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REFUSE CONTAINER WITH WHEELS

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REFUSE CONTAINER WITH WHEELS

The invention relates to a refuse bin made of plastic in the approximate shape of an upright cylinder with a hinged lid and two wheels mounted coaxially to each other in recesses in the bottom portion of the refuse bin, connected with axle stumps.

Refuse bins of this type already exist in various embodiments. Whilst the wheels were for the most part initially mounted on a continuous metal axle, there have recently been an increasing number of attempts to dispense with the relatively expensive metal axle which is problematic when the refuse bin is subsequently recycled because it is made of a different material. Hence e.g. utility model G 93 07 297 proposes a solution whereby at least the wheels, tyres and locking fixtures for mounting the wheels on the axle are made of plastic. A complete replacement for the continuous metal axle consisted in axle stumps moulded directly onto the bin for accommodating the wheels, but said stumps could snap off relatively easily. Other prior art solutions which proposed an axle stump connected with the wheels required additional elements made from a relatively expensive material, which then had to be mounted on the bin in an additional working procedure.

The invention is therefore based on the task of providing a refuse bin of the generic type, where the wheels and their mountings can be manufactured and assembled very simply with the aid of a small number of separate parts.

In the refuse bin of the generic type, this task is solved in that mounting barrels are provided inside the recesses, which are connected via a number of ribs in one piece with the refuse bin, and that together, the axle stumps of the wheels and the mounting barrels form a locking mechanism to axially lock the axle stumps in place.

Hence the axle stumps with which the wheels are connected merely have to be pushed into the mounting barrels until the two elements lock into position of their own accord. No other wheel-mounting procedures are required.

To form the locking mechanism, the axle stumps are preferably provided at their free ends with several, e.g. four slits contrived parallel to the axle and distributed around the periphery, by means of which springy tongues are formed at the end of the axle stump. These springy tongues have outwardly directed harpoon-like hooks that are angled away from the end of the axle stump, which lockingly engage with the ends of the two mounting barrels. To accommodate the shape of the harpoon-like hooks the mounting barrels can have a peripheral bead on the appropriate side on the inside.

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The axle stumps are preferably hollow or barrel-like and the inner diameter tapers over a bevelled stage in the vicinity of the hooks. In front of the ends of the axle stumps, stoppers moulded on by means of stems to form one piece have an outwardly projecting peripheral bead on the side facing the axle stumps and a crown that projects like a flange on the other side. These stoppers can be pushed into the open end of the axle stumps by destroying the stems. In its end position, the bead then engages behind the taper of the inner diameter of the axle stumps at the corresponding end. Once the stoppers are pushed in, the tongues can no longer be pressed together and the hooks at the ends of the tongues can no longer become detached from the ends of the axle stumps.

Between the outside of the axle stumps and the inside of the mounting barrels an intermediate barrel made from a non-stick, abrasion-resistant material, in particular a suitable hard plastic or even a metal, can be provided. In the case of a refuse bin made from polyethylene, polyethylene can, for example, be used for the intermediate barrels, which undergoes so-called self-strengthening.

The mounting barrels are preferably connected as one piece with the bottom portion of the refuse bin by means of an open rib construction in the aforementioned recesses, which can also be referred to as wheel boxes.

The refuse bin according to the invention can be manufactured entirely from plastic and, in particular, from one and the same type of plastic, e.g. polyethylene. It consists, wheels included, of only a few parts which are relatively uncomplicated and easy to connect with each other.

Preferred embodiments of the invention will be described below with reference to the enclosed drawings, in which

- Fig. 1 shows a view in the upper half and, in the lower half, a cross-section through a wheel according to the invention with wheel rim and axle stump, but without a tyre;
- Fig. 2 is a corresponding illustration of a tyre for the rim shown in Fig. 1;
- Fig. 3 is a partial side view of the bottom portion of a refuse bin with mounting barrel;

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- Fig. 4 is a partial view from the left in Fig. 3 of the bottom corner section of a refuse bin;
- Fig. 5 is a perspective partial view of the sections of the refuse bin shown in Figs. 3 and 4;
- Fig. 6 shows a wheel connected with a mounting barrel to the bottom corner section of a refuse bin.

One embodiment of a wheel according to the invention will now be described with reference to Fig. 1. The wheel consists overall of a wheel rim 10 and an axle stump 12. The wheel rim 10 comprises a rim well 14, a cylindrical hub 16 and a circular-ring shaped disk 18 connecting the two in the middle plane of the wheel. The hub passes towards the right into the equally hollow-cylindrical axle stump 12 via a slightly backwardly projecting step 20. The step 20 is reinforced by ribs 22 distributed over the periphery.

At its outer end, seen on the right in Fig. 1, the axle stump 12 has a section 24 whose cross-section differs from that of the even hollow cylinder. Viewed from a position 26, which constitutes the beginning of section 24, the outer diameter of this section initially widens slightly outwards. From position 26 to the end of the axle stump four partial sections 28, 30, 32, 34 follow on consecutively with different shapes and different diameters. The first part-section 28 is cylindrical on the outside and the inside, whilst the second section 30 tapers on both the outside and the inside towards the middle line 36 of the axle stump. The next part-section 32 is again cylindrical on the outside and the inside, but its diameter is smaller than the axle stump 12. Finally, the last part-section 34 is in the form of an outwardly directed hook angled away from the end of the axle stump.

Furthermore, the entire section 24 is divided into four segments or tongues 40, 42 distributed over the periphery by means of four slits 38 contrived parallel to the axle and arranged in a cross. If a suitable plastic is used, the tongues can be pressed together like a spring.

In front of the end of the axle stump 12, i.e. to the right thereof in Fig. 1, a cylindrical stopper is shown which is designated by 44 and which is connected with the axle stump 12 by means of thin stems (not shown). In this manner the wheel, axle stump and stopper 44 can be injection-moulded together. More details about the shape and the function of the stopper will be given later on in conjunction with Fig. 6.

Fig. 2 shows a tyre for the rim 10 of Fig. 1, which is made from an elastomeric material and can be injection-moulded direct onto the rim. More details about the tyre will be given below.

A mounting barrel for the axle stump 12 and its arrangement in the bottom edge portion of a refuse bin will now be described below with reference to Figs. 3 to 5. In each of Figs. 3 to 5 a partially illustrated refuse bin is designated by 46. In its bottom edge portion the refuse bin has recesses 48 in two adjacent corners, which could also be referred to as wheel boxes. Inside these two recesses two mounting barrels 50, 52 (Figs. 3, 5 and 6) are connected with the outside of the refuse bin by a number of connecting and strengthening ribs 54, 56, 58, 60, 62 (Figs. 3 and 5). The ribs run outwards in different directions from the periphery of the mounting barrels, thereby supporting the wheels against forces from different directions. Ribs 54 and 58 extend vertically on both opposite sides of the mounting barrels 52 and run right through the entire width of the refuse bin so that they also connect the two mounting barrels with each other to provide additional reinforcement. The other ribs are set at an angle and are only as wide as the relatively restricted length of the mounting barrels.

The interaction between the mounting barrels and the axle stumps 12 will be explained in more detail with reference to Fig. 6.

Fig. 6 initially shows a wheel with rim 10 and axle stump 12, as already explained with reference to Fig. 1. A tyre 64 made of an elastomeric material as shown in Fig. 2 is disposed on the rim 10.

The mounting barrel 50 is provided on its inside end facing the other mounting barrel not shown in Fig. 6 with a peripheral bead 66, which slopes inwardly into the barrel. The form of the cross-section of this bead 66 corresponds exactly to the contour of the part-sections 30 and 32 on the outside of the axle stump 12 as described with reference to Fig. 1. Thus, when the axle stump 12 is inserted from the left in Fig. 6 into the mounting barrel 50, the hook-like part-sections 34 at the end of the axle stump 12 run up against the slope of the bead 66. This presses the hook-like segments 40, 42 of the section 24 inwards until they reach the position shown in Fig. 6, in which the hooks of the outer part-sections 34 engage lockingly behind the end surface of the mounting barrel 50 resp. the bead 66. In this position the axle stump 12 is locked in position in the mounting barrel 50 without any further measures needing to be taken.

The stopper 44 already briefly mentioned in connection with Fig. 1 serves as a way of additionally securing the axle stump 12 in place. This stopper is only connected with the axle stump 12 via short stems (not shown). On the outside periphery of the end nearest axle stump 12, the stopper has a peripheral bead 68 that is sloped on both sides, and at its other, outer end it has a crown 70 that projects outwardly like a flange.

If the stopper 44 is pushed towards and into the axle stump, then segments 40,42 first run up against the sloping bead 68 of the stopper 44, until this bead reaches the inside of the part-section of the axle stump 12 designated as 30 that tapers like a cone in the direction of the stopper. The bead 68 engages behind this sloping surface of part-section 30. At the same time, the crown 70 abuts from outside against the end of axle stump 12. In this position, it is impossible for the stopper to be pulled out, or even to fall out. Segments 40,42 of the axle stump can no longer be pressed together so that the wheel is permanently secured with the axle stump in the mounting barrel 50.

Fig. 6 also shows a relatively thin intermediate barrel 72 which lies between the inside of the mounting barrel 50 and the outside of the axle stump 12 and extends beyond the length of the mounting barrel to the hub 16 of the wheel. This intermediate barrel 72 is made from a harder material than the other parts of the refuse bin and thereby serves to strengthen and reinforce the axle stump 12, but also has good non-stick characteristics in relation to the adjoining plastic of the axle stump and/or the mounting barrel. A suitable metal could be used, as could a plastic which is stronger than the plastic used for the bin, e.g. a plastic with a high self-strengthening modulus.

As can also be seen in Fig. 6, the intermediate barrel is supported in the axial direction on the one hand by means of a flanged edge on the hub 16 (not shown) and, on the other hand, on the step formed in position 26 on the outside of the axle stump.



PATENT CLAIMS

1. Refuse bin made of plastic in the approximate shape of a standing cylinder with a hinged lid and two wheels mounted coaxially to each other in recesses in the bottom portion of the refuse bin, connected with axle stumps, **characterized** in that mounting barrels (50,52) are provided inside the recesses (48), which are connected via a number of ribs (54,56,58,60,62) in one piece with the refuse bin, and in that together, the axle stumps (12) of the wheels and the mounting barrels (50,52) form a locking mechanism to axially lock the axle stumps in place.
2. The refuse bin of claim 1, **characterized** in that the end portions of the axle stumps (12) are divided into segments (40,42) by slits (38) contrived parallel to the axle and, viewed in a longitudinal cross-section, form outwardly projecting, harpoon-like hooks (30,32,34) at the outer ends.
3. The refuse bin of claim 1 or 2, **characterized** in that the opposite ends of the mounting barrels (50,52) have a short section whose inside diameter decreases in line with an inclined step that forms an inwardly directed bead (66).
4. The refuse bin of one of the preceding claims, **characterized** in that the axle stumps (12) are hollow-cylindrical and at their ends in the vicinity of the harpoon-like hooks (30,32,34), they have a section (24) whose inside diameter decreases in line with a sloping stage, and in that there is one stopper (44) for pushing into the end of each axle stump, which has, on the outside of its leading edge, a peripheral bead (68) that is sloped on both sides, and a flange-like outwardly protruding crown (70) at the opposite end.
5. The refuse bin of claim 4, **characterized** in that the stopper (44) is connected as one piece with the axle stump (12) via at least one connecting stem in a position in front of the end of the axle stump.
6. The refuse bin of one of the preceding claims, **characterized** in that arranged between the axle stump (12) and the inside of the mounting barrel (50,52) there is an intermediate barrel (72) made from a material that is harder and stiffer than the plastic of the refuse bin, with non-stick characteristics with respect to the plastic of the refuse bin, in particular a metal.
7. The refuse bin of claim 6, **characterized** in that the intermediate barrel (72) is made from a self-strengthened plastic.

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8. The refuse bin of one of the preceding claims, **characterized** in that the mounting barrels (50,52) are connected inside the recesses (48) in one piece with the outside of the refuse bin by means of ribs (54,56,58,60,62).

9. The refuse bin of claim 8, **characterized** in that there are two vertical ribs (54,58) on both sides of the mounting barrels to absorb vertical forces and in that the ribs (54,56) are extended into plates that run along the entire transverse direction, linking the two mounting barrels at the same time.

10. The refuse bin of claim 9, **characterized** in that there are other ribs (56,60,62) arranged at an angle in relation the vertical ones between the mounting barrels (50,52) and the outside of the refuse bin to absorb horizontal forces.

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