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

(11) **EP 2 881 007 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.06.2015 Bulletin 2015/24

(51) Int Cl.:
A47B 3/08 *(2006.01)*

(21) Application number: **13195480.2**

(22) Date of filing: **03.12.2013**

(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

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(54) Locking mechanism

(57) The present invention relates to a locking mechanism which locks a first part relative to a second part. When unlocked, either the first or second part can be pivoted relative to the other between at least one locked and at least one unlocked position.

The locking mechanism is to be attached to a device or a device part comprising a first (1) and a second (9) part. The first part is fixed unreleasable to a stationary part (2) via a hinge connection (5, 6) defining a swing axis a1, the first part can pivot relative to the stationary part along the swing axis a1 and has at least two positions: a locking position and a not locking position, the first part comprises:

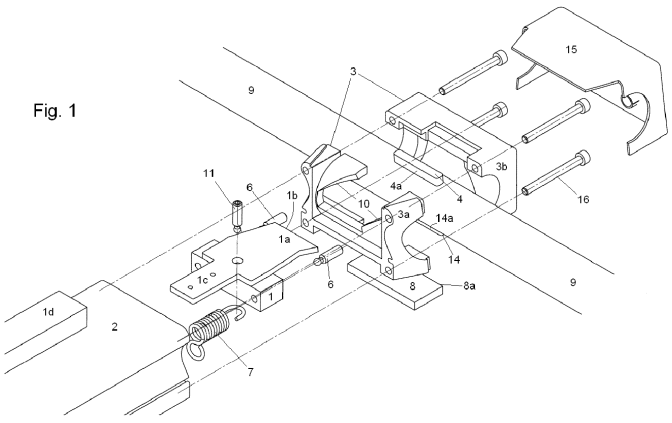
-- a protruding part (1 a) extending in direction of the second part (9) and having a first contact surface (1 b),

-- an attachment position for a spring (7) or spring system which spring or spring system forces the first part into the locked position, upon biasing the spring (7) the first part is brought to the unlocked position,

-- a release mechanism (1c, 1 d) which upon user impact biases the spring.

The second part (9) comprises a first protruding part (4) having a second contact surface (4a) and a second protruding part (14) having a third contact surface (14a), the second part can be in a locked position and in an unlocked position and when in the locked position the first contact surface (1 b) touches the second contact surface (4a), the second part (9) is placed in a bearing (3, 3a, 3b) allowing rotation between the locked and unlocked positions of the second part while the bearing is fixed relative to the stationary part (2). The bearing or the stationary part or an independent part held in position by the stationary part or by the bearing (3, 3a) has a fourth contact surface (8a) and in the locked position the third contact surface (14a) of the second part touches the fourth contact surface (8a).

Fig. 1



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Description

Field of the invention

[0001] The present invention relates to a locking mechanism which locks a first part relative to a second part. When unlocked, either the first or second part can be pivoted relative to the other between at least one locked and at least one unlocked position.

Background of the invention

[0002] The locking mechanism of the present invention will often be used in connection with furnitures where a simple, light-weight solution is appreciated.

[0003] Due to the possibility of enclosing the movable parts of the locking mechanism in a closed or semi-closed profile the locking mechanism can be placed in positions where it will be visible as the user will see the outer surface of the profile and not the mechanism as such.

[0004] US 2010/0175598 relates to a table with a swingable bow foot. The table comprises a table top and at least one bow foot which is swingable between a transportation position in which it is swung in so as to rest against a surface of the table top, and a swung out utilization position. The bow foot has a base limb and at least one table leg, the bow foot experiences an offset between its transportation position and its utilization position axially to its base limb, which offset is controlled by a control tenon (36) guided in a control track, wherein the control track is formed on the circumference of the base limb and the control tenon is firmly attached to the table top. A bar plate (46) comprises on its inner site facing the table top (12) a pocket-like recess (52) corresponding to bar elements (42A, 42B) in such a way that when the relevant bar element (42A, 42B) is engaged, the relevant bow foot is locked and cannot be swung.

[0005] This mechanism is relatively complex i.e. it is constructed of many interacting parts, and the locking mechanism comprising a bar element and the recess of the bar plate has to be constructed of material having a high hardness in order to withstand stress. Also, forces are transferred to the table top via the bar plate and the swing axis, thereby necessitating that the table top posses a certain strength.

[0006] Consequently, there is a need for a more simple locking mechanism i.e. a mechanism constructed of fewer parts which in regard to design is pleasing and also self-supporting meaning that the locking mechanism allows for the use of surfaces or parts which are of low strength or even fragile, because all forces relating to pivoting the first and second part of the locking mechanism relative to each other are excersized on inside surfaces of the locking mechanism and therefore not transferred to the device e.g. a table top to which the locking mechanism is fixed.

Summary of the invention

[0007] The present invention was made in view of the prior art described above, and the object of the present invention is to provide a locking mechanism which is both simple, easy to operate and having a design which makes it acceptable to be placed in a position where it will be seen.

[0008] The present invention provides a locking mechanism to be attached to a device or a device part comprising a first and a second part,

- the first part (1) is fixed unreleasable to a stationary part (2) via a hinge connection (5, 6) defining a swing axis a1, the first part (1) can pivot relative to the stationary part (2) along the swing axis a1 and has at least two positions: a locking position and a not locking position, the first part (1) comprises:

    --- a protruding part (1 a) extending in direction of the second part (9) and having a first contact surface (1 b),
    --- an attachment position for a spring (7) or spring system which spring (7) or spring system forces the first part (1) into the locked position, upon biasing the spring (7) the first part (1) is brought to the unlocked position,
    --- a release mechanism (1 c, 1 d) which upon user impact biases the spring (7),

- the second part (9) comprises a first protruding part (4) having a second contact surface (4a) and a second protruding part (14) having a third contact surface (14a), the second part (9) can be in a locked position and in an unlocked position and when in the locked position the first contact surface (1b) touches the second contact surface (4a), the second part (9) is placed in a bearing (3, 3a, 3b) allowing rotation between the locked and unlocked positions of the second part (9) and the bearing (3, 3a, 3b) is fixed relative to the stationary part (2). The bearing (3, 3a, 3b) or the stationary part (2) or an independent part held in position by the stationary part (2) or by the bearing (3, 3a) has a fourth contact surface (8a) and when in the locked position the third contact surface (14a) of the second part (9) touches the fourth contact surface (8a).

[0009] According to some embodiments of the present invention, the stationary part (2) is a closed or semi-closed profile. The profile can be made of an extruded material, e.g. a light weight material such as aluminium or a polymer material or another material e.g. charachterized by strength such as steel.

[0010] According to some embodiments of the present invention, the first part (1) can be at least partly positioned inside the stationary part (2) and the stationary part (2) is fixed to a part of a device. The stationary part (2) can be constituted by or be part of a device part such as a surface of a table top or a wall or a side of a wall mounted shelf.

[0011] According to some embodiments of the present invention, the release mechanism can be a release arm (1c, 1d) extending in a direction opposite the protruding part (1 b). The release arm can function as a lever thereby reducing the strength needed by the user to unlock the locking mechanism.

[0012] According to some embodiments of the present invention, the part of the bearing (3, 3a, 3b) or the stationary part (2) or the independent part held in position by the stationary part (2) or by the bearing (3, 3a) having the fourth contact surface (14b) is made of steel or of a material having similar indentation hardness i.e. ability to resist deformation.

[0013] According to some embodiments of the present invention, the spring (7) or spring system can have a second attachment position on the stationary part (2). Especially, the spring (7) or spring system can have a second attachment position on the stationary part (2) which - relative to the swing axis a1 - is placed opposite the protruding part (1 a) and the spring (7) is biased when extended i.e. the spring (7) pulls.

[0014] According to some embodiments of the present invention, the first part (1) can be unreleasably fixed to a surface of a table top and the second part (9) comprises a singel table leg or a set of two table legs which are pivotable between a locked position in which the table legs support the table top, and an unlocked position in which the table legs are in a folded position.

[0015] According to some embodiments of the present invention, the bearing (3, 3a, 3b) can provide guiding means (10) providing an off-set in a direction perpendicular to the direction of rotation of the second part (9) when the second part (9) is pivoted from the locked to the unlocked position and the same or secondary guiding means provide an off-set in the opposite direction when the second part (9) is pivoted from te unlocked to the locked position..

[0016] According to some embodiments of the present invention, one part of the bearing (3a) can provide primary guiding means (10) providing an off-set in a direction both perpendicular to the direction of rotation of the second part (9) and parallel to the surface of attachment, when the second part is privoted from the locked to the unlocked position, and a second part of the bearing (3b) can provide secondary guiding menas (10) providing an off-set in the opposite direction of the first off-set when the second part (9) is pivoted from the unlocked position to the locked position.

[0017] The guiding means (10) can be constituted by at least two inclined surfaces (10) corresponding to each their surface of respectively the first and the second protruding part (4).

[0018] According to some embodiments of the present invention, the locking mechanism can comprise means (6) for adjusting the distance between the first and second contact surfaces (1 b, 4a) of respectively the first (1) and the second (9) part.

[0019] According to some embodiments of the present invention, the first part (1) can be unreleasbly fixed to the lower surface of a table top or a shelf and the second part (9) comprises a part which is unreleasably and stationary fixed to a wall, allowing the table top or shelf to pivot between a locked position where the upper surface of the table top or shelf is placed perpendicularly relative to the wall and an unlocked position where the table top or shelf is parallel to the wall.

[0020] According to another aspect, the present invention also provides a table provided with a locking mechanism comprising a first and a second part, the first part (1) is fixed to the table top (25) and the second part (9) is constituted by a part of a table leg,

- the first part (1) is fixed unreleasable to a stationary part (2) via a hinge connection (5, 6) defining a swing axis a1, the first part (1) can pivot relative to the stationary part (2) along the swing axis a1 and has at least two positions: a locked position and a not locked position, the first part (1) comprises:

    --- a protruding part (1a) extending in direction of the second part (9) and having a first contact surface (1 b),
    --- an attachment position for a spring (7) or spring system which spring (7) or spring system forces the first part (1) into the locked position, upon biasing the spring (7) the first part (1) is brought to the unlocked position,
    --- a release mechanism (1c, 1d) which upon user impact biases the spring (7),

- the second part (9) comprises a first protruding part (4) having a second contact surface (4a) and a second protruding part (14) having a third contact surface (14a), the second part (9) can be in at least one locked position and in at least one unlocked position and when in the locked position the first contact surface (1 b) touches the second contact surface (4a), the second part (9) is placed in a bearing (3, 3a, 3b) allowing rotation between the locked and unlocked positions of the second part (9) and the bearing (3, 3a, 3b) is fixed relative to the stationary part (2). The bearing (3, 3a, 3b) or the stationary part (2) or an independent part held in position by the stationary part (2) or by the bearing (3, 3a) has a fourth contact surface (8a) and when in the locked position the third contact surface (14a) of the second

part (9) touches the fourth contact surface (8a).

Brief description of the drawings

[0021]

Figure 1 shows an exploded view of an embodiment of a locking mechanism according to the claims.
Figure 2 shows a first cut-through side view of the same embodiment as shown in fig. 1 of the locking mechanism in a locked state.
Figure 3 shows a second cut-through side view of the same embodiment as shown in fig. 1 and 2.
Figure 4a and 4b shows respectively a side view and an end view of a stationary part before mounting.
Figure 5 shows several views of each of the parts of the bearing 3a and 3b shown in fig. 1.
Figure 6a and 6b shows side views of example of use of the locking mechanism according to the claims where the locking mechanism is part of a table having foldable legs.
Figure 7 shows details of the locking mechanism for the table shown in fig. 6.
Figure 8 shows details of release mechanism.

Definitions:

[0022] In describing the embodiments of the invention specific terminology will be resorted to for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected, and it is understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.
[0023] If the word "generally" is used when describing a feature, it defines that a feature is relevant for all embodiments according to the inventions as defined in the claims, regardless that the feature might be mentioned in a part of the description relating to a specific embodiment e.g. defined by the figures.
[0024] Closed or semi-closed profile is an object having a fixed, cross-sectional cut i.e. the cross-sectional view is the same through-out the length of the profile. Normally, such a profile is made by extrusion of e.g. metals or polymers. That the profile is either closed or semi-closed means that the profile has either a completely closed outer surface or an almost closed outer surface i.e. only a small opening is present in the outer surface.

Detailed description of the invention

[0025] Figure 1 shows an exploded view of a locking mechanisme comprising a first 1 and a second part 9. The locking mechanism allows the first 1 and second 9 parts to pivot relative to each other when the locking mechanism is in a released state. This means that the locking mechanism will allow one part of a device to swing relative to another part of the same device such as e.g. the device is a table and a pair of table legs are allowed to swing relative to a table top, the device is a vehicle and a tailboard is allowed to swing relative to the vehicle, the device is a wall mounted bed and the sleeping surface e.g. including a matress is allowed to swing relative to the wall, the device is a wall or seat mounted tray or table top which is allowed to swing relative to the wall or the seat etc.
[0026] Fig. 2 and 3 show cut-through side views of the same embodiment as fig. 1. Fig. 2 shows a cut-through side view where the cut has been made through the centre of the locking mechanism. Fig. 3 shows a cut-through side view where the cut has been makde off the centre and instead shows how the fastening means for the bearing 3 fix the bearing 3 to the stationary part 2. According to the embodiment of fig. 1-3 the fastening means is constituted by four screw bolts 16.
[0027] The locking mechanism comprises a stationary part 2 to which the first part 1 is fixed via a hinged connection, and a bearing 3, 3a, 3b in which the second part 9 is rotatably mounted. The stationary part 2 and the bearing 3 do not move relative to each other i.e. they are fixed relative to each other and relative to one of the device parts which the locking mechanism operates with. The stationary part 2 and the bearing is fixed to one device part and the second part either constitutes a second device part or is attached to a second device part.
[0028] The bearing 3 can e.g. be provided with a cover plate 15 able to cover fastening means 16 for the bearing and making it possible to adapt the design of the locking mechanism to any desirable use or function without influencing the functionality of the locking mechanism.

First part

[0029] The first part 1 can be constituted by a single piece of material, e.g. it can e.g. be molded from a hard polymer such as glass reinforeced nylon or steel, alternatively the first part 1 can be composed of separate pieces of material which are assembled and after assembling, the parts will be completely fixed and stationary relative to each other. If the

first part 1 is composed of two or more pieces then each piece might be made of a material which is optimized in respect of weight and durability. I.e. if the locking mechanism is placed in a tray in an aeroplane it is important that each part weighs as little as possible, where as if a locking mechanism is used for e.g. holding a wall bed including a bottom and a matress which can be turned up or down, then it should be able to carry about 200 kg.

[0030] Generally, the first part 1 comprises a first protruding part 1 a provided with a first contact surface 1b at one end. The protruding part 1 a extends in direction of the second part 9 and when the first part 1 is mounted in the locking mechanism and the locking mechanism is in a locked postion, the first contact surface 1 b will be in contact with the second part 9. The first protruding part 1 a should be constructed of a relatively hard and wear resistent material as it should remain relatively unaffected by the contact during the life time of the locking mechanism. When using the word "relatively" it is indicated that the use of the locking mechanism will determine how hard and wear resistent the material needs to be.

[0031] The first part 1 illustrated in fig. 1 is constructed of a flat part fixed on top of a rectangular block, the flat part extends toward the second part 9 as the first protruding part 1a, and the front surface i.e. the first contact surface 1 b of the flat part is in contact with a corresponding surface of the second part 9. The contact between the first contact surface 1b and the actually prevents the second part 9 from rotating, the flat part has to be made of a material having a relatively high durability, "relatively high" means that the choice of material is influenced by the force the actual locking mechanism is subjected to.

[0032] The first part 1 is also provided with a central part and the central part of the embodiment shown in fig. 1 provides an attachment position for a spring 7, the spring 7 forces the first part 1 into the locked position. Generally, the first part 1 is provided with some kind of release means which are able to provide a force big enough to overcome the force from the spring 7, the embodiment in fig. 1 is provided with a second protruding part 1c which extends in a direction opposite from the first protruding part 1a, when a relatively long handle part or release part 1d is attached to the second protruding part thereby providing a lever, it becomes easy for the user to overcome the force from the spring or spring system and release the first part 1 from the locked position.

Hinged connection

[0033] Generally, the hinged connection allows the first part 1 to pivot around a swing axis a1 between at least two positions, a first locked position and a second released or unlocked position. In the first locked position the first part 1 is forced into a locked position by a spring 7, and in the second unlocked or released position a user overcomes the force of the spring 7 and the user forces the first part 1 into the second released position.

[0034] Figure 1-3 illustrates one embodiment of a hinged connection where two pointed screws 6 with round heads forms a line which line represents the swing axis a1 (see fig. 2). The round heads of the pointed screws 6 face the staionary part 2 and fit into each their top recess of two screw bolts 5 which have been screwed into treads in the stationary part 2. The screw bolts 5 will normally be made of a very durable material such as steel.

Spring attachment

[0035] Generally, the spring 7 or spring system i.e. a plurality of springs has one or more attachment points on the stationary part 2 and one or more attachment points on the first protruding part 1 a of the first part. Generally, the first part needs to have an attachment position for a spring or a spring system, but the attachment position could be at several positions, the attachment position e.g. depends on whether the spring or spring system which forces the first part into the locked position pushes or pulls. The spring 7 causes a movement of the protruding part 1a of the first part towards the circumferential surface of the second part 9 in order to keep the first protruding part 1 a in contact with the second part 9, until the force provided by the spring is exceeded by a releasing force normally provided by the user.

[0036] According to the embodiment shown in fig. 1, the attachment point for the spring 7 on the first part 1 is provided by a pointed screw 11 which extends from the "lower" side of the central part of the first part 1 which is the inside of an inner surface 19 of the stationary part 2. Alternatively, the attachment point could be constituted by a tap or hook protruding from the lower surface of the first part 1, such a part could be an integrated part of the first part 1. The inner surface 19 of the stationary part 2 is the side facing the device part to which the stationary part 2 is attached. The spring 7 is illustrated as a helical metal spring which pulls in order to get from a biased to a relaxed position. One end of the helical spring 7 is attached to the free end of the pointed screw 11; the opposite end of the helical spring 7 is attached to the stationary part 2, e.g. to a (not shown) screw which is screwed into a longitudinal track 22 provided in the profile constituting the stationary part 2. The longitudinal track 22 is placed centrally and close to the inner surface 19 of the stationary part 2. When the spring 7 is placed in the position shown in fig. 1-3, the spring pulls in the direction of rotation of the first part 1, in order for the user to bring the first part 1 into an unlocked position, the user has to overcome the force provided by the spring 7 and rotate or pivot the first part 1 into an unlocked position. The first part 1 will be in an unlocked position when the first protruding part 1 a is pivoted into a position where the first protruding part 4 of the second part 9 can pass

below, i.e. rotate anticlockwise in the figure, the contact surface 1b of the first protruding part 1.

[0037] Alternatively, a spring or spring system can be positioned anywhere in the system where it pushes or pulls in direction of the rotation. The position of the spring 7 in the embodiment of fig. 1-3 has the advantageous that it is possible to use a physically large spring such as a helical spring without having to e.g. increase the height of the stationary part 2.

Second part

[0038] Normally, the second part 9 shown in fig. 1 has a circular or at least partly circular perifery provided with two protruding parts, a first protruding part 4 and a second protruding part 14. The first protruding part 4 has a contact surface 4a corresponding to the first contact surface 1b of the first part 1 and the second protruding part 14 has a contact surface 14a corresponding to the third contact surface 8a of either the bearing 3a or the stationary part 2 or an independent part 8.

[0039] Generally, the second part 9 is immobilised in one position when the locking mechanism is locked and when the locking mechanism is released the second part 9 can rotate or pivot between at least two positions. The contact between the first and the second contact surfaces 1 a and 4a on respectively the first part 1 and the second part 9 prevents the second part 9 from rotating or pivoting in one direction (i.e. anticlockwise according to the embodiment of fig. 1) when the locking mechanism is in a locked position, and the contact between the fourth and the third contact surfaces 8a and 14a on respectively the bearing 3a or the stationary part 2 or an independent part 8 and on the second part 9 prevent the second part 9 from rotating or pivoting in the opposite direction (i.e. clockwise according to the embodiment of fig. 1) when the locking mechanism is in a locked position. As the bearing 3 is fixed to the stationary part 2, the bearing 3 fixes the position of the second part 9 relative to both the stationary part 2 and the first part 1, and makes it impossible for the second part 9 to move away from the first part 1.

[0040] Normally, friction alone will keep the second part 9 in a released or unlocked end position but the locking mechanism can be provided with means to lock the second part 9 in the released or unlocked end position and/or to lock the second part 9 in one or more intermediate positions. Whether this feature is advantagouos will depend on the actual use of the locking mechanism. According to the embodiment of fig. 1-3, the second part 9 is locked by friction in the released or unlocked position, and need therefore not be released by any release means as such; thus, the user has to overcome the frictional resistance and tentioning of the spring 7 upon bringing the second part 9 back into the locked position.

Bottom impact

[0041] Either the bearing 3a or the stationary part 2 or an independent part held in position by the stationary part 2 or by the bearing 3a constitutes the fourth contact surface 8a facing the second part 9. The fourth contact surface 8a can be constituted e.g. by a protruding part of either the bearing 3a or the stationary part 2 extending in direction of the second part, or alternatively the fourth contact surface 8a can be provided by a separate piece e.g. a rectangular block 8 as shown in fig. 1, which is made of e.g. a hard and durable material such as steel. By making a separate piece it is possible to increase the wear resistence of the fourth contact surface without increasing the weight of the locking mechanism significantly.

Distance adjustment

[0042] Normally, the locking mechanism will be provided with a means for adjusting the distance between the first and second part 1, 9 in order to make it possible to obtain a very precise contact between the first contact surface 1b of the first part and the second contact surface 4a of the second part 9 compensating for that the first and second part might not be made in accurate measures. This feature makes it possible to produce the first and second parts of the locking mechanism with a larger tolerance.

[0043] In the embodiment according to fig. 1-3, the means 6 for adjusting the distance or contact between the first and second contact surfaces of respectively the first and the second part comprises the two bolts which are part of the hinged connection.

Stationary part

[0044] Generally, the stationary part 2 provides a mounting for the first part 1 i.e. the first part 1 is fixed unreleasably via the hinged connection to the stationary part 2 and the stationary part 2 is fixed, normally unreleasably, to a device part able to swing relative to the second part 9.

[0045] Normally, and also according to the embodiment shown in fig. 1, the stationary part 2 is constituted by a closed profile enclosing the the hinged connnection and the first part and providing a large part of the external surface of the locking mechanism. As a result the design of the locking mechanism do not depend on the functions of the locking

mechanism but allows for completely different functions such as providing handles for carrying the device on which the locking mechanism is mounted or providing attachment points for equipment to be used together with the device or just allowing a pleasing design which makes it acceptable to show the locking mechanism when the device on which it is mounted is e.g. folded together or up against a wall. Also, using a profile for stationary part 2 makes it possible to reduce the number of necessary parts when constructing the locking mechanism as most of the parts are either bolts screwed directly into the tracks of the profile or parts attached by the bolts which are screwed directly into the tracks of the profile. This reduces the number of necessary parts and simplifies the production.

[0046] Normally, the outer or external surfaces of the locking mechanism are constituted entirely by the stationary part 2, i.e. the closed profile, and the cover plates 15 covering each end of the profile.

[0047] The stationary part 2 can e.g be a profile extruded of aluminium as this is a lightweight and inexpensive material.

[0048] Fig. 4a and 4b shows an embodiment of a stationary part, fig. 4a shows a side view of the stationary part and fig. 4b shows a cross-sectional end view of the stationary part. The profile constituting the stationary part 2 is furnished with the shown tracks in its full length, and the lenght of the profile is adapted to the first and the second part of the locking mechanism. The shown profile is closed i.e. the wall of the profile comprises a closed surface surrounding an enclosed space in which the first part 1 is placed, when the profile is closed it will normally be provided with one or more openings allowing a user to access e.g. the handle part 1 c. Alternatively, the profile could be open i.e. the profile could be provided with an opening in the full length of the profile, this might e.g. allow the user to see and to access the full length of the first part 1.

[0049] The stationary part 2 according to fig. 4, is has an outer surface 18 which is facing way from the surface to which the locking mechanism is attached, and an inner surface 19 which is facing the surface of the device to which the locking mechanism is attached. The stationary part 2 further has two outward facing side surfaces 17 which each are provided with a recess or indentation 24 in the full length of the stationary part. The recess 24 might function as a fingergrip if carrying the device which the locking mechamism is attached to. The outward facing side surfaces 17 is also provided with an external track 23 which also extends in the full length of the stationary part 2. Such an external track 23 can be used to permanently or temporarily attach extra parts to the device to which the stationary part 2 of the locking mechanism is attached.

[0050] In the embodiment of fig. 1 the part of the hinged connection attached to the stationary part 2 is constructed of two screw bolts 5 which are fixed in the stationary part 2. According to the shown embodiment the screw bolts 5 are postiioned in each of two longitudinal tracks 20 provided in the profile close to the middle of the profile thereby allowing the first part 1 to move both up and down. The screw bolts 5 are inserted from the open end of the stationary part 2 and screwed into the tracks 20. The profile of fig. 4 is also provided with longitudinal tracks 21 close to each corner of the profile, these four tracks 21 are adapted to receive the fastening means 16 i.e. the four screw bolts 16 shown in fig. 1. A further track 22 positioned centrally and close to the inner surface of the stationary part 2 can be used for a bolt having a head to which head the spring 7 is attached i.e. representing the attachment point 12 of the spring with the stationary part 2.

[0051] Generally, the stationary part 2 will be provided wiith an opening 13 in an outer surface 18 or a side surface 17 through which opening 13 a user can manipulate the release part 1d. Fig. 8 shows an embodiment of a stationary part 2 provided with an opening 13 fitting to a release arm 1d, the release arm 1d is provided with a release button which fits closely into the opening 13.

Bearing in two parts

[0052] Generally, a bearing 3 according to the invention will be assembled from at least two parts 3a, 3b in order to make it possible to assembly the bearing 3 around the second part 9.

[0053] If desired, the bearing can be provided with guiding means 10 causing a displacement of the second part in direction of the rotation axis of the second part 9 i.e. the second part 9 rotates in one direction and is simultaneously displaced along the axis which it rotates around.

[0054] The guiding means 10, i.e. two inclined surfaces perpendicular to the surface of the second part 9, on the inner bearing part 3a is in contact with both end surfaces of the first protruding part 4 during rotation; and the guiding means 10 i.e. an inclined surface perpendicular to the surface of the second part 9, on the outer bearing 3b is in contact with one end surface of the second protruding part 14 during rotation of the second part 9. The contact between the guiding means 10 and the two protruding parts 4, 14 forces the second part 9 to move relatively to the stationary part 2 in direction of the rotation axis of the second part 9.

[0055] Particularly, the bearing 3a provides primary guiding means 10 providing an off-set i.e. displacement in a direction perpendicular to the direction of rotation of the second part 9 when the second part is brought from the locked to the unlocked position and an off-set in opposite direction when the second part 9 is brought from the unlocked position to the locked position.

Example: Locking mechanism used with foldable table

[0056] The locking mechanism according to the claims is particularly advantageous when used with a table having foldable legs. Such a table is illustrated in fig. 6a and 6b where fig. 6a shows a side view of the table and fig. 6b shows an end view of the table. The table comprises a table top 25 corresponding to a device part and two sets of U-shaped table legs 9 each corresponding to a second part 9. The stationary part 2 has the form of a profile and the locking mechanism for both the left and the right set of U-shaped table legs is placed in the same profile which side 17 can be seen in fig. 6a. When the table legs 9 extends perpendicularly from the table top 25 then the locking mechanism is in a locked position.

[0057] The release part 1 d of the first part 1 of the locking mechanism locking eahc pair of U-shaped table legs, extends through each an opening in the stationary part 2 and allows the usert to push the release part 1d in direction of the table top and thereby release the locking mechanism and allowing the user to fold the table legs to a position along i.e. parallel to the table top 25. This movement from the locked to the unlocked end position is illustrated with arrows on fig. 6a.

[0058] The two pairs of U-shaped table legs are held in position by the stationary part 2 which is attached to the table top 25 and by the bearings 3 which are attached to the stationary part 2. The bearings 3 are not shown as such in fig. 6a and fig. 6b as the bearings 3 are hidden inside each their cover plate 15. When a bearing with guiding means 10 as shown in fig. 5 is used, the second part 9 i.e. each set of U-shaped table legs will be displaced in a direction perpendicular to the direction of rotation and parallel to the lower surface of the table top 25 during folding and unfolding of the U-shaped table legs.

[0059] This result in that the oppositely positioned sets of U-shaped table legs 9 are displaced relative to each other and when the U-shaped table legs 9 are brought to the unlocked position close to the table top 25, the two sets of U-shaped table legs 9 will not be placed on top of each other but beside each other which will reduce the stack height when folded tables are stacked on top of each other during storage.

[0060] As the stationary part 2 is a closed profile, all forces originating from the locking mechanism will be absorbed by the profile as the locking mechansim is placed inside the profile. This makes it possible to use relatively fragile plates for table tops as e.g. a white board or material with a very low weight.

[0061] The stationary part 2 can as it is shown in fig. 6a extend in the full length of the table top 25, but it might also be provided as two separate parts, where each part only extends long enough to contain the locking mechanism for a set of U-shaped table legs. Especially, if the stationary part 2 extends in the full lengt of the table top 25, it is advantageous if the side surface 17 of the stationary part 2 is provided with indentations 24 improving finger grip when carrying the folded table, or provided with one or more indentations or tracks 23 as shown in fig. 4 corresponding to a wall mounting part fixed on a wall, thereby allowing the user to hang the folded table on a wall where the wall mounting part is positioned having the table top facing away from the wall.

[0062] Fig. 7 shows details of the locking mechanism when used for the table shown in fig. 6a and 6b. The arrows along the middle piece of the U-shaped table legs 9 indicate how the table legs are displaced perpendicular to the direction of rotation, i.e. in a direction parallel to the surface of the table top, during folding and un-folding of the table legs 9.

[0063] Fig. 7 also shows an enlargement of the corner bearings 26 which are placed on each side of the locking mechanism.

[0064] A first side of the L-shaped corner bearing 26 is fixed to the table top 25, this side of the L-shaped corner bearing 26 defines the distance between the lower surface of the table top 25 and the perifery of the circular table leg 9. The length of the second side of the L-shaped corner bearing defines the distance between the folded tables when they are stacked during storage in a folded state. As the corner bearings 26 are placed on both sides of the locking mechanism the corner bearings also help stabilizing the table when the table is in the unfolded and locked use position.

[0065] *When describing the embodiments of the present invention, the combinations and permutations of all possible embodiments have not been explicitly described. Nevertheless, the mere fact that certain measures are recited in mutually different dependent claims or described in different embodiments does not indicate that a combination of these measures cannot be used to advantage. The present invention envisages all possible combinations and permutations of the described embodiments.*

Ref. No.	Species
1	First part i.e. locking pin
1a	First protruding partt of first part
1b	First contact surface
1c	Second protruding partt of first part

(continued)

Ref. No.	Species
1d	Handle part or release part
2	Stationary part e.g. extruded profile
3	Bearing holding second part
3a, 3b	Two parts of bearing 3 - inner and outer bearing part
4	First protruding part on second part
4a	Second contact surface of protruding part 4 being in contact with first part 1
5	Screw bolt, part of hinge connection
5a	Recess in head of screw bolt
6	Pointed screw, part of hinge connection
7	Spring
8	Bottom impact having contact surface 8a for second part
8a	Fourth contact surface being in contact with second protruding part of second part
9	Second part
10	Guiding means of bearing
11	Fastening point for spring with first part (pointed screw)
12	Fastening point for spring with stationary part
13	Opening in stationary part 2
14	Second protruding part on second part
14a	Third contact surface of second protruding part
15	Cover plate
16	Fastening means for bearing (Screw bolts)
17	Side surfaces of stationary part 2
18	Outer surface of stationary part 2
19	Inner surface of stationary part 2
20	Track for screw bolt 5, part of hinge connection
21	Track for fastening means 16 for bearing (Screw bolts)
22	Track for central bolt functioning as fastening point 12 for spring
23	External track for external attachments
24	Recess for finger grip
25	Table top
26	Corner bearing

Claims

1. Locking mechanism *to be attached to a device or a device part* comprising a first (1) and a second (9) part,

- the first part (1) is fixed unreleasable to a stationary part (2) via a hinge connection (5, 6) defining a swing axis a1, the first part (1) can pivot relative to the stationary part (2) along the swing axis a1 and has at least two positions: a locking position and a not locking position, the first part (1) comprises:

--- a protruding part (1a) extending in direction of the second part (9) and having a first contact surface (1 b),
--- an attachment position for a spring (7) or spring system which spring (7) or spring system forces the first part (1) into the locked position, upon biasing the spring (7) the first part (1) is brought to the unlocked position,
--- a release mechanism (1 c, 1 d) which upon user impact biases the spring (7),

- the second part (9) comprises a first protruding part (4) having a second contact surface (4a) and a second protruding part (14) having a third contact surface (14a), the second part (9) can be in a locked position and in an unlocked position and when in the locked position the first contact surface (1 b) touches the second contact surface (4a), the second part (9) is placed in a bearing (3, 3a, 3b) allowing rotation between the locked and unlocked positions of the second part (9) and the bearing (3, 3a, 3b) is fixed relative to the stationary part (2),

characterized in that the bearing (3, 3a, 3b) or the stationary part (2) or an independent part held in position by the stationary part (2) or by the bearing (3, 3a) has a fourth contact surface (8a) and when in the locked position the third contact surface (14a) of the second part (9) touches the fourth contact surface (8a).

2. Locking mechanism according to claim 1, wherein the stationary part (2) is a closed or semi-closed profile.

3. Locking mechanism according to claim 1, wherein the profile is made of extruded material.

4. Locking mechanism according to claim 1 or 2 or 3, wherein the stationary part (2) is made of a light weight material e.g. aluminium.

5. Locking mechanism according to any preceding claim, wherein the first part (1) is at least partly positioned inside the stationary part (2) and the stationary part (2) is fixed to a part of a device.

6. Locking mechanism according to claim 1, where in the stationary part (2) is constituted by or part of a device part such as a surface of a table top or a wall or a side of a wall mounted shelf.

7. Locking mechanism according to any preceding claim, wherein the release mechanism, is a release arm (1c, 1d) extending in a direction opposite the protruding part (1 b).

8. Locking mechanisme according to any preceding claim, wherein the part of the bearing (3, 3a, 3b) or the stationary part (2) or the independent part held in position by the stationary part (2) or by the bearing (3, 3a) having the fourth contact surface (14b) is made of steel or of a material having similar indentation hardness i.e. ability to resist deformation.

9. Locking mechanisme according to any preceding claim, wherein, the spring (7) or spring system has a second attachment position on the stationary part (2).

10. Locking mechanisme according to any preceding claim, wherein, the spring (7) or spring system has a second attachment position on the stationary part (2) which relative to the swing axis a1 is placed opposite the protruding part (1 a) and the spring (7) is biased when extended i.e. the spring (7) pulls.

11. Locking mechanisme according to any preceding claim, wherein the first part (1) is unreleasably fixed to a surface of a table top and the second part (9) comprises a set of two table legs which are pivotable between a locked position where the table legs supports the table top, and an unlocked position where the table legs are in a folded position.

12. Locking mechanisme according to any preceding claim, wherein the bearing (3, 3a, 3b) provides guiding means (10) providing an off-set in a direction perpendicular to the direction of rotation of the second part (9) when the second part (9) is pivoted from the locked to the unlocked position and the same or secondary guiding means provide an off-set in the opposite direction when the second part (9) is pivoted from te unlocked to the locked position..

13. Locking mechanisme according to any preceding claim, wherein one part of the bearing (3a) provides primary guiding means (10) providing an off-set in a direction both perpendicular to the direction of rotation of the second part (9) and parallel to the surface of attachment, when the second part is brought from the locked to the unlocked position, and a second part of the bearing (3b) provides secondary guiding menas (10) providing an off-set in the opposite direction when the second part (9) is brought from the unlocked position to the locked position.

14. Locking mechanisme according to claim 12 or 13, wherein the guiding means (10) comprises at least two inclined surfaces (10) corresponding to each their surface of respectively the first and the second protruding part (4).

15. Locking mechanisme according to any preceding claim, wherein the locking mechanism comprises means (6) for adjusting the distance between the first and second contact surfaces (1b, 4a) of respectively the first (1) and the second (9) part.

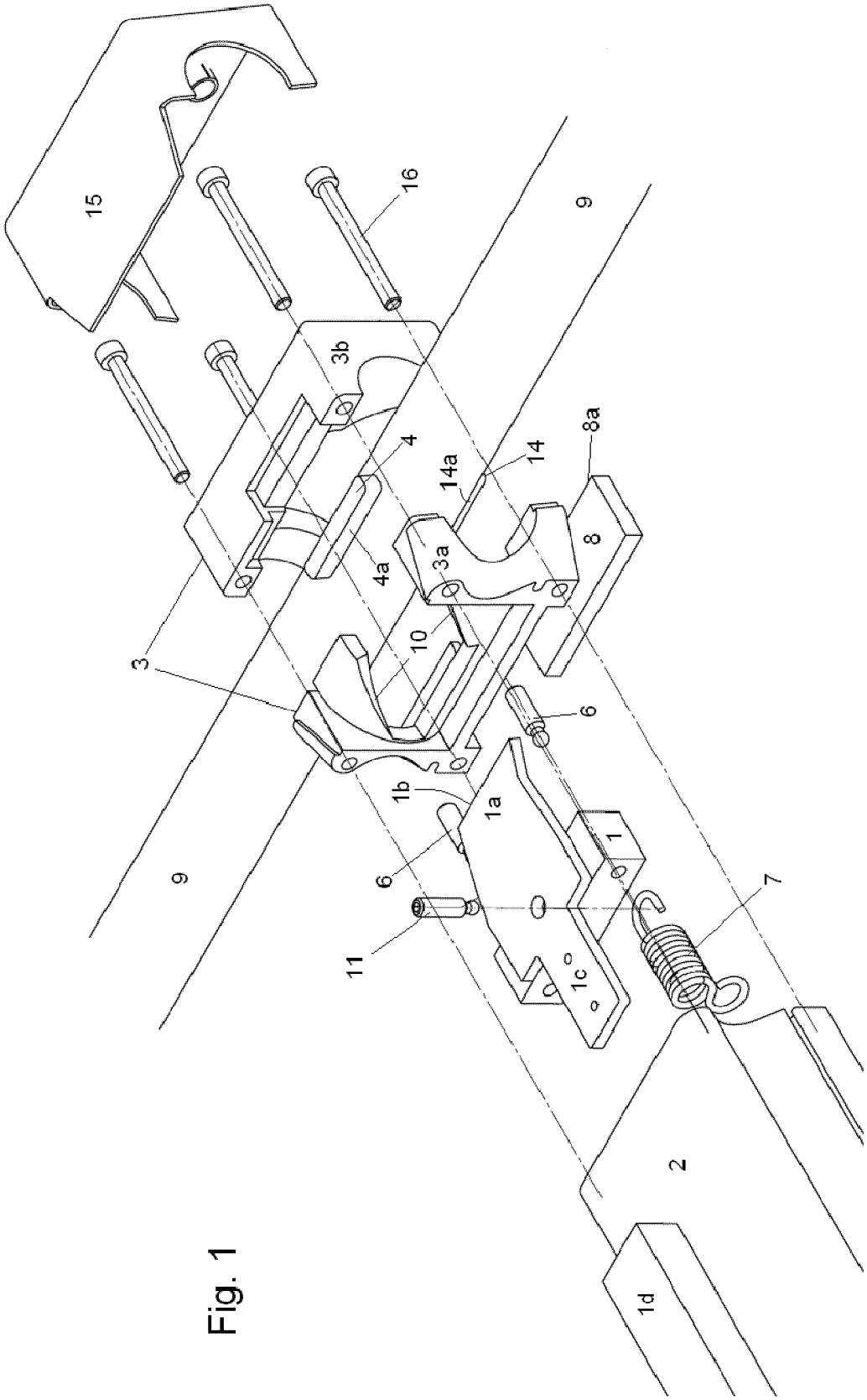

Fig. 1

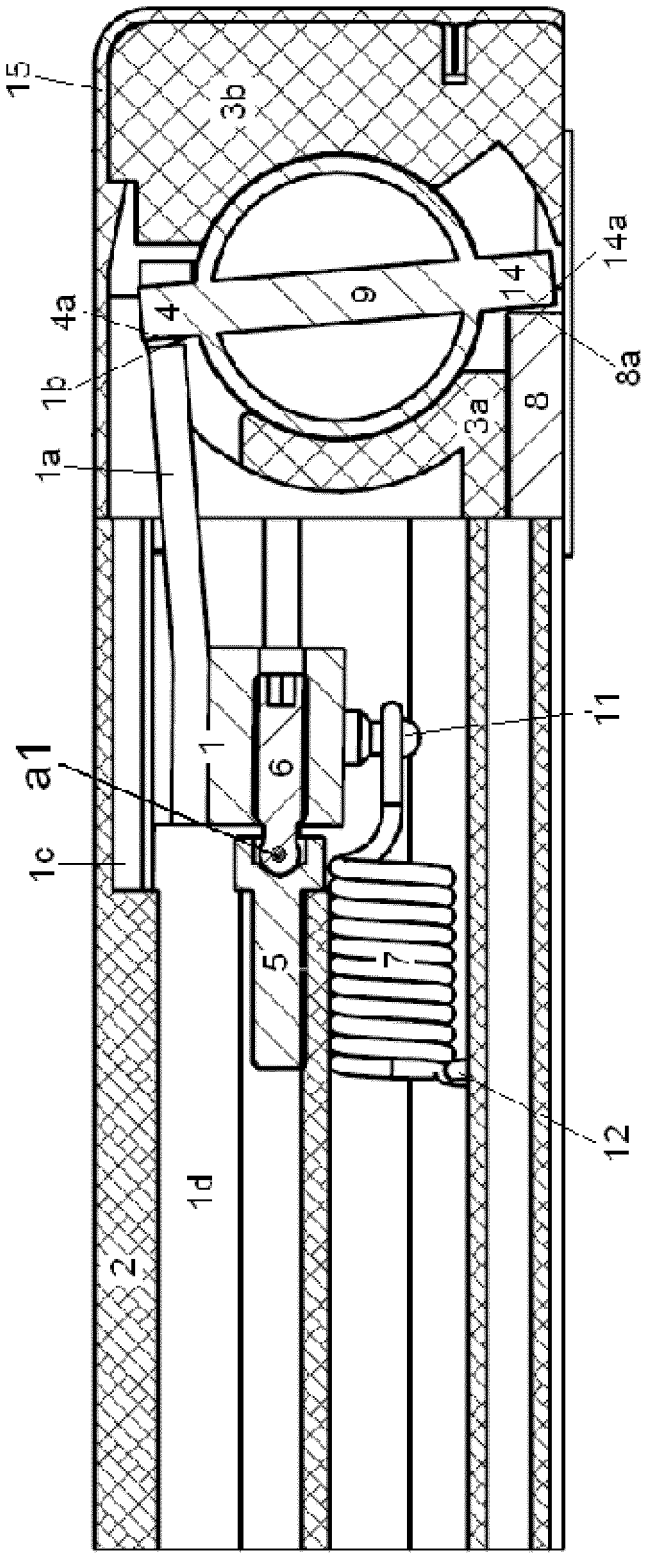

Fig. 2

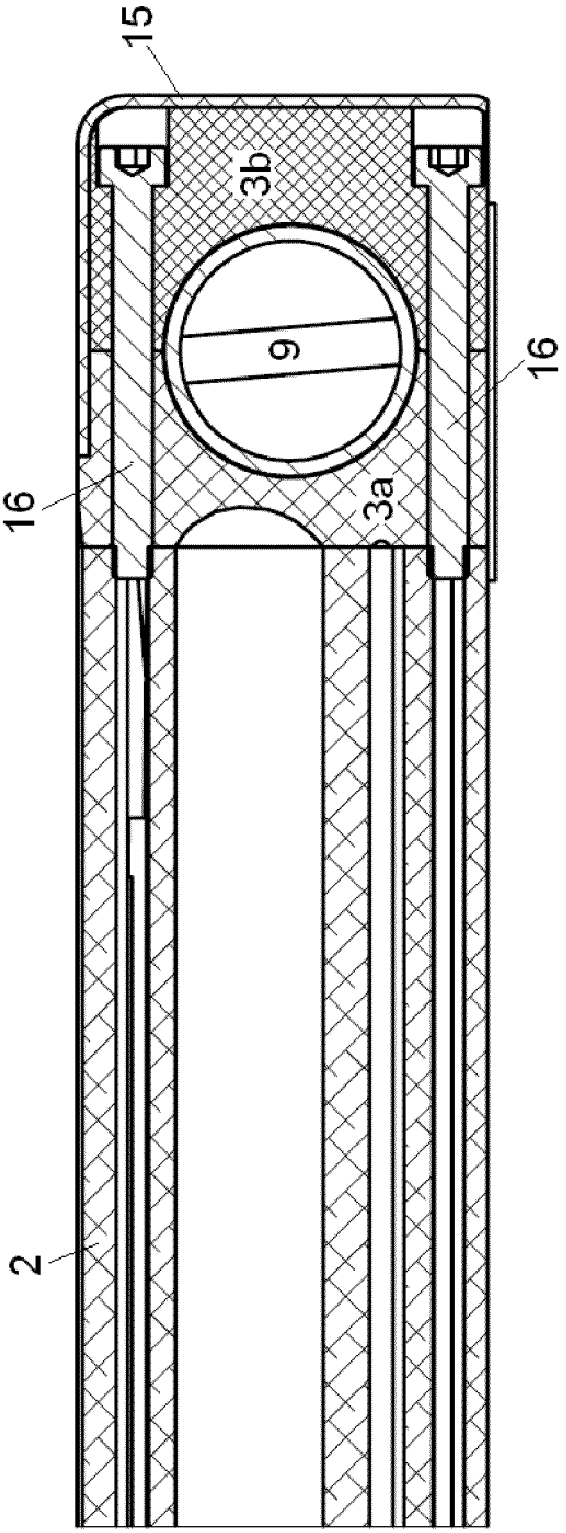

Fig. 3

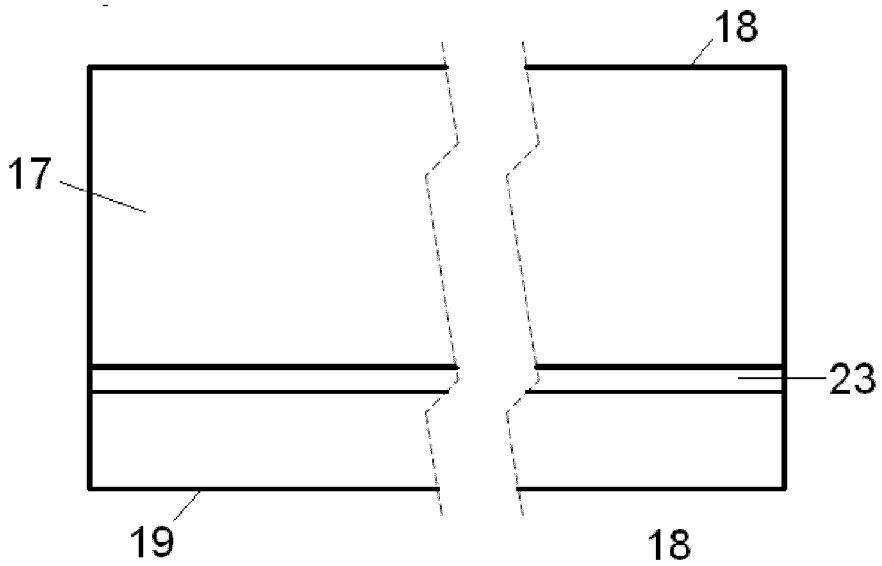

Fig. 4a

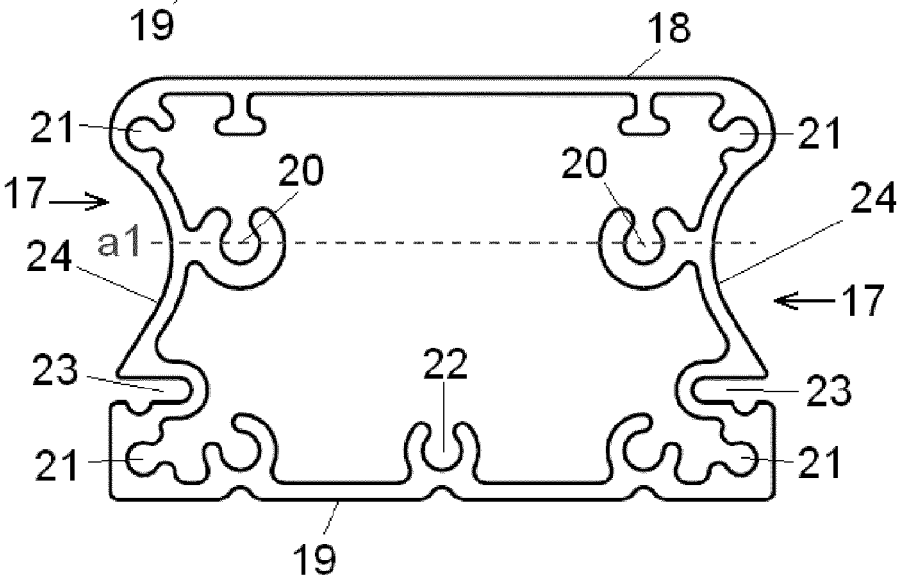

Fig. 4b

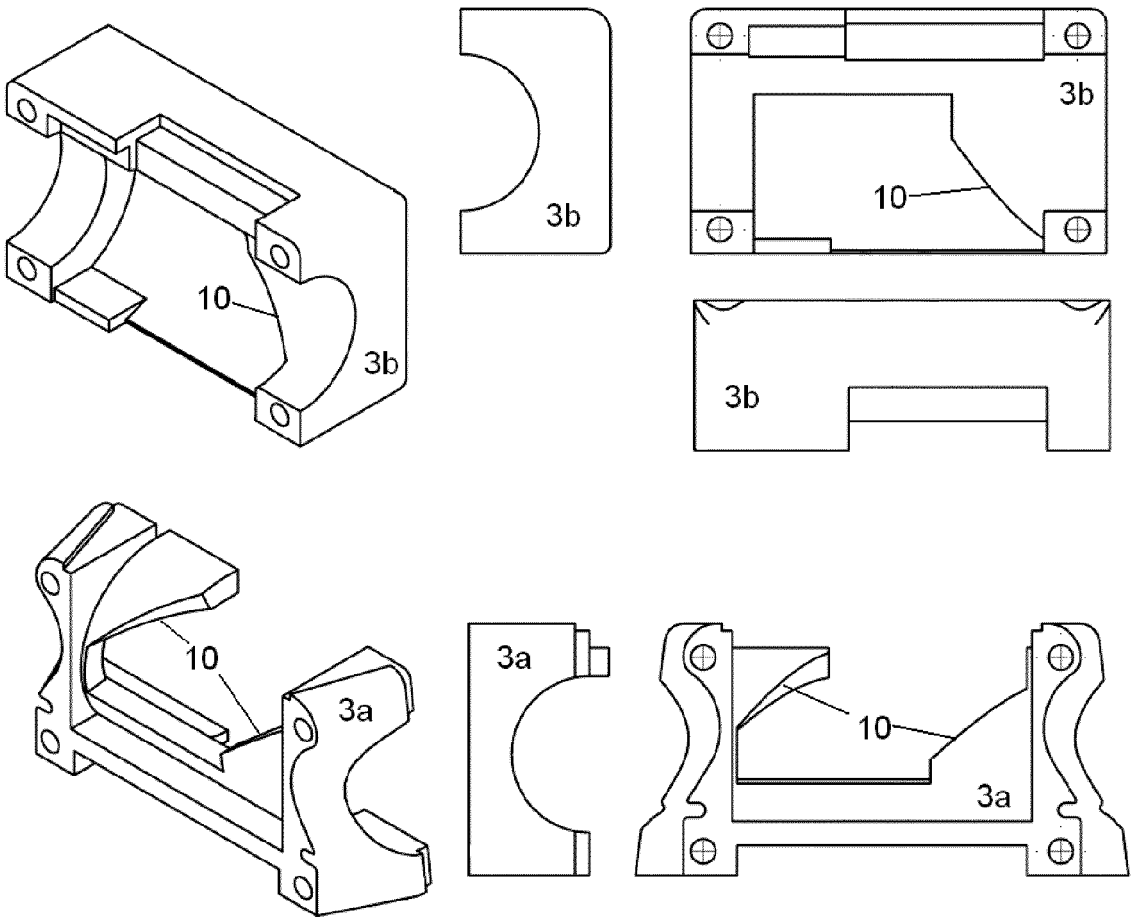

Fig. 5

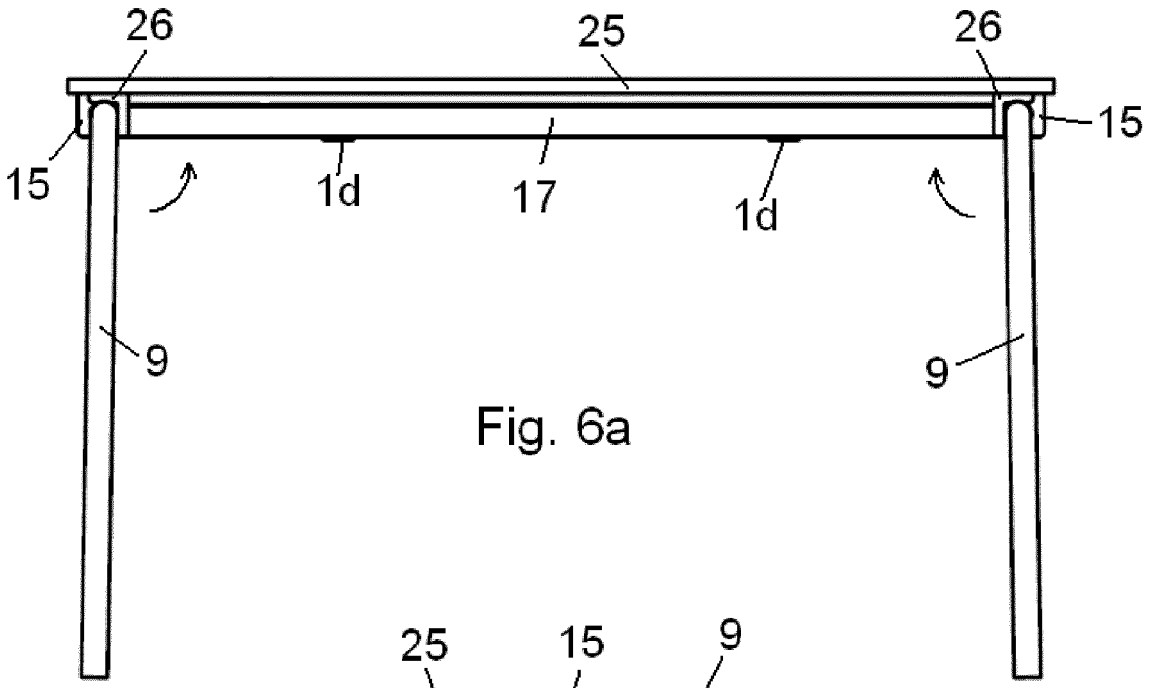

Fig. 6a

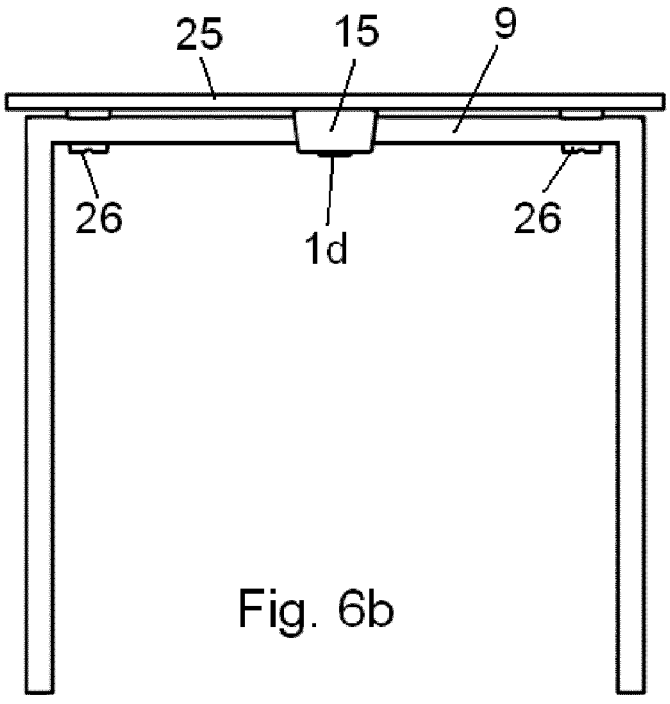

Fig. 6b

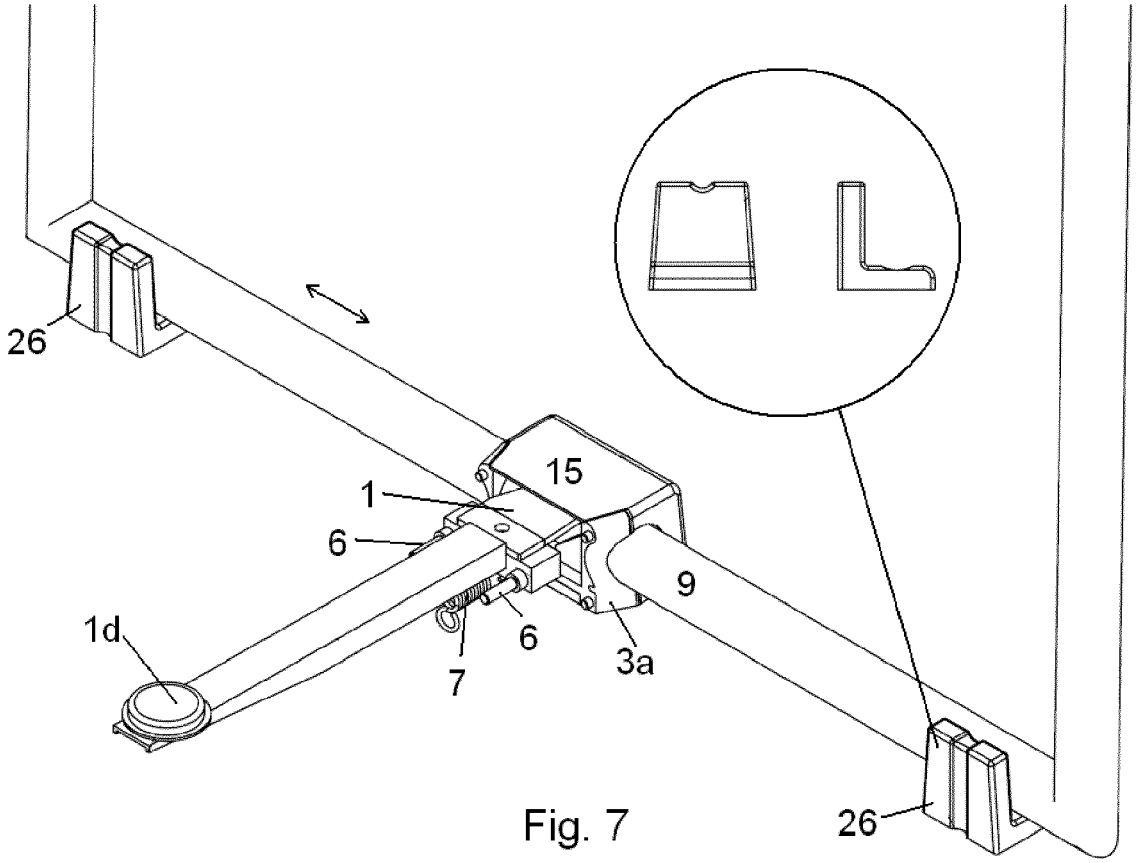

Fig. 7

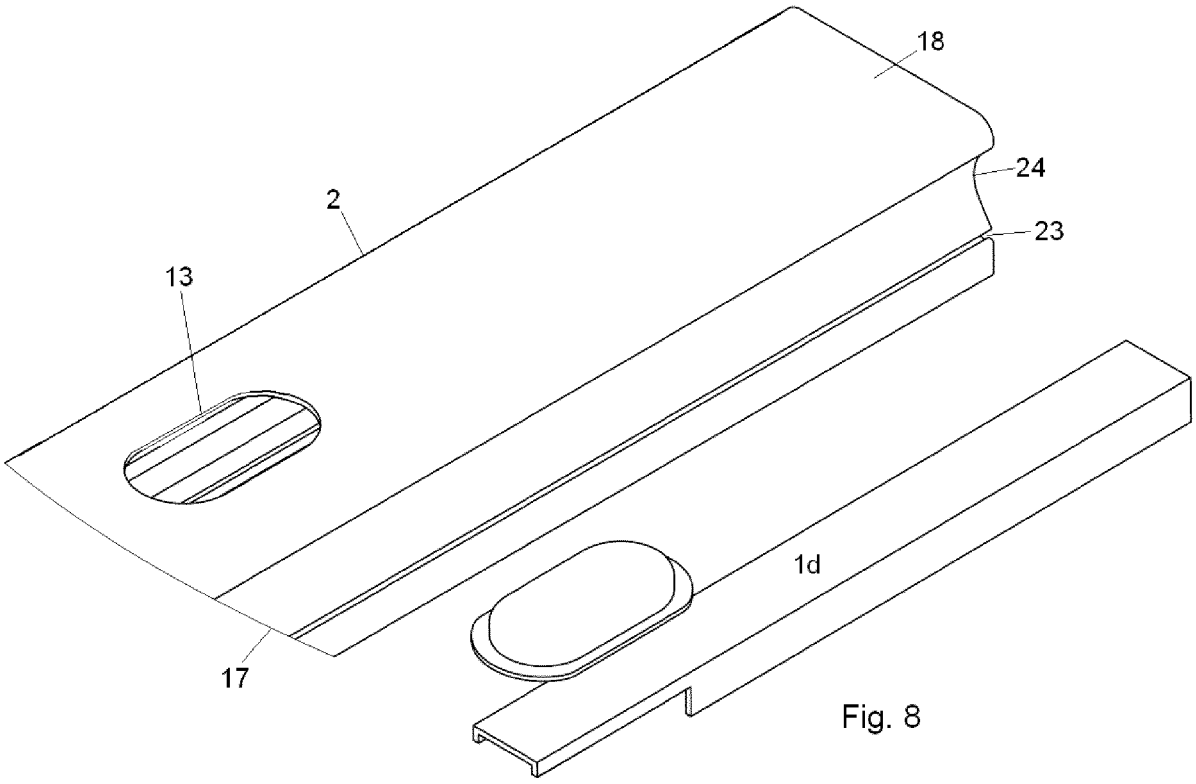

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
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