs 54 being of less depth. This "waffle" effect gives a strong floor panel of minimum deflection for weight supported and a minimum of weight.

The projections or lugs 26 on the supporting brackets 24 are not only spaced to receive the open frame members 34, and 32 in pairs, but also are receivable in the divisions of the waffle arrangement of webs 54 and 56. Thus the standards may be placed directly under any panel, with the brackets 24 elevated by nuts 22, to support the panels directly without interference from the webs as shown in dotted lines in the lower left panel of FIG. 1 and in FIG. 9.

Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what we claim is:

1. The combination of a floor panel for elevated flooring comprising a generally flat solid body having an upper floor surface and a lower reenforced surface, a series of reenforcing webs on the body, said webs projecting downwardly and criss-crossing each other forming divisions in the lower floor panel surface, with a supporting standard to support the floor panel, and an adjustable head on said standard, and a series of upwardly projecting spaced lugs on the head, said lugs conforming in general to a like number of divisions in the lower surface of the floor panel and engaged with the lower surface of the floor panel within the corresponding divisions to support the floor panel without interference with the reenforcing webs.

2. Elevated sectional flooring comprising a series of uprights, a vertically adjustable head on each upright, a series of spaced generally upright lugs on each adjustable head, a series of floor panels, each panel including depending members thereon at the lower surface thereof between which the lugs may engage, the lugs being contacted directly by the under surface of the panels and the panels being held against horizontal motion by the interengagement of lugs and said depending members.

3. The elevated flooring of claim 2 including rectangular open frames underlying the panels, additional uprights including adjustable heads and lugs on the heads, the frames being supported on the last-named heads between the last-named lugs.

4. The elevated flooring of claim 2 including rectangular open frames underlying the panels, additional uprights including adjustable heads and lugs on the heads, the frames being supported on the last-named heads between the last-named lugs, the last-named heads being lower than the first-named heads.

5. Elevated sectional flooring comprising a series of uprights, an open frame for disposition on the uprights, a panel adapted to be disposed upon the open frame, and means on the panel at the under side thereof for insertion in the opening of the frame, said uprights being selectively disposable to underlie the panels and support the latter

directly, upstanding lugs on the uprights, and webs for the panels at the lower surfaces thereof providing a reenforced waffle-like under surface for the panels to selectively receive the lugs of the upright in the divisions thereof to support the panels directly without interference from the webs.

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