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(54) **Platform which is suitable for use in combination with a scaffold**

(57) Platform (1) which is suitable for use in combination with climbing equipment, comprising a frame (2) which can be coupled to the climbing equipment and a panel (3) which is supported by the frame (2), in which

platform the panel (3) is a sandwich structure comprising a core (11, 12) of thermoplastic material and fibre-reinforced skins (14, 16) of thermoplastic material which are partially fused to the core (11, 12) on respective principal sides of the core (11, 12).

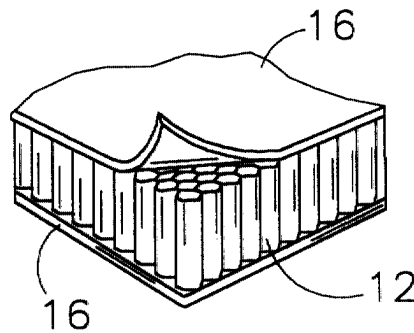


Fig 4

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Description

[0001] The invention relates to a platform which is suitable for use in combination with a scaffold, comprising a frame which can be coupled to the scaffold and a panel which is supported by the frame.

[0002] A platform of the abovementioned type for use in combination with a rolling scaffold is known in practice. The frame of the known platform generally consists of aluminium, and the panel is generally a sheet of multiply wood, such as water-resistant adhesive-bonded birch plywood or meranti, with a thickness of 9 to 12 mm and provided with a non-slip layer on the top side. The platform has to be sufficiently strong and rigid to comply with the demands of standard NEN 2718. A platform of this type, with a main area of 0.6 x 3 m, weighs approximately 21 kg.

[0003] The known platform has the drawback that its weight is so high that, while it is being fitted to and removed from the scaffold, it has to be held by a plurality of scaffolders simultaneously, and the same applies when it is being transported upwards or downwards. This represents a considerable physical load on the scaffolders. Furthermore, when transporting awkward loads of this type, scaffolders often adopt unergonomic positions and work with a bent back. In the long term, this causes high levels of absence from work, sickness levels and permanent physical problems compared to other trades.

[0004] It is an object of the invention to eliminate the drawbacks of the known platform.

[0005] According to the invention, the said object is achieved by the fact that the platform according to the invention is characterized in that the panel is a sandwich structure comprising a core of thermoplastic material and fibre-reinforced skins of thermoplastic material which are partially fused to the core on respective principal sides of the core.

[0006] In this way, it is possible to considerably restrict the weight of the platform. It is possible to reduce the weight by between 35 and 50%.

[0007] The core of the panel may be an extruded corrugated sheet or honeycomb structure. Although platforms for scaffolds in which the panels consist of extruded or corrugated aluminium are known, the weight of platforms of this type which is required in order to achieve the required strength and rigidity is still high.

[0008] Furthermore, it is noted that sandwich panels are known per se for use in, for example, aircraft and racing cars. However, sandwich structures of this type consist of expensive, exotic materials, such as epoxy reinforced with carbon or aramid fibres, epoxy being used as a binder for sticking together the core and the skins. Furthermore, sandwich structures which comprise a honeycomb core of aluminium with aluminium skins attached by means of a binder are known per se. These known structures have a relatively low weight, high rigidity, a high strength and a high durability, but are

also very expensive. The high price makes structures of this type unsuitable for commercial use for a low-grade item of equipment, such as a platform for a scaffold.

[0009] The panel of the platform differs from the known structures in that a high-grade technical structure, namely a sandwich structure, with fusible low-grade (bulk) plastics is used for its production. As a result, it is possible to produce an inexpensive panel for a platform for a scaffold or other climbing equipment which complies with all the required standards.

[0010] Other properties and advantages of the invention will become clear from the following description in combination with the drawings, in which:

Fig. 1 shows a perspective view of a platform according to the invention;

Fig. 2 shows a perspective view, on a larger scale, of part of the platform shown in Fig. 1;

Fig. 3 shows a diagrammatic perspective view of a sandwich structure for the panel of the platform shown in Figs. 1 and 2; and

Fig. 4 shows another sandwich structure.

[0011] Figs. 1 and 2 show a platform 1 according to the invention which comprises a frame 2 and a panel 3 which is supported by the frame 2. The frame 2 may, as is known per se, consist of elongate aluminium parts. At the ends of the platform 1, the frame 2 has hooks, such as the hooks 6, 7, by means of which the platform 1 can be hooked over a pole of a scaffold or other climbing equipment, such as a stage between two scaffold frames or a suspended outer wall stage (not shown).

[0012] The panel 3 has a thickness of from 12 to 14 mm and, according to the invention, has a sandwich structure. Figs. 3 and 4 show sandwich structures which can be used for the panel 3. Each of the sandwich structures comprises a core, such as the corrugated sheet 11 shown in Fig. 3 or the honeycomb structure shown in Fig. 4, to the principle sides of which skins, such as the skins 14 shown in Fig. 3 or the skins 16 shown in Fig. 4, are attached.

[0013] According to the invention, the cores 11, 12 and the skins 14, 16 consist of thermoplastic material, the skins 14, 16 being reinforced by means of fibres. The thermoplastic material is in particular polypropylene (PP), and the fibres of the skins 14, 16 are in particular glass fibres.

[0014] The cores 11, 12 of polypropylene can be produced easily and inexpensively by extrusion. Polypropylene corrugated sheets and polypropylene honeycomb structures are used on a large scale for packaging purposes.

[0015] The skins 14, 16 may likewise be formed by inexpensive bulk material, for example by skins which are known under the trade name Twintex, type designation PP60. These skins comprise polypropylene with 40% by weight of glass. The number of fibres in one direction may differ from the number of fibres in a direction

which is perpendicular to the first direction. Skins of this type with a thickness of from 1 to 2 mm and a direction-dependent fibre number ratio of 1 to 4 are suitable for the skins 14, 16 of the panel 3 according to the invention. When using skins in which the said ratio is greater than 1, the skins 14, 16 are fitted to the cores 11, 12, and the panels 3 are attached to the frame 2, in such a manner that for each unit length there are more fibres in the transverse direction on the panel 3 than in the longitudinal direction of the panel 3. This allows greater loads to be applied to the panel 3 or makes it possible to use less material for the panel 3.

[0016] A suitable combination for the panel 3 with the sandwich structure comprises a core of an extruded corrugated sheet of polypropylene with a thickness of 1.0 mm and top and bottom skins of Twintex PP60 with a thickness of 0.7 mm and 1 mm, respectively, and a transverse/longitudinal fibre number ratio of 4/1 and 1/1, respectively.

[0017] A Twintex PP60 skin with a transverse/longitudinal fibre number ratio of 4/1 is, however, more expensive than one with a ratio of 1/4 and even more expensive than for a thickness of 1 mm and a ratio of 1/1.

[0018] Surprisingly, further research has shown that an extruded core is more expensive than a honeycomb core. Furthermore, although it is relatively easy to impart a suitable profile to an extruded core, for example in order to achieve a better impact strength, its use is dependent on the length/width orientation of the profile, whereas a honeycomb core is independent of orientation.

[0019] Therefore, extensive research has led to the following two most favourable combinations, comprising a thermoplastic core with a honeycomb structure of Sodesa or Tubus Bauer with a thickness of 12 mm and Twintex PP60 1/1 glass-fibre-reinforced thermoplastic skins with a thickness of 1 mm. When using these combinations, the panel 3 weighed 6.7 and 7.6 kg, respectively, representing a considerable weight saving compared to known panels of platforms of climbing equipment.

[0020] The skins 14, 16 are preferably provided with a non-slip structure. Furthermore, the skins 14, 16 may have an indelible colour by suitable selection of the material of which they consist. By using different colours, it is possible to assign specific functions to the use of the platforms 1 or parts of these platforms. Known platforms could be painted for this purpose, but this is not a practical solution in view of the wear to the paint which occurs while the platforms are being used.

[0021] To produce the panels 3, in a first step the skins 14, 16 can be heated, after which they are laid onto the appropriate side of the core 11, 12 and then a pressure is exerted. Preferably, the pressure exerted on the skins 14, 16 is sufficient for some of the plasticized material of the skins 14, 16 to penetrate into the core 11, 12. The result is very good adhesion.

[0022] According to another method, the skins are

preheated in a continuous process and, with core material being added between them, are passed between two rollers which exert a suitable pressure and cause the thermoplastic skins and core material to fuse together. By providing the rollers with a suitable profile, it is possible to apply a non-slip profile directly to the skins.

[0023] The panel according to the invention can be produced quickly and inexpensively using thermoplastic materials which are already in widespread use. In addition, there is no need for a binder, such as glue, which makes production simple, inexpensive, safe and the entire panel easily to be recycled.

15 Claims

1. Platform (1) which is suitable for use in combination with climbing equipment, comprising a frame (2) which can be coupled to the climbing equipment and a panel (3) which is supported by the frame (2), **characterized in that** the panel (3) is a sandwich structure comprising a core of thermoplastic material and fibre-reinforced skins (14, 16) of thermoplastic material which are partially fused to the core (11, 12) on respective principal sides of the core (11, 12).
2. Platform (1) according to claim 1, **characterized in that** the skins (14, 16) are fused into spaces in the core (11).
3. Platform (1) according to a preceding claim, **characterized in that** the fibres of the skins (14, 16) are glass fibres.
4. Platform (1) according to a preceding claim, **characterized in that** the skins (14, 16) consist of fibre-reinforced polypropylene.
5. Platform (1) according to a preceding claim, **characterized in that** the core (11, 12) consists of polypropylene.
6. Platform (1) according to claim 1 or 2, **characterized in that** the skins (14, 16) consist of polypropylene reinforced with 40% by weight of glass fibres, and the core (11, 12) consists of polypropylene.
7. Platform (1) according to claim 6, **characterized in that** the skins (14, 16) have a thickness of from 0.5 to 1.5 mm, and the number of fibres per unit length in the transverse direction of the panel (3) is 1 to 4 times the number of fibres in the longitudinal direction of the panel (3).
8. Platform (1) according to claim 7, **characterized in that** the top skin and bottom skin have a thickness of 0.7 mm and 1 mm, respectively, and a transverse/

longitudinal fibre number ratio of 4 and 1, respectively, and the core (11) is a corrugated sheet with a height of 10 mm.

9. Platform (1) according to claim 7, **characterized in that** the skins (14, 16) have a thickness of 1 mm and a transverse/longitudinal fibre number ratio of 1, and the core (12) has a honeycomb structure and a thickness of 11 mm.

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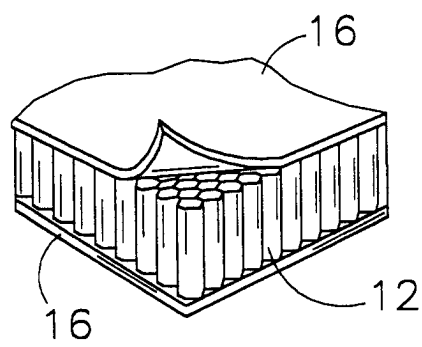
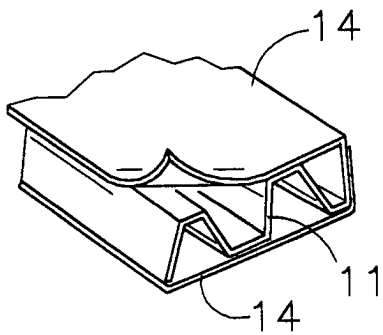
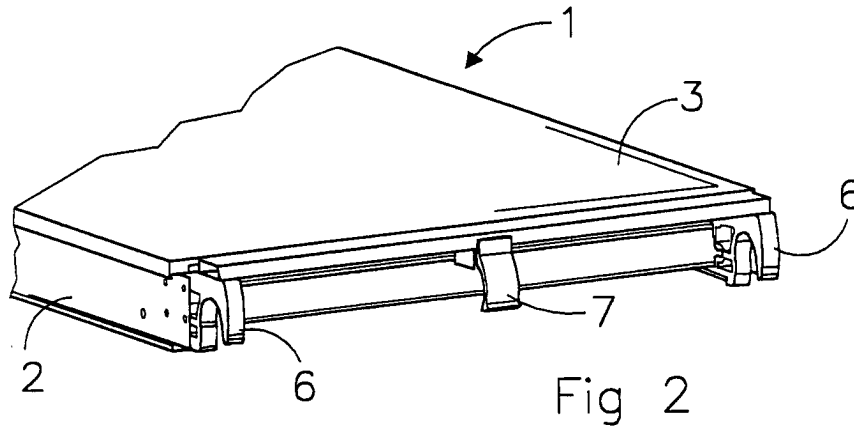
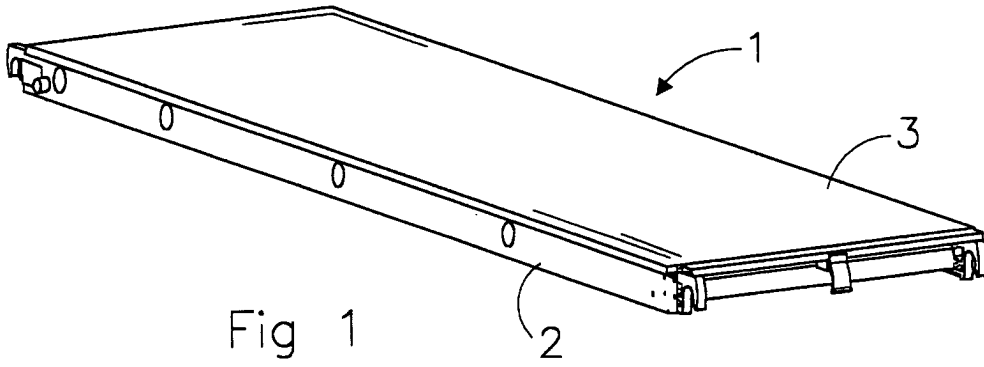


Fig 3

Fig 4