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(71) Applicant: **Jakor, s.r.o.**
093 02 Vranov nad Topl'ou (SK)

(72) Inventors:
- **Dzurenda, Stefan**
  080 01 Presov (SK)
- **Mandul'ak, Jan**
  093 01 Vranov nad Topl'ou (SK)

(74) Representative: **Vojcik, Peter**
Razusova 28
040 01 Kosice (SK)

(54) Tank with balance weight and manufacturing method for the same

(57) The invention relates to the tank with balance weight and manufacturing method for the same using moulding of balance weight segments during the tank production process by injection moulding of thermoplastics namely without need of using of fasteners or a separate operation in the assemblage process of the tank for example tank of drum washing machines, dryers or centrifuges, in the household appliances industry. Another solution according the invention is division of balance weight onto several equal segments and by this way is there is better elimination of tank imbalance.

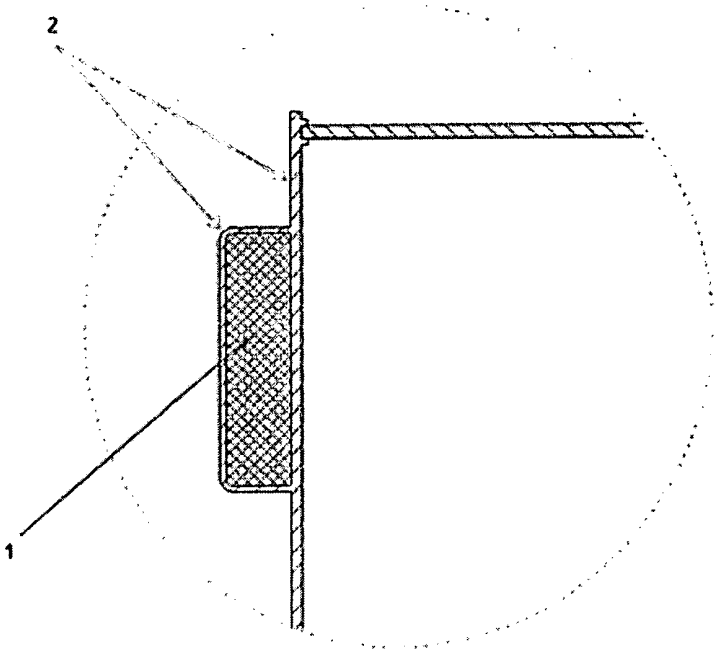

Fig. 3

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Description

[0001] The present invention relates to the tank with balance weight and manufacturing method for the same without need of using of fasteners or a separate operation in the process of assembly of the tank for example tank of drum washing machines, dryers and centrifuges, in the household appliances industry.

[0002] The balance weights are used for compensate of imbalances in a rotating drum washing machines, dryers or centrifuges in the production of automatic washing machines and dryers, what ensures stability of the machine or dryer during washing or drying cycle, especially during the centrifuging. These balance weights manufactured by different ways are primarily fixed to the tank by fasteners as separate operation in the assembly of washing machines, dryers and other equipment operating on the principle of centrifuging. Currently used methods for fixation of balance weights in the washing machine sets principally based on the typology of the material used in their manufacture. The concrete weights are fixed to the tank by fasteners such as screws, expansion pins, washers or another in a separate operation in the assemblage process of washing machine on the production lines of white goods manufacturers. For example the solution of balance ring attachment in an automatic washer is described in Patent Application No. US5765404. According the Patent Application No. KR100182732 named The Dynamic Balancing Apparatus for Clothes Washer, there is containing a balancing medium such as a liquid or balls entrained in a liquid, but disadvantage of this solution is the using only on vertical axis. There is the solution according the Patent Application No. CN 1521317 which described the balancing block mechanism for drum washing machine installed at the outer front mouth of water tank of common tumble washer or tumble washer with stove function. The balance block structure includes one first balance block with front part capable of setting drying pipe, second balance block thicker than and set symmetrically to the first one, and one third balance block set to ends of the first one to make up the weight of the first one to equalize the second one.

[0003] Disadvantages of present state of art relieves the present solution, the tank with balance weight and manufacturing method for the same, which lies in the balance weight forcing-in by liquid plastic already at a stage in the manufacture of tanks or its components when the tank is made up of several parts. The additional solution is the division of balance weight onto several smaller segments. The production process which is used for tanks manufacture is injection moulding of thermoplastics, which uses injecting moulding of molten thermoplastic into a metal mould under pressure and its subsequent cooling in the form, thereby achieving the desired shape of the moulding ie. tank. Since the cooling of the thermoplastic in the form, and out of it too, there is the additional shrinkage ie. resize, so the disposition of balance weight into several segments to eliminate internal stresses in the tank which is generated during cooling.

[0004] The balance weight segments are automatically (by robot), or manually inserted into the cavity. The balance weight segments position as the inserts provide the bearing surface and the spacers, which are fixed their position in thermoplastic form. The molten thermoplastic which is filling the cavity of form is bringing under pressure into the form through the inlet system. The segment of balance weight is wrapped in by plastic in this way and it becomes part of the tank or its parts as the insert. The traces of the contact pins on the insert of balance weight segment are possible to eliminate by precisely timed withdrawal, for example by hydraulic system in the stage of thermoplastic filling of cavity of form.

[0005] After thermoplastic forcing-in into the form and cooling there is involved the opening form and subsequent releasing of the tank moulding or its components by the ejection system. The balance weight segments are already after forcing-in by plastic and they create the compact unit together with the tank or tank components which does not require further operation in terms of balance weight tack.

[0006] The advantage of the present solution of the tank with balance weight and manufacturing method for the same according the invention is the elimination of assemblage operation of balance weights onto the tank or its components for example of automatic washing machines or dyers, the savings of fasteners which are needed to assembly of balance weights onto the tank or its components for example of automatic washers. Another advantage of solution according invention lies in the fact that the method of balance weight forcing-in removes the problem with recessed handles weights and subsequent vibration which are the critical point in terms of strength during the station of tank drum. The possibility of better distribution on the tank area individually is obtained by the division of balance weight onto several equal segments and by this way there is better elimination of imbalance which is generated by the rotation of the drum machine tank or other rotating equipment. The division of balance weight onto several independent segments is very important from view of production process. Demands on strength of individual balance weight segments are minimized by division of balance weight onto several independent segments with subsequent forcing-in with plastic since the individual segments are loaded in proportion to their weight by centrifugal forces of tank rotation for example tank of washing machine drum or centrifugal machine.

[0007] Embodiments of the present invention with now are described, by way of example, with reference to the accompanying drawings in which:

Figure 1 shows a front view of an embodiment of a tank with balance weight and manufacturing method for the same according to the present invention.

Figure 2 shows a transverse section of side view of an embodiment of a tank with balance weight and manufacturing method for the same according to the present invention.

Figure 3 shows a detail of an embodiment of a tank with balance weight and manufacturing method for the same according to the present invention.

[0008] The tank with balance weight and manufacturing method for the same according to figure 1, 2 and 3 consist of the balance weight segment 1 which is automatic (by robot) inserted into a form cavity. The position of balance weight segment as a moulding in the thermoplastic form is provided by the bearing surface and the spacers, which are fixed its position. Consequently, it is possible to close the form and prepared it for injection of molten thermoplastic. The molten thermoplastic which is filling the cavity of form is bringing under pressure into the form through the inlet system. The balance weight segment 1 is wrapped in by plastic in this way and it becomes part of the tank 2 or its parts as the insert. The traces of the contact pins on the insert of balance weight segment 1 are possible to eliminate by precisely timed withdrawal, for example by hydraulic system in the stage of thermoplastic filling of a form cavity. After thermoplastic forcing-in into the form and cooling there is involved the opening form and subsequent releasing of the tank 2 moulding or its components by the ejection system. The balance weight segment 1 is forcing-in by plastic and they create the compact unit together with the tank 2 or tank components which does not require further operation in terms of balance weight tack.

[0009] Tank with balance weight and manufacturing method for the same according to figure 1 consist for example of the 12 balance weight segments 1 which are manually or automatic (by robot) inserted into a form cavity determined for production of the tank 2 or its components by thermoplastic process. The position of balance weight segment as a moulding in the thermoplastic form is provided by the bearing surface and the spacers, which are fixed its position. Then the form is closed and prepared for injection of molten thermoplastic. The molten thermoplastic which is filling the cavity of form is bringing under pressure into the form through the inlet system. The balance weight segments 1 are wrapped in by plastic in this way and they become a part of the tank 2. After thermoplastic forcing-in into the form and its cooling there is involved the opening the form and subsequent releasing of the tank 2 moulding or its components. The balance weight segments 1 are already forcing-in by plastic and together with the tank 2 of washing or centrifugal machine or its components they create the compact unit which does not require further operation.

List of reference signs

[0010]

1. The balance weight segment
2. The tank

Claims

1. The tank with balance weight and manufacturing method for the same for damping of unwanted mechanical vibrations of washing and centrifugal machine **characterized in that** consists of at least one at the same time forcing-in and moulding balance weight segment (1) in the tank (2) or its components to form a solid unit.

2. The tank with balance weight and manufacturing method for the same according to claim 1, **characterized in that** consists of at least two moulding balance weight segments (1) for example by injection moulding of thermoplastics in the tank (2) or its components.

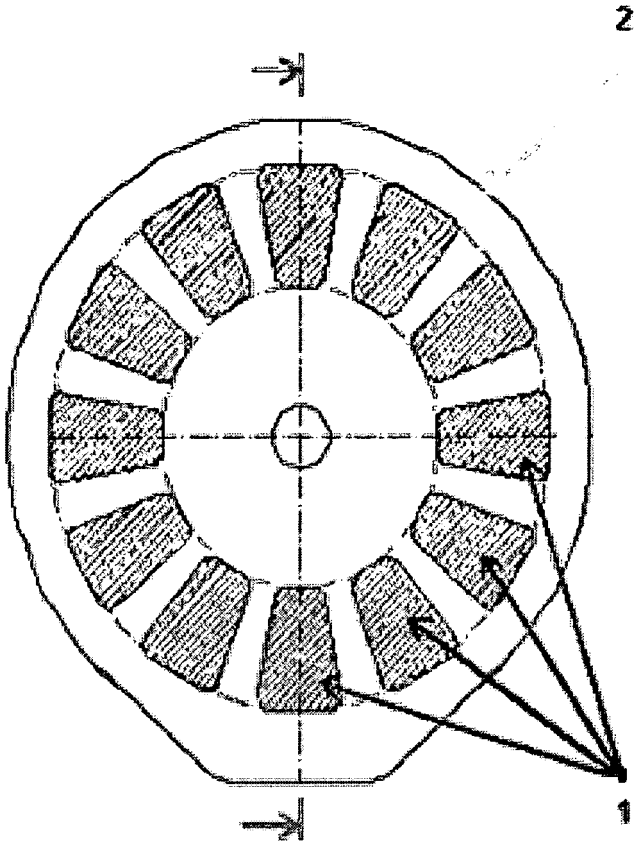

Fig. 1

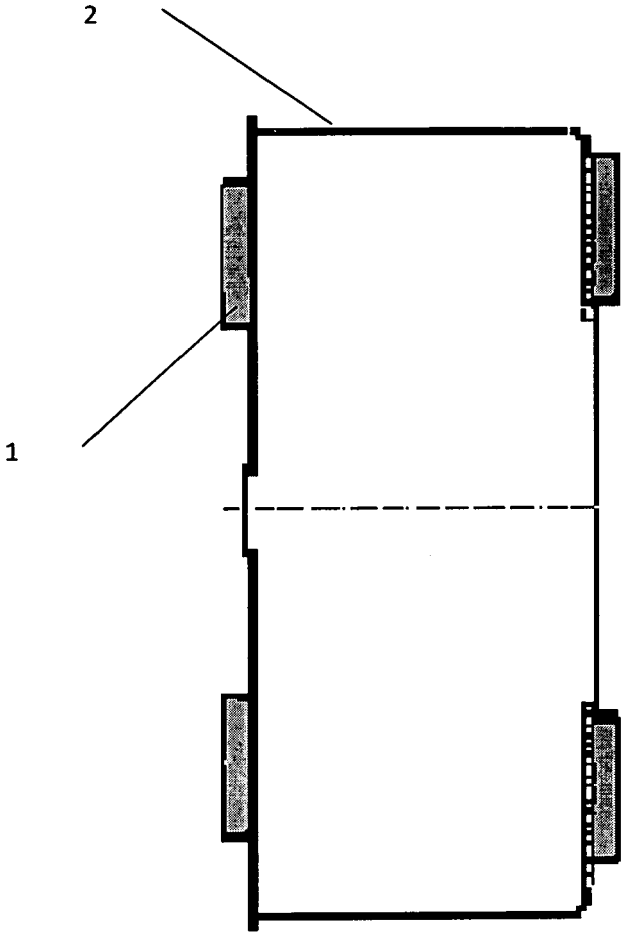

Fig. 2

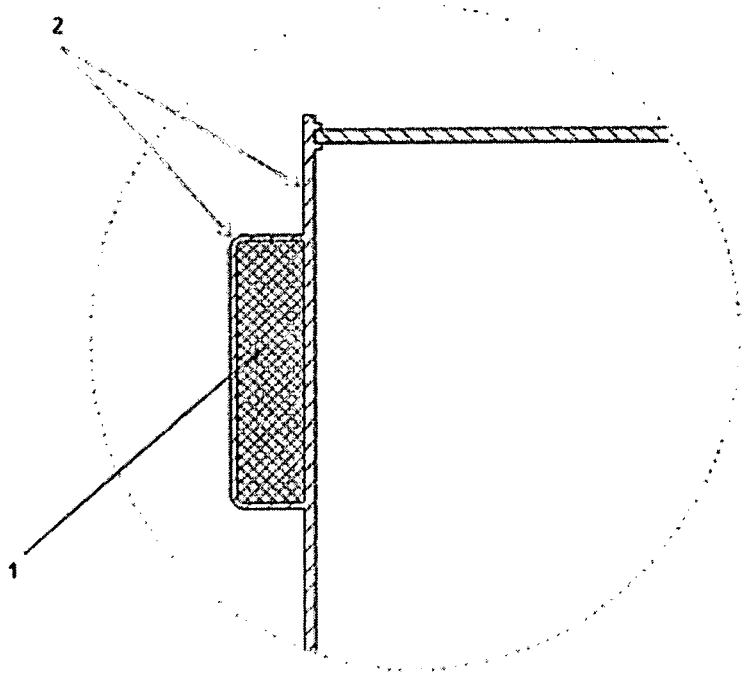

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5765404 A **[0002]**
- KR 100182732 **[0002]**
- CN 1521317 **[0002]**