DESCRIPTION

WELDING MACHINE

[0001] The present invention relates to welding devices comprising electrodes in the form of welding wheels, making it possible to weld together the parts to be welded.

[0002] Current welding machines comprise drive wheels as well as welding wheels making it possible to weld the parts to be welded, as well as a drive member able to drive in rotation at least the drive wheels along the parts to be welded. The welding wheels are supplied with electric current during the movement of the welding machine by means of an electric current unit, ensuring the welding of the parts to be welded. Current welding machines are able to follow welding instructions entered by an operator, prior to the implementation of a welding method by said welding machine.

[0003] However, a problem of current welding machines lies in that they do not allow continuous monitoring of the welding instructions during the welding process and thus have no means to enable parameters of the welding machine to be controlled. Also, current welding machines do not offer means for correcting the parameters of the welding machine directly during the welding process and must be stopped each time a correction must be made during the welding process.

[0004] Thus, the aim of the present invention is to propose a welding machine able to continuously control the parameters of the welding machine during the welding process and to ensure an at least partially automatic correction of the parameters of the welding machine, directly during the welding of the parts to be welded. The invention therefore proposes a welding machine that is at least partially autonomous in the monitoring and control of the welding process.

[0005] The invention therefore relates to a machine for welding at least two parts to be welded, the welding machine comprising at least one mobile assembly which comprises at least one pair of drive wheels intended to move said mobile assembly relative to the parts to be welded and at least one welding head comprising at least two welding wheels able to produce a weld intended to secure the parts to be welded by rolling the welding wheels against the parts to be welded, the welding machine comprising a unit for controlling the welding head, the control unit being able to control parameters of the welding machine chosen from: the contact pressure of the welding wheels against the parts to be welded and/or the speed of movement of the mobile assembly along the parts to be welded and/or the intensity of an electric current passing through the welding wheels and/or the durations of the pulses of electric current passing through the welding wheels and/or the position of the mobile assembly relative to the parts to be welded.

[0006] The welding machine according to the invention can be used for example to weld two raised edges together and/or with an anchoring wing of a sealed membrane constituting a wall of a tank for storing and/or transporting cryogenic products such as liquefied natural gas.

[0007] For this purpose, the welding machine comprises at least the pair of drive wheels providing, by means of a drive member controlled by the control unit, the movement of the mobile assembly along the parts to be welded in a rectilinear welding direction, otherwise called the forward direction of the welding machine. The drive member may for example be an electrical, hydraulic, pneumatic or even mechanical drive member. Preferably, the drive member in the context of the invention is an electric motor.

[0008] The welding wheels make it possible to produce the weld by contact with at least one of the parts to be welded, which may be at least one of the raised edges or the anchoring flange. More specifically, and according to a non-limiting example of the invention, when welding the parts to be welded,

the movement of the welding machine relative to the parts to be welded causes the rotation of the welding wheels against the parts to be welded and an electric current supplied by an electrical supply unit and passing through said welding wheels makes it possible to form a weld bead on said parts to be welded. The pressure of the welding wheels against the parts to be welded can be ensured by a pressurization device controlled by the control unit. The pressurization device may for example be a hydraulic cylinder.

[0009] Furthermore, the intensity of the electric current passing through the welding wheels is managed by a current converter, the latter being able to be controlled by the control unit. The pulsation times of the electric current are controlled by the control unit, in combination with the transformer.

[0010] The position of the mobile assembly relative to the parts to be welded can be ensured by a positioning member controlled by the control unit.

[0011] The function of the control unit of the welding machine is to at least partially control some of the parameters of the welding machine. The term “control” means that the control unit is able to process information received in relation to said parameters such as values of said parameters in order on the one hand to ensure their compliance with expected reference thresholds for these parameters, and on the other hand, if necessary, to adjust these values so that they converge towards said reference thresholds. Thus, the advantage of such a control unit is that on its own it enables the monitoring and adjustment of the welding machine parameters in an at least partially autonomous manner.

[0012] It is also understood that the measurement of the pulses of the electric current passing through the welding wheels is carried out at times when said electric current is injected into said welding wheels. Each pulse is defined by two values, a first value corresponding to a maximum current intensity flowing through the welding wheels, and a second value corresponding to a minimum current intensity flowing through the welding wheels. Thus, the pulses of the

electric current passing through the welding wheels correspond to an alternation of these maximum current intensities and of these minimum current intensities. It should be noted that these pulses nevertheless generate continuous welding.

[0013] The duration during which the welding wheels have maximum intensity passing through them is called hot time, while the duration during which the welding wheels have the minimum intensity passing through them is called cold time.

[0014] The minimum intensity is lower than the maximum intensity. Preferably, this minimum intensity is non-zero.

[0015] According to a preferred example, the minimum intensity has a value equal to 10% of the maximum intensity. This feature makes it possible to optimize the energy necessary to produce a continuous weld.

[0016] According to a feature of the invention, the control unit is able to receive values of the different parameters of the welding machine so as to control them.

[0017] It is understood that the control unit receives the values of the different parameters of the welding machine in such a way as to process them and allow for the monitoring of said parameters of the welding machine.

[0018] According to a feature of the invention, the welding machine comprises at least one control interface capable of at least displaying the values of the different parameters at least of the welding machine.

[0019] It is understood that the control unit, receiving the values of the parameters of the welding machine, sends said values to the control interface,

thus allowing an operator to monitor the parameters of the welding machine directly during the welding process.

[0020] According to one feature of the invention, the control interface is an input member for the reference thresholds of the different parameters of the welding machine.

[0021] It is understood that the control interface is capable of integrating the reference thresholds entered by the operator and transferring them to the control unit such that the control unit is able to process the values of the parameters received relative to their respective reference thresholds, entered by the operator in the control interface.

[0022] According to a feature of the invention, the welding machine comprises at least one device for cooling the welding head, the control unit being able to control parameter values of the cooling device.

[0023] The welding wheels cooling device comprises an internal circuit making a cooling liquid circulate as close as possible to the welding wheels, this circuit further comprising a tank and a pump.

[0024] According to one feature of the invention, the parameters of the cooling device comprise at least one parameter from: the flow rate of a cooling liquid which circulates in the welding machine and/or the temperature of said cooling liquid.

[0025] According to one feature of the invention, the welding machine comprises a first determination means capable of detecting values of the parameter relating to the contact pressure of the welding wheels against the parts to be welded and/or a second determination means capable of detecting values of the parameter relating to the speed of movement of the mobile assembly along the parts to be welded and/or a third determination means

capable of detecting values of the parameter relating to the intensity of the electric current passing through the welding wheels and/or a fourth determination means capable of detecting values of the parameter relating to the position of the mobile assembly relative to the parts to be welded and/or a fifth determination means capable of detecting values of the parameter relating to the durations of the pulses of electric current passing through the welding wheels.

[0026] The determination means may for example be a sensor which determines values of different parameters or else a device which can determine the value of the parameter from another parameter measured elsewhere. It is understood that the determination means make it possible to detect the values of the parameters in order then to send them to the control unit so that it processes them.

[0027] According to one feature of the invention, the welding machine comprises a carriage that is remote from the mobile assembly and connected thereto by a wiring harness, the control unit being carried by the mobile assembly or by the carriage.

[0028] The carriage of the welding machine is intended to carry certain elements of the welding machine such as the tank of the cooling device or else the electrical supply unit and the control interface. According to a preferred embodiment of the invention, the control unit is carried by the mobile assembly of the welding machine.

[0029] According to a feature of the invention, the mobile assembly comprises at least one electrical converter. The converter comprises, inter alia, a rectifier bridge, a capacitor and an inverter and in particular makes it possible to transform a 50 Hz alternating current supplied by the electrical power supply unit of the welding machine into a 1000 Hz alternating current in order to deliver

it to a transformer/rectifier which will transform this 1000 Hz alternating current into a pulsed electric current delivered to the welding wheels.

[0030] According to a feature of the invention, the electrical converter and the control unit are carried by the same printed circuit board. It is understood that according to a preferred embodiment, the printed circuit board bearing the converter and the control unit is carried by the mobile assembly of the welding machine.

[0031] According to a feature of the invention, the control of the parameters and/or the reception of the parameter values is carried out continuously between a starting position of the mobile assembly and an arrival position of the mobile assembly.

[0032] In other words, the control of the parameters and/or the reception of the parameter values is carried out continuously during the entire process of welding the parts to be welded.

[0033] The invention also relates to a method for controlling the welding of at least two parts to be welded by a welding machine according to any one of the preceding features, the welding control method comprising at least:

- an input step in the reference threshold control interface of at least a first parameter of the welding machine;
- a step of receiving by the control unit at least one measured value of the first parameter of the welding machine;
- a step of comparing by the control unit at least one measured value of the first parameter with the reference threshold of the first parameter;
- a step of controlling by the control unit at least one of the parameters of the welding machine if there is no convergence between the measured value of the first parameter with the reference threshold of the first parameter.

[0034] It is understood here that, according to a first alternative, the control unit is able to modify the first parameter so that the next measured values of said first parameter converge with the reference threshold of the first parameter. Furthermore, according to a second alternative, the control unit is able to modify a parameter different from the first parameter so that the next measured values of the first parameter converge with the reference threshold of the first parameter.

[0035] According to a feature of the invention, the control step comprises a step of adjusting at least one of the parameters of the welding machine during the welding of the parts to be welded, in order to make the measured value of the first parameter converge with the reference threshold of the first parameter. In other words, it is understood that the control unit is able to correct a fault of at least one of the parameters of the welding machine autonomously, so as to make the next measured values of the first parameter converge with the reference threshold of said first parameter.

[0036] According to one feature of the invention, the control step comprises a step of stopping the welding of the parts to be welded when the at least one measured value of the first parameter diverges from the reference threshold of the first parameter by more than 5 to 20%.

[0037] It is understood that when the value of the measured parameter becomes too far from the reference threshold, the control unit stops the welding method so that a correction can be provided, for example by the operator.

[0038] According to a feature of the invention, the method is carried out continuously between a starting position of the mobile assembly and an arrival position of said mobile assembly.

[0039] According to one feature of the invention, during the receiving step, the control unit records the detected values of the different parameters.

[0040] Other features, details and advantages of the invention will emerge more clearly on reading the description given below by way of indication, in relation to the drawings, in which:

Fig. 1 is a general perspective view of a tank for storing and/or transporting cryogenic products, comprising at least two parts to be welded that form a sealed membrane of the tank;

Fig. 2 is a perspective view of a welding machine according to the invention, able to weld the two welding parts of Figure. 1;

Fig. 3 is a flowchart of the steps of a method for controlling the welding of the parts to be welded by the welding machine according to the invention.

[0041] It should first of all be noted that while the figures set out the invention in detail for its implementation, these figures can of course be used to better define the invention where appropriate. It should also be noted that these figures only show exemplary embodiments of the invention. Finally, the same references designate the same elements in all the figures.

[0042] Figure 2 shows a welding machine 1 configured to move along at least two parts to be welded 2. More specifically, the parts to be welded 2 constitute a sealed membrane 4 of a wall 6 of tank 8 for storing and/or transporting cryogenic products, for example liquefied natural gas, visible in figure 1.

[0043] The welding machine 1 comprises at least one mobile assembly 10 which has a substantially parallelepipedal shape and which extends in a main extension direction P parallel to a longitudinal direction L of the welding machine 1. The mobile assembly 10 of the welding machine 1 is intended to move along the parts to be welded 2 and for that purpose comprises at least one pair of drive wheels 12 intended to move said welding machine 1 relative to the parts to be welded. More particularly, the drive wheels 12 are arranged

in contact with the parts to be welded 2 by means of a pressurizing device 13, such as for example a hydraulic cylinder, and a drive member, not visible, makes it possible to drive them in rotation against the parts to be welded, thus moving the mobile assembly 10 of the welding machine 1. The drive member may for example be an electrical, hydraulic, pneumatic or even mechanical drive member. Preferably, the drive member in the context of the invention is an electric motor. According to the illustrated example of the invention, the mobile assembly 10 of the welding machine 1 comprises two pairs of drive wheels 12 arranged opposite one another in the main extension direction P of the mobile assembly 10.

[0044] The mobile assembly 10 further comprises a welding head 14 comprising at least two welding wheels 16 able to produce a weld intended to secure the parts to be welded by rolling said welding wheels 16 against the parts to be welded. In the illustrated example of the invention, the welding head 14 is arranged between the two pairs of drive wheels 12 in the main direction of extension P of the mobile assembly 10. The welding head 14 further comprises at least one device 15 for pressurizing the welding wheels 16 against the parts to be welded 2, the pressurizing device 15 being able to take the form, for example, of hydraulic cylinders.

[0045] The welding machine 1 further comprises at least one cooling device 18 intended to cool at least the welding head 14. More particularly, the cooling device 18 is composed of an internal circuit, not visible, circulating a cooling liquid as close as possible to the welding wheels 16, the cooling device 18 further comprising a coolant tank 20, a pump and a cooling unit, not visible. Such a cooling device 18 makes it possible in particular to avoid overheating of the welding wheels 16 during the operation of the welding machine 1.

[0046] The welding machine 1 also comprises a carriage 22, remote from the mobile assembly 10, and connected thereto by a wiring harness 24. The wiring harness 24 comprising, inter alia, the electrical and hydraulic connections

necessary for the operation of the mobile assembly 10. The carriage 22 is in particular configured to carry elements of the welding machine 1, for example an electrical power supply unit 26 of the welding machine 1 as well as the tank 20, the pump and the cooling unit of the cooling device 18.

[0047] The function of the electrical power supply unit 26 is in particular to deliver an electric current at least to the drive wheel drive member 12 so that they are driven in rotation in such a way as to move the mobile assembly 10 of the welding machine 1, and to the welding wheels 16 so that they are able to weld the parts to be welded 2 when this electric current passes through them. Furthermore, the electric current from the power supply unit 26 is an alternating current. Thus, the welding machine 1 comprises an electrical converter 28, hereinafter called a converter, arranged in the path of the electric current between the electrical supply unit 26 and the welding wheels 16, the converter 28 making it possible to transform the 50 Hz alternating current of the power supply unit 26 into a 1000 Hz alternating current, required for the welding wheels 16. The converter notably comprises at least one rectifier bridge, a capacitor and an inverter. The electric current at the converter output is directed to a transformer/rectifier which transforms the 1000 Hz alternating current into a pulsed electric current sent to the welding wheels 16.

[0048] According to the invention, the welding machine 1 comprises a control unit 30 for the welding head 14, the control unit 30 being able to control parameters of the welding machine 1 chosen from: the contact pressure of the welding wheels 16 against the parts to be welded 2 and/or the speed of movement of the mobile assembly 10 along the parts to be welded 2 and/or the intensity of an electric current passing through the welding wheels 16 and/or the position of the welding machine 1 relative to the parts to be welded 2. It is then understood that the control unit 30 is able to at least control the device for pressurizing the welding wheels and/or the drive wheel drive member 12 and/or the intensity of the electric current delivered by the power

supply unit 26 and/or to determine the position of the welding machine 1 relative to the parts to be welded 2 in accordance with its forward speed.

[0049] The term control means that the control unit 30 is able to process values of the different parameters of the welding machine 1 that it receives in such a way as to allow monitoring of the welding method by an operator continuously between a starting position of the mobile assembly 10 and an arrival position of the mobile assembly 10 of the welding machine 1 on the parts to be welded 2. Starting position is understood as a position of the mobile assembly 10 on the parts to be welded 2 where the start of the weld is desired, and arrival position as a position of the mobile assembly 10 on the parts to be welded 2 where the end of the weld is desired. Such a position of the mobile assembly 10 is determined by a positioning member as a component of the welding machine, optionally on board the mobile assembly 10, this member being controlled by the control unit 30.

[0050] According to the invention, the control unit 30 is carried by the mobile assembly 10 or by the carriage 22 of the welding machine 1. According to a preferred embodiment of the invention, the control unit 30 is carried by the mobile assembly 10.

[0051] Furthermore, according to one example of the invention, the converter 28 is carried by the mobile assembly 10 of the welding machine 1. More particularly, the converter 28 and the control unit 30 are carried by the same printed circuit board, said printed circuit board being carried by the mobile assembly 10.

[0052] According to one example of the invention, the control unit 30 is able to control parameter values of the cooling device 18. More particularly, the parameters of the cooling device 18 comprise at least one parameter from the flow rate of the cooling liquid which circulates in the welding machine 1 and/or the temperature of said cooling liquid.

[0053] According to the invention, the control unit 30 is able to receive the values of the different parameters from the welding machine 1 that it is able to control. More particularly, the welding machine 1 comprises at least a first determination means 32a capable of detecting values of the parameter relating to the contact pressure of the welding wheels 16 against the parts to be welded 2 and/or a second determination means 32b capable of detecting values of the parameter relating to the speed of movement of the mobile assembly 10 along the parts to be welded 2 and/or a third determination means 32c capable of detecting values of the parameter relating to the intensity of an electric current passing through the welding wheels 16 and/or a fourth determination means 32d capable of detecting values of the parameter relating to the position of the welding machine 1 relative to the parts to be welded and/or a fifth determination means 32e capable of detecting values of the parameter relating to the durations of the pulses of electric current passing through the welding wheels 16.

[0054] The determination means 32a, 32b, 32c, 32d, 32e are for example sensors configured to detect a value of one of the parameters such as the contact pressure exerted by the pressurizing device 15 of the welding wheels 16 and/or the rotational speed of the drive wheels 12 and/or the intensity of the electric current circulating in the welding wheels 16 and/or the position of the welding machine 1 relative to the parts to be welded and/or the durations of the pulses of electric current passing through the welding wheels 16. The determination means 32a, 32b, 32c, 32d, 32e can also be devices capable of determining the value of one of the parameters from another parameter measured elsewhere. For example, one of the determination means 32d can be a device capable of determining the position of the mobile assembly 10 relative to the parts to be welded 2 as a function of the value of the speed of the mobile assembly 10 detected by one of the sensors and relative to the starting position of the mobile assembly 10.

[0055] The welding machine 1 can also comprise a sixth determination means 32f making it possible to detect values relating to the flow rate of the cooling liquid which circulates in the welding machine 1 and/or a seventh determination means 32g disposed in the tank 20 and making it possible to detect the temperature of said cooling liquid. More particularly, the sixth determination means 32f makes it possible to determine a speed of rotation of the pump.

[0056] The determination means 32a, 32b, 32c, 32d, 32e, 32f, 32g are then able to transmit the at least one measured value for at least one of the parameters to the control unit 30 such that it processes it as mentioned previously. The method for controlling welding by the control unit will be described later in the rest of the detailed description.

[0057] According to the invention, the welding machine 1 comprises at least one control interface 34 capable of at least displaying the values of the different parameters of the welding machine 1 received by the control unit 30. More particularly, and according to one example of the invention, the control interface 34 is carried by the carriage 22 and allows the operator to follow the changes in the parameters of the welding machine 1 during the welding process. The control interface 34 also allows the operator to input reference thresholds of the different parameters of the welding machine 1, that is, predefined values and/or predefined intervals of values, for each of the parameters of the welding machine 1. The term “reference threshold” means values and/or intervals of values expected by an operator for different parameters of the welding machine 1 during the welding process. According to another example of the invention that is not illustrated, the control interface may be carried by a portable device, separate from the carriage.

[0058] It will be understood from the foregoing that the control interface 34 and the control unit 30 are capable of communicating reciprocally with one another so that the control interface 34 is capable of displaying the values received by the control unit 30 and such that the control unit 30 is capable of processing

the received values relative to the reference thresholds entered in the control interface 34.

[0059] The method for controlling the welding of the at least two parts by the welding machine 1 according to the invention will now be described in relation to figures 2 and 3.

[0060] The control method comprises at least one input step 100 corresponding to a step during which the operator enters the reference thresholds for at least one of the parameters of the welding machine 1, in the control interface 34. According to one example of the invention, the operator enters the set of reference thresholds for all the parameters of the welding machine 1. Thus, once the reference thresholds have been entered, they are communicated by the control interface 34 to the control unit 30. It is then understood that the control unit 30 uses the reference thresholds entered into the control interface 34 as expected values or intervals of values for each of the parameters of the welding machine 1. It is also understood that the control unit 30 and the control interface 34 are configured to communicate reciprocally with one another.

[0061] The control method also comprises a step 200 of receiving, following the input step 100, during which the control unit 30 receives the values of the parameters from the welding machine 1 detected by the determination means 32a, 32b, 32c, 32d, 32e, 32f, 32g.

[0062] Subsequently, the control unit 30 is capable of performing a step 300 of comparing the at least one received value of at least one of the parameters by one of the determination means 32a, 32b, 32c, 32d, 32e, 32f, 32g described above, with respect to the reference threshold of said value. In other words, the control unit 30 continuously receives the values detected by the different determination means 32a, 32b, 32c, 32d, 32e, 32f, 32g from the welding

machine 1 and compares these received values to the reference thresholds entered for each of the parameters.

[0063] Furthermore, according to the invention, the values received by the control unit 30 are also transmitted to the control interface 34 in such a way as to allow monitoring by the operator. According to one example of the invention, the control interface 34 is able to record the values received by the control unit 30 in such a way as to constitute a database of said values of the parameters of the welding machine 1.

[0064] Once the comparison step 300 has been carried out, the control unit 30 optionally implements a step 400 of checking at least one of the parameters of the welding machine 1 if there is no convergence between the value received by at least one of the determination means 32a, 32b, 32c, 32d, 32e, 32f, 32g with the reference threshold of said parameter. In other words, when the comparison step 300 concludes, at a deviation between the value of the parameter received by the control unit 30 and the previously-entered reference threshold, the control unit 30 implements the control step 400, and more particularly a step 401 of adjusting the control step 400, during which it rectifies the parameter and/or at least one other distinct parameter, such that the next received values for the parameter converge towards the entered input threshold of said parameter. It is understood that such a control step 400 applies to all of the parameters of the welding machine 1.

[0065] Furthermore, it must be understood from this adjustment step 401 that the rectification of one of the parameters can comprise the adjustment of another different parameter. For example, in the case where the intensity of the electric current passing through the welding wheels is to be corrected in order to come closer to its input threshold value, the control unit adjusts the intensity of the electric current directly at the output of the power supply unit.

[0066] In other words, the input threshold entered for each parameter is fixed. The adjustment step is carried out in such a way that there is a convergence between the entered input threshold and the measurements carried out in this parameter. The adjustment step may concern one or more parameters of the welding machine.

[0067] According to an example of use of the control method, when the received value of at least one of the parameters diverges from the reference threshold, for example by more than 5% for the durations of the pulses of electric current passing through the welding wheels 16 and/or 20% for the contact pressure of said welding wheels 16, the control unit 30 implements a step 402 of stopping the control step 400, during which the control unit 30 stops the welding of the parts to be welded by the welding machine 1. In other words, when the received value of the parameter is too far from the reference threshold to be adjusted during the adjustment step 401, the control unit 30 stops the welding of the parts to be welded so that an operator is able to manually rectify one or more parameter(s) of the welding machine 1 or to be able to carry out a control operation of the welding or maintenance machine. The maintenance operation may for example be cleaning of the welding and/or drive wheels when they are clogged.

[0068] It is also understood that when the comparison step 300 concludes that there is a match between the received value of the parameter and the reference threshold of said parameter, the control unit 30 does not make any modification of said parameter and resumes the control method in the reception step 200.

[0069] Thus, once the control step 400 or the comparison step 300 has been carried out, the control unit 30 repeats the control method from the reception step 200 when the reference thresholds of the parameters of the welding machine 1 are unchanged. In the case where the reference thresholds of the

parameters require a modification, the method is repeated from the input step 100.

[0070] According to one example of the invention, during the steps of adjusting 401 and stopping 402 of the control step 400, the control interface 34 indicates the implementation of these steps 401, 402 to the operator by a signal, for example audible and/or visible.

[0071] It is also understood that the control method is carried out continuously between the starting position of the mobile assembly 10 and the arrival position of said mobile assembly 10. Such a continuity of the control method ensures optimum monitoring of the welding method of the parts to be welded 2 and thus better quality of the weld.

[0072] The invention as it has just been described cannot, however, be limited to the means and configurations exclusively described and illustrated, and also applies to all equivalent means or configurations and to any combination of such means or configurations.

Claims

1. A welding machine (1) for at least two parts (2) to be welded, the welding machine (1) comprising at least one mobile assembly (10) which comprises at least one pair of drive wheels (12) intended to move said mobile assembly (10) relative to the parts to be welded (2) and at least one welding head (14) comprising at least two welding wheels (16) able to produce a weld intended to secure the parts to be welded (2) by rolling of the welding wheels (16) against the parts to be welded (2), the welding machine (1) comprising a control unit (30) of the welding head (14), the control unit (30) being able to control parameters of the welding machine (1) chosen from: the contact pressure of the welding wheels (16) against the parts to be welded (2) and/or the speed of movement of the mobile assembly (10) along the parts to be welded (2) and/or the intensity of an electric current passing through the welding wheels (14) and/or durations of pulses of the electric current passing through the welding wheels (14) and/or the position of the mobile assembly (10) relative to the parts to be welded (2) and the control unit (30) being able to receive values of the different parameters from the welding machine (1) so as to control them.

2. The welding machine (1) according to claim 1, comprising at least one control interface (34) capable of at least displaying the values of the different parameters of the welding machine (1).

3. The welding machine (1) according to claim 2, wherein the control interface (34) is a member for inputting reference thresholds of the different parameters of the welding machine (1).

4. The welding machine (1) according to any one of claims 1 to 3, comprising at least one cooling device (18) of the welding head (14), the control unit (30) being able to control parameter values of the cooling device (18).

5. The welding machine (1) according to claim 4, wherein the parameters of the cooling device (18) comprise at least one parameter from the flow rate of a coolant flowing in the welding machine (1) and/or the temperature of said cooling liquid.

6. The welding machine (1) according to any one of claims 1 to 5, comprising a first determination means (32a) capable of detecting values of the parameter relating to the contact pressure of the welding wheels (16) against the parts to be welded (2) and/or a second determination means (32b) capable of detecting values of the parameter relating to the speed of movement of the mobile assembly (10) along the parts to be welded (2) and/or a third means of determination (32c) capable of detecting values of the parameter relating to the intensity of the electric current passing through the welding wheels (16) and/or a fourth means of determination (32d) capable of detecting values of the parameter relating to the position of the mobile assembly (10)relative to the parts to be welded (2) and/or a fifth means of determination (32e) capable of detecting values of the parameter relating to the durations of the pulses of the electric current passing through the welding wheels (16).

7. The welding machine (1) according to any one of claims 1 to 6, comprising a carriage (22) remote from and connected to the mobile assembly by a wiring harness (24), the control unit (30) being carried by the mobile assembly (10) or by the carriage (22).

8. The welding machine (1) according to any one of claims 1 to 7, wherein the mobile assembly (10) comprises at least one electric converter (28).

9. The welding machine (1) according to claim 8, wherein the electric converter (28) and the control unit (30) are carried by a same printed circuit board.

10. The welding machine (1) according to any one of claims 1 to 9, wherein the control of the parameters and/or the reception of the parameter values is carried out continuously between a starting position of the mobile assembly (10) and an arrival position of the mobile assembly (10).

11. A method for controlling welding of at least two parts (2) by a welding machine (1) according to any one of claims 1 to 10, the welding control method comprising at least:

- an input step (100) in a reference threshold control interface (34) of at least one first parameter of the welding machine (1);

- a step of receiving (200) by the control unit (30) at least one measured value of the first parameter of the welding machine (1);

- a step of comparing (300) by the control unit (30) at least one measured value of the first parameter with the reference threshold of the first parameter;

- a step of controlling (400) by the control unit (30) at least one of the parameters of the welding machine (1) if there is no convergence between the measured value of the first parameter with the reference threshold of the first parameter.

12. The control method according to claim 11, wherein the checking step (400) comprises a step of adjusting (401) at least one of the parameters of the welding machine (1) when welding the parts to be welded (2), to make the measured value of the first parameter converge with the reference threshold of the first parameter.

13. The control method according to claim 11 or 12, wherein the checking step (400) comprises a step (402) of stopping the welding of the parts to be welded (2) when the at least one measured value of the first parameter diverges from the reference threshold of the first parameter by more than 5 to 20%.

14. The control method according to any one of claims 11 to 13, wherein the method is operated continuously between a starting position of the mobile assembly and an arrival position of said mobile assembly (10).