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(71) Applicant
Industrie Zanussie S.p.A

(Incorporated in Italy)

Via Giardini Cattaneo 3, 33170 Pordenone, Italy

(72) Inventor
Luciano Lorenzetti

(74) Agent and/or Address for Service
J A Kemp and Co
14 South Square, Gray's Inn, London, WC1R 5LX,
United Kingdom

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(54) **Laundry washing machine with ballasted tub**

(57) A domestic front loading laundry washing machine comprises a tub formed by a cylindrical body closeable by a front wall provided with an opening for access to the drum and with a ballast mass of cement or other suitable heavy material, said front wall being formed by a moulded plastics flange in the form of a continuous hollow ring provided with a plurality of radial ribs projecting from the bottom surface of said ring and provided with a raised edge capable of being tightened by means of a clamping ring and with the interposition of a sealing member against the oppositely disposed raised edge of the cylindrical body of the tub. The annular flange is also provided with a front closure surface produced in one piece with same at a position spaced from said bottom surface and delimiting said radial ribs in such a way as to define corresponding closed cavities, and said ballast mass is accommodated in said closed cavities preferably by means of the plastics material being injected around the cement mass itself.

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Fig.1.

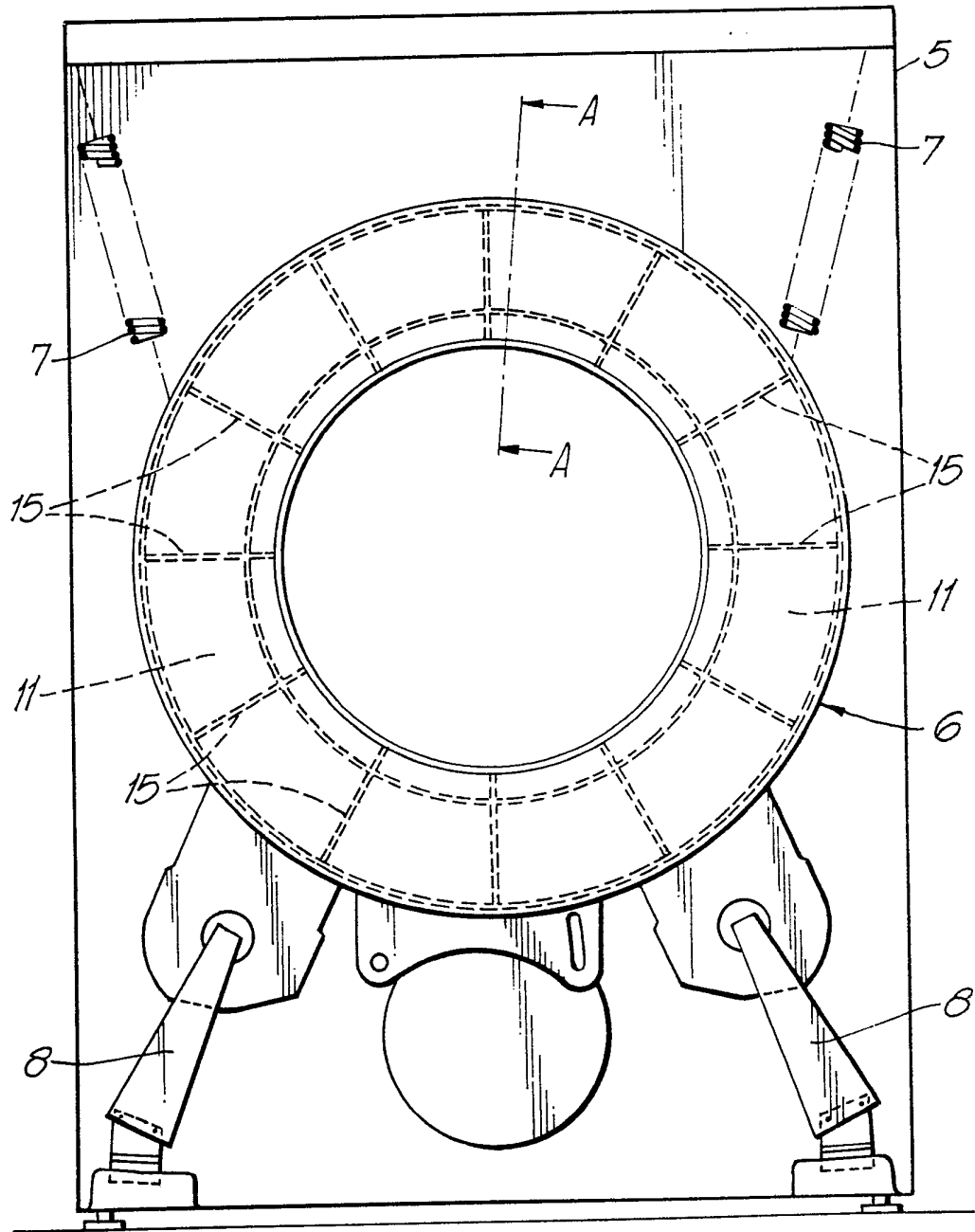


Fig.2.

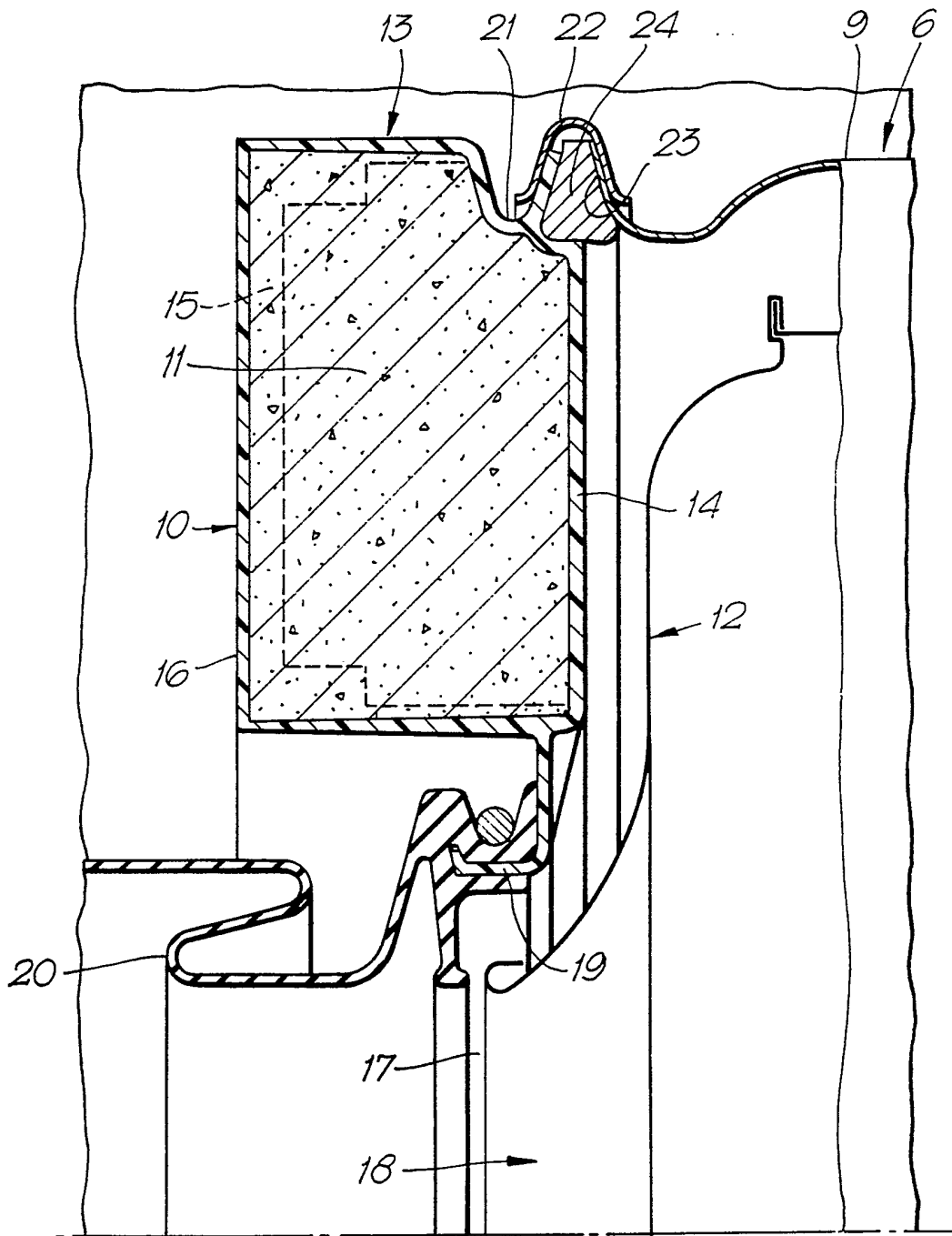
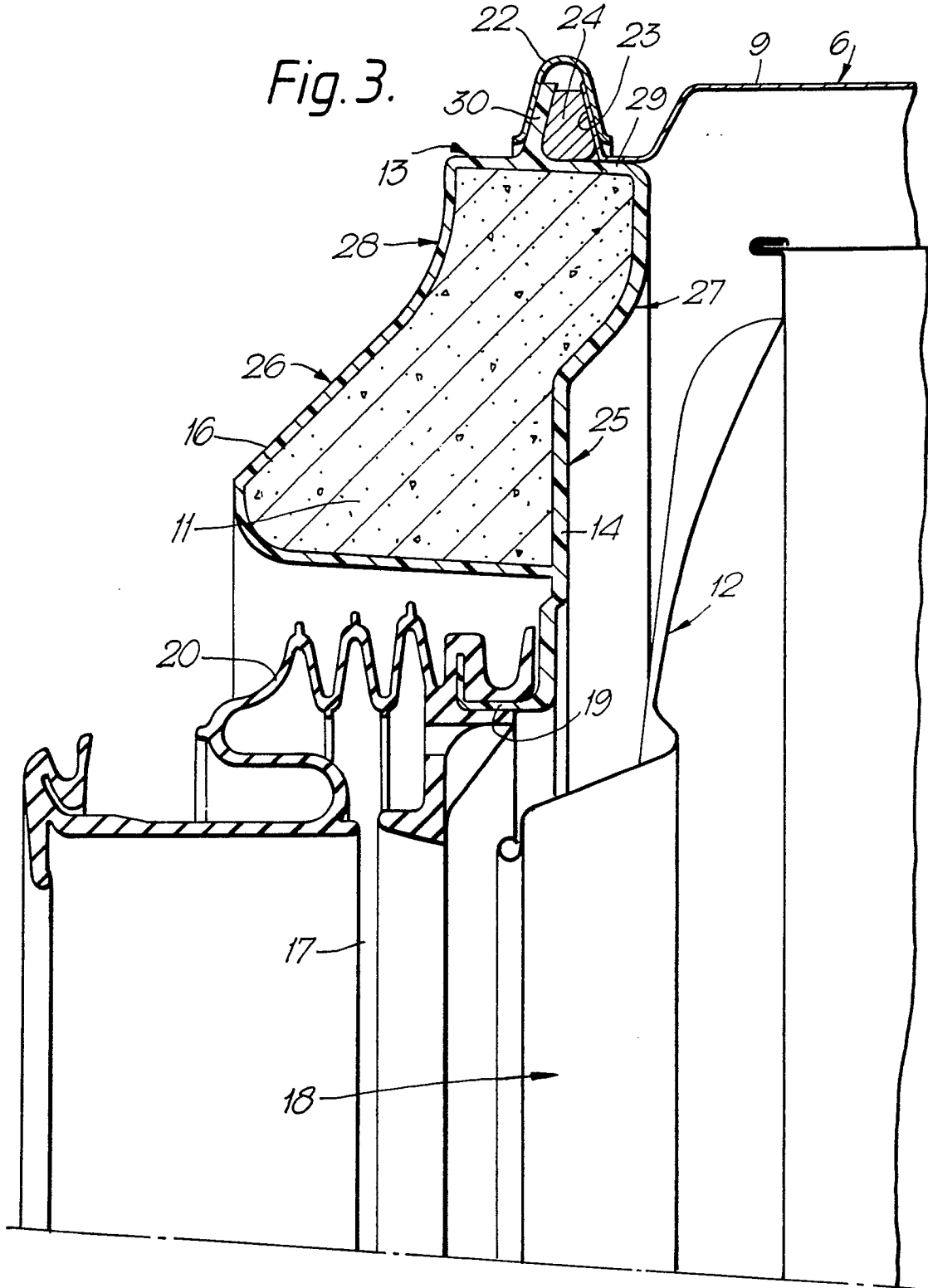


Fig. 3.



LAUNDRY WASHING MACHINE WITH BALLASTED TUB

The invention concerns a domestic front loading laundry washing machine provided with a tub which is
5 ballasted to increase its inertia.

Laundry washing machines with ballast weights applied to the tub in various ways are known.

In particular, in one form, the ballast is formed by a block of cement which has been prepared previously or
10 by masses of heavy material of different kinds, which are fixed to the front wall of the tub of the associated machine by removable elements such as screws, bolts, nuts and washers or the like.

In addition, in accordance with a further design
15 configuration, the ballast is formed by a moulded plastics material flange forming the front wall of the tub and in the form of a continuous hollowed-out ring of U-section which is capable of containing a mass of cement, said flange being further provided with a plurality of radial ribs
20 disposed at positions corresponding to the front open surface of the flange, for the purposes of retaining the mass of cement which is cast in the cavity defined between the continuous ring and the respective radial ribs.

Subsequently the flange with incorporated cement
25 ballast is fitted against the curved edge of the cylindrical casing of the tub by means of a clamping ring which is introduced into the corresponding peripheral groove in the flange, with the interposition of a sealing member.

However, the ballast arrangements provided in that
30 way suffer from some disadvantages.

In the first case the presence of various fixing elements means that the ballast is of a complicated construction and results in assembly of the tub being a difficult and impractical operation.

35 In the second case on the other hand, because of

the vibrations produced during operation of the machine and due to shrinkage phenomena of the cement in the associated mountings, that assembly can suffer from undesirable detachment of the cement masses from the mounting seats, with the result that pieces thereof drop off outside the flange.

Therefore the aim of the present invention is to eliminate the above described disadvantages in a laundry washing machine with a ballasted tub which is designed in such a way as to ensure effective and secure support for the cement ballast mass and in addition to permit easy and rapid fitting of the ballast to the front wall of the tub.

According to the present invention, there is provided a domestic front loading laundry washing machine comprising a tub formed by a cylindrical body closeable by a front wall provided with an opening for access to the drum and with a ballast mass of cement or other suitable heavy material, said front wall being formed by a moulded plastics flange in the form of a continuous hollow ring provided with a plurality of radial ribs projecting from the bottom surface of said ring and provided with a raised edge capable of being tightened by means of a clamping ring and with the interposition of a sealing member against the oppositely disposed raised edge of the cylindrical body of the tub, wherein said annular flange is also provided with a front closure surface produced in one piece with same at a position spaced from said bottom surface and delimiting said radial ribs in such a way as to define corresponding closed cavities, and said ballast mass is accommodated in said closed cavities, preferably by means of the plastics material being injected around the cement mass itself.

The invention will be more clearly apparent from the following description given solely by way of non-limiting example and with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic front view of a laundry washing machine provided with a ballasted tub according to the invention;

Figure 2 is a view on an enlarged scale of the machine shown in figure 1, partly in section taken along line A-A, in a first embodiment; and

Figure 3 shows the machine illustrated in figure 1, partly in section taken along line A-A and in a second embodiment.

Referring to figure 1, the domestic laundry machine according to the invention comprises a casing 5 in which there is accommodated a tub 6 which is supported in its upper part by suspension springs 7 and which is provided in its lower part with dampers 8 of per se known type.

As can be seen from figure 2, the tub 6 is formed by a cylindrical metal body 9 and a front wall 10 which is connected to the metal body 9 and which is shaped in a fashion which will be described hereinafter.

The front wall of the tub, which supports the cement ballast mass 11 which is provided to balance the tub-drum unit of the machine during actuation of the drum 12 at the respective low and high laundry washing and spin speeds is substantially formed by a flange of moulded plastic material in the form of a continuous hollow ring 13 of U-shaped section.

Provided integrally with the annular flange 13 at a position corresponding to the flat bottom surface 14 of the annular flange 13 are a plurality of radial ribs 15 which are uniformly distributed around the circumference of the above mentioned bottom surface and which project orthogonally therefrom, the radial ribs being delimited at the front by a front closure surface 16 of flat shape which is parallel to the bottom surface 14 and also made in one piece with the radial ribs 15.

That configuration defines closed internal

cavities symmetrically distributed along the annular flange 13 and forming housings for receiving the cement ballast mass 11.

5 The flange in question is also provided with a circular opening 17 which is coincident with and disposed at a small distance from the opening 18 for access to the drum 12, the circular opening being provided with a raised edge 19 to permit connection of the flexible coupling cuff 20 of the door (not shown) of the machine.

10 In order to be able to fit the front wall 10 of the above defined configuration to the cylindrical body 9 of the tub 6, provided along the whole of the external circumference of the front wall 10 is a groove 21 into which is inserted a clamping ring 22 which is tightened around the 15 peripheral edge 23 of the cylindrical body 9, with the interposition of a sealing member 24.

In practice, in order to be able to introduce the cement ballast mass 11 into the cavities provided in the annular flange 13, the cement is previously cast in 20 corresponding separate moulds (not shown) and left to harden until it is completely dry in such a way as to provide a plurality of blocks of cement of the same number and in the same shape as the cavities in the annular flange 13.

25 The blocks of cement are then introduced into the interior of the mould (not shown) for shaping the annular flange 13 in the respective positions of fitting thereof and then the flange is produced by injecting plastics material around all the cement blocks which are therefore embedded within the respective cavity accommodating same in the 30 annular flange. In that way, by virtue of the plastics material being injected over the cement after having been prepared in the manner described, it is possible to provide for effective and secure support for the cement ballast mass on the tub, avoiding shrinkage and possible movements of the 35 various blocks of cement in their respective mountings,

thereby substantially reducing the vibration of the machines which was previously due to the specific reasons, during actuation of the drum at low and high speeds in the washing and spin phases, while also eliminating any possibility of detachment of the blocks of cement from the annular flange.

In addition, that arrangement provides for quick and easy fitting of the ballast to the tub, being an aspect which also imparts practicality and convenience of use to the tub.

Finally, looking now at figure 3, shown therein is a further possible embodiment of the present ballast tub in which the annular flange 13 is of a different shape from that described above and in particular it is provided with a bottom surface 14 and a front surface 16 which are respectively formed by a flat portion 25, 26 and a curved portion 27, 28 and in which a raised edge 30 is provided along the whole of the peripheral surface 29 of the flange, which is connected to the curved surface portions 27, 28 the raised edge 30 being capable of being tightened by means of the clamping ring 22 and with the interposition of the sealing member 24 against the oppositely disposed raised edge 23 of the cylindrical body of the tub.

In this case also, as before, the blocks of cement of the ballast are embedded in the interior of the corresponding closed cavities of the annular flange 13, assuming the associated shapes thereof, in the same manner as described above.

It is also possible in accordance with the invention to use heavy materials different from cement to form the ballast, while the flange may also be shaped in a different form from that described solely by way of example, provided that those materials are nonetheless accommodated in the interior of the cavities in the flange in the manner described or by conventional working methods which are suitable for that purpose.

CLAIMS

1. A domestic front loading laundry washing machine comprising a tub formed by a cylindrical body closeable by a front wall provided with an opening for access to the drum and with a ballast mass of cement or other suitable heavy material, said front wall being formed by a moulded plastics flange in the form of a continuous hollow ring provided with a plurality of radial ribs projecting from the bottom surface of said ring and provided with a raised edge capable of being tightened by means of a clamping ring and with the interposition of a sealing member against the oppositely disposed raised edge of the cylindrical body of the tub, wherein said annular flange is also provided with a front closure surface produced in one piece with same at a position spaced from said bottom surface and delimiting said radial ribs in such a way as to define corresponding closed cavities, and said ballast mass is accommodated in said closed cavities.

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2. A washing machine according to claim 1, wherein said ballast mass is accommodated in said closed cavities by means of the plastics material being injected around the cement mass itself.

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3. A domestic front loading laundry washing machine constructed and arranged substantially as hereinbefore described with reference to and as illustrated in figures 1 and 2 or figures 1 and 3 of the accompanying drawings.