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⑴ Applicant: **Zanussi Elettrodomestici S.p.A., Via Giardini Cattaneo, 3, I-33170 Pordenone-C.P. 147 (IT)**

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⑵ Inventor: **Plal, Dino, Via Parrilla 4, I-31015 Conegliano Treviso (IT)**

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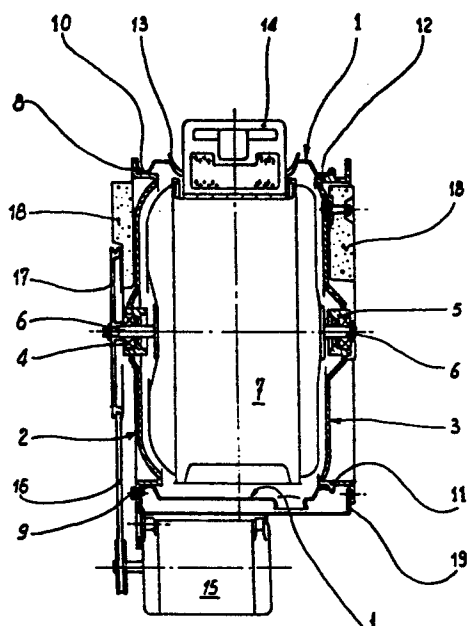
⑶ Representative: **Patentanwälte Grünecker, Kinkeidley, Stockmair & Partner, Maximilianstrasse 58, D-8000 München 22 (DE)**

㉕ **Composite structure tub for a washing machine of the radial-loading type.**

㉖ A tub for a washing machine comprises a circumferential metal wall (1) formed with a loading opening (13) and sealingly cooperating with opposite disc-shaped end walls (2,3) made of a plastic material.

The end walls incorporate respective support bearings (4, 5) for a drum (7) mounted for rotation about a horizontal axis (6).

One end wall (3) is preferably circumferentially welded to the rim of the circumferential wall (1).



**EP 0 212 259 A2**

1 Composite Structure Tub for a Washing Machine  
of the Radial-Loading Type

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Description

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The present invention relates to a tub for a laundry washing machine with a drum mounted for rotation about a horizontal axis and adapted to be loaded from above, that is, through the circumferential walls of the drum and the  
10 tub.

Already known are tubs for washing machines of a composite structure consisting of metal and plastic components to thereby combine the advantages of the mechanical strength  
15 of the metal components with the advantages of the sealing capability and resistance to corrosion typical for plastic components. In practice, however, tubs of this type are usually of an undesirably complicated construction,

A composite tub having a relatively simple structure is  
20 described for instance in GB-PS 1,555,746. Basically this tub is formed of a circumferential wall of a plastic material sealingly cooperating with two disc-shaped end walls made of metal. The various components are secured to one another by means of tension bolts extending between  
25 the two end walls.

This solution also presents a number of shortcomings. In the conventional manner, the heater elements for heating the washing liquid are disposed in proximity to the circum-  
30 ferential wall of the tub, that is, close to a plastic component which should be protected against overheating. This entails the necessity of providing the machine with suitable electric circuits or similar safety components for ensuring adequate protection of the tub against over-  
35 heating. As a result, the overall construction of the machine becomes undesirably complicated. Moreover, the reliable assembly of the circumferential wall with the end walls requires the employ of separate fastener means,

1 specifically, tension bolts, the elimination of which would  
result in a desirable simplification of the construction.

It is thus an object of the present invention to provide  
5 a tub for a washing machine of the radial-loading type  
having a composite structure including components of  
different materials, to result in a particularly rational  
and reliable construction and notably simplified assembly.

10 This object is attained according to the invention by a  
tub for a washing machine having a circumferential wall  
formed with a loading opening and sealingly connected to  
a pair of opposite substantially disc-shaped end walls  
incorporating respective support bearings for a drum  
15 mounted for rotation about a substantially horizontal axis.

This tub is basically characterized in that the circum-  
ferential wall is made of metal while the two end walls  
are made of a plastic material. Preferably at least one  
of the end walls is circumferentially welted to the  
20 respective rim of the circumferential wall.

The characteristics and advantages of the invention will  
become more clearly evident from the following description,  
given by way of example with reference to the accompany-  
25 ing drawings, wherein:

fig. 1 shows an axial sectional view of the tub according  
to the invention, in combination with various  
operating components of a washing machine,  
30 figs. 2 and 3 show on an enlarged scale respective details  
of the tub of fig. 1 in a preferred embodiment.

With reference to fig. 1, a tub is substantially composed  
of a circumferential wall 1 made of a metal, preferably  
stainless steel, the opposite rims of which sealingly  
35 cooperate with respective disc-shaped end walls 2 and 3  
made of a plastic material and incorporating bearings 4  
and 5, respectively, for rotatably supporting a horizontal  
shaft 6 of a washing drum 7. In a per se known manner, the

- 1 top portion of circumferential wall 1 is provided with a loading opening 13 giving access to the interior of drum 7 after opening a loading hatch 14. Drum 7 is adapted to be rotated by a driving motor 15 secured to end walls 2 and 5 3 by means of a support bracket 19. The driving power of motor 15 is transmitted by a belt 16 cooperating with a pulley 17 fixedly secured to shaft 6 at the side of the tub corresponding to end wall 2.
- 10 In particular, and also with reference to fig. 2, end wall 2 is foremd with an offset rim portion 8 which is secured to the respective rim of circumferential wall 1 by means of bolts 9 or the like, with the interposition of a sealing gasket 10.
- 15 With reference to fig. 3, end wall 3 is preferably formed with a rim portion 11 of increased wall thickness along which it is welted to the respective rim of circumferential wall 1, with a sealing gasket 12 interposed therebetween. In this context it is to be noted that the welt is executed 20 with a relatively great radius to thereby minimize the stress occurring in circumferential wall 1 at the location of the welt connection.
- Sealing gasket 12 is accommodated in a groove 20 of rim 25 portion 11 and is eslastically compressed in the radial direction by an annular bead 21 formed in circumferential wall 1 adjacent the respective rim. Bead 21 is preferably formed simultaneously with the welting of circumferential wall 1 onto end wall 3.
- 30 The elastic compression of sealing gasket 12 by annular bead 21 ensures a liquid-tight seal between the metallic circumferential wall 1 and plastic end wall 3 irrespective of the different thermal expansion coefficient of the two 35 components, even when the tub is subjected to relatively high thermal loads. In addition, the elastic compression of sealing gasket 20 compensates any tolerances and/or imperfections of the contact surfaces between circumferential wall 1 and end wall 3.

1 Similar to the bolted end wall 2, the welt-connected end wall 3 is preferably likewise provided with an integrally formed annular outer rim portion 22.

5 Annular rim portion 22 projects radially outwards and is formed with seats 23 or the like adapted to receive fastener means 24 for securing operating components of the machine.

10 The annular outer rim portion 22 may thus be used for instance for securing thereto bracket 19 for supporting motor 15, brackets for the suspension of the tub by means of resilient elements, friction shock dampener plates and the like. Annular rim portion 22 may additionally be used for securing thereto a per se known device for tensioning  
15 transmission belt 16.

The tub according to the invention offers various advantages deriving from the above explained characteristics. In particular, the incorporation of bearings 4, 5 in the  
20 plastic end walls 2 and 3, respectively, results in a structural continuity between the bearings and circumferential wall 1. The latter has the only function of containing the washing liquid and is not subjected to any substantial mechanical stress, so that it can be made of  
25 stainless steel sheet of minimum thickness. On the other hand, circumferential wall 1, being made of metal, does not present any overheating problems otherwise resulting from the operation and the conventional positioning of the heater elements (not shown for the sake of clarity).

30 At the same time, the metallic circumferential wall 1 acts as the only support element for end walls 2 and 3, without the necessity of tension bolts or the like.

35 On the other hand, the end walls, being made of a plastic material, are particularly suited for incorporating in a per se known manner various functional elements such as means for anchoring the suspension springs of the laundering assembly, pressure sensing outlets for pressure switches, support means for equilibration weights 18, and the like.

1 The descibed washing tub may obviously undergo numerous  
modifications. Pulley 17 may thus be disposed adjacent  
end wall 3, so that the opposite end wall 2 can be  
readily dismantled for giving access to the interior of  
5 the tub. Likewise, the bolts 9 securing end wall 2 to  
circumferential wall 1 may be replaced by an annular  
channel-section clamping member.

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GRUNECKER, KINKELDEY, STOCKMAIR &amp; PARTNER

PATENTANWALTE  
EUROPEAN PATENT ATTORNEYS

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A GRUNECKER DPL. ING.  
DR. H. KINKELDEY DPL. ING.  
DR. W. STOCKMAIR DPL. ING. AEE, ICA, TECH.  
DR. K. SCHUMANN DPL. PHYS.  
P. H. JAKOB DPL. ING.  
DR. G. BEZOLD DPL. CHEM.  
W. MEISTER DPL. ING.  
H. HILGERS DPL. ING.  
DR. H. MEYER-PLATH DPL. PHYS.  
DR. M. BOTT-BODENHAUSEN DPL. PHYS.  
DR. U. KINKELDEY DPL. BIOL.5 Zanussi Elettrodomestici S.p.A.  
Via Giardini Cattaneo, 3  
33170 Prodenone-C.P. 147

I t a l y

\*LICENCE EN DROIT DE L'UNIV. DE GENÈVE

8000 MÜNCHEN 22  
MAXIMILIANSTRASSE 56

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EP 2978

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20 Composite Structure Tub for a Washing Machine  
of the Radial-Loading TypePatent Claims:

25 1. A tub for a washing machine having a circumferential wall formed with a loading opening and sealingly connected to a pair of substantially disc-shaped end walls incorporating respective support bearings for a drum mounted for rotation about a substantially horizontal axis,  
30 characterized in that said circumferential wall (1) is made of metal while the two end walls (2, 3) are made of a plastic material.

35 2. A tub according to claim 1, characterized in that said circumferential wall (1) is formed with at least one annular bead (21) adjacent its end for resiliently compressing a sealing gasket (12) interposed between said circumferential wall and a respective end wall (3) connected thereto as by welting.

1 3. A tub according to claim 1, characterized in that  
said welt-connected end wall (3) comprises an integrally  
formed substantially annular rim portion (22) projecting  
radially therefrom and formed with seat means (23) adapted  
5 to receive fastener means (24) for securing operating  
components (25, 26) of the machine.

4. A tub according to claim 1, characterized in that at least one  
of said end walls (2, 3) is circumferentially welted to the rim of  
10 said circumferential wall (1).

5. A tub according to claim 1, characterized in that each of  
said support bearings (4, 5) is incorporated in a respective one  
of said plastic end walls (2, 3).

15 6. A tub according to claim 1, characterized in that said welt-  
connected end wall (3) comprises an enlarged rim portion adapted to  
cooperate with the rim of said metallic circumferential wall (1).

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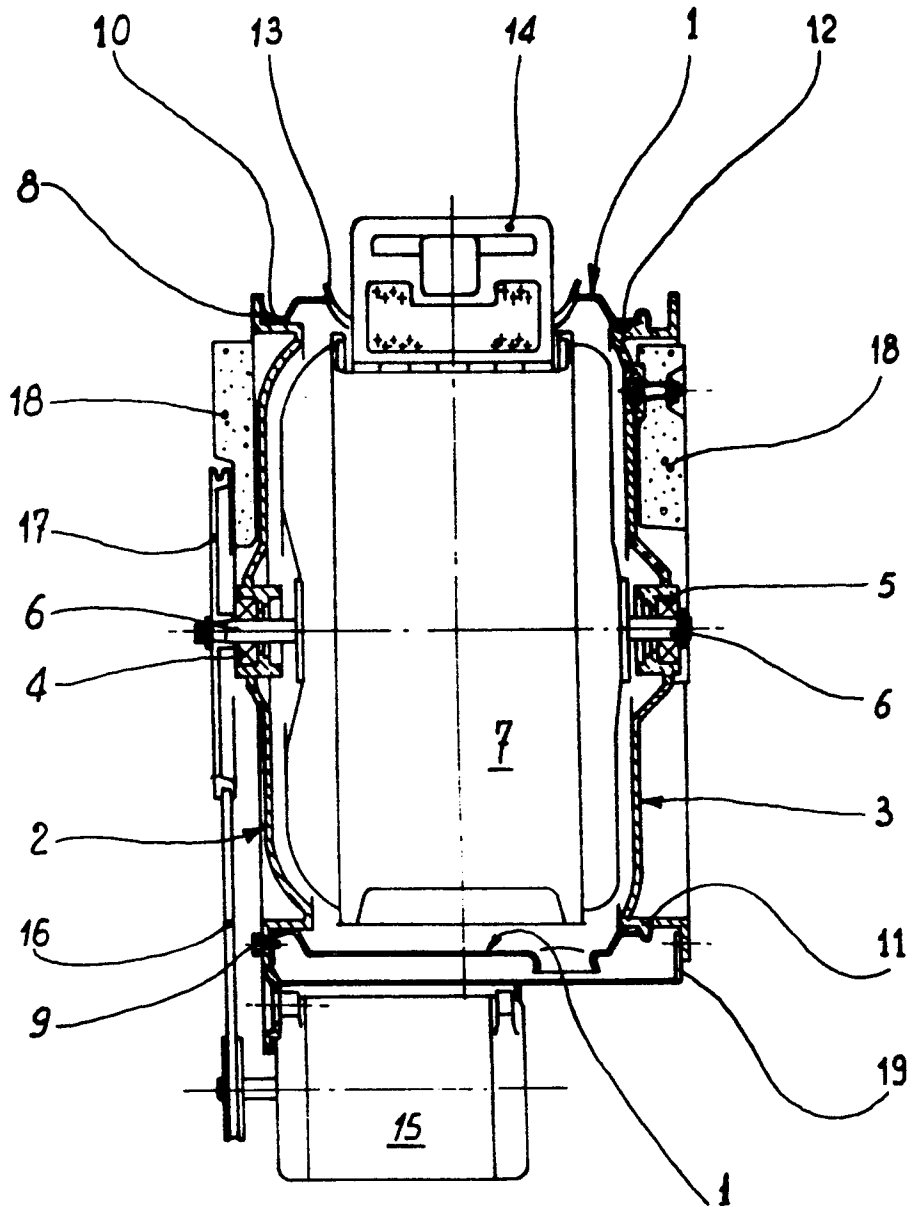
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FIG. 1

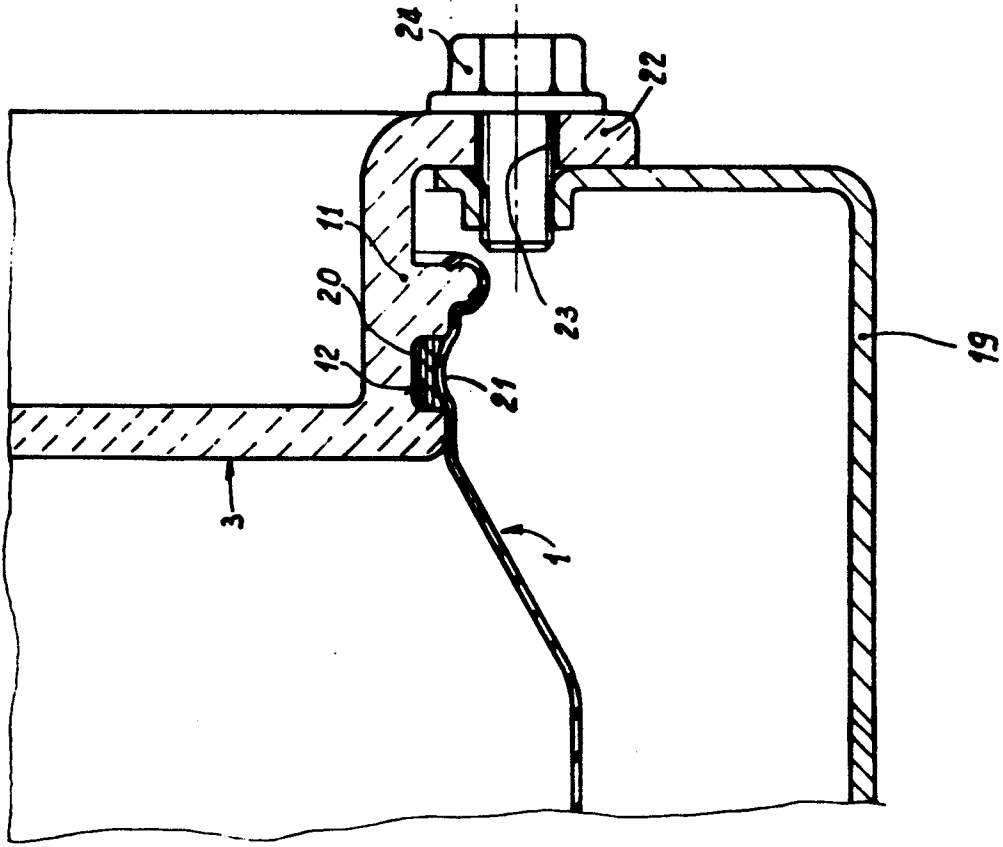


FIG. 3

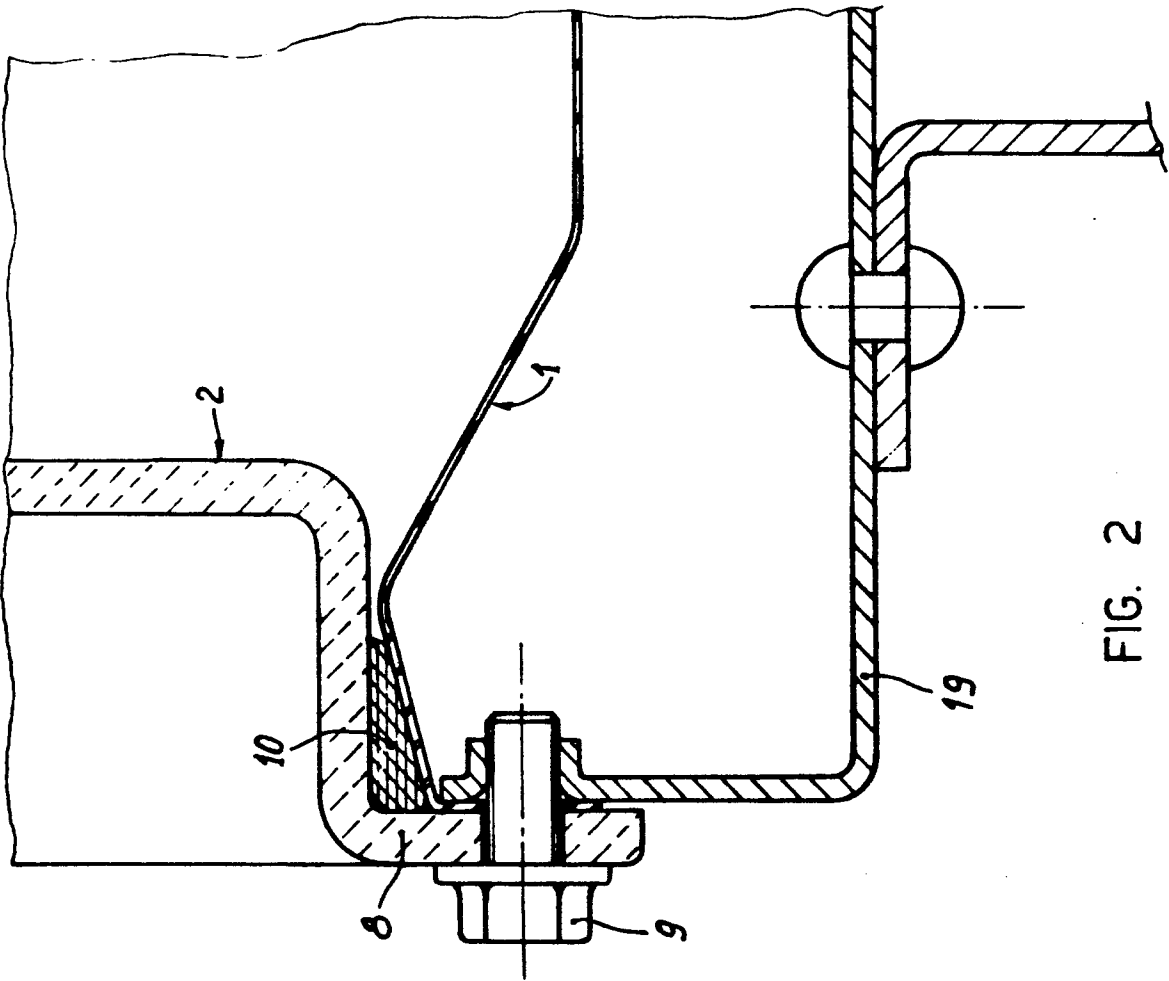


FIG. 2