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(54) **KIT FOR REALIZATION OF A MODULAR PALLET**

(57) Kit for the realization of a modular pallet (P); the kit comprises two supporting assemblies (G), each one comprising a crosspiece (2) comprising at least two fixing areas (20) with fixing means (A2); the supporting assembly (G) also comprises a supporting leg (3) for each fixing area (20); said supporting leg (3) comprising an upper portion (3a) with upper fixing means (A31) and a lower portion (3b) with lower fixing means (A32) suitable for cooperating with the fixing means (A2) of the fixing area (20); the kit also comprises a platform (1) comprising fixing areas (10) with fixing means (A1) suitable for cooperating with the upper fixing means (A31) of the upper portion (3a) of the supporting leg (3); wherein the supporting legs (3) can be stacked one on top of the other one and said crosspieces (2) can be stacked one on top of the other one.

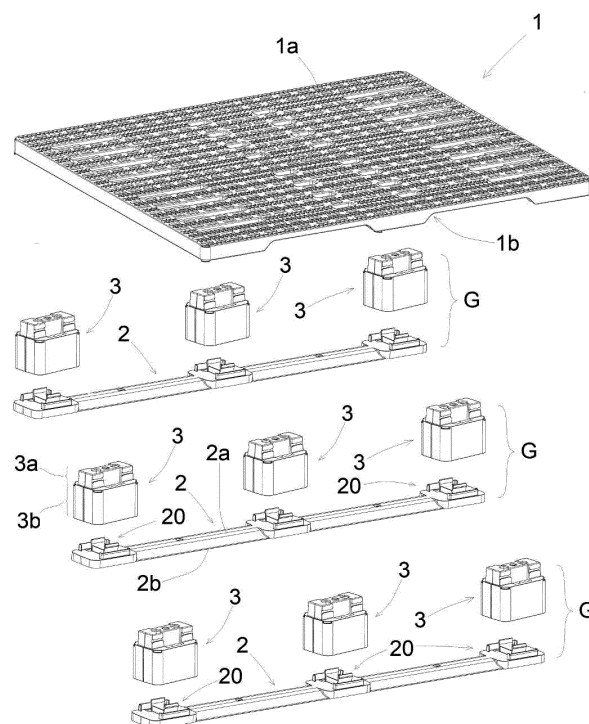


FIG. 2

Description

[0001] The present patent application for industrial invention relates to a kit for the realization of a modular pallet.

[0002] As it is well known, pallets are used for the storage and the transportation of goods and finished products.

[0003] In their simplicity, pallets are an essential tool that is at the base of many economic activities and, in turn, are an end product of an important industrial sector.

[0004] Numerous companies are involved in the production of pallets all over the world and just as many are active in their recovery and recycling.

[0005] Commonly, a pallet comprises an upper platform, where the raw materials or products are disposed, and supporting assemblies suitable for supporting the upper platform from below.

[0006] Pallets are conventionally made of wood, steel, or plastic materials.

[0007] Wooden or steel pallets are impaired by several drawbacks arising from the material that is used to produce them.

[0008] In particular, wooden pallets can be easily damaged by atmospheric agents; moreover, their mechanical characteristics can suffer great variations over time; further, because wood is a refuge for microorganisms such as bacteria, fungi, or insects, larvae or parasites, wooden pallets must be subjected to sterilization and sanitization treatments, especially if they are used for the transportation of food materials.

[0009] Furthermore, in the case of breakage or failure, wooden pallets can no longer be used to perform the main function for which they are designed; moreover, great attention must be paid during the recycling process because wooden pallets are treated with special products (in order to increase waterproof properties and improve weather resistance) that can be harmful to human health, prohibiting their use as firewood.

[0010] Generally speaking, steel or metal pallets have a greater strength, which is however correlated to a significant increase in their weight; moreover, said steel or metal pallets must be adequately protected with special anti-corrosion products.

[0011] The aforementioned problems can be solved by pallets that are molded in one piece from plastic materials; in fact, they are extremely lightweight, resistant and hygienic and they can be used to store the goods outdoors since there is no risk of infiltration of moisture and pests in the material.

[0012] However, even these pallets are not free from drawbacks.

[0013] Firstly, a first drawback, which also applies to wooden and steel pallets, is that said pallets are extremely bulky to store when not in use. As a matter of fact, they must be stored one on top of the other one in the warehouse of the manufacturing company.

[0014] Another drawback of plastic pallets is that, in

spite of their sturdiness, in case of cracking or breakage, they cannot be used anymore and must necessarily be disposed of.

[0015] WO2010128260A2 discloses a modular pallet comprising a platform, a series of cross-members and supporting legs (also defined as spacers). Each spacer comprises an external body and two connecting pieces disposed inside a cavity of the external body, which protrude superiorly and inferiorly from the external body. Each connecting piece comprises clips that are snap-fitted with respective means obtained on the platform and on the cross-members. The supporting legs cannot be stacked firmly, one on top of the other one. Moreover, also the cross-members cannot be stacked firmly, one on top of the other one.

[0016] WO9628358A1 discloses a modular pallet comprising a load-bearing platform formed of decking boards and cross-members connected by means of mating dove-tail portions, a base member and supporting legs that connect the base member and the platform by means of snap-fit connections. Each supporting leg comprises a vertical column having a lower spigot member and an upper spigot member, each of them comprising two wings provided with nose portions. Said nose portions are suitable for being engaged in respective steps obtained on the crossmember of the platform and on the base. Also in such a case, the supporting legs cannot be stacked firmly, one on top of the other one. Likewise, the cross-members cannot be stacked firmly, one on top of the other one.

[0017] DE202015100355 discloses a modular pallet comprising a loading platform, floor boards and connectors or supporting legs. The connectors are connected to the loading platform and to the floor boards by means of snap-in clips. The connectors are shaped as a bi-dimensional plates and cannot be stacked one on top of the other one. Moreover, the configuration of the floor boards prevents them from being stacked one on top of the other one.

[0018] Therefore, the modular pallets disclosed in WO2010128260A2, WO9628358A1 and DE202015100355 cannot be transported or stored occupying a small amount of space because their parts are not stackable.

[0019] US6029583 and US2007056483A1 disclose pallets comprising a lower member composed of base cross-members and an upper member composed of a deck and legs obtained in one piece. Given the fact that the deck and the legs are obtained in one piece, in case of breakage or damage of one of the legs, it will be necessary to replace the entire deck with a new deck, instead of replacing only the broken supporting leg.

[0020] Following to a careful study of the aforementioned drawbacks, the present invention was devised in order to solve the aforementioned problems by providing an innovative kit for the realization of a modular pallet made of plastic material.

[0021] Otherwise said, the purpose of the present in-

vention is to provide a kit that allows for realizing a modular pallet in a simple and fast way, and wherein it is no longer necessary to dispose of the pallet in case of breakage of the elements of the pallet.

[0022] Another purpose of the present invention is to devise a kit wherein all the elements of the kit can be stored and transported occupying a small amount of space.

[0023] These purposes are achieved in accordance with the present invention with the characteristics listed in the appended independent claim 1.

[0024] Advantageous embodiments appear from the dependent claims.

[0025] The kit according to the invention is defined by claim 1.

[0026] For the sake of clarity, the description of the kit according to the invention is continued by reference to the attached drawings, which are for illustrative and non-limiting purposes only, wherein:

Fig. 1 is an axonometric view of a pallet obtained by assembling the elements of the kit according to the invention;

Fig. 2 is an axonometric view of the kit according to the invention in disassembled condition;

Fig. 3 is a sectional view of the pallet of Fig. 1, taken along the I-I plane;

Figs. 4 and 4A are two axonometric views of a supporting leg of the kit, seen from two different angles;

Fig. 4B is a top view of the supporting leg;

Fig. 4C is a side view of two supporting legs stacked one on top of the other one;

Fig. 4D is a side view of the two supporting legs of Fig. 4C sectioned along a vertical central plane;

Fig. 5 is an axonometric view of a crosspiece of the kit according to the invention;

Fig. 5A is an enlarged view of the detail enclosed in the circle Q of Fig. 5;

Fig. 5B is a side view of two crosspieces stacked one on top of the other one;

Fig. 5C is a sectional view of the two crosspieces of Fig. 5B, taken along the V-V plane;

Fig. 6 is a side view of two platforms of the pallet, one disposed on top of the other one;

Fig. 6A is an axonometric bottom view of a portion of the platform of the pallet.

[0027] With reference to the appended figures, a kit for the realization of a pallet according to the present invention is described.

[0028] The pallet (P) realized with the kit according to the invention is shown in Fig. 1.

[0029] The kit according to the invention comprises a set of connectable elements, which are all made of plastic material.

[0030] With reference to Fig. 2, firstly the elements of the kit comprise three supporting assemblies (G) suitable for being disposed side by side.

[0031] Each one of said supporting assemblies (G) comprises:

a) a crosspiece (2) with a lower side (2b) suitable for resting on the ground, and an upper side (2a); said crosspiece (2) comprises three fixing areas (20) obtained on the upper side (2a); and

b) a supporting leg (3) for each fixing area (20); each supporting leg (3) comprises an upper portion (3a) and a lower portion (3b) suitable for being coupled with one of the fixing areas (20) of the crosspiece (2).

[0032] The kit also comprises a monoblock platform (1) made of plastic material, having an upper side (1a), a lower side (1b) and a plurality of fixing areas (10) (shown in Fig. 6A) obtained on the lower side (1b), one for each supporting leg (3) of the supporting assemblies (G) of the kit.

[0033] The upper portion (3a) of one of said supporting legs (3) is suitable for being coupled in each fixing area (10).

[0034] With reference to Fig. 3, the upper portion (3a) of each supporting leg (3) comprises upper fixing means (A31) suitably configured to cooperate with corresponding fixing means (A1) of the fixing area (10) of the platform (1) in such a way to fix the supporting leg (3) to the platform (1).

[0035] Likewise, the lower portion (3b) of each supporting leg (3) comprises lower fixing means (A32) suitably configured to cooperate with corresponding fixing means (A2) of the fixing area (20) of the crosspiece (2) in such a way to fix the supporting leg (3) to the crosspiece (2).

[0036] In the preferred embodiment of the invention, the upper fixing means (A31) of the upper portion (3a) and the corresponding fixing means (A1) of the fixing area (10) are snap-fit means.

[0037] Similarly, the lower fixing means (A32) of the lower portion (3b) and the corresponding fixing means (A2) of the fixing area (20) of the crosspiece (2) are snap-fit means.

[0038] Advantageously, in addition to the aforementioned fixing means (A2), each fixing area (20) of each crosspiece (2) also comprises centering means (C2). In this regard, the lower portion (3b) of the supporting leg (3) is configured in such a way as to cooperate with said centering means (C2) so as to center the supporting leg (3) with respect to the fixing area (20).

[0039] Similarly, the fixing area (10) of the platform (1) comprises centering means (C1). In such a case, the upper portion (3a) of the supporting leg (3) is configured to cooperate with said centering means (C1) of the fixing area (10) so as to center the supporting leg (3) with respect to the fixing area (10).

[0040] Preferably, with reference to Figs. 4, 4A and 4B, the supporting leg (3) is box-shaped and comprises an internal cavity, which is open at the bottom and closed at the top.

[0041] The lower portion (3b) has the shape of a parallelepiped that is open inferiorly, whereas the upper portion (3a) has the shape of a block that protrudes superiorly from the lower portion (3b).

[0042] The lower portion (3b) comprises two first longitudinal lateral walls (3p) in opposite position and two second transverse lateral walls (3q) in opposite position. Each lateral wall (3p, 3q) of the lower portion (3b) comprises a lower ending edge suitable for abutting against the upper side (2a) of the crosspiece in correspondence of the fixing area (20).

[0043] The walls (3p, 3q) are connected by means of rounded corners (3g). The upper portion (3a) comprises two longitudinal lateral walls (3r) and two transverse lateral walls (3s).

[0044] When seen in a top view, the upper portion (3a) has lower dimensions than the lower portion (3b), and the two portions (3a, 3b) are connected to each other by two horizontal supporting walls (34) whereon the platform (1) rests.

[0045] The lower dimensions of the upper portion (3a) with respect to those of the lower portion (3b) allow the upper portion (3a) to be fitted inside the lower portion (3b) of an identical supporting leg (3) in such a way that the supporting legs (3) can be stacked one on top of the other one, as shown in Figs. 4C and 4D, when they are stored and are not used to make the pallet (P).

[0046] As mentioned above, the fixing areas (20) of the crosspieces (2) are provided with said centering means (C2) and with said fixing means (A2).

[0047] With reference to Figs. 5 and 5A, the centering means (C2) of the fixing area (20) comprises two opposite edges (22) that project from the upper side (2a) of the crosspiece (2) and are suitable for being contained between the lateral walls (3p, 3q) of the lower portion (3b) of the supporting leg (3), preventing the supporting leg (3) from moving freely above the fixing area (20).

[0048] Each edge (22) comprises a central rectilinear portion (22a) and two folded ending sections (22b).

[0049] The central rectilinear portions (22a) are suitable for being disposed side by side, abutting against the second lateral walls (3q), whereas the folded ending sections (22b) are suitable for being disposed side by side with the rounded corners (3g).

[0050] Even if in the embodiment shown in the attached figures the centering means (C2) comprise said two opposite edges (22), nothing would change for the achievement of the objectives pursued by the invention if said centering means (C2) comprised a single annular edge completely contained by the lateral walls (3p, 3q) of the lower portion (3b).

[0051] With reference to Fig. 5A, the fixing means (A2) of the fixing area (20) comprise two flexible tabs (4) disposed in an inclined, diverging position, each one being provided at the top with a retention tooth (41).

[0052] On the other hand, with reference to Fig. 4D, the lower fixing means (A32) of the lower portion (3b) of the supporting leg (3) comprise two opposite steps (32)

disposed inside the lower portion (3b); one of the two retention teeth (41) is suitable for being disposed on each step (32), thereby fitting the supporting leg (3) to the fixing area (20).

[0053] The two steps (32) are obtained at the top of two lateral edges (33) that define a narrow opening (33a) that provides access to the supporting leg (3) suitable for accommodating the flexible tabs (4).

[0054] During the coupling of the supporting leg (3) to the fixing area (20), and therefore during the insertion of the flexible tabs (4) inside the narrowed opening (33a), the lateral edges (33) abut against the retention teeth (41), pushing them towards the center, thus bending the flexible tabs (4) until the retention teeth (41) intercept the two steps (32), positioning themselves on the steps (32).

[0055] With reference to Fig. 3, preferably each retention tooth (41) comprises an inclined lateral surface (41a) which acts as an invitation surface for the lateral edge (33). Similarly, the lateral edge (33) comprises an inclined section (330) at its base, having the same inclination as the inclined lateral surface (41a) of the retention tooth (41).

[0056] Evidently, in order to couple the supporting leg (3) with the fixing area (20), it is necessary to push the supporting leg (3) towards the fixing area (20) with a sufficient force to overcome the elastic resistance of the flexible tabs (4) until the retention tooth (41) is engaged and is disposed on the step (32).

[0057] Now with reference to Fig. 5C, a notch (2s) is provided underneath each fixing area (20), said notch (2s) being shaped in such a way as to accommodate and contain a fixing area (20) of an identical crosspiece (2), at least partially, so that the crosspieces (2) can be stacked one on top of the other one as explicitly shown in Figs. 5B and 5C.

[0058] The fixing area (20) comprises supporting elements (5) disposed between the two flexible tabs (4), whereon separators (6) arranged inside the notch (2s) are suitable for being rested.

[0059] Said supporting elements (5) comprise two parallel partitions (5) above which said two separators (6) are arranged astride.

[0060] With reference to Fig. 6A, each fixing area (10) of the platform (1) consists of a seat and said centering means (C1) of the fixing area (10) consist of two lateral ribs (10a) that laterally define said seat. The two lateral ribs (10a) are suitable for accommodating and retaining the two longitudinal lateral walls (3r) of the upper portion (3a) of the supporting leg (3) when the upper portion (3a) is coupled with the fixing area (10).

[0061] As shown in Figs. 3 and 6A, the fixing means (A1) of the fixing area (10) are obtained in correspondence with said lateral ribs (10a).

[0062] In particular, said fixing means (A1) consist of two teeth (11) for each lateral rib (10a) that protrude towards the seat. On the other hand, the upper fixing means (A31) of the upper portion (3a) consist of two slots (31) placed side by side, and obtained on the lateral walls

(3r), wherein said teeth (11) are to be inserted.

[0063] Thus, in order to fix the upper portion (3a) to the fixing area (10), the upper portion is to be inserted into the seat. During such an insertion, each tooth (11) slides against the lateral wall (3r) until it is intercepted and inserted in the slot (31), thereby fixing the supporting leg (3) to the platform (1).

[0064] Preferably, the walls of the upper portion (3a) of the supporting leg (3) are inclined in such a way that said upper portion (3a) has a tapered shape going from the bottom to the top to facilitate the insertion of the upper portion (3a) between the two lateral ribs (10a) that define the seat.

[0065] The lateral ribs (10a) that define the seat are flexible enough to bend outwards during the penetration of the upper portion caused by the sliding of the teeth (11) against the longitudinal lateral walls (3r).

[0066] In an alternative embodiment of the invention the position of the teeth and of the slots may be inverted. Otherwise said, in an alternative embodiment of the invention, the fixing means (A1) of the fixing area (10) may comprise slots, whereas the upper fixing means (A31) of the upper portion (3a) may comprise teeth suitable for being inserted in said slots.

[0067] Finally, analyzing the platform (1) in detail with reference to Figs. 6 and 6A, the platform (1) comprises perimeter teeth (18) that protrude inferiorly from the lower side (1b) and are suitable for being inserted in respective perimeter slots (19) obtained on the upper side of an identical platform (1) below, in such a way as to stack the platforms (1) one on top of the other one, when they are stored and are not used for the realization of the modular pallet (P).

[0068] Preferably, a plurality of transverse stiffening ribs (1CT) and a plurality of longitudinal stiffening ribs (1CL) are provided on the lower side in order to stiffen the platform (1) so as to make it more rigid and reduce the deformations caused by the loads supported by the platform (1).

[0069] Following the above description, the advantages of the kit according to the invention are evident.

[0070] First of all, the kit according to the invention is composed of elements that can be assembled together in a very simple and fast way.

[0071] Moreover, since the pallet (P) is modularly built by means of the aforementioned kit, in case of breakage of an element of the pallet, it is possible to replace such a broken element without having to dispose of the pallet (P) completely.

[0072] Moreover, since the pallet (P) is composed of elements that can be stacked firmly, one on top of the other one, it is possible to store and transport the various elements in a stable manner, occupying a small amount of space. Such a feature makes the pallet (P) according to the invention extremely less bulky, especially during storage and transportation, when compared with the modular pallets of the prior art described in WO2010128260A2, WO9628358A1, and

DE202015100355.

[0073] Numerous variations and detailed modifications may be made to the present embodiment of the invention, which are within the reach of a person skilled in the art, and still fall within the scope of the invention as expressed by the appended claims.

[0074] By way of example, even if the kit according to the invention is composed of three support assemblies (G), nothing would change if the kit were composed of two support assemblies (G). Furthermore, in an alternative embodiment of the invention, two fixing areas (20) or even four fixing areas (20) may be provided on each crosspiece (2) for fixing an equal number of supporting legs (3).

Claims

1. Kit for realization of a modular pallet (P); wherein said kit comprises the following plastic elements:

- at least two supporting assemblies (G), each one comprising:

c) a crosspiece (2) with a lower side (2b) suitable for facing the ground, and an upper side (2a); said crosspiece (2) comprising at least two fixing areas (20) obtained on the upper side (2a); each fixing area (20) comprising fixing means (A2);

d) a supporting leg (3) for each fixing area (20); said supporting leg (3) comprising an upper portion (3a) with upper fixing means (A31), and a lower portion (3b) with lower fixing means (A32); said lower fixing means (A32) being suitably configured to cooperate with the fixing means (A2) of the fixing area (20) of the crosspiece (2);

- a monoblock platform (1) with an upper side (1a) and a lower side (1b); said platform (1) comprising a plurality of fixing areas (10) obtained on the lower side (1b), one for each supporting leg (3) of the supporting assemblies (G) of the kit; each fixing area (10) comprising fixing means (A1) suitably configured to cooperate with the upper fixing means (A31) of the upper portion (3a) of the supporting leg (3);

characterized in that:

- said supporting leg (3) has a box-shaped structure, is internally hollow and is open on the bottom; wherein the upper portion (3a) has lower dimensions than the lower portion (3b) in such a way that the upper portion (3a) can be fitted inside the lower portion (3b) of an identical supporting leg (3) in such a way that the supporting

- legs (3) can be stacked one on top of the other one; and
 - each crosspiece (2) comprises a notch (2s) under each fixing area (20), said notch (2s) being suitably configured to contain a fixing area (20) of an identical crosspiece (2), at least partially, so that the crosspieces (2) can be stacked one on top of the other one.
2. The kit according to claim 1, wherein the platform (1) comprises perimeter teeth (18) that protrude inferiorly from the lower side (1b) and are suitable for being inserted in respective perimeter seats (19) obtained on the upper side of an identical platform (1) in such a way that the platform can be firmly disposed on top of an identical platform.
3. The kit of claim 1 or 2, wherein each fixing area (20) of the crosspiece (2) is provided with centering means (C2); said lower portion (3b) of the supporting leg (3) being suitably configured to cooperate with the centering means (C2) of the fixing area (20) in order to center the supporting leg (3) relative to the fixing area (20); wherein each fixing area (10) of the platform (1) is provided with centering means (C1); said upper portion (3a) being suitably configured to cooperate with the centering means (C1) of the fixing area a(10) in order to center the supporting leg (3) relative to the fixing area (10).
4. The kit of any one of the preceding claims, wherein:
- said fixing means (A1) of the fixing area (10) and said upper fixing means (A31) of the upper portion (3a) of the supporting leg (3) are snap-fit means; and/or
 - said fixing means (A2) of the fixing area (20) of the crosspiece (2) and said lower fixing means (A32) of the lower portion (3b) of the supporting leg (3) are snap-fit means.
5. The kit of claim 3 or 4, wherein said fixing area (10) consists in a seat; said centering means (C1) comprise at least two lateral ribs (10a) that laterally define said seat; said upper portion (3a) of the supporting leg (3) comprising at least two lateral walls (3r) suitable for being accommodated and retained between the two lateral ribs (10a).
6. The kit of claim 5, wherein said fixing means (A1) of the fixing area (10) of the platform (1) are provided on the lateral ribs (10a) and said upper fixing means (A31) of the upper portion (3a) of the supporting leg (3) are provided on the lateral walls (3r); wherein said fixing means (A1) comprise at least one tooth (11) that protrudes from each lateral rib (10a) towards the interior of the seat; said upper fixing means (A31) of the upper portion (3a) of the supporting leg (3) comprising at least one slot (31) wherein said tooth (11) is elastically inserted; it being provided that, when the upper portion (3a) is inserted in the seat, said tooth (11) slides against the lateral wall (3r) of the upper portion (3a) of the supporting leg until said tooth (11) is intercepted and inserted in the slot (31), thus fixing the platform (1) to the supporting leg (3).
7. The kit according to any one of claims 3 to 6, wherein said lower portion (3b) of the supporting leg (3) comprises two first lateral walls (3p) in opposite position, and two second lateral walls (3q) in opposite position, each one comprising a lower ending edge suitable for being engaged against the upper side (2a) of the crosspiece in correspondence of the fixing area (20); said centering means (C2) of the fixing area (20) comprising at least one edge (22) that protrudes from the upper side (2a) of the crosspiece (2) and is suitable for being accommodated between the lateral walls (3p, 3q) of the lower portion (3b) of the supporting leg (3), preventing the supporting leg (3) from moving freely along the upper side (2a) of the crosspiece (2).
8. The kit of claim 7, wherein said centering means (C2) of the fixing area (20) comprise two opposite edges (22), each one comprising a central rectilinear portion (22a) and two folded ending sections (22b).
9. The kit according to claim 7 or 8, wherein said fixing means (A2) of the fixing area (20) comprise two flexible tabs (4) disposed in an inclined, diverging position; each flexible tab (4) being provided in upper position with a retention tooth (41); wherein said lower fixing means (A32) comprise two steps (32) disposed in the first portion (3a) of the supporting leg (3), one of the two retention teeth (41) being suitable for being disposed on each step (32), fixing the supporting leg (3) to the fixing area (20).
10. The kit of claim 9, wherein the two steps (32) are provided in upper position in two lateral edges (33) which define a narrow opening (33a) that provides access to the supporting leg (3) suitable for receiving the flexible tabs (4); it being provided that the lateral edges (33) are suitable for being engaged against the retention teeth (41) during the coupling of the lower portion (3b) of the supporting leg (3) with the fixing area (20), in such a way to bend the flexible tabs (4) towards the center until the two retention teeth (41) are engaged and disposed on the steps (32).
11. The kit of any one of the preceding claims, wherein said upper portion (3a) and said lower portion (3b) of the supporting leg (3) are made in one piece.

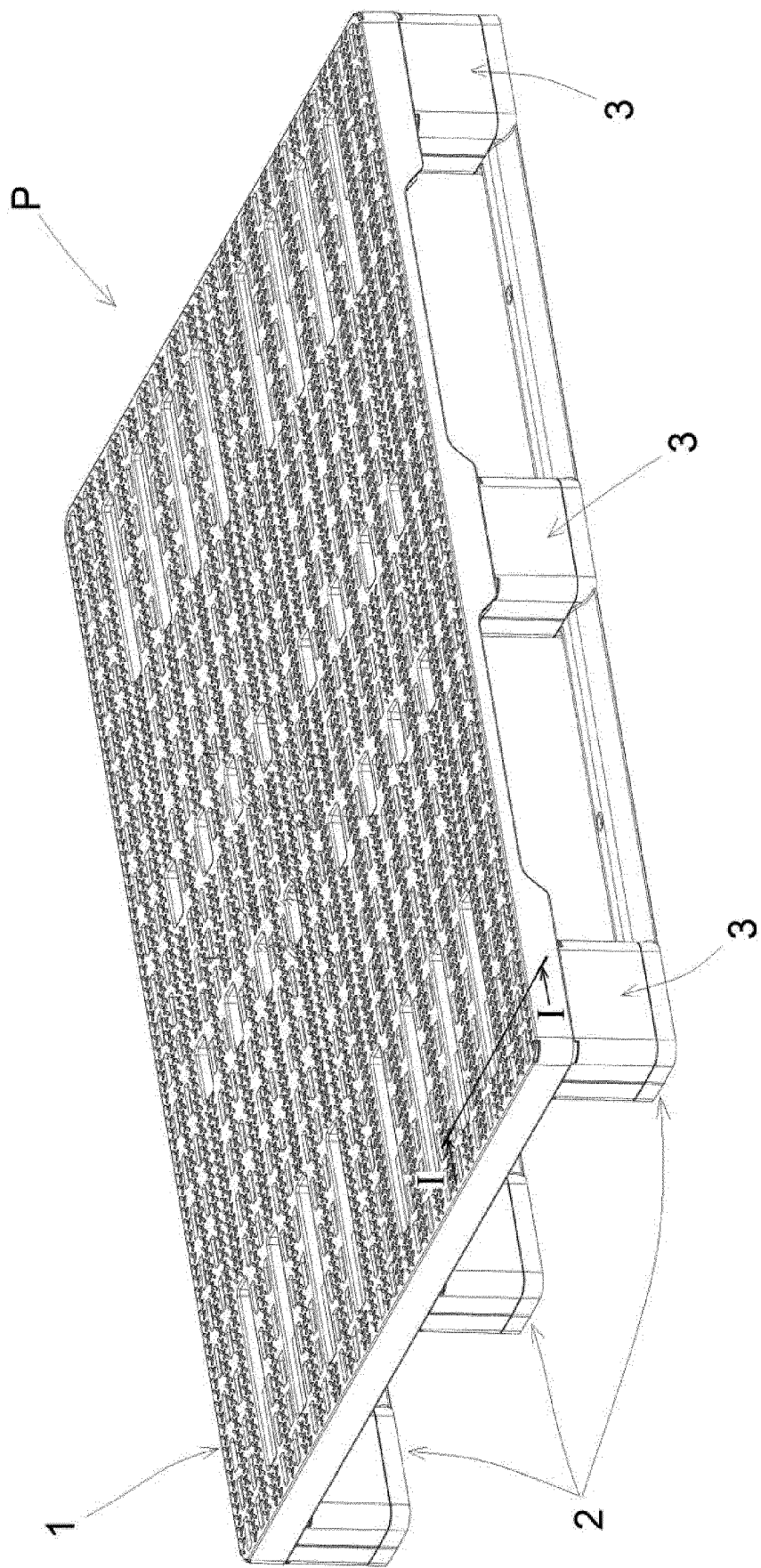


FIG. 1

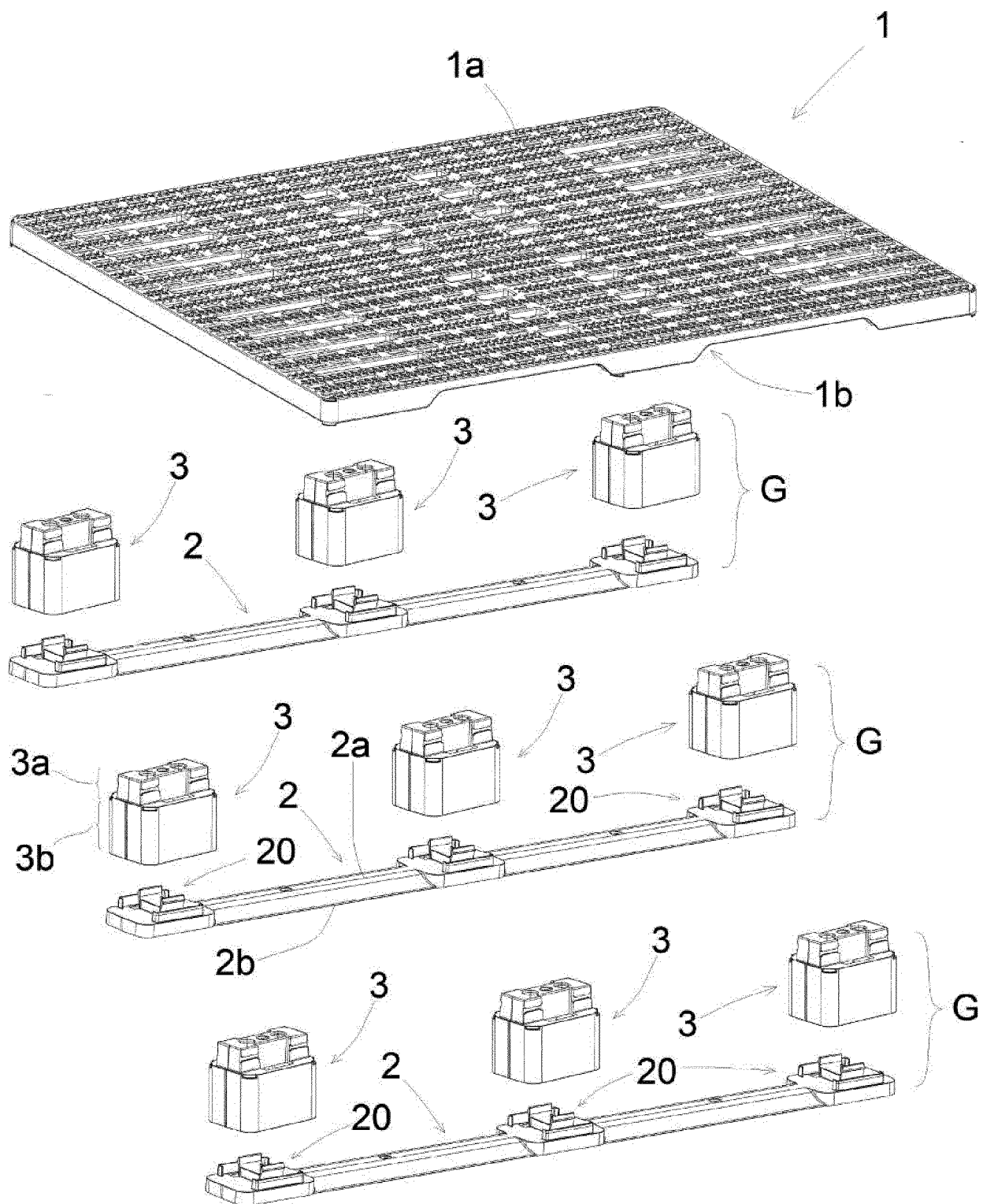
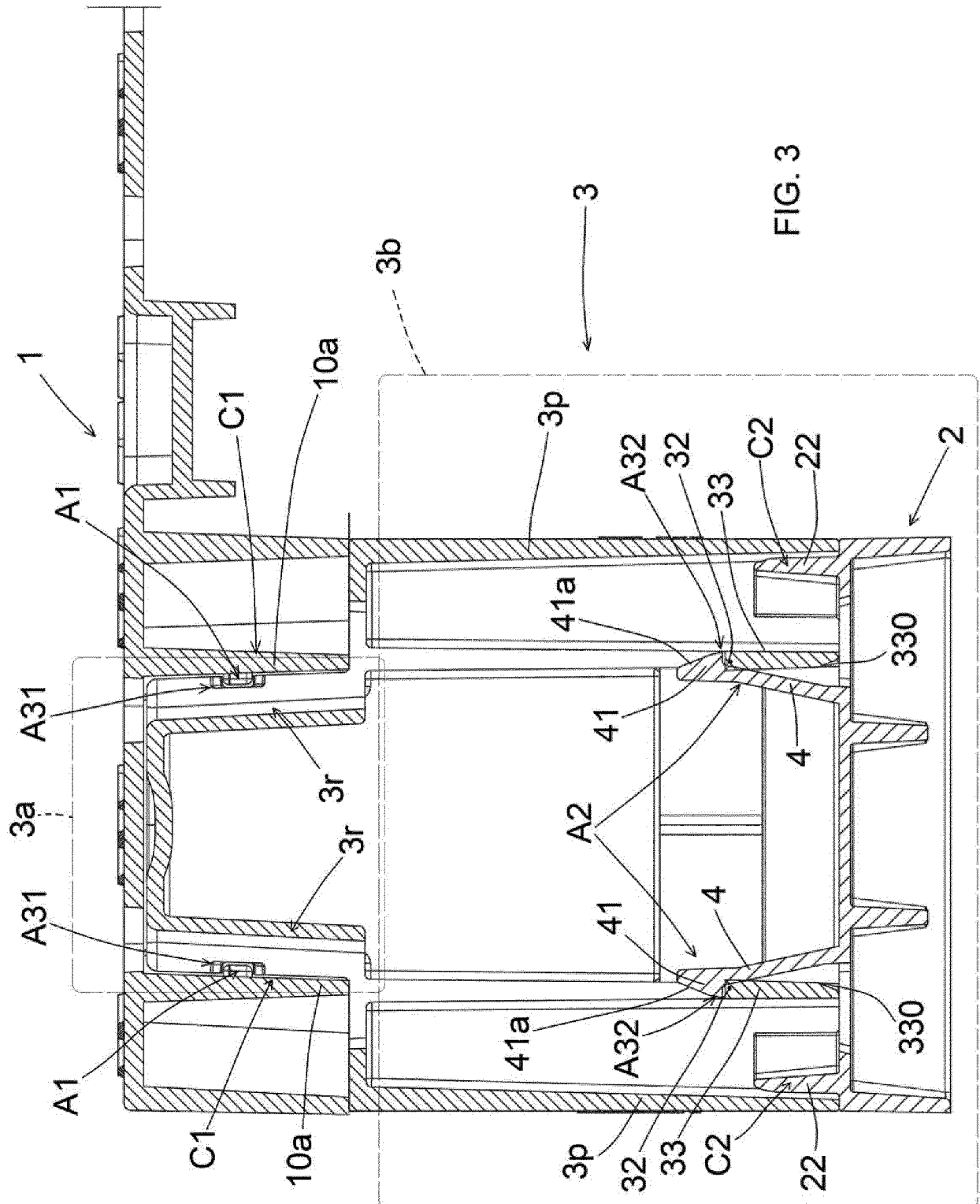


FIG. 2



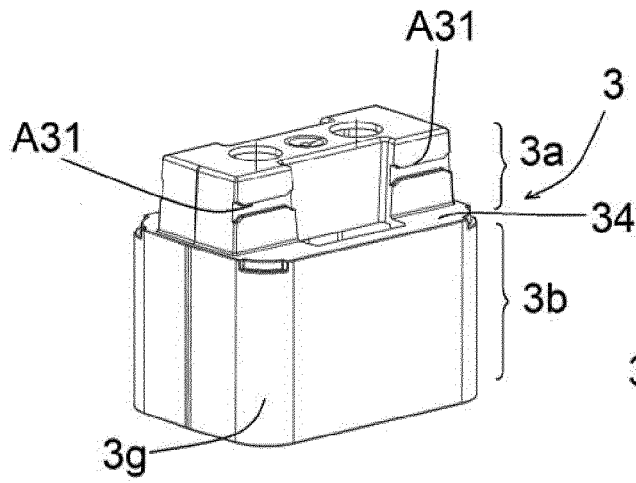


FIG. 4

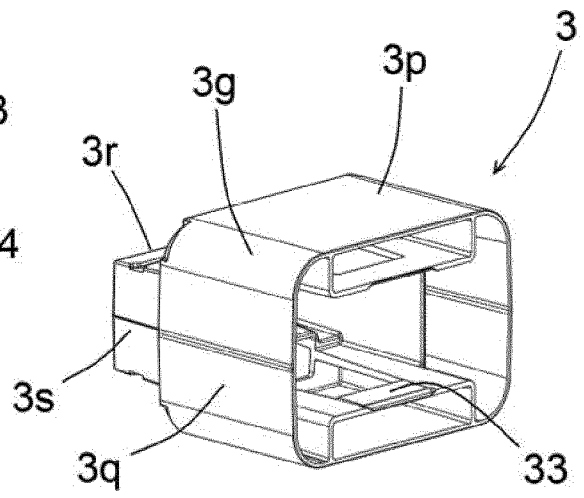


FIG. 4A

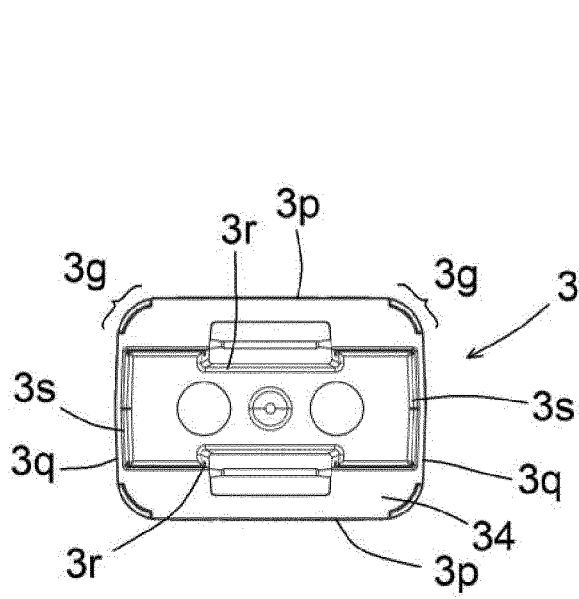


FIG. 4B

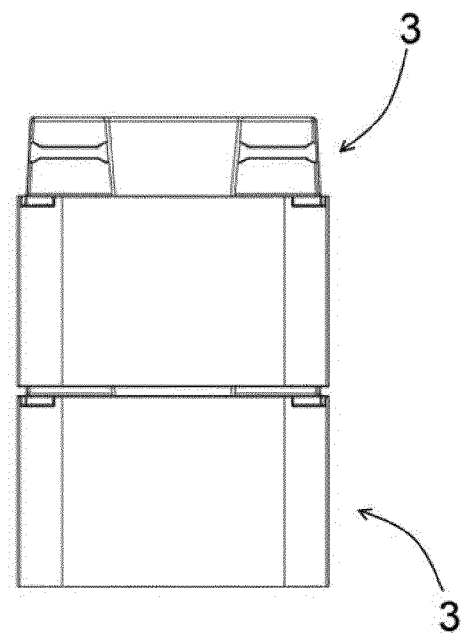


FIG. 4C

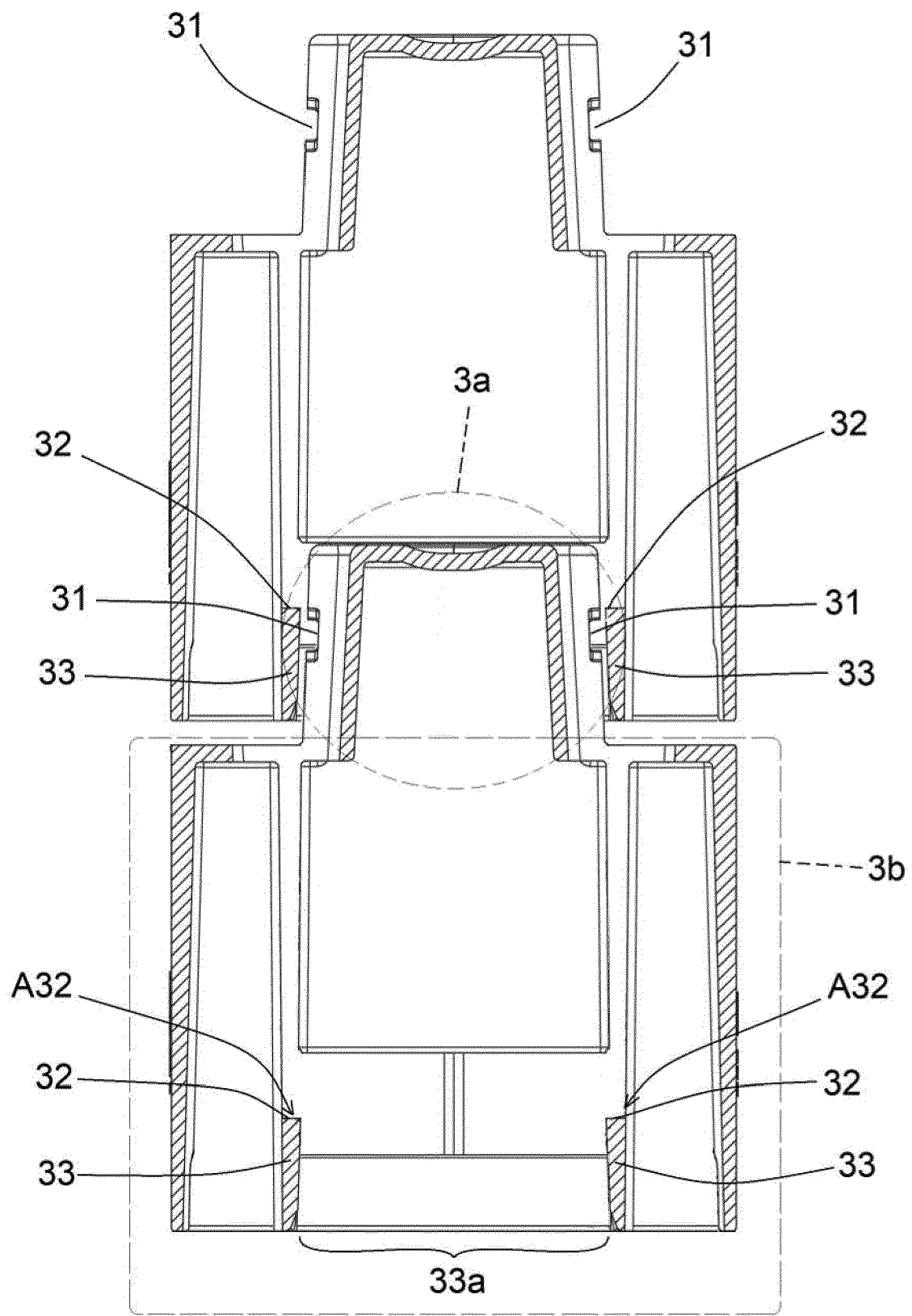


FIG. 4D

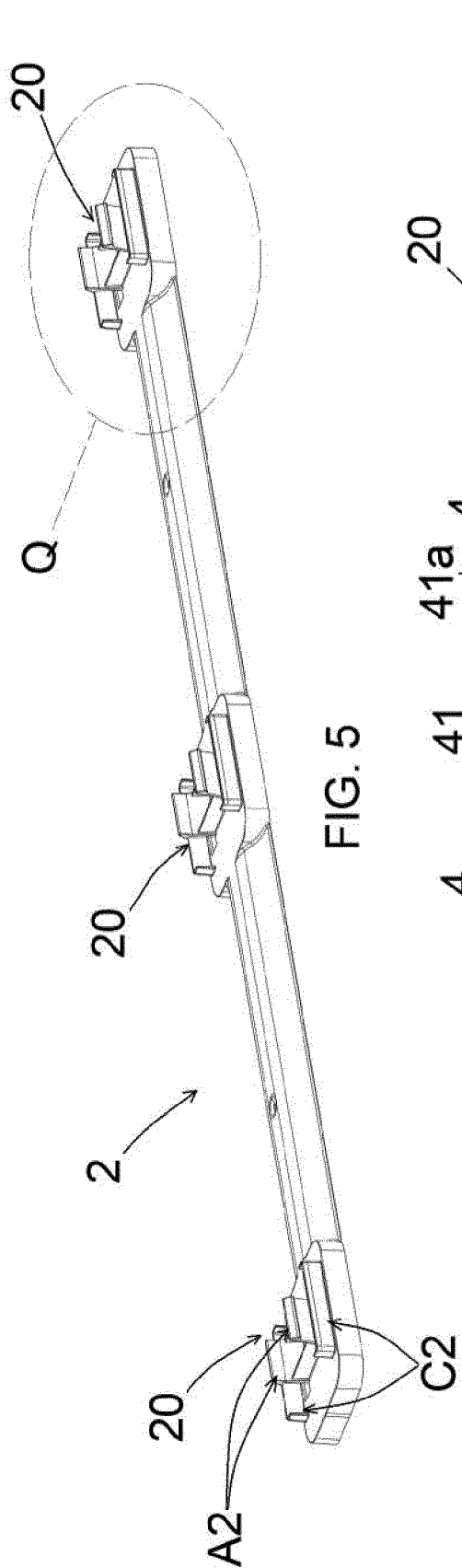


FIG. 5

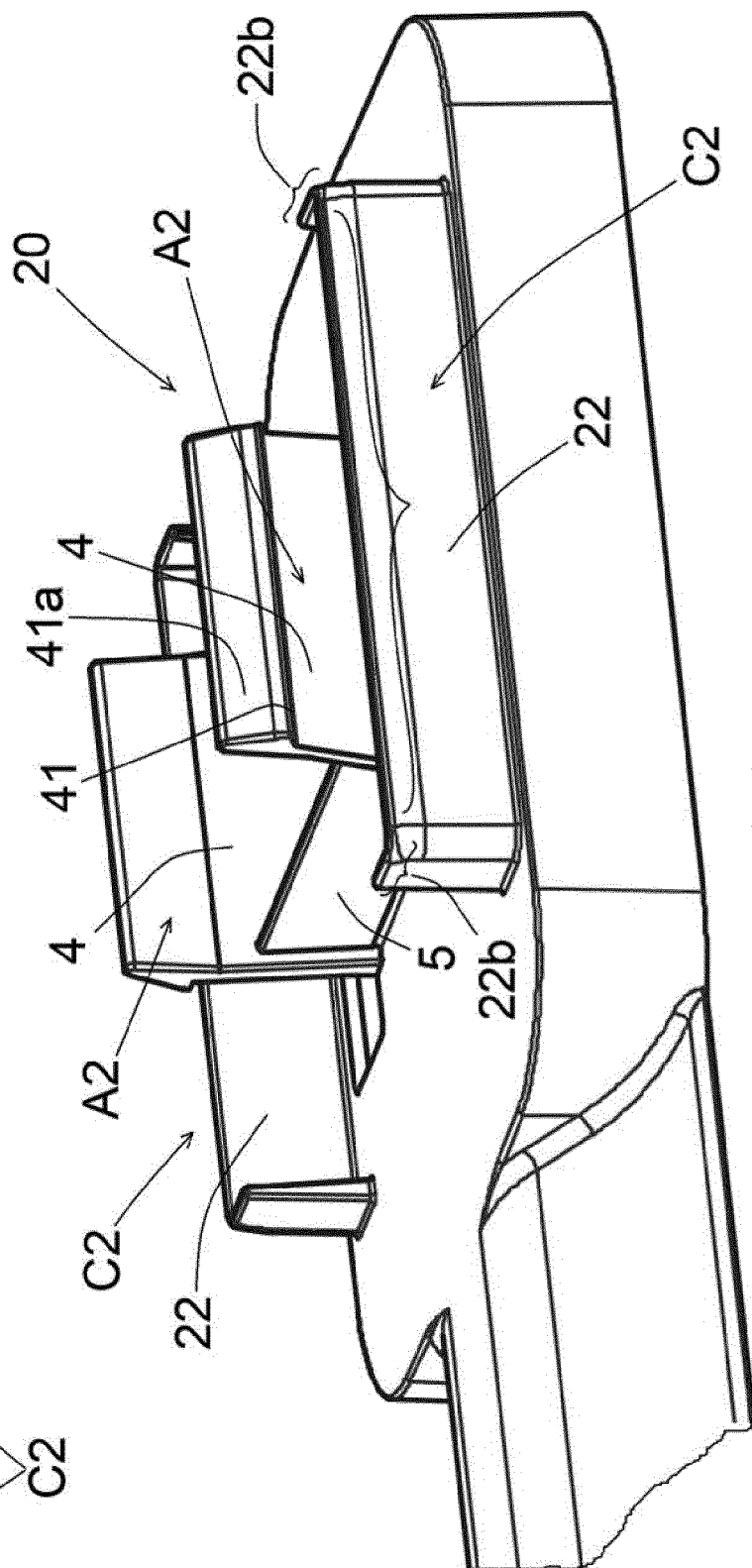


FIG. 5A

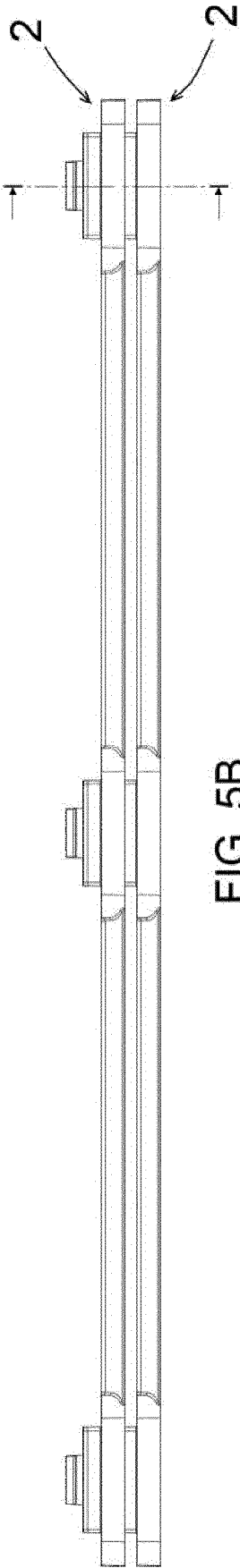


FIG. 5B

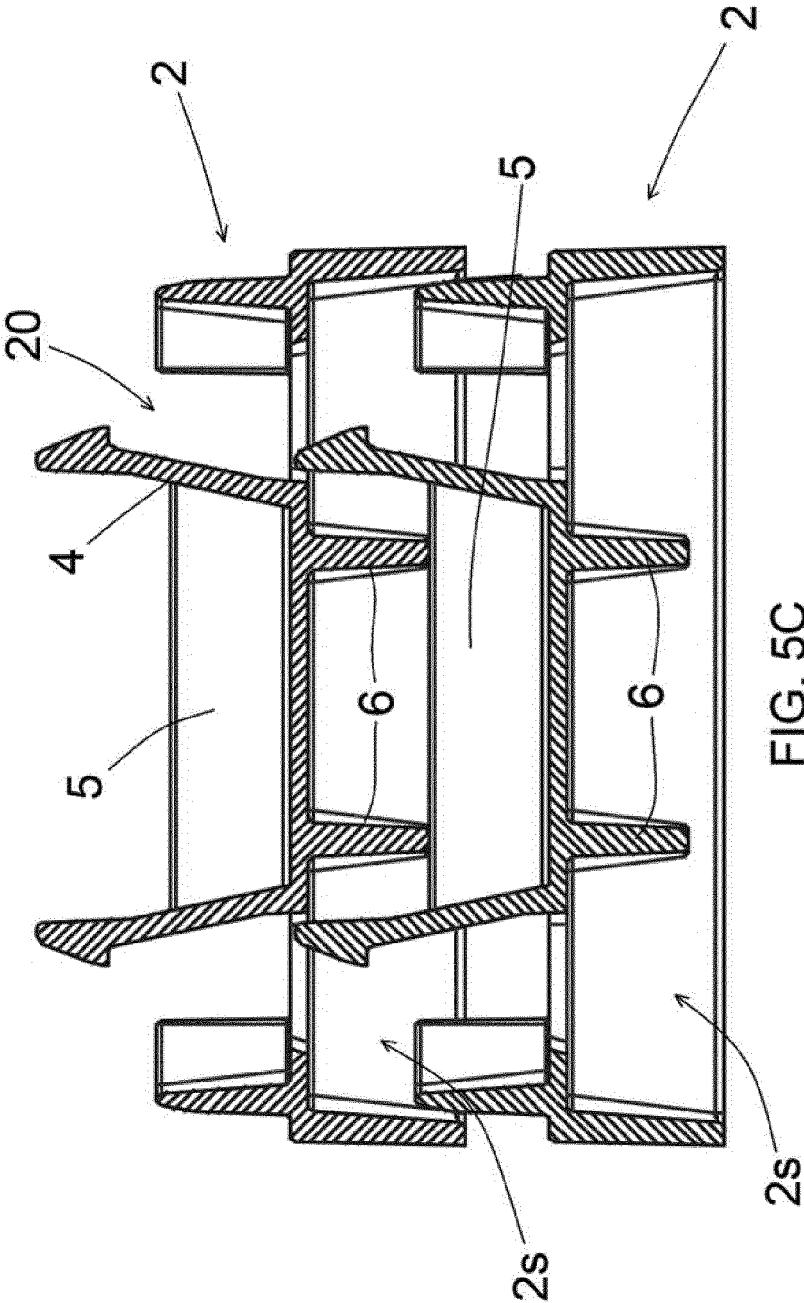
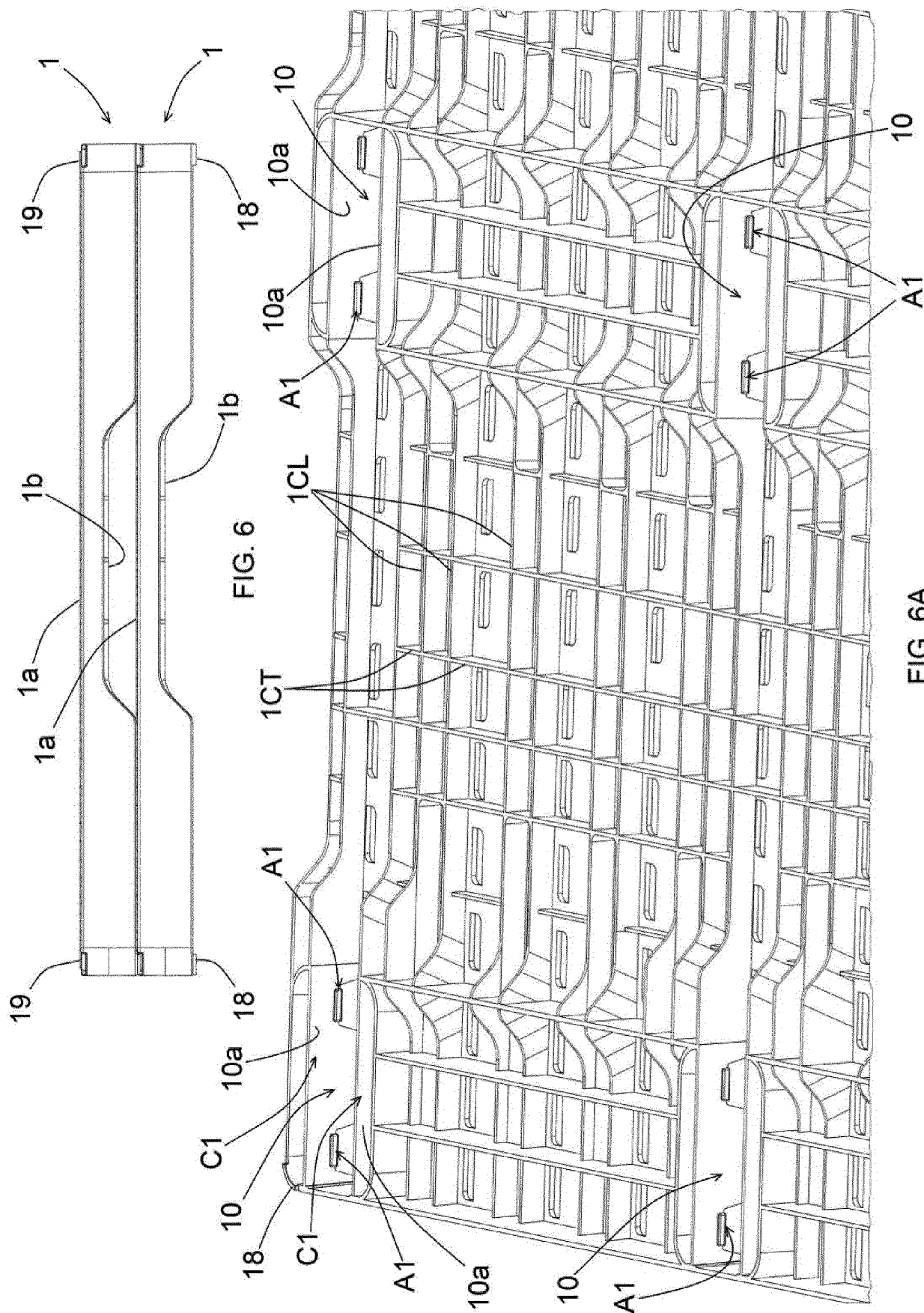


FIG. 5C





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