(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 231 325 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.08.2002 Bulletin 2002/33

(51) Int Cl.[7]: **E01C 9/08**

(21) Application number: **02075396.8**

(22) Date of filing: **31.01.2002**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **13.02.2001 NL 1017348**

(71) Applicant: **Stabag PCP B.V.**
4731 TA Oudenbosch (NL)

(72) Inventor: **Klijnstra, Tjipke Gerard**
8071 KJ Nunspeet (NL)

(74) Representative: **Brookhuis, Hendrik Jan Arnold**
Exter Polak & Charlouis B.V.,
P.O. Box 3241
2280 GE Rijswijk (NL)

(54) Panel system

(57) A panel system for creating a temporary floor, which in particular can be walked on, over an area of ground, in particular over a building site.

The system comprises a plurality of substantially rectangular panels, which can be assembled, with their sides adjoining one another, to form a floor, and coupling means for releasably coupling adjacent panels in the region of their adjoining sides.

The system further comprises a support element, which is designed to rest - in the area of the adjoining sides of two panels which are to be coupled - on the area of ground beneath the panels. The coupling means are designed to create a coupling between the two panels which are to be coupled via the support element.

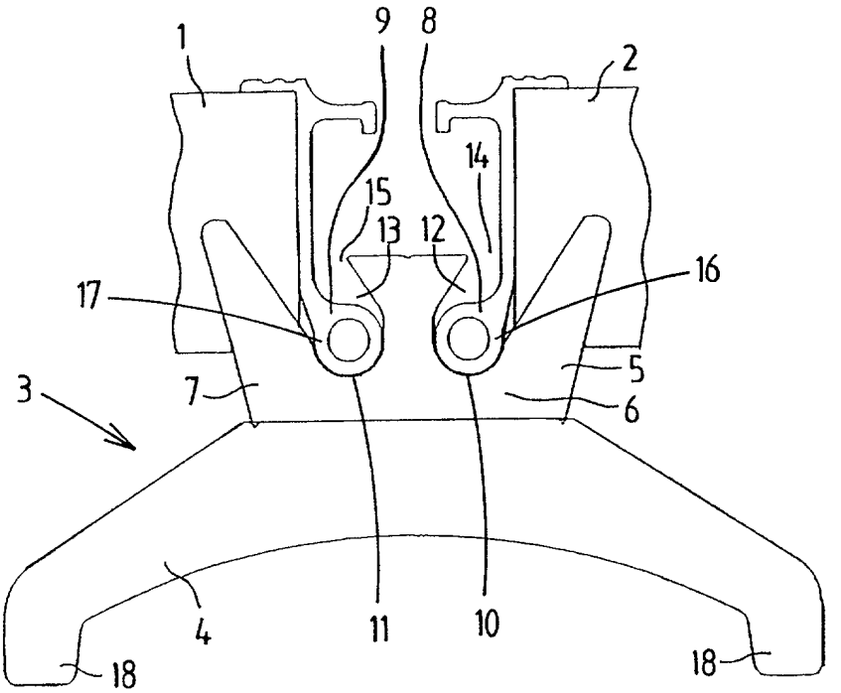

Fig 1a

EP 1 231 325 A2

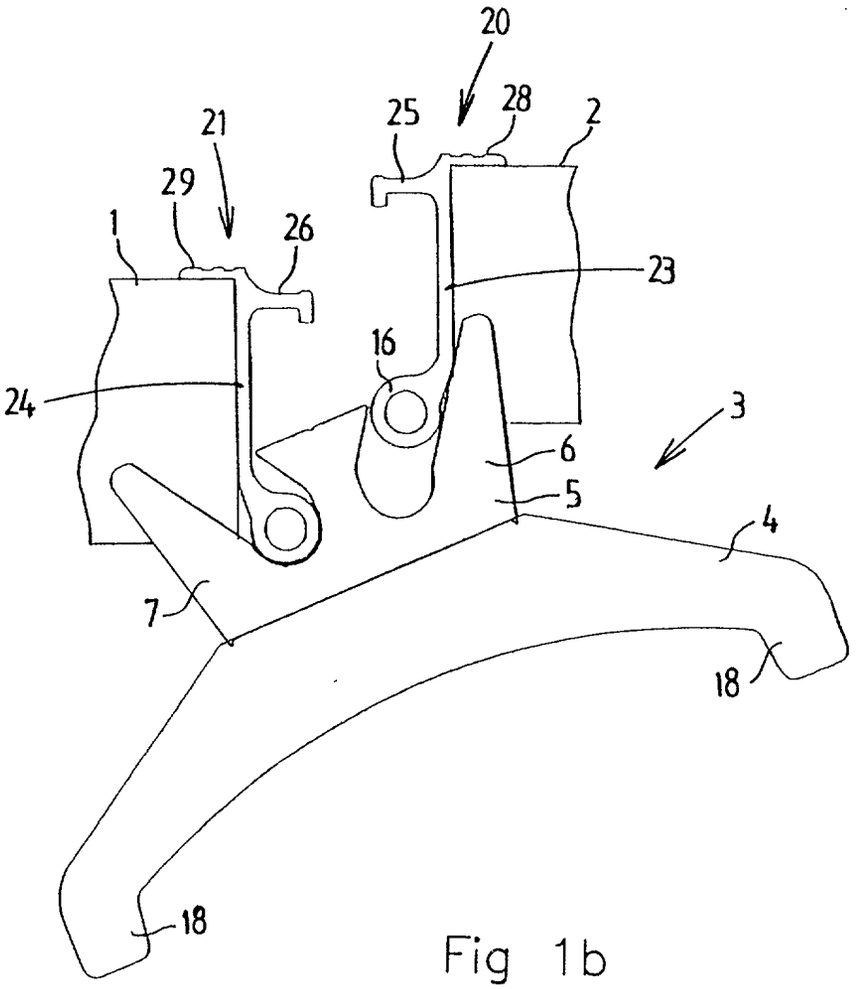

Fig 1b

Description

[0001] The present invention relates to a panel system for providing a supporting, temporary floor, which in particular can be walked on, over an area of ground, in particular over a building site. The panel system comprises a plurality of substantially rectangular panels, which can be assembled with their sides adjoining one another to form a floor, and coupling means for releasably coupling adjacent panels in the region of their adjoining sides.

[0002] A panel system according to the preamble of claim 1 is known in various embodiments.

[0003] US 4 440 363 and DE 32 18 155 show known systems in which coupling elements are provided, which have to be fitted into holes in the top side of the panels which are to be coupled. These coupling members are impractical to use, can easily be lost and are susceptible to damage.

[0004] EP 0 135 749 shows a system in which each panel is provided, on opposite sides, with a first coupling member and a second coupling member, respectively. The first coupling member of a panel can be brought into positively-locking engagement with the second coupling member of the adjoining panel. In this known system, the coupling members are formed integrally on the panel, so that a number of drawbacks of the systems which were known at the time are avoided. However, a significant drawback of the system which is known from EP 0 135 749 is that the system does not allow an easy removal of a panel lying between two other panels. This is desirable if, for example, the system has been used to lay a path which can be walked on over a building site and the path has to be broken up locally in order for a crane, lorry, pipe which is to be laid, etc. to pass through.

[0005] It is an object of the present invention to provide an improved panel system.

[0006] The present invention achieves this object by providing a panel system according to claim 1.

[0007] The panel system according to the invention provides for the use of support elements which each rest, in the region of the adjoining sides of two coupled panels, on the area of ground beneath the panels. The fact that the support elements can be tilted makes it possible to remove a panel from the support element while the adjoining panel remains coupled to the corresponding support element. This creates the desired possibility of removing one panel from a series of panels without having to detach the entire series. Furthermore, the tilting-axis design between the panels and the support element also offers the option of adapting the temporary floor to unevenness in the area of ground.

[0008] The tilting movement of the support element which is required for detaching a panel can be obtained by tilting the support element itself and/or by lifting a panel - at the side which is to be removed - with the result that the support element tilts.

[0009] The system may comprise a tilting lever which is integral with the support element or can be detachably connected thereto, for the purpose of tilting the support element.

[0010] The system may comprise a lifting/bearing member which can be coupled to a panel for lifting and/or bearing the panel. The lifting/bearing member is provided for example, with a handle and a rod, so that there is no need to bend over.

[0011] Preferably, a support element has an elongate foot on its underside, with a length which preferably approximately corresponds to the length of the sides of the panels which are to be coupled.

[0012] The width of the elongate foot is preferably between 10 centimetres and 30 centimetres, so that the foot has a sufficient supporting area but equally the width of the foot does not make tilting unnecessarily difficult.

[0013] Preferably, the elongate foot has longitudinal ribs which project downwards on its longitudinal sides, so that effective support for the panels can be achieved in soft ground.

[0014] The foot is preferably made from (recycled) plastics material, in order to maintain a low weight of the foot.

[0015] In a preferred embodiment, as described in claim 2, there is provision for the first coupling members arranged on the support element each to form a support socket, as well as a slot which adjoins the support socket and has an associated opening, the openings of the first coupling members lying at a higher level than the support sockets and also lying further apart than the support sockets, as seen in the horizontal direction, and the second coupling members each comprising a mating support element which can be introduced into the slot of the associated first coupling member via the opening and fits into the support socket.

[0016] In an alternative embodiment, as described in claim 13, it is provided that the second coupling member arranged on a panel forms a support socket, as well as a slot which adjoins the support socket and has an associated opening, the opening of the second coupling member lying at a lower level than the support socket and further towards the outside than the support socket, as seen in the horizontal direction, and the first coupling members each comprising a mating support element, which can be introduced into the slot of the associated second coupling member via the opening and fits into the support socket.

[0017] Further advantageous embodiments of the system according to the invention, as well as associated coupling pieces, will be explained in more detail below with reference to the drawing, in which:

Fig. 1a shows a side view of a part of two panels and a support element of a preferred embodiment of the panel system according to the invention in the coupled state,

Fig. 1b shows the panels and the support element

from Fig. 1a during the uncoupling of a panel,
Fig. 2 shows a front view of a panel and the support element coupled thereto according to Figure 1a,
Fig. 3a shows a side view of a part of two panels and a support element of an alternative embodiment of the panel system according to the invention in the coupled state,
Fig. 3b shows the panels and the support element from Figure 3a immediately after a panel has been uncoupled,
Fig. 4a shows a side view of a panel as shown in Figures 1a, 1b, as well as a coupling member which can be hooked on,
Fig. 4b shows the coupling member from Figure 4a in a view in the direction indicated by arrow IV in Figure 4a,
Fig. 5a shows a side view of a coupling piece and a panel of the system according to the invention, and
Fig. 5b shows the coupling piece from Figure 5a in the direction indicated by arrow V in Figure 5a.

[0018] A preferred embodiment of the panel system according to the invention will be described below with reference to Figures 1a, 1b and 2.

[0019] The panel system is intended to create a load-bearing floor, which in particular can be walked on, and which can be laid temporarily over an area of ground, in particular on a building site. Fitting a floor or walkway of this type on a building site makes it possible to prevent the construction workers having to put up with an uneven surface on the building site, with water and with mud; in brief, working conditions can be improved. It is also possible to prevent construction materials and tools from becoming dirty and damaged.

[0020] The panel system comprises a plurality of substantially rectangular panels, which can be assembled with their sides adjoining one another to form a floor. The panels may be of a width which is such that a series of panels which lie in line with one another form a walkway which can be walked upon, as is the case in the current example (cf. Figure 2). For a wider floor area, or if the panels are narrow, it is, of course, possible to lay a plurality of panels next to one another. As will become apparent later on, advantageous embodiments of the system provide for all possible arrangements of the floor.

[0021] Part of two identical panels 1, 2 is shown in Figures 1a, 1b. In this example, the panels 1, 2 are made from aluminium, but other embodiments, for example panels made from steel or wood (in part) are, of course, also possible. The panels 1, 2 are preferably provided with a nonslip profiling.

[0022] It can be seen from Figure 2 that in this example a single panel 2 is obtained from a plurality of panel sections which lie next to one another and are provided at their longitudinal edges with a downwardly facing flange which, at the bottom, has been formed into a beaded edge. The panel sections are permanently secured to one another in an appropriate way.

[0023] To prevent the panels 1, 2 from shifting and to form a stable floor, there is provision for coupling means, which are to be explained in more detail, to be used for releasably coupling adjacent panels 1, 2 in the region of their end sides which adjoin one another.

[0024] It can be seen from Figures 1a, 1b and 2 that the system comprises a support element 3 which is designed to rest - in the region of the adjoining sides of two panels 1, 2 which are to be coupled - on the area of ground beneath the panels 1, 2. In the embodiment shown, the support element 3 primarily comprises an elongate foot 4 of a length which, in the example shown, is slightly greater than the width of the panel 2.

[0025] The foot 4 is provided, on both its longitudinal edges, with a downwardly projecting rib 18. In the vicinity of each end of the foot 4, a first coupling-member assembly 5 with two first coupling members 6, 7 is arranged on the top side of the foot 4. These first coupling members 6, 7 are rigid, i.e. are designed as rigid elements without movable components. When the floor is complete, the support element 3 and the two first coupling member assemblies 5 are situated beneath the panels 1, 2.

[0026] A rigid second coupling member 9, 8 is arranged at each end of the panels 1, 2.

[0027] An assembly 5 of first coupling members 6, 7 arranged on the support element 3 is in this case formed by a block-like body, for example made from aluminium. For each first coupling member 6, 7, a support socket 10, 11 is formed in the block, as well as a slot 12, 13 which adjoins the support socket 10, 11, extends obliquely upwards from the support socket 10, 11 and has an associated opening 14, 15. The slots 12, 13 run in opposite directions with respect to an imaginary vertical centre plane through the support element 3.

[0028] The openings 14, 15 of the first coupling members 6, 7 lie at a higher level than the support sockets 10, 11 and are further apart than the support sockets 10, 11, as seen in the horizontal direction.

[0029] The s second coupling members 8, 9 are likewise rigid, i.e. are designed without moving components. The second coupling members 8, 9 each comprise a mating support element 16, 17 which can be introduced from the top, via the opening 14, 15, into the slot 12, 13 of the associated first coupling member 6, 7 and fits into the support socket 10, 11.

[0030] In this example, each mating support element 16, 17 is part of an extruded aluminium profiled-section element 20, 21 which is arranged at the end edge of the panel 1, 2. In this case, the profiled-section element 20, 21 has a vertical flange 23, 24, which at its under side curves outwards and then adjoins the mating support element 16, 17 which is integral therewith.

[0031] The mating support element 16, 17 is in this case tubular with a substantially cylindrical outer periphery. The associated support socket 10, 11 has a support-

socket wall which, in a bottom part thereof, is substantially semicircular, with a diameter which matches the diameter of the mating support element 16, 17.

[0032] At the level of the top side of the panel 2, the profiled-section element 20, 21 has an outwardly projecting cover flange 25, 26 which is situated above the mating support element 16, 17.

[0033] The tubular mating support element 16, 17 is situated in the vicinity of the bottom edge of the panel 1, 2 and even projects slightly below this level. The round shape of the mating support element 16, 17 is advantageous when the panel 1 is being carried by hand.

[0034] The design of the profiled-section element 20, 21 is preferably such that - when panels 1, 2 are stacked on top of one another - the mating support element 20, 21 rests on the cover flange 25, 26 of a panel below it.

[0035] Each profiled-section element 20, 21 also has an overlapping flange 28, 29 which extends over an edge region of the top side of the panel 2, 1. Furthermore, the associated cover flange 25, 26 is provided at a lower level than the overlapping flange 28, 29. The result of this is that any difference in height between the two panels 1, 2 caused by unevenness on the building site does not give rise to a dangerous step at the transition from one panel to the next.

[0036] In this example, the profiled-section elements 20, 21 extend over the entire length of the end side of the panels 2, 1. In a variant, a plurality of short mating support elements are arranged on the corresponding side of the panel.

[0037] It is readily apparent from Figure 1a that, when the floor is being installed, the support element 3 can be placed onto the area of ground, and then the second coupling member 8, 9 of a panel 1, 2 can be brought into positively-locking engagement with the associated first coupling member 6, 7. For this purpose, it is sufficient for the tubular part 16, 17 of each profiled-section element 20, 21 to be arranged above the associated opening 14, 15 and then to be lowered into the associated support socket 10, 11 via the slot 12, 13.

[0038] The positively-locking engagement may also allow a certain degree of play, but is such that each panel 1, 2 is locked with respect to the support element 3 resting on the area of ground, both in the plane of the panel and in the vertical direction. It can be seen from Figures 1a, 1b that the slots 12, 13 are each delimited by an inner slot wall and an outer slot wall, the outer slot wall extending to a greater height than the inner slot wall. This embodiment makes it easier to introduce the mating support elements 16, 17 into the openings 14, 15 and is also advantageous when the coupling is being released.

[0039] The locking of the panels 1, 2 is such that the panels 1, 2 cannot move upwards with respect to the support element 3. This locking is produced by the fact that the openings 14, 15 lie further towards the outside than the support sockets 10, 11 so that a vertical upward movement of the mating support elements 16, 17 is blocked by the inner slot walls.

[0040] The first and second coupling members which engage in one another, as can be seen in Figure 1a, also form a tilting axis, which extends substantially parallel to the corresponding side of each of the panels 1, 2, to allow tilting of the support element 3 with respect to the panel 1, 2.

[0041] It can be seen from Figure 1b that the positively locking engagement of the coupling members 6, 8, i.e. the coupling of panel 2 to support element 3, can easily be released by tilting the support element 3 about the tilting axis which is formed by the coupling members 7, 9 engaging in one another, forming the coupling between the respective support element 3 and the other panel 1, and lifting the panel 2 which is to be removed with respect to the support element 3. As a result of the tilting of the support element 3, the opposite support 16 can now be moved upwards out of the support socket 10, through the slot 12, and can come out of the first coupling member 5 at the opening 14. The tilting of the support element 3 can be achieved by tilting the support element 3 itself and/or by lifting the panel 2 at the end side which is to be detached. It should be noted that when the relevant end side of the panel 2 is being lifted, the said panel 2 can pivot, at its other end side, about the tilting axis which is formed by the support element which is present on this side and the panel 2.

[0042] For tilting, it is possible to use a separate tilting lever which is brought into engagement with the support element 3, or alternatively a lever of this type may be permanently fitted to the support element 3.

[0043] It will be clear that the tilting of the support element 3 which is shown in Figure 1b takes place only if this tilting is desired. Usually, the weight of the panels 1, 2 will be sufficient to ensure that the tilting will not occur when it is not desired.

[0044] Obviously, other solutions for achieving the tilting are also conceivable, in which case it is also conceivable for the foot 4 to remain resting flat on the area of ground and for only the assemblies 5 to execute the tilting movement. However, it is preferable for the assemblies 5 to be mounted rigidly on the support element 3, on account of the robustness and cost price.

[0045] It will be clear that, in a variant which is not shown, the first coupling members 6, 7 may be formed by a profiled section, for example an extruded section, which extends over a considerable part of the length, or the entire length, of the support element 3.

[0046] Another embodiment of the panel system according to the invention will now be explained with reference to Figures 3a, 3b. In Figures 3a, 3b, components which correspond to the components shown in Figures 1a, 1b are provided with identical reference numerals. In essence, the embodiment which will now be explained forms the inverted version of the preferred embodiment described above.

[0047] It can be seen from Figures 3a, 3b that a second coupling member 50, 51 is arranged on the end

sides of each panel 1, 2, with a support socket 52, 53 which is accessible from below. Each support socket 52, 53 is adjoined by a slot which, as seen from the support socket, is directed obliquely downwards, towards the outside in the direction away from the panel 1, 2. At the bottom, each slot ends at an associated opening, the opening being at a lower level than the support socket 52, 53 and lying further towards the outside than the support socket, as seen in the horizontal direction.

[0048] In this case, a profiled-section element 60, for example an extruded section, is arranged on the support element 3 and in this case extends over the entire length of the support element 3. The profiled-section element 60 forms the two first coupling members, which each comprise a tubular mating support element 61, 62. The tubular mating support elements 61, 62 are provided on the top longitudinal edges of a U-shaped web of the profiled-section element 60.

[0049] It will be clear that a panel 1, 2, with its second coupling member 50, 51 in positively-locking engagement with the associated mating support element 61, 62, provides coupling of the panels 1, 2 in the plane of the panels 1, 2 in this "inverted" design as well, and also prevents the panels 1, 2, once they have been laid, from being able to move upwards when this is not intended.

[0050] It is preferable for each panel 1, 2 to be provided with second coupling members 50, 51 on two opposite sides, and for the other sides not to be provided with integrated coupling members. Nevertheless, it may be desirable to effect a coupling between two panels of the type shown in Figures 1a, 1b which are at right angles to one another. To allow this to take place, the system provides a hook-on coupling member 70 as shown in Figures 4a, 4b. This coupling member 70 has a hook member 71 for securely hooking the coupling member 70 to a side of a panel 1, 2 which is not provided with a second coupling member.

[0051] By way of example, the panels 1, 2 are provided on the top side with perforations, the hook member 71 being provided with a locking projection 72 which fits into a perforation.

[0052] In practice, it may also be desirable to couple panels 1, 2 whose long sides lie next to one another, which long sides are not provided with integrated second coupling members. For this situation, a coupling piece is provided for coupling sides of adjacent panels 1, 2 which are not provided with second coupling members. One example of a coupling piece 80 of this type is shown in Figures 5a, 5b.

[0053] The coupling piece 80 has a vertical flange 81 which is positioned between the sides of the panels 1, 2 which are to be coupled, and also a top flange 82, which covers the adjacent edge regions of the top side of the panels, and a bottom flange 83 which extends beneath the adjacent edge regions of the underside of the panels.

[0054] If the panels 1, 2 are provided with perforations on the top side, as shown in Figure 5a, the top flange 82 is advantageously provided with locking projections 84 which fit into a perforation in a panel.

[0055] The invention also provides a solution in which a single support element bears a plurality of, preferably two, adjacent panels, so that the panels can be kept narrow and therefore easy to handle.

Claims

1. Panel system for creating a temporary floor, which in particular can be walked on, over an area of ground, in particular over a building site, comprising:

   - a plurality of substantially rectangular panels (1, 2), which can be assembled, with their sides adjoining one another, to form a floor, and
   - coupling means for releasably coupling adjacent panels in the region of their adjoining sides,

   characterized in that the system comprises a support element (3), which is designed to rest - in the area of the adjoining sides of two panels which are to be coupled - on the area of ground beneath the panels,
   in that the coupling means are designed to create a coupling between the two panels (1, 2) which are to be coupled via the support element (3),
   in that the coupling means for coupling each of the panels to the support element comprise a first coupling member (6, 7) and a second coupling member (8, 9), which are respectively arranged on the support element and the panel,
   which first and second coupling members can be brought into positively-locking engagement, in such a manner that the panel is locked in the plane of the panel and in the vertical direction with respect to the support element (3) resting on the area of ground, and in such a manner that the first and second coupling members which engage in one another also form a tilting axis, which extends substantially parallel to the corresponding side of the panel, for allowing possible tilting of the support element with respect to the panel (1, 2),
   and which first and second coupling members (6, 7, 8, 9) are designed in such a manner that the positively-locking engagement between them can be released by the support element (3) being tilted about the tilting axis which is formed by the coupling members engaging inside one another so as to couple the relevant support element to the other panel and by the panel which is to be removed being lifted with respect to the support element.

2. Panel system according to claim 1, in which the first coupling members arranged on the support element

each form a support socket (10, 11) and a slot (12, 13) which adjoins the support socket and has an associated opening (14, 15), the openings of the first coupling members lying at a higher level than the support sockets and further apart, as seen in the horizontal direction, than the support sockets, and in which the second coupling members each comprise a mating support element (16, 17) which can be introduced into the slot of the associated first coupling member via the opening (14, 15) and fits into the support socket (10, 11).

3. Panel system according to claim 2, in which the slot (12, 13) of the first coupling member is delimited by an inner slot wall and an outer slot wall, the outer slot wall extending to a greater height than the inner slot wall.

4. Panel system according to claim 2 or 3, in which the mating support element (16, 17) has a cylindrical outer periphery, and in which the support socket (10, 11) has a support-socket wall which, in a bottom part thereof, is substantially semicircular, with a diameter which matches the diameter of the mating support element.

5. Panel system according to one or more of claims 2-4, in which the mating support element (16, 17) extends over the length of the side of the panel, and in which the mating support element (16, 17) is preferably part of a, preferably extruded, profiled-section element which is arranged on the side of the panel.

6. Panel system according to one or more of the preceding claims, in which the mating support element (16, 17) is part of a profiled-section element which is arranged on the side of the panel, and in which the profiled-section element has a vertical flange (23, 24) which, at its underside, curves outwards, where it adjoins the mating support element.

7. Panel system according to claim 6, in which the profiled-section element, at the height of the top side of the panel, has an outwardly projecting cover flange (25, 26), which is located above the mating support element, and in which - when panels (1, 2) are stacked on top of one another - the mating support element preferably rests on the cover flange of a panel below it.

8. Panel system according to claim 6 or 7, in which the profiled-section element has an overlapping flange (28, 29) which extends over an edge region of the top side of the panel, and in which the cover flange is provided at a lower level.

9. Panel system according to one or more of the preceding claims, in which the first coupling members (10, 11) of a support element (3) are provided at locations which are spaced apart in the longitudinal direction of the support element, or in which the first coupling members are formed by a profiled section which extends over a considerable part of the length of the support element.

10. Panel system according to claim 1, in which the second coupling member arranged on a panel forms a support socket, as well as a slot, which adjoins the support socket, with an associated opening, the opening of the second coupling member lying at a lower level than the support socket and further outwards than the support socket, as seen in the horizontal direction, and in which the first coupling members each comprise a mating support element which can be introduced into the slot of the associated second coupling member via the opening and fits into the support socket, the mating support elements if appropriate forming part of a single profiled section which extends over the length of the support element.

11. Panel system according to claim 10, in which the mating support element has a cylindrical outer periphery, and in which the support socket has a support-socket wall which, in a top part thereof, is semicircular, with a diameter which matches the diameter of the mating support element.

12. Panel system according to one or more of the preceding claims, in which each panel is provided, on two opposite sides, with second coupling members.

13. Panel system according to one or more of the preceding claims, in which a coupling member (70) which can be hooked on is also provided, which has a hook member for securely hooking the coupling member to a side of a panel which is not provided with a second coupling member and which can be coupled to a second coupling member, which is arranged on a different panel, the hook member - if the panel is provided with perforations on the top side - being provided with a locking projection which fits into a perforation.

14. Panel system according to one or more of the preceding claims, in which a coupling piece (80) is also provided for coupling sides of adjacent panels which are not provided with second coupling members, which coupling piece (80) preferably has a vertical flange which is positioned between the sides of the panels which are to be coupled, and a top flange, which covers the adjoining edge regions of the top side of the panels, and a bottom flange, which extends beneath the adjoining edge regions of the underside of the panels.

15. Panel system according to claim 14, in which the panels are provided, on the top side, with perforations, and in which the top flange is provided with locking projections, which fit into a perforation in a panel.

16. Support element as set forth in one or more of the preceding claims which is to be positioned on the area of ground.

17. Panel as set forth in one or more of the preceding claims.

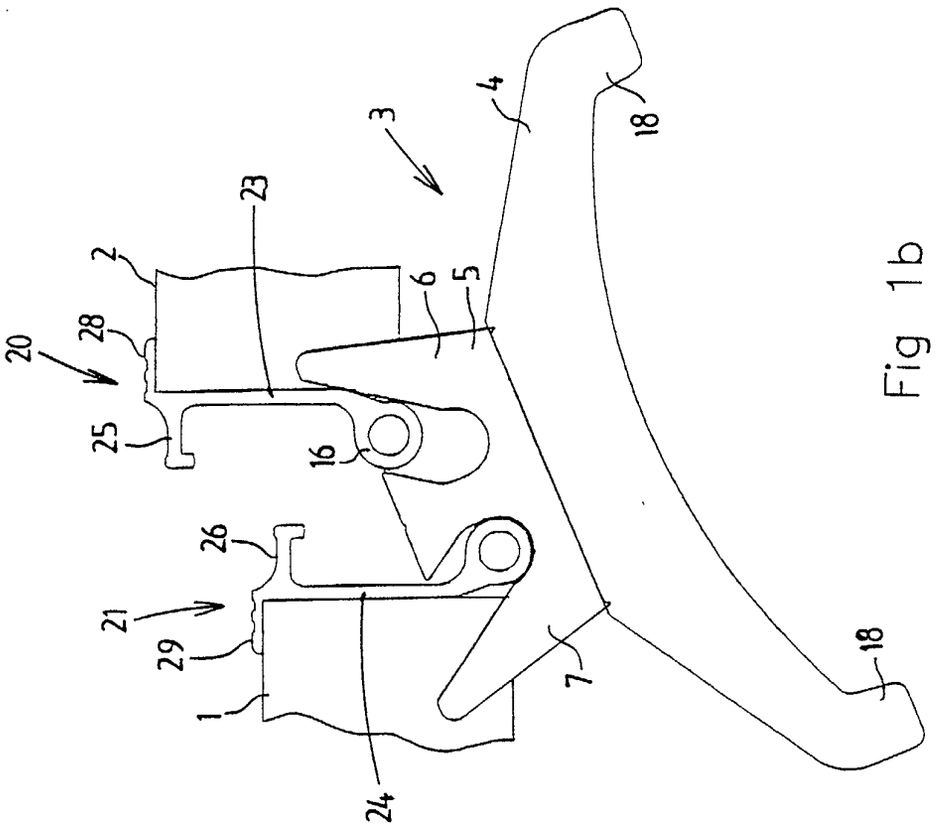
20
28
25
2
23
3
4
18
6
5
16
26
21
29
1
24
7
18

Fig 1b

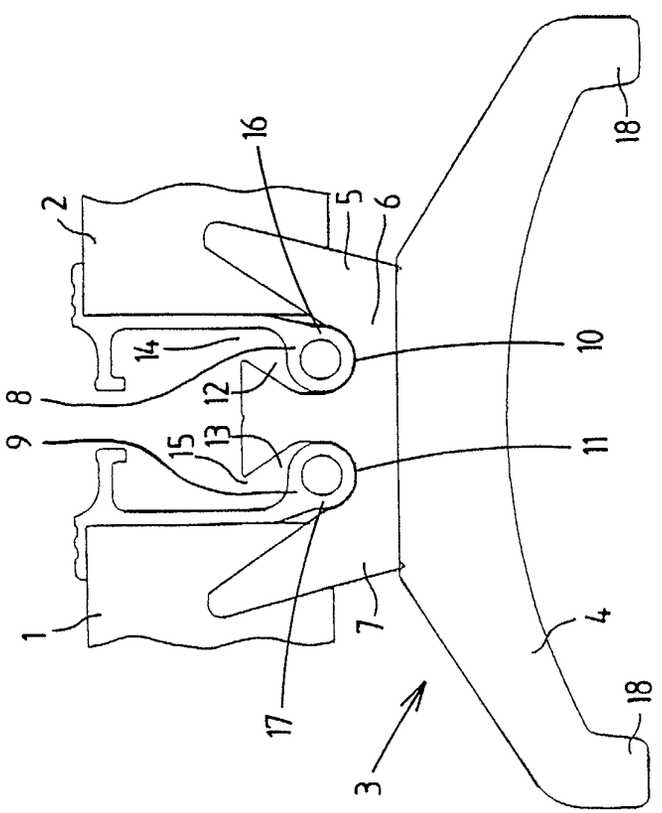
16
2
5
6
18
14
10
8
12
9
15
13
11
1
7
4
17
3
18

Fig 1a

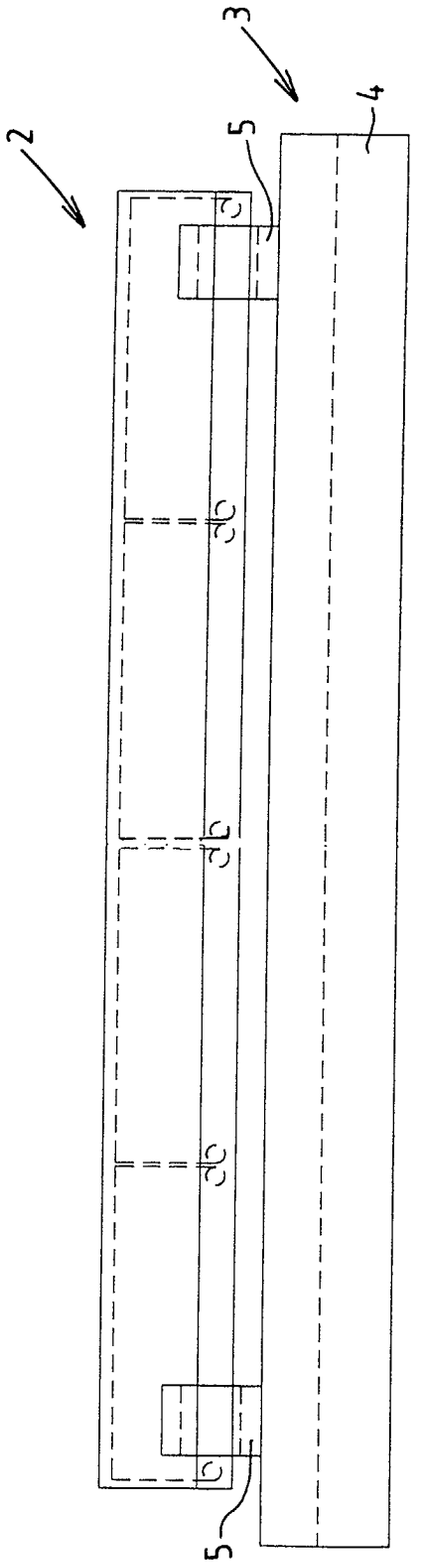

Fig 2

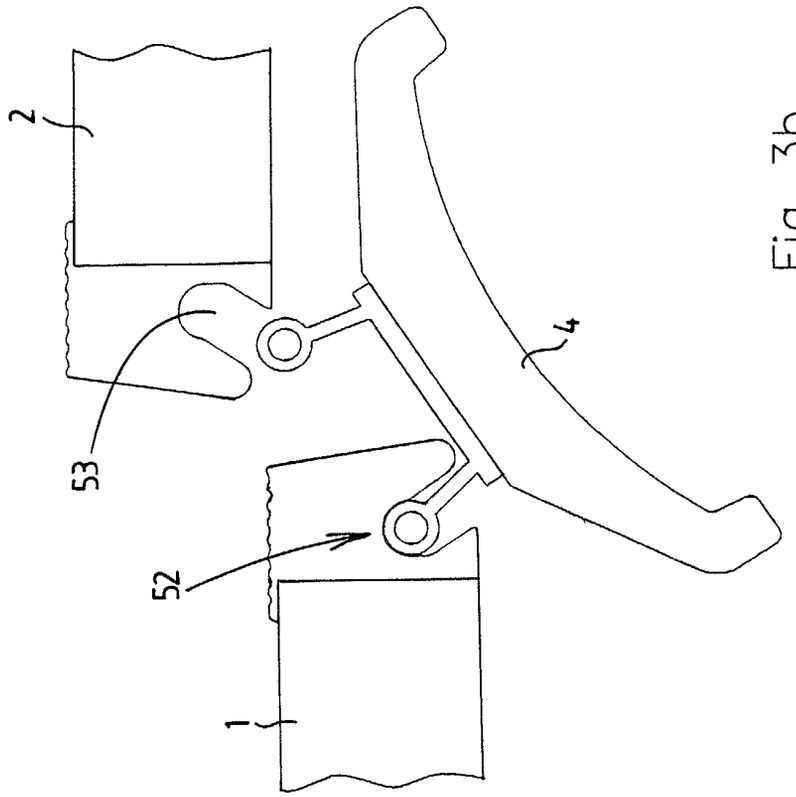

Fig 3b

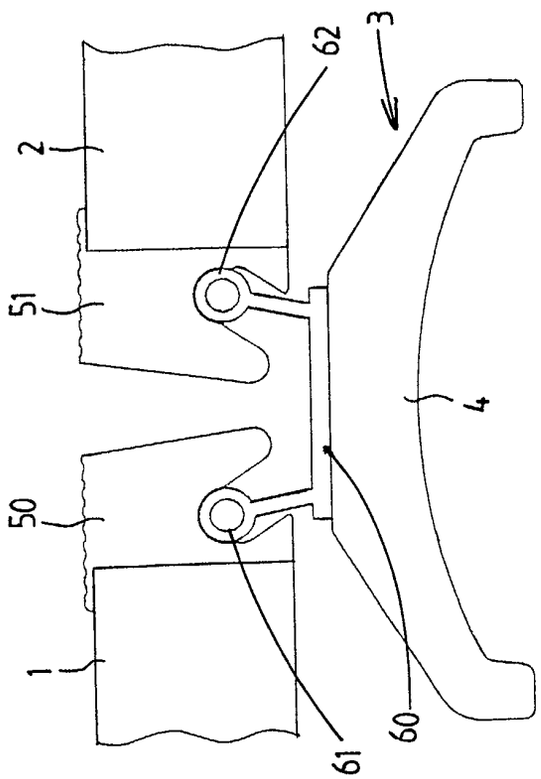

Fig 3a

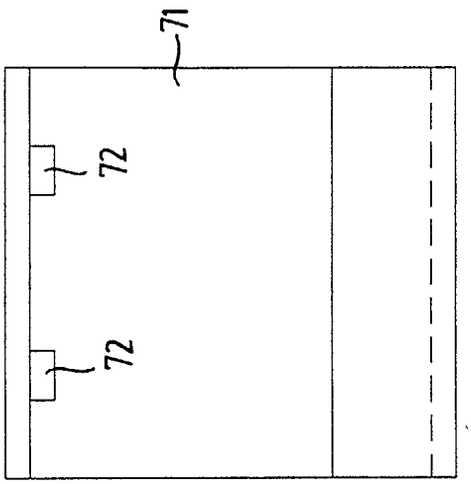

Fig 4b

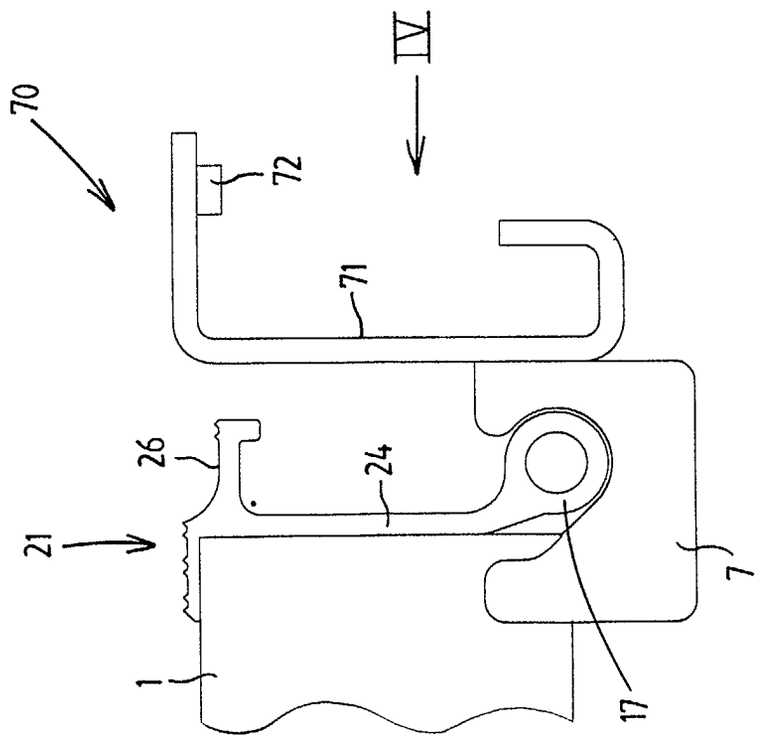

Fig 4a

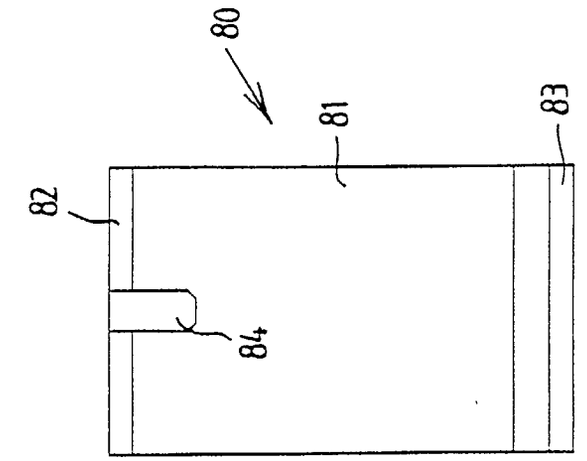

Fig 5b

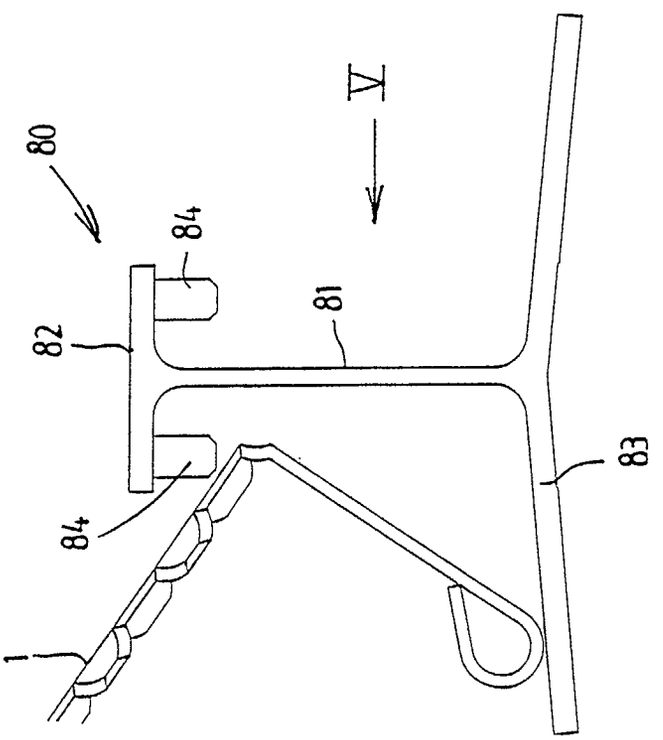

Fig 5a