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connected to another arm (120') of the hinge assembly (100) characterised in that the hinge assembly (100) further comprises at least one friction surface (160, 160') which counteracts rotation and/or movement of the portion (140) of the first arm (120) along or around the first friction surface (160)



Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of hidden hinges used in the automotive industry.

BACKGROUND OF THE INVENTION

[0002] Hidden hinges today are widely known to be used in pieces of furniture where a closing and opening mechanism are employed, but where it is for esthetical reasons not desirable that the hinge itself is seen when in the closed position.

[0003] One example of a hidden hinge is given in US 2,001,356 assigned to Bates, where a hinge for a door is shown consisting of vertically arranged hinge plates. Each hinge plate comprises an arm which is slidably movable through an aperture in the other arm. These hinge plates may thus be moved 180 degrees to one another. The hinge however does not seem to have a firm end position and no intermediate positions which may be locked. It also seems not possible to load the hinge with items when in the end-position. Also, it appears from the document that the hinge is not constructed to have resistance against movement, i.e. when opening or closing the door.

[0004] Another example of a hidden door hinge is described in US 3,881,221 assigned to SOS Consolidated Inc., where the hinge consists of a left and a right body portion with respective lever arms, each lever arm being slidably connected to the other body portion of the hinge by means of an aperture in the body portion, where the body portion may be moved 180 degrees in relation to each other.

Even in this case, although having a robust construction, the hidden hinge is built for smooth gliding motion between the body portions of the hinge, thus to lessen resistance to movement and also with no fixed intermediate or end positions of the body portions which could take a load.

[0005] A similar hinge construction as in US 3,881, 221 to SOS Consolitaed Inc. above is shown in US 4,780,929 to Burns. The document deals with a type of floating hinge which may for example be used in collapsible items, where the left part of the hinge among others consists of a pin which engages a bore in the right part of the hinge when the hinge is in the closed state. This construction seems to provide for a firm end position when the pin engages the bore in the right part of the hinge, but since the left and the right wing of the hinge are slidingly arranged in relation to each other they do not seem to be lockable in intermediate positions.

[0006] US 5,943,739 to Vandergriff assigned to Lockheed Martin Energy Systems describes also a hinge consisting of two leaves and a linking member, where one of the leaves consists of two contact surfaces. In the open position the contact surface of the first leaf abuts the first

contact surface of the second leaf, while in the closed position the first contact surface of the first leaf abuts the second contact surface of the second leaf. The hinge also can be constructed as a hinge where the leaves may be moved 180 degrees in relation to each other. In this case, the hinge may take loads when in the end positions which appear to be firm, but is not constructed to be in fixed intermediate positions which also could take a load.

[0007] Finally, US 6,587,755 to Caldari and assigned to Koblenz S.p.A. shows a hidden hinge for use with a door and a door post with two extremities pivotally attached to each other by means of fastening elements, where the extremities of the hinge are rotatable and slidably mounted to each other so as to be able to be moved in relation to each other in an angle of about 180 degrees. Similar to the hinges described by the documents US 2,001,356, US 3,881,221 and US 3,881, 221, the hinge in US 6,587,755 suffers from the same drawbacks.

[0008] The object of the invention is to overcome at least some of the disadvantages and problems with known technology.

SUMMARY OF THE INVENTION

[0009] This object is achieved by a hinge assembly for motor vehicles according to the present invention, where said hinge assembly comprises a first container, a first arm, where said first container comprises a first opening for receiving a portion of the first arm, where the first arm further comprises an end pivotally connected to another container of the hinge assembly characterised by that the hinge assembly further comprises at least one friction surface for counteracting rotation and/or movement of the portion of the first arm along or around the first friction surface.

[0010] The above end by means of which the first arm is connected to another container of the hinge assembly may be a common pivot for the first arm and the another container of the hinge assembly. In this fashion the first arm and the rest of the hinge assembly are rotatable in relation to each other.

[0011] According to one embodiment of the present invention the another container of the hinge assembly is a second arm. This arm may, for example, be rotatably connected to the first container of the hinge assembly by means of a second pivot.

[0012] The second arm may be rotatably connected to the first container of the hinge assembly by means of a second pivot and the first arm rotatably connected to a second container of the hinge assembly by means of a first pivot.

Thereby the first arm and the second arm are movable from 0 to 90 degrees in opposite directions in relation to each other making the hinge assembly rotatable 180 degrees in total.

[0013] According to another embodiment of the present invention the first arm comprises at least one first leg extending away from the first arm and the second

arm and at least one second leg extending away from the second arm, whereby each of the at least one first and second legs are movable and/or rotatable in the at least one opening.

The rotating and moving of the first and second legs in the opening makes it possible to move the hinge assembly from a fully opened (unfolded) position to a fully closed position (folded).

[0014] According to yet another embodiment of the present invention the first and second arms each at least one frictional element extending from one end of the at least one first and second leg towards another end of the at least one first and second leg and at least two connecting elements engaging opposite ends of the at least one frictional element, where the at least one frictional element is adapted for exert a force on the at least two connecting elements so as to move them in opposite directions towards the outer walls of the first and second container.

[0015] Although not essential, the first frictional elements may rest on support plates extending from one end of the first or second legs towards the other end of the second and first legs. By using such support plates, the force on the connecting elements may be more evenly distributed without inducing folding in the frictional element, in case elastical springs are used as frictional elements.

Also, the frictional elements may connect one end of the at least one first and one second leg to another end of the at least one first and second leg by means of connecting elements. The advantage of this configuration is that the frictional element is held firmly in its position by the one or more connecting elements.

[0016] According to another embodiment of the present invention the at least one friction surface may protrude from an inner wall of the above mentioned first and/or second containers towards the at least one frictional element.

[0017] According to another embodiment of the present invention the friction surface may comprise a friction plate. Using a plate translation movement of the arms of the hinge assembly is restricted due to friction between the arms and the plate. It is equally possible to use a curved friction surface instead of a flat one, such as, for example in plate.

This would have the additional advantage of restricting both rotational and translational movement of the arms of the hinge assembly on and around the curved friction surface.

[0018] The hinge assembly according to the present invention may also comprise a first and a second shoulder and a first and a second stopper rod where the first arm is adapted to contact the first stopper rod between the first shoulder and the at least one first leg, and where the second arm is adapted to contact the second stopper rod between the second shoulder and the at least one second leg when the hinge assembly is moved into a fully closed position. In this fashion, a firm end position for the hinge assembly as achieved, when the hinge assembly

is in the fully closed position.

[0019] According to yet another embodiment of the present invention, the hinge assembly may comprise a first and a second projection each extending from an end opposite the first and the second shoulders with the first and second pivots extending from one end of the first and second projections.

[0020] Also, at least a container of the first and the second arms may be adapted to rest on a first and the second support when the hinge assembly is fully opened. Similar to the previous case when the hinge assembly is in the fully closed position, the advantage of the first and second supports is the firm end position for the hinge assembly when it is brought into the fully opened position.

[0021] The first and second arms of the hinge assembly according to the present invention may also comprise a first upper surface and the second upper surface adapted to define a common surface when the hinge assembly is fully opened. The common surface in the open position adds to the premium impression of the hinge assembly.

[0022] According to another embodiment of the present invention the first container may further comprise a first and a second side wall adjacent the at least one first leg with at least one first recess in each of the first and second walls which allows each end of the at least one first connecting element to engage the at least one first recess and a second container which further comprises a third and a fourth side wall adjacent the at least one second leg with at least one second recess in each of the third and fourth side walls allowing each end of at least one second connecting element to engage the at least one second recess when the hinge assembly is moved from a fully closed to a fully open position or from a fully open to a fully closed position, where the at least one first and at least one second recesses define fixed intermediate positions for the hinge assembly between the fully open and the fully closed position.

[0023] The hinge assembly according to the present invention may be constructed so that the first and the second support, the first and second pivots, the common pivot, the friction elements, the at least one friction plate and the engagement between the at least one first connecting element and the at least one first recess as well as the engagement between the at least one second connecting element and the at least one second recess are adapted to counteract a downward force on the first and second upper faces of the first and second arms. The hinge assembly would thus be capable to be loaded with one or more items when fixed in the one or more intermediate positions defined by the at least one first and second recesses.

[0024] Additionally, the hinge assembly according to the present invention may be constructed so that the first and second pivots, the common pivot and the at least one friction plate are adapted to counteract a downward force on the first and second upper faces of the first and second arms which thus would allow the hinge assembly to be loaded by force or torque with one or more items

when fully closed.

[0025] By the same token, the hinge assembly according to the present invention may also be constructed so that the first and the second support, the first and second pivots, the common pivot and the at least one friction plate are adapted to counteract a downward force acting on the first and second upper faces of the first and second arms which thus would allow the hinge assembly to be loaded with one or more items when fully opened.

[0026] According to yet another embodiment of the hinge assembly the first and second arms may be essentially L-shaped seen in a direction normal to two imaginary planes containing the rotational axes for the first arm and the second arm.

[0027] The first and second arms of the hinge assembly according to the present invention may also be made of durable material, which would allow greater longevity and robustness for the hinge construction - especially when it is used in an armrest of a motor vehicle.

[0028] According to another embodiment of the hinge assembly according to the present invention at least one ear may be located at one end of the at least one first and second legs where each ear may comprise an aperture for receiving the at least the one first and second connecting element.

[0029] Further, the first and the second arms may be adapted to pivot around the axes X and X' and to move along the first and second friction plates, respectively.

[0030] The first and second containers of the hinge assembly according to the present invention may be made of durable material, such as engineering plastics, metal or some other material of comparable durability to achieve robustness of the hinge mechanism or reduce wear and tear.

[0031] These and other advantages will become apparent when reading the description of the preferred embodiments of the present invention with reference to the accompanying drawings.

SHORT DESCRIPTION OF THE DRAWINGS

[0032]

Fig. 1 illustrates in an exploded perspective side view an embodiment of the hinge assembly according to the present invention.

Fig. 2 illustrates a sectional side view of an embodiment of the hinge according to the present invention in the fully open position

Fig. 3 illustrates a sectional side view of the embodiment of the hinge from Fig. 2 in one intermediate position.

Fig. 4 shows a sectional side view of the embodiment of the hinge from Fig. 2 in the fully closed position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] Fig. 1 illustrates one possible embodiment of the hinge 100 according to the present invention. Showing the embodiment of the hinge 100 from a sectional side view in the fully open position, a first container 110 and a second container 110' are connected by means of a first arm 120 and a second arm 120', the arms 120, 120' each having curved upper surfaces, i.e. a first upper surface 170 and a second upper surface 170'.

The two arms 120, 120' are rotatably connected to each other by a common pivot 155 (Fig. 2) rotatable around a common central axis Z for the first and second arms 120, 120'. Additionally, the first arm 120 is rotatable around a first and a third central axis X and Y, while the second arm 120' is additionally rotatable around a second and a fourth central axis X' and Y'. Seen from a direction essentially perpendicular to a first plane (not shown) containing the first and third central axes X and Y and from a direction essentially perpendicular to a second plane (not shown) containing the second and fourth central axes X' and Y', the first and second arms 120, 120' are essentially L-shaped.

[0034] When the hinge assembly 100 is in the fully open position the first and the second arms 120, 120' essentially form a curved surface crossed by a single continuous line which is formed, thus making a premium appearance to the observer.

[0035] It should be mentioned that the upper surfaces 170, 170' of the two arms need not necessarily be curved. They may be kinked or have some other upper surface structure as long as the hinge assembly 100 in the fully open position makes a premium impression on the user, i.e. avoids too many lines splitting the common surface defined by the upper surfaces 170, 170'. Also, the shape of the arms 120, 120' need not necessarily be L-shaped. It may be any shape as long as the two arms fold in a similar manner as in the case of L-shaped arms.

[0036] Each of the two arms 120, 120' is provided with a shoulder 121, 121', a first leg 122 and a second leg 124 (figure 2) extending essentially vertically downward from the first arm 120 and essentially parallel to an inner wall surface 130 of the first container 110. One end of the first and second legs 122 and 124 forms a first ear 140 and a second ear 141 having a first and a second aperture 141, 143 for receiving a first pin 151 and a second pin 153. Each of the pins is inserted into the corresponding aperture in the first and second ear 140, 142 (figure 2) and engages one end of a first spring 150 provided between the inner faces of the first and second ears 140, 142..

[0037] The function of the first spring 150 or an equivalent elastical element is to exert a force on the first and the second pin 151, 153 in order to drive them apart in a direction longitudinal to the first axis towards a first outer wall (131) and a second outer wall (not shown) of the first container (110). The

The first spring 150 rests partly or wholly on a first support plate 145 extending vertically with respect to the second leg 124 from the lower part of the second ear 142 in the direction vertical to the first leg 122 of the first arm 120. The support plate 145 may support only a part of each spring (as shown in Fig. 1) or the entire spring, thus extending from one ear of one leg all the way to the other ear of the other leg.

Naturally, the first and second arms (120, 120') may only comprise one leg each which possibly would make for an easier construction of the arms (120, 120').

[0038] The central axis X of the first spring 150 forms a pivoting axis for the first arm 120 of the hinge 100 according to one embodiment of the present invention. Also, a first friction plate 160 located in a recess of a wall 130 of the first container 110 where the wall 130 is essentially parallel with the first leg 122 and a second friction plate 160' are provided in a recess of a wall 130' of the second container 110', where the friction plates 160, 160' may be made of a material with a high friction coefficient so as to counteract the force of the springs tending to return the first and the second arms 120, 120' into the previous position before the arms were moved in order to close the hinge 100. The friction plates may thus counteract both rotation of the first and second arms (122, 124) about the axis X and the third (122') and fourth (not shown) arms around the axis X' and/or a translational movement of the first and second arms in the apertures 198, 198'. In this fashion intermediate stop positions for the hinge 100 may be established when for example the hinge is used in arm rest used in a motor vehicle.

The friction plates 160, 160' may also be provided with ribs as shown in Fig. 1 enhancing the frictional force counteracting rotation and/or the translational movement of the first and second arms. However, instead of using a friction plate, one may provide the walls 130, 130' only with ribs made of materials with high friction coefficients, such as rubber, metal with rugged surface or some other suitable material providing high friction.

However, it may be added that the friction plates 160, 160' may be replaced by frictional elements having other surfaces than only flat surfaces. These surfaces providing friction for the first and second arms 120, 120' may be curved and embrace at least a part of one or both legs in order to counteract the rotational and/or translational movement of the legs for the first and second arms on the friction elements 160, 160'.

[0039] Also, the walls parallel to the side faces 190, 190' of the first and second arms are provided with first and second grooves 192, 193 as well as third and fourth grooves 192', 193'. By rotating from the open position to intermediate positions, the first and second pins 151, 153 inserted in opposite ends of the first spring 150, and also the third and fourth pins 151', 153' fall into the grooves. The action of the springs 150, 150' pressing the pins 151, 151' apart from each other in a direction longitudinal to the axes X and X' towards the outer walls (132, 131', rest not shown) of the first and second containers 110, 110'

together with the action of the friction plates 160, 160' counteracting the rotational and/or translational movement of the arms 122, 122' back to their previous position enables the hinge assembly 100 to rest in intermediate positions when moving from the open to the closed position. In order to move the hinge assembly into another position from this intermediate position, the application of additional force is needed. The advantage of the resting in intermediate positions when the hinge assembly is used as an armrest in a motor vehicle is to be able to keep the armrest in an intermediate position when accessing a storage compartment (not shown) normally arranged under the armrest.

[0040] The first arm 120 is connected to the second arm 120' by means of a common pivot 155 engaging an opening 158 in the second arm 120'. Also, a first projection 126 extending vertically from the other end of the first arm 120 is rotatable around a first pivot 156 engaging an opening (not shown) in the second container 110'.

[0041] When open, the lower surface of the first arm 120 may rest on or be close to a support surface 126 belonging to a wall of the first container 110. This would define a fixed end-position when the hinge assembly is fully opened. The action of the friction plates 160, 160' would then prevent the first and the second arms 120, 120' from returning to the previous position.

[0042] The second arm 120', which is similar in structure to the first arm 120 is provided with a third leg 122' and a fourth leg (not shown) extending essentially vertically downward from the second arm 120' and essentially parallel to an inner wall surface 130' of the second container 110'. Due to the almost identical structure of the second arm 120' in relation to the first arm, only the structural details of the second arm 120' will be enumerated here.

Thus the second arm 120' further comprises a third and a fourth leg 122', 124', a third ear 140' and a fourth ear (not shown), a third aperture 141' and a fourth aperture (not shown), a third pin 151' and a fourth pin (not shown), a second spring 150' a second plate (not shown), a second pivot 156' and a second projection 196'.

[0043] Also, the first and second containers 110, 110' comprise a first and a second stopper rod 180 and 180'. The function of the stopper rods 180, 180' is to provide a firm end position for the first and second arms 120, 120' when the hinge 110 assembly is in the closed position. In this position, the ears 121, 121' and the end of the legs for the two arms 120 next to the ears 121, 121' make contact with the first and second stopper rods 180, 180'. Together with the action of the friction plates 160, 160' counteracting rotational and/or translational movement of the arms 120, 120' back to the previous position provides for a fixed end-position when the hinge assembly 100 is in the fully closed position.

[0044] Fig. 3 illustrates an intermediate position of the hinge assembly 100, where the first arm 110 has rotated a certain angle around the central axis X of the first spring 150, the first pivot 156 and the common pivot 155 and the second arm 110' has rotated the same or some other

angle in the opposite direction around the central axis Y of the second spring 150', the second pivot 156' and the common pivot 155. Both the first and the second shoulders 121, 121' have then rotated towards the first and second stopper rods 180, 180' respectively. The arms 120, 120' of the hinge assembly 100 may be indexed in the positions marked by the grooves 192, 193 and the corresponding grooves for the second arm 120' or be in some other non-indexed intermediate position.

[0045] It may be mentioned that other arrangements to create intermediate positions are possible, where the common principle is to use a kind of spring function and geometrically distinct locations defined by recesses or similar

[0046] Fig. 4 illustrates the hinge assembly according to the present invention from a sectional side view in the fully closed position. When the hinge assembly is used in an arm rest of a motor vehicle, this fully closed position may for example correspond to the armrest being folded up from a vertical into a horizontal position. In the closed position, the hinge is preferably not visible from outside. Here, the first and second arms 120, 120' fold next to each other in the way depicted in Fig. 4, while the first and second containers 110, 110' become essentially parallel as shown in Fig. 4.

The first and the second ears 121, 121' together with the corresponding first and second legs 122, 122', the third leg 122 and the fourth leg (not shown) embrace the stopper rods 180 and 180' giving a fixed end stop position for the hinge assembly 100.

[0047] In this fashion, one may construct the hinge assembly according to the present invention by letting the first arm be movable from 0 to 90 degrees and the second arms from 0 to 90 degrees in the direction opposite the first arm. This would then yield a hinge assembly movable in 180 degrees. Even though the first and second containers 110, 110' and the first and second arms are essentially symmetrical resulting in a similar symmetrical movement of both containers and arms the hinge may be constructed so as to allow a difference in the range of angular movement between the first and second arms 120, 120' of up to 10%.

[0048] As far as the material for the hinge assembly is concerned, the hinge assembly may by way of example be made of engineering plastics, metal, such as aluminium, magnesia, steel or some other durable material in case one aims at giving a high quality finishing impression to the user.

Claims

1. A hinge assembly for motor vehicles (100) comprising a first container (110), a first arm (120), the first container (110) comprising a first opening (198) for receiving a portion (140) of said first arm (120), said first arm (120) comprising an end (155) pivotally con-

nected to another arm (120') of said hinge assembly (100)

characterised by

that said hinge assembly (100) further comprises at least one friction surface (160, 160') for counteracting rotation and/or movement of said portion (140) of said first arm (120) along or around said first friction surface (160).

2. A hinge assembly according to claim 1
characterised by
that said end (155) by means of which said first arm (120) is connected to another arm (120') of said hinge assembly (100) is a common pivot (155) for said first arm (120) and said another arm (120') of said hinge assembly (100).
3. A hinge assembly according to claims 1 or 2
characterised by
that said another arm (120') of said hinge assembly (100) is a second arm (120').
4. A hinge assembly according to claim 3
characterised by
that said second arm (120') is rotatably connected to said first container (110) of said hinge assembly (100) by means of a second pivot (156').
5. A hinge assembly according to one of the preceding claims 1-3
characterised by
that said first arm (120) is rotatably connected to a second container (110') of said hinge assembly (100) by means of a first pivot (156).
6. A hinge assembly according to one of the preceding claims 1-5
characterised by
that said first arm (120) comprises at least one first leg (122) extending away from said first arm (120) and that said second arm (120') arm comprises at least one second leg (122') extending away from said second arm (120') each of said at least one first and second legs (122, 122') movable and/or rotatable in said at least one opening (198, 198').
7. A hinge assembly according to one of the preceding claims 1-6
characterised by
that said first and second arms (120, 120') each comprise at least one frictional element (150, 150') extending from one end (140, 140') of said at least one first and second leg (122, 122') towards another end (141) of said at least one first and second leg (122, 122') and at least two connecting elements (151, 151') engaging opposite ends of said at least one frictional element (150, 150'), said at least one frictional element (150, 150') adapted for exerting a

- force on said at least two connecting elements (151, 151') so as to move them in opposite directions along an axis (X, X') towards the outer walls (132, 132') of said first and second container (110, 110')
8. Hinge assembly according to claim 7,
characterised by
that said first frictional elements (150, 150') rest on support plates (180, 180') extending from one end (141, 140') of the first or second legs towards the other end of the second and first legs.
 9. A hinge assembly according to claim 8
characterised by
that said frictional elements (150, 150') connect one end (140, 140') of said at least one first and one second leg (122, 122') to another end (141) of said at least one first and second leg (122, 122') by means of said connecting elements (151, 151').
 10. Hinge assembly according to one of the preceding claims 1-8
characterised by
that said at least one friction surface (160, 160') protrudes from an inner wall (130, 130') of said first and/or second containers (110, 110') towards said frictional elements (150, 150').
 11. A hinge assembly according to one of the preceding claims 1-10,
characterised by
that said friction surface (160, 160') comprises a friction plate.
 12. A hinge assembly according to one of the preceding claims 1-10,
characterised by
that said friction surface (160, 160') is curved.
 13. Hinge assembly according to one of the preceding claims 3 to 12
characterised by
a first and a second shoulder (121, 121') and a first and a second stopper rod (182, 182'), said first arm (120) adapted to contact said first stopper rod (182) between the first shoulder (121) and the at least one first leg (122, 124), said second arm (120') adapted to contact said second stopper rod (182') between the second shoulder (121') and the at least one second leg when said hinge assembly (100) is moved into a fully closed position.
 14. Hinge assembly according to one of the preceding claims 4-13,
characterised by
a first and a second projection (192, 192') each extending from an end opposite the first and the second shoulders (121, 121'), said first and second pivots (156, 156') extending from one end of said first and second projections (192, 192').
 15. Hinge assembly according to one of the preceding claims 3 to 14 where at least a container of said first and said second arms (120, 120') is adapted to rest on a first and said second support (145, 145') when said hinge assembly (100) is fully opened.
 16. Hinge assembly according to one of the preceding claims 3 to 15 where said first and second arms (120, 120') comprise a first upper surface and said second upper surface (170, 170) adapted to define a common surface when said hinge assembly (100) is fully opened.
 17. Hinge assembly according to one of the preceding claims 5 to 16
characterised by
that said first container (110) further comprises a first and a second side wall (132) adjacent said at least one first leg (122, 124) with at least one first recess (192) in each of the first and second walls (132) for allowing each end of said at least one first connecting element (151) to engage said at least one first recess (192) and a second container (110') further comprising a third and a fourth side wall (131', 132') adjacent said at least one second leg (122') with at least one second recess (192') in each of the third and fourth side walls allowing each end of at least one second connecting element (151') to engage said at least one second recess when moving said hinge assembly (100) from a fully closed to a fully open position or from a fully open to a fully closed position, said at least one first and at least one second recesses (192, 192') defining fixed intermediate positions for the hinge assembly (100) between the fully open and the fully closed position.
 18. Hinge assembly according to claim 15-17
characterised by
that said first and said second support (145, 145'), said first and second pivots (156, 156'), said common pivot, (155), said friction elements (150, 150'), said at least one friction surface (160, 160') and the engagement between said at least one first connecting element (151) and said at least one first recess (192) as well as the engagement between said at least one second connecting element (151') and said at least one second recess (192') are adapted to counteract a downward force on the first and second upper faces (170, 170') of the first and second arms (120, 120') thus the hinge assembly (100) being capable to be fixed in the one or more intermediate positions defined by the at least one first and second recesses (192, 192').
 19. Hinge assembly according to one of the preceding

claims 4 to 18

characterised by

that said first and second pivots (156, 156'), said common pivot (155) and said at least one friction plate (160, 160') are adapted to counteract a downward force on the first and second upper faces (170, 170') of the first and second arms (120, 120') thus allowing the hinge assembly (100) to be loaded with one or more items when fully closed.

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20. Hinge assembly according to one of the preceding claims 15 to 19

characterised by

that said first and said second support (145, 145'), said first and second pivots (156, 156'), said common pivot (155) and said at least one friction surface (160, 160') is adapted to counteract a downward force acting on the first and second upper faces (170, 170') of the first and second arms (120, 120') thus allowing the hinge assembly (100) to be loaded with one or more items when fully opened.

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21. Hinge assembly according to one of the preceding claims 3 to 20

characterised by

that said first and second arms (120, 120') are essentially L-shaped.

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22. Hinge assembly according to one of the preceding claims 3 to 21

characterised by

that said first and second arms (120, 120') are made of durable material.

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23. Hinge assembly according to one of the preceding claims 6 to 22

characterised by

at least one ear (140, 140') located at one end of the at least one first and second legs (122, 122'), said ears (140, 140') each comprising an aperture (142) for receiving said at least said one first and second connecting element (151, 151').

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24. Hinge assembly according to one of the preceding claims 3 to 23

characterised by

that said first and said second arms (120, 120') are adapted to pivot around the axes X and X' and to move and/or around the first and second friction plates (160, 160'), respectively.

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25. Hinge assembly according to one of the preceding claims 5 to 24

characterised by

that said first and second containers (110, 110') are made of durable material, such as engineering plastic, metal or some other material of comparable durability.

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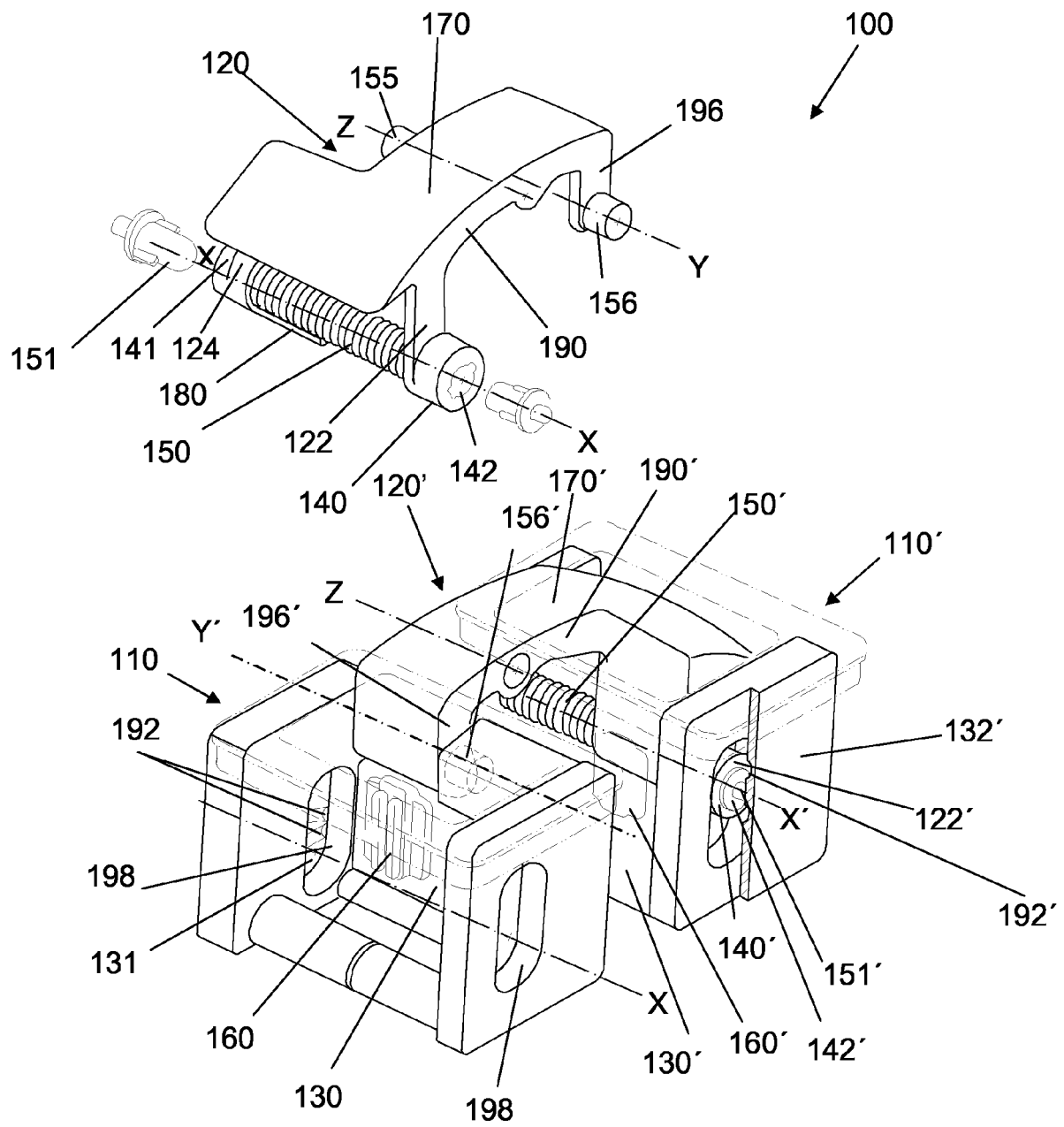


FIG. 1

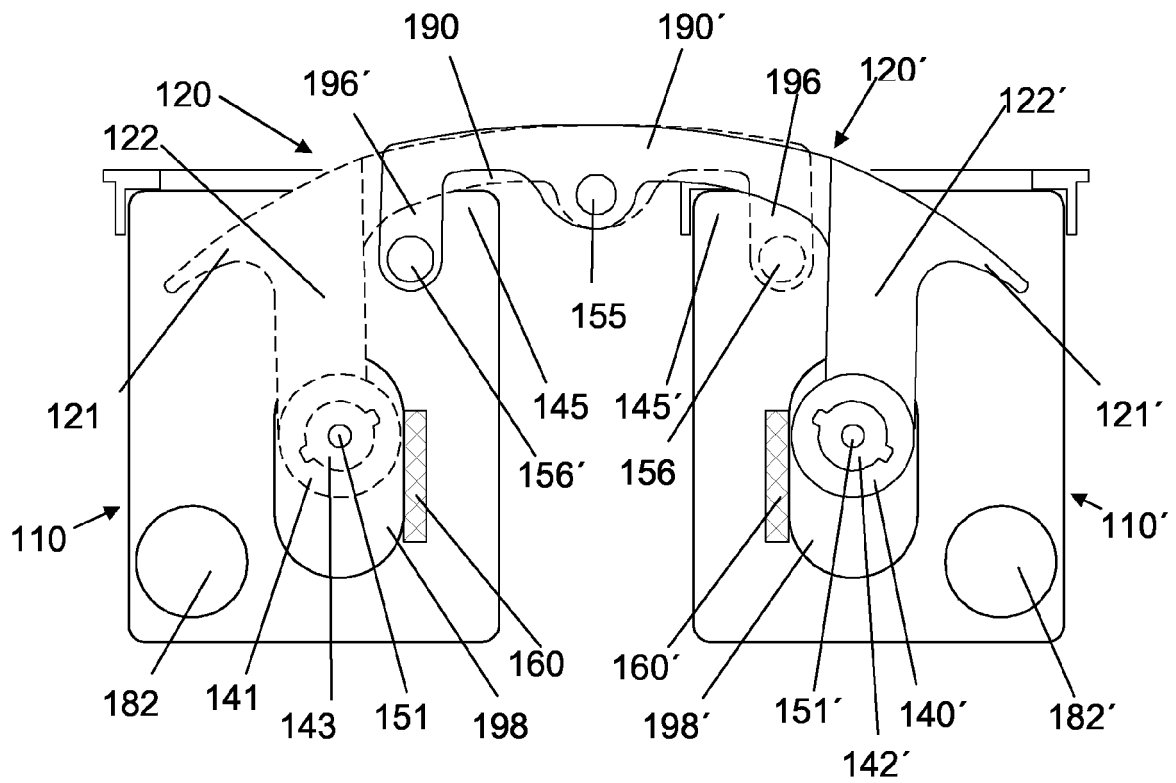


FIG. 2

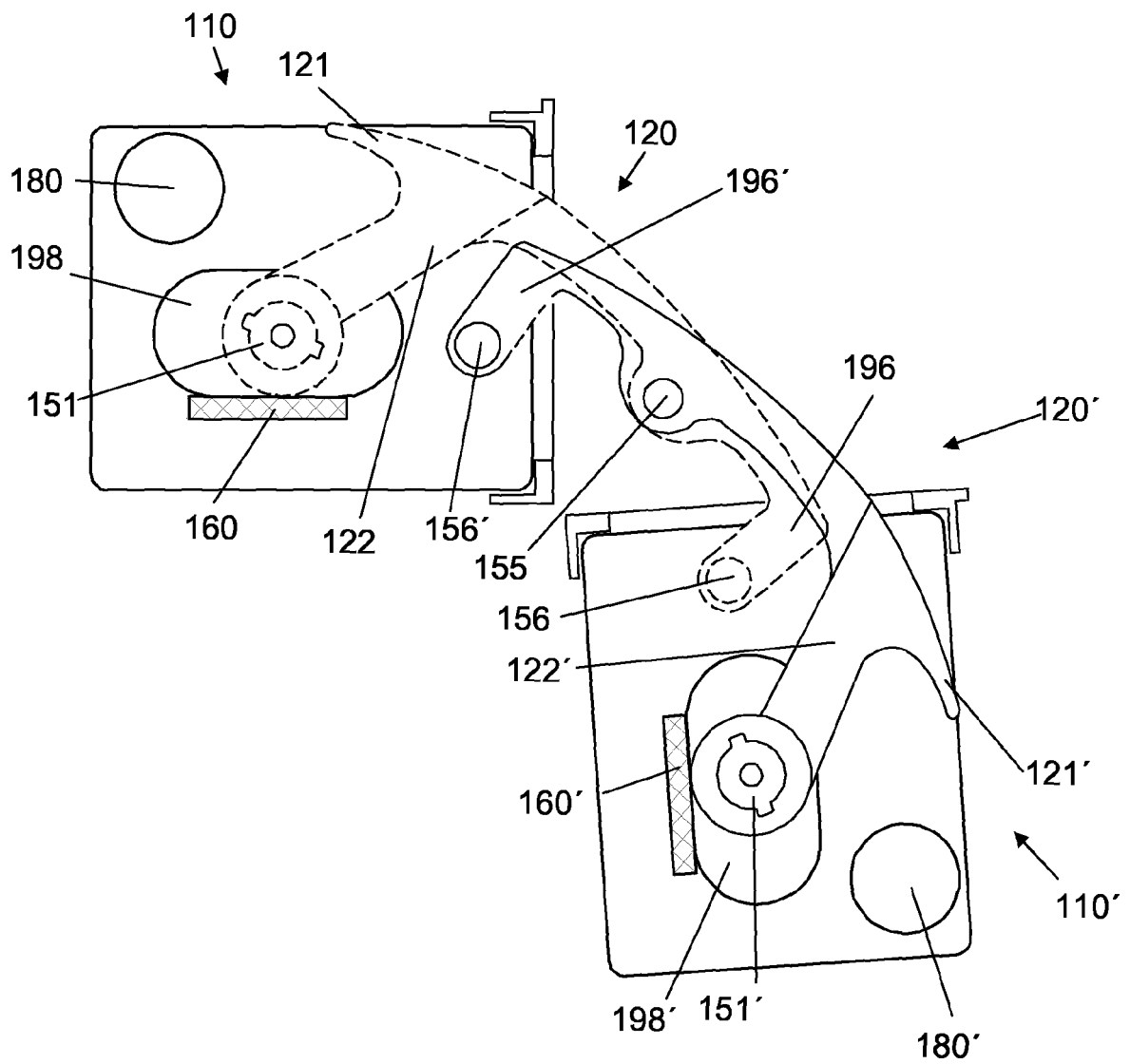


Fig. 3

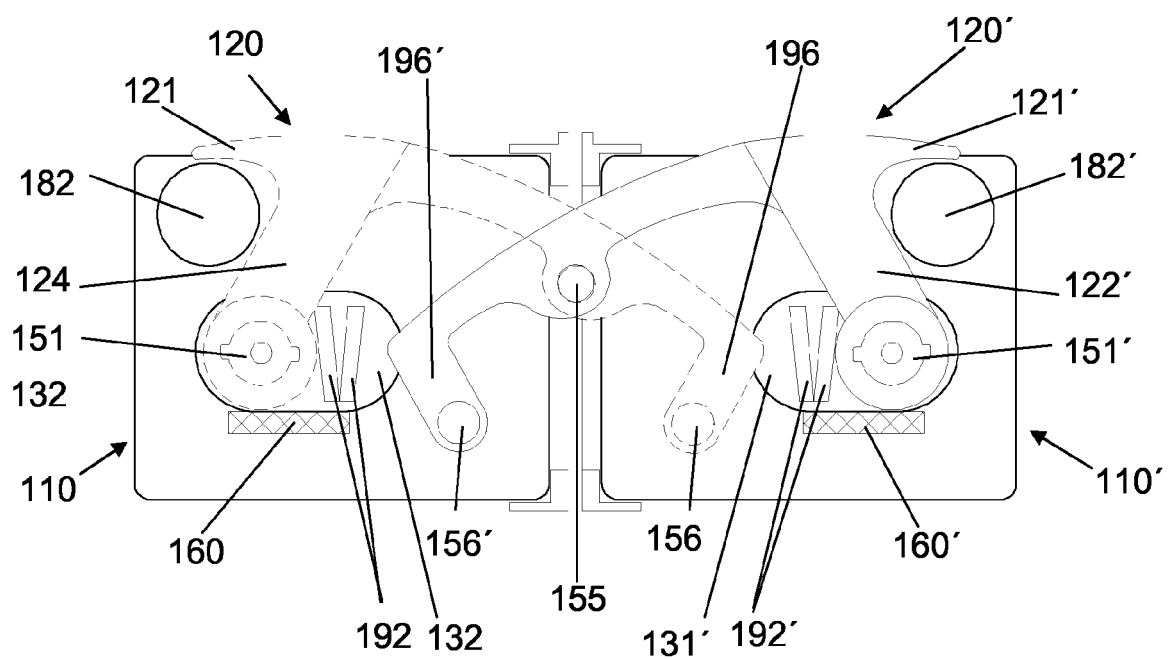


FIG. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 06 11 4274

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