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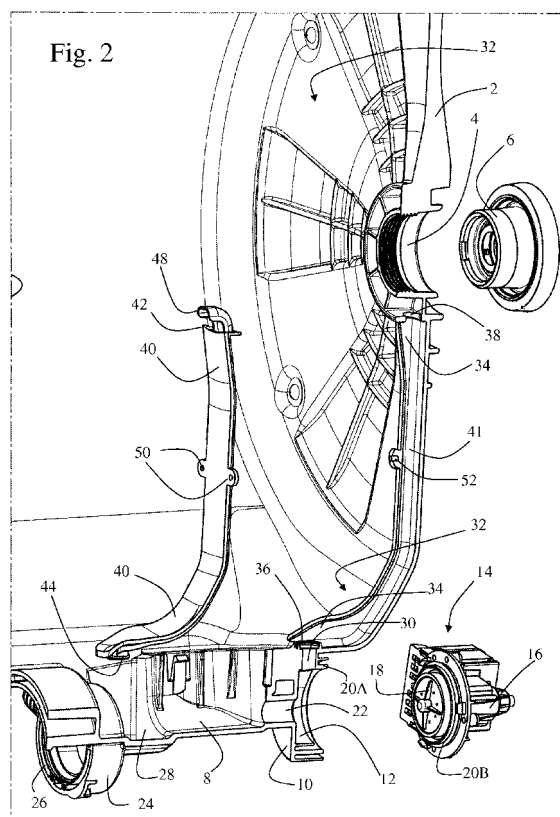
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(54) **Washing water recirculation tub arrangement**

(57) The invention relates to a washing machine tub arrangement comprising: a tub 2 having an inner surface 32 and an outer surface, a pump housing 10 for receiving a recirculation pump 14, wherein the pump housing comprises a pumping cavity 12, and a recirculation conduit 41 connecting the pumping cavity 12 of the pump housing 10 to at least one outlet element 48 for supplying liquid into the tub 2. According to the invention the recirculation conduit 41 is at least partially formed at the inner surface 32 of the tub 2, and the recirculation conduit 41 comprises a cover member 40 mounted or mountable to the inner surface 32 of the tub 2, wherein at least a portion of the recirculation conduit 41 is formed between the inner surface of the cover member 40 and the inner surface 32 of the tub 2.



Description

[0001] The invention relates to a washing machine tub arrangement having a recirculation conduit connecting a recirculation pump housing to a spray nozzle for spraying the recirculated liquid into a drum arranged within the washing machine tub. Further the invention relates to a washing machine having such a washing machine tub.

[0002] WO 2008/125974 A2 discloses a tub for a washing machine formed of two shells which are welded together to form the closed tub in which the rotatable mounted drum is arranged. Wash liquid recirculating channels are integrally arranged at the washing tub and a pump housing is formed at the sump of the tub. The pump is mounted to the pumping housing and, depending on the position of a valve, the wash liquid sucked from the tub sump is either directed to a drain hose or recirculated into the interior of the drum through wholes formed in the drum. At the outer surface of the tub an axially running conduit is in fluid connection with the pressure outlet of the pumping housing. At the outlet side of the closed axial conduit a circumferentially running conduit is formed at the joining interface of the two shell halves. The circumferential conduit is closed when the two shell halves of the tub are welded together. In this solution, for forming the axially running closed conduit, a complex molding tool is required for forming the pump housing and in fluid connection therewith the closed axial conduit. Further, when welding the two shell halves together the circumferential conduit formed between shell halves requires a complex welding procedure in which it has to be guaranteed that the junction between the two shell halves at the circumferential conduit are permanently water tight sealed - even under mechanical and thermal stress.

[0003] DE 199 62 257 A1 proposes a recirculation-type washing machine in which the recirculated washing liquid is directly injected into the drum. A water distribution chamber is arranged around a shaft bearing at the side wall of a tub at which the shaft of the drum is supported. The liquid chamber surrounding the shaft bearing is in fluid communication with a recirculation pump, wherein a hose is connecting the pump and the circular liquid chamber. The hose is running along the inner side wall of the tub between the tub and the drum. The hose and the wash liquid chamber around the shaft bearing require extra space between the side wall of the tub and the drum.

[0004] It is an object of the present invention to provide a washing machine tub arrangement and a washing machine having such a tub arrangement, wherein the circulation conduit is provided in a simple manufacturing structure and prevents the risk of water leakage to the outside of the tub.

[0005] The invention is defined in claims 1 and 15, respectively.

[0006] Particular embodiments are set out in the dependent claims.

[0007] According to claim 1 a washing machine tub

arrangement having a tub is provided for storing in its interior washing liquid or liquor used to wash laundry, and for housing a drum within the tub. The tub arrangement may be provided for a top-loader washing machine having an opening at the upper side for loading the laundry from above, or may be for a front-loader washing machine for loading the laundry through a front opening. The drum rotation axis may be a horizontal axis (front- and top-loader models) or a vertical axis (top-loader), or may have a drum rotation axis deviating some degrees from the horizontal or vertical direction.

[0008] A pump housing for receiving a recirculation pump (i.e. at least a portion of the recirculation pump) is arranged at the tub. The pump housing comprises a pumping cavity in fluid connection to a bottom region of the tub, preferably a sump of the tub. Preferably the pump housing is a portion of the wall of the tub and more preferably is formed with the tub material as a unitary piece, for example by injection molding. In an embodiment the recirculation pump is at the same time a draining pump wherein for example a valve is used to switch between wash liquid recirculation into the drum or draining the wash liquid to the outside of the washing machine. In another embodiment a separate draining pump is provided to drain the wash liquid out of the tub.

[0009] A recirculation conduit provides a liquid connection between the pumping cavity, in particular the pressure outlet opening of the pumping cavity, to at least one outlet element arranged in the tub and which supplies the liquid into the tub. Preferably the at least one outlet element is arranged at the side wall or the circumferential wall of the tub and faces the drum arranged in the tub. During drum rotation temporally or when positioning the drum in a predefined angular orientation within the tub, the opening of the at least one outlet element is facing at least one opening in the drum such that the recirculated liquid is directly sprayed into the drum's interior. In an alternative embodiment the at least one outlet element can be in liquid communication with a hollow shaft at which the drum is rotated so that the washing liquid can pass through the hollow shaft into the interior of the drum. Further alternatively the at least one outlet element can be in liquid communication with a chamber formed between the drum and the side wall of the tub such that the recirculated washing liquid can flow into the drum through openings arranged at the drum's side of the liquid chamber.

[0010] Claim 1 provides that the recirculation's conduit is at least partially formed or arranged at the inner surface of the tub, preferably the recirculation conduit is completely formed at the inner surface of the tub over its length from the pumping cavity to the at least one outlet element. By providing the recirculation conduit at least partially at the inner surface of the tub, the recirculation conduit is correspondingly arranged at the interior of the tub such that even if the recirculation conduit has a leakage, the recirculated washing liquid is not leaking to the outside of the tub, but to the interior of the tub where the

washing liquid is stored anyway.

[0011] Further according to claim 1, the recirculation conduit comprises a cover member that is mounted or mountable to the inner surface of the tub such that when the cover member is mounted, at least a portion of the conduit, preferably all or essentially all of the length of the recirculation conduit is formed between the inner surface portion of the tub covered by the cover member and the inner surface of the cover member itself. This means that along the length of the cover member a conduit having a flat internal extension from the tub inner wall is provided that can be easily arranged in a small gap between the inner side walls and/or circumferential wall of the tub and the rotating drum's outer surface. Further the conduit can have a complex geometry according to the tub's internal surface geometry in that the cover member is easily adapted to mate with the inner surface geometry of the tub. For example it is not required to bend a closed pipe or hose at each curvature of the inner surface curvature of the tub. Along the length of the recirculation conduit formed by the inner surface of the tub and the cover member no complex molding tool is required to form hollow structures like pipe sections - neither at the cover member nor at the inner surface of the tub. Manufacturing tolerances relating to the junction lines between the inner surface of the tub and the cover member are not critical as leakages through the junction line or connecting line between the tub and the cover member are uncritical as mentioned above.

[0012] Preferably the material of the tub and the material of the cover member are identical, but according to the need and for manufacturing optimization, different materials can be used for the tub and the cover member. For example the cover member may be formed of a thin metal sheet such that the internal extension of the conduit formed by the inner surface and the cover member is further reduced. Additionally or as another embodiment the tub material may be rigid or semi-rigid, while the material of the cover member is more flexible and elastic such that in the mounting process the form of the cover member can be easily adapted to the connection or junction line at the inner surface of the tub. Preferably the material or wall thickness of the cover member - at least over an essential portion of the area of the cover member - is less than the material thickness of the tub. In this case the mechanical stability is provided by the tub, while the cover member only has water guiding function and thus may be thinner than the tub material.

[0013] In an embodiment the length of the recirculation conduit from the pumping cavity or close to the pumping cavity to the outlet element is formed as far as possible by the opposing surfaces of the inner surface portion of the cover member and the inner surface portion of the tub. Thereby a complex geometry of the molding tool is not necessary. Additionally or in an alternative embodiment no separate or additional sealing means or material is provided to seal between the cover member and the inner surface, in particular the conduit formed by cover

member and inner surface is free of any gasket.

[0014] Preferably in the region of the tub's inner surface that is covered by the cover member an open channel or groove is formed that has a depth extension to contribute to the cross section of the conduit. In an embodiment the cover member can be completely flat such as to cover only the open channel or groove in the tub wall. More preferably the cover has also at least a moderate open channel or groove such that when the cover member is mounted at the inner surface of the tub, a portion of the conduit's cross section is contributed by the groove or channel in the tub and another portion is contributed by the channel or groove of the cover member. In another embodiment it can be provided that the channel or groove in the cover member provides the cross section of the conduit and the inner surface of the tub only provides a lid or closure side wall of the conduit.

[0015] In an embodiment the cover member is welded or bonded to the inner surface of the tub by ultrasonic techniques. Alternatively or additionally the cover member can be fixed at the inner wall of the tub by screwing, adhesive bonding or a snap-fit connecting. The mechanical connection between the cover member and the tub interior can be made by one, two, three, four or more spot connections, by one, two, three, four or more extended line connections or by a connection running at least over extended portions of the junction line or connection line between the cover member and the inner surface of the tub. For example an ultrasonic weld connection can be made all along the junction or interface between cover member and tub on one or both sides of the cover member. Additionally or alternatively a snap-fit connection can be provided all along the length between cover member and the tub - for example like a snap-fit connection between the cover and the channel of a cable conduit. In another embodiment it can be provided that no separate connection between the tub and the cover member is required, for example if one or both end portions of the cover member are snap-fitted or flanged to the at least one outlet element and/or the pressure side outlet of the pumping cavity, respectively.

[0016] For mounting the cover member to the inner surface of the tub, preferably a snap connection element is formed along at least a portion of the length of the cover member and the inner surface comprises a mating connection element mating with the snap connection element to form a snap connection mounting between the inner surface of the tub and the cover member.

[0017] In an embodiment the outlet element is formed by a portion of the inner surface or inner structure of the tub and/or an end section of the cover member. For example the inner surface or inner structure of the tub may provide a mounting element or flange element onto which or into which the end of the cover member is inserted. Alternatively or additionally the outlet element is formed by the end section of the cover member or an end portion of the cover member and an internal structure of the tub form in common the at least one outlet element. The out-

let element for example comprises one or a plurality of outlet nozzles directing the recirculated liquid to the outside of the drum having liquid holes or directly into the interior of the drum.

[0018] If a first and/or second retaining element is arranged at the inner surface or inner structure of the tub adapted to retain a first end and/or second end of the cover member, respectively, than the mounting process for mounting the cover member on the inner surface of the tub is simplified in that the first end and/or the second end portion of the cover member is just inserted into or snap connected to the respective first and/or second retaining element. Preferably or alternatively a first and/or second flange element is provided at a respective end portion of the cover member adapted to be connected to a mating flange element provided at the pump cavity and/or at the outlet element, respectively. The flange element also provides a connection element between the cover member and the interior structure of the tub such that the fluid connection, preferably a sealed fluid connection, is provided between the pumping cavity and/or outlet element, respectively.

[0019] In an embodiment a fluff filter is arranged within the tub to filter fluff and particles from the washing liquid. The filter can for example be arranged in a suction path lying between the pumping cavity of the pump and the drum interior, for example when the filter is arranged in the sump of the tub. Preferably the filter can be removed and cleaned by the user for example through an opening accessible from the outside of the washing machine and having a sealed lid at the bottom of the tub. Or the filter can be removed through a filter opening in the drum by user access through the drum, wherein the opening in the drum to the filter location can be covered by a removable lid or preferably by a movable lifter. In another embodiment the filter can be arranged at the inside of the drum such that it filters the fluff during the washing process and drum rotation. If separate recirculation and draining pumps are provided, the fluff filter can be located at a common suction path of the draining and recirculation pumps.

[0020] Preferably at least a portion of the tub wall and the pump housing; or the tub wall, the pump housing and the wall portion of the conduit; or at least a portion of the tub wall and a portion of the recirculation conduit are formed as a single piece, in particular by injection molding.

[0021] Any combination of any of the above embodiments and any of the below embodiments from the detailed description may be provided according to the invention.

[0022] Reference is made in detail to a preferred embodiment of the invention, an example of which is illustrated in the accompanying figures, which show:

Fig. 1 a cross section through a portion of a washing machine tub having a pump housing a recirculation conduit, and

Fig. 2 a disassembled and partial cross sectional view of the tub section shown in Fig. 1, and

Fig. 3 a cross section through a portion of a washing machine tub having a pump housing a recirculation conduit, wherein the lifter for accessing the filter is in closed position, and

Fig. 4 a cross section through a portion of a washing machine tub having a pump housing a recirculation conduit, wherein the lifter for accessing the filter is in open position.

[0023] Fig. 1 shows in cross section a portion of a washing tub 2 for a top-loader washing machine (not shown) having a laundry drum (not shown) with a horizontal axis A. The cross section in Fig. 1 shows the middle and lower portion of the left side of the tub 2. The top-loader, horizontal-axis type washing machine is only an exemplary embodiment and the invention may also be implemented with a washing tub for a front-loader washing machine or a top-loader, vertical-axis type washing machine.

[0024] At the left side wall of the washing tub a shaft passage 4 with a drum bearing 6 is arranged and correspondingly a shaft passage and drum bearing are arranged on the right side wall of the tub 2 (the latter not shown in Fig. 1 and 2). The tub 2 houses a rotatably supported drum 56 (Fig. 3 and 4) and the inner dimensions of the tub are selected such that the drum 56 can rotate within the tub 2 without excessive spacing between the inner wall of the tub 2 and the outer wall of the drum. The tub 2 comprises a cylindrical wall and two closure caps 54.

[0025] A sump 8 with a sump volume for receiving some liters of the washing liquid extends at the bottom of the tub 2 downwards. At a lateral side of the sump 8 a pump housing 10 is integrally formed with the sump walls and the tub walls and laterally extends in axial direction from the sump, wherein the axial direction is given by the drum axis A. The pump housing 10 encloses a pumping cavity 12 which is in fluid connection with the sump volume 8 via a liquid passage 22. A recirculating impeller 18 of a recirculating pump 14 is housed in the pumping cavity 12 and the open side of the pumping cavity 12 is closed by a body part of the pump motor 16. A sealing is arranged between the body part of the motor 16 and the pumping cavity 12 such that the cavity 12 is sealed water tight and no washing liquid can leak out of the drum's interior. The disassembled perspective view in Fig. 2 shows the recirculation pump 14 taken away from the pump housing 10 wherein the flange connection formed by the housing flange 20A at the pump housing 10 and the pump flange 20B at the motor body of the recirculation pump 14 can be seen. From Fig. 2 it can be better appreciated that the sump 8 as well as the pump housing 10 form a single piece construction with the tub.

[0026] Further, Fig. 2 shows a drain pump housing 24

having a housing flange 26 to which a drain pump (not shown) can be flanged in a sealing manner. The drain pump housing 24 has an outlet to a draining hose of the washing machine (not shown). The pumping cavity enclosed by the draining pump housing 24 is connected via a passage 28 to the sump volume 8. The drain pump housing 24 is arranged at a side wall of the sump 8 opposite to the side wall where the pump housing 10 is formed. In the depicted embodiment thus the wash liquid recirculation is provided by pumping the washing liquid from the sump using the recirculation pump 14, while the washing tub 2 is drained using the drain pump (not shown). Preferably also the drain pump housing 24 form a single piece construction with the tub.

[0027] However, also other embodiments may be provided where for example draining and recirculation of the washing liquid is made by a single pump where a valve or switch directs the pumped liquid flow either to the recirculation path (see below) or to a draining hose of the washing machine (not shown).

[0028] In the embodiment depicted in Figs. 1 and 2 the washing liquid pumped by the recirculation impeller 18 of the pump 14 is exhausted from the pumping cavity 12 through a pressure outlet 30 of the pump housing 10. The pressure outlet 30 fluidly connects the pumping cavity 12 to the interior of the tub 2. As can be best seen from the cross section in Fig. 1, but also from the cross section in Fig. 2, the sump walls, at least a portion of the tub walls, the walls of the passage 22, the walls of the pumping cavity 12, and also the walls of the pressure side outlet 30 are formed by a single piece material, preferably an injection molded or pressure formed material where the only opening between the interior of the tub and the outer surroundings of the tub 2 is the opening of the pumping cavity 12. The latter one being covered and sealed by the body part (flange 20B) of the recirculation pump 14. Thus no leakage can happen to the outside of the tub.

[0029] As can be seen in the partial perspective and disassembled view of Fig. 2, the pressure side outlet 30 connects to a surface channel 34 formed at the inner surface 32 of one of the closure cap 54 of the washing tub 2. At the wall side of the tub interior the pressure side outlet 30 has a lower tub flange 36. Starting from outlet 30, the surface channel 34 axially extends a distance along the bottom side of tub 2 and then ascends along the inner lateral side wall of tub 2. The surface channel 34 terminates in an upper tub flange 38 provided close to the middle section or close to the drum bearing 6. It is evident that the surface channel 34 can be formed alternatively on the inner surface of the other closure cap 54.

[0030] Fig. 2 depicts a cover 40 in a disassembled state and Fig. 1 shows the cover 40 in the assembled state where it is covering the surface channel 34 formed in the washing tub's inner wall. The length and other dimensions of the cover 40 are adapted to the channel-length and cross extension of the open side of the surface channel 34 such that in the assembled state the cover 40

completely covers and closes the surface channel 34. In the assembled state the surface channel 34 and cover 40 form a liquid conduit 41 that is guiding the liquid pumped by the recirculation pump 14 from the pressure side outlet 30 to the upper tub flange 38. At the lower end the cover 40 has a lower cover flange 44 that mates with the lower tub flange 36 to form a flange connection. Further the cover has an upper cover flange 42 that mates with the upper tub flange 38 to form a flange connection. The lower cover flange 44 is in the form of a short stub that is inserted in a corresponding stub receptacle formed by the lower tub flange 36. The upper cover flange 42 is in the form of a hook-shaped deflection channel that is hooked into the lug-shaped upper tub flange 38. In cross section, the cover 40 has a slightly concave shape formed by a cover channel 46 facing the surface channel 34 when the cover 40 is mounted on the surface channel 34. Thus the cross section of the conduit 41 is combined by cover channel cross section and surface channel cross section. The hook-shaped upper cover flange 42 forms a nozzle 48 that directs the flow of recirculated washing liquid in an axial direction from the side wall of the tub towards an outer side wall of the drum. In the side wall of the drum corresponding circumferentially distributed holes are formed such that during the rotation of the drum the recirculated washing liquid can intermittently enter into the interior of the washing drum.

[0031] For mounting the cover 40 onto the surface channel 34 at the inner wall of the tub, two pin-shaped mounting elements 50 are provided on the inner side wall surface of the tub 2 and correspondingly mating pin receptacles 52 are arranged in a middle portion and extending from the lateral sides of the cover 40. The mounting element 50 is durably fixed to the corresponding receptacle pin 52 in that ultrasonic power is applied to the area of the pin 50 and receptacle 52 to thereby form an ultrasonic welding point. When mounting the cover 40 on the surface channel 34, first the hook-shaped nozzle 48 at the upper cover flange 42 is hooked into the upper tub flange receptacle 38. By slightly bending the cover 40, the lower cover flange 44 is positioned over the lower tub flange 36 and is then pressed into the lower tub flange 36. A press-fit connection is then provided when the cover 40 is neatly bent to fit to the surface channel 34 and the press-fit can not be released or resolved by the pressure of the recirculated liquid, the mechanical stress during washing or the washing liquid flowing in the tub after the ultrasonic weld connection is formed at the mounting elements 50 and receptacle pins 52. Thus a simple to mount and fixed liquid conduit 41 is provided between the cover 40 and the surface channel 34. If due to tolerances or other effects a liquid leakage should occur between the cover 40 and the surface channel 34, it is no problem since the washing liquid is just flowing back into the washing tub 2 and the sump 8 therein.

[0032] As shown by the black arrows in the cross section of Fig. 1, when the recirculation pump 14 is operated and wash liquid is in the sump 8, it will be drawn through

passage 22 into the pumping cavity 12 by the pumping activity of the recirculation impeller 18. The pumped liquid will then be exhausted from the pumping cavity 12 through the pressure side outlet 30 and the flange connection 36, 44 into the liquid conduit 41 formed by cover 40 and surface channel 34. Within the liquid conduit 41 the recirculated water is pumped up towards the drum bearing 6 where it is then passing through the flange connection 38/42 and is guided by the nozzle 48 towards the drum arranged within the washing tub 2.

[0033] Laundry fluff and other particles can be filtered by using a fluff filter 53 shown in Fig. 3 and 4. The fluff filter 53 is arranged in the sump 8 in the sucking passage from the sump 8 to the liquid passage 22. The filter 53 can preferably be taken out by the user for cleaning through an opening in the drum that can be opened by removing a removable lid that forms portion of the outer surface wall of the drum. In the embodiments disclosed in Fig 3 and 4 a lifter 55 associated to the drum 56 provides the access to the filter 53 arranged in the sump 8. Preferably the lifter 55 comprises a lower portion 55A fixed to the internal side of the cylindrical wall of the drum 56. The lower portion 55A forms a passage corresponding to the opening of the drum 56 through which the filter 53 is removable from the sump 8. The lifter 55 further comprises an upper portion 55B pivotably associated to the lower portion 55A so as to move between a closed position in which the upper portion 55B is connected to the lower portion 55A so as to act together as a normal lifter and an open position in which the upper portion 55B is spaced apart from the lower portion 55A to enable the user to access the filter 53 from inside the drum 56.

[0034] However other embodiments can be envisaged for example The fluff filter may be arranged exchangeably at the inside of the drum or the filter arranged in the sump can be removed from the outside of the tub and the washing machine through a removable lid that forms a side or bottom wall of the sump 8. For example instead of the draining pump housing 24 that is shown in Fig. 2 a removable lid can be arranged that is accessible from the outside of the washing machine and through which a fluff filter can be placed in the sump. A filter positioned in this way filters fluff and other particles when the liquid passes from the sump into the direction of the recirculation pump 14.

Reference Numeral List:

[0035]

2 washing tub

4 shaft passage

6 drum bearing

8 sump

10 pump housing

12 pumping cavity

5 14 recirculation pump

16 motor

18 recirculation impeller

10

20A housing flange

20B pump flange

15

22 passage

24 drain pump housing

26 housing flange

20

28 passage

30 pressure side outlet

25

32 inner surface

34 surface channel

36 lower tub flange

30

38 upper tub flange

40 cover

35

41 liquid conduit

42 upper cover flange

44 lower cover flange

40

46 cover channel

48 nozzle

45

50 mounting element (hole)

52 receptacle (pin)

53 filter

50

54 closure cap

55 lifter

55

55A filter lower portion

55B filter upper portion

56 drum
A drum axis

Claims

1. Washing machine tub arrangement comprising:

a tub (2) having an inner surface (32) and an outer surface,
a pump housing (10) for receiving a recirculation pump (14), wherein the pump housing comprises a pumping cavity (12), and
a recirculation conduit (41) connecting the pumping cavity (12) of the pump housing (10) to at least one outlet element (48) for supplying liquid into the tub (2),

characterized in that

the recirculation conduit (41) is at least partially formed at the inner surface (32) of the tub (2), in particular the recirculation conduit (41) is partially formed by the inner surface (32) of the tub, and

the recirculation conduit (41) comprises a cover member (40) mounted or mountable to the inner surface (32) of the tub (2), wherein at least a portion of the recirculation conduit (41) is formed between the inner surface of the cover member (40) and the inner surface (32) of the tub (2).

2. Arrangement according to claim 1, wherein the inner surface (32) of the tub (2) comprises a channel (34) that forms at least a portion of the conduit (41) and/or wherein the inner surface of the cover member (40) comprises a channel (46) that forms at least a portion of the conduit (41).

3. Arrangement according to claim 1 or 2, wherein the cover member (40) is mounted to the inner surface (32) of the tub (2) by welding, screwing, adhesive bonding, ultrasonic welding or bonding, snap-fit connecting and/or latching.

4. Arrangement according to claim 1, 2 or 3, the cover member (40) is fixed or connected to the inner surface of the tub (2) by one or more of the following spatial connection types:

one, two, three, four or more connection spots,
one, two, three, four or more connection lines, or
one, two, three, four or more connection fields.

5. Arrangement according to any of the previous claims, wherein the at least one outlet element (48) is formed by a portion of the inner surface (32) or structure of the tub (2) and/or an end section (42) of the cover member (40).

6. Arrangement according to any of the previous claims, wherein all or essentially all the length of the recirculation conduit (41) within the tub (2) is formed by the opposing or facing inner surface portions of the cover member (40) and the tub (2).

7. Arrangement according to any of the previous claims, wherein the at least one outlet element (48) comprises one or a plurality of spray nozzles.

8. Arrangement according to any of the previous claims, wherein the tub (2) comprises a first retaining element (36) arranged at its inner surface (32) for retaining a first end (44) of the cover member (40) and/or wherein the tub (2) comprises a second retaining element (38) arranged at its inner surface (32) for retaining a second end (42) of the cover member (40).

9. Arrangement according to any of the previous claims, wherein the cover member (40) comprises a first flange element (44) at a first end portion for connecting to the outlet opening (30) of the pumping cavity (12) and/or a second flange element (42) at a second end portion for connecting to the at least one outlet element (48).

10. Arrangement according to any of the previous claims, wherein the at least one outlet element (48) is arranged close to or at a shaft passage (4) of the tub (2) and/or wherein the pumping cavity (12) of the pump housing (10) is arranged at a bottom of the tub (2) and/or connected to a sump (8) of the tub (2).

11. Arrangement according to any of the previous claims, wherein the at least one outlet element (48) is directing circulated liquid towards a rear wall, peripheral wall or side wall of a drum (56) arranged within the tub (2).

12. Arrangement according to claim 11, wherein one or a plurality of holes are formed at the drum, the holes at least temporally facing the at least one outlet element (48) to allow circulated liquid passing into the interior of the drum (56).

13. Arrangement according to any of the previous claims, wherein a filter (53) is arranged within the tub (2), in particular the filter (53) is arranged in a sump (8) of the tub (2), preferably a movable lifter (55) or lid associated to the drum (56) provides access to the filter (53) from inside the drum (56).

14. Arrangement according to any of the previous claims, wherein at least a portion of the tub (2) and the pump housing (10) are formed as a single piece, in particular the at least a portion of the tub (2) and the pump housing (10) are formed as an injection

molding element.

15. Washing machine having a washing machine tub arrangement according to any of the previous claims, in particular the washing machine being a front loader or top loader washing machine. 5

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Fig. 1

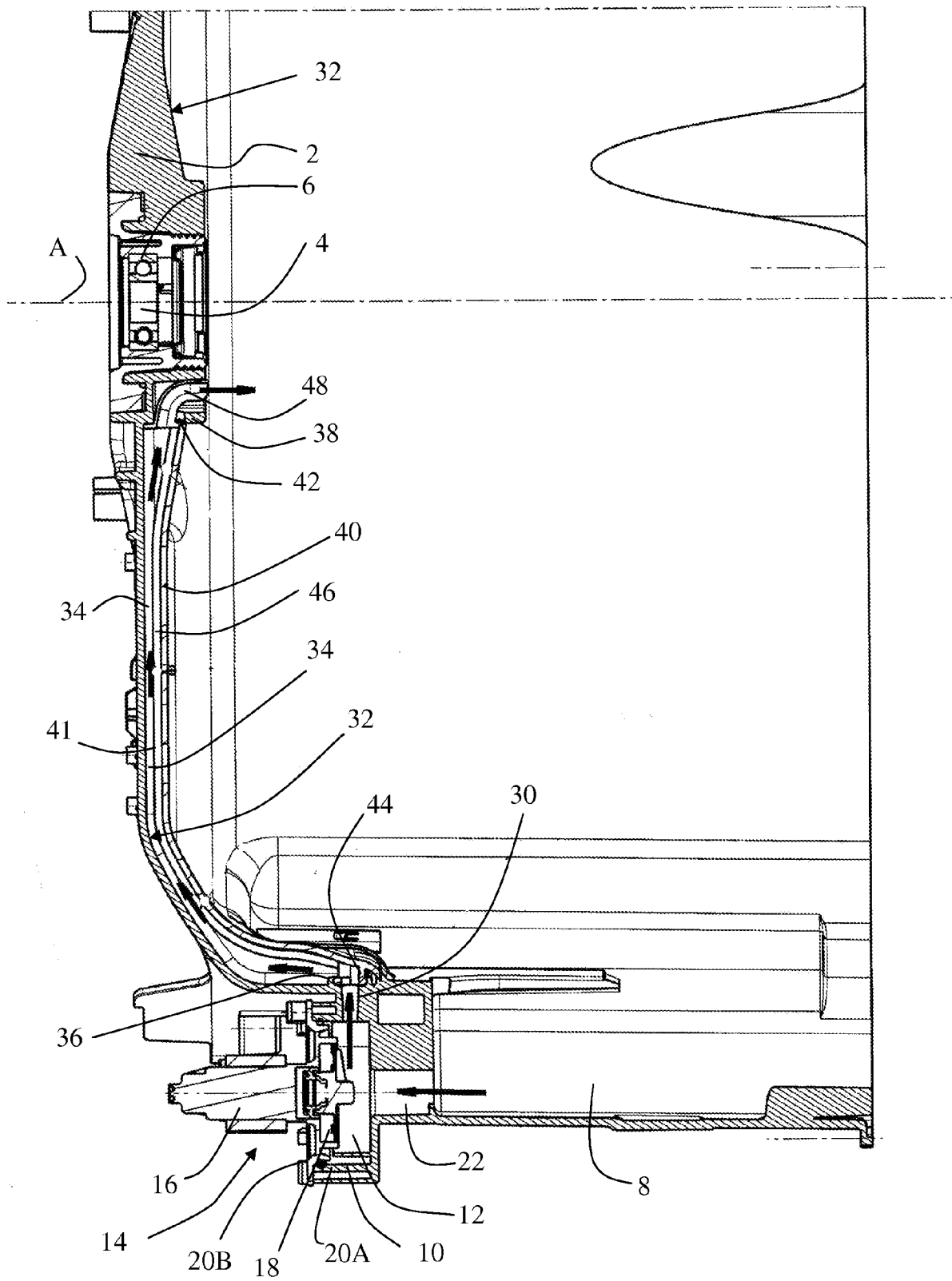


Fig. 2

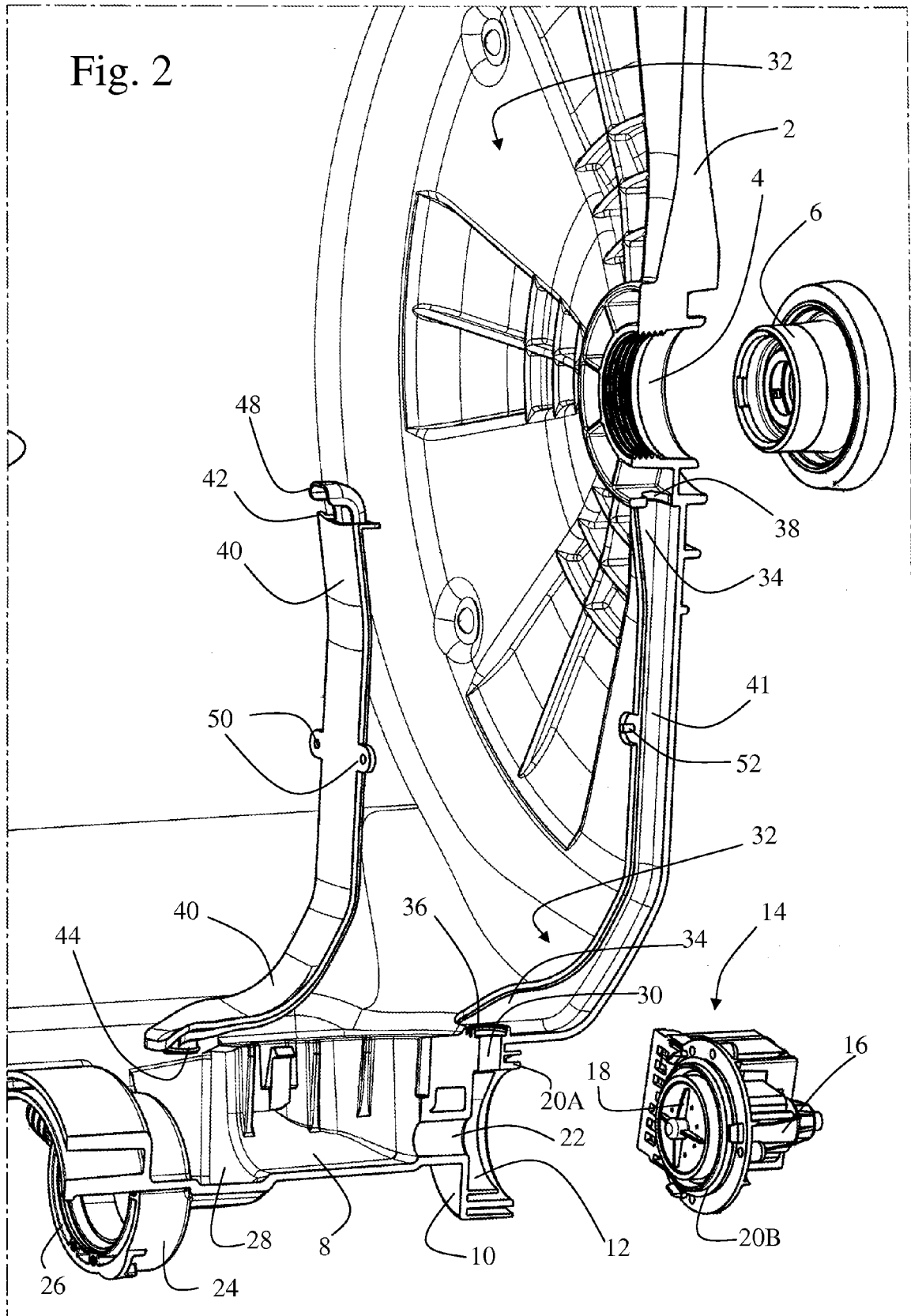


FIG. 3

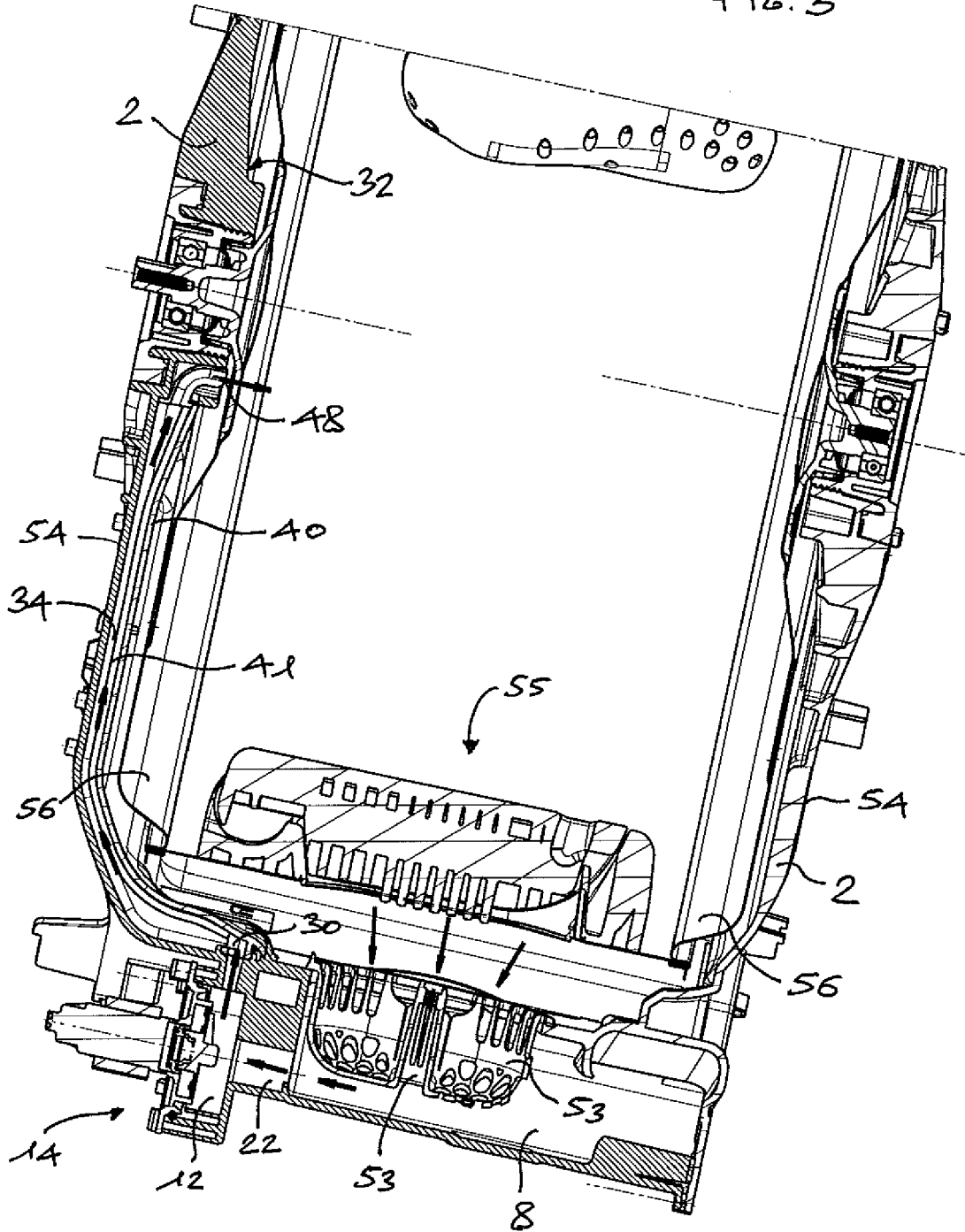
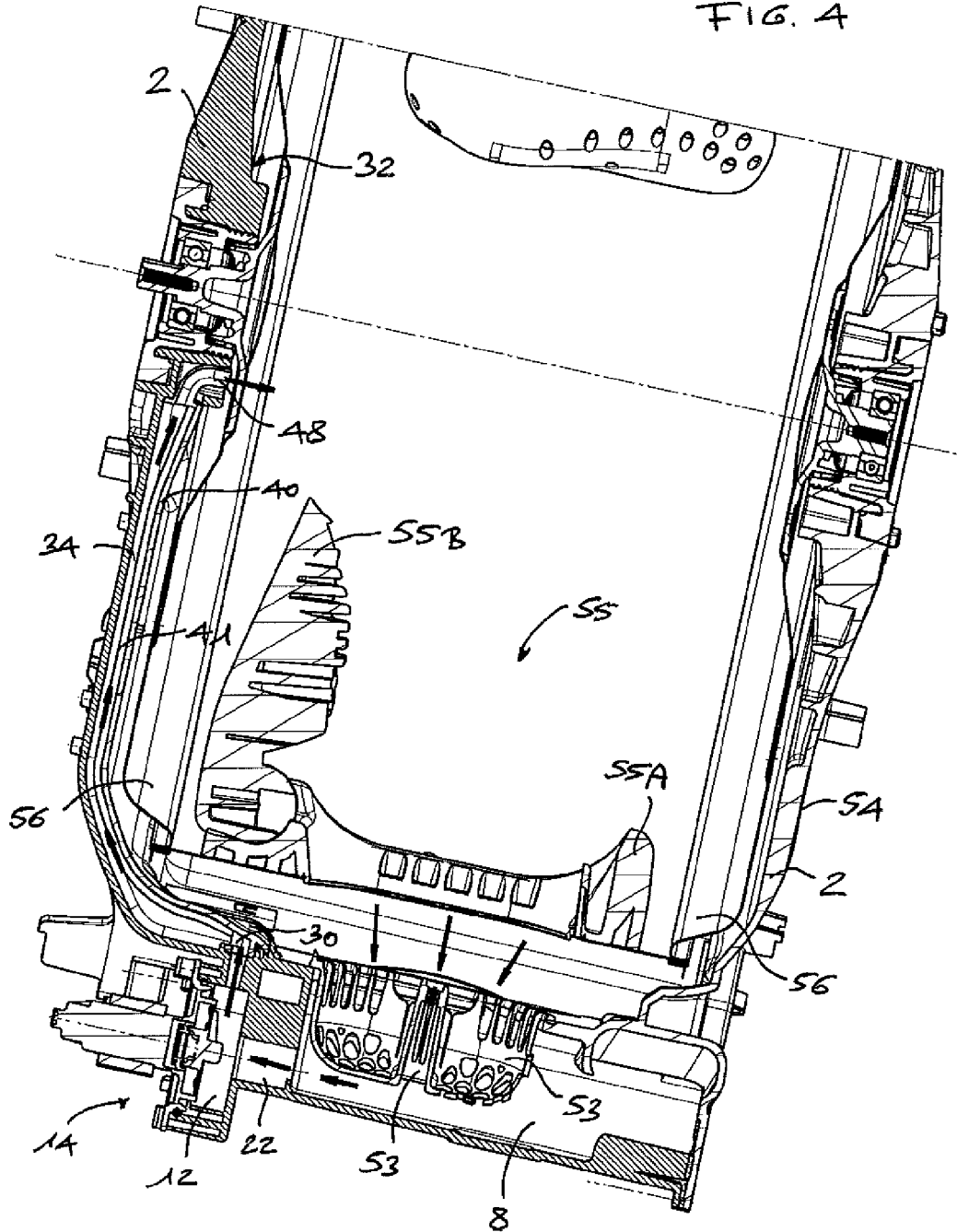


FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 4909

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2007 111161 A (MATSUSHITA ELECTRIC IND CO LTD) 10 May 2007 (2007-05-10) * abstract; figure 1 *	1-15	INV. D06F37/26 D06F39/08
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