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(56) Documents Cited:
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(58) Field of Search:
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(54) Abstract Title: **Decking structure incorporating slabs and support plates**

(57) A decking structure having timber decking planks supported on timber joists 2 which extend transverse to the planks and to which the planks are secured. At least one slab of inorganic material is inserted in a space between the planks, with the upper surface of the slab substantially coplanar with the upper surface of the planks. The slab is supported on a resilient layer which overlies support plates which are fixed between the joists 2. Each plate includes a pair of plate members having tongues 21 which are slidably inserted in sockets 32 formed in the opposing plate member. The plate member is fixed to the joist 2 through mounting flanges 13 and has locating lugs 16, 17 which sit on top of the joist.

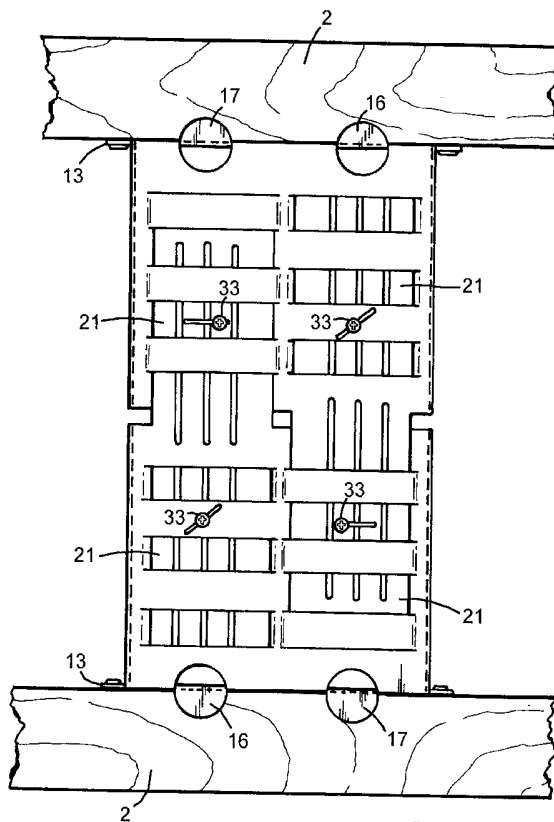


Fig. 4

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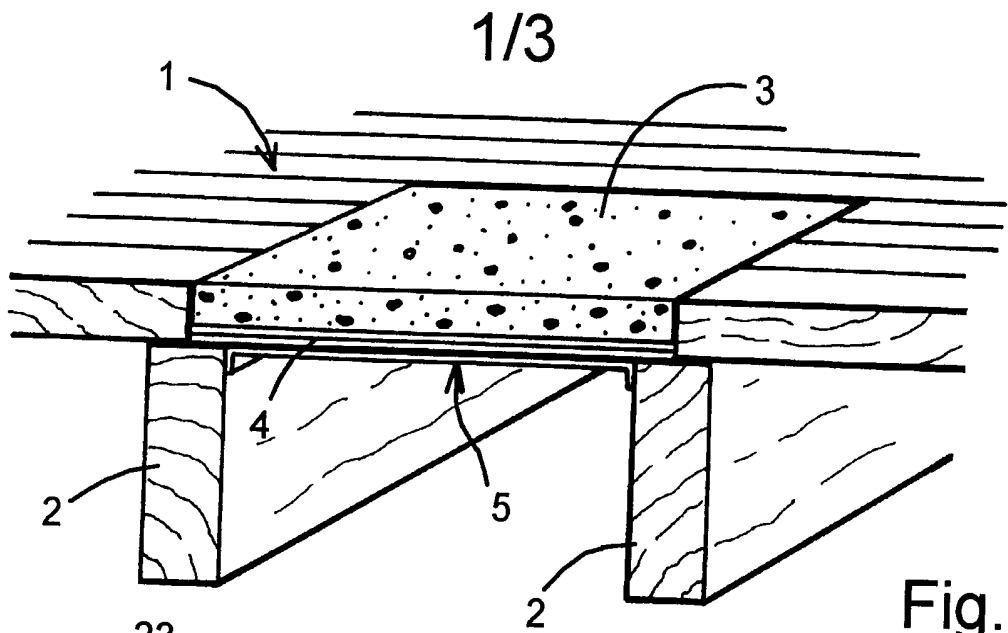


Fig. 1

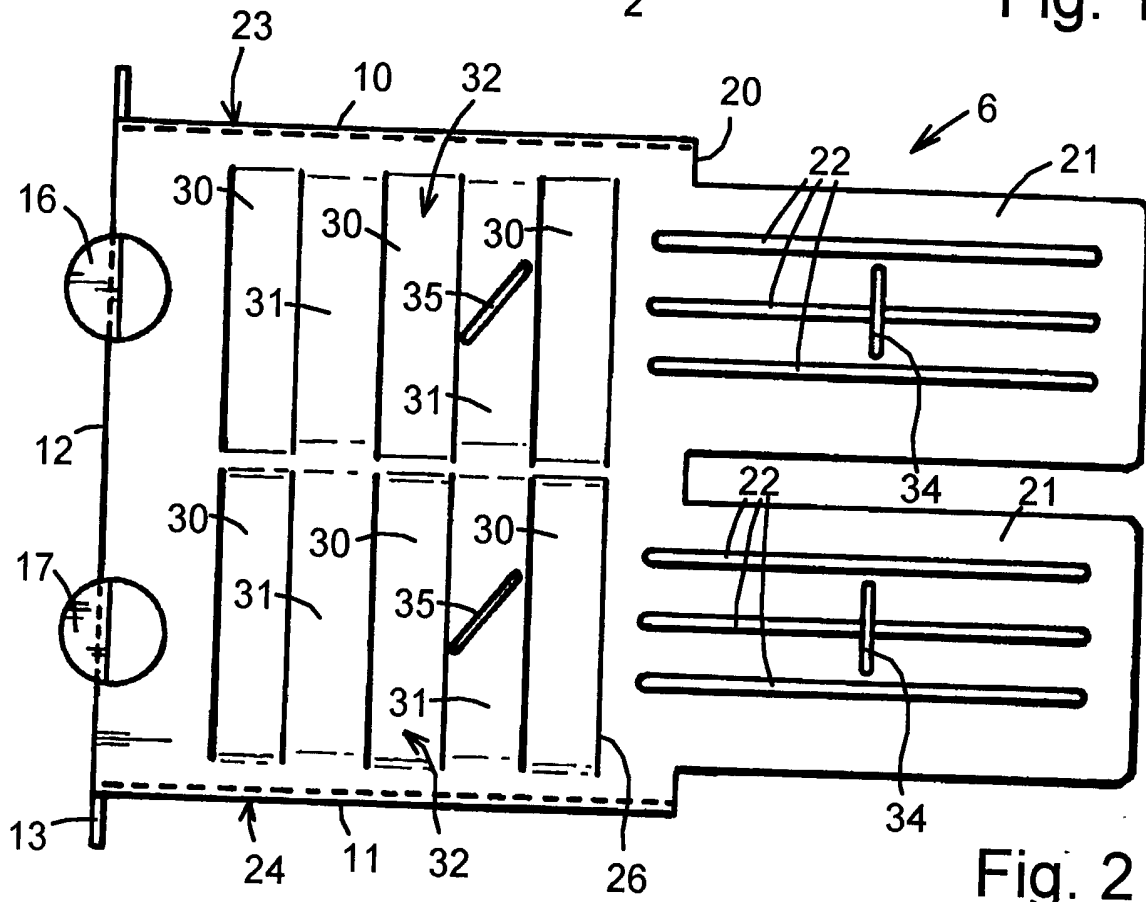
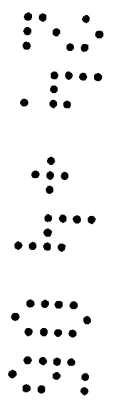


Fig. 2

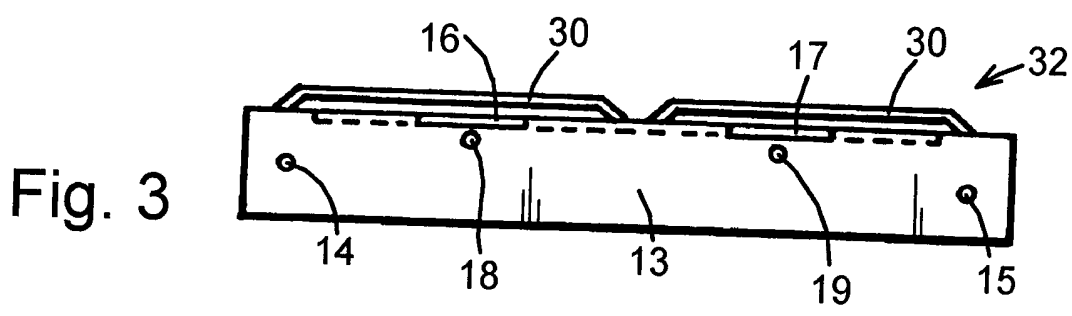


Fig. 3

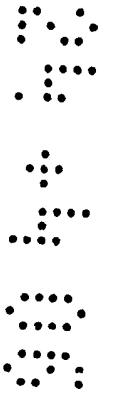
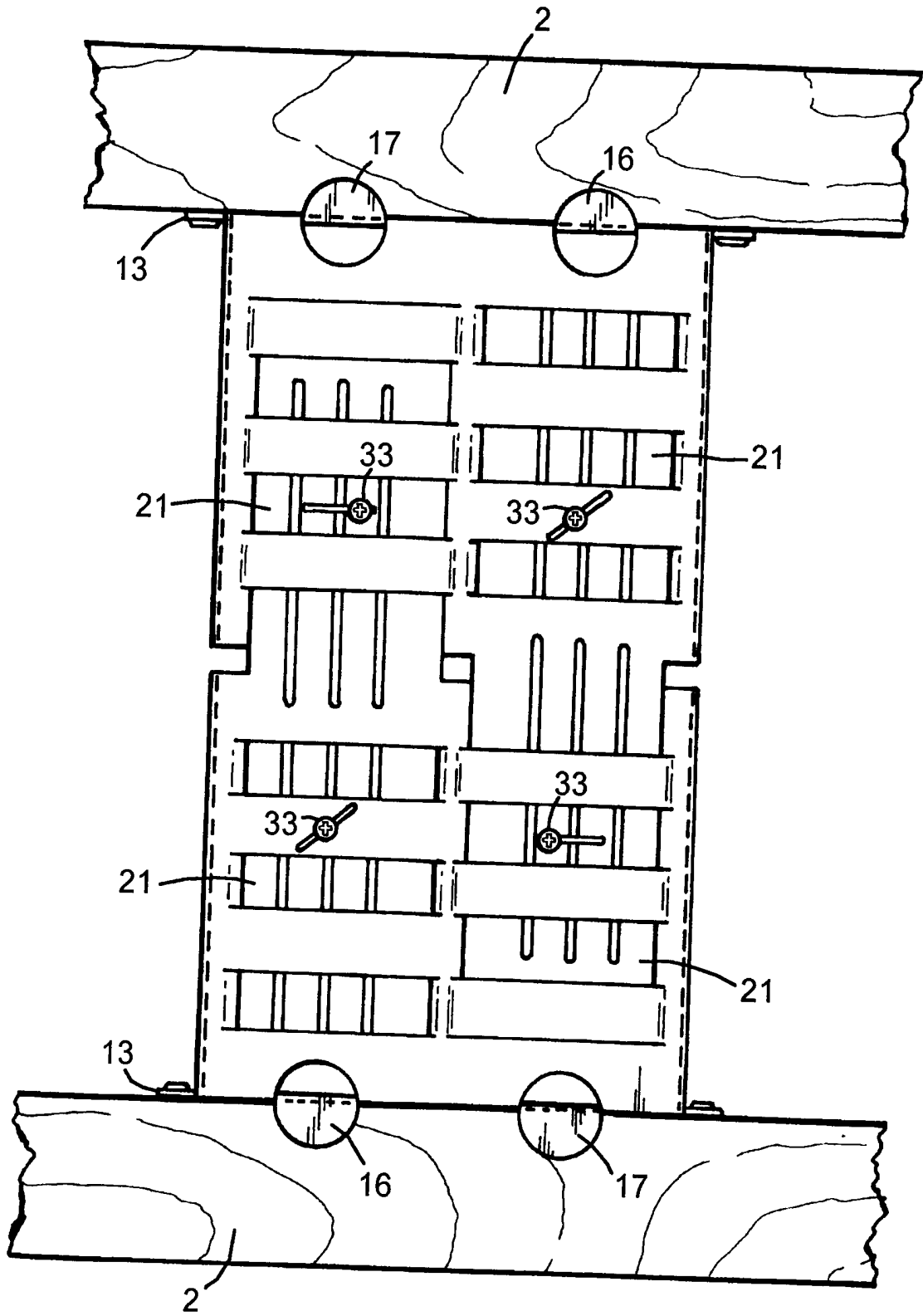


Fig. 4

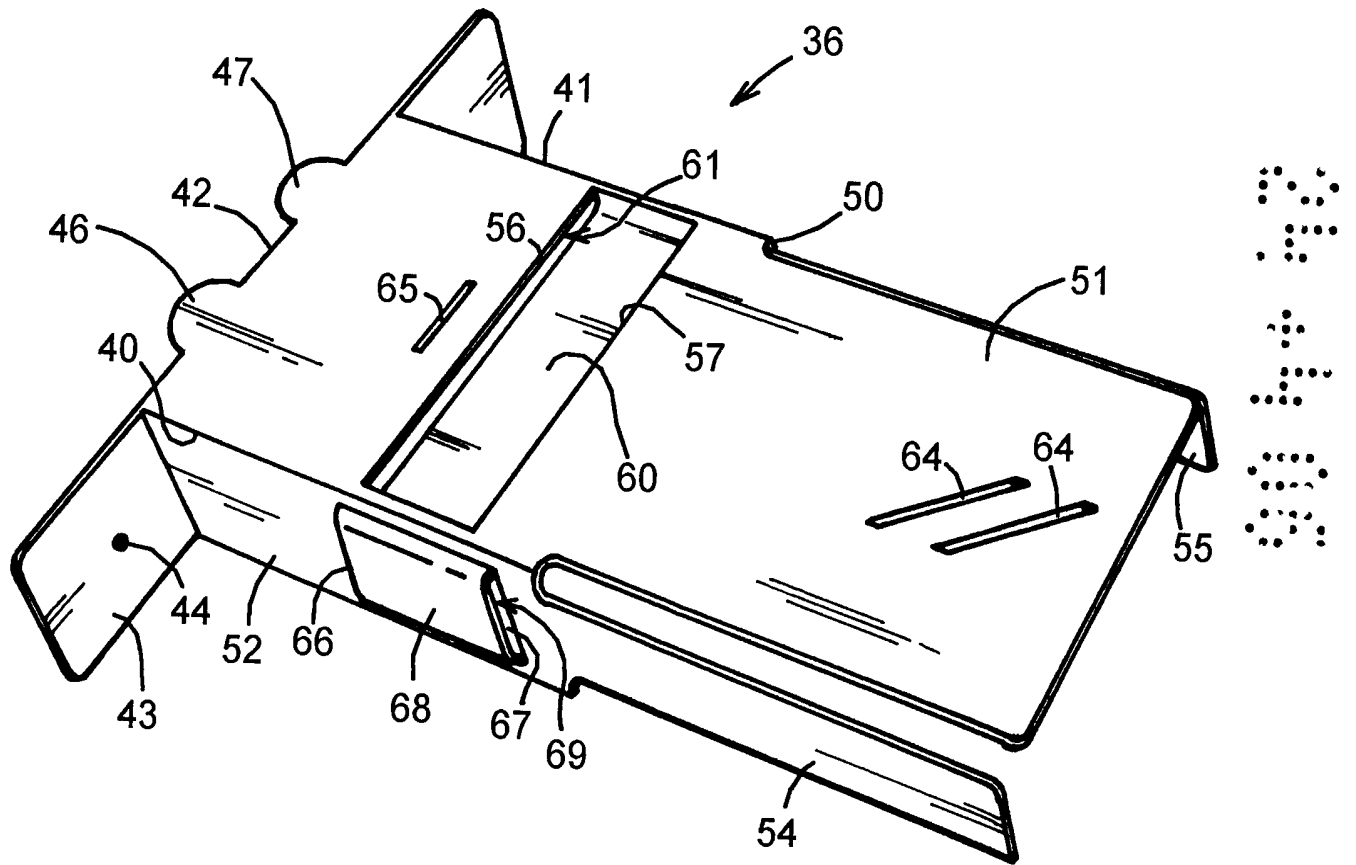


Fig. 5

Brian Richard Crout

**DECKING STRUCTURE INCORPORATING SLABS
AND SUPPORT PLATES**

TECHNICAL FIELD OF THE INVENTION

This invention relates to decking structures of the kind which have timber decking planks supported on timber joists which extend transverse to the planks and to which the planks are secured.

BACKGROUND

Such decking structures are currently very popular. They provide a useful outdoor area for living or working, which can often be installed in places where it is not possible or convenient to provide a traditional paved surface, e.g. on ground which falls away steeply. Nevertheless, many people find large decking structures visually uninteresting or unattractive. Furthermore, it is not always possible, or advisable, on timber decking to perform many activities which can be carried out on paved patio areas. For example, some kinds of barbecue should not be used on a timber surface.

The present invention aims to provide a new and inventive form of decking structure which is of enhanced visual appearance and which is also capable of extending the range of activities which can be carried out

upon the structure.

The invention further aims to provide a strong and versatile support element which is adapted for use in such a structure.

SUMMARY OF THE INVENTION

The present invention provides a decking structure having timber decking planks supported on timber joists which extend transverse to the planks and to which the planks are secured, in which at least one slab of inorganic material is supported by the joists substantially filling a space between the planks with the upper surface of the slab substantially coplanar with the upper surface of the planks.

The slabs could be formed of various inorganic materials such as concrete, stone, slate, marble etc.

Timber decking has a tendency to shrink and swell with changing environmental conditions. It has been found that the provision of at least one layer of resilient material beneath the or each slab is desirable to prevent the slabs from rocking. Such a layer also cushions the slab when subjected to heavy loads, or blows, and significantly reduces breakage of the slabs.

It is also highly desirable to provide additional support for the slabs in the form of support elements which are located between, and attached to, the joists. The support elements may be substantially flush with the tops of the joists.

The invention also provides a support element which includes a pair of slidably-engaged plate members. The plate members preferably each have fixing flanges for respective attachment to a pair of mutually spaced joists. At least one of the plate members preferably has a tongue portion which is slidably engaged with a socket portion of the other plate member. The socket portion may include generally parallel slits forming a strip which is deformed out of the general plane of the plate member. The socket portion may include a plurality of generally parallel slits dividing a portion of the plate member into a series of generally parallel strips which are deformed such that alternate strips lie on opposite faces of the tongue portion.

The strength of the support element may be increased by providing said tongue portion with at least one rib which extends generally parallel to the sliding direction. Either of the plate members may have at least one strengthening flange which extends generally parallel to the sliding direction. The or each strengthening flange preferably extends along an edge portion of the plate member transverse to the fixing flange, and in a preferred configuration each plate member has a pair of such strengthening flanges provided at opposite edges thereof.

Preferably, the support element includes provision for insertion of a fastener to prevent relative sliding of the plate members when they have been fixed to the joists. In order to allow fixing of the plate members in a continuous range of sliding positions, such provision preferably includes a pair of mutually inclined slots for receiving the fastener at the point of intersection of the slots.

Each plate member preferably has a tongue portion and a socket portion, which may be spaced apart transverse to the sliding direction. Preferably,

each plate member has plural tongue portions and plural socket portions.

BRIEF DESCRIPTION OF THE DRAWINGS

The following description and the accompanying drawings referred to therein are included by way of non-limiting example in order to illustrate how the invention may be put into practice. In the drawings:

Figure 1 is a general view, partly seen in vertical cross section, of a decking structure in accordance with the invention;

Figure 2 is a plan view of one plate member of a support plate for use in the decking structure;

Figure 3 is an end view of the plate member looking from the left in Fig. 2;

Figure 4 is a plan view of the support plate as mounted between two joists in such a decking structure; and

Figure 5 is a general view of a modified form of plate member for use in such a decking structure.

DETAILED DESCRIPTION OF THE DRAWINGS

Fig. 1 shows part of a decking structure having timber decking planks 1

supported on spaced parallel timber joists 2. The joists extend transverse to the planks, which are secured to the joists by nails, screws or other fixing means. In the drawing, a slab 3 of inorganic material is incorporated in the decking structure, filling a space between the planks 1. Although a single rectangular slab is shown for purposes of illustration, a number of slabs could be incorporated in the decking, arranged edge-to-edge in any desired pattern. Also, a number of slabs could be incorporated in separate spaces within the decking structure, either singly or in groups.

The slabs 3 could be formed of various inorganic materials, e.g. concrete, stone, slate, granite or marble. The slabs are of smaller thickness than the planks 1 and are laid upon a layer of rubber sheet 4 or similar resilient material. At least one such sheet is required, but, depending on the thickness of the sheets, the number of sheets can be adjusted to bring the upper surface of the slab 3 substantially coplanar with the upper surface of the planks 1. The resilient layer formed by the sheet or sheets 4 prevents the slabs from rocking due to slight movement of the decking timbers with changing environmental conditions. The resilient layer also cushions the slabs and reduces the risk of breakage should the slabs be subjected to heavy loads or blows in use.

In the region between the joists the sheets 4 and slabs 3 are supported by support plates 5 which are fixed between the joists. Each support plate 5 is formed from a pair of substantially identical sliding plate members, one of which is shown in **Fig.s 2 and 3**. Each plate member 6 is formed from a single sheet of metal having opposed side edges 10 and 11. An outer edge 12, which is substantially perpendicular to the side edges. 10, 11, is provided with a down-turned mounting flange 13. The opposite ends of the flange 13 extend a short distance beyond the side edges 10 and 11 to

contain respective fixing holes 14 and 15. In addition, small locating lugs 16 and 17 are punched from the plate member adjoining the outer edge 12 and bent to lie perpendicular to the flange 13, extending outwards. Additional fixing holes 18 and 19 may also be provided in the flange 13 immediately below the lugs 16 and 17, as shown.

The plate member has a fourth edge 20 which extends parallel to the outer edge 12. This edge 20 is extended to form a pair of projecting rectangular tongues 21 which are spaced apart along the edge 20. Each tongue is strengthened by spaced parallel ribs 22 which extend along the length of the tongue and continue across the edge 20. Additional strength may be provided by down-turned strengthening flanges 23 and 24 extending along the opposite side edges 10 and 11. The plate member is also formed with two sets of spaced parallel slits 26, extending parallel to the edges 12 and 20, which form two sets of generally parallel strips 30 and 31. Alternate strips 30 and 31 are deformed on opposite sides of the plate to form sockets, indicated generally at 32, through which the tongues of a second such plate member can be slid, as shown in **Fig. 4**.

By sliding the tongues 21 within the sockets 32 the spacing between the mounting flanges 13 can be varied to allow for varying spacing between the joists 2. Each of the plates is deformed slightly to allow one of the tongues to lie above and one below the other plate member, as shown. The support plates can be temporarily fixed to the joists by screws, nails or similar fixing elements inserted through the holes 18 and 19. Permanent fixing to the joist is carried out by inserting further such fixing elements through the holes 14 and 15 in the projecting ends of the flange 13. The lugs 16 and 17 rest on the top face of the joist and vertically locate the support plate to lie substantially level with the tops of the joists. Bolts and nuts or self-tapping screws 33 can be inserted through

angularly disposed slots 34 and 35 (**Fig. 2**) in the tongues 21 and strips 30, 31 to prevent relative sliding movement between the plate members once the support plate has been fixed to the joists. Additional slots 34 or 35 (not shown) can be provided to extend the distance over which the two plate members can be secured together.

By providing two pairs of overlapping tongues in the middle region of the support plate the support strength is enhanced without increasing the weight and thickness of the plate members.

It will be appreciated that each plate member may have a single tongue and a single socket. Similarly, the number of tongues and sockets may be increased to three or more per plate member.

Fig. 5 shows another form of sliding plate member. Again, two identical plate members can be used as described to form a support plate for fixing between the joists. Each plate member 36 is formed from metal sheet with opposed side edges 40 and 41 and an outer edge 42 provided with a down-turned mounting flange 43. The opposite ends of the flange 43 extend beyond the side edges 40 and 41 to contain respective fixing holes 44. Locating lugs 46 and 47 are punched from the mounting flange 43 to extend perpendicularly outwards. Additional fixing holes (not shown) may also be provided in the flange 43 if desired.

The plate member has a fourth edge 50 which extends parallel to the outer edge 42 and which is extended to form a projecting rectangular tongue 51. The tongue may be strengthened by one or more longitudinal ribs if desired. Down-turned strengthening flanges 52 extend along the opposite side edges 40 and 41, which are extended to form projecting tongues 54 and 55. The plate member is formed with a pair of spaced

parallel slits 56 and 57, extending parallel to the edges 42 and 40, to define a strip 60 which is deformed towards the underside of the plate member to form a socket 61. In addition, the strengthening flanges 52 are each formed with a pair of spaced parallel slits 66 and 67 to define a strip 68 which is deformed towards the outside of the plate member to form a socket 69.

Two of the plate members are engaged together to form a support plate by inserting the tongues 51, 54 and 55 into the corresponding sockets 61 and 69 of the opposing plate member. By sliding the plate members relative to each other the spacing between the mounting flanges 43 can be adjusted to fit between the joists 2. The support plates are fixed to the joists by inserting screws, nails or similar fixing elements through the holes provided in the flanges 43, with the lugs 46 and 47 resting on the top face of the joist. Bolts and nuts or self-tapping screws can be inserted through angularly disposed slots 64 in the tongues 51 and corresponding slots 65 in the opposing plate to prevent relative sliding movement once the support plates have been fixed to the joists. Additional slots 64 and/or 65 can be provided to extend the distance over which the two plate members can be secured together.

The forms of support plate described herein have the advantage that both plate members are substantially identical, which reduces manufacturing cost, increases the strength and simplifies assembly, but the plate members could be non-symmetrical, e.g. with one plate member having only tongues and the other having only sockets.

A single support plate may be used to support one relatively small slab, but larger slabs, or groups of slabs, will usually require a number of support plates to be affixed in a row between each pair of joists 2. The

support plates may be mutually spaced by about 10cm, providing adequate space for fixing the support plates to the joists.

Although **Fig. 1** shows opposite edges of the slab 3 being supported above the joists 2 the edges of the slabs could lie above a support plate.

It will be appreciated that the features disclosed herein may be present in any feasible combination. Whilst the above description lays emphasis on those areas which, in combination, are believed to be new, protection is claimed for any inventive combination of the features disclosed herein.

* * * * *

CLAIMS

1. A decking structure having timber decking planks supported on timber joists which extend transverse to the planks and to which the planks are secured, in which at least one slab of inorganic material is supported by the joists substantially filling a space between the planks with the upper surface of the slab substantially coplanar with the upper surface of the planks.
2. A decking structure according to Claim 1 in which the or each slab is formed of concrete, stone, slate or marble.
3. A decking structure according to Claim 1 or 2 which includes a layer of resilient material located beneath the or each slab.
4. A decking structure according to Claim 1, 2 or 3 which includes at least one support element which is located between, and attached to, the joists.
5. A decking structure according to Claim 4 in which the or each support element is substantially flush with the tops of the joists.
6. A decking structure according to Claim 4 or 5 in which the or each support element includes a pair of slidably-engaged plate members.
7. A decking structure according to Claim 6 in which the plate members each have fixing flanges for respective attachment to a pair of mutually spaced joists.
8. A decking structure according to Claim 6 or 7 in which at

least one of the plate members has a tongue portion which is slidably engaged with a socket portion of the other plate member.

9. A decking structure according to Claim 8 in which the socket portion includes generally parallel slits forming a strip which is deformed out of the general plane of the plate member.

10. A decking structure according to Claim 9 in which the socket portion includes a plurality of generally parallel slits dividing a portion of the plate member into a series of generally parallel strips which are deformed such that alternate strips lie on opposite faces of the tongue portion.

11. A decking structure according to any of Claims 8 to 11 in which the or each tongue portion is provided with at least one rib which extends generally parallel to the sliding direction.

12. A decking structure according to any of Claims 6 to 11 in which at least one of the plate members has at least one strengthening flange which extends generally parallel to the sliding direction.

13. A decking structure according to Claim 12 in which the or each strengthening flange extends along an edge portion of the plate member transverse to the fixing flange.

14. A decking structure according to Claim 12 or 13 in which both plate members have a strengthening flange extending generally parallel to the sliding direction.

15. A decking structure according to Claim 15 in which each

strengthening flange has a tongue portion and a socket portion which are spaced apart transverse to the sliding direction.

16. A decking structure according to any of Claims 12 to 15 in which each plate member has a pair of such strengthening flanges provided at opposite edges thereof.
17. A decking structure according to any of Claims 6 to 16 in which the support element includes provision for insertion of a fastener to prevent relative sliding of the plate members when they have been fixed to the joists.
18. A decking structure according to Claim 17 in which such provision includes a pair of mutually inclined slots for receiving the fastener at the point of intersection of the slots.
19. A decking structure according to Claim 8 to 18 in which each plate member has a tongue portion and a socket portion.
20. A decking structure according to Claim 19 in which the tongue and socket portions of each plate member are spaced apart transverse to the sliding direction.
21. A decking structure according to Claim 19 or 20 in which each plate member has plural tongue portions and plural socket portions.
22. A decking structure substantially as described with reference to the drawings.

* * * * *

Application No: GB0601228.0

Examiner: Mr Anders Bak Sørensen

Claims searched: 1-22

Date of search: 12 June 2006

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
Y	1-4	US4028858 A (REHBEIN) See abstract, column 1, line 56-60, column 2, line 19-20, figure 1 and 2.
Y	1-4	US5361554 A (BRYAN) See figure 1 and 2.
Y	1-4	WO02/02885 A1 (POTTER) See abstract, page 3, lines 17-29, page 4 lines 17-26, and figure 1-5.
Y	1-3	GB2377460 A (ARMOND et al.) See abstract, page 3, lines 18-19 and figure 5.
Y	1,2,4	JP09250195 A (ASAHI CHEM IND) See EPO abstract and figure 1 and 2.
Y	1,2,4	GB0507394 A (ALBERT) See figure 1.
Y	1,2	JP04052349 A (ONODA ALC KK) See EPO abstract and figure 1 and 2.
Y	1,2	US2002/0194806 A1 (ROEN) See section [0042] and figure 8.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

E04B; E04F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI