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(54) **Gate and associated hinge cap**

Tor und zugehörige Scharnierkappe

Portail et couvercle de charnière associée

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Description

[0001] The present invention relates to a gate with a hollow bar, which has an open end at its top and bottom, and with two hinges attached to said bar. The hinges each comprise a hinge arm and a hinge cap, at least partially made of a plastics material. The hinge cap is provided with laterally projecting ribs, made from said plastics material, with which the hinge caps are clamped in the upper and in the lower open end of the bar of the gate, respectively, such that the plastics ribs are deformed against the inside of the hollow bar. The hinge caps each exhibit an opening in which one end of the hinge arms is rotationally received.

[0002] Hinges with such a hinge cap and a corresponding hinge arm are commercially available. An example thereof is shown in Figure 1. The hinge cap of this known hinge is entirely manufactured of plastics, in particular by injection moulding. The hinge cap consists of a central tube structure which forms the opening for the hinge arm. On said central tube structure, laterally projecting plastics ribs are provided by means of which the hinge cap can be clamped in the hollow bar of the gate. The upper part of the hinge cap is formed by a thicker cover plate with which the upper and the lower open end of the hollow bar is covered, respectively.

[0003] An important advantage of such hinge caps is that they are simple and inexpensive to manufacture. Moreover, they can easily be applied to the gate. In this respect, the flexible plastics ribs are of essential importance, since the hollow bars, notwithstanding they have standard dimensions (in particular external dimensions of 30, 40 or 50 mm), may have slightly varying inner dimensions. The wall thickness of the bars may be, for example 1.5 or 2.0 mm. Furthermore, the hollow bars are produced by cold forming of metal sheets which are subsequently welded together in the longitudinal direction. The thickness of the weld seam thus formed on the inside of said hollow bars may also be compensated by the deformation of the plastics ribs.

[0004] The known plastics hinge caps also exhibit significant disadvantages. In the first place, it is not possible to find a plastics material which has, under all climatic conditions, on the one hand the required hardness to provide the necessary support for the hinge arm, and on the other hand is soft enough to be applied using clamping without breaking in the hollow bar of the gate. In practice, for applications in cold countries, for instance a softer plastics material is selected, such as polyethylene, while in hot countries, a harder plastics material is selected, such as polyamide. However, the well-known plastics hinge caps keep showing the problem that the plastics ribs, particularly in wintertime, may be too brittle and may break off during the insertion of the hinge cap in the hollow bar such that the hinge cap becomes unusable. On the other hand, under warmer conditions, it happens that the ribs are insufficiently hard such that, when the hinge cap experiences an exceptional load, such as when a person is standing on the end of the gate, it will be deformed in such a way that the hinge arm, optionally with the hinge cap itself, may be lifted out of the hollow bar of the gate. After a prolonged use, in particular under warmer conditions, the opening in the hinge cap may also become undesirably large, due to creep of the plastics material. Furthermore, the plastics material, due to frequent opening and closing of the gate, may also simply wear off, particularly if it concerns a softer type of plastics material. A final disadvantage is that the gate fully rests at the bottom on the lower hinge cap, whereas this hinge cap, in particular the upper part thereof, which covers the open end hinge cap, in particular the upper part thereof, which covers the open end of the hollow bar, and on which the hollow bar rests, may become deformed and may even break under prolonged or excessive stress.

[0005] GB2430967 discloses a gate for pivotally mounting. The gate has a hollow bar with an open end at its top and bottom and two hinge mechanisms attached to the open ends of the bar. The hinge mechanisms include an end cap mounted at a respective one of the open ends of the bar. The end cap includes a flange seated on a respective distal edge of the bar and a sleeve part connected to the flange and fitted in the respective open end. The end cap confines an opening formed through the flange and sleeve part for rotatably receiving an actuator.

[0006] The object of the invention is to provide a new gate, and in particular a new hinge cap for said gate, by means of which said disadvantages may be remedied.

[0007] To this end, the gate and the hinge caps according to the invention are characterized in that the hinge caps, in addition to the plastics ribs, comprise a support skeleton in which the opening for the hinge arm is formed, which support skeleton exhibits lateral projections extending, in the unloaded state of the hinge, up to a short distance from the inside of the hollow bar, and which are provided, when the plastics ribs are deformed as a result of a load on the hinge, to provide an additional support of the hinge cap against the inside of said bar, wherein the lateral projections extend in at least three layers, wherein between each successive layers of projections each time at least one of said plastics ribs is provided, wherein the support skeleton is made of a material which has a higher hardness than the plastics material said ribs are made of and the support skeleton comprises a central tube structure, which forms said opening, and wherein said plastics ribs are formed by plastics elements which are laterally clamped over said tube structure.

[0008] Since the support skeleton fits in the hollow bar with some clearance, and because, during insertion of the hinge cap in the hollow bar, only the plastics ribs need to be deformed, the hinge cap may be inserted in the hollow bar in the same simple manner as the existing plastics hinge caps. However, the advantage of the hinge caps of the gate according to the invention is that the plastics ribs may be made from a softer plastics material,

such that they are less likely to break off rapidly. When the hinge is loaded, the plastics ribs may indeed deform rapidly as the lateral projections of the support skeleton, which are harder than the plastics ribs, provide for an additional support of the hinge cap against the inside of the hollow bar. Moreover the support skeleton and the plastics part of the hinge cap may be manufactured separately, wherein the plastics elements, for example, may be manufactured in a simple and relatively inexpensive manner by injection moulding, after which, using a snap-fit system, the various parts of the hinge caps may be assembled very easily and quickly.

[0009] In a preferred embodiment, the support skeleton is made of metal, wherein the support skeleton is preferably injection moulded.

[0010] In this way, the support skeleton of the hinge cap may be manufactured in a simple and relatively inexpensive manner. The metal has a higher hardness than the plastics material, as well as a higher wear resistance, such that it is able to provide the required rigid support for the hinge arm, whereas the plastics material is sufficiently soft for the hinge cap to be clamped in the hollow bar.

[0011] In a further embodiment, said hollow bar has a cross-section which has a substantially rectangular shape, in particular a substantially square shape, wherein said support skeleton has at least four of said lateral projections, each of which is directed to one of the four corners of the hollow bar.

[0012] This embodiment offers the advantage that the support skeleton is supported on the strongest areas of the hollow bar, namely at the corners thereof. A further advantage is that the weld seam of the hollow bar is situated in the middle of a side thereof, such that the thickness thereof, which may slightly vary from bar to bar, has no effect on the distance between the ends of the lateral projections of the support skeleton and the inside of the hollow bar.

[0013] Further advantages and particularities of the invention will become apparent from the following description of a preferred embodiment of a gate and of a hinge cap according to the invention. However, this description is only given as an example and is not intended to limit the scope, as defined by the claims. The reference numerals indicated in the description, relate to the annexed drawings wherein :

Figure 1, in perspective, shows an exploded view of a part of a gate attached to a pole using a commercially known hinge ;

Figure 2 is the same view as Figure 1, but in which a hinge cap according to the invention is applied;

Figures 3 and 4 show a perspective view on a larger scale of said hinge cap according to the invention, viewed from the top and from the bottom, respectively;

Figure 5 shows, in perspective, an exploded view of the hinge cap according to Figures 2 to 4;

Figures 6 and 7 show a bottom view and a side view of the hinge cap, respectively;

Figure 8 is a longitudinal sectional view through the hinge cap according to the previous figures, and the hollow bar in which said hinge cap may be tightly clamped;

Figure 9 is a longitudinal sectional view of the hollow bar and the hinge cap according to Figure 8, wherein the hinge cap is inserted in a clamped manner in the hollow bar; and

Figures 10 through 14 illustrate another embodiment of the hinge arm with which the hinge cap may cooperate, wherein said hinge arm is adjustable to be able to adjust the distance between the gate and the pole on to which the gate is mounted.

[0014] The invention generally relates to a gate with a hollow bar, which has an open end at the top and at the bottom, and comprising hinge caps which are provided to be fitted in said open ends.

[0015] Figure 1 shows an exploded view of such a gate, provided with commercially available hinge caps. This gate 1 consists of a rectangular frame 2, provided with a wire mesh 3. The rectangular frame 2 comprises the hollow bar 3, which has an open end 4 at the top and at the bottom. The hollow bar 3 is formed by a substantially rectangular metal tube which mostly has a square shape. In practice, this tube has a standard outside dimension of 30, 40 or 50 mm. The thickness of the tube is usually about 1.5 or 2.0 mm. Such tubes are produced by cold bending a metal sheet and longitudinally welded their free ends together. The formed weld seam is not shown in the figures but is located approximately in the middle of one of the sides of the tube. On the outside, the weld plane is flattened but on the inside of the tube, the weld seam remains.

[0016] The hinge cap 5, which is already known and which is inserted in a clamped manner in the upper and lower open end 4 of the hollow bar 3, is entirely manufactured of a plastics material, in particular by injection moulding. It consists of a central tube structure 6 with laterally projecting plastics ribs 7 and having at the top a cover plate 8 which rests on the wall of the hollow bar 3. The central tubular structure 6 forms an opening 9 in which one end 10 of a hinge arm 11 is rotationally received. This end 10 of the hinge arm 11 thus forms the axis of the hinge. The other end 12 is located substantially perpendicular to this rotation axis and is provided with screw-thread, to be fixed by means of the nuts 13 to a support, more particularly a rigid pole 14.

[0017] In Figure 2 is displayed the same gate, provided with the same hinge system. In this figure, the same elements as in the known gate are referred to with the same reference numerals. The only difference is that in the hinges of this gate, a hinge cap 15 according to the invention is used.

[0018] As can be seen more clearly in Figure 8, said hinge cap 15 also comprises a central tube structure 6

and laterally projecting plastics ribs 7. The central tubular structure 6 is provided at the top with a cover plate 8 which rests on the wall of the hollow bar 3 (or on which the wall of the hollow bar 3 rests for the bottom hinge). At the bottom, the central tube structure 6 is provided with a collar 16 which fits with some clearance into the hollow bar 3. The central tube structure 6 further forms a central opening 9 in which the end 10 (rotation axis) of the hinge arm 11 is rotationally received, and which extends in the longitudinal direction of the bar 3.

[0019] It is essential for the hinge caps 15 according to the invention that they contain, in addition to the plastics ribs 7, a support skeleton 17. This support skeleton 17 is displayed in the centre image of Figure 5, and forms the central tube structure 6, in which the opening 9 for the hinge pin 11 is formed. In the preferred embodiment shown in the figures, as can be clearly seen in Figure 5, the plastics ribs 7 are formed by plastics elements 18 which may be clipped laterally on the tube structure 6. According to the invention, the support skeleton 17 shows lateral projections 19 which extend in unloaded condition of the hinge 11, 15, up to a short distance from the inside of the hollow bar 3 (see Figure 9). When the hinge is loaded, the plastics ribs 7 experience a deformation in which the lateral projections 19 (more specifically, at least some of them) starting from a certain load, provide an additional support of the hinge cap 15 against the inside of the hollow bar 3. In order to be able to absorb higher loads, the support skeleton 17 is made of a material which has a higher hardness than the plastics material of which the ribs 7 are made. The distance over which the lateral projections 19 extend, in the unloaded condition of the hinge, from the inside of the hollow bar 3, is preferably less than 2.0 mm, more preferably less than 1.5 mm and most preferably less than or equal to 1.0 mm.

[0020] The plastics ribs 7 ensure that the hinge cap 15 is clamped in the hollow bar 3. As can be seen in Figure 9, these plastics ribs 7 are hereby slightly deformed against the inside of the hollow bar 3. However, the harder lateral projections 19 of the support skeleton 17 remain, when the hinge is not loaded, at a short distance from the inside of the hollow bar 3, such that these may provide for an additional support, but do not hamper the smooth insertion of the hinge cap 15 in the hollow bar 3.

[0021] In the preferred embodiment, shown in the figures, the lateral projections 19 of the support skeleton 17 are provided to extend, when the plastics ribs 7 are deformed as a result of a load on the hinge 11, 15, up to the inside of the hollow bar 3. In a variant embodiment, the plastics material of which the ribs 7 are made, could form a relatively thin buffer between the ends of the lateral projections 19 in the inside of the hollow bar 3, such that these projections 19 do not directly come into contact with the inside of the hollow bar 3, but are still able to offer additional support. Preferably, said plastics buffer has a limited thickness which, in particular, is less than 5 mm, and most preferably less than 3 mm.

[0022] The plastics material the ribs 7 are made of, preferably contains polyethylene (PE) or polyoxymethylene (POM). To reduce the hardness of such plastics, it is known to add plasticisers thereto. The plastics material of the ribs 7 preferably has a Shore D hardness, measured according to ASTM D2240, which is less than 80, preferably less than 70, and more preferably less than 60. However, this Shore D hardness is preferably higher than 10, more preferably higher than 20, and most preferably higher than 30.

[0023] The support skeleton 17 may also be made of a plastics material which is harder than the plastics material of the ribs 7. The support skeleton 17 may be made, for example, of glass-fibre reinforced polyamide (PA) or, alternatively, also of acrylonitrile-butadiene-styrene (ABS). However, the support skeleton 17 is preferably made of a metal material, for example of aluminium or of an alloy containing at least zinc and aluminium, such as Zamac, with preference being given to aluminium. Indeed, aluminium can be moulded easily and provides the necessary hardness, wherein moulding of the support skeleton is preferred since that is the simplest/cheapest way of manufacturing.

[0024] Both the part of the hinge cap 15 with the plastics ribs 7, as well as the support skeleton 17 are preferably separately produced, preferably by moulding or injection moulding. So-called "over-moulding" techniques, in which the support skeleton 17 is provided in advance as an insert in the mould in which the plastics part is to be manufactured, are also possible but are more complex and more expensive. As described above and is clearly shown in Figure 5, it is preferred for the plastics ribs 7 to be manufactured as part of the plastics elements 18, in which these plastics elements 18 are preferably formed such that they can easily be clipped on the support skeleton 17.

[0025] The lateral projections 19 of the support skeleton 17 extend preferably in at least three, more preferably in at least four layers. In the hinge cap 15 shown in the figures, there are four layers of projections 19, wherein the upper layer of projections 19 is fixed to the bottom of the cover plate 8 and wherein the bottom layer of projections 19 is formed by the collar 16. Between these layers of projections 19, the plastics ribs 7 are positioned.

[0026] The lateral projections 19 of the support skeleton 17 are preferably directed to the corners of the hollow bar 3. At these locations, the hollow bar 3 offers the highest resistance to deformation. Moreover, there are no weld seams in the corners which would hamper insertion of the hinge cap 15 by contact with the hard lateral projections 19 of the support skeleton 17.

[0027] From the above description of the gate according to the invention, it will be understood that the invention is by no means limited to the embodiments described herein, but that all kinds of modifications may be made thereof without departing from the scope of the invention as defined by the appended claims.

[0028] For example, the hinge arm can have a more

complex shape and may possibly also be adjustable, such as the hinge arm 500 shown in Figures 10 to 14. The hinge arm 500 shown in these figures, includes a housing 510 in which the hinged end 520 of the hinge arm is mounted. The housing 510 itself is fixed by means of a bolt 530 and a nut 535 against the pole 14.

[0029] Within the housing 510 there is a toothed rack 540 on which the hinged end 520 is arranged. As shown, the position of the hinged end 520 on the toothed rack 540 can be adjusted according to arrow 550. Once in the correct position, the hinged end 520 can be fixed by means of a bolt 525. The bolt 525 is screwed into the end 520 and clamps a plate 560 against the toothed rack 540. Such adjustable hinge arm enables thus to control the position of the gate.

Claims

1. A gate (1) for hinged mounting to a support, said gate (1) comprising a hollow bar (3), which has an open end (4) at its top and bottom, and
two hinges attached to said bar (3), which hinges each comprise a hinge arm (11, 500) and a hinge cap (15),
wherein the hinge caps (15) are at least partially made of a plastics material and are provided with laterally projecting ribs (7), made from said plastics material, with which they are clamped in the upper and in the lower open end (4) of the bar (3) of the gate, such that the plastics ribs (7) are deformed against the inside of the hollow bar (3), and
wherein the hinge caps (15) exhibit an opening (9) in which one end (10, 520) of the hinge arms (11, 500) is rotationally received, **characterized in that** the hinge caps (15), in addition to said plastics ribs (7), comprise a support skeleton (17) in which said opening (9) is formed, which support skeleton (17) exhibits lateral projections (19) extending, in the unloaded state of the hinge, up to a short distance from the inside of the hollow bar (3), and being provided, when the plastics ribs (7) are deformed as a result of a load on the hinge, to provide an additional support of the hinge cap (15) against the inside of said bar (3), wherein the lateral projections (19) extend in at least three layers, wherein between each successive layers of projections (19) each time at least one of said plastics ribs (7) is provided, wherein the support skeleton (17) is made of a material which has a higher hardness than the plastics material from which said ribs (7) are made, wherein the support skeleton (17) comprises a central tube structure (6), which forms said opening (9), and wherein said ribs (7) are formed by plastics elements (18) which are laterally clamped over said tube structure.

2. A gate according to claim 1, **characterized in that** the support skeleton (17) is made of metal.

3. A gate according to claim 2, **characterized in that** the support skeleton (17) is made of aluminium or of an alloy containing at least aluminium and zinc, wherein the support skeleton is preferably made of aluminium.

4. A gate according to claim 1, **characterized in that** the support skeleton (17) is made of a plastics material, preferably of polyamide that is in particular glass-fibre-reinforced.

5. A gate according to any one of the claims 1 to 4, **characterized in that** the support skeleton (17) is moulded.

6. A gate according to any one of claims 1 to 5, **characterized in that** said lateral projections (19) are provided to extend, when the plastics ribs (7) are loaded as a result of a load on the hinge, up to the inside of the hollow bar (3).

7. A gate according to any one of claims 1 to 6, **characterized in that** said plastics material contains polyethylene or polyoxymethylene.

8. A gate according to any one of the claims 1 to 7, **characterized in that** said plastics material has a Shore D hardness, measured according to ASTM D2240, which is less than 80, preferably less than 70, and more preferably less than 60.

9. A gate according to any one of the claims 1 to 8, **characterized in that** said plastics material has a Shore D hardness, measured according to ASTM D2240, which is higher than 10, preferably higher than 20, and more preferably higher than 30.

10. A gate according to any one of the claims 1 to 9, **characterized in that** said hollow bar (3) has a cross-section which has a substantially rectangular shape, in particular a substantially square shape, wherein said support skeleton (17) has at least four of said lateral projections (19), each of which is directed to one of the four corners of the hollow bar (3).

11. A gate according to any one of claims 1 to 10, **characterized in that** said lateral projections (19) extend in at least four layers, wherein between each two successive layers of projections (19) each time at least one of said plastics ribs (7) is provided.

12. A gate according to any one of the claims 1 to 11, **characterized in that** the hinge cap (15) has a cover plate (8), which extends beyond the inside of the hollow bar (3), and which covers the hollow bar (3).

13. A gate according to any one of the claims 1 to 12, **characterized in that** said short distance between

the projections (19) of the support skeleton (17) and the inner side of the hollow bar (3) is less than 2.0 mm, preferably less than 1.5 mm, and more preferably less than or equal to 1.0 mm.

Patentansprüche

1. Ein Tor (1) zur Montage an eine Stütze mittels Scharnieren, wobei das erwähnte Tor (1) Folgendes umfasst:

   eine hohle Stange (3), welche oben und unten ein offenes Ende (4) hat, und zwei Scharniere befestigt an der erwähnten Stange (3), wobei die Scharniere jeweils einen Scharnierarm (11, 500) und eine Scharnierkappe (15) umfassen,
   wobei die Scharnierkappen (15) zumindest teilweise aus einem Kunststoffmaterial hergestellt sind und mit seitlich vorspringenden Rippen (7), hergestellt aus dem erwähnten Kunststoffmaterial, versehen sind, mit denen sie in das obere und untere offene Ende (4) der Stange (3) des Tores geklemmt sind, sodass die Kunststoffrippen (7) gegen die Innenseite der hohlen Stange (3) verformt werden, und
   wobei die Scharnierkappen (15) eine Öffnung (9) aufweisen, in die ein Ende (10, 520) der Scharnierarme (11, 500) rotierend aufgenommen wird, **dadurch gekennzeichnet, dass**
   die Scharnierkappen (15), zusätzlich zu den erwähnten Kunststoffrippen (7), ein Stützskelett (17) umfassen, in dem die erwähnte Öffnung (9) geformt ist, wobei das Stützskelett (17) seitliche Vorsprünge (19) aufweist, die sich, im unbelasteten Zustand des Scharniers, bis zu einem kurzen Abstand von der Innenseite der hohlen Stange (3) ausdehnen, und die vorgesehen sind, um, wenn die Kunststoffrippen (7) aufgrund einer Last auf dem Scharnier verformt werden, eine zusätzliche Unterstützung der Scharnierkappe (15) gegen die Innenseite der erwähnten Stange (3) zu bieten, wobei die seitlichen Vorsprünge (19) sich in zumindest drei Lagen ausdehnen, wobei zwischen jeder aufeinander folgenden Lage von Vorsprüngen (19) jeweils zumindest eine der erwähnten Kunststoffrippen (7) vorgesehen ist, wobei das Stützskelett (17) aus einem Material hergestellt ist, das eine höhere Härte als das Kunststoffmaterial hat, aus dem die erwähnten Rippen (7) hergestellt sind, wobei das Stützskelett (17) eine zentrale Rohrstruktur (6) umfasst, welche die erwähnte Öffnung (9) formt, und wobei die erwähnten Rippen (7) durch Kunststoffelemente (18) geformt sind, welche seitlich über die erwähnte Rohrstruktur geklemmt sind.

2. Ein Tor nach Anspruch 1, **dadurch gekennzeichnet, dass** das Stützskelett (17) aus Metall hergestellt ist.

3. Ein Tor nach Anspruch 2, **dadurch gekennzeichnet, dass** das Stützskelett (17) aus Aluminium oder aus einer Legierung, die zumindest Aluminium und Zink enthält, hergestellt ist, wobei das Stützskelett vorzugsweise aus Aluminium hergestellt ist.

4. Ein Tor nach Anspruch 1, **dadurch gekennzeichnet, dass** das Stützskelett (17) aus einem Kunststoffmaterial hergestellt ist, vorzugsweise aus Polyamid, das insbesondere mit Glasfasern verstärkt ist.

5. Ein Tor nach irgendeinem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das Stützskelett (17) geformt ist.

6. Ein Tor nach irgendeinem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die erwähnten seitlichen Vorsprünge (19) vorgesehen sind, um sich, wenn die Kunststoffrippen (7) aufgrund einer Last auf dem Scharnier belastet werden, bis ins Innere der hohlen Stange (3) auszudehnen.

7. Ein Tor nach irgendeinem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** das erwähnte Kunststoffmaterial Polyethylen oder Polyoxymethylen enthält.

8. Ein Tor nach irgendeinem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** das erwähnte Kunststoffmaterial eine Shore-D-Härte hat, gemessen nach ASTM D2240, die weniger als 80 beträgt, vorzugsweise weniger als 70 und noch besser weniger als 60.

9. Ein Tor nach irgendeinem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** das erwähnte Kunststoffmaterial eine Shore-D-Härte hat, gemessen nach ASTM D2240, die mehr als 10 beträgt, vorzugsweise mehr als 20 und noch besser mehr als 30.

10. Ein Tor nach irgendeinem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** die erwähnte hohle Stange (3) einen Querschnitt hat, welcher eine im Wesentlichen rechteckige Form hat, insbesondere eine im Wesentlichen quadratische Form, wobei das erwähnte Stützskelett (17) zumindest vier der erwähnten seitlichen Vorsprünge (19) hat, von denen jeder in eine der vier Ecken der hohlen Stange (3) gerichtet ist.

11. Ein Tor nach irgendeinem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** sich die erwähnten seitlichen Vorsprünge (19) in zumindest vier Lagen ausdehnen, wobei zwischen zwei aufeinander fol-

genden Lagen von Vorsprüngen (19) jeweils zumindest eine der erwähnten Kunststoffrippen (7) bereitgestellt ist.

12. Ein Tor nach irgendeinem der Ansprüche 1 bis 11, **dadurch gekennzeichnet, dass** die Scharnierkappe (15) eine Abdeckplatte (8) hat, die sich über die Innenseite der hohlen Stange (3) hinaus ausdehnt und die die hohle Stange (3) abdeckt.

13. Ein Tor nach irgendeinem der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** der erwähnte kurze Abstand zwischen den Vorsprüngen (19) des Stützskeletts (17) und der Innenseite der hohlen Stange (3) weniger als 2,0 mm beträgt, vorzugsweise weniger als 1,5 mm und noch besser weniger als oder gleich viel wie 1,0 mm.

Revendications

1. Portail (1) à monter à charnière sur un support, ledit portail comprenant
une barre (3) creuse qui a une extrémité ouverte (4) à son sommet et son pied, et
deux charnières attachées à ladite barre (3), lesquelles charnières comprennent chacune un bras (11, 500) de charnière et un couvercle (15) de charnière, dans lequel les couvercles (15) de charnière sont réalisés au moins en partie dans une matière plastique et sont pourvus de nervures (7) faisant saillie latéralement, réalisées dans ladite matière plastique, avec lesquelles ils sont serrés dans l'extrémité ouverte supérieure et l'extrémité ouverte inférieure (4) de la barre (3) du portail, de sorte que les nervures (7) en matière plastique soient déformées contre le côté intérieur de la barre (3) creuse, et
dans lequel les couvercles (15) de charnière présentent une ouverture (9) dans laquelle une extrémité (10, 520) des bras (11, 500) de charnière est reçue de manière rotative,
caractérisé en ce que
les couvercles (15) de charnière comprennent, outre lesdites nervures (7) en matière plastique, un squelette de support (17) dans lequel ladite ouverture (9) est formée, lequel squelette de support (17) présente des saillies latérales (19) s'étendant, dans l'état non chargé de la charnière, jusqu'à une courte distance du côté intérieur de la barre (3) creuse, et qui sont prévues, quand les nervures (7) en matière plastique sont déformées en raison d'une charge sur la charnière, pour fournir un support additionnel du couvercle (15) de charnière contre le côté intérieur de ladite barre (3), dans lequel les saillies latérales (19) s'étendent en au moins trois couches, dans lequel au moins une desdites nervures (7) en matière plastique étant prévue chaque fois entre chaque couche successive de saillies (19), dans lequel le squelette de support (17) est réalisé dans un matériau qui a une plus grande dureté que la matière plastique dans laquelle lesdites nervures (7) sont réalisées, dans lequel le squelette de support (17) comprend une structure tubulaire (6) centrale qui forme ladite ouverture (9), et dans lequel lesdites nervures (7) en matière plastique sont formées par des éléments (18) en matière plastique qui sont serrés latéralement sur ladite structure tubulaire (6).

2. Portail selon la revendication 1, **caractérisé en ce que** le squelette de support (17) est réalisé en métal.

3. Portail selon la revendication 2, **caractérisé en ce que** le squelette de support (17) est réalisé en aluminium ou dans un alliage contenant au moins de l'aluminium et du zinc, le squelette de support étant de préférence réalisé en aluminium.

4. Portail selon la revendication 1, **caractérisé en ce que** le squelette de support (17) est réalisé dans une matière plastique, de préférence du polyamide qui est en particulier renforcé par des fibres de verre.

5. Portail selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** le squelette de support (17) est moulé.

6. Portail selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** lesdites saillies latérales (19) sont prévues pour s'étendre, quand les nervures (7) en matière plastique sont chargées en raison d'une charge sur la charnière, jusqu'au côté intérieur de la barre (3) creuse.

7. Portail selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** ladite matière plastique contient du polyéthylène ou du polyoxyméthylène.

8. Portail selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** ladite matière plastique a une dureté Shore D, mesurée selon ASTM D2240, qui est inférieure à 80, de préférence inférieure à 70 et mieux encore inférieure à 60.

9. Portail selon l'une quelconque des revendications 1 à 8, **caractérisé en ce que** ladite matière plastique a une dureté Shore D, mesurée selon ASTM D2240, qui est supérieure à 10, de préférence supérieure à 20 et mieux encore supérieure à 30.

10. Portail selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** ladite barre (3) creuse a une section transversale qui a une forme sensiblement rectangulaire, en particulier une forme sensiblement carrée, dans lequel ledit squelette de support (17) a au moins quatre desdites saillies latérales (19) dont chacune est dirigée vers un des quatre

coins de la barre (3) creuse.

11. Portail selon l'une quelconque des revendications 1 à 10, **caractérisé en ce que** lesdites saillies latérales (19) s'étendent en au moins quatre couches, dans lequel au moins une desdites nervures (7) en matière plastique est prévue chaque fois entre chaque paire de couches successives de saillies (19).

12. Portail selon l'une quelconque des revendications 1 à 11, **caractérisé en ce que** le couvercle (15) de charnière a une plaque (8) de couvercle qui s'étend au-delà du côté intérieur de la barre (3) creuse et qui couvre la barre (3) creuse.

13. Portail selon l'une quelconque des revendications 1 à 12, **caractérisé en ce que** ladite courte distance entre les saillies (19) du squelette de support (17) et le côté intérieur de la barre creuse (3) est inférieure à 2,0 mm, de préférence inférieure à 1,5 mm et mieux encore inférieure ou égale à 1,0 mm.

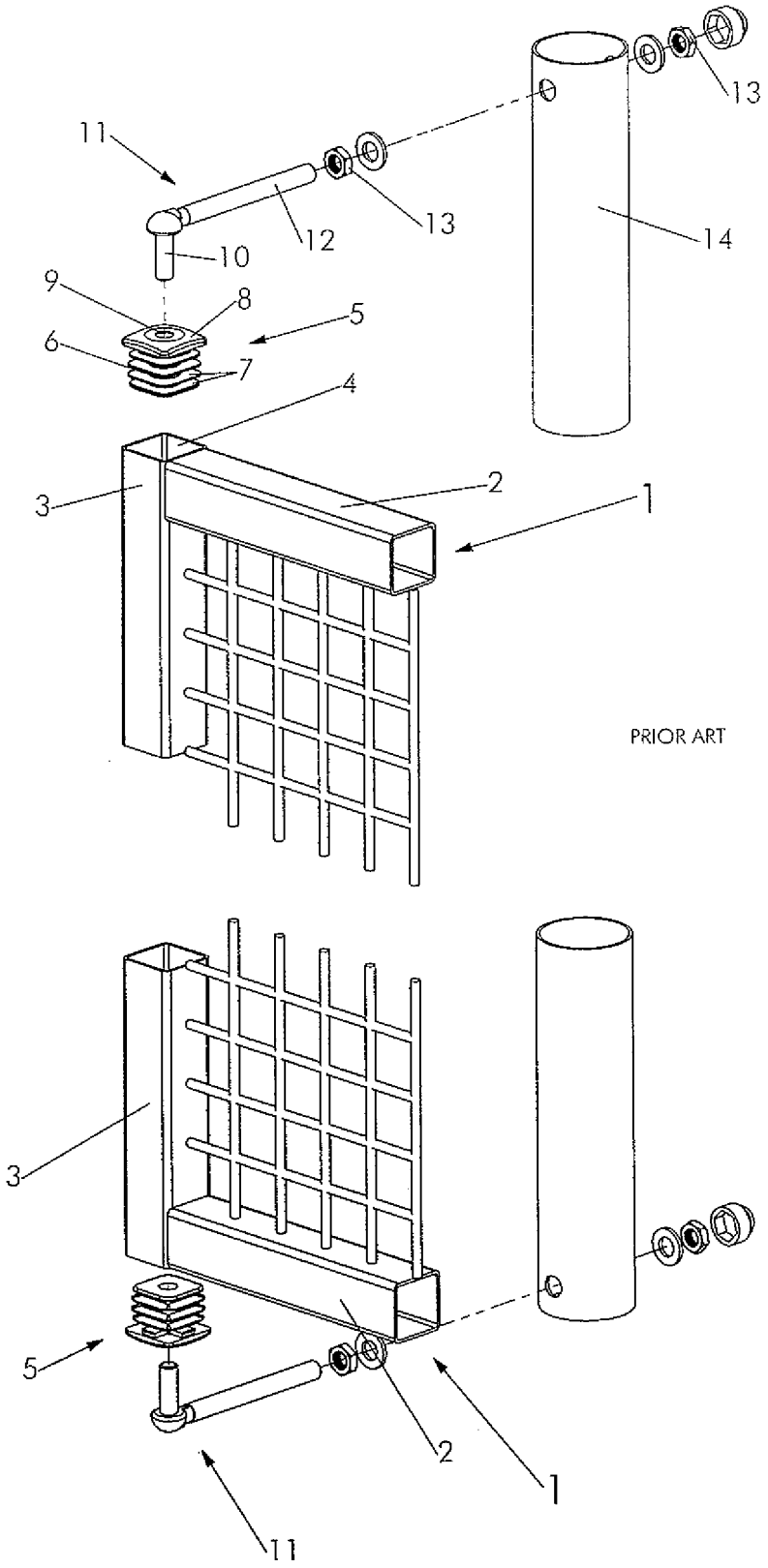


Fig.1

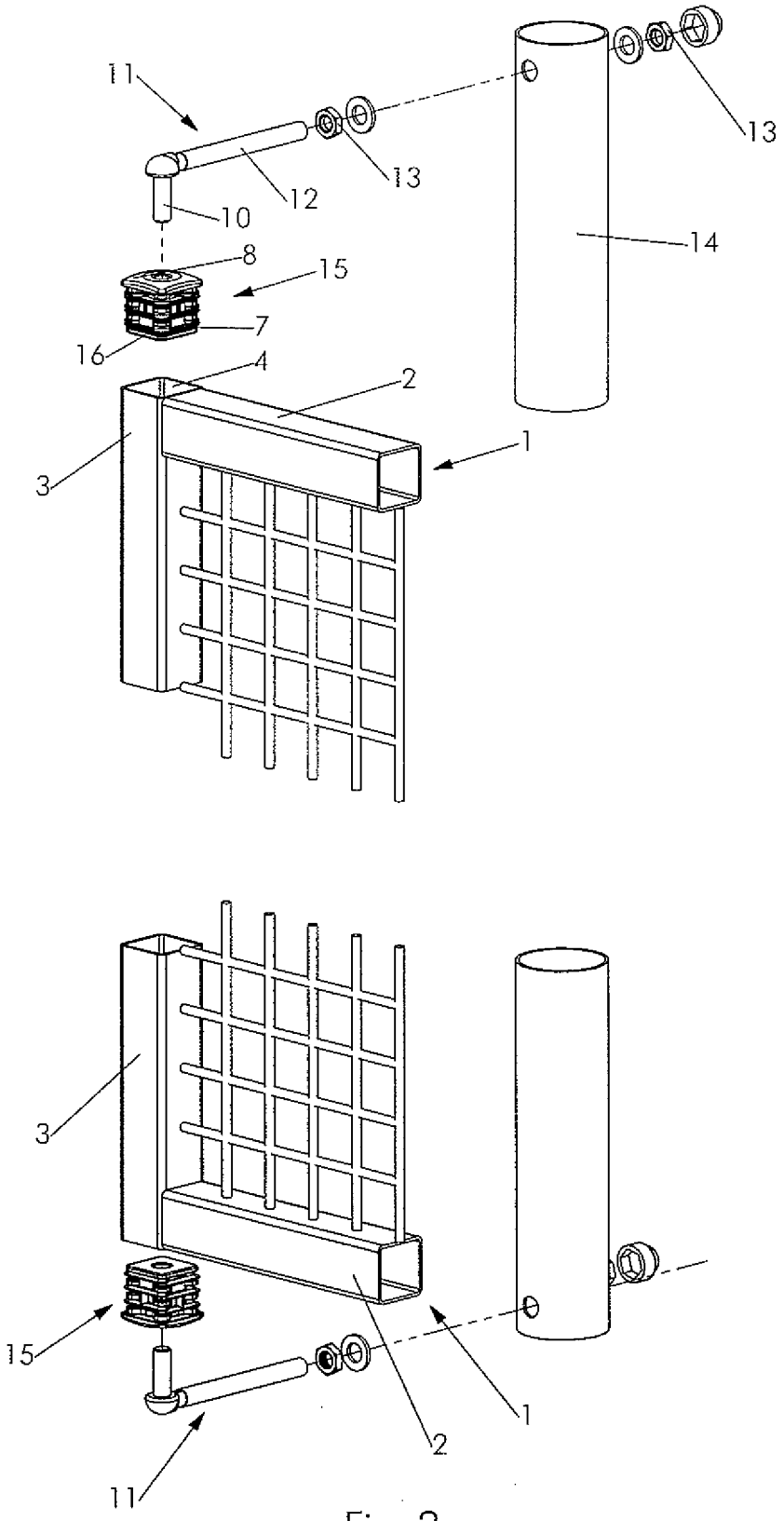


Fig. 2

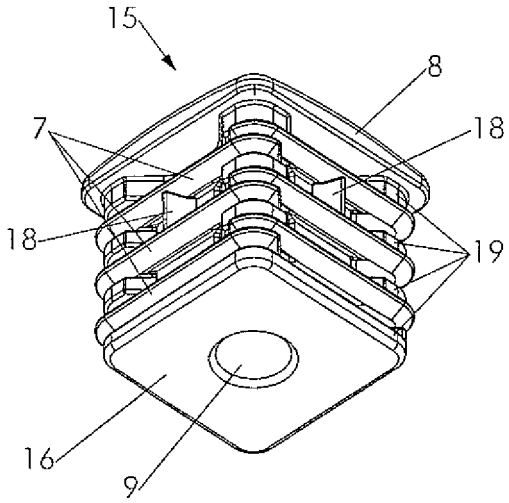


Fig. 3

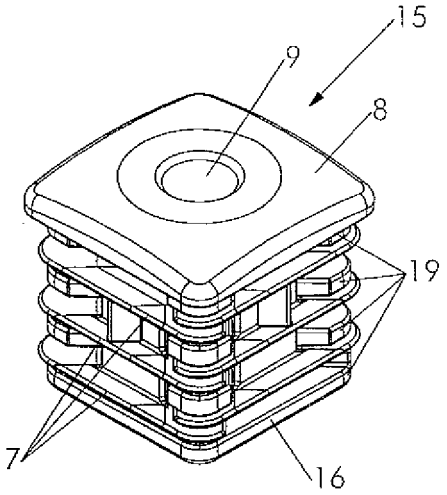


Fig. 4

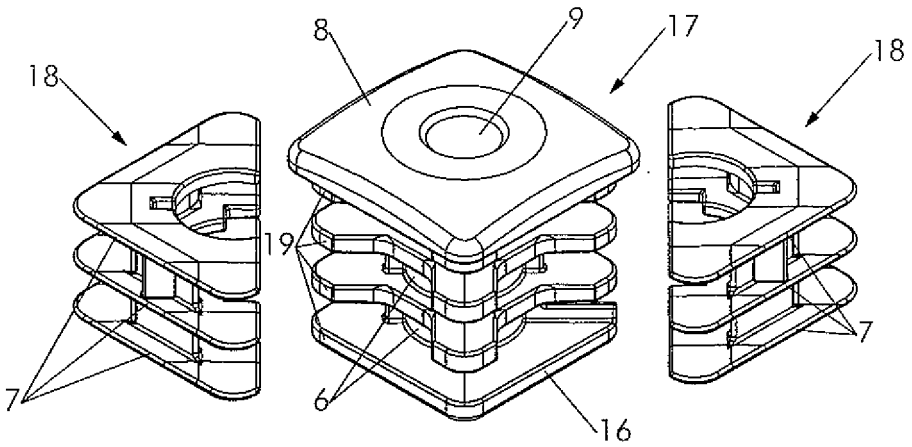


Fig. 5

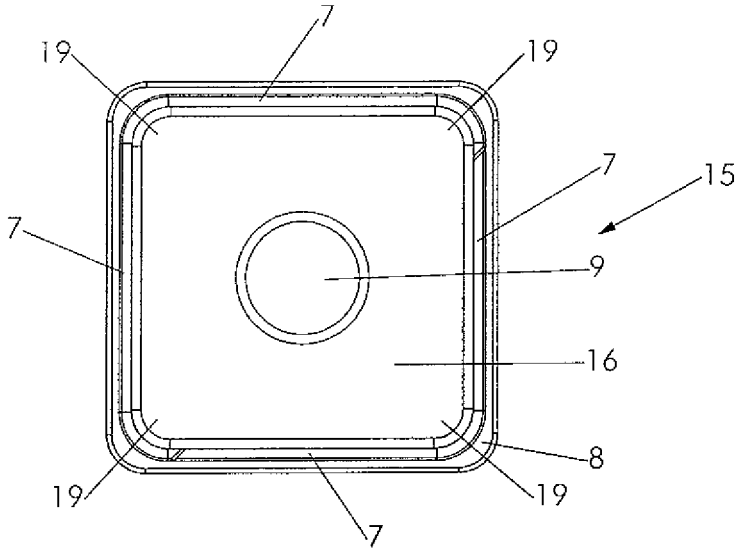


Fig. 6

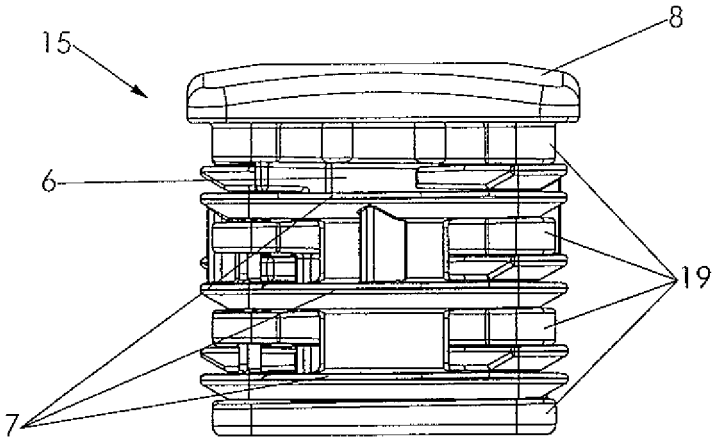


Fig. 7

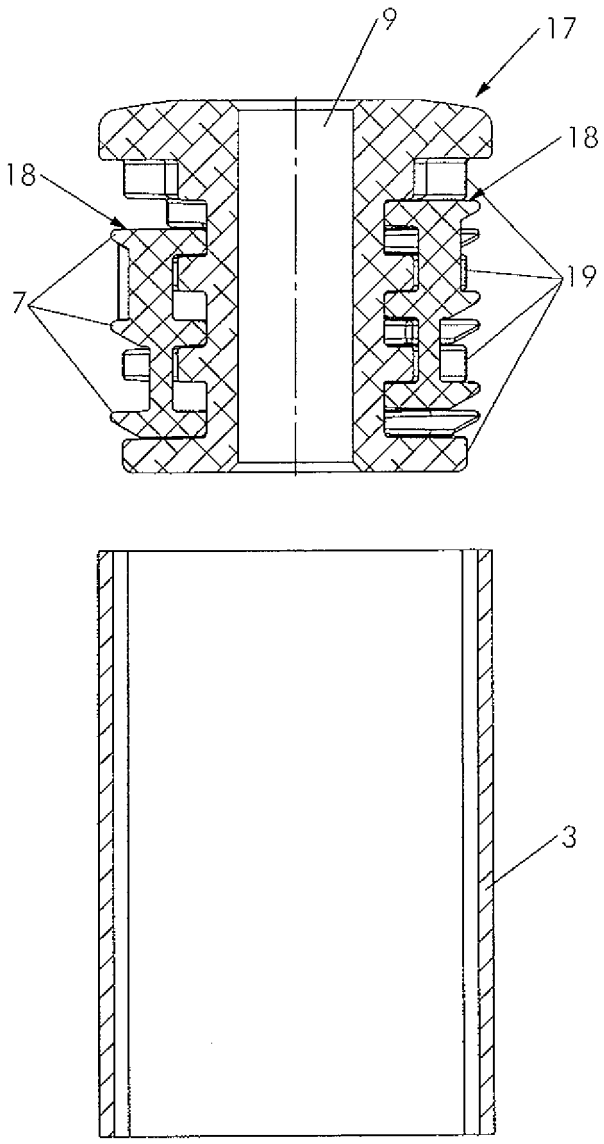


Fig. 8

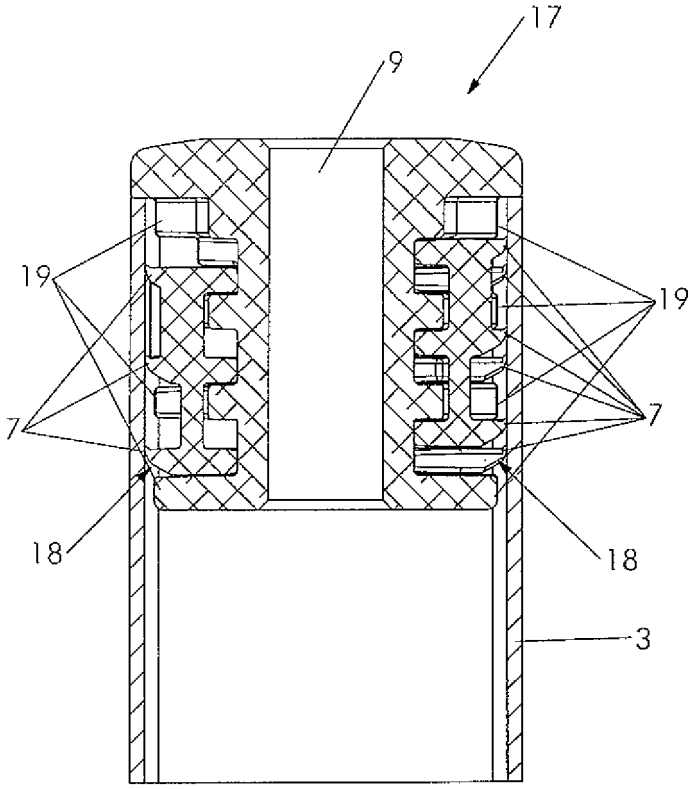


Fig. 9

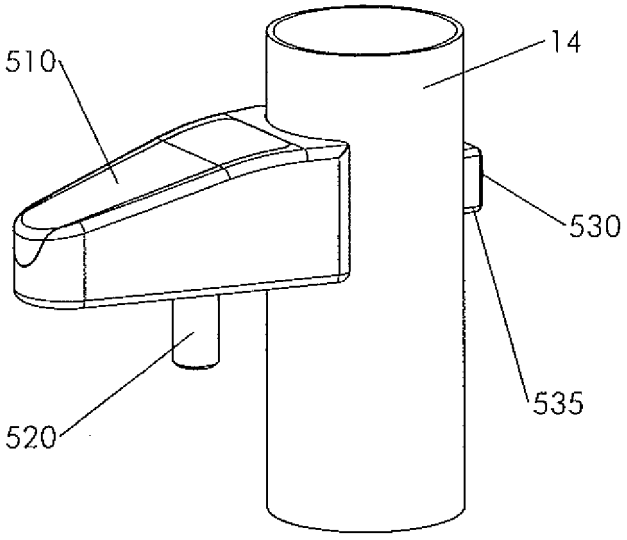


Fig. 10

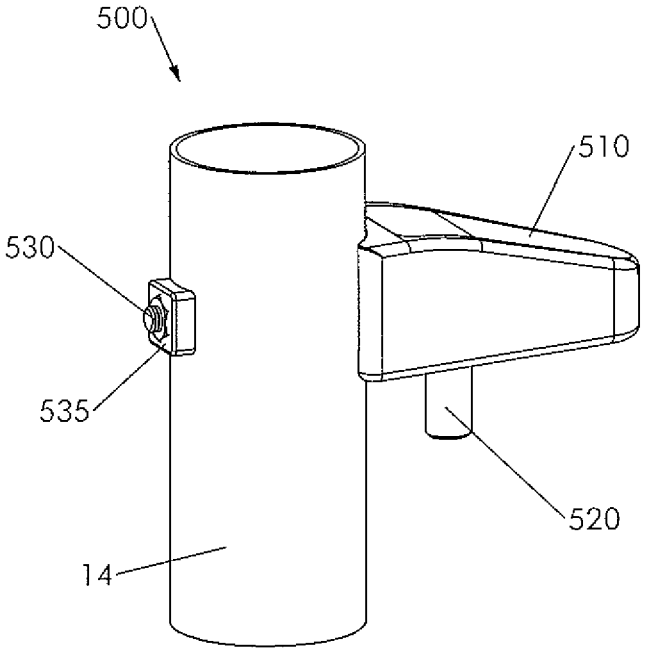


Fig. 11

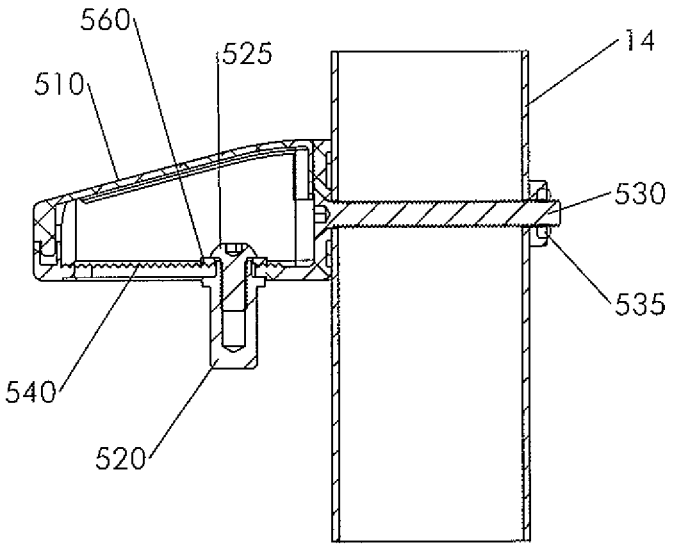


Fig. 12

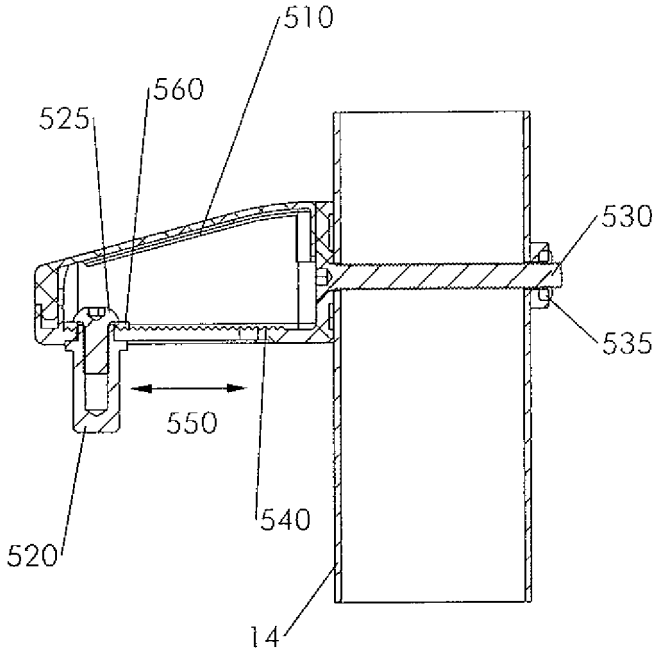


Fig. 13

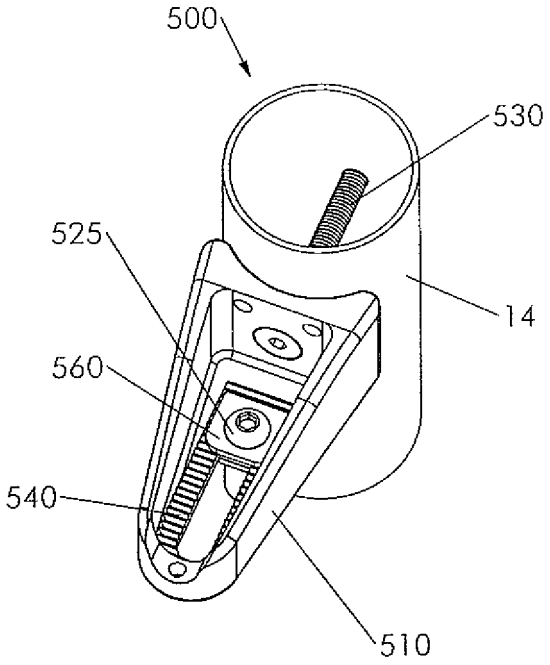


Fig. 14

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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