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(54) **WHEELCHAIR AND WHEELCHAIR SIDE GUARD**

ROLLSTUHL UND ROLLSTUHLSEITENSCHUTZ

FAUTEUIL ROULANT ET PROTECTION LATÉRALE DU FAUTEUIL ROULANT

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(56) References cited:
EP-A2- 0 376 504

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Description

TECHNICAL FIELD

[0001] The present invention relates to wheelchairs and more specifically to manually driven so-called active wheelchairs designed for people with disabled legs but well-functioning upper bodies.

BACKGROUND ART

[0002] A large number of wheelchair users are people having disabled legs but well-functioning upper bodies. They are capable of manually driving their own wheelchair and live an active and to a large extent independent life. This group of wheelchair users tend to drive so-called active wheelchairs, disclosed for example in EP 1097688 A2, and EP 0 376 504 A2.

[0003] Active wheelchairs are lightweight, compact and easy rolling in order to enable high manoeuvrability and thus increased mobility for the user. However, the compact design implies that the user sits rather close to the ground or floor and thus has a limited range of reach in an upward direction. As most environments and interiors are designed for standing people, active wheelchair users often find themselves in situations where they cannot reach desired objects, for example a plate placed on a shelf. As many active wheelchair users wish to live an independent life, there is a need for an improved wheelchair which provides an extended upward range of reach of the user.

SUMMARY OF THE INVENTION

[0004] An object of the present invention is to provide a wheelchair side guard which allows for an extended upward range of reach of the user. This object is achieved by the features of independent claim 1. Another object of the invention is to provide a method for manufacturing a side guard adapted for mounting to a wheelchair.

[0005] The invention concerns a side guard adapted for mounting to a wheelchair as to separate a seat portion from a main wheel of the wheelchair. The side guard comprises an upper section and a lower section. The upper section is configured for flexing due to a force acting upon it. The advantage of such a side guard is that it, when mounted to a wheelchair, can be flexed down by the weight of a wheelchair user to bear against an upper circumferential edge of a main wheel of the wheelchair. Said circumferential edge may be for example a tyre rim or a push rim of the main wheel. With the upper portion of the side guard between the main wheel and the user, the user may sit on the possibly dirty main wheel without risking soiling her clothes. In most manually driven wheelchairs, the main wheels extend higher above the ground than the seat base.

[0006] With configured for flexing is meant that the upper section can assume an actuated position due to a

force acting upon it and an unactuated position once the force acting on the upper section when the force is lifted. The flexing can in one example be performed by that the upper section itself can elastically deform due to the force acting upon it and thereby return to its original shape once the force is lifted. The flexing can in a second example be performed by that the entire upper section moves in relation to the lower section upon a force acting upon the upper section. The upper section is attached to the lower section in a way that the upper section is biased to return to its unactuated position once the force acting on the upper section is lifted.

[0007] Consequently, by sitting on top of a main wheel the user is positioned higher above the ground than when sitting on the seat base, and is thus enabled to reach higher up. Hence, the inventive side guard extends the upward range of reach of the user.

[0008] Further advantages are achieved by implementing one or several of the features of the dependent claims.

[0009] In one aspect of the invention, the lower section of the side guard is rigid. A rigid lower section enables effective prevention of a wheelchair user's legs or buttocks from interfering with the spokes of a wheelchair wheel. The rigidity of the lower section further prevents it from deforming and eventually interfering with the main wheel spokes upon e.g. sideways movements of the user.

[0010] The upper section of the side guard may be made of a flexible material. As used herein, the term "flexible material" means that the material deforms in response to an applied force, but returns substantially to its original shape when the force is lifted, i.e. is capable of elastic deformation. A flexible material provides the ability of flexing while also being gentle to the user. The yieldingness of a flexible material reduces the risk of tears, lacerations and abrasions if the user inadvertently bumps against the upper section of the side guard, e.g. during driving the wheelchair or when getting in and out of the wheelchair. The maximum force applied to the side guard at most 1800 N, more specifically at most 1500 N. This corresponds to the weight of a user of max 180 kg, more specifically max 150 kg. The maximum force is applied when the user of the wheelchair sits such that the entire weight is borne by the wheel of the wheelchair. The upper part of the side guard thereby reaches its actuated position bearing against the wheel.

[0011] The flexible material may be a thermoplastic elastomer (TPE). Using a thermoplastic elastomer is advantageous since materials belonging to this group are weather-resistant and durable. More specifically, the thermoplastic elastomer may be a thermoplastic polyurethane (TPU). TPU is particularly advantageous as its smooth surface does not "grab" body parts or clothing which are moved across the surface, for example when the user moves up and down from sitting on the upper section of the side guard upon the main wheel. The flexible material could be also selected from any of the other

classes of TPE materials: styrenic block copolymers (TPE-s), polyolefin blends (TPE-o), elastomeric alloys (TPV), thermoplastic copolyesters, or thermoplastic polyamides. Alternatively, the flexible material can be a hard grade rubber.

[0012] The upper section has shore hardness within the interval 65D-70D. An upper section having shore hardness within this interval has been found to have the right flexibility for properly deforming under the weight of a user.

[0013] In one aspect of the invention, the upper section is provided with a bending zone having a thickness of 50-90 % of a general thickness of the upper section. With general thickness means the thickness of the majority of the upper section. The upper section has a homogeneous thickness unless where structural or design requirements requires a different thickness. The parts of the upper section which may have a different thickness than the remainder of the upper section are the outer edge, the part of the upper section joining the upper section to the lower section and the bending zone. Materials tend to bend in their weakest parts. As the bending zone due to its lesser thickness is somewhat weaker than the rest of the upper section, the upper section will flex along bending zone in response to an applied force. The advantage of a having a bending zone is thus that the flexing of the upper section can be controlled. For example, it can be controlled to flex in an aesthetically pleasing manner.

[0014] The general thickness of the upper section may be between 1-4 mm, more specifically between 1.5-2.5 mm.

[0015] In one aspect of the invention, the lower section is made of a fibre-reinforced plastic. Fibre-reinforced plastics materials are robust, have a high stiffness-to-weight ratio, and are easy to injection-mould. The reinforcing fibres are for example glass fibre or carbon fibre. Examples of suitable materials for the lower section are nylon 6 with glass fibre (PA6 + GF), nylon 6-6 with glass fibre (PA66 + GF), polybutylene terephthalate with glass fibre (PBT + GF), or any other comparable fibre-reinforced plastic. The lower section in one example has a Young's modulus or tensile modulus of 2-10 GPa, more specifically between 4-6 GPa. If other materials than the above mentioned are used, the Young's modulus is adapted accordingly to provide the same characteristics.

[0016] In one aspect of the invention, the upper section is injection-moulded onto the lower section such that the upper section is enclosing an upper edge of the lower section and is penetrating through a plurality of perforating holes provided in said upper edge of the lower section. Consequently, there are double joining means between the upper and lower sections - the chemical binding between the materials of the upper and lower sections and the mechanical binding provided by the bridges formed by the upper section through the holes of the lower section. The resulting advantage is improved strength and durability of the side guard.

[0017] The invention further concerns a wheelchair having two main wheels separated by a seat portion, provided with at least one side guard as defined above. The side guard separates the seat portion from one of the main wheels. The upper section of the side guard is configured for flexing due to a force acting upon it, so as to assume an actuated position bearing against an upper circumferential edge of said main wheel.

[0018] An advantage of this inventive solution is that it allows a user of the wheelchair to temporarily sit or support herself on an upper circumferential edge of a main wheel without soiling her clothes. A circumferential edge of the main wheel may be for example a tyre rim, a push rim, or any other outwardly facing rim of the main wheel. In this context, the term "upper" refers to a substantially upwardly facing portion of the circumferential edge, such as the circumferential edge of the uppermost quarter of the main wheel. The upper circumferential edge may be for example the upward facing portion of the tyre rim or the push rim of the main wheel. In most manually driven wheelchairs, the main wheels extend higher above the ground than the seat base.

[0019] Consequently, by sitting on top of a main wheel the user is positioned higher above the ground than when sitting on the seat base, and is thus enabled to reach higher up. Hence, the inventive side guard extends the upward range of reach of the user.

[0020] In an unactuated position, the upper section of the side guard may extend a distance above a circumferential edge of the main wheel. The distance is between 15-40 mm, more specifically 25-30 mm. In the unactuated position, the upper section is not depressed against the main wheel. In other words, as long as no force is depressing the upper section of the side guard, it forms a wing extending at least partly over the main wheel and thus functions as a splash guard. If driving the wheelchair on wet surfaces, droplets drawn up from the surface by the wheel are prevented from splashing onto the user of the wheelchair by the upper section of the side guard.

[0021] The upper section of the side guard may in the actuated position brake the main wheel by means of friction between the upper section and the circumferential edge of the main wheel. The braking of the main wheel prevents unintentional rolling of the wheelchair as a user sits or supports on top of a main wheel. Consequently, the risk of the user losing her balance and falling when sitting or supporting on a main wheel is reduced.

[0022] In one aspect of the invention, a surface of the upper section adapted to face a circumferential edge of the main wheel is provided with a friction-enhancing material, for instance by reinforcing this part of the upper section with glass or carbon fibre. This increases the friction between the upper the upper section and the circumferential edge of the main wheel, which improves the braking of the main wheel.

[0023] The invention further relates to a method for manufacturing a side guard adapted for mounting to a wheelchair as to separate a seat portion from a main

wheel of the wheelchair, the side guard comprising a lower section and an upper section configured for flexing due to a force acting upon it, wherein the method comprises:

- forming the lower section by injecting a first material in a first mould shaped such that an upper edge of the lower section is provided with a plurality of perforating holes,
- placing the lower section in a second mould, and
- forming the upper section by injecting a second material into the second mould such that the second material penetrates the holes and encloses the upper edge of the lower section.

[0024] Advantages of this method are that two different materials, a first and a second material, can be joined at the same time as forming the product, i.e. the upper section is formed and joined to the lower section in the same step. No additional step of joining the upper and lower sections is required. Further, the provision of perforating holes in the lower section enables the upper section to be securely and durably mechanically joined to the lower section during the forming of the upper section.

[0025] The method may further comprise that the first material is, when hardened, a rigid material. The method may further comprise that the first material is a fibre-reinforced plastic.

[0026] The method may further comprise that the second material is a flexible material. The method may further comprise that the second material is a thermoplastic elastomer (TPE). The method may further comprise that the second material is a thermoplastic polyurethane (TPU).

[0027] The method may further comprise that the upper section has a shore hardness in the range of 65D-70D.

[0028] The method may further comprise that the upper section is provided with a bending zone having a thickness of 50-90 % of a general thickness of the upper section.

[0029] The method may further comprise that the general thickness of the upper section is between 1-4 mm, more specifically between 1.5-2.5 mm.

[0030] The method may further comprise that the lower section has a Young's modulus in the range of 2-10 GPa, more specifically between 4-6 GPa.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] In the detailed description of the invention given below reference is made to the following schematic figures, in which:

Figure 1 shows a an overview of an example of the inventive wheelchair,

Figure 2a-b show a perspective view of an example

of the inventive wheelchair with the upper section of the side guard in an unactuated and actuated position, respectively,

5 Figure 3 shows an example of the inventive side guard,

Figure 4 shows a second example of the inventive side guard,

10 Figure 5 shows an example of the lower section of the side guard,

15 Figure 6a-b show a cross-sectional view of the inventive side guard in an unactuated and actuated position, respectively,

20 Figure 7a-c show a perspective and cross-sectional view of a further example of the inventive side guard, respectively, and

Figure 8a-c show a perspective and cross-sectional view of a further example of the inventive side guard, respectively.

DETAILED DESCRIPTION

[0032] Various aspects of the invention will hereinafter be described in conjunction with the appended drawings to illustrate but not to limit the invention. In the drawings, like designations denote like elements. Variations of the different aspects are not restricted to the specifically shown embodiment, but are applicable on other variations of the invention.

30 **[0033]** Figure 1 shows an overview of an example of the inventive wheelchair 1. The wheelchair 1 comprises two main wheels 2 separated by a seat portion 10. Each main wheel 2 is provided with a tyre 3, spokes 4, and a push rim 5 for manually driving of the wheelchair by the user. The seat portion 10 comprises a substantially vertical seat back 11 and a substantially horizontal seat base 12. During normal use, the user sits in the seat portion 10, the back supported by the seat back 11 and the buttocks and upper portion of the thighs supported by the substantially horizontal seat base 12.

35 **[0034]** The seat portion 10 is separated from each of the two main wheels 2 by a side guard 20. Each side guard 20 has an upper portion 21 which is adapted for flexing due to a force acting upon it and a rigid lower portion 22. The side guards 20 prevent the lower part of the body - i.e. buttocks, hips, legs - of a user from interfering with the main wheels 2. The side guards 20 further protect the user's clothes from getting soiled if the main wheels are dirty, and the rigid lower portion 22 prevent the user's legs from falling out towards the main wheels 2. The wheelchair 1 is further provided with two front wheels 8 and a foot rest 9. In this example, the wheelchair 1 has two front wheels 8, but it would also be possible to

have fewer or a greater number of front wheels 8.

[0035] Figure 2a shows the upper portion 21 of a side guard 20 in its unactuated position. In the example of Figure 2a, a user 30 sits in the seat portion 10 of a wheelchair 1, her buttocks resting on the seat base. The user 30 does not apply a force to the upper section 21 of the side guard 20, and hence the upper section is in its unactuated position. In the unactuated position, the upper section 21 of the side guard 20 extends a distance above the tyre 3 of the main wheel 2, i.e. the upper section 21 does not bear against the main wheel 2. In the unactuated position, the upper section 21 functions as a splash guard and protects the user from droplets and dirt drawn up from the ground by the tyre 3.

[0036] In the example of Figure 2a, the lower section 22 is made of a rigid material and the upper section 21 is made of a soft, flexible material. The yieldingness of the upper section 21 makes it gentle to the user and reduces the risk of scratching or injuring the user's hand or wrist during the action of pushing the push rim 5 as to drive the main wheel 2.

[0037] Figure 2b shows the same upper section 21 of a side guard 20 as in Figure 2a, but in its actuated position. By pressing down her hands against the push rims 5, the user 30 has lifted herself from the seat base 12 and placed her buttocks on the upper section 21 of the side guard. The user's body weight applies a force in downward direction upon the upper section 21. In response to this force, the flexible upper section 21 assumes a position bearing against the tyre 3 of the main wheel. Hence, the user 30 sits on top of the main wheel 2, her weight being carried by the main wheel 2 and the upper section 21 of the side guard separating her buttocks from direct contact with the possibly dirty tyre 3. As the top of the main wheel 2 is provided higher above the ground than the seat base 12 (visible in Fig 1), the user sits higher up than in the normal seating position on the seat base. Sitting higher above the ground means that the user is able to reach higher with her hands, e.g. for fetching an object 41 on a shelf 42. Further, as the upper section 21 is pressed down against the tyre 3 by the user's weight, the main wheel 2 is braked by means of friction between the upper section 21 and the tyre 3. The braking of the main wheel 2 prevents the wheelchair from rolling, which increases the stability of the user 30 sitting on the wheel 2. Sitting on top of the main wheel 2 is intended to be a temporary position due to the limited user comfort and due to the fact that the wheelchair 1 is not driveable.

[0038] When the user 30 has fetched a desired object and/or performed a desired action at height, she uses her arms to lift herself back and sit down on the seat base again. As the force acting upon the upper section of the side guard is released, the upper section flexes back to an unactuated position, as shown in Figure 2a, in which it does not bear against the main wheel. The user can also utilize the upper section 21 of the side guard 20 for braking a main wheel 2 when sitting in the normal seating position on the seat base 12 by simply pressing the upper

section 21 down against the tyre 3 with her hand.

[0039] In the example of Figures 2a and 2b, the upper section 21 of the side guard 20 is made of a soft, flexible material. However, it is also possible to achieve the flexing ability of the upper section by hinging a rigid upper section in a pivotable manner to the lower section of the side guard. In such case, a restoring spring or an elastic thread attaching the upper section 21 to the lower section 22 can be used to return the upper section to the unactuated position. See figures 7a-7c and 8a-8c for a more detailed description.

[0040] Figure 3 shows a side view of an example of the inventive side guard 20. The side guard 20 comprises an upper section 21 and a lower section 22. The size and shape of the side guard 20 are adapted for mounting to a wheelchair in order to separate the seat portion of the wheelchair from one of its main wheels. The lower section 22 is made of a rigid material, such as a fibre-reinforced plastic. Examples of suitable reinforced plastics are nylon 6 (PA6), nylon 6-6 (PA66), and polybutylene terephthalate (PBT) reinforced with either glass fibre or carbon fibre. Other rigid plastics would also be possible to use. The lower section 22 is provided with fastening means 24, 25 via which the side guard 20 is fastened to the wheelchair. The fastening of the lower section 22 can be accomplished in a variety of ways, and the fastening means 24, 25 may be designed and positioned in other ways than shown in Figure 3. Preferably, the lower section 22 is firmly secured to the wheelchair frame such that the lower section does not move when a force acts on the side guard. The upper section 21 is made of a flexible material which deforms in response to an applied force, and returns substantially to its original shape once the force is lifted. Examples of suitable flexible materials are thermoplastic elastomers (TPE). A specifically suitable thermoplastic elastomer is thermoplastic polyurethane (TPU).

[0041] Figure 4 shows an alternative embodiment of the inventive side guard 20. Here, the upper portion 21 is provided with a bending zone 26. The bending zone 26 has an elongated shape and extends along the joint between the upper and lower sections 21, 22. The bending zone 26 is made of the same material as the rest of the upper portion, but the thickness of the material is somewhat less than the general thickness of the upper portion, i.e. 50-90 % of the general thickness, preferably 70-80 % of the general thickness. Materials tend to bend in their weakest parts. As the bending zone due to its lesser thickness is somewhat weaker than the rest of the upper section, the upper section will flex along the bending zone in response to an applied force. The bending zone 26 is not necessary for the flexing functionality of the side guard, but it enables the upper portion to be controlled to flex in an aesthetically pleasing manner.

[0042] In the example of figure 4, the bending zone 26 extends over a greater portion of the length of the upper section 21, but not all the way to the edges of the upper section. However, a bending zone extending over the

entire length of the upper section 21 would also be possible.

[0043] The bending zone could alternatively be made of another, weaker material than the rest of the upper portion. In such case, the bending zone does not have to be thinner than the general thickness of the upper portion.

[0044] The side guard 20 is preferably manufactured via double injection-moulding. A first material is injected into a first mould in order to form the lower section 22. Once the first material has hardened, the lower section 22 is removed from the first mould and placed in a second mould. A second material is then injected into the second mould as to form the upper section 21 which thereby is formed and joined to the lower section 22 at the same time. In order to provide a robust and durable joining between the upper section 21 and the lower section, the first mould preferably is shaped such that an upper edge 28 of the formed lower section 22 is perforated by a plurality of holes 29, as shown in figure 5. The second mould is shaped such that the upper section 21 is formed to enclose the upper edge 28 and penetrate the holes 29 of the lower section 22. This results in both a chemical joining between the first and second materials as well as a mechanical joining in the shape of "bridges" of the upper section penetrating the holes 29 of the lower section.

[0045] Alternatively, the upper section 21 and the lower section 22 of the side guard 20 may be manufactured in different pieces - the upper section in a flexible material and the lower section 22 in a rigid material - and joined by any type of connection means that can handle the two different materials, e.g. screws, rivets, glue or another adhesive. A further alternative is to mould or in another way manufacture the entire side guard in one piece in a rigid material. In such case, the flexing ability of the upper section 21 is achieved by hinge means provided at the boundary between the upper and lower sections 21, 22.

[0046] Figure 6a shows a cross-sectional view of the side guard 20 in an unactuated position. No external force is applied to the upper section 21 which therefore does not abut against the main wheel 2, but extends a distance above it. In this position, the upper section 21 mainly functions as a splash guard. As can be seen in this cross-sectional view, the upper section 21 is enclosing an upper edge 28 of the lower section 22 of the side guard 20. Preferably, the upper edge 28 is provided with a plurality of holes (not seen in figure 6a) which the upper section penetrates in order to achieve a stronger joining of the upper and lower sections. In this example, the upper section 26 is further provided with a bending zone 26 which is somewhat thinner than the rest of the upper section 21. The bending zone 26 preferably extends along the length of the upper section 21 as shown in figure 4. In order to prevent clothes from getting caught in the side guard 20 when a user is moving in and out of the chair, an outer edge 27 of the upper section 21 is rounded and has a greater thickness than the rest of the upper section 21.

[0047] Figure 6b shows a cross-sectional view of the side guard 20 in an actuated position. Here, an external force F is applied to the upper section 21. In response to the force F, the upper section 21 bends along its bending zone 26 to abut against the main wheel 2. In the example of figure 6b, the force F is applied in a vertical, downward direction. However, the force F could also be applied at an angle, as long as it directs the upper section 21 towards the main wheel 2.

[0048] Once the force F is removed, the upper section 21 automatically returns to its unactuated position. This is preferably achieved by inherent resilient properties of the material.

[0049] Figure 7a-7c show an alternative embodiment of the side guard 20. Figure 7a shows a perspective view of side guard 20, wherein the upper section 21 is hingedly attached to the lower section 22 by means of that parts of the upper section 21 encloses the upper edge 28 of the lower section 22. The upper section 21 can enclose the entire upper edge 28 of lower section 22 or intermittently enclose upper edge 28 of lower section 22 as shown in figure 7a. In figure 7a, one restoring spring 31 is attached to the upper and lower sections 21, 22 such that the upper section 21 is biased to return to its original position when the force F is removed.

[0050] Figure 7b and 7c show a cross-sectional view of the alternative embodiment of the side guard 20 of figure 7a in unactuated position and actuated position. In figure 7c the upper section 21 is actuated when a force F is applied to the upper section 21. Figure 7c illustrates how the restoring springs 3 which is attached to the upper and lower sections 21, 22 bends, thereby biasing the upper section 21 to return to its original position when the force F is removed.

[0051] Figures 8a-8c show a further alternative embodiment of the side guard 20. Figure 8a shows a perspective view of side guard 20, wherein the upper section 21 is hingedly attached to the lower section 22 by means of that the upper section 21 is attached to lower section 22 by an elastic connection means 32, for instance an elastic thread. The elastic connection means 32 can alternatively be an elastic wire or fibre. The stitching of the elastic connection means 32 to connect the upper section 21 to the lower section 22 can be varied to provide different characteristics.

[0052] Figures 8b and 8c show a cross-sectional view of the alternative embodiment of the side guard 20 of figure 8a. In figure 8b the upper section 21 is actuated when a force F is applied to the upper section 21. In figures 8b and 8c it is shown that the elastic connection means 32 causes the upper section 21 to be biased to return to its original position when the force F is removed.

[0053] Reference signs mentioned in the claims should not be seen as limiting the extent of the matter protected by the claims, and their sole function is to make claims easier to understand.

[0054] As will be realised, the invention is capable of modification in various obvious respects, all without de-

parting from the scope of the appended claims. Accordingly, the drawings and the description thereto are to be regarded as illustrative in nature, and not restrictive.

Claims

1. A side guard (20) adapted for mounting to a wheelchair (1) as to separate a seat portion (10) from a main wheel (2) of the wheelchair (1), the side guard (20) comprising an upper section (21) and a lower section (22), wherein the upper section (21) is configured, when mounted to the wheelchair, for flexing in response to a force F acting upon it such that it assumes an actuated position bearing against an upper circumferential edge (3, 5) of said main wheel (2) and wherein the upper section (21) returns to its original shape when the force is lifted such that it returns to an unactuated position, **characterised in that** the upper section (21) is made in a material which has a shore hardness in the range of 65D-70D.
2. A side guard (20) according to claim 1, wherein the upper section (21) is made of a flexible material, wherein the movement between the actuated position and the unactuated position arises from an elastic deformation of at least part of the upper section (21).
3. A side guard (20) according to claim 2, wherein the flexible material is a thermoplastic elastomer.
4. A side guard (20) according to any of the preceding claims wherein the upper section (21) is provided with a bending zone having a thickness of 50-90 % of a thickness of the upper section (21).
5. A side guard (20) according to claim 4, wherein the thickness of the upper section (21) is between 1-4 mm, more specifically between 1.5-2.5 mm.
6. A side guard (20) according to any of the preceding claims, wherein the lower section (22) is made of a fibre-reinforced plastic.
7. A side guard (20) according to any of the preceding claims, wherein the upper section (21) has been injection-moulded onto the lower section (22) such that the upper section (21) is enclosing an upper edge (28) of the lower section (22) and penetrates into a plurality of perforating holes (29) provided in said upper edge (28) of the lower section (22).
8. A side guard (20) according to claim 1, wherein the upper section (21) is hingedly attached to the lower section (22), wherein the upper section (21) is attached to lower section (22) by that the upper section encloses an upper edge (28) of the lower section (22) and wherein at least one restoring spring (31) is attached to the upper and lower sections (21, 22) such that the upper section (21) is biased to return to its original position when the force F is removed.
9. A side guard (20) according to claim 1, wherein the upper section (21) is hingedly attached to the lower section (22), wherein the upper section (21) is attached to lower section (22) by that the upper section is attached to lower section 22 by an elastic connection means (32) and wherein the elastic connection means (32) causes the upper section (21) to be biased to return to its original position when the force F is removed.
10. A wheelchair (1) having two main wheels (2) separated by a seat portion (10) **characterised in that** it is provided with at least one side guard (20) according to any of the preceding claims, said side guard (20) separating the seat portion (10) from one of the main wheels (2), and wherein the upper section (21) of the side guard (20) is configured for flexing in response to a force acting upon it such that it assumes an actuated position bearing against an upper circumferential edge (3, 5) of said main wheel (2) and wherein the upper section (21) returns to its original shape when the force is lifted such that it returns to an unactuated position.
11. A wheelchair (1) according to claim 10, wherein said upper section (21) in an unactuated position extends a distance above a circumferential edge (3, 5) of the main wheel (2).
12. A wheelchair (1) according to claim 10 or 11, wherein the upper section (21) in the actuated position brakes the main wheel (2) by means of friction between the upper section (21) and the circumferential edge (3, 5) of the main wheel (2).
13. A method for manufacturing a side guard (20) according to any of claims 1-9, wherein the method comprises the steps of:
 - forming the lower section (22) by injecting a first material in a first mould shaped such that an upper edge (28) of the lower section (22) is provided with a plurality of perforating holes (29),
 - placing the lower section (22) in a second mould,
 - forming the upper section (21) by injecting a second material into the second mould such that the second material (21) penetrates the holes (29) and encloses the upper edge (28) of the lower section (22).

Patentansprüche

1. Seitenschutz (20), welche für die Montage an einem Rollstuhl (1) angepasst ist, um einen Sitzteil (10) von einem Hauptrad (2) des Rollstuhls (1) zu trennen, wobei der Seitenschutz (20) einen oberen Abschnitt (21) und einen unteren Abschnitt (22) umfasst, wobei der obere Abschnitt (21), wenn am Rollstuhl montiert, als Antwort auf eine darauf einwirkende Kraft F zum Biegen ausgelegt ist, so dass er eine betätigte Position annimmt, an einer oberen umlaufenden Kante (3, 5) des Hauptrads (2) anliegend, und wobei der obere Abschnitt (21) in seine ursprüngliche Form zurückkehrt, wenn die Kraft aufgehoben wird, so dass er in eine unbetätigte Position zurückkehrt, **dadurch gekennzeichnet, dass** der obere Abschnitt (21) aus einem Material hergestellt ist, das eine Shorehärte im Bereich von 65D-70D aufweist. 5
2. Seitenschutz (20) nach Anspruch 1, wobei der obere Abschnitt (21) aus einem flexiblen Material hergestellt ist, wobei die Bewegung zwischen der betätigten Position und der unbetätigten Position sich aus einer elastischen Verformung zumindest eines Teils des oberen Abschnitts (21) ergibt. 10 25
3. Seitenschutz (20) nach Anspruch 2, wobei das flexible Material ein thermoplastisches Elastomer ist. 30
4. Seitenschutz (20) nach einem der vorhergehenden Ansprüche, wobei der obere Abschnitt (21) mit einer Biegezone versehen ist, welche eine Dicke von 50-90 % einer Dicke des oberen Abschnitts (21) aufweist. 35
5. Seitenschutz (20) nach Anspruch 4, wobei die Dicke des oberen Abschnitts (21) zwischen 1-4 mm, genauer gesagt zwischen 1,5-2,5 mm, beträgt. 40
6. Seitenschutz (20) nach einem der vorhergehenden Ansprüche, wobei der untere Abschnitt (22) aus einem faserverstärkten Kunststoff hergestellt ist. 45
7. Seitenschutz (20) nach einem der vorhergehenden Ansprüche, wobei der obere Abschnitt (21) auf dem unteren Abschnitt (22) spritzgegossen worden ist, so dass der obere Abschnitt (21) eine obere Kante (28) des unteren Abschnitts (22) umgibt und in eine Mehrzahl von in der oberen Kante (28) des unteren Abschnitts (22) vorgesehenen Perforationslöchern (29) eindringt. 50
8. Seitenschutz (20) nach Anspruch 1, wobei der obere Abschnitt (21) am unteren Abschnitt (22) gelenkig befestigt ist, wobei der obere Abschnitt (21) am unteren Abschnitt (22) befestigt ist, indem der obere Abschnitt eine obere Kante (28) des unteren Abschnitts (22) umgibt, und wobei zumindest eine 55
- Rückstellfeder (31) am oberen und unteren Abschnitt (21, 22) befestigt ist, so dass der obere Abschnitt (21) vorgespannt wird um in seine ursprüngliche Position zurückzukehren, wenn die Kraft F beseitigt wird.
9. Seitenschutz (20) nach Anspruch 1, wobei der obere Abschnitt (21) am unteren Abschnitt (22) gelenkig befestigt ist, wobei der obere Abschnitt (21) am unteren Abschnitt (22) befestigt ist, indem der obere Abschnitt durch ein elastisches Verbindungsmittel (32) am unteren Abschnitt 22 befestigt ist, und wobei das elastische Verbindungsmittel (32) dazu veranlasst, dass der obere Abschnitt (21) vorgespannt wird, um in seine ursprüngliche Position zurückzukehren, wenn die Kraft F beseitigt wird.
10. Rollstuhl (1) mit zwei durch einen Sitzteil (10) getrennten Haupträdern (2), **dadurch gekennzeichnet, dass** er mit zumindest einem Seitenschutz (20) nach einem der vorhergehenden Ansprüche versehen ist, wobei der Seitenschutz (20) den Sitzteil (10) von einem der Haupträder (2) trennt, und wobei der obere Abschnitt (21) des Seitenschutzes (20) als Antwort auf eine darauf einwirkende Kraft zum Biegen ausgelegt ist, so dass er eine betätigte Position annimmt, an einer oberen umlaufenden Kante (3, 5) des Hauptrads (2) anliegend, und wobei der obere Abschnitt (21) in seine ursprüngliche Form zurückkehrt, wenn die Kraft aufgehoben wird, so dass er in eine unbetätigte Position zurückkehrt.
11. Rollstuhl (1) nach Anspruch 10, wobei der obere Abschnitt (21) in einer unbetätigten Position einen Abstand über einer umlaufenden Kante (3, 5) des Hauptrads (2) verlängert.
12. Rollstuhl (1) nach Anspruch 10 oder 11, wobei der obere Abschnitt (21) in der betätigten Position das Hauptrad (2) mittels Reibung zwischen dem oberen Abschnitt (21) und der umlaufenden Kante (3, 5) des Hauptrads (2) abbremst.
13. Verfahren zur Herstellung eines Seitenschutzes (20) nach einem der Ansprüche 1 bis 9, wobei das Verfahren die folgenden Schritte umfasst:
 - Formen des unteren Abschnitts (22) durch Einspritzen eines ersten Materials in eine erste Form, die so gebildet ist, dass eine obere Kante (28) des unteren Abschnitts (22) mit einer Mehrzahl von Perforationslöchern (29) versehen ist,
 - Anbringen des unteren Abschnitts (22) in einer zweiten Form,
 - Formen des oberen Abschnitts (21) durch Einspritzen eines zweiten Materials in die zweite Form, so dass das zweite Material (21) in die Löcher (29) eindringt und die obere Kante (28)

des unteren Abschnitts (22) umgibt.

Revendications

1. Protection latérale (20) adaptée pour être montée sur un fauteuil roulant (1) pour séparer une partie formant siège (10) d'une roue principale (2) du fauteuil roulant (1), la protection latérale (20) comprenant une section supérieure (21) et une section inférieure (22), la section supérieure (21) étant configurée, lorsqu'elle est montée sur le fauteuil roulant, pour fléchir en réponse à une force F agissant sur elle si bien qu'elle prend une position actionnée en appui contre un bord supérieur périphérique (3, 5) de ladite roue principale (2), et la section supérieure (21) retournant à sa forme originale lorsque la force est levée si bien qu'elle revient à une position non actionnée, **caractérisée en ce que** la section supérieure (21) est réalisée en un matériau qui présente une dureté Shore dans la plage de 65D-70D.
2. Protection latérale (20) selon la revendication 1, dans laquelle la section supérieure (21) est réalisée en un matériau souple, le déplacement entre la position actionnée et la position non actionnée résultant d'une déformation élastique d'au moins une partie de la section supérieure (21).
3. Protection latérale (20) selon la revendication 2, dans laquelle le matériau souple est un élastomère thermoplastique.
4. Protection latérale (20) selon l'une quelconque des revendications précédentes, dans laquelle la section supérieure (21) est pourvue d'une zone de flexion ayant une épaisseur de 50-90 % d'une épaisseur de la section supérieure (21).
5. Protection latérale (20) selon la revendication 4, dans laquelle l'épaisseur de la section supérieure (21) est comprise entre 1-4 mm, plus précisément entre 1,5-2,5 mm.
6. Protection latérale (20) selon l'une quelconque des revendications précédentes, dans laquelle la section inférieure (22) est faite d'une matière plastique renforcée par des fibres.
7. Protection latérale (20) selon l'une quelconque des revendications précédentes, dans laquelle la section supérieure (21) a été moulée par injection sur la section inférieure (22) si bien que la partie supérieure (21) entoure un bord supérieur (28) de la section inférieure (22) et pénètre dans une pluralité de trous de perforation (29) ménagés dans ledit bord supérieur (28) de la section inférieure (22).
8. Protection latérale (20) selon la revendication 1, dans laquelle la section supérieure (21) est fixée de manière articulée à la section inférieure (22), dans laquelle la section supérieure (21) est fixée à la section inférieure (22) en ce que la section supérieure entasse un bord supérieur (28) de la section inférieure (22), et dans laquelle au moins un ressort de rappel (31) est fixé aux sections supérieure et inférieure (21, 22) si bien que la section supérieure (21) est sollicitée pour revenir à sa position d'origine lorsque la force F est retirée.
9. Protection latérale (20) selon la revendication 1, dans laquelle la section supérieure (21) est fixée de manière articulée à la section inférieure (22), dans laquelle la section supérieure (21) est fixée à la section inférieure (22) en ce que la section supérieure est fixée à une section inférieure (22) par un moyen élastique de raccord (32), et dans laquelle le moyen élastique de raccord (32) provoque la section supérieure (21) à être sollicitée pour revenir à sa position initiale lorsque la force F est retirée.
10. Fauteuil roulant (1) comportant deux roues principales (2) séparées par une partie formant siège (10) **caractérisé en ce qu'il** est pourvu d'au moins une protection latérale (20) selon l'une quelconque des revendications précédentes, ladite protection latérale (20) séparant la partie formant siège (10) de l'une des deux roues principales (2), et la section supérieure (21) de la protection latérale (20) étant configurée pour fléchir en réponse à une force agissant sur elle si bien qu'elle prend une position d'actionnement en appui contre un bord supérieur périphérique (3, 5) de ladite roue principale (2), et la section supérieure (21) retournant à sa forme originale lorsque la force est levée si bien qu'elle revient à une position non actionnée.
11. Fauteuil roulant (1) selon la revendication 10, dans lequel la section supérieure (21) dans une position non actionnée s'étend sur une distance au-dessus d'un bord périphérique (3, 5) de la roue principale (2).
12. Fauteuil roulant (1) selon la revendication 10 ou 11, dans lequel la section supérieure (21) dans la position actionnée freine la roue principale (2) au moyen de la friction entre la section supérieure (21) et le bord périphérique (3, 5) de la roue principale (2).
13. Procédé de fabrication d'une protection latérale (20) selon l'une quelconque des revendications 1 à 9, le procédé comprenant les étapes consistant à:
 - la formation de la section inférieure (22) en injectant un premier matériau dans un premier moule en forme de telle sorte qu'un bord supérieur (28) de la section inférieure (22) est pourvu

d'une pluralité de trous de perforations (29),
- le placement de la section inférieure (22) dans
un deuxième moule,
- la formation de la section supérieure (21) en
injectant un deuxième matériau dans le deuxiè- 5
me moule si bien que le deuxième matériau (21)
pénètre dans les trous (29) et entoure le bord
supérieur (28) de la partie inférieure (22).

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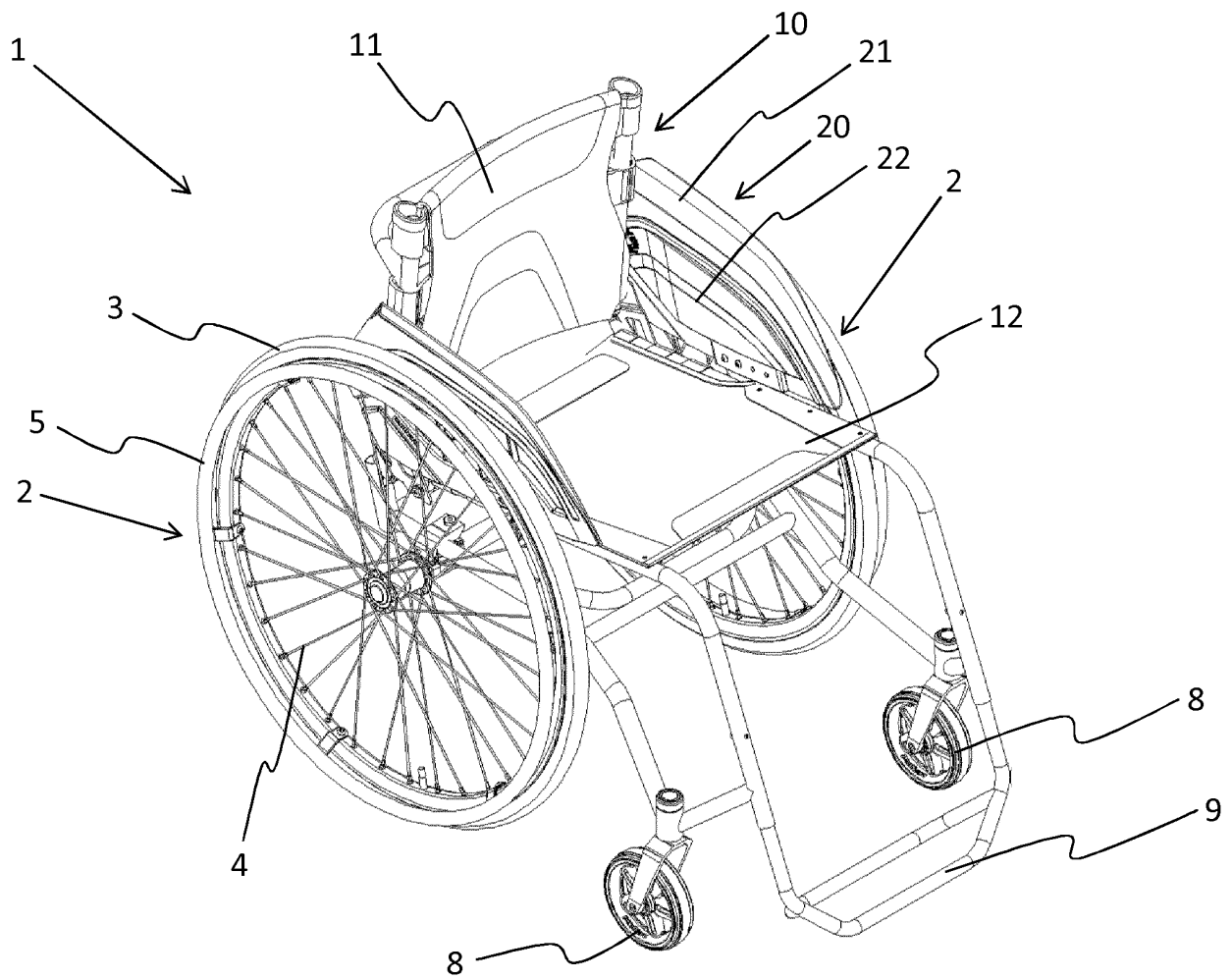


FIG 1

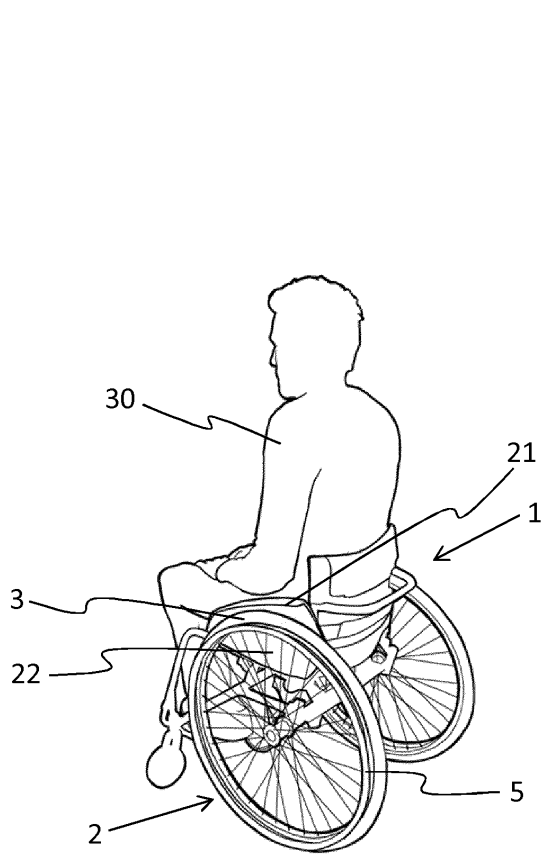


FIG 2A

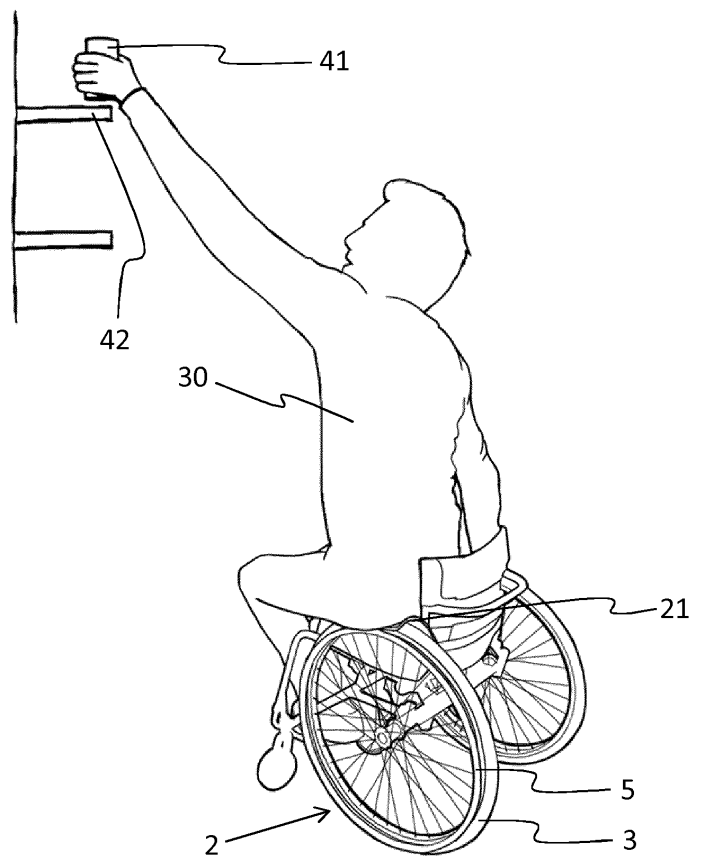


FIG 2B

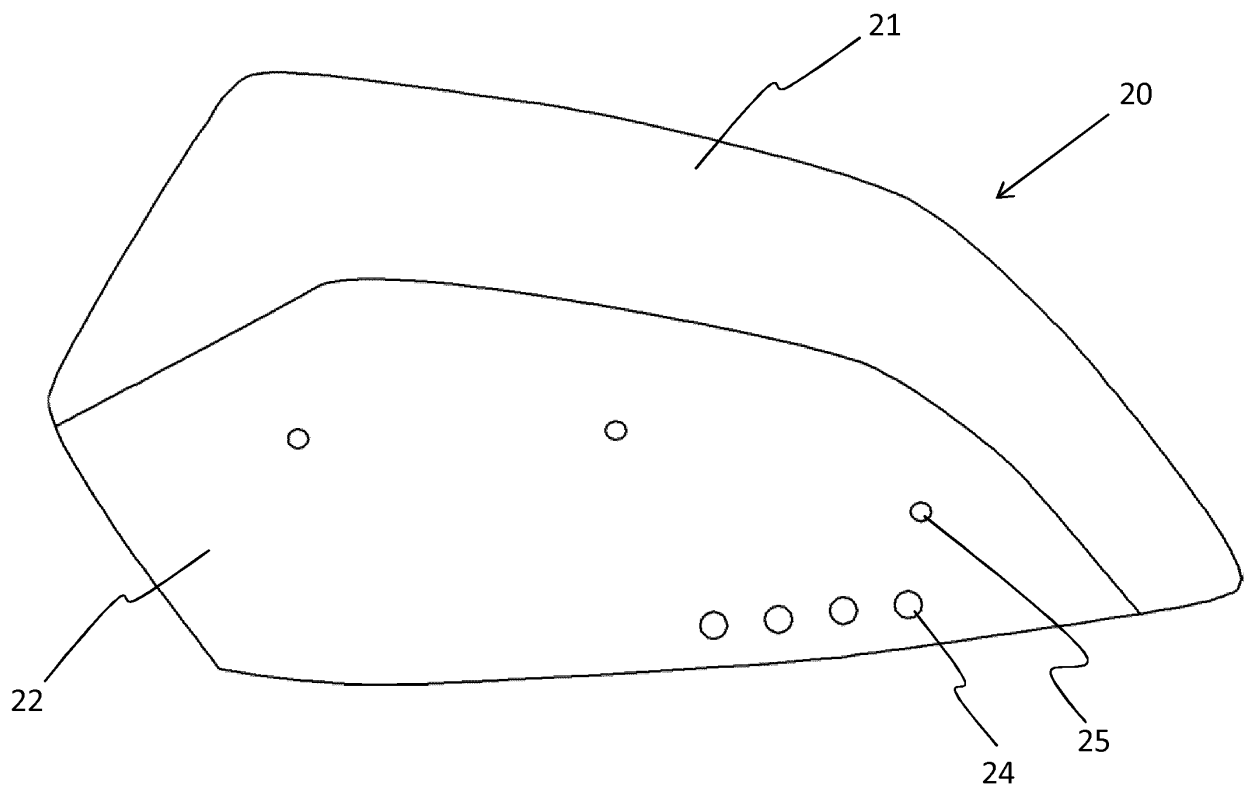


FIG 3

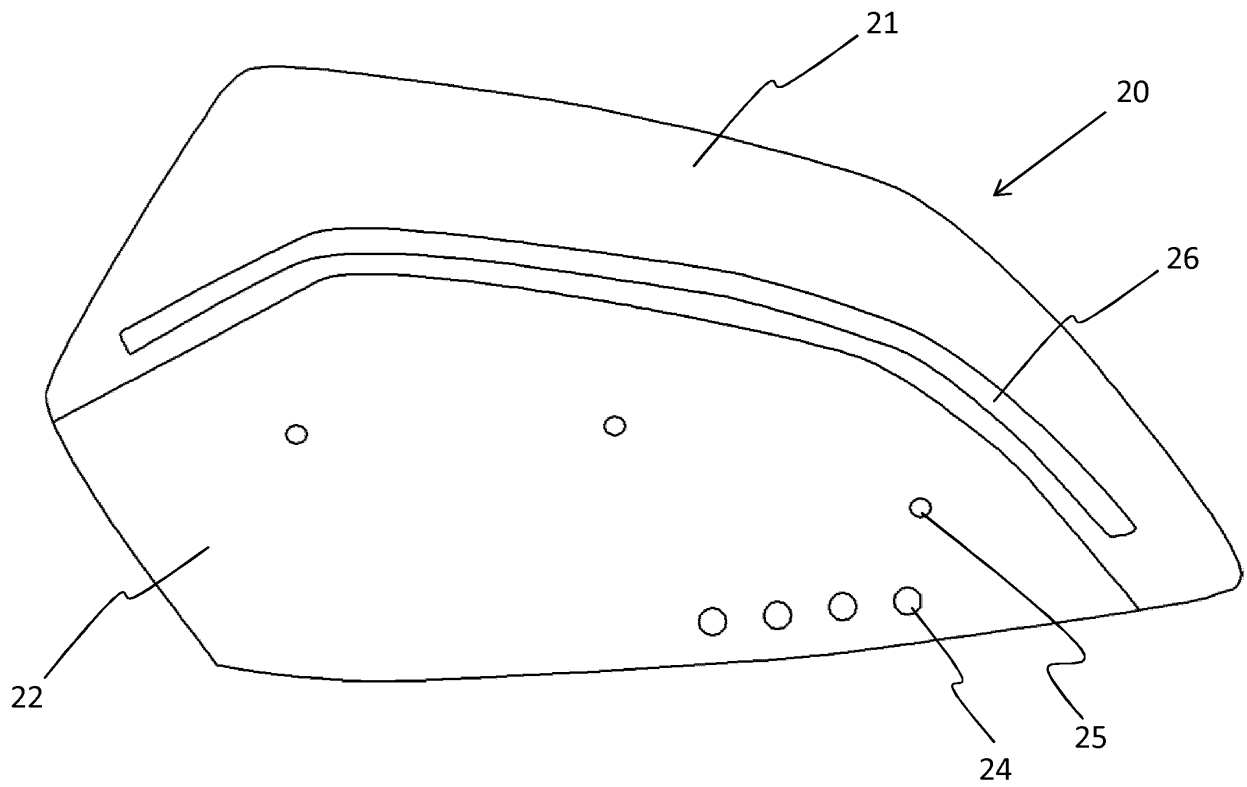


FIG 4

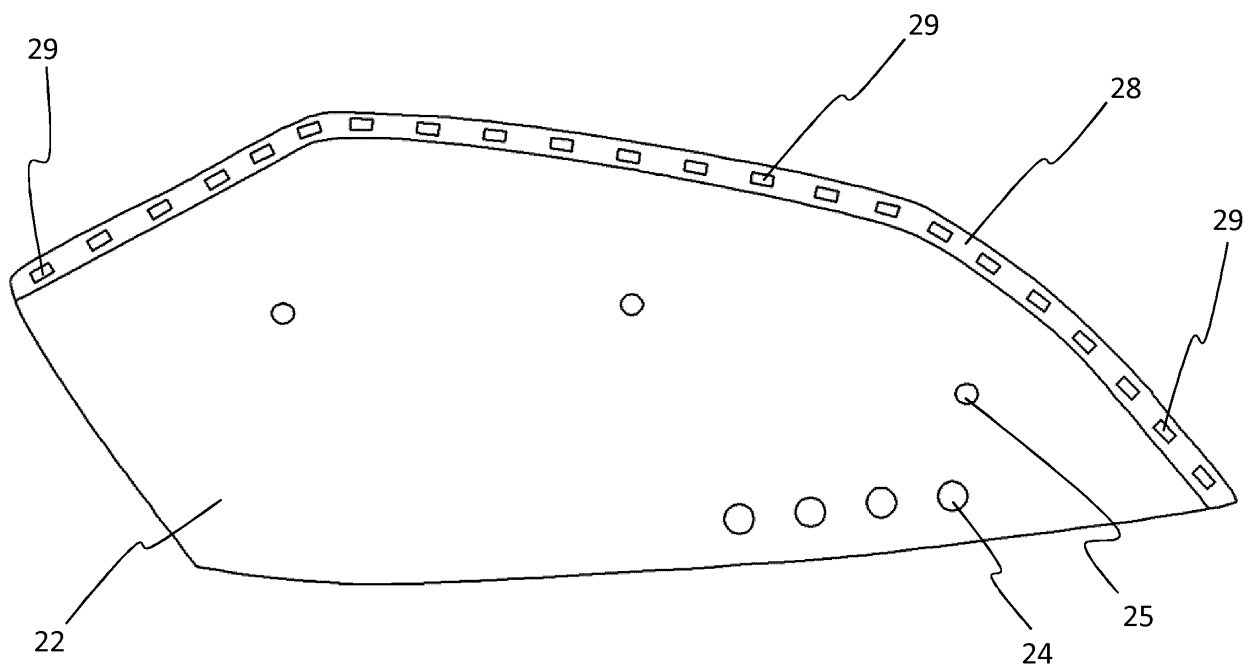


FIG 5

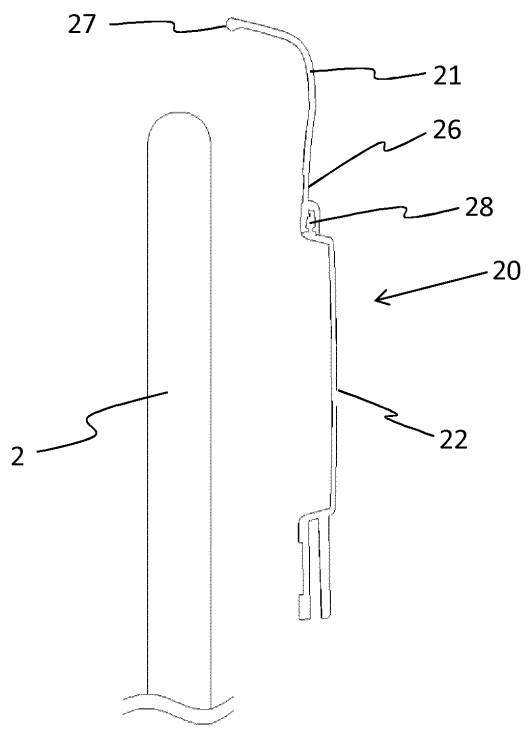


FIG 6A

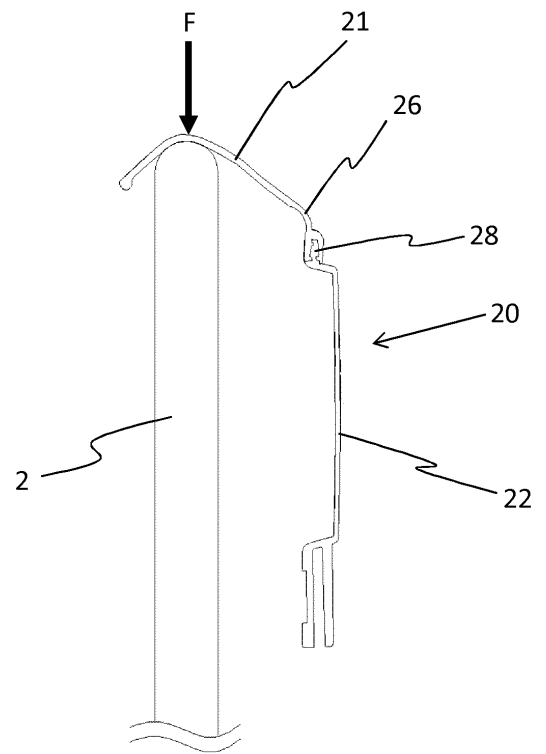


FIG 6B

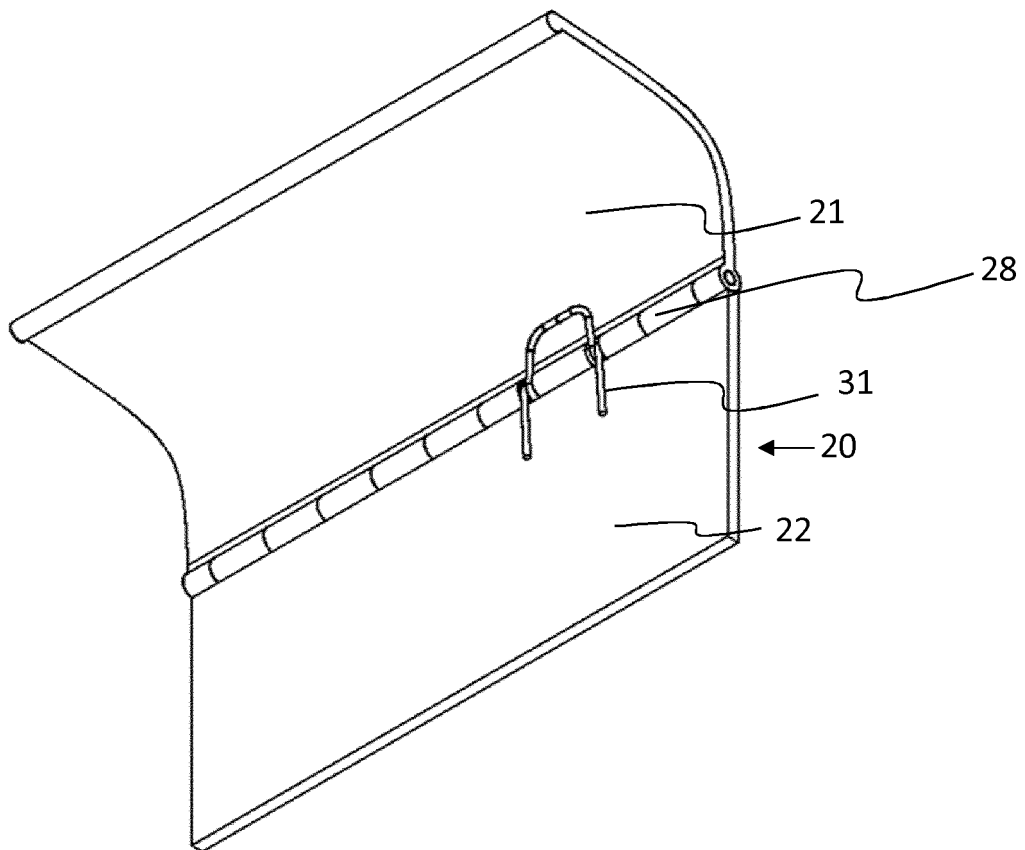


FIG 7A

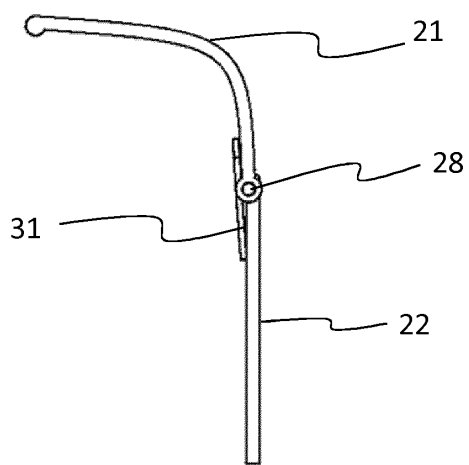


FIG 7B

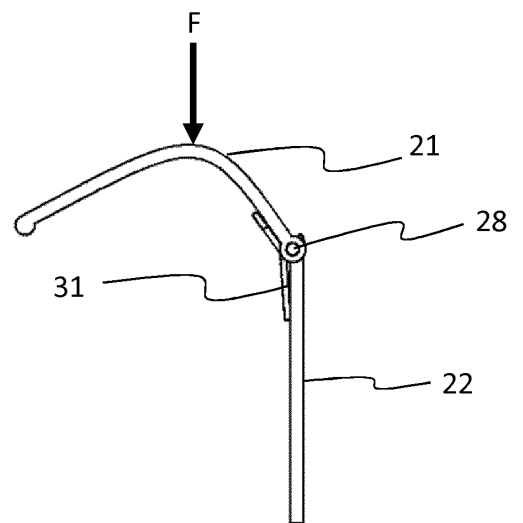


FIG 7C

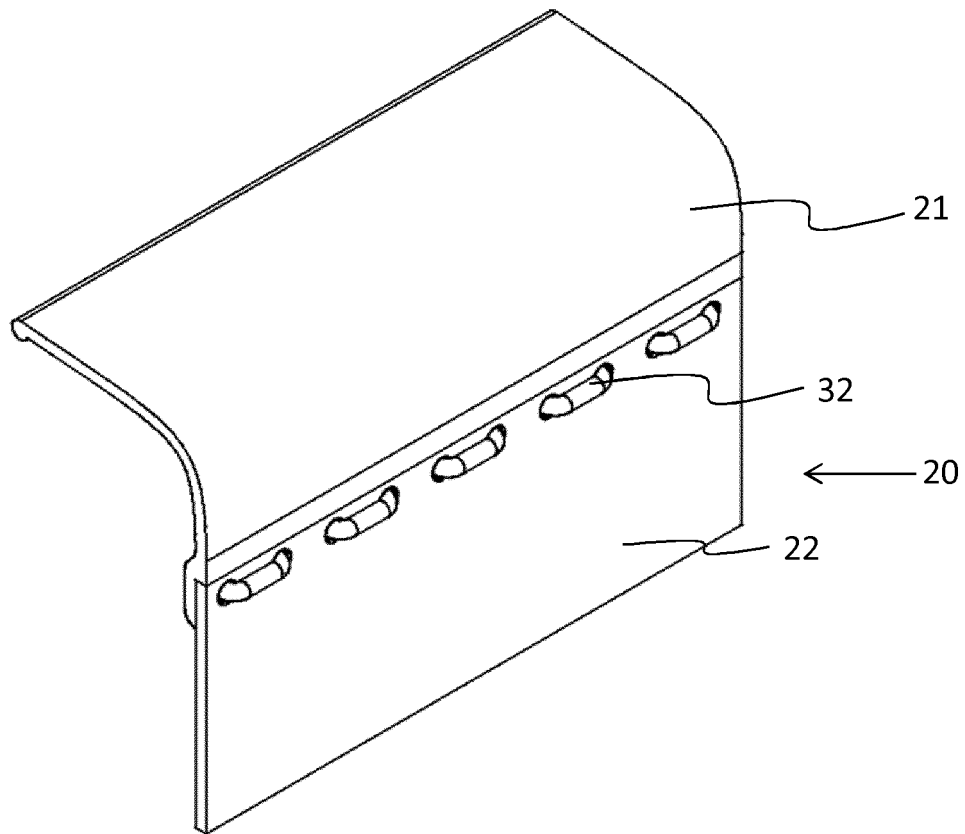


FIG 8A

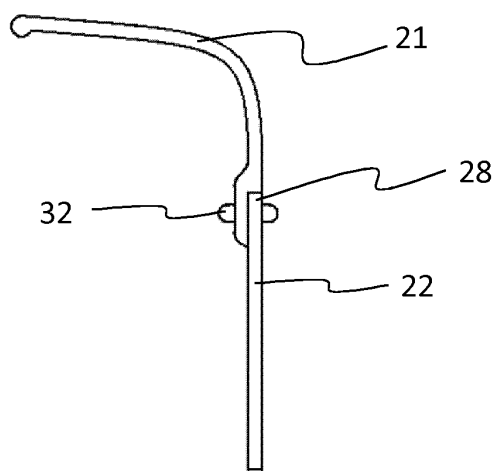


FIG 8B

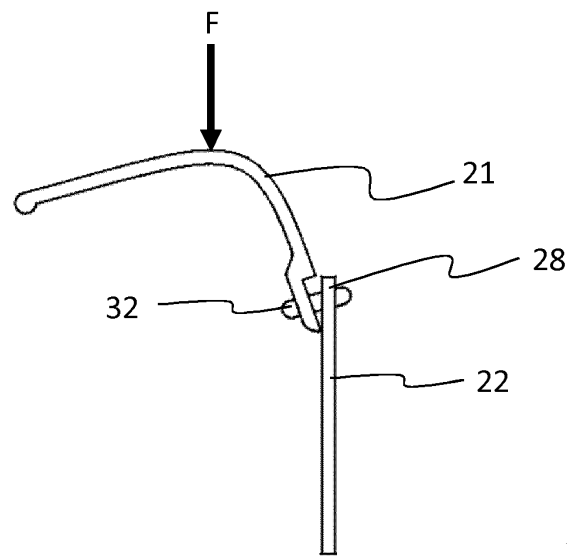


FIG 8C

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1097688 A2 [0002]
- EP 0376504 A2 [0002]