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Translation

European Patent No. 0324882Description

The invention relates to a bung barrel made of thermoplastics material for the storage and transport of dangerous liquids, with at least one carrying and transporting ring, which is located on the barrel casing near the associated end face of the barrel, is solid in cross section, i.e. consists of solid material, and has a horizontal contact face, which encircles continuously in the circumferential direction and is freely accessible from the outside, and a vertical contact face - which faces inwards and is freely accessible from above - for the gripper arms of an inserted barrel-gripper, wherein the carrying and transporting ring is connected with the barrel so as to be in one piece therewith by way of a connecting ring, which adjoins the horizontal contact face and enters the barrel casing, wherein an encircling annular groove is provided - behind the connecting ring or behind the inward-facing vertical contact face of the carrying and transporting ring - as free space for the engagement of an upper barrel-gripper claw, and wherein the casing region, which rises out of the annular groove, rises conically towards the barrel end face.

Such a barrel, corresponding to the first part of Claim 1, is known from DE-A-35 26 921. Here, the barrel in question is a bung barrel produced entirely in the blow-moulding process and in which, during production, the carrying and transporting rings are formed from the barrel casing so as to be in one piece and solid, i.e.

consisting of solid material. However, bung barrels are also known in which the tubular barrel-casing-part and the barrel end regions are produced separately from one another. The end regions produced by injection-moulding and the carrying and transporting rings located thereon are welded onto the tubular barrel body in a further operation.

A plastics barrel is known from publication BE-A-819 466, which has a handling ring also extending upwards. This plastics barrel is a beer barrel which consists of two parts produced by injection-moulding. Here, a cylindrical upper part and a base part are interconnected firmly by means of a few ultrasonic spot-weld connections and sealed against one another so as to be gas-tight and liquid-tight by means of an interposed sealing ring. Subsequently, it is possible to produce different sizes of beer barrel having the same diameter but upper cylinder parts of different lengths, whilst always using the same base part. Towards the top and as a straight extension of the beer barrel wall, a cylindrical upper edge is formed as a handling ring in which at least two handle openings are provided. Such beer barrels in usual barrel sizes of 10 l to maximum 50 l are usually lifted and/or carried by hand and transported and are not provided and/or suitable for use with industrial lifting and transporting devices such as a fork-lift with barrel gripper or crane lifting-devices.

In bung barrels made of thermoplastics material for the storage and transport of dangerous liquids, carrying and transporting rings suitable for the insertion of a barrel gripper have a web which is horizontal in cross section and a vertical web, e.g. according to DE-GM 76 00 621. Here, the free end of the vertical web is oriented to the respective head face of the barrel and the horizontal web is formed radially outwards from the

barrel casing. Because it was difficult in this design to control peak loads in the critical weld region of the respective carrying and transporting rings, the carrying and transporting ring was formed - in accordance with the aforementioned DE-A-35 26 921 - so that the critical weld zones are substantially relieved of bending forces, so that the ring becomes resilient in the circumferential direction and therefore becomes deformable on impact stress as compared with the barrel casing, and so that the carrying and transporting ring is bound flexibly to the barrel casing. To this end, the carrying and transporting ring was connected to the barrel by way of an annular connecting web which adjoins the horizontal contact face and enters the barrel casing.

The annular connecting web is now only loaded by harmless tensile loads introduced into the barrel casing when the barrel is carried and transported in the barrel gripper.

If, in order to bind the carrying and transporting ring as resiliently as possible, the annular connecting web thereof enters the barrel casing at an acute angle to the barrel axis, the base of the groove between the carrying and transporting ring and the adjacent, conically rising casing part ends in the vertical plane of the horizontal contact face of the ring. The space between this face and the conical casing part of the barrel is thus made very narrow, especially since the stacking forces arising when a further full barrel is stacked onto the barrel end face can be diverted via the cone face directly into the remaining barrel casing. DE-OS 35 26 921 shows such a design.

This narrowing makes it difficult to insert a barrel gripper, which therefore needs to be given a particular shape. In order to be able to use any barrel grippers,

in particular those for sheet-metal barrels, it is proposed in accordance with the invention that the groove base between the connecting ring and the casing part, which rises conically towards the barrel end region, is arranged at a distance below the horizontal contact face of the carrying and transporting ring, the connecting ring being formed from an axial extension of the cylindrical barrel-casing-part.

In barrel grippers of usual design, this measure creates sufficient space for the upper gripper arm to be inserted unhindered behind the vertical contact face of the carrying and transporting ring. It is furthermore guaranteed that the radial outer edge of the carrying and transporting ring remains unchanged, since this is required for the palletisation of the barrel.

But manual handling is also made substantially easier by the enlargement of the engagement space. By extending the connecting ring compared with an earlier proposal, according to which the groove base between the carrying and transporting ring and the adjacent casing part ends on the vertical plane of the horizontal contact face, particular favour is given to the arrangement where the binding to the barrel casing is resilient in the circumferential direction.

Extending the height of the connecting ring in accordance with the invention gives the same wall thicknesses in the cylindrical region of the casing, in the adjacent region of the casing part which rises conically towards the barrel end face and in the region of the connecting ring.

In particular, the wall thickness in the connecting ring, which may be reduced further, and the flexibility thus achieved mean that, when a full barrel falls

laterally, the same deformation strains arise in all the wall cross-sections concerned, so that no harmful peak strains can occur with the result of cracks in the casing.

Moreover, the extension of the connecting ring means that, when the barrel falls laterally, the path by which the ring part striking the base pivots into the deformation position is shortened, and the angular variation in the transition of the connecting ring into the cylindrical casing part therefore becomes smaller. Decreasing the deformation paths and angles contributes to reducing the material strains.

In a development of the invention, the barrel end face ends below the plane of the horizontal contact face of the carrying and transporting ring. Here, the vertical length of the conical casing region corresponds at least to the height of the carrying and transporting ring. This vertical length must be observed in order to guarantee sufficient flexibility when a full barrel falls laterally.

It is therefore advisable to retain a casing region which rises from the annular groove and into the barrel end face, in order to guarantee what is known as a crumple zone, where the main impact energy is absorbed. This occurs in such a manner that the groove base of the respective carrying and transporting ring is arranged at a distance below the horizontal contact face. The height of the conical casing region with the adjoining top end face can advantageously be lifted into the plane of the upper edge face of the carrying and transporting ring and above. Where the barrel end face is lowered below the horizontal contact face of the carrying and transporting ring, the minimum height of the conical casing part should - as explained earlier - correspond

at least to the height of the carrying and transporting ring.

In lighter barrels, a slightly lower vertical position is possible where a sufficient crumple zone is maintained.

An embodiment of the invention is shown in the drawing by way of example.

Fig. 1 is a detail of the head of a barrel, showing the bung part in longitudinal section,

Fig. 2 is a detail of the head of a barrel in longitudinal section with low-lying barrel top and

Fig. 3 is a detail of the head of a barrel in longitudinal section with barrel end face arched outwards.

In the drawing, 7 designates the cylindrical part of the barrel casing and 6 designates the barrel end face of the plastics barrel. In the top face of the barrel, the bungs 9 are arranged in the bung recesses.

The carrying and transporting ring 1 is located near the barrel end face 6, this carrying and transporting ring 1 being solid in cross section and having a horizontal contact face 2 and a vertical contact face 3 for the gripper arms (not shown in the drawing) of an inserted barrel-gripper. In Fig. 1, the upper edge face 10 of the carrying and transporting ring 1 is in alignment with the barrel end face 6, whilst in Fig. 2 it projects over the barrel end face 6. The carrying and transporting ring 1 is connected so as to be in one piece with the barrel casing via a connecting ring 4 which adjoins the horizontal contact face 2. The groove base between the

connecting ring 4 and the casing part 5 rising conically towards the barrel end region 6 is arranged at a distance below the horizontal contact face 2 of the carrying and transporting ring 1.

If, as shown in Fig. 2, the barrel end face 6 ends below the horizontal contact face 2 of the carrying and transporting ring 1, the vertical length of the conical casing region 5 corresponds at least to the height of the carrying and transporting ring 1.

Conicity is necessary because of the space required by the barrel gripper. On the other hand, the minimum height of the so-called crumple zone serves as a necessary elasticity buffer between the barrel end face 6 and the side wall 7 of the barrel.

As shown in Fig. 3, the barrel end face 6 is arched outwards in a uniform manner.

A passage 8 for the discharge of water is arranged in the base of the connecting ring 4. The groove base can extend over the barrel circumference in a wavelike manner and is constructed so that the passage(s) (8) are always located in a wave trough.



Claims

- 1.) A bung barrel made of thermoplastic synthetic material for the storage and transport of dangerous liquids, with at least one carrying and transporting ring (1), which is located on the barrel casing (7) near the assigned end face (6) of the barrel, is solid in cross section, i.e. consists of solid material, and has a horizontal contact face (2), which encircles continuously in the circumferential direction and is freely accessible from the outside, and a vertical contact face (3) - which faces inwards and is freely accessible from above - for the gripper arms of an inserted barrel-gripper, the carrying and transporting ring (1) being connected with the barrel so as to be in one piece therewith by way of a connecting ring (4), which adjoins the horizontal contact face (2) and enters the barrel casing (7), an encircling annular groove being provided - behind the connecting ring (4) or behind the inward-facing vertical contact face (3) of the carrying and transporting ring (1) - as free space for the engagement of an upper barrel-gripper claw, and the casing region (5), which rises out of the annular groove, rising conically towards the barrel end face (6), characterised in that the groove base between the connecting ring (4) and casing part (5), which rises conically towards the barrel end face (6), is arranged at a distance below the horizontal contact face (2) of the carrying and transporting ring (1), the connecting ring (4) being formed from an axial extension of the cylindrical barrel-casing-part (7) of the barrel.
- 2.) A bung barrel according to Claim 1, characterised in that the barrel end face (6) ends below the plane of



the horizontal contact face (2) of the carrying and transporting ring (1), and in that the vertical length of the conical casing region (5) corresponds at least to the height of the carrying and transporting ring (1).

- 3.) A bung barrel according to the Claims 1 and 2, characterised by a barrel end face (6) which is arched outwards in a uniform manner.
- 4.) A bung barrel according to Claims 1 to 3, characterised by at least one passage (8) for the discharge of water, which passage leads outwards and is arranged in the base of the connecting ring (4).
- 5.) A bung barrel according to the preceding Claims, characterised in that the groove base extends over the barrel circumference in a wavelike manner.