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GB-A- 2 273 955
US-A- 3 648 328

DESCRIPTION

Technical Field

[0001] The present disclosure relates to a hinge mechanism and more specifically to a hinged component.

Background

[0002] Various types of Hinge Joints have been developed in the art. They provide a simple, efficient method of allowing two or more components to move about one another in a designated manner. Their simple construction and efficient performance, makes the hinge joints to be found in many everyday products, building structures, vehicles, and complex systems.

[0003] US 3648328 discloses a hinge joint mechanism according to the preamble of claim 1.

[0004] Perhaps the most common or well-known type of hinged joints comprises a movable member, such as a door or a lid, coupled to a stationary base or receiver capable of receiving the movable member and allowing the movable member to come to rest within the base or receiver. This fitting incorporates a hole to receive a pin therein which is affixed to a lock bar. The ends of the lock bar bend inwardly to press against the frame and the door for door locking purposes.

[0005] Moreover such pin based hinge joints fail to provide proper sealing in the joints to make them completely intact with each other.

[0006] Profiled hinged joints are also known in the art. Said joints have fixed member and movable member that is capable of partially rotating in the slot of the fixed member as disclosed in US4315345. The fixed member is having a hollow circular bead portion connected to the flange. This invention also does not restrict assembly / disassembly in non-axial directions.

[0007] The bead member is partially surrounded by a shell which protrudes from the flange. The gap between the shell and the bead member forms a slot in which the movable member rotates around the bead member. Said design does not provide any sealing properties as the slot in which the movable part rotates is not enclosed structure preventing leakage.

[0008] Moreover, other similar kinds of hinge joints fail to gain widespread acceptance either because of their relatively complicated nature, their appearance or inability to provide the necessary degree of desired protection.

Summary

[0009] To obviate the aforesaid drawback, the present disclosure seeks to overcome these by providing a hinge joint mechanism with relatively better sealing across the joint and simpler construction because of a reduced number of components.

[0010] Therefore, it is an object of the present disclosure to provide a hinge mechanism with simple construction and said mechanism provides relative rotation between the two surfaces of the hinge joints such that movable part can rotate by a desired amount relative to fixed part.

[0011] To achieve said objectives the present disclosure provides a hinge joint mechanism comprising a first component including a plurality of curved portions and at least one straight portion; a second component including a plurality of curved portions and a plurality of straight portions; wherein each of the first and second components comprises at least one straight portion disposed between two curved portions; wherein the first and second components are operable to rotate relative to each other between two extreme positions, and at any point during the rotation, the first and second components maintain an area contact against each other at at least one of their straight or curved portions; wherein different zones of the first component and the second component mesh at a plurality of different angular positions during relative rotation between the first component and the second component; wherein the location of the area contact varies during the rotation; wherein the meshing surface of the second component comprises at least one convex zone and at least one concave zone; and wherein the meshing surface of the first component comprises at least one convex zone and at least one concave zone; and wherein at any point during rotation, a convex zone of a first curved portion of the second component meshes with at least one concave zone of the first component.

Brief description of the accompanying drawings:

[0012] The invention, together with its objects and advantages thereof may be best understood by reference to the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify substantially like elements in the several figures and in which:

Figure 1 shows hinge joint mechanism in its open position.

Figure 2 shows hinge joint mechanism in its closed position.

Figure 3 shows hinge joint mechanism description in open position according to the present invention.

Figure 4 shows hinge joint mechanism description in closed position according to the present invention.

Figure 5 shows the operation of hinge joint position at first stage.

Figure 6 shows the operation of hinge joint position at second stage.

Figure 7 shows the operation of hinge joint position at third stage.

Figure 8 shows the operation of hinge joint position at fourth stage.

Figure 9 shows the operation of hinge joint position at fifth stage.

Detailed description of the invention

[0013] For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the disclosure is thereby intended, such alterations and further modifications in the illustrated bag, and such further applications of the principles of the disclosure as illustrated therein being contemplated as would normally occur to one skilled in the art to which the disclosure relates.

[0014] The hinge mechanism of the present disclosure provides a proper sealing in the joints to avoid liquid or any such kind of material to move across it.

Figure 1 shows a hinge joint mechanism in its open position. The hinge mechanism contains two parts attached to (or integral to) two surfaces. A fixed part **101** and a movable part **102**.

Figure 2 shows a hinge joint mechanism in its closed position. The hinge mechanism contains two parts attached to (or integral to) two surfaces. A fixed part **101** and a movable part **102**.

Figure 3 shows hinge joint mechanism description in open position according to the present invention. The fixed part consists of two curved portions **301** and **302** and a straight portion **303**. Similarly, the movable part also consists of two curved portions **304** and **305** and two straight portions **306** and **307**.

Figure 4 shows hinge joint mechanism description in closed position according to the present invention. The fixed part consists of two curved portions **301** and **302** and a straight portion **303**. Similarly, the movable part also consists of two curved portions **304** and **305** and two straight portions **306** and **307**.

Figure 5 shows the operation of joint in the first stage. In the first stage of motion, the convex surface of the curved portion **304** of the movable part meshes with the concave surface of the curved surface **301** of the fixed part, convex surface of the curved portion **305** of the movable part meshes with concave surface of the curved portion **302** of the fixed part, and straight portion **306** of the convex zone of the movable part meshes with straight portion **303** of the concave zone of the fixed part.

Figure 6 shows the operation of joint in the second stage. In the second stage of motion, the convex zone of the curved portion **304** of the movable part meshes with the concave zone of the curved portion **301** of the fixed part and convex zone of the curved portion **305** of the movable part meshes with the concave zone of the curved portion **302** of the fixed part.

Figure 7 shows the operation of joint in the third stage. In the third stage of motion the convex zone of the curved portion **304** of the movable part meshes with the concave zone of the curved portion **301** of the fixed part and the convex zone of the curved portion **305** of the movable part meshes with the concave zone of the curved portion **302** of the fixed part.

Figure 8 shows the operation of joint in the fourth stage. In the fourth stage of motion, the convex zone of the curved portion **301** of the fixed part meshes with the concave zone of the curved portion **305** of the movable part and convex zone of the curved portion **304** of movable part meshes with the concave zone of the straight portion **303** of the fixed part.

Figure 9 shows the operation of joint in the fifth stage. In the fifth stage of motion, the concave zone of the curved portion **305** of the movable part meshes with the convex zone of the curved portion **301** of the fixed part and the convex zone of the movable part (304) meshes with the concave zone of the fixed part (303).

[0015] Different zones of the fixed component and movable component mesh at a plurality of different angular positions during a hinge motion.

[0016] Further, the aforementioned sequence of motion stages results in a rotation between fixed part and movable part thereby causing a movement between the two surfaces **101** and **102** about the centre of rotation (CR) of hinge joint. This hinge joint also allows a predefined level of rotation. Beyond the predefined level of rotation (i.e. 180^0), this rotation hinge point is self locked because in extreme position of the joint curved portion **301** of the fixed part and straight part **303** of the fixed part restrict further movement of curved portion **304** of the movable part and straight part **306** of the movable part respectively.

[0017] In the other extreme position of the joint curved portion **302** of the fixed part and straight part **303** of fixed part restrict further movement of straight part **306** and **307** of movable part respectively.

[0018] Further, movable part and fixed part can be assembled or disassembled only in axial direction of hinge. The hinge can be optionally be used along with a lock in the locked and unlocked positions.

[0019] The hinge mechanism of the present disclosure is used in various appliances/equipment. Said hinge mechanism is used in a container and more particularly in a transport container.

[0020] All documents cited in the description are incorporated herein by reference. The present disclosure is not to be limited in scope by the specific embodiments and examples which are intended as illustrations of a number of aspects of the disclosure and any embodiments which are functionally equivalent are within the scope of this invention. Those skilled in the art will know, or be able to ascertain using no more than routine experimentation, many equivalents to the specific embodiments of the described herein.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- [US3648328A \[0003\]](#)
- [US4315345A \[0006\]](#)

Krav

1. En hængselledmekanisme omfattende:
en første komponent (101) inklusive et flertal af kurvede dele (301, 302) og mindst en
lige del (303);
en anden komponent (102) inklusive et flertal af kurvede dele (304, 305) og mindst et
flertal af lige dele (306, 307);
hvor hver af den første og anden komponent (101, 102) omfatter mindst en lige del
(303, 306, 307) anbragt mellem to kurvede dele (301, 302, 304, 305);
hvor den første og anden komponent (101, 102) kan bruges til at dreje i forhold til
hinanden mellem to ekstreme positioner, og ved ethvert punkt under rotationen
bibeholder den første og anden komponent (101, 102) en områdekontakt til hinanden
ved mindst en af deres lige (303, 306, 307) eller kurvede dele (301, 302, 304, 305); og
hvor forskellige zoner på den første komponent (101) og den anden komponent (102)
går i indgreb med hinanden ved et flertal af forskellige vinkelpositioner under relativ
rotation mellem den første komponent (101) og den anden komponent (102);
hvor placeringen af områdekontakten varierer under rotationen;
hvor indgrebsoverfladerne på den anden komponent (102) omfatter mindst en konveks
zone og mindst en konkav zone, og hvor indgrebsoverfladerne på den første
komponent (101) omfatter mindst en konveks zone og mindst en konkav zone; og
karakteriseret ved, at en konveks zone på en første kurvede del (304) på den anden
komponent (102) går i indgreb med mindst en konkav zone på den første komponent
(101) ved ethvert punkt under rotationen.
2. Hængselledmekanismen ifølge krav 1, hvor under den relative rotation mellem den
anden komponent (102) og den første komponent (101), mindst en af et flertal af
kurvede dele (304, 305) på den anden komponent (102) går i indgreb med mindst en af
et flertal af kurvede dele (301, 302) på den første komponent (101), derved er den
anden komponent (102) og den første komponent (101) i indgreb med hinanden.
3. Hængselledmekanismen ifølge ethvert af foregående krav, hvor indgrebsoverfladerne
på den anden (102) og første (101) komponent omfatter et flertal af tilgrænsende zoner
af forskellige krumninger med eller uden samme center af krumninger.
4. Hængselledmekanismen ifølge krav 3, hvor nævnte indgrebsoverflader eventuelt
omfatter en overflade af uendelig krumning.
5. Hængselledmekanismen ifølge ethvert af foregående krav, hvor rotationen er

begrænset til et forudbestemt niveau afhængigt af indgrebsoverfladerne, som har forskellig lokal krumningsradius i forskellige indgrebszoner.

- 5
6. Hængselledmekanismen ifølge ethvert af foregående krav, hvor den anden komponent (102) og den første komponent (101) kun samles eller skilles ad i en hovedsageligt aksial retning for hængselleddet.
 7. Brug af hængselledmekanismen ifølge ethvert af foregående krav i en transportcontainer.

DRAWINGS

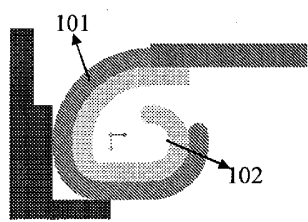


FIGURE 1

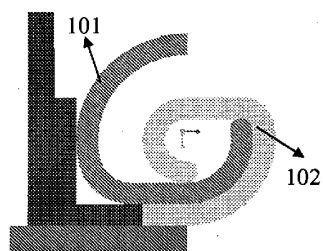
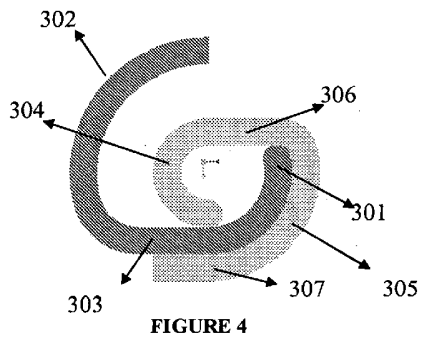
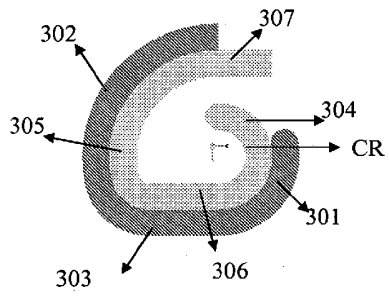


FIGURE 2



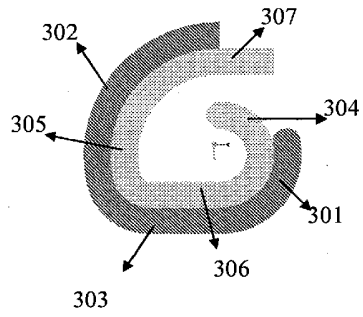


FIGURE 5

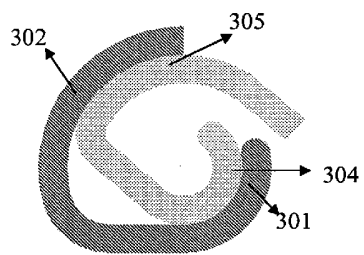


FIGURE 6

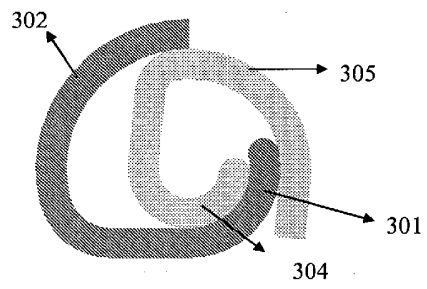


FIGURE 7

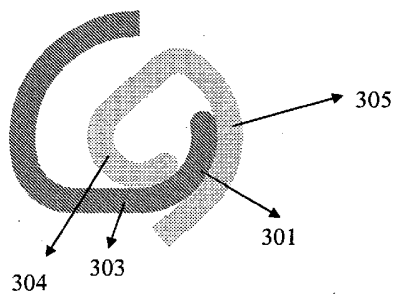


FIGURE 8

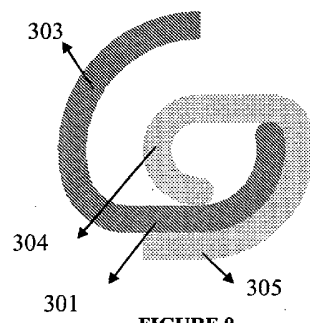


FIGURE 9