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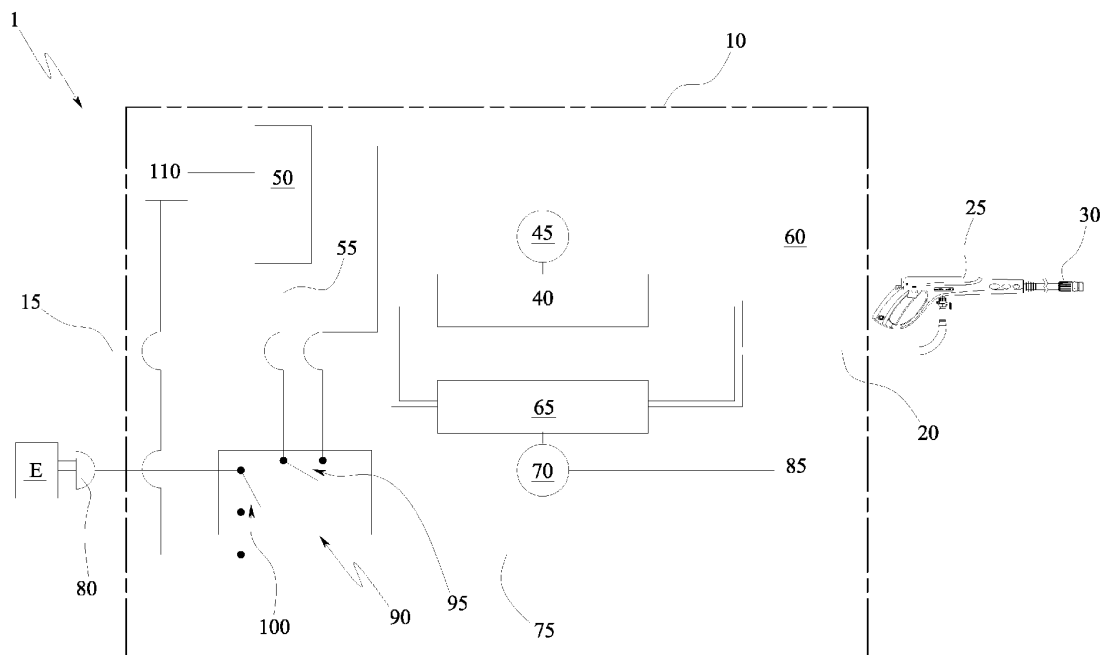
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(54) PRESSURE WASHER PROVIDED WITH AN ELECTRIC BATTERY

(57) A pressure washer (1,1') is described comprising: a first pump (40) and a second pump (65) connected in parallel to each other to an inlet duct (15) of a liquid to be pressurised and to a delivery duct (20) of the pressurised liquid, a first electric motor (45) configured to actuate the first pump (40), a second electric motor (70) configured to actuate the second pump (65), and a selection device (90) configured

to select the first electric motor (45) or the second electric motor (70), wherein the first electric motor (45) is connected to an electric power supply battery (50) through a first electric power supply line (55) and the second electric motor (70) is connected and supplied by an electric distribution network (E) through a second electric power supply line (75).

**FIG.1****EP 3 944 905 A1**

DescriptionTECHNICAL FIELD

[0001] The present invention relates to a pressure washer, i.e., a high-pressure washing device, for cleaning surfaces by generating a jet of liquid under pressure. In particular, the invention relates to a pressure washer provided with a battery and therefore suitable for use where it is not possible to connect to the electric network.

PRIOR ART

[0002] As is well known, high-pressure washing devices, or pressure washers, generally comprise a motor pump, which comprises a pump to which an electric motor is mechanically connected for the purpose of supplying the pump with the mechanical energy necessary to pressurise a washing fluid, such as water, and send it to a delivery duct. Washing devices with two pumps and two motors connected to a single power source are also known, like for example shown in EP3320989.

[0003] The delivery duct is connected to a flexible pipe serving a pressurised liquid dispensing gun, which usually comprises an elongated body provided with a handle to which a dispensing lance supporting a dispensing nozzle at the free end thereof can be associated in a removable manner.

[0004] The dispensing gun also comprises a trigger which is located at the handle and actuates a tap adapted to allow or stop the flow of washing fluid from the pump to the dispensing nozzle.

[0005] In order to be able to operate in environments where it is not possible to connect to the electric network, pressure washers are known to be provided with an electric battery that supplies the motor of the motor pump. In order to improve the versatility of this type of motor pump, it is known to make available a dual power supply of this motor, i.e., either by battery or by connection to the electric network. A washing device of this type is known from document DE102008019524.

[0006] A known problem with this solution is that, in order to operate the pressure washer optimally when supplied by the electric battery, the electric motor of the motor pump is designed to have maximum power and/or maximum efficiency at the typical voltages delivered by the batteries, which are much lower than those of the connection to the electric distribution network (approximately 40V versus 220V). Consequently, when such an electric motor is supplied through the electric network voltage, it is not able to deliver significantly more power than when supplied from the battery, because despite the increased voltage, the motor is optimised for a much lower power supply voltage.

[0007] The object of the present invention is to solve the drawbacks of the prior art, all within the framework of an efficient, rational and robust construction solution.

[0008] Such object is achieved by the features of the

invention indicated in the independent claim. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

5 DISCLOSURE OF THE INVENTION

[0009] The invention, particularly, makes available a pressure washer comprising:

- 10 - a first pump and a second pump connected in parallel with each other to an inlet duct of a liquid to be pressurised and to a delivery duct of the pressurised liquid,
- 15 - a first electric motor configured to actuate the first pump,
- a second electric motor configured to actuate the second pump, and
- a selection device configured to select the first electric motor or the second electric motor,

20 wherein the first electric motor is connected to an electric power supply battery through a first electric power supply line and the second electric motor is connected and supplied by an electric distribution network through a second electric power supply line.

25 **[0010]** Thanks to this solution a pressure washer is made available that can be used in environments where it is not possible to connect to the electric network and that at the same time delivers a fluid at a considerable pressure and flow rate when connected to the electric network. This is because the first motor and the second motor, thanks to the configuration of the electric power supply of the motors envisaged by the invention, can be different from each other, in particular, the first motor can be optimised for low power supply voltages provided by the batteries, while the second motor can be optimised for the power supply through the electric network and therefore present a higher power that translates into a higher pressure and/or flow rate of the fluid delivered by the pressure washer. In addition, compared to well-known pressure washers with dual power supply and single motor, this allows improving the electric efficiency of the motors, as each motor can be supplied at the specific voltage for which it was designed, which is not the case in known devices when the single motor is supplied through the electric network.

30 **[0011]** According to an aspect of the invention, the selection device can be actuated between a first position, in which both of the motors are turned off, a second position, in which the first motor is turned on and the second motor is turned off, and a third position, in which the first motor is turned off and the second motor is turned on.

35 **[0012]** This prevents both pumps from running at the same time, thus avoiding hydraulic problems since, due to the difference between the first motor and the second motor, the pumps deliver different powers.

40 **[0013]** According to another aspect of the invention, the pressure washer may comprise a casing, inside

which the first motor and the second motor are housed, and an electric transformer, housed inside the casing and adapted for charging the electric battery.

[0014] This eliminates the need for external power supplies, which the user has to carry along in order to charge the battery.

[0015] According to a further aspect of the invention, the transformer can be electrically connected to the second power supply line.

[0016] In this way, no additional electrical connections are required to be able to charge the battery.

[0017] According to yet another aspect of the invention, when the selection device selects the second electric motor, the transformer charges the battery.

[0018] This allows to automatically charge the battery while the pressure washer is being used in the configuration connected to the electric network.

[0019] The invention can also provide that the pressure washer can comprise a first pressure-limiting device, which is configured to detect the pressure in the delivery duct and to interrupt the electric power supply of the first electric motor when it detects a pressure greater than a first predetermined threshold value, and a second pressure-limiting device, which is configured to detect the pressure in the delivery duct and to interrupt the electric power supply of the second electric motor when it detects a pressure greater than a second predetermined threshold value, where the first predetermined threshold value is lower than the second predetermined threshold value.

[0020] Thanks to this feature it is possible to increase the useful life of the battery by decreasing the maximum pressure that can be delivered when the first motor is actuated.

[0021] An embodiment of the invention provides a casing inside which the first electric motor and the second electric motor are at least partially contained, a housing seat of the electric battery made in the casing and configured to allow the insertion and the extraction of the battery from outside the casing itself, an electric connector positioned in the housing seat and configured to be coupled with a respective electric connector of the electric battery to form an electric connection with the electric battery, wherein the first electric power supply line connects the electric connector with the first electric motor to power the first electric motor.

[0022] This solution makes it possible, for example, to provide a plurality of batteries that can be charged externally to the pressure washer, so that it is always ready for use as soon as one battery runs out.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Further characteristics and advantages of the invention will become clear from reading the following description provided by way of non-limiting example, with the aid of the figures illustrated in the accompanying tables.

Figure 1 is a schematic view of a first embodiment of the pressure washer.

Figure 2 is a schematic view of a second embodiment of the pressure washer of Figure 1.

Figure 3 is a partial front view of the pressure washers according to the invention.

Figure 4 is a rear view of the pressure washers according to the invention, in which a portion of the casing has been removed allowing part of the internal members to be seen.

DETAILED DESCRIPTION

[0024] With particular reference to these figures, a pressure washer, i.e., a high-pressure washing device, has been indicated with 1,1'.

[0025] The pressure washer 1,1' comprises a box-like casing 10, for example made of plastic material, to which a handle and/or wheels (not illustrated) are preferably associated for handling the pressure washer.

[0026] The pressure washer 1,1' comprises a single inlet duct 15 of the fluid to be pressurised, for example a single inlet duct 15 of the fluid to be pressurised, adapted to be connected to a source of fluid to be pressurised, for example a tank or a water network.

[0027] This inlet duct is at least partially contained inside the casing 10.

[0028] The pressure washer 1,1' further comprises a delivery duct 20 of the pressurised fluid, for example a single delivery duct 20 of the pressurised liquid, and a dispensing gun 25 to which said pressure fluid delivery duct is fluidically connected, for example by means of a flexible pipe. For example, the delivery duct 20 is at least partially contained in the casing 10.

[0029] The dispensing gun 25 comprises a body provided with a handle to which, for example, a dispensing lance 30 is removably associated, which is provided with a dispensing nozzle at one free end thereof. The dispensing gun can be associated with any other cleaning tool as an alternative to the lance, such as a rotary brush.

[0030] The dispensing gun 25 may comprise a trigger that is movable between a first position, in which the dispensing gun does not dispense pressurised fluid, and a second position, in which the dispensing gun dispenses pressurised fluid.

[0031] The pressure washer 1,1' comprises a first hydraulic pump 40, preferably of the fixed displacement type, connected at the inlet to the inlet duct 15 and at the outlet to the delivery duct 20.

[0032] The first hydraulic pump 40 is housed inside the Casing 10.

[0033] The pressure washer 1,1' comprises a first electric motor 45 configured to actuate (only) the first pump 40 in order to pressurise the fluid coming from the inlet duct. That is, the first electric motor 45 is provided with an outlet shaft mechanically connected to the first pump 40 to actuate it so as to pressurise the fluid coming from the inlet duct.

[0034] The first electric motor 45 is housed inside the Casing 10.

[0035] Altogether, the first electric motor 45 and the first pump 40 form a first motor pump of the pressure washer.

[0036] The first electric motor 45 can only be turned on or off and, for example, when it is turned on, it actuates the first pump at a, preferably single, pre-set operating speed (rotation speed) in order to pressurise the fluid.

[0037] The first electric motor 45 is configured to be powered, for example only, by a direct current, preferably at a voltage below 100V, in particular comprised between 30V and 60V. The first electric motor 45 is a DC motor, for example one between a DC motor with brushes and a brushless motor.

[0038] For the power supply of the first electric motor 45, the pressure washer comprises an electric power supply battery 50 to which the first electric motor 45 is connected through a first electric power supply line.

[0039] That is, the first electric motor 45 is connected and supplied by the electric power supply battery 50 through a first electric power supply line 55. In particular, the first motor 45 is supplied solely by the power supply battery 50 and through the first power supply line 55. The first electric power supply line 55 starts at the battery 50 and ends at the first electric motor 45.

[0040] The first electric power supply line 55 may comprise one or more electric power supply cables (electrically conductive), usually a pair of electrical cables, each electrically connected at one end to the battery and at the other end to the first electric motor.

[0041] In the figures, the power supply line is shown schematically as a single wire, but, as mentioned, the electrical cables it may contain are more than one.

[0042] The electric power supply battery 50 has one higher electric potential pole and one lower electric potential pole, the voltage delivered is lower than 100V, preferably comprised between 30V and 60V.

[0043] The cables of the pair of cables are respectively connected, independently of each other, to a respective of said battery poles.

[0044] The first electric motor 45 can be actuated between a first condition, in which it is turned on, i.e., in which it is electrically supplied by the battery 50 and actuates the first pump 40, or in other words again in which it is electrically connected to both the higher electric potential pole and the lower electric potential pole of the battery 50 and actuates the first pump 40, and a second condition, in which it is turned off, i.e., in which it is not electrically supplied by the battery and does not actuate the first pump, or in other words again in which it is not electrically connected, i.e., is disconnected, to both the higher potential pole and the lower potential pole of the electric power supply battery and no electric current flows in the first motor.

[0045] The pressure washer 1, 1' comprises a first pressure-limiting device 60, which is configured to detect a parameter indicative of the pressure in the delivery duct

and to interrupt the electric power supply of the first electric motor when it detects a pressure greater than a first predetermined threshold value.

[0046] In particular, the first pressure-limiting device 60 comprises a sensor, which is configured to detect a parameter indicative of the pressure present in the delivery duct 20, and an electrical switch, placed along the first power supply line 55 so as to be able to interrupt the electrical continuity thereof.

[0047] The electrical switch of the first pressure-limiting device 60 can be actuated, for example directly by the sensor or by an electronic control unit operatively connected to the sensor, in a closed position, in which it allows, i.e. does not interrupt, the electrical continuity in the first power supply line, when the pressure measured by the sensor is below the first predetermined threshold value, and an open position, in which it interrupts the electrical continuity in the first power supply line, when the pressure measured by the sensor is above the first predetermined threshold value.

[0048] The first predetermined threshold value is for example comprised between 15 bar and 60 bar.

[0049] The pressure washer 1, 1' also comprises a second hydraulic pump 65, preferably of the fixed displacement type, connected, at the inlet to the inlet duct 15 and at the outlet to the delivery duct 20, in parallel with respect to the first pump 40.

[0050] The pressure washer 1, 1' comprises a second electric motor 70 configured to actuate (only) the second pump 65 in order to pressurise the fluid coming from the inlet duct. That is, the second electric motor 70 is provided with an outlet shaft mechanically connected to the second pump 65 to actuate it so as to pressurise the fluid coming from the inlet duct. Altogether the second electric motor 70 and the second pump 65 form a second motor pump of the pressure washer.

[0051] The second electric motor 70 can only be turned on or off and, for example, when it is turned on, it actuates the second pump 65 at a, preferably single, pre-set operating speed (rotation speed) in order to pressurise the fluid.

[0052] The second electric motor 70 is configured to be supplied, for example only, through connection to an electric distribution network E, preferably at a voltage of 100V or comprised between 120V and 127V or comprised between 220-240V, depending on the standard adopted by the various countries. In particular, the present architecture of the electric motors is particularly advantageous when the voltage of the electric distribution network is comprised between 220V and 240V, therefore very different from the power supply voltage of the battery.

[0053] The second electric motor 70 is an AC motor.

[0054] In particular, the second electric motor 70 is connected and supplied (solely) by an electric distribution network through a second electric power supply line 75.

[0055] For example, the second electric power supply line 75 starts at an electrical connector and/or electrical

plug 80 (such as for example the electrical plugs that can be coupled to electrical sockets built into walls) and ends at the second electric motor.

[0056] The second electric power supply line 75 may comprise one or more electric power supply cables (electrically conductive), typically a pair of electrical cables, each electrically connected at one end to the electrical connector/plug and at the other end to the second electric motor.

[0057] The electrical connector/plug 80 protrudes from the outside of the casing 10.

[0058] The electric network to which the second power supply line is to be connected generally has one higher electric potential pole and one lower electric potential pole, and the cables of the pair of cables are respectively connected, independently of each other, to a respective of said poles.

[0059] The second electric motor 70 can be actuated between a first condition, in which it is turned on, i.e. in which it is electrically supplied by the electric distribution network E and actuates the second pump 65, or in other words again in which it is electrically connected both to the pole at higher electric potential and to the pole at lower electric potential of the electric network E, and a second condition, in which it is turned off, i.e. in which it is not electrically supplied by the electric distribution network E and does not actuate the second pump 65, or in other words again in which it is not electrically connected, i.e. is disconnected, to both the higher potential pole and to the lower potential pole of the electric distribution network E and no electric current flows in the second motor.

[0060] The pressure washer 1,1' comprises a second pressure-limiting device 85, which is configured to detect a parameter indicative of the pressure in the delivery duct and to interrupt the electric power supply of the second electric motor when it detects a pressure greater than a second predetermined threshold value.

[0061] In particular, the second pressure-limiting device 85 comprises a sensor configured to detect a parameter indicative of the pressure of the delivery duct and an electrical switch, placed along the second power supply line 75 so as to be able to interrupt the electrical continuity thereof.

[0062] The electrical switch of the second pressure-limiting device can be actuated, for example directly by the sensor or by an electronic control unit operatively connected to the sensor, in a closed position, in which it allows, i.e. does not interrupt, the electrical continuity in the second power supply line 75, when the pressure measured by the sensor is below the second predetermined threshold value, and an open position, in which it interrupts the electrical continuity in the second power supply line, when the pressure measured by the sensor is above the second predetermined threshold value.

[0063] The second predetermined threshold value is, for example, greater than 65 bar.

[0064] The first pressure-limiting device 60 and the second pressure-limiting device 85 are distinct and inde-

pendent of each other.

[0065] The pressure washer 1,1' comprises a selection device 90 configured to select the first electric motor 45 or the second electric motor 70.

[0066] It should be noted that by selecting it is meant selecting the turning on and off of a respective motor, i.e., it means connecting or disconnecting the first electric motor 45 with respect to the power supply battery 50 and the second electric motor 70 with respect to the electric power supply network E.

[0067] In other words again, by selecting it is meant interrupting or not interrupting the electrical continuity of the first electric power supply line 55 and of the second electric power supply line 75 respectively, for example in a section of said line upstream of the respective pressure limiter (i.e. in a section respectively comprised between the battery and the first pressure limiter as regards the first electric power supply line and between the electric network and the second pressure limiter as regards the second electric power supply line) so as to allow or prevent the passage of electric current to the first electric motor or to the second electric motor.

[0068] The first electric motor 45 and the second electric motor 70 are electrically connected respectively to the battery 50 and to the electric network E by interposition of the selection device 90, which therefore intercepts the first power supply line and the second power supply line.

[0069] For example, the selection device 90 comprises at least one switch 95 placed on the first power supply line 55 and at least one switch 100 placed on the second power supply line 75, each of which is configured to selectively interrupt the electric continuity on the respective line.

[0070] Each switch is movable between a closed position, in which it allows the passage of an electric current along the power supply line, i.e., it does not interrupt the electric continuity of the power supply line, and an open position, in which it interrupts the electric continuity of the power supply line, i.e., which means preventing the passage of electrical current along the power supply line.

[0071] The switches 95,100 of the selection device 90 are preferably separate, distinct and independent of the switches of the pressure-limiting devices.

[0072] In the illustrated embodiment, the selection device 90 can be actuated in three positions of which a first position, in which the first electric motor 45 and the second electric motor 70 are both turned off, i.e. are disconnected from the electric power supply battery 50 and from the electric network E respectively, a second position in which only the second electric motor 70 is turned on and the first electric motor 45 is turned off, i.e., in which the second electric motor 70 is connected and supplied by the electric network and the first electric motor is disconnected from the electric power supply battery, and a third position in which the first electric motor 45 is turned on and the second electric motor 70 is turned off, i.e., in which the first electric motor is connected and supplied

by the electric power supply battery and the second electric motor is disconnected from the electric power supply network.

[0073] In detail, in the first position the switch 95 on the first power supply line and the switch 100 on the second power supply line are both in the open position, in the second position the switch 95 on the first power supply line is in the open position and the switch 100 on the second power supply line is in the closed position, in the third position the switch 95 on the first power supply line is in the closed position and the switch 100 on the second power supply line is in the open position.

[0074] For example, the first selection device can only be actuated in said three positions.

[0075] The selection device is preferably of the manual type.

[0076] It should be noted that "manual type" means that it can be activated manually, preferably only manually activable by an operator.

[0077] For example, the selection device 90 comprises, i.e. consists of, a single switch apparatus, which contains the switches 95, 100 on the above-described power supply lines, configured to be selectively positioned in the three positions described above and a selection body that is contactable/ grippable directly by the user, e.g. a knob 105, for selecting the positions, e.g. hooked, to the casing 10, in particular, in such a way that it can be accessed externally to the casing itself.

[0078] The selector apparatus comprises an electric selector (not illustrated), e.g., moved by the selector body, which is configured so that when actuated it opens and or closes the switches of the selection device.

[0079] It is not excluded that in an alternative embodiment not illustrated, the selection device may comprise a microprocessor configured to selectively turn the motors on and off and a control interface configured to actuate the microprocessor.

[0080] Further, it is not excluded that in an alternative embodiment not illustrated, the switches 95, 100 placed on the power supply lines, are controllable individually and independently of each other by means of two respective manual controls independent of each other, such as for example two lever switches or two rocker switches or two bistable buttons positioned on the casing 10.

[0081] The pressure washer 1 may comprise an electric transformer 110 housed inside the casing 10 and adapted for allowing the electric battery 50 to be charged.

[0082] Specifically, an electric transformer is defined as an electrical device configured to transform an alternating current into direct current by varying the voltage difference of the incoming alternating current with respect to the outgoing alternating current. In addition, a transformer comprises or is associated with electronic circuitry adapted to monitor the charging percentage of the battery and to interrupt the charging when the charging percentage is at its maximum.

[0083] The pressure washer is conformed in such a way that when the second motor 70 is selected, i.e., when

it is electrically supplied, the battery 50 is charged through the electric transformer 110.

[0084] In particular, the pressure washer is configured in such a way that when the selection device 90 is in the third position, the transformer automatically charges the battery 50, i.e., when the selection device is in the third position, the transformer is automatically connected and supplied by an input current coming from the electric network E. This connection to the network may take place through the second electric power supply line 75. However, it is not ruled out that in an embodiment not illustrated, this connection could be made through a further electric power supply line.

[0085] The transformer 110 is preferably electrically connected to the second power supply line 75, from which it receives an incoming electrical current. In particular, the transformer 110 is electrically connected to the second power supply line, for example in an intermediate position between the selection device 90 and the second electric motor 70, or between the selection device 90 and the second pressure-limiting device 85, so as to be interposed between the second electric power supply line 75 and the electric battery 50.

[0086] In such a configuration, in which the transformer is connected to the second power supply line in a position comprised between the selection device 90 and the second electric motor 70, and the selection device is in the third position, the electric current arrives through the second power supply line simultaneously at the second electric motor 70 and at the transformer 110, thereby charging the electric power supply battery 50 when the second electric motor is in use.

[0087] Another configuration, not illustrated, that allows the battery to be charged automatically when the selection device is in the third position provides for the transformer to be connected to the electric network through a third power supply line connected to the second power supply line at a point comprised between the connector/plug and the selection device, or through an electric power supply line that is independent of the first and of the second one and which allows the connection to the electric network. In such a case, the selection device comprises a switch placed on the third electric power supply line and actuatable between an open position, in which it interrupts the electrical continuity of the third power supply line, and a closed position, in which it allows a current to flow in the third power supply line, and which is actuated between said positions in accordance with the switch placed on the second power supply line of the selection device.

[0088] In a first embodiment of the pressure washer indicated with 1 and illustrated in figure 1, the electric battery 50 is housed inside the casing 10 (in a non-removable manner except during maintenance operations involving the disassembly of the casing).

[0089] In such a case, the cables of the first electric power supply line 55 directly connect one higher electrical potential pole and one lower electrical potential pole

of the battery 50 to the first electric motor 45.

[0090] Furthermore, in such an embodiment, the pressure washer 1 comprises the transformer 110, which is preferably housed in the casing 10 (in a non-removable manner except during maintenance operations involving the disassembly of the casing) and is connected to the second power supply line 75 in the portion comprised between the selection device 90 and the second electric motor 70, that is the portion comprised between the selection device 90 and the second pressure-limiting device 85.

[0091] In a second embodiment of the pressure washer indicated with 1' and illustrated in figure 2, the electric power supply battery 50 is removably associated with the casing 10 and preferably the pressure washer 1 does not comprise a transformer housed inside the casing.

[0092] In this case, charging the electric power supply battery 50 can be carried out using a transformer external to the pressure washer and independent of the connection to electric network of the pressure washer.

[0093] The pressure washer 1' then comprises a housing seat 115 for the electric power supply battery 50 made in the casing and configured to allow the insertion and the extraction of the battery from outside the casing itself.

[0094] In such an embodiment, the pressure washer 1' comprises an electric connector 120 positioned in the housing seat and configured to be coupled to a respective electric connector 125 installed on the electric battery 50 to form an electric connection between the electric battery and the first power supply line 55.

[0095] In this embodiment, the first electric power supply line 55 connects, for example only, the electric connector 120 positioned in the housing seat 115 with the first electric motor 45 to supply the first electric motor.

[0096] In detail, the cables of the first electric power supply line start from the electric connector 120 positioned in the housing seat 115 and end at the first electric motor.

[0097] The operation of the invention is as follows.

[0098] When the user is in a place where the connection to the electric network is not possible, he can operate the pressure washer by selecting the first electric motor, i.e., by actuating the knob of the selection device in the second position where the electric power supply battery 50 is electrically connected to the first electric motor 45 and supplies it.

[0099] In this case the first electric motor 45 actuates the first pump 40, thereby increasing the pressure of the liquid in the delivery duct. When the first predetermined pressure threshold value is reached in this duct, the first pressure-limiting device interrupts the electrical continuity of the first power supply line, thus turning off the first electric motor. This condition is generally achieved when the user is not requesting for fluid to be dispensed through the gun. As soon as the user requests fluid to be dispensed, the pressure in the delivery duct drops below the first predetermined threshold value and the first pressure-limiting device then re-establishes the electrical

continuity of the first electric power supply line, so that the connection of the first electric motor to the battery is resumed.

[0100] If, on the other hand, the user is in a place where the connection to the electric distribution network is possible, e.g., by inserting the plug/connector of the pressure washer into a corresponding electrical outlet, he can select the second electric motor 70 for dispensing a pressurised fluid at a higher pressure/flow rate than when the first motor is supplied. To do this, the user simply needs to act on the knob of the selection device and move it to the third position.

[0101] In this case the second electric motor 70 actuates the second pump 65, thereby increasing the pressure of the liquid in the delivery duct. When the first predetermined pressure threshold value is reached in this duct, the first pressure-limiting device interrupts the electrical continuity of the first power supply line, which does not create any problems because the first power supply line is already interrupted by the selection device. When the second predetermined pressure threshold value is reached, the second pressure-limiting device interrupts the electrical continuity of the second power supply line, thus turning off the second electric motor. As soon as the user requests fluid to be dispensed, the pressure in the delivery duct drops below the second predetermined threshold value and the second pressure-limiting device re-establishes the electrical continuity of the second power supply line, so that the connection of the second electric motor to the electric network is resumed.

[0102] During use in the third position, in the embodiment shown in Figure 1, the transformer is electrically connected to the second electric power supply line when the selection device is in the third position, thus allowing the electric battery to be charged.

[0103] In the case of the embodiment illustrated in figure 2, the electric battery must be charged by extracting the battery and charging it through a transformer external to the pressure washer. This configuration offers the convenience of being able to use the pressure washer for a prolonged time by means of battery power supply if the user has more than one battery.

[0104] The invention thus conceived is susceptible to several modifications and variations, all falling within the scope of the inventive concept.

[0105] Moreover, all the details can be replaced by other technically equivalent elements.

[0106] In practice, the materials used, as well as the contingent shapes and sizes, can be whatever according to the requirements without for this reason departing from the scope of protection of the following claims.

Claims

1. Pressure washer (1,1') comprising:

- a first pump (40) and a second pump (65) con-

connected in parallel with each other to an inlet duct (15) of a liquid to be pressurised and to a delivery duct (20) of the pressurised liquid,

- a first electric motor (45) configured to actuate the first pump (40),
- a second electric motor (70) configured to actuate the second pump (65), and
- a selection device (90) configured to select the first electric motor (45) or the second electric motor (70),

wherein the first electric motor (45) is connected to an electric power supply battery (50) through a first electric power supply line (55) and the second electric motor (70) is connected and supplied by an electric distribution network (E) through a second electric power supply line (75).

2. Pressure washer (1,1') according to claim 1, wherein the selection device (90) can be actuated between a first position, in which both of the motors (45,70) are turned off, a second position, in which the first electric motor (45) is turned on and the second electric motor (70) is turned off, and a third position, in which the first electric motor (45) is turned off and the second electric motor (70) is turned on.
3. Pressure washer (1) according to any one of the previous claims, comprising a casing (10), inside which the first electric motor (45) and the second electric motor (70) are housed, and an electric transformer (110), housed inside the casing (10) and adapted for charging the electric power supply battery (50).
4. Pressure washer (1) according to claim 3, wherein the electric transformer (110) is electrically connected to the second electric power supply line (75).
5. Pressure washer (1) according to claim 3 or 4, wherein when the selection device (90) selects the second electric motor (70), the electric transformer (110) charges the electric power supply battery (50).
6. Pressure washer (1') according to claim 1, comprising a casing (10) inside which the first electric motor (45) and the second electric motor (70) are at least partially contained, a housing seat (115) of the electric power supply battery made in the casing (10) and configured to allow the insertion and the extraction of the battery from outside the casing itself, an electric connector (120) positioned in the housing seat and configured to be coupled with a respective electric connector (125) of the electric battery to form an electric connection with the electric power supply battery (50), wherein the first electric power supply line (55) connects the electric connector (120) with the first electric motor (45) to power the first electric motor itself.

7. Pressure washer (1,1') according to claim 1, comprising a first pressure-limiting device (60), which is configured to detect the pressure in the delivery duct (20) and to interrupt the electric power supply of the first electric motor (45) when it detects a pressure greater than a first predetermined threshold value, and a second pressure-limiting device (85), which is configured to detect the pressure in the delivery duct (20) and to interrupt the electric power supply of the second electric motor (70) when it detects a pressure greater than a second predetermined threshold value, where the first predetermined threshold value is lower than the second predetermined threshold value.

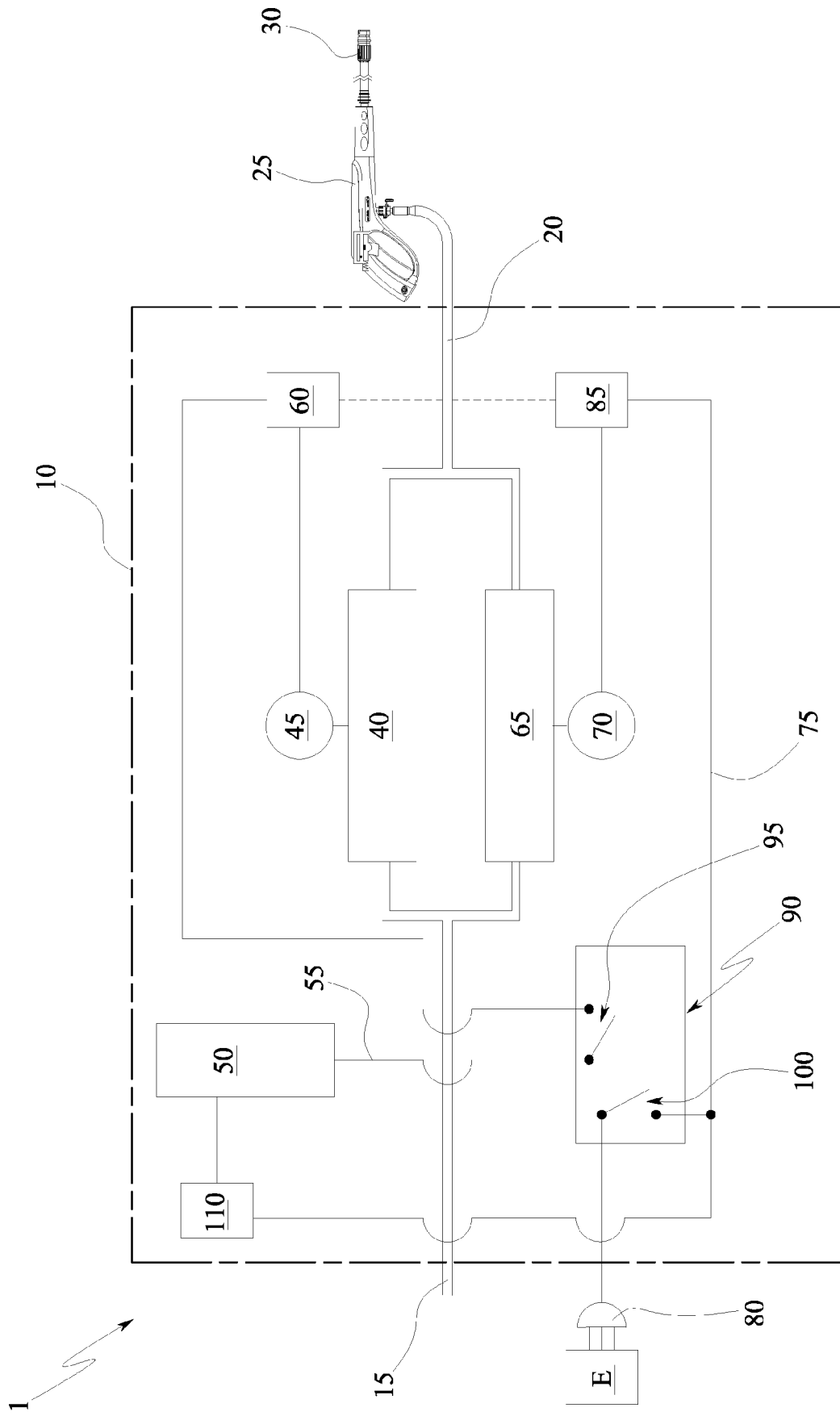


FIG. 1

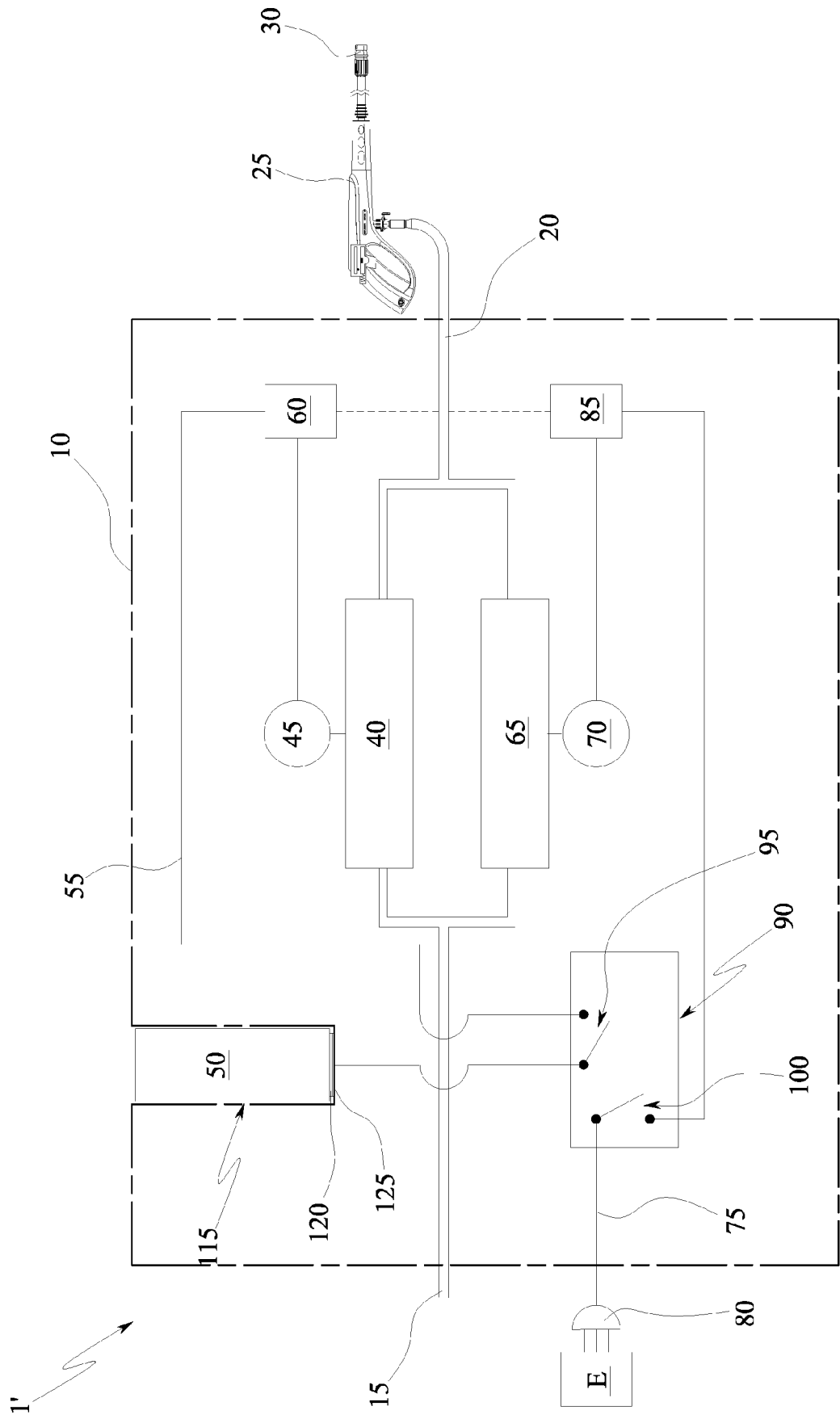
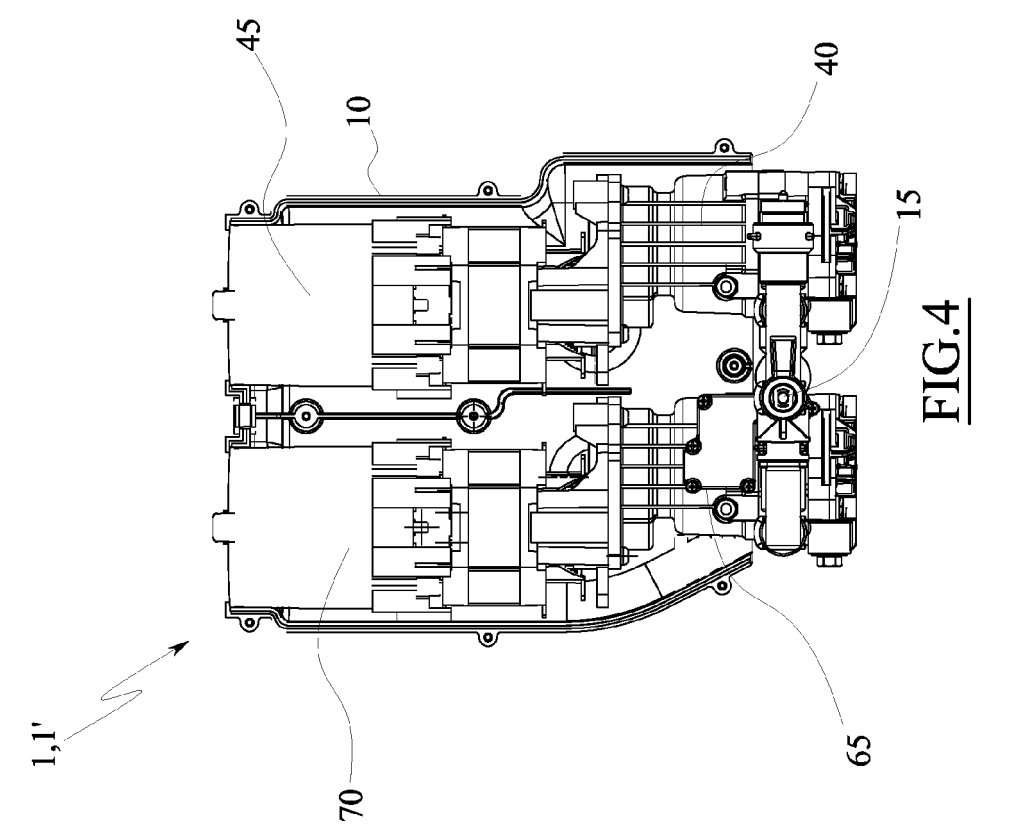
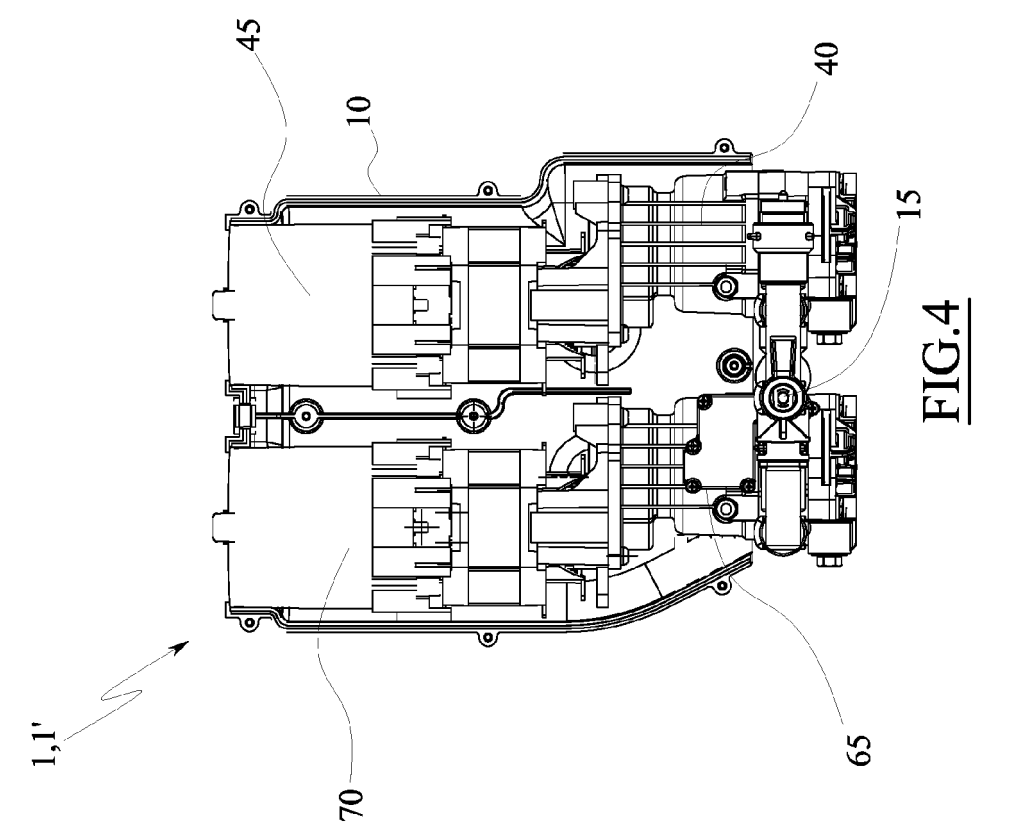


FIG.2





EUROPEAN SEARCH REPORT

Application Number

EP 21 18 0789

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			B08B
4 The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 December 2021	Examiner Plontz, Nicolas
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