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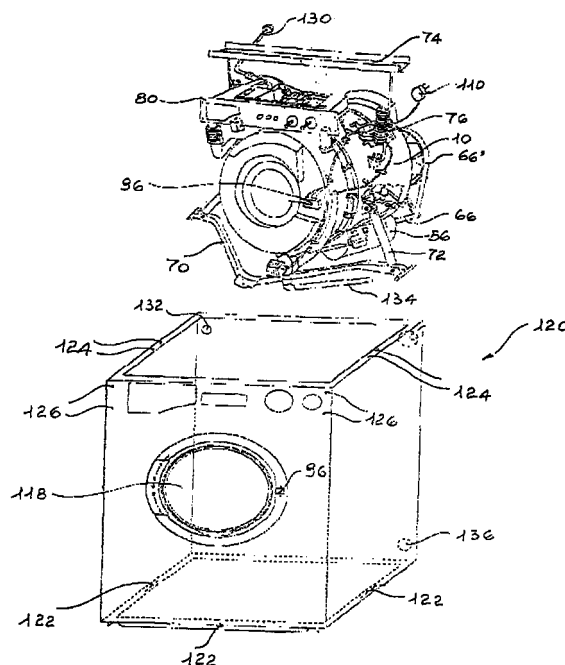
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(54) **Process for assembling washing machines**

(57) A process for assembling washing machines comprises a tub (10, 26), a rotary drum (12), mechanical components comprising a motor (56), a water discharge pump (115), elastic support means (74, 76), and shock absorbers (70, 72); electric components (62, 64), a front panel (80) wherein there are housed and fastened the activation, program and control devices (82), a detergents box (84) and an external body (120), said process comprising the following steps:

- fastening on the outer surface of tub (10, 26), wherein drum (12) is inserted, all the mechanical and electric components, an end of the elastic means (76) and of the shock absorbers (72) and the front panel (80);
- testing the so assembled washing machine;
- inserting the tested washing machine in the external body (120), and
- fastening to said external body the free ends of the elastic means (76) and of the shock absorbers (72) and the front panel (80), on prior detachment from the tub.

FIG. 14



Description

[0001] The present invention relates to a process for assembling washing machines.

[0002] More particularly, the present invention relates to a process for assembling washing machines that allows to optimize the working steps for the assembly of said machines, allowing also their testing in the assembly line, without installing and/or connecting the various mechanical and electric components to the external body or envelope.

[0003] As is known, the washing machines essentially comprise a tub, wherein the rotary drum is housed; a detergents box connected with said drum; mechanical components such as a motor for the rotation of the drum, a water pump, elastic support means, shock absorbers; electric components such as resistors, thermostats, electric cables forming the wiring, and a front panel wherein there are housed and fastened the activation, program and control means that, by opening and closing several electric contacts, cause the various mechanical respectively electric components to start operating, adjusting also the duration in the time.

[0004] These different components are enclosed in an external body, generally made from sheet, that constitutes the body of the washing machine, said components being for the most part connected to the walls of the external body. For this purpose, the latter is provided with brackets, tie-rods or fasteners that form as many anchoring points for said components, as well as elastic clutches or the like for fastening the electric cables.

[0005] During the assembly of the washing machine, the external body is fitted, as a structural component, on the tub and the other components of the washing machine are connected and fastened to said external body. As a consequence, at the end of the assembly line, the washing machine is entirely assembled, i.e., it is provided also with the external body, and in these conditions it is transferred to the testing station.

[0006] In this testing step, the most important drawbacks become obvious, mainly due to the presence of the external body. Said external body, in fact, causes the visual control by the operator of all the components housed in the inside to be difficult, so that minor water leaks cannot be seen.

[0007] In case, instead, of marked leaks or if some components do not work or work poorly, the machine must be disassembled again to a large extent or at least freed from the external body. Taking into account that the latter is a structural part of the machine and that many components are finally fastened to it, for instance by means of rivets, the operation is particularly long and laborious, markedly increasing the production costs. After the replacement or repairing of the defective component, the machine is transferred again to the assembly line in the station wherein the external body is assembled once again without any possibility of prior testing.

[0008] Apart from the above difficulties, the removal of the external body often causes the deterioration of some parts or components of the washing machine, that must therefore be replaced with a further increase in costs and waste of time.

[0009] Another drawbacks of the assembly of the washing machines according to the traditional method concerns the assembly and fastening difficulty of some components because of the presence and the bulk of the external body. The operator is often obliged to operate in uncomfortable operating conditions, having to accede to the inside of the machine through small openings, with obliged ways between the outer sheet and the internal tub.

[0010] The difficulties, besides involving an extension of the assembly times, can determine, however involuntary, an imprecise assembly or fastening of some components, with ensuing possible malfunction of the machine, which malfunction can be noticed during testing or only afterwards by the end user.

[0011] This drawback constitutes not only a remarkable inconvenience for the user, but causes also additional costs for the producer during the warranty period of the machine. Besides, this gives the impression of a poor quality production.

[0012] Object of this invention is to obviate the aforesaid drawbacks.

[0013] More particularly, object of this invention is to provide a process for the assembly of washing machines capable of optimizing the various assembly steps.

[0014] A further object of the invention is to provide a process as defined above that allows an effective control by the operator of the correct working of all the components of the washing machine during the testing step.

[0015] A further object of the invention is to provide a process for the assembly of washing machines such as to avoid complicated and expensive operations to repair the components of those machines that possibly show a malfunction during the testing step.

[0016] In its more general aspect, the present invention allows to achieve these and still other objects, that will appear from the following description, by means of a process comprising the following steps:

- fastening on the outer surface of the tub, wherein the drum is inserted, all the mechanical and electric components of the washing machine, such as counterweights, motor, pump, electric cables, feed and discharge water connections, resistors, the ends of the elastic means that support the machine, and of the shock absorbers, etc., as well as the front panel wherein there are housed and fastened the activation, program and control devices, and the detergents box;
- testing the so assembled washing machine;

- inserting the tested washing machine in an external body, and
- fastening to said external body the free ends of the elastic means and of the shock absorbers as well as the front panel and the detergents box, on prior detachment from the tub.

[0017] According to a preferred embodiment of the present invention, the tub wherein the drum is inserted comprises a front base, a back base and a cylindrical side surface, wherein the front base is provided with a central opening for the introduction of the linen and of means for fastening the front counterweights; the back base is provided with the bearings for the rotation of the drum; and the cylindrical side surface has integral fasteners for the mechanical and electric components of the washing machine.

[0018] Preferably, the tub is made up by two complementary half-shells, coupled with each other.

[0019] In particular and preferably, the assembly process of the present invention comprises the following operating steps:

- realizing two complementary half-shells, of which at least the first one is provided along its outer side surface, with integral fasteners for the mechanical and electric components, and on a base, with a central seat, wherein a bushing is inserted, and means for fastening a rear counterweight; and the second half-shell is provided, on a base, with means for fastening the front counterweight, and a central opening for the introduction of the linen;
- realizing a tub by coupling with each other said first and said second half-shells in correspondence of the respective bases not provided with fasteners, on prior insertion in the tub of a drum provided with a rotary shaft inserted in said bushing;
- positioning and fastening the front counterweight on the correspondent fasteners of the second half-shell;
- positioning and fastening the rear counterweight on the correspondent fasteners of the first half-shell;
- positioning and fastening a driven pulley on the drum shaft protruding from the first half-shell;
- fastening to the tub the motor provided with a rotary shaft, and the pump by means of the fasteners;
- inserting in the tub, on the front of the first half shell from which the pulley shaft protrudes, a resistor, capsules and related sealing and locking gaskets through corresponding calibrated openings previously obtained on said half shell on its formation;
- connecting the pulley of the drum shaft with the free end of the motor rotation shaft by means of an elastic belt;
- fastening a lower tie-rod, complete with shock absorbers, to the tub by means of the corresponding fasteners;
- fastening an upper tie-rod provided with elastic means to said tub by means of the corresponding fasteners;
- positioning, possibly provisionally, the front tie-rod of the washing machine, complete with components, wires and detergents box, on the tub, in correspondence of its upper part;
- connecting the branches and the free ends of the cables to the pump and the motor, fastening said cables through the respective fasteners or fastening seats;
- possibly, provisional fastening of the door blocking device near the tub opening;
- possibly, providing a provisional door with a strike-edge for the blocking device and putting it near, or connecting it to the opening by means of an intermediate bellows;
- electrically connecting the washing machine with the electric network through the wiring current plug, hydraulically connecting said machine to the water mains, starting from the detergents box fastened to the front tie-rod;
- connecting the discharge outlet from the pump to the waste water collection body, on prior fastening of the sleeve protruding to the detergents box;
- possibly, starting a washing cycle of the machine to test it, through the control and adjustment devices fastened to the tie-rod or through a station connected to said devices;
- possibly, removing the provisional door from the bellows;
- disconnecting the feed and discharge water connections, the electric connections and the connections of the station with the control and adjustment devices of the front tie-rod;
- inserting the washing machine in the external body open in the upper part, adapting the bellows to the front circular opening of said external body, and finally fastening of the door blocking device to the external body;
- fastening the lower tie-rod to the base of said external body and the upper tie-rod to the top of said external body;
- possibly, removing the front panel from the provisional support means of the tub, removing said support means and fastening said panel to the front of the external body; and
- withdrawing from the external body the water feed pipe through an opening, the discharge pipe from a lower opening and the electric cable with the plug from a back opening.

[0020] The process for the assembly of washing machines of the present invention will be better understood thanks to the following description, wherein reference is made to the attached drawings that show the various preferred non limiting steps and sequences of such process, and wherein:

Figure 1 shows schematically, in exploded perspective view, the assembly step of the bearings on a tub of a washing machine according to the process of the present invention;

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Figure 2 shows schematically, in exploded perspective view, the insertion step of a washing drum in the tub;

Figure 3 shows schematically, in exploded perspective view, the assembly step of a gasket of the tub, closing of the same with the front half shell and assembly of the bellows for the door;

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Figure 4 shows schematically, in exploded perspective view, the assembly step on the tub of the washing machine of a front counterweight;

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Figure 5 shows schematically, in exploded perspective view, the assembly step on the tub of the washing machine of a rear counterweight;

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Figure 6 shows schematically, in exploded perspective view, the application step on said tub of a driven pulley;

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Figure 7 shows schematically, in exploded perspective view, the assembly step of an electric motor to the tub of the washing machine;

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Figure 8 shows schematically, in exploded perspective view, the assembly step on said tub of a resistor, capsules and related gaskets;

Figure 9 shows schematically, in exploded perspective view, the application step of the elastic belt on said pulley and on the shaft of the electric motor;

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Figure 10 shows schematically, in perspective view, the assembly step of the lower tie-rod, complete with shock absorbers, connecting the tub of the machine with an external body;

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Figure 11 shows schematically, in exploded perspective view, the assembly step on said tub of an upper tie-rod, complete with suspension elastic means for the connection to said external body;

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Figure 12 shows schematically, in exploded perspective view, the assembly step of a tie-rod or front panel, complete with control components and the associated wiring;

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Figure 13 shows schematically, in exploded perspective view, the testing step of the washing machine with the associated water feed and discharge connections and electric connections; and

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Figure 14 shows schematically, in exploded perspective view, the insertion of the tested washing machine in the external body wherein all the functional elements and components are finally arranged and fastened.

[0021] With reference to the aforementioned figures, the assembly process of the washing machine of the present invention comprises a plurality of steps, detailed in the following, not necessarily according to the sequence indicated, applied to a washing machine of the so-called front-loading type, i.e. with a front door openable for the introduction of the linen to be washed, and the subsequent removal from the same at the end of the washing, centrifugation and possibly drying cycle.

[0022] The components of the washing machine, assembled according to the process of the present invention, are substantially those of the conventional machines, except for the fact that the tub is designed to realize the process of the present invention.

[0023] Figure 1 shows the preliminary assembly step of the tub, comprising a first front half-shell 10, wherein the holed drum 12 provided with a rotation shaft 20 is inserted. Said half-shell, advantageously made from rigid plastic material, has a substantially cylindrical shape and is provided, along its external side surface, with a plurality of anchoring means or seats, 14, 16 for the components of the machine, detailed in the following. On the lower base of the half-shell 10, in a special seat obtained in central position, bearings 18 for the rotation shaft 20 of drum 12 are arranged and fastened with fastening means known in themselves, for instance, by pressure. Said bearings 18 are positioned in alignment with a cylindrical seat 22, defined by a bushing 24 previously attached to said tub 10.

[0024] Figure 2 shows the subsequent step of insertion into the half-shell 10 of the holed drum 12, whose rotation shaft 20 abuts in seat 22, to which bearings 18 are coupled.

[0025] The drum is realized by closing the upper head of the half-shell 10, complete with drum 12, opposite to that on which the cylindrical seat 22 is obtained, with a second front half-shell 26, whose exposed front has an opening 28 having a circular shape. Said opening defines the passage for the introduction of the linen in the tub and is subsequently closed, as will be explained later on, by the associated mobile door.

[0026] The second front half-shell 26 has a diameter equal to that of the back half-shell 10 to which it is brought near and fastened, on prior interposition of a sealing gasket 30, from rubber or other suitable material. Edges 32, 34 of the half-shells 10, 26 designed to couple with each other are constituted by a smooth surface having a limited extension that forms a flange, the fastening of said half-shell between each other after the interposition of the sealing gasket 30, is realized with fasteners known in themselves, for instance with elastic clips or the like (not shown).

[0027] Along the edge that defines the central opening 28 of the second front half-shell 26 projections 36 are obtained, for instance in number of three arranged at 120° from one another, intended for constituting as many truing and connection seats for the front counterweight 38 of the tub formed by the two half-shells 10 and 26.

[0028] Figure 4 shows such application step of the front counterweight 38, constituted by a ring from conventional prestressed conglomerate. Said ring 38 is provided with through-openings 40 complementary to projections 36 and wherein said projections 36 are inserted.

[0029] Before the positioning of counterweight 38 on the free front of the second half-shell 26, there is positioned, along opening 28 of the same, a bellows 42 from natural rubber or plastic material that realizes the sealing between the tub and the door. Said bellows 42 has a conventional lip 44 for the coupling with the edge of said opening 28.

[0030] Figure 5, wherein the tub formed by the half-shells 10 and 26 is represented in upside down position, shows the back front of said first half-shell 10, intended for housing, according to a further step of the assembly process, the rear counterweight 46 of the tub.

[0031] Said counterweight, preferably made from the same material as that of the front counterweight 38, is provided with a plurality of through-holes 46 wherein corresponding truing and connection projections 50 are obtained on the back front of the first half-shell 10.

[0032] From the middle of said back front of the first half-shell 10 there protrudes shaft 20 of the holed drum 12. On said shaft 20 a pulley 54 is inserted and fastened, as schematized in Figure 6.

[0033] Figure 7 shows the application step of the tub formed by the half-shells 10 and 26 of a motor 56 provided with a rotation shaft 66. Said tub is provided with integral shaped extensions 58 that form the support for motor 56, also correspondingly provided with coupling projections 60. The fastening of motor 56 to the tub is obtained by means of bolts or the like, inserted in the seats defined by extensions 58 and projections 60.

[0034] Figure 8 schematically shows the housing step in the tub, starting from the back front of the half-shell 10, of a resistor 62 and capsules 64, suitable to control the temperature of water during the washing steps. The housing of resistor 62 and capsules 64 in the tub is realized in a rapid and easy manner as the back front of the first half-shell 10 is provided with corresponding calibrated openings 52.

[0035] Figure 9 schematizes the assembly step of an elastic belt 66' that connects pulley 54 to shaft 66 of motor 56, in correspondence of its free end 68 aligned with said pulley.

[0036] The subsequent assembly step of the washing machine is schematized in Figure 10 and shows the application of a lower support tie-rod 70. Said tie-rod 70 is provided with shock absorbers 72 and is fastened

with bolts or the like to the first half-shell 10 in correspondence of the anchoring seats 14. Said shock absorbers 72, whose free end is connected, though the aforementioned means, to seat 14, are previously fastened to the tie-rod 70.

[0037] The subsequent assembly step, schematized in Figure 11, provides for the connection to the tub, in correspondence of the first half-shell 10, with an upper tie-rod 74, suitable to be subsequently horizontally fastened to the external body in its upper part. Said tie-rod 74 is provided with suspension springs 76 that are fastened to the half-shell 10 in correspondence of special anchoring means 78. Said anchoring means 78 are obtained integrally with the half-shell 10 on its formation or possibly applied afterwards.

[0038] Figure 12 shows the further step of the assembly process that provides for the positioning, through a provisional fastening on the tub, of a front tie-rod 80 of the washing machine, complete with control and wiring components. Said tie-rod or panel 80 constitutes the support for different control electric components, for instance switches and adjustment selectors for a thermostat and a timer, indicated by 82, as well as for the detergents box 84 with sleeve 86 for the fastening to the tub. Said electric components, previously assembled on the tie-rod 80, are complete with wiring. The various electric cables, schematized by 88, are partly connected to a support plate 90, complete with a pressure switch 92 and fastened to the half-shell 10 in correspondence of the elastic protrusions 94, preferably integrally formed with the first half-shell 10, in the same way as the anchoring means and seats 14, 16, 58, 78.

[0039] Electric cables 88 comprise branches with end connections for the connection with other components of the washing machine, for instance the pump and the blocking device 96 of the door.

[0040] During the aforementioned steps of the assembly process, the different components of the washing machine, starting from the complementary half-shells 10 and 26 that form the tub, are automatically and sequentially fed along the assembly line. The main body constituted by said tub, to which the other components are progressively assembled and connected, remains suspended by means of chains or like means along the way, so as to be systematically at the height most suitable for the interventions of the various operators. Up to the assembly step of the upper tie-rod 74 with the associated suspension springs 76, the washing machine is definitely assembled, meaning that the various components are finally fastened and do not require further removal operations. Instead, the tie-rod or front panel 80 with the activation, program and control devices and the wiring, requires a first temporary and provisional fastening on the tub of the machine. Said tie-rod 80, in fact, is subsequently fastened to the external body with which it forms a part of the front panel. On the other hand, in order to render the testing of the washing machine possible without said external body, the tie-rod

80 with the activation and control devices, including that for water feeding, must be positioned on the tub, or near it; this allows to connect, through cables 88 and the branches thereof, all the mechanical and electric operating components of the machine, already mounted on the tub, such as for instance motor 56. The various cables are easily fastened to said tub, thanks to the presence of the anchoring seats 15. The tie-rod or front panel 80, instead, is provisionally positioned on the half-shell 10 of the tub by means of one or more mobile supports 98, preferably in the form of a section. To this aim, the mobile support 98 is provided with an upper transversal groove 102 whose width is such as to allow the insertion of said panel. Preferably, said supports are in number of two, housed in the respective pocket-like seats 100 obtained during the molding or applied subsequently on the tub and connected to the same by means of adhesives or other suitable systems.

[0041] As an alternative, the tie-rod 80 can be suspended near the tub through and independent chain or like provisional support means.

[0042] Before transferring the so formed washing machine without the external body to the testing station, its front opening, formed by the sealing bellows 42 from rubber, is closed. During the testing, in fact, water is let in the tub of the machine and said front opening must therefore be closed. To this aim, a provisional door is provided, indicated by 104 in Figure 13, that has a strike-edge 106 for the blocking device 96.

[0043] The final door of the washing machine is not utilizable during the testing, being fastened to the external body that will be employed only after the testing.

[0044] The provisional door 104 is constituted, by way of example, by a hollow circular body with holes in the front facing bellows 42, connected through a pipe 105 to a suction pump (not shown in the figures), suitable to create a vacuum and therefore the sealing after the approaching of said circular body to the bellows.

[0045] Preferably, in order to allow the visual inspection of the inside of the tub during the testing of the machine, the central part 108 of door 104 is made from glass or other transparent material.

[0046] The so prepared washing machine may be activated, on prior electric connection with the mains through the conventional current plug 110, with the water feed network starting from the detergents box 84, and with the waste water discharge from pump 115 through a conventional pipe 115 connected to a discharge water collection container or conveyor 114'. Said pump 115 is conventionally mounted on the tub constituted by the two half-shells 10, 26 during one of the preliminary steps, before the overturning of said tub.

[0047] Figure 13 shows schematically the testing step of the machine without the external body, connected, by way of example, to a control station 116, controlled by the testing operator.

[0048] Having carried out the testing, verified the integrity and correct working of all the parts and the

components, the washing machine is provided with the body, i.e. the external container. Checks are carried out in an easy and complete manner, as the operator has a full view of the structural and functional components of the machine.

[0049] The last step of the assembly process of the present invention, schematized in Figure 14, comprises the insertion of the washing machine in the associated external body, schematized as a whole by 120. Said external body, preferably made from sheet, is previously assembled starting from the panels, to form an external body having a parallelepiped shape and an opportune size, and is provided in the front with a circular opening 118 housing bellows 42, that can be closed afterwards with the door (not shown).

[0050] The washing machine is inserted from up downwards in the external body whose top is open so as to allow the final connection of the components of said external body. In particular, the lower tie-rod 70 is fastened with screws or like fasteners to the base of the external body, in correspondence of the preformed holes 122, while the upper tie-rod 74 is fastened in the same way in holes 124. The front panel 80 is disassembled from the provisional supports 98 and placed on the front of the external body 120, to which it is fastened with screws or like fasteners inserted in holes 126. The provisional supports are removed from seats 100 of the half-shell 10 and eliminated or subsequently reused in the assembly cycle of other washing machines.

[0051] The assembly steps is completed with the fastening of the blocking device of door 96 in correspondence of the front circular opening 118, and with the operations that cause the taking out from the external body of the components to be connected outside, namely the water feeding pipe 130 and the discharge pipe 134.

[0052] The feeding pipe 130 develops in the detergents box 84 and is led towards the outside through a back opening 132 formed on external body 120; the discharge pipe 134 comes out from hole 136 obtained in the lower back part of said external body.

[0053] A further back opening 138 allows the passage of plug 110 connected to cable 88. The upper part of the external body 120 is subsequently closed by means of a conventional completion panel or the like.

[0054] Obviously, the process of the present invention may exclude the steps of preparation of the machine for the testing; said machine will be therefore inserted from up downwards in the external body according to the aforementioned sequence.

[0055] As can be inferred from the above description, the advantages provided by the invention are evident.

[0056] The assembly process of the present invention allows to realize and cause to be functional for any purposes washing machines without the external body, so that the testing of the same can be carried out in the best conditions, and repairs and component replace-

ments can be made without requiring laborious and expensive operations.

[0057] However, while the invention has been described above with reference to a possible embodiment solely proposed by way of non critical example, several modifications and variants may be introduced, all of which fall within the scope of the inventive concept and the following claims.

Claims

1. A process for the assembly of washing machine comprising a tub (10, 26), wherein a rotary drum (12) is housed; mechanical components comprising a motor (56), a waste water discharge pump (115), elastic support means (74, 76), and shock absorbers (70, 72); electric components (62, 64); a front panel (80) wherein there are contained and fastened the activation, program and control devices (82), and a detergents box (84) connected with said drum (12); and an external body (120), characterized in that said process comprises the following steps:

- fastening on the outer surface of tub (10, 26), wherein drum (12) is inserted, all the mechanical and electric components, an end of the elastic means (76) and of the shock absorbers (72) and the front panel (80);
- testing the so assembled washing machine;
- inserting the tested washing machine in the external body (120), and
- fastening to said external body the free ends of the elastic means (76) and the shock absorbers (72) and the front panel, on prior detachment of the tub.

2. The process according to claim 1, wherein the mechanical and electric components are definitely fastened to the tub, and the front panel (80) is provisionally fastened for the testing step.

3. The process according to claim 2, wherein the front panel (80) is fastened to the tub by means of at least a mobile support (98), in the form of a section, provided with a transversal groove (102) wherein panel (80) is inserted.

4. The process according to any of the preceding claims, wherein the tub in which drum (12) is inserted comprises a front base, a back base and a cylindrical side surface, wherein the front base is provided with a central opening (28) for the introduction of the linen and means (36) for fastening lower counterweights (38); the back base is provided with bearings (18) for the rotation of drum (12) and means (50) for fastening the rear counterweights (46); and the cylindrical side surface is pro-

vided with integral means (14, 16, 58, 78, 94, 100) for fastening the mechanical and electric components and the front panel (80).

5. The process according to any of the preceding claims, wherein the tub is formed by two complementary half-shells (10, 26) coupled with each other.

6. The process according to any of the preceding claims, comprising the following operation steps:

- realizing two complementary half-shells (10, 26), of which at least the first one (10) is provided along its outer side surface, with integral fasteners (10, 16, 58, 78, 100) for the mechanical and electric components, and on a base, with a central seat, wherein a bushing (24) is inserted, and means for fastening a rear counterweight (46); and the second half-shell (26) is provided, on a base, with means (36) for fastening a front counterweight (46), and a central opening (28) for the introduction of the linen;
- realizing a tub by coupling with each other said first (10) and said second (26) half-shells in correspondence of the respective bases not provided with fasteners, on prior insertion in the tub of a holed drum (12) provided with a rotary shaft (20) inserted in said bushing (24);
- positioning and fastening the front counterweight (38) on the correspondent fasteners (36) of the second half-shell (26);
- positioning and fastening the rear counterweight (46) on the correspondent fasteners (50) of the first half-shell (10);
- positioning and fastening a driven pulley (54) on the shaft (20) of drum (12) protruding from the first half-shell (10);
- fastening to the tub of a motor (56) provided with a rotary shaft (66), and a pump (115) by means of fasteners (58);
- inserting in the tub, on the front of the first half-shell (10) from which shaft (20) of pulley (54) protrudes, a resistor (62), capsules (64) and related sealing and locking gaskets through corresponding calibrated openings (52) previously obtained on said half-shell on its formation;
- connecting pulley (54) of shaft (20) of drum (12) with the free end (68) of the rotation shaft (66) of motor (56) by means of an elastic belt

- (66');
 - fastening a lower tie-rod (70), complete with shock absorbers (72), to the tub by means of the corresponding fasteners (14); 5
 - fastening an upper tie-rod (74) provided with elastic means (76) to said tub by means of the corresponding fasteners (78); 10
 - fastening, possibly provisionally, the front tie-rod (80) whereon there are housed and fastened the activation, program and control devices (82) as well as a detergents box (84), on the upper part of the tub, by means of mobile support means (98); 15
 - connecting the branches and the free ends of the cables (88) to pump (115) and motor (56), fastening said cables through the respective fasteners or fastening seats (16); 20
 - possibly, provisional fastening of the door blocking device (96) near opening (28) of the tub by interposition of a bellows (42); 25
 - possibly, providing a provisional door (104) with a strike-edge (106) for the blocking device (96) and putting it near, or connecting it to the opening (28) by means of an intermediate bellows (42); 30
 - electrically connecting the washing machine with the electric network through the wiring current plug (10), hydraulically connecting said machine to the water mains, starting from the detergents box (84) fastened to the front tie-rod (80); 35
 - connecting the discharge outlet from pump (115) to a waste water collection container (114'), on prior fastening of sleeve (58) protruding from the detergents box (84) to the tub; 40
 - possibly, starting a washing cycle of the machine to test it, through the control and adjustment devices (82) fastened to the tie-rod (80) or through a station (116) connected to said devices; 45
 - possibly, removing the provisional door (104) from bellows (42); 50
 - disconnecting the feed and discharge water connections, the electric connections and the connections of station (116) with the control and adjustment devices (82) of the front tie-rod (80); 55
- inserting the washing machine in the external body (120) open in the upper part, adapting bellows (42) to the front circular opening (118) of said external body, and finally fastening of the door blocking device (96) to the external body (120);
 - fastening the lower tie-rod (70) to the base of said external body and the upper tie-rod (74) to the top of said external body;
 - possibly, removing the front panel (80) from the provisional support means (98) of the tub, removing said support means (98) and fastening panel (80) to the front of the external body (12); and
 - withdrawing from the external body (120) the water feed pipe (130) through an opening (132), the discharge pipe (134) from a lower opening (136) and the electric cable with plug (110) from a back opening (138).
- 7.** The process according to any of the preceding claims, wherein the front counterweight (38) and the rear counterweight (46) are provided with through-holes complementary to projections (36, 50) of the tub and fastened thereto.
- 8.** The process according to any of the preceding claims, wherein the provisional door (104) with strike edge (106) for the blocking device is constituted by a holed hollow cylindrical disc on the front facing bellows (42) and is connected to a suction pump by a pipe (105).
- 9.** The process according to claim 8, wherein the hollow disc forming the provisional door (104) is provided in the middle with a barrier from transparent material.
- 10.** The process according to any of the preceding claims, wherein the mobile supports (98) of the front tie-rod (80) are constituted by sections having an upper transversal groove (102) wherein said tie-rod is inserted.

FIG. 1

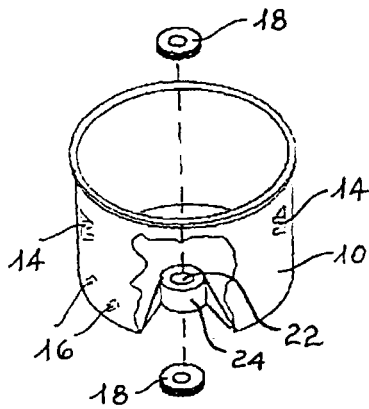


FIG. 2

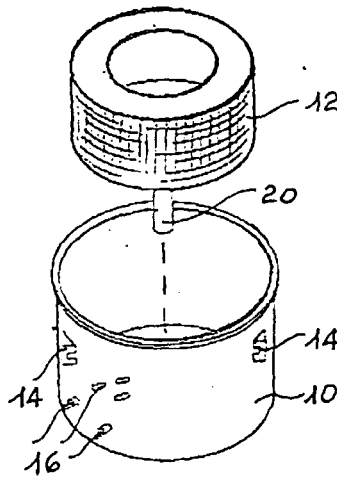


FIG. 3

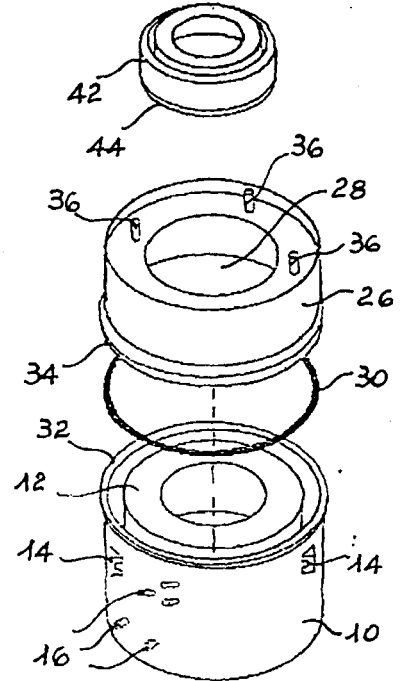


FIG. 4

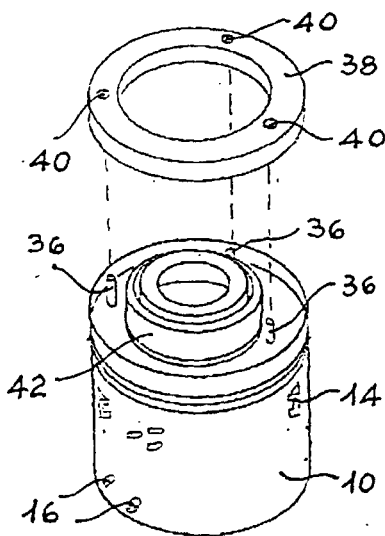


FIG. 5

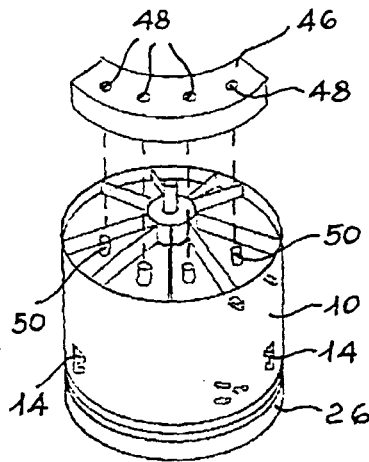


FIG. 6

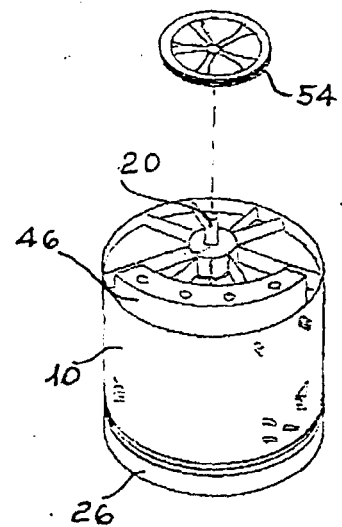


FIG. 7

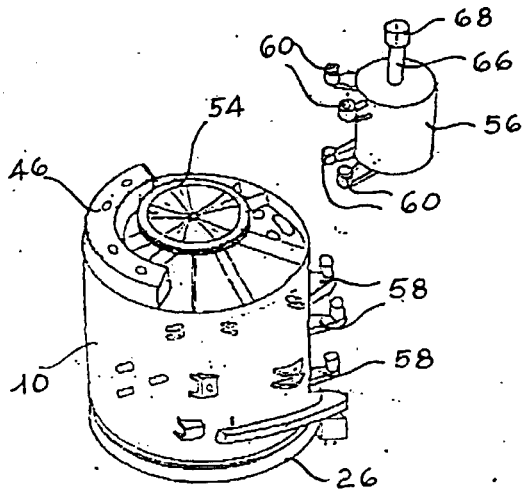


FIG. 8

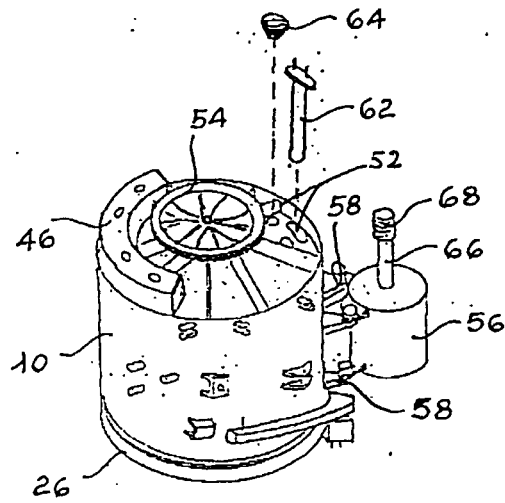


FIG. 9

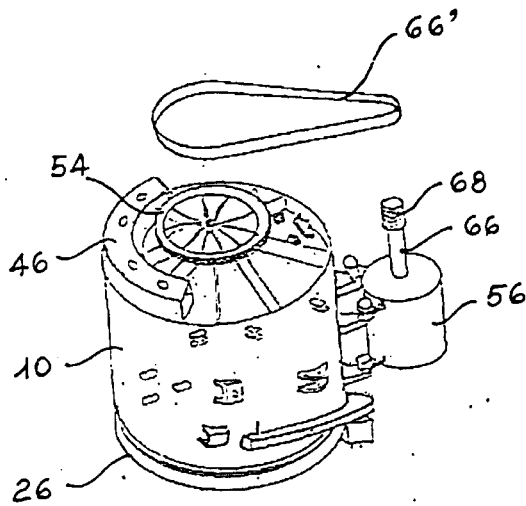


FIG. 10

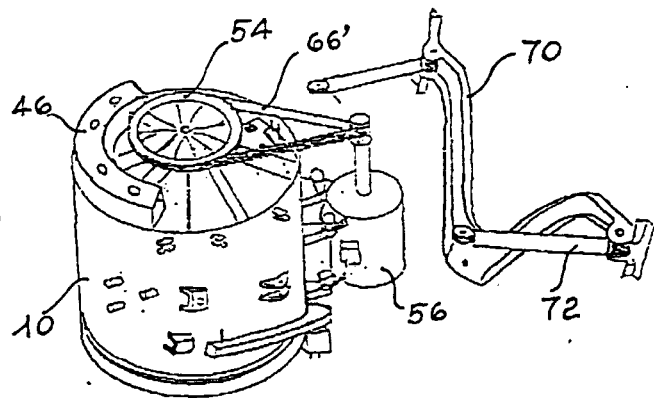


FIG. 12

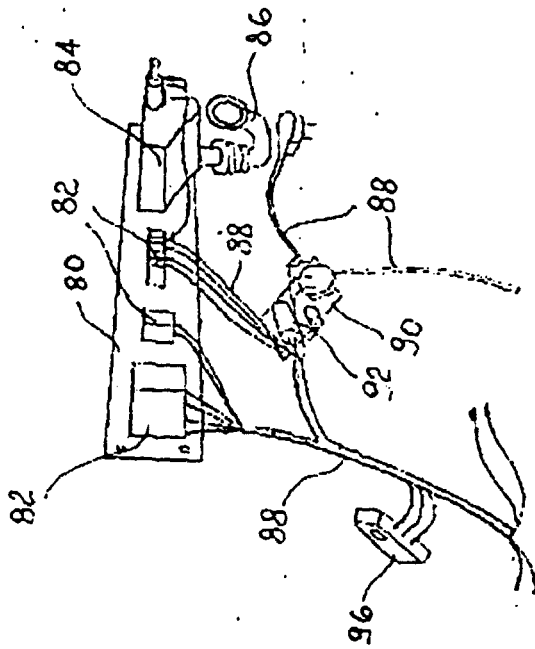


FIG. 11

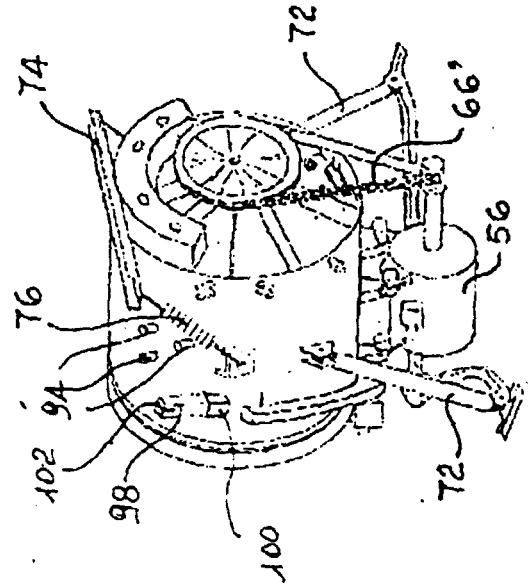
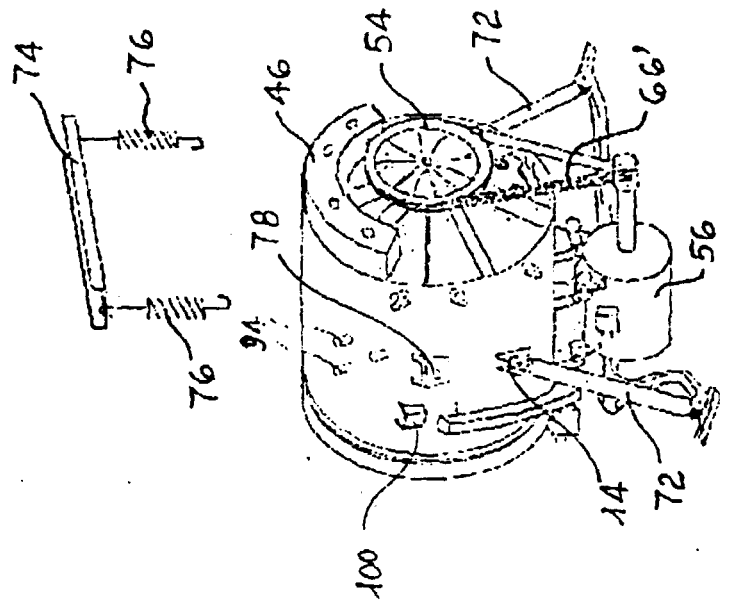


FIG. 13

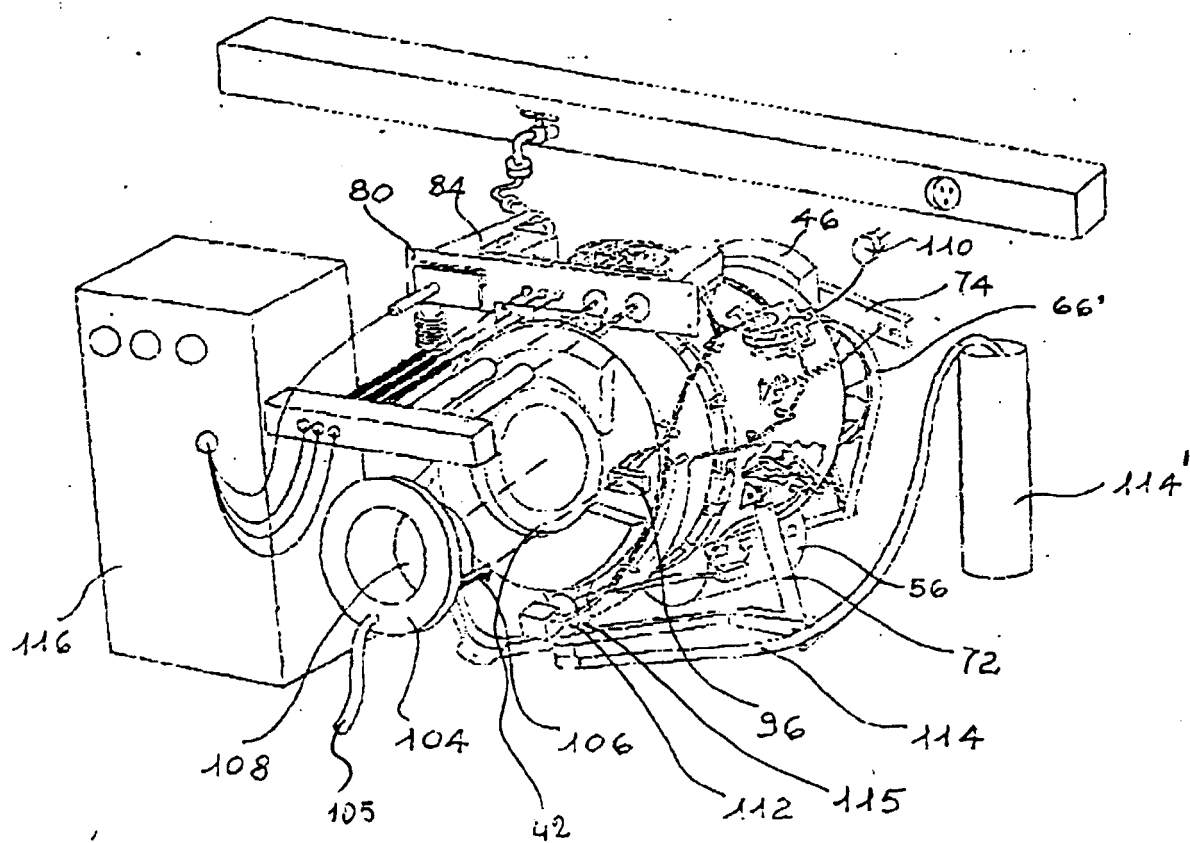


FIG. 14

