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DE-A- 3 036 498
DE-A- 3 307 529
FR-A- 2 201 702
FR-A- 2 418 046

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Description

Known nowadays are hinge devices including a male element of hollow construction to lighten the structure and decrease its manufacturing costs.

Such a product, and the method for obtaining it, are claimed in prior French Patent Application FR-A-2418.046, by the same Applicant.

That known type, however, is not exempt of drawbacks: first of all, owing to the particular structure of the male element, the female element cannot pivot around the pin but only on the base thereof. Furthermore, where such a hinge is formed from ferrous materials and utilised in a marine environment, oxides are formed which create a friction area over the pin base, reducing the hinges' functionality.

To obviate the latter drawback, it would be sufficient to use materials such as stainless steel or brass, which, however, greatly increase the cost of the finished product.

The hollow structure of the male element may develop another problem associated with the surface treatment thereof: when immersed in galvanic baths, some of the liquid seeps into the interior of the male element and is trapped therein as the element is advanced to the next treatment bath, thereby contaminating successive tanks, with small quantities of different liquids from prior baths, the passage whereof is necessary to complete the treatment.

This also brings about a cost increase, albeit a slight one, due to the necessity to renew the liquids in the galvanic baths more frequently than would be necessary if they were contaminated to a lesser extent by different liquids from prior baths.

In the storing phase, moreover, any liquid left inside the hollow male element could flow out of it and corrode, by its mainly acid nature, other hinges.

Among the ordinary "solid" hinges, that is with the male element fabricated as a single solid member, some types are known which utilise a sphere on a pin end, see for example DE-A 3 036 498.

The main disadvantage of such types resides in their higher cost due to the greater amount of material employed in their manufacture.

It is a primary aim of this invention to obviate the above cited inconveniences of the known types of hinge devices by providing a hinge device, wherein the working load is supported on the pin and is subject to only neglectable frictional resistance.

Another important object is to provide a hinge device which combines with the preceding feature a reduction in the overall manufacturing costs, and in particular a significant reduction in the quantity of material employed.

A further object of the invention is to provide a hinge device which reduces contamination of successive galvanic baths during the treatment thereof.

A not unimportant object is to provide a hinge device which can be manufactured by utilizing standard equipment, and readily available materials which is safe and reliable in use.

These and other objects are achieved by a hinge

device, according to the appended Claim 1.

Further features and advantages will become apparent from the following detailed description of a particular embodiment, with reference to the accompanying drawing sheet, in which:

Figure 1 is a partly sectional perspective view of the hinge device according to the invention;

Figure 2 is a side elevation view of the same;

Figure 3 is a sectional view taken on the line III-III of Figure 2.

With reference to the above figures, the hinge device 1 comprises a male element 2 and a female element 3.

The male element 2 includes a cylindrical body 4 and a cylindrical pin 5, of similar shape and having the same longitudinal axis but defining a smaller diameter than the body 4. The male element 2 defines between the pin 5 and the body 4 an annular flat base 6, extending perpendicularly to the longitudinal axis of the male element 2 and having a radial extension corresponding to the difference between the diameter of the cylindrical body 4 and the diameter of the pin 5.

Both the body 4 and the pin 5 define hollow internal cavities, 7 and 7a respectively, the size of the cavity 7 being larger than the latter 7a.

At the end 8 of the pin 5 there is formed a cylindrical seat 9, having a slightly larger diameter than the cavity 7a, and adapted to accommodate a spherical bearing consisting of a small hardened sphere 10. The seat 9 extends along the longitudinal axis of the cavity 7a for a distance which is greater than the radius of said sphere 10 but smaller than the diameter thereof.

The hardened sphere 10 has a slightly smaller diameter than said seat 9 and is made fast with the pin 5 by upsetting its end 8; this prevents the sphere 10 from coming out of the seat 9 as well as preventing liquid from entering the cavities 7, 7a through the end 8 of the pin 5 during the phase of immersion in galvanic baths.

The sphere 10 thus becomes the terminating extremity of the pin 5.

The female element 3 has a cylindrical body 11 matingly shaped to receive the pin 5 of the male element 4, in a seat 12 having an end 12a and defining an axial extension which is slightly smaller than the length dimension of the pin 5, with the sphere 10 located in the seat 9. Thus, when the female element 3 is operatively positioned on the male element 2, the end 12a of the seat 12 defined by the female element 3 rests and is rotatable on the sphere 10 with neglectable friction, due to the small surface area of tangential contact between the curved surface of the sphere 10 and the flat surface of the end 12a.

Fast with each of the side surfaces 13 and 14 of the bodies 4 and 11 is a means 15 for associating the hinge 1 with casings, said means comprising, for example, a threaded shank 16.

The hinge 1, owing to the configuration of the pin 5 and seat 12, advantageously works on the sphere 10 and not on the annular base 6: this improves the functional aspect since the coefficient of friction existing between the respectively rotatable elements 2,3 of the hinge is greatly reduced, and the

point of rotation is protected inside the female element 3.

The male element 2, being hollow, lowers the production costs by reducing the quantity of raw material employed in the manufacture of the hinge device.

Furthermore, the sphere 10, by closing the cavity 7, 7a also prevents the liquid present in the galvanic treatment tanks from entering the male element 2, and being inadvertently transported to, and thereby contaminating, successive tanks containing different liquids.

Thus, it has been ascertained that the hinge device according to the invention achieves all of the objects set forth, which allows manufacturing costs to be reduced, and simultaneously provides an improved hinge device from the functional point of view.

Of course, the materials employed and the dimensions may be any ones according to necessity.

Claims

1. A hinge device (1) comprising a male element (2) having a body (4) and a pin (5) extending from said body, a seat (9) being formed at the free end of said pin (5) for accommodating a sphere (10) therein, and further comprising a female element (3) matingly shaped to rotatably receive at least part of said pin, said sphere (10) protruding at least partially out of the edge of said seat (9) to form a bearing surface for said female element (3), connecting means (15) being provided for associating said hinge device (1) with casings, characterized in that said male element (1) is hollow to define an internal cavity (7, 7a) extending from said seat (9), the edge of said seat (9) being at least partially upset for rigidly fastening said sphere (10) to said pin (5) in such a manner to sealingly occlude said internal cavity (7, 7a), whereby said sphere (10) is prevented from being accidentally removed from said seat (9) and liquid is prevented from entering said internal cavity (7, 7a).

2. A hinge device according to Claim 1, characterized in that said internal cavity comprises a first portion (7) extending internally to said body (4) and a second portion (7a) extending internally to said pin (5), said seat (9) being substantially coaxial with both said first portion (7) and said second portion (7a) of said internal cavity.

3. A hinge device according to Claim 2, characterized in that said seat extends along the longitudinal axis of said second cavity portion (7a) for a distance which is greater than the radius of said sphere (10) and smaller than the diameter thereof.

4. A hinge device according to Claim 2, characterized in that the diameter of said seat (9) is substantially the same as that of said sphere (10), said second portion (7a) of said internal cavity having a smaller diameter than said seat (9) to prevent passage of said sphere (10) therethrough.

Patentansprüche

1. Scharnier (1), bestehend aus einem Steckteil (2), von dessen Körper (4) sich ein Stift (5) er-

streckt, dessen freies Ende einen Sitz (9) zur Aufnahme einer Kugel (10) bildet, die zumindest teilweise den Rand des Sitzes (9) überragt, um eine Lagerfläche für ein aufnehmendes Teil (3) zu bilden, das eine entsprechend angepaßte Form aufweist, um zumindest einen Abschnitt des genannten Stiftes drehbar aufzunehmen, und ferner bestehend aus Verbindungselementen (15) zur Verbindung des Scharniers (1) mit einem Rahmen, einer Einfassung oder dergleichen, dadurch gekennzeichnet, daß das Steckteil (2) einen inneren Hohlraum (7, 7a) umschließt, der mit dem genannten Sitz (9) in Verbindung steht, dessen Rand zumindest teilweise nach innen geneigt ist, um die Kugel (10) auf dem Stift (5) so festzulegen, daß sie den genannten inneren Hohlraum (7, 7a) dichtend abschließt und an einem zufälligen Abheben von dem Sitz (9) gehindert ist und Flüssigkeit nicht in den inneren Hohlraum einzudringen vermag.

2. Scharnier nach Anspruch 1, dadurch gekennzeichnet, daß der genannte innere Hohlraum einen ersten, sich im Innern des genannten Körpers (4) erstreckenden Abschnitt (7) sowie einen zweiten, sich im Innern des genannten Stiftes (5) erstreckenden Abschnitt (7a) aufweist, wobei der Sitz (9) im wesentlichen koaxial sowohl mit dem ersten Abschnitt (7) als auch dem zweiten Abschnitt (7a) des inneren Hohlraumes liegt.

3. Scharnier nach Anspruch 2, dadurch gekennzeichnet, daß sich der Sitz entlang der Längsachse des zweiten Hohlraumabschnittes (7a) über eine Distanz erstreckt, die größer ist als der Radius der Kugel (10) und kleiner als deren Durchmesser.

4. Scharnier nach Anspruch 2, dadurch gekennzeichnet, daß der Durchmesser des Sitzes (9) im wesentlichen dem der Kugel (10) entspricht, wobei der zweite Hohlraumabschnitt (7a) einen kleineren Durchmesser aufweist als der Sitz (9), um einen Durchtritt der Kugel (10) durch ihn hindurch zu verhindern.

Revendications

1. Charnière (1), comprenant un élément mâle (2) comportant un corps (4) et un gond (5) s'étendant à partir de ce corps, un siège (9) étant ménagé à l'extrémité libre de ce gond (5) pour permettre qu'une bille (10) y soit logée, et comprenant en outre un élément femelle (3) de forme complémentaire de façon à recevoir au moins une partie du gond en permettant le pivotement, la bille (10) dépassant au moins en partie le bord du siège (9) de façon à former une surface d'appui pour l'élément femelle (3), des moyens de jonction (15) étant prévus pour fixer la charnière (1) sur des supports, caractérisée en ce que l'élément mâle (2) est creux de façon à délimiter une cavité intérieure (7, 7a) s'étendant à partir du siège (9), le bord de ce siège (9) étant repoussé au moins en partie afin d'immobiliser la sphère (10) sur le gond (5) de manière à obturer de manière étanche la cavité intérieure (7, 7a), ce qui empêche la bille (10) d'être extraite accidentellement du siège (9) et empêche les liquides de pénétrer dans la cavité intérieure (7, 7a).

2. Charnière suivant la revendication 1, caracté-

risée en ce que la cavité intérieure est constituée d'une première partie (7) s'étendant à l'intérieur du corps (4) et d'une seconde partie (7a) s'étendant à l'intérieur du gond (5), le siège (9) étant pratiquement coaxial à la fois à cette première partie (7) et à cette seconde partie (7a) de la cavité intérieure.

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3. Charnière suivant la revendication 2, caractérisée en ce que le siège s'étend suivant l'axe longitudinal de la seconde partie (7a) de la cavité sur une distance qui est supérieure au rayon de la bille (10) et inférieure au diamètre de celle-ci.

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4. Charnière suivant la revendication 2, caractérisée en ce que le diamètre du siège (9) est pratiquement le même que celui de la bille (10), la seconde partie (7a) de la cavité intérieure comportant un diamètre plus faible que le siège (9) afin d'empêcher la bille (10) de la traverser.

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