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

(11) EP 3 719 204 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.10.2020 Bulletin 2020/41

(51) Int Cl.:
E01F 13/02 *(2006.01)*

(21) Application number: **20167622.8**

(22) Date of filing: **01.04.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **05.04.2019 GB 201904885**

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(54) BARRIER WITH CONNECTOR

(57) A temporary barrier 30 comprises a barrier panel 11 manufactured from a moulded plastics material and an end-to-end connector arrangement 34a, 34b, wherein the barrier panel 11 is moulded with at least one mounting location 33a for locating a connector element 34a of the end-to-end connector arrangement, allowing the connector element 34a to be affixed at the mounting location 33a, to extend from the barrier panel 11 to be able to connect in end-to-end fashion to an adjacent temporary barrier to be provided.

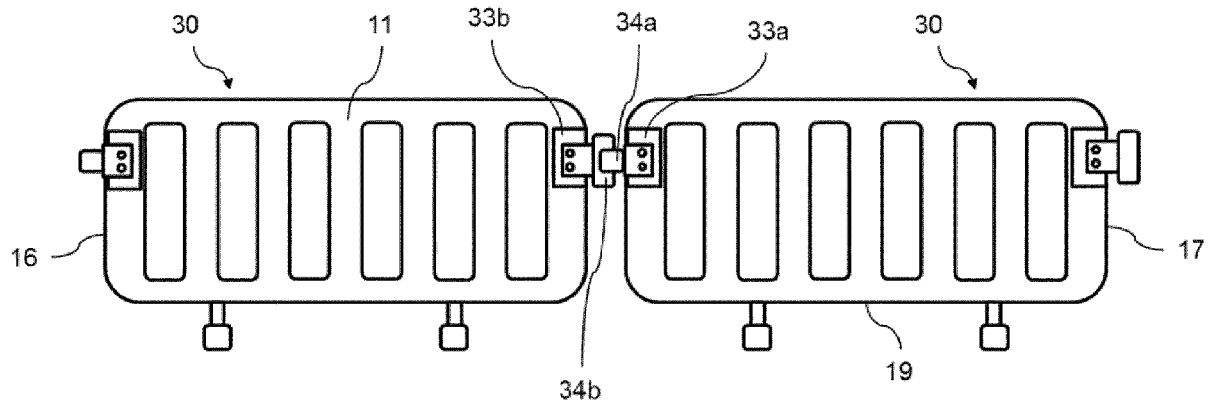

Figure 3a

EP 3 719 204 A1

Description

Field of the Invention

[0001] This invention relates to a barrier. More particularly, the invention relates to a temporary barrier of the type to be used on or near roadways and which is manufactured at least partially from a moulded plastics material.

Background

[0002] Temporary barriers are typically constructed of light-weight material, such as blow-moulded plastics material, so that they can be handled by a single worker. The mass of a temporary barrier is often less than 25 kg to comply with load handling restrictions for single workers. If necessary, increased stability can be imparted to a temporary barrier by adding weight in the form of sand bags, support blocks, or similar.

[0003] Commonly, temporary barriers comprise end-to-end connectors in the form of a hook on one end of the barrier and a ring at the other end of the barrier, such that multiple temporary barriers can be hooked together in end-to-end fashion to provide a length of temporary fencing.

[0004] The end-to-end connector elements are integral with the temporary barrier which facilitates moulding and ensures the connector elements are provided together with a barrier panel.

[0005] The present applicant pioneered a temporary barrier comprising as part of an end-to-end connector arrangement a relatively long engaging element to engage in elongate slots of much wider cross-section than that of the engaging element. The wider cross section results in a loose engagement allowing the long engaging element to tilt relative to the elongate slot while it is engaged in it, which in turn allows a relatively secure end-to-end connection of adjacent barriers to be maintained on uneven terrain e.g. from street level to a relatively higher pavement level.

[0006] The present invention has been devised to further improve or facilitate the use of end-to-end connection arrangements between temporary barriers.

Summary of the Invention

[0007] According to a first aspect, the present invention provides a temporary barrier as defined in claim 1, comprising a barrier panel manufactured from a moulded plastics material. The barrier panel comprises an end-to-end connector arrangement. The barrier panel is moulded with at least one mounting location for locating a connector element of the end-to-end connector arrangement, allowing the connector element to be affixed at the mounting location, to extend from the barrier panel to be able to connect in end-to-end fashion to an adjacent temporary barrier to be provided.

[0008] The temporary barrier may be a type of barrier supported on two feet. The feet may be swivelable from a retracted configuration in which they are aligned with the plane of the panel to an extended configuration in which they extend sideways from the plane of the panel to provide stability. The temporary barrier may be generally flat, or transformable into a flat configuration, e.g. by using the aforementioned swivelable feet, to reduce the stack height of multiple stacked panels.

[0009] It will be understood that the connector element, since it is affixed to the mounting surface, is a separate component to the barrier panel, and in particular it may be manufactured without a need for it to be integrally moulded with the barrier panel. Since the at least one connector element is a separate structure to the barrier panel, this facilitates replacing the connector element without having to replace an entire barrier panel. The present arrangement provides that in the event of damage to the connector element, only the damaged connector element will need to be replaced. This is advantageous since it avoids a need for replacing an entire barrier panel if only a connector element needs to be replaced.

[0010] The mounting location identifies a surface to which a connector element can be affixed on the barrier panel, for instance at or near a lateral end of the barrier panel. It will be understood that the connector element is provided with a panel-engaging portion and a connector portion. E.g., the panel-engaging portion may be provided in the form of an abutment surface to be seated on or in the mounting location. The connector portion may be a protrusion such as a hook, or a receptacle such as a ring, carried on the panel-engaging portion.

[0011] In some embodiments, the mounting location comprises a fixture-receiving configuration and the connector element comprises an attachment configuration, wherein the fixture-receiving configuration corresponds to the attachment configuration such that their alignment defines a predetermined orientation of the connector element relative to the barrier panel.

[0012] The predetermined orientation achieves that the connector extends in a predefined direction from the barrier panel when it is affixed to the mounting location. Thereby, the at least one connector element may be rotationally locked in relation to the barrier panel, and/or locked in a vertical and/or horizontal position. In particular, the connector element may be affixed such that a worker can lift the temporary barrier to connect it to an adjacent barrier, without having to consider that the connector might slide or rotate away. As such, by way of fixing the connector in position, the temporary barrier can be handled in a working environment just like an unitary barrier panel, e.g. a barrier panel with integrally moulded connectors. Likewise, if the panel is stacked for storage or transportation, the connector elements should remain fixed to avoid that they rotate or slide in a position, e.g. sticking out sideways, away from the panel plane, in which they inhibit dense stacking or would be more prone

to damage.

[0013] In a simple configuration, the connector element is affixed to the mounting location, e.g. a planar surface of the panel-engaging portion abutting a planar surface of the mounting location, using one or more bolts to fix the connector element rotationally and translationally on the barrier panel. However, such a configuration may require a thread of a bolt to grip the panel material, and may require a tightening of the bolts which may place undesirable strain on some types of barrier panel, for instance panels of blow moulded construction with relatively thin and therefore brittle walls.

[0014] In some embodiments, the fixture-receiving configuration is integral with the mounting location.

[0015] In some embodiments, the attachment configuration is integral with the connector element.

[0016] Integral mounting locations and/or attachment configurations avoid the need for alignment of the fixture-receiving configuration with the mounting location, or of the attachment configuration with the connector element, respectively, during assembly, contrary to what would be the case for separate components.

[0017] In some embodiments, the fixture-receiving configuration and/or the attachment configuration comprises holes.

[0018] This avoids the need to permanently alter or damage the barrier panel and/or the connector element to allow it to receive a fixture. Particularly blow-moulded barrier panels can be of hard, thin-walled plastics material that is relatively brittle and therefore not well suited for drilling holes into the panel without causing damage. The fixture-receiving elements may be aligned with corresponding attachment elements on the connector element. For instance, the connector element and the barrier panel may comprise holes that are aligned to allow a bolt to be received through the connector element and through the barrier panel, to be secured with a corresponding nut.

[0019] By providing fixture-receiving holes, a connector element can be removably affixed to the mounting surface, e.g. using bolts, washers, and nuts, without damage to the barrier panel. The localised loads onto the barrier panel material can be further reduced by using washers or contact surfaces of the fixture-receiving configuration and attachment configuration that avoid a need for a fixture to come into direct contact with the barrier panel material.

[0020] Likewise, the connector element may comprise, as attachment configuration, a thread that can be engaged by a bolt fed through a hole of the fixture-receiving configuration of the panel.

[0021] In some embodiments, the fixture-receiving configuration and the attachment configuration comprise corresponding engagement features.

[0022] In some embodiments, the connector element is made from a different material than the barrier panel. The connector element may be made from metal. The connector element may be made from the same material as the barrier panel. The at least one connector may be manufactured from a plastics material, particularly moulded plastics material. Additionally, or alternatively, the at least one connector element may be manufactured from, or reinforced with, a stronger material than the barrier panel, such as fibre reinforcement.

[0023] Manufacturing the at least one connector element from, or reinforcing the at least one connector element with, a stronger material than the barrier panel allows the connector element to be of a smaller size when compared to another connector element with the same failure load but manufactured from the same material as the barrier panel. A smaller and more compact connector element is advantageous since it allows for a smaller gap between connected barriers. Further, a smaller and more compact connector element is less likely to get accidentally damaged when handling the barrier. As can be imagined, temporary barriers are used at roadwork and construction sites and be subject to robust handling. Particularly as end-to-end connectors protrude from the general body of a barrier panel, they are more exposed and more susceptible to damage. A smaller connector element may also have a smaller area of attachment to a barrier panel which is advantageous since it provides more design freedom for positioning the mounting location on the barrier panel.

[0024] On the other hand, a connector element may have to be made from a relatively large size to remain compatible with existing barrier systems. For instance, the hook of an end-to-end connector may protrude laterally, in the extension of the plane of the barrier panel, about 10-15 cm from the barrier panel body and have a length, vertically, of about 25-30 cm. However, using a stronger material, the hook may be made thinner, with a smaller cross-section than would otherwise be the case.

[0025] In some embodiments, the barrier panel and/or the connector element has a Shore A hardness of no more than 95, 90, 85, 80, 75, 70, 65, or 60. The barrier panel and/or the connector element may have a Shore A hardness of at least 60, 65, 70, 75, or 80. Exemplary materials to provide a moulded panel of this degree of Shore A hardness are thermoplastics such as low density polyethylene, which have a rubbery consistency. To provide illustrative values, a Shore A hardness of 80 would be corresponding to hard rubber, whereas a Shore A hardness of 60 would be relatively floppy, such as rubber material used in a door seal.

[0026] In some embodiments, the barrier panel is made of a material with a Young's modulus (measured in GPa) of no more than 4.5, 4, 3.5, 3, 2.5, 2, or 1.5 GPa. In some embodiments, the barrier panel is made of a material with a Young's modulus of no less than 0.05, 0.1, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, or 6 GPa.

[0027] In some embodiments, a connector is made of a material with a Young's modulus of no more than 4.5, 4, 3.5, 3, 2.5, 2, or 1.5 GPa. In some embodiments, a connector is made of a material with a Young's modulus of no less than 0.05, 0.01, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4,

4.5, 5, 5.5, 6, 10, 20 or 30 GPa. In particular plastics material may be fibre reinforced, having a Young's modulus of no less than 10, 20, 30, 40 or 50 GPa. A connector may be made from metal.

[0028] In some embodiments, the barrier panel and the connector element have the same rigidity. In some embodiments, the barrier panel is more rigid than a connector element. In some embodiments, a connector element is more rigid that the barrier panel. In some embodiments, one connector element is more rigid than the barrier panel and another connector element is less rigid than the barrier panel. As such, the connector element may be more flexible than the barrier panel. This may be appropriate for relatively larger connectors. The connector element may be less flexible than the barrier panel. This may be appropriate for relatively smaller connectors. The barrier panel may comprise at least two connector elements, and one connector element may be less flexible than the barrier panel and another connector element may be more flexible than the barrier panel. For instance, a hook-type connector element may be more rigid than the barrier panel and a corresponding ring-type connector element shaped to receive the hook may be more flexible than the barrier panel, or vice versa. The connector elements may have the same rigidity.

[0029] In some embodiments, the temporary barrier panel is manufactured via a blow moulding process, an injection moulding process, or a compression moulding process.

[0030] In some embodiments, the at least one connector element may be affixed using either screws, rivets, bolts, pins, via a tongue-and-groove engagement, relying on friction fit or a snap-fit arrangement, or a combination of two or more thereof.

[0031] In some embodiments, the connector element is affixable to the barrier panel via the fixture-receiving configuration and the attachment configuration when they are aligned.

[0032] More generally, the connector element may be affixed in a manner permitting its removal without damage to the barrier panel. This allows each connector element to be removed without otherwise affecting the structure of the barrier panel, and to be replaced with a connector element of the same configuration or a different configuration. This allows broken connector elements to be easily and quickly replaced. Likewise, this allows connector elements to be repeatedly detached or attached. The use of replaceable connector elements also enhances the modularity of the temporary barrier, because the same panel mould can be used to attach different connector systems.

[0033] The temporary barrier may comprise at least two connector elements. The at least two connector elements may include at least one first connector element and at least one second connector element. The at least one first connector element may have a different configuration to the at least one second connector element. The at least one first connector element may comprise a receiving portion and the at least one second connector element may comprise a corresponding protruding portion dimensioned to engage in a receiving portion of same dimensions of an adjacent temporary barrier. The protruding portion may be hook-shaped and the receiving portion may be ring-shaped.

[0034] The temporary barrier may comprise at least two mounting locations. At least one mounting location may be comprised at or near a first lateral end of the barrier panel. At least one mounting location may be comprised at or near a second lateral end of the barrier panel. The at least one mounting location at the first lateral end of the barrier panel may be paired with at least one mounting location at the second lateral end of the barrier panel, such that the at least one pair of mounting locations are located at the same height from a base of the barrier panel.

[0035] The mounting location may be constituted by one or more mounting surfaces. The mounting surface may be planar. The mounting surface may either be parallel or perpendicular to a plane of the barrier panel.

[0036] Turning to the connector element, the panel-engaging portion may comprise at least one planar surface corresponding to the planar mounting surface when affixed to it. The panel-engaging portion may comprise two or more planar surfaces configured to lie adjacent at least two planar mounting surfaces of the mounting location when affixed to it.

[0037] The mounting surface and/or the panel-engaging portion may comprise corresponding surface patterns, e.g. ridges, protrusions and/or corresponding recesses, to improve the surface-to-surface engagement between the connector element and the mounting location.

[0038] The mounting surface may be curved. The panel-engaging portion may comprise at least one curved surface configured to at least partially conform to and at least partially surround the curved mounting surface when affixed to the curved mounting surface.

[0039] In some embodiments, the at least one mounting location is recessed into an outer surface of the barrier panel. A depth of the at least one recessed mounting location may be chosen to be no less than a thickness of a mounting plate of the panel-engaging portion of the connector element.

[0040] By choosing a thickness of a mounting plate of the connector element to be equal to, or less than a depth of the at least one recessed mounting location, the connector element may be configured such that an outer surface of the mounting plate is flush with, or not protruding from, the outer surface of the barrier panel once affixed. This is advantageous since it reduces the likelihood that the affixing portion of the connector element will be accidentally damaged. In particular, the mounting location may be recessed in the plane of the barrier panel, such that multiple barrier panels can be stacked without interference by the mounting location if a mounting plate is attached to it. This can be achieved by providing con-

nector elements that are not wider, in a direction perpendicular to the plane of the barrier panel, than the barrier panel.

[0041] Alternatively, the connector element may be configured such that some portions of the mounting plate are higher than the recessed mounting location, but at least an edge of its outer surface is flush with, or not protruding from, the outer surface of the barrier panel, such that there is no protruding step. The stackability may provided even if a mounting plate of a connector element protrudes from the plane of a barrier panel, if the corresponding opposite side of the barrier panel is provided with a recess. In that case, the protruding mounting plate of the connector on a first barrier panel may extend into the recess provided by the mounting location of a second barrier panel.

[0042] According to a second aspect, the present invention provides a temporary barrier system comprising two or more of the aforementioned temporary barriers. The temporary barriers are arranged such that at least one connector element of each barrier is connected to a connector element of an adjacent barrier.

Description of the Figures

[0043] Embodiments of the invention will now be described by way of example and with reference to the accompanying Figures, in which:

Figure 1 is a side view of a temporary barrier in accordance with the invention.

Figure 2a is a side view of two temporary barriers in accordance with another embodiment of the invention connected in end-to-end fashion.

Figure 2b is an isolated perspective view of the connector elements shown in Figure 2a.

Figure 3a is a side view of two temporary barriers in accordance with another embodiment of the invention connected in end-to-end fashion.

Figure 3b is an isolated perspective view of the connector elements shown in Figure 3a.

Figure 4a is perspective view of a connector element mounting configuration in accordance with an embodiment of the invention.

Figure 4b is perspective view of a connector element mounting configuration in accordance with another embodiment of the invention.

Figure 4c is perspective view of a connector element mounting configuration in accordance with another embodiment of the invention.

Figure 5 is perspective view of a connector element mounting configuration in accordance with another embodiment of the invention.

Description

[0044] Figure 1 is a side view of a temporary barrier 10. The temporary barrier 10 comprises a barrier panel 11, two supporting feet 12, a mounting surface 13 constituting a mounting location and a connector element 14.

[0045] As shown in Figure 1, the barrier panel 11 has an oblong-shaped side profile comprising a first lateral end 16, a second lateral end 17, a base 19 and a top rail 18. The first and second lateral ends 16, 17 are separated by a distance defined by the panel's width, and the base 19 and top rail 18 are separated by a distance defined by the panel's height. The barrier panel 11 has a thickness (not shown in Figure 1) which is much smaller than both the panel width and the panel height. The plane of the panel is understood to correspond to the width and height extension of the barrier panel 11. The first and second lateral ends 16, 17 are substantially straight and parallel in relation to each other and are generally vertically aligned when both supporting feet 12 rest on an underlying ground surface (not shown in Figure 1). The base 19 and top rail 18 are substantially straight and parallel in relation to each other and are generally horizontally aligned when both supporting feet 12 rest on an underlying ground surface. Panels of this type are typically flat to allow them to be stacked for storage or transportation. However, it will be appreciated by those skilled in the art that the barrier panel 11 may have any shaped side profile. For example, the barrier panel 11 may have a side profile which is oval-shaped or irregularly-shaped. Some temporary barriers are of balcony shape with a wider footprint for increased stability. The barrier may be assembled from multiple panel components. Any such, barriers would be understood to include lateral ends for end-to-end connection of a series of barriers.

[0046] In Figure 1, the panel 11 is of a grid-panel type with integrally moulded vertical posts spaced apart by a plurality of (here: six) openings 15. However, the barrier panel 11 may comprise more than six openings, fewer than six openings, or no openings (i.e. the panel 11 may be a continuously solid panel, as may be desirable to protect passers-by from debris or dust).

[0047] The barrier panel 11 may be manufactured from a moulded plastics material such as, for example, acrylonitrile butadiene styrene (ABS), polyethylene, polycarbonate, polyamide, or polypropylene. The barrier panel 11 may be manufactured from either a virgin plastic material or a recycled plastic material. The barrier panel 11 may be manufactured via any process known in the art such as, for example, blow moulding, injection moulding, or compression moulding.

[0048] The barrier panel 11 may include one or more strengthening members to improve the panel's strength and/or rigidity. The strengthening members may be man-

ufactured from a different material to the barrier panel such as, for example, a stronger and/or more rigid plastics material, steel, aluminium or wood, or a fibre-reinforced composite material. The strengthening members may lie adjacent: the top rail 18, the base 19, the first lateral end 16, the second lateral end 17, one or more openings 15, or a combination of said locations.

[0049] As shown in Figure 1, the temporary barrier 10 comprises a mounting surface 13 constituting a mounting location, located on a side face of the barrier panel 11 and adjacent the second lateral end 17 of the barrier panel 11. By "side face", it is meant an outer surface of the barrier panel 11 which is at least partially defined by the first lateral end 16, the second lateral end 17, the base 19 and the top rail 18. Thus, a barrier panel will typically have two side faces, only one of which is shown in Figure 1. A connector element 14 is affixed to the mounting surface 13. The connector element 14 extends laterally from second lateral end 17 of the barrier panel 11 such that it is able to connect in end-to-end fashion to an adjacent temporary barrier.

[0050] In Figure 1, the mounting surface 13 is a distinct portion of the outer surface of the barrier panel 11 onto which a connector element 14 may be affixed. In other embodiments, the mounting surface 13 is comprised on a separate structure which has been affixed to the outer surface of the barrier panel 11. Said separate structure may be manufactured from a different material to the barrier panel 11 such as, for example, a different plastics material, steel, aluminium or wood, or a fibre-reinforced composite material. Said separate structure may be manufactured from a stronger material than the barrier panel 11. In some embodiments, the mounting surface 13 may be recessed into the outer surface of the barrier panel 11.

[0051] In some embodiments, the connector element 14 is manufactured from a different material to the barrier panel 11. For example, the connector element 14 may be manufactured from a different moulded plastics material to the barrier panel 11. Alternatively, the connector element 14 may be manufactured from a non-plastics material such as, for example, steel, aluminium, wood or a fibre-reinforced composite. The connector element 14 may be manufactured from, or reinforced with, a stronger material than the barrier panel 11. By stronger, it is meant that the connector element may be harder, more durable, more resilient and/or more rigid than the barrier panel.

[0052] In Figure 1, the connector element 14 is affixed to the mounting surface 13 via rivets 20. However, it will be appreciated by those skilled in the art that the connector element 14 may be affixed to the mounting surface via any means well known in the art such as, for example, screws, a snap-fit arrangement, or a combination of two or more different affixing means.

[0053] In some embodiments, the connector element 14 is rotationally locked in relation to the barrier panel 11. In other embodiments, the connector element 14 is vertically fixed in position to prevent sliding up and down the barrier and allowed to rotate in relation to the barrier panel 11 about at least one axis of rotation. The locked, or fixed, engagement may be achieved by providing corresponding engagement features in the form of an arrangement of holes as attachment configuration of the connector element 14 and in the form of corresponding holes as fixture-receiving configuration of the outing surface 13.

[0054] In Figure 1, the mounting surface 13 is shown to be rectangular. However, it will be appreciated by those skilled in the art that the mounting surface could be of any size and shape which is suitable for accommodating the connector element 14 which is to be affixed to it. Particularly if integrally moulded with the barrier panel 11, the mounting surface may comprise tapered and curved contours to facilitate manufacture by moulding.

[0055] Referring to Figures 2a and 2b, Figure 2a shows a side view of two temporary barriers 20 according to another embodiment of the invention connected in end-to-end fashion. The same reference numerals are used in Figures 1 and 2a for corresponding elements without repeating the description thereof. Each temporary barrier 20 comprises a first mounting surface 23a adjacent the first lateral end 16 of the barrier panel 11, and a second mounting surface 23b adjacent the second lateral end 17 of the barrier panel 11. In the embodiment shown in Figure 2a, the first and second mounting surfaces 23a, 23b are located on a side face of the barrier panel 11. In the particular embodiment, the second mounting surface 23b is located at a different height (at a greater vertical distance from the base 19 of the barrier panel 11) than the first mounting surface 23a.

[0056] As shown in Figure 2a, a first connector element 24a is affixed to the first mounting surface 23a and a second connector element 24b is affixed to the second mounting surface 23b. The first and second connector elements 24a, 24b may be affixed to the first and second mounting surfaces 23a, 23b via any of the affixing means previously described in relation to Figure 1.

[0057] Figure 2b shows an isolated perspective view of the first and second connector elements 24a, 24b shown in Figure 2a. As shown in Figure 2b, the first connector element 24a has a different configuration to the second connector element 24b. The first connector element 24a comprises a ring 25 and the second connector element 24b comprises a hook 26. The ring 25 is configured to receive the hook 26. It will be appreciated by those skilled in the art that any engaging configuration can be provided instead of the ring 25 and the hook 26 so that it can be provided that the first and second connector elements 24a, 24b are engageable in the lateral direction of the temporary barrier 20; the lateral direction of the temporary barrier 20 being defined as parallel to the width of the barrier panel 11. For example, the hook 26 may comprise a straight downwardly depending rod such as that shown comprised in the connector element 14 of Figure 1. As a further example and as illustrated in Figure 3b, the hook 36 may comprise a cylindrical structure constituting the hook end and the ring 35 may com-

prise a circular cuff configured to at least partially surround the cylindrical structure. This will be discussed in more detail below.

[0058] The temporary barrier 20 shown in Figure 2a comprises first and second mounting surfaces 23a, 23b and first and second connector elements 24a, 24b located adjacent the first and second lateral ends 16, 17 of the barrier panel respectively. In some embodiments, the first and second mounting surfaces 23a, 23b and the first and second connector elements 24a, 24b may both be located at the same lateral end of the barrier panel 11. In said embodiments, the first and second mounting surfaces may be located on opposite side faces of the barrier panel 11 such that the first and second connector elements are offset from one another in a direction parallel to the barrier panel's thickness.

[0059] In some embodiments, the barrier panel 11 exhibits symmetry such that the mounting panels are on the same height. This facilitates manufacture if the temporary barrier can be assembled without regard to the orientation of the barrier panel. The barrier panel may comprise multiple mounting locations, e.g. a total of four mounting locations, or six mounting locations, near the base, near the centre, and near the top, on each of the left and right end of the barrier panel, such that the barrier panel is correctly oriented for assembly regardless of which edge is facing up or to a particular side. It will be understood that the barrier panel may have more mounting locations than connectors. Each mounting location may allow a connector to be affixed to it.

[0060] Referring to Figures 3a and 3b, Figure 3a shows a side view of two temporary barriers 30 according to another embodiment of the invention connected in end-to-end fashion. The same reference numerals are used in Figures 1 and 3a for corresponding elements without repeating the description thereof. The temporary barrier 30 comprises a first mounting surface 33a located adjacent the first lateral end 16 of the barrier panel 11 and a second mounting surface 33b located adjacent the second lateral end 17 of the barrier panel 11. In the particular embodiment, the first and second mounting surfaces 33a, 33b are located at the same height from the base 19 of the barrier panel.

[0061] As shown in Figure 3a, a first connector element 34a is affixed to the first mounting surface 33a and a second connector element 34b is affixed to the second mounting surface 33b. The first and second connector elements 34a, 34b may be affixed to the first and second mounting surfaces 33a, 33b via any of the affixing means previously described in relation to Figure 1.

[0062] Figure 3b shows an isolated perspective view of the first and second connector elements 34a, 34b shown in Figure 3a. The first connector element 34a comprises a circular cuff 35 and the second connector element 34b comprises a cylindrical structure 36. The circular cuff 35 is configured to at least partially surround the cylindrical structure 36 such that the first and second connector elements 34a, 34b are interlocked in the lateral direction of the temporary barrier 30. In some embodiments, the cylindrical structure 36 and the circular cuff 35 are rotationally locked about an axis parallel to the longitudinal direction of the temporary barrier 30; the longitudinal direction being defined as parallel to the height of the barrier panel 11. In other embodiments, the circular cuff 35 is free to rotate about the cylindrical structure 36.

[0063] Referring to Figures 4a-4c, Figure 4a shows a perspective view of a connector element mounting configuration according to another embodiment of the invention. The same reference numerals are used in Figures 1 and 4a-4c for corresponding elements without repeating the description thereof. The temporary barrier 40a comprises a mounting surface 43a adjacent a lateral end of the barrier panel 11. The mounting surface 43a is planar and is parallel to a plane passing through the two lateral ends 16, 17 of the barrier panel 11. In the particular embodiment, the mounting surface 43a is recessed into a side face of the barrier panel 11. However, it will be appreciated that in other embodiments, the mounting surface 43a may be flush with a side face of the barrier panel 11. The connector element 44a comprises an affixing portion 46a constituting a panel-engaging portion and a connecting portion 47a. In Figure 4a, the connecting portion 47a is shown as a hook. However, the connecting portion 47a may alternatively be a ring or otherwise. The affixing portion 46a comprises a planar affixing surface 45a (obscured in Figure 4a). When the connector element 44a is affixed to the mounting surface 43a, the planar affixing surface 45a abuts and lies adjacent to the planar mounting surface 43a. The connector element 44a may be affixed to the mounting surface 43a via any of the means previously described. The thickness of the affixing portion 46a, as defined in the direction normal to the planar affixing surface 45a, may be chosen to be substantially the same as the depth of the recessed mounting surface 43a.

[0064] Figure 4b shows a perspective view of a connector element mounting configuration according to another embodiment of the invention. The temporary barrier 40b comprises a mounting surface 43b at a lateral end of the barrier panel 11. The mounting surface 43b is planar and is perpendicular to a plane passing through the two lateral ends 16, 17 of the barrier panel 11. In the particular embodiment, the mounting surface 43b is recessed into an end face of the barrier panel 11. By end face, it is meant an outer surface of the barrier panel 11 which is substantially perpendicular to the barrier panel's side faces and which has a surface normal which is parallel to the width of the barrier panel 11. However, it will be appreciated that in other embodiments, the mounting surface 43b may be flush with an end face of the barrier panel 11. The connector element 44b comprises an affixing portion 46b constituting a panel-engaging portion and a connecting portion 47b. In Figure 4b, the connecting portion 47b is shown as a hook. However, the connecting portion 47b may alternatively be a ring or otherwise. The affixing portion 46b comprises a planar affixing

surface 45b (obscured in Figure 4b). When the connector element 44b is affixed to the mounting surface 43b, the planar affixing surface 45b abuts and lies adjacent to the planar mounting surface 43b. The connector element 44b may be affixed to the mounting surface 43b via any of the means previously described. The thickness of the affixing portion 46b, as defined in the direction normal to the planar affixing surface 45b, may be chosen to be substantially the same as the depth of the recessed mounting surface 43b.

[0065] Figure 4c shows a perspective view of a connector element mounting configuration according to another embodiment of the invention. The temporary barrier 40c comprises a mounting location constituted by two surfaces, namely a first mounting surface 431c and a second mounting surface 432c (obscured in Figure 4c). Both mounting surfaces 431c, 432c lie adjacent a lateral end of the barrier panel 11. The mounting surfaces 431c, 432c are planar and are parallel to a plane passing through the two lateral ends 16, 17 of the barrier panel 11. In the particular embodiment, the mounting surfaces 431c, 432c are recessed into the side faces of the barrier panel 11. However, it will be appreciated that in other embodiments, the mounting surfaces 431c, 432c may be flush with the side faces of the barrier panel 11. The surfaces of the mounting location may be provided with integrally moulded holes extending through the thickness of the barrier panel from one mounting surface 431c to the opposite mounting surface 432c. The connector element 44c comprises an affixing portion 46c constituting a panel-engaging portion and a connecting portion 47c. In Figure 4c, the connecting portion 47c is shown as a hook. However, the connecting portion 47c may alternatively be a ring or otherwise. The affixing portion 46c comprises a first planar affixing surface 451c (obscured in Figure 4c) and a second planar affixing surface 452c, which constitute the panel-engaging portion. When the connector element 44c is affixed to the mounting surfaces 431c, 432c, the first planar affixing surface 451c abuts and lies adjacent to the first planar mounting surface 431c and the second planar affixing surface 452c abuts and lies adjacent to the second planar mounting surface 432c. In the connector element mounting configuration shown in Figure 4c, the connector element 44c sandwiches the mounting surfaces 431c, 432c comprised on the barrier panel 11. The connector element 44c may be affixed to the mounting surfaces 431c, 432c via any of the means previously described, for example may be affixed via prefabricated holes, without having to alter or damage the barrier panel mould. The overall thickness of the affixing portion 46c, as defined in the direction normal to the planar affixing surfaces 451c, 452c, may be chosen to be substantially the same as the thickness of the barrier panel 11.

[0066] Referring to Figure 5, Figure 5 shows a perspective view of a connector element mounting configuration according to another embodiment of the invention. The temporary barrier 50 comprises a mounting surface 53 at a lateral end of the barrier panel 51. The mounting surface 53 is curved about an axis which is parallel to the longitudinal direction of the temporary barrier 50. In the particular embodiment, the mounting surface 53 corresponds to the curved outer surface of a circular cylinder. However, it will be appreciated that the mounting surface 53 may correspond to any curved surface, such as, for example, the curved surface of a partial circular cylinder, the surface of a sphere or the curved surface of a partial sphere. In the particular embodiment, the mounting surface 53 is recessed into the outer surface of the lateral end of the barrier panel 51. However, it will be appreciated that in other embodiments, the mounting surface 53 may be flush with the outer surface of the lateral end of the barrier panel 11. The connector element 54 comprises an affixing portion 56 constituting a panel-engaging portion and a connecting portion 57. The affixing portion 56 comprises two flexible arms separated by a gap 58. The two arms are configured to be prised apart such that the gap 58 is wide enough to receive the mounting location 53. In Figure 5, the connecting portion 57 is shown as a hook. However, the connecting portion 57 may alternatively be a ring or otherwise. The affixing portion 56 comprises a curved affixing surface 55. In the particular embodiment, the affixing portion 56 comprises a circular cuff with an inner circular affixing surface 55. The inner circular affixing surface 55 has a similar radius to the curved mounting surface 53. When the connector element 54 is affixed to the curved mounting surface 53, the curved affixing surface 55 at least partially conforms to and at least partially surrounds the curved mounting surface 53. The connector element 54 may be affixed to the mounting surface 53 via any of the means previously described. The thickness of the affixing portion 56, as defined in the direction normal to the curved affixing surface 55, may be chosen to be substantially the same as the depth of the recessed mounting surface 53. In some embodiments, the connector element 54 is rotationally locked with respect to the mounting surface 53.

[0067] One or more of the connector elements may extend in the extension of the plane of the panel, laterally beyond the footprint of the base, sufficiently to allow two adjacent temporary barriers to be connected at a right angle, such that four panels can be connected to form a square.

[0068] While the barrier panel has been depicted as fence-type panel with slots, variants of the barrier panel may be continuously solid to provide protection against dust or debris.

Claims

1. A temporary barrier comprising a barrier panel manufactured from a moulded plastics material, the barrier panel comprising an end-to-end connector arrangement,
   wherein the barrier panel is moulded with at least

one mounting location for locating a connector element of the end-to-end connector arrangement, allowing the connector element to be affixed at the mounting location, to extend from the barrier panel to be able to connect in end-to-end fashion to an adjacent temporary barrier to be provided.

2. The temporary barrier of claim 1, wherein the mounting location comprises a fixture-receiving configuration and wherein the connector element comprises an attachment configuration, wherein the fixture-receiving configuration corresponds to the attachment configuration such that their alignment defines a predetermined orientation of the connector element relative to the barrier panel.

3. The temporary barrier of claim 2, wherein the fixture-receiving configuration is integral with the mounting location and/or the attachment configuration is integral with the connector element; and optionally wherein the fixture-receiving configuration and/or the attachment configuration comprises holes.

4. The temporary barrier of any one of claims 2 to 3, wherein the fixture-receiving configuration and the attachment configuration comprise corresponding engagement features.

5. The temporary barrier of any preceding claim, wherein the connector element is manufactured from a different material to the barrier panel, and/or wherein the connector element is manufactured from a plastics material.

6. The temporary barrier of any preceding claim, wherein the connector element is manufactured from, or is reinforced with, a stronger material than the barrier panel.

7. The temporary barrier of any preceding claim, wherein the barrier panel and/or at least one connector element is made of a material with a Young's modulus of no more than 4.5, 4, 3.5, 3, 2.5, 2, or 1.5 GPa and/or no less than 0.05, 0.1, 0.5, 1, 1.5, 2, 2.5 or 3, 3.5, 4, 4.5, 5, 5.5, 6, 10, 20 or 30 GPa.

8. The temporary barrier of any preceding claim, wherein the barrier panel and/or the connector element has a Shore A hardness of no more than 95, 90, 85, 80, 75, 70, 65 or 60.

9. The temporary barrier of any preceding claim, wherein the barrier panel is manufactured via a blow moulding process, an injection moulding process, or a compression moulding process.

10. The temporary barrier of any one of claims 2 to 9, wherein the connector element is affixable to the barrier panel via the fixture-receiving configuration and the attachment configuration when they are aligned.

11. The temporary barrier of any preceding claim, comprising at least two connector elements, the at least two connector elements including at least one first connector element and at least one second connector element, the at least one first connector element having a different configuration to the at least one second connector element.

12. The temporary barrier of any preceding claim, wherein the at least one first connector element comprises a receiving portion and the at least one second connector element comprises a protruding portion dimensioned to engage in a receiving portion of same dimensions of an adjacent temporary barrier.

13. The temporary barrier of any preceding claim comprising at least two mounting locations, wherein at least one mounting location is comprised at or near a first lateral end of the barrier panel, and wherein at least one mounting location is comprised at or near a second lateral end of the barrier panel, and wherein at least one mounting location at the first lateral end of the barrier panel is located at the same height from a base of the barrier panel.

14. The temporary barrier of any preceding claim, wherein at least one mounting location comprises a planar surface and: wherein the at least one planar surface is parallel to a plane of the barrier panel, or wherein the at least one planar surface is perpendicular to a plane of the barrier panel; and optionally, wherein the connector element comprises at least one planar surface configured to abut the at least one planar surface of the mounting location when affixed to the at least one planar surface of the mounting location.

15. A temporary barrier system comprising two or more of the temporary barriers of any preceding claim, wherein the barriers are arranged such that at least one connector element of each barrier is connected to a connector element of an adjacent barrier.

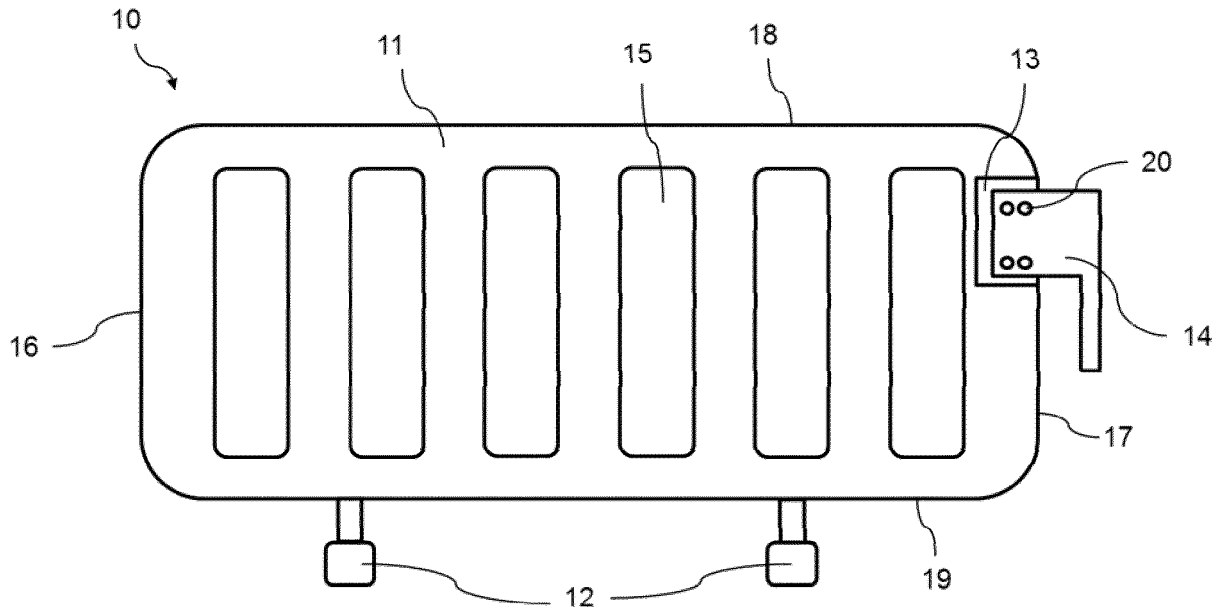

Figure 1

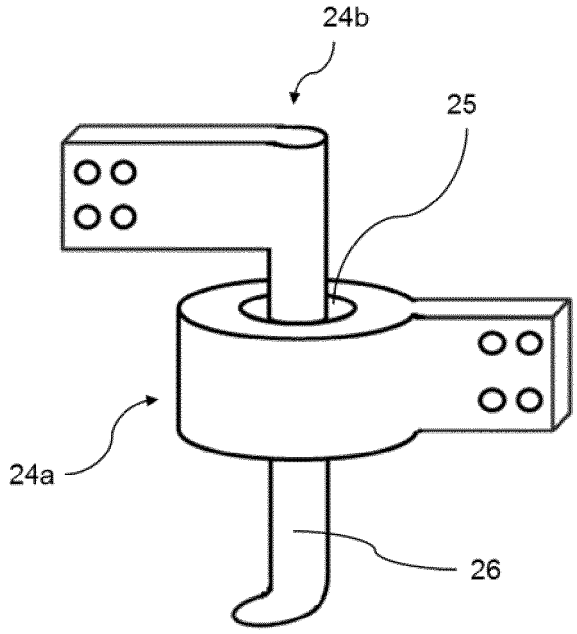

Figure 2b

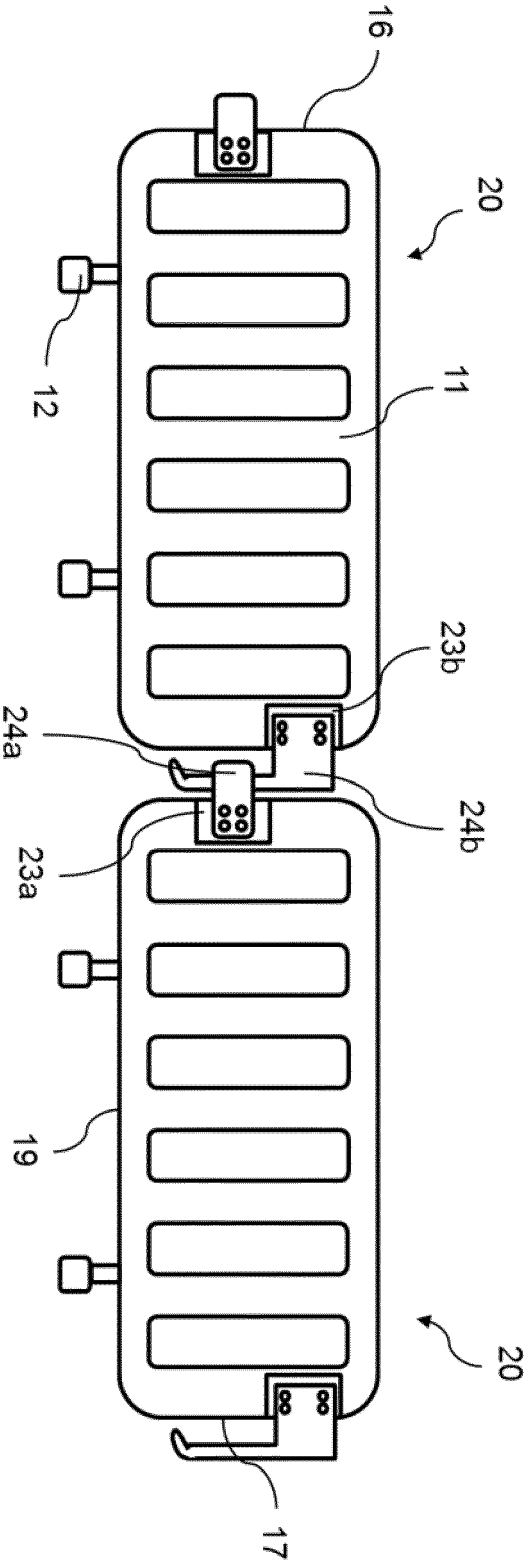

Figure 2a

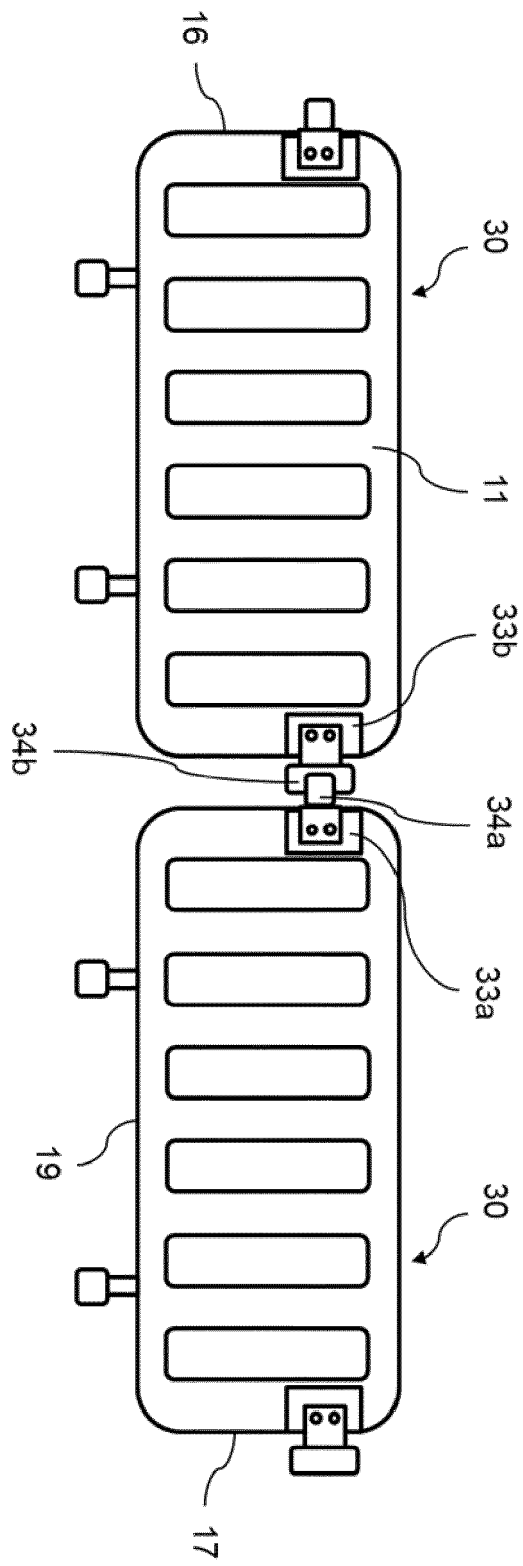

Figure 3a

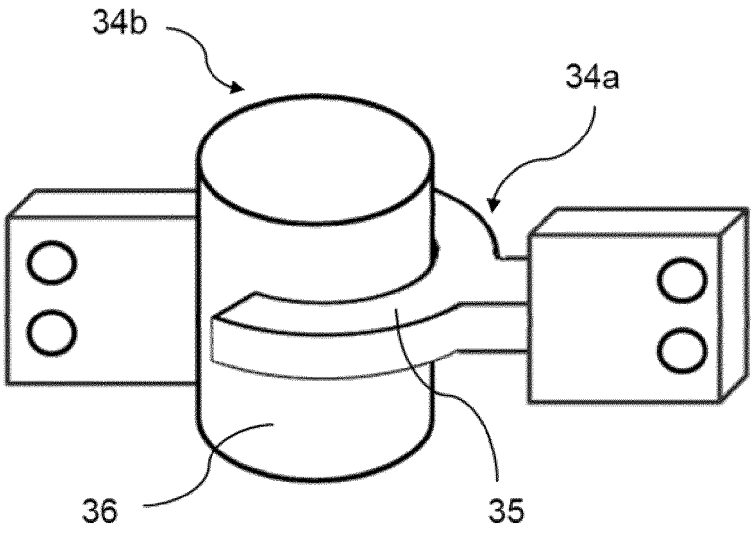

Figure 3b

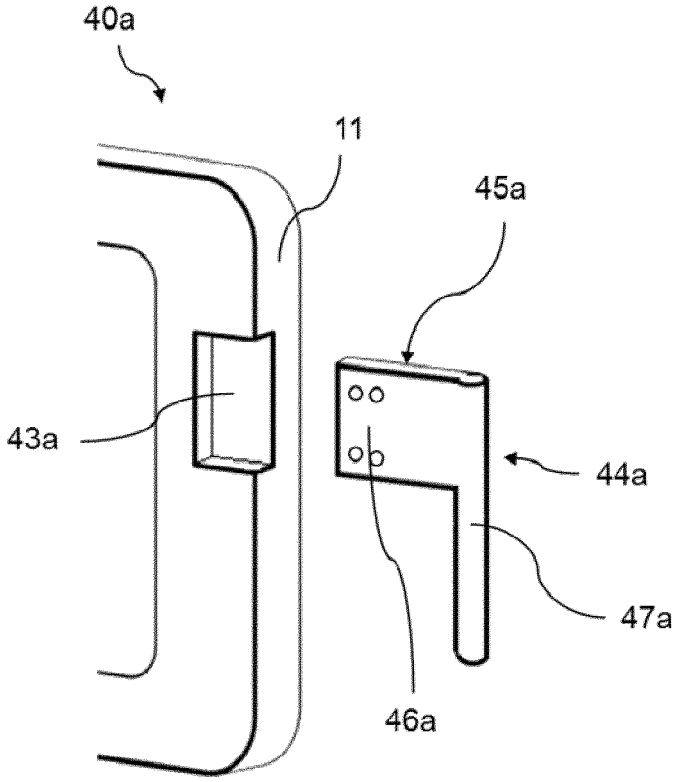

Figure 4a

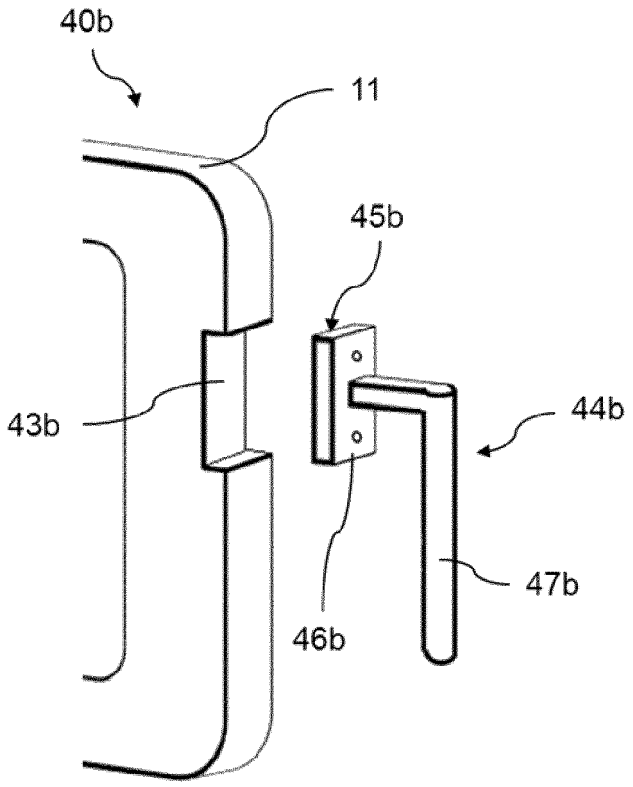

Figure 4b

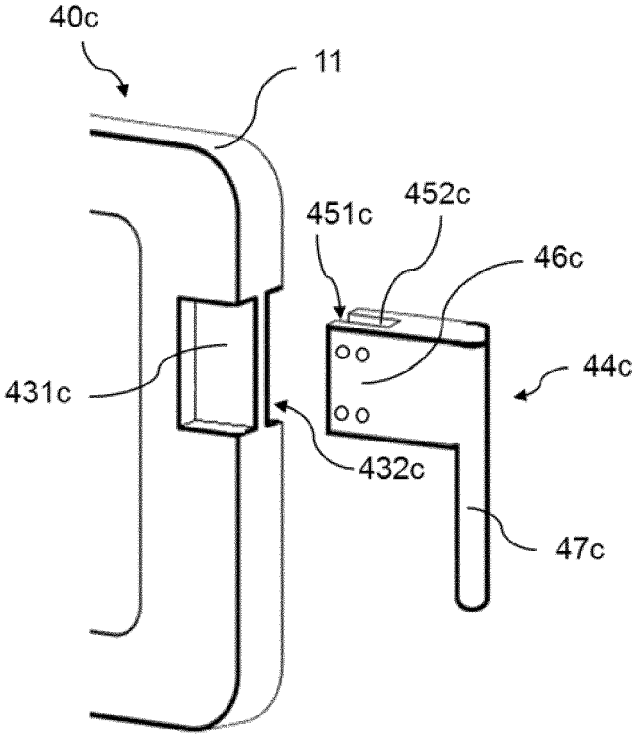

Figure 4c

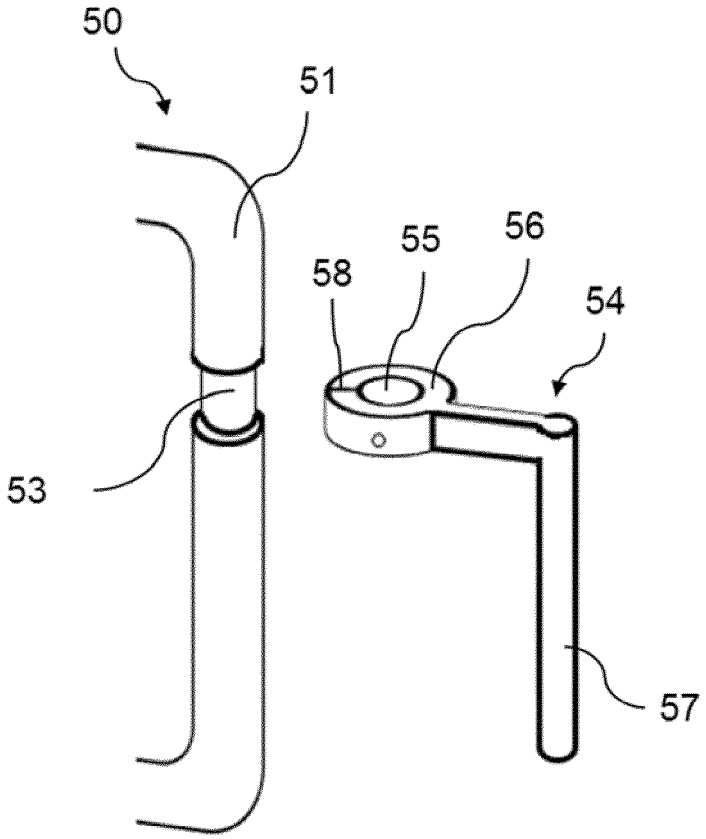

Figure 5

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EUROPEAN SEARCH REPORT

Application Number
EP 20 16 7622

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 August 2020	Flores Hokkanen, P

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