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(54) **Multipart pallet**

(57) The invention relates to a multipart pallet comprising a bottom frame (4) made of a thermoplastic material and with interconnected supporting blocks (42), and a load carrying top deck (2), said bottom frame supporting said top deck. The top deck (2) is made of a material

imparting more rigidity to the pallet than the material of said bottom frame (4). In particular said top deck (2) is made of a thermoplastic material including a stiffening filler, such as glass fibres, talc, carbon fibres or additives, alone or in combination, stiffening the plastic material.

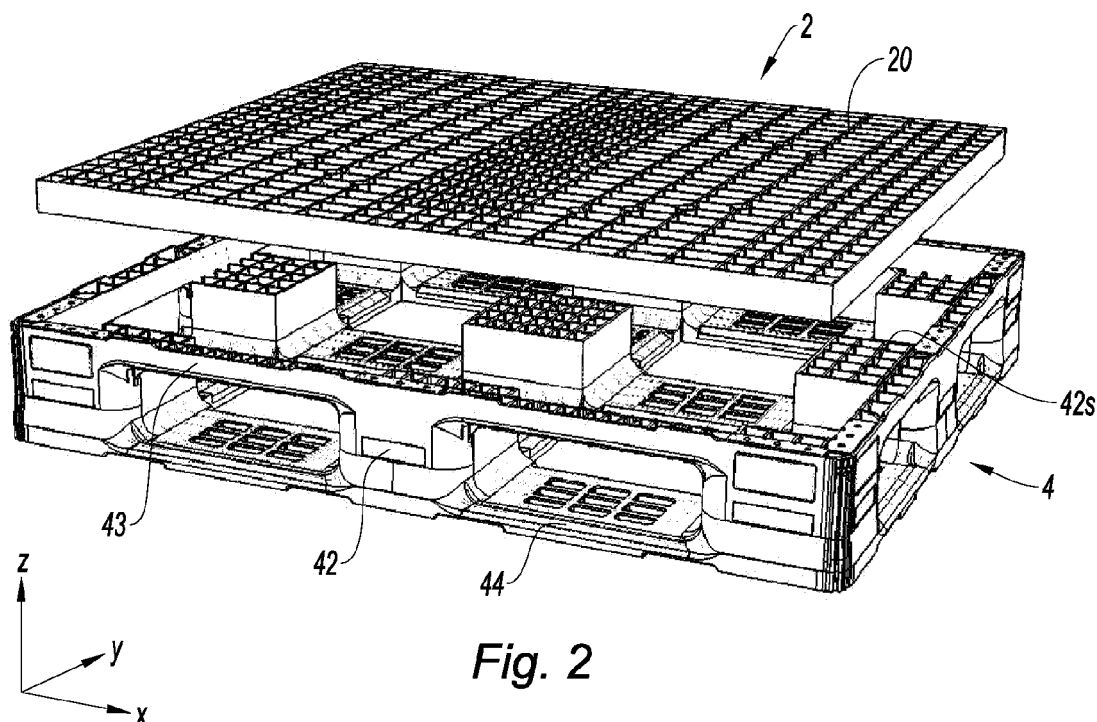


Fig. 2

Description

Field of the invention

[0001] The invention relates to the field of pallets or other similar platforms for carrying and storing loads, said pallets being made at least partly of a plastic material.

Background of the invention

[0002] Plastic pallets are usually made by injection moulding of a synthetic thermoplastic resin such as HDPE or PP. They usually comprise a substantially planar top deck for carrying articles, and a number of supporting elements in the form of blocks under the platform for the loads on the platform to be transferred to the supporting structure; such as the ground or pallet racks for storage. The pallet may be loaded with various articles such as crates, boxes, bags, six packs, etc.

[0003] Usual standard pallets have deficiencies; hereafter is a list of properties they should present and what are the required specifications.

[0004] When the articles on the platform are heavy and the pallet is not uniformly supported, such as on pallet storage racks, a deflection of the platform may result from this lack of uniform support. The products on the platform are then unstable and may fall from the pallet. There is a deflection of the pallet that can be considered as acceptable. For example according ISO8611 specifications the deflection should be limited to 20mm for a pallet placed on two supports distant from each other of 1 meter. It is possible to insert metal reinforcing elements in the walls of the pallet elements but this is not advantageous for the recyclability of the pallet and it makes it heavier; it goes against the maintenance of the weight of the pallet between ergonomic specifications.

[0005] There is thus a need for limiting or preventing excessive deflection in case of support of the pallet on the outer side (called racking in the domain). There is also a need for limiting or preventing excessive deflection during lifting with a forklift or similar means which could lead to a reaction of the load. It is to be noted that the production of a more rigid pallet is costly.

[0006] The pallets are subjected to shocks and impacts for example from the tines of the forklift during handling operations and they, in particular the bottom frame, should have enough shock resistant properties. But the production of a more rigid pallet increases the brittleness of it.

[0007] Thus there is a need for a pallet combining the properties of rigidity and resistance to shocks.

[0008] The friction coefficient of the load on the pallet has to be sufficient in order to prevent the load from sliding on the pallet during transport, but at the same time it must not be too high when loading and unloading the pallet. There is thus a need for resolving this problem

[0009] In case of excessive local damage, the whole pallet needs to be replaced.

[0010] The carrying surface of the pallet is not adapted to the pressure pattern of the load it carries, which can lead to local damage (imprints, indentations).

Summary of the invention

[0011] These problems are solved by the invention according thereto a multipart pallet comprising a bottom frame made of a thermoplastic material and with interconnected supporting blocks, and a load carrying top deck, said bottom frame supporting a load carrying top deck, is characterized by the fact that said top deck is made of a material imparting more rigidity to the pallet than the material of said bottom frame.

[0012] The pallet of the invention by the rigidity of the top deck presents a limited deflection in case of support on the outer sides or during lifting with a forklift or similar means. By a proper choice of material, the rigidity can be adapted to different kinds of loads. In case of static stresses, the top deck remains straight, as a result of which the entrance openings will remain large enough and the tolerance on the openings is reduced. In case of dynamic stresses, there is less deflection of the top deck, as a result of which the load remains compact and do not disperse.

[0013] Also the pallet of the invention, by the thermoplastic material for the bottom frame, presents the advantage of being less sensible to shock. The bottom frame forms a protection of the carrying surface top deck.

[0014] The multipart structure of the pallet of the invention permits thus a combination of the properties of rigidity against deflection and of impact resistance.

[0015] The multipart structure permits the adaptation to different loads, such as boxes or kegs that require different pallets and different material specifications.

[0016] According to an embodiment of the invention, said top deck is made of thermoplastic material incorporating a stiffening filler such as glass fibres, talc or carbon fibres said filler stiffening the plastic material. In particular said filler is composed of glass fibres in a proportion between 5 and 50% of the total weight of the deck.

[0017] Said bottom frame comprises preferably a synthetic resin chosen among polyethylene and polypropylene.

[0018] According to another feature of the invention the deck is in one or more parts that may or may not be equal, and the bottom frame ensures impact resistance against side impact through use of an impact top border which protects at least one side and preferably the sides of the deck.

[0019] According to another feature the top face of said impact top border is at the same level of the top face of the deck. In particular the impact top border can be arranged to provide additional support in case of load on the edge of the pallet, without a risk of breaking the deck.

[0020] More particularly the deck comprises at least a panel, the thickness of the panel and the height of the impact top border between two adjacent blocks being of

same value.

[0021] According to a preferred embodiment the deck comprises at least a rectangular panel, the impact top border forming a rectangular top frame protecting the panel from lateral impacts. Thus the deck is a carrying element for the biggest part of the load and it is a carrying element of the pallet during transport by a forklift or similar means.

[0022] According to another preferred embodiment said blocks are interconnected by flat interconnecting elements forming with the impact top border opening for the tines of forklift. Thus the bottom frame is a carrying element for the deck in case of static load and can act as an additional carrying element for part of the load.

[0023] According to another feature of the invention said deck and said bottom frame are made of different material. Thus the invention presents also the advantage of a cost-efficient production through use of different materials in different places and as a result of the combination of different materials with different specifications. According to an alternative embodiment the top deck is made of wood. Also decks in various configurations can be made in different colours whether or not the bottom part remains the same, as a result of which various functions can be linked to the pallet.

[0024] According to another feature said deck and said bottom frame comprise mechanical attaching means, said attaching means permitting permanent or removable attachment of the deck to said bottom frame. In particular the deck can be exchangeable so that all possible loads can be carried with a deck adapted to a specific load. In particular connection between top deck and bottom frame is carried out in such a way that it can be interrupted mechanically for the purpose of repair and/or recycling. Thus in case of excessive local damage, only one part of the pallet needs to be replaced.

[0025] The two part construction allows larger carrying surfaces, such as T-profile, closed deck or other shapes, as a result of which a good carrying surface for all possible loads is obtained. Moreover as a result of the two part construction, injection points on the upper surface of the pallet can be avoided, and the simplified construction permits a total freedom regarding configuration of the deck.

[0026] According to another feature the deck comprises antiskid elements.

[0027] According to another embodiment hollow spaces for RFID or other similar means are executed in a completely closed version.

Brief description of the drawings

[0028] Additional objects and advantages will become obvious from the following detailed description of the invention with accompanying drawings.

Figure 1 is a perspective view of a pallet according to the invention;

Figure 2 is a perspective view of the pallet of figure

1 with the top deck detached from the bottom frame; Figure 3 shows in perspective the bottom frame alone;

Figure 4 shows a detail of a particular embodiment dealing with antiskid elements incorporated within the top deck.

Detailed description of the invention

[0029] The pallet 1 is shown in a perspective view from above in figures 1. It comprises a top deck 2 and a bottom frame 4. The top deck is shown detached from the bottom frame in figure 2. As illustrated, the pallet is rectangular but can be of a different shape. For instance the corners could be rounded.

[0030] The pallet is here in two parts; both parts are manufactured separately and then assembled, the top deck within the frame of the bottom structure.

[0031] The material constituting the bottom frame is thermoplastic in order for it to be formed by an injection moulding process. Advantageously it is a polymeric synthetic resin such as polyethylene in particular a high density polyethylene HDPE or a polypropylene PP. Such a material has the property for the articles made from it to absorb shocks and to be resistant to impacts.

[0032] It is possible to add appropriate filler such as glass fibres in order to stiffen the material and make it more rigid when needed but the material become brittle. The bottom frame could contain a limited amount of glass fibres.

[0033] According to the invention the pallet is made in at least two parts having different functions: one part with a shock absorbing function, that is the bottom frame part, and a part with a function of imparting appropriate rigidity to the pallet, that is the top deck 2.

[0034] Due to its shock absorbing function and limited rigidity, the bottom frame 4 includes no or a limited amount of a stiffening filler.

[0035] The top deck 2 is made of a material which imparts rigidity to the structure. According to an embodiment, it is constituted of a thermoplastic synthetic resin such as a polyethylene, in particular a high density polyethylene HDPE or polypropylene PP. An appropriate stiffening filler is incorporated to the resin. It is advantageously composed of glass fibres, in an amount comprised between 5 and 50% of the total weight of the deck 2. The more the amount of filler is incorporated to the resin the more the deck is resistant to deflection. The quantity of filler is chosen according to an acceptable deflection of the top deck in function of the application of the pallet.

[0036] The top deck 2 provides thus an upper pallet load carrying surface on which articles, not shown, can be carried. The illustrated top deck is constituted by a structure of interconnected rib elements 20; other configurations are possible. Larger carrying surfaces than the usual I profile ribs are possible, such as T-profile, closed deck or other shapes, as a result of which a good

carrying surface for all possible loads is obtained. This provides a planar open structure which is strong enough for supporting forces applied perpendicular to the plane of the deck. The structure is rather light considering the strength. This open structure has also the advantage of allowing the pallet to be cleansed.

[0037] As seen on figure 2 the top deck element is a part that can be separated from the bottom frame.

[0038] The bottom frame comprises supporting blocks 42 which are disposed substantially perpendicularly to the underside of the top deck 2. In one preferred embodiment there are nine supporting blocks; one at each of the four corners of the frame, one at the approximate midpoint of each edge of the frame and one at the centre of the frame. This embodiment is not limiting; the number and position of the blocks may be varied. The blocks 42 are interconnected along their lower edges longitudinally and transversally by flat connecting elements 44. The lower surfaces of the blocks 42 and of the connecting elements 44 form the lower surface of the bottom frame.

[0039] The upper surfaces 42s of the blocks are at the same height as the underside of the top deck and form supports for the top deck 2. The blocks 42 are interconnected at their upper surfaces 42s by impact top border elements 43 along the edges of the top deck 2. The height of these elements 43 from the upper surface 42s is of the same value as the thickness of the deck 2. The function of these elements is to protect the edges of the deck from lateral shocks.

[0040] The different parts of the frame i.e. blocks 42 connecting elements 44 and impact top border elements 43 are preferably moulded together and form an integral bottom frame.

[0041] The top deck 2 and the bottom frame are manufactured separately and assembled together. The top deck 2 is placed on the bottom frame 4 so as to rest on the top surfaces 42s of the blocks 42. Attaching means are provided to attach the deck to the bottom frame. They are not represented. There can be mechanical attaching means, such as bolts or clips, between the blocks 42 and/or the impact border elements 43, but also the parts can be glued or soldered together.

[0042] According to a variant the top deck incorporates friction elements 50 as illustrated in figure 4. Such elements are described in the patent application EP 2 228 312 filed by the present applicant. These elements are mounted in openings for increasing the friction between the pallet and any prongs of a fork lift.

Claims

1. Multipart Pallet comprising a bottom frame (4) made of a thermoplastic material and with interconnected supporting blocks (42), and a load carrying top deck (2), said bottom frame supporting said top deck **characterized by** the fact that said top deck (2) is made of a material imparting more rigidity to the pallet than

the material of said bottom frame (4).

2. Multipart pallet according to claim 1, said top deck (2) being made of thermoplastic material including a stiffening filler, such as glass fibres, talc, carbon fibres or additives, alone or in combination, stiffening the plastic material.
3. Multipart pallet according to claim 2, said filler being glass fibres in a proportion between 5 and 50% of the total weight of the deck.
4. Multipart pallet according to any one of claims 1 to 3, the material of said bottom frame (4) comprising a synthetic resin chosen among polyethylene or polypropylene.
5. Multipart pallet according to any claim 1 to 4 wherein said bottom frame (4) includes an impact top border (43), said top deck (2) resting on said supporting blocks (42) and being bordered on at least one side by said impact top border (43) said impact top border being made of a material absorbing impacts or shocks.
6. Multipart pallet according to any one of claims 1 to 5, wherein said top deck (2) and said bottom frame (4) comprise cooperating mechanical attaching means, said attaching means permitting permanent or removable attachment of the deck to said bottom frame.
7. Multipart pallet according to any one of claims 1 to 6, wherein said impact top border (43) and said top deck (2) comprises each a top surface both top surface being at the same level.
8. Multipart pallet according to claim 7, wherein said top deck (2) comprises at least a panel, the thickness of the panel and the height of the impact top border between two adjacent blocks being of same value.
9. Multipart pallet according to any one of claims 1 to 8, wherein said blocks (42) are interconnected by interconnecting elements (44) forming with the impact top border (43) openings for the tines of forklift.
10. Multipart pallet according to any one of claims 1 to 9, said deck comprising antiskid elements (50).
11. Multipart pallet according to anyone of claims 1 to 10, said bottom frame comprising antiskid elements.

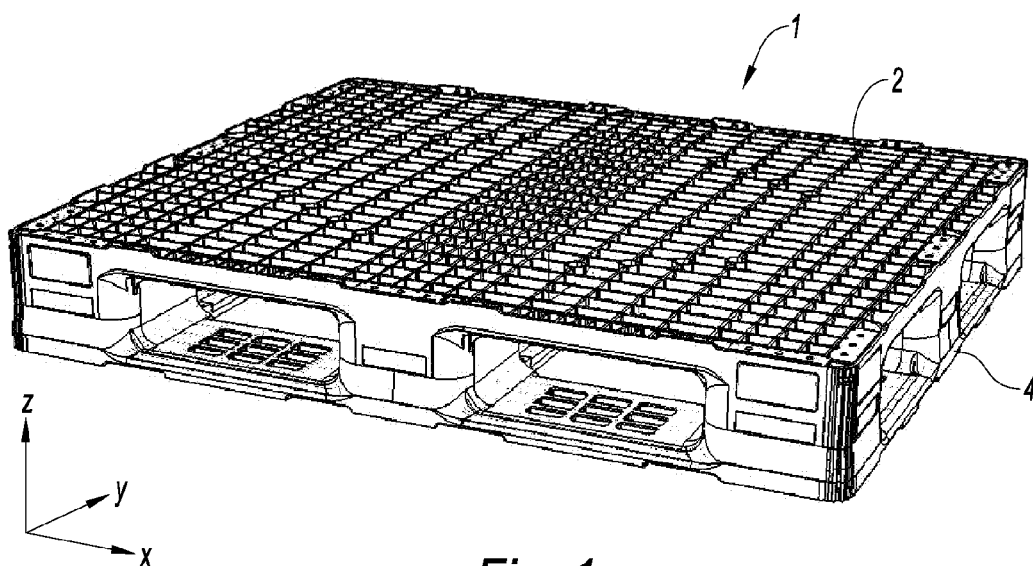


Fig. 1

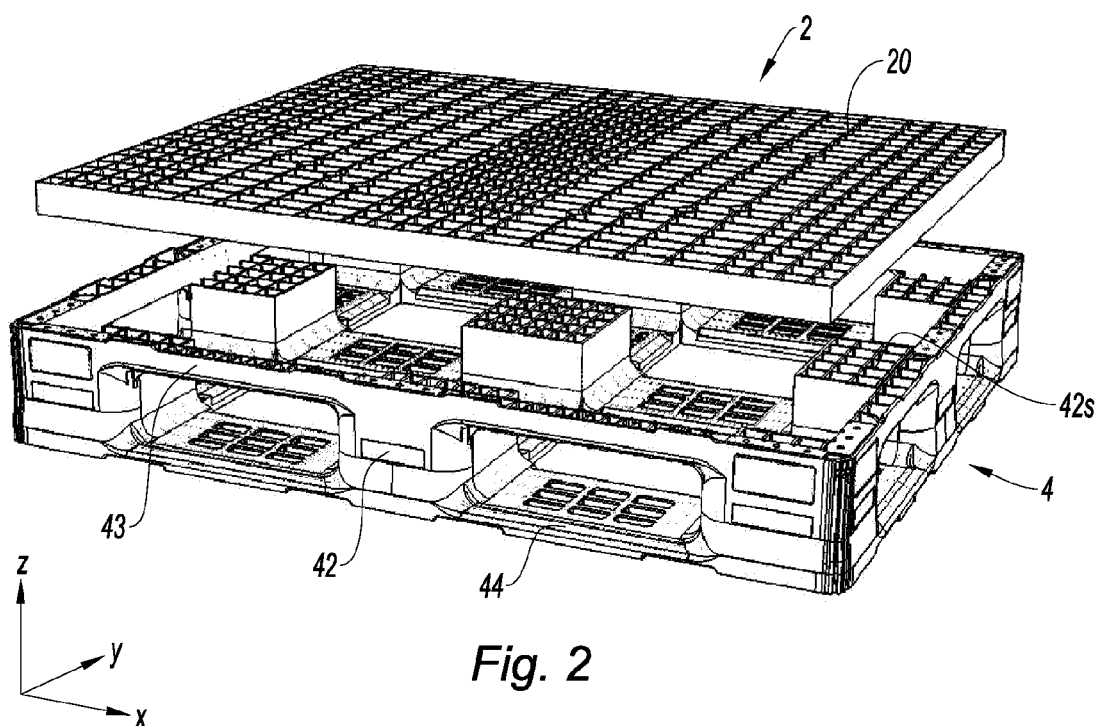
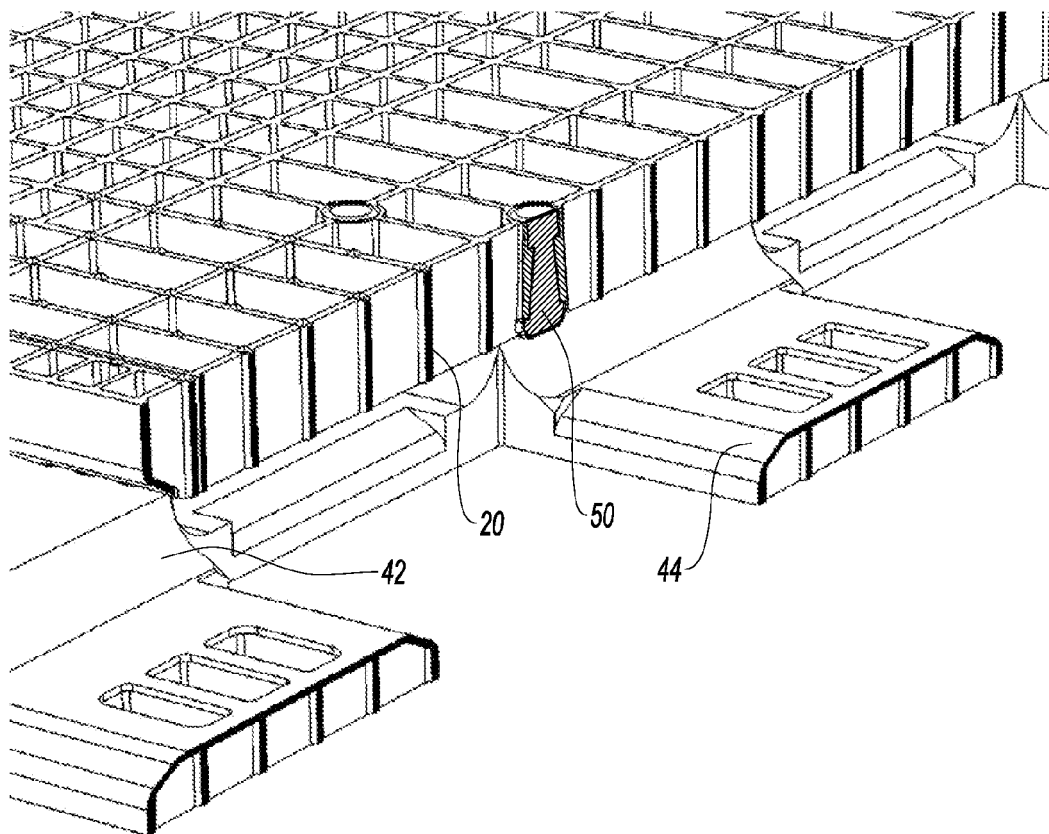
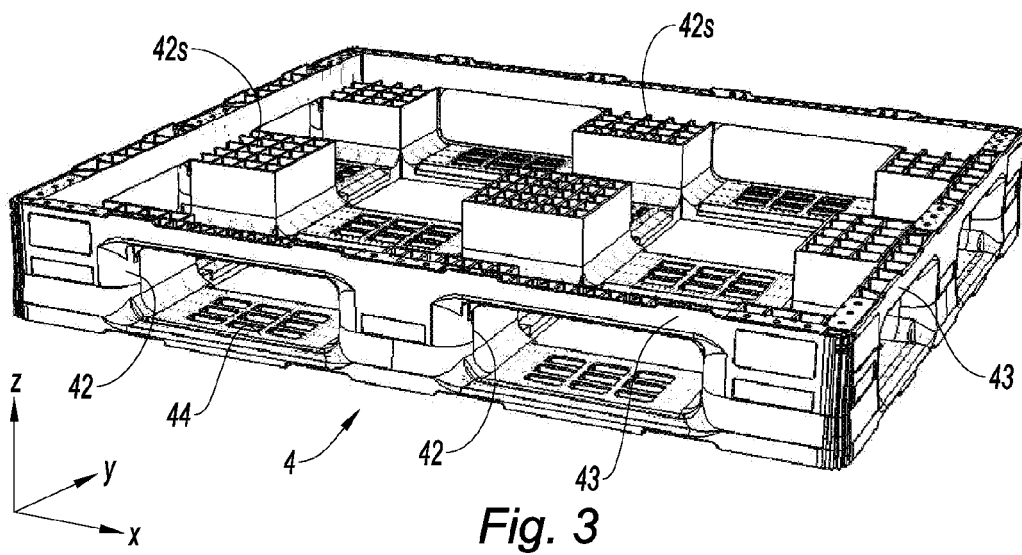


Fig. 2





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Application Number
EP 10 19 4242

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Place of search Munich		Date of completion of the search 10 May 2011	Examiner Fitterer, Johann
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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