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(54) Cooking appliance

(57) Cooking appliance comprising at least one heat source (1), an actuator (2) associated to the heat source (1), which is operated by a user to act on the corresponding heat source (1) and which comprises at least one associated switch (3; 3a, 3b) whose state changes when the user acts on said actuator (2), and a connection (I) to an external power supply through which it is powered, which comprises at least two terminals (T1, T2). The switch (3; 3a) associated to the actuator (2) is connected in series to the connection (I), so that the appliance (100) does not consume energy from the external power supply unless the actuator (2) is acted on.

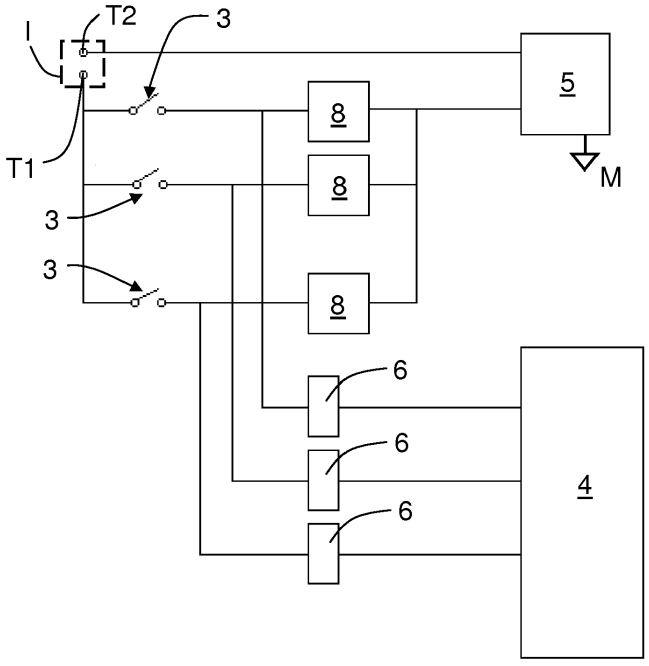

Fig. 2

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Description

TECHNICAL FIELD

[0001] This invention relates to cooking appliances, and in particular to cooking appliances comprising at least one heat source with an associated actuator, each actuator comprising at least one switch.

PRIOR ART

[0002] Conventional cooking appliances are connected to an external power supply, generally to a main alternating voltage supply, through which they are powered. Said appliances comprise at least one heat source associated to an actuator, generally a manual one, and on which a user acts to activate or deactivate it, generally corresponding with a tap or handle. Each actuator also comprises an associated switch, so that when said actuator is operated by a user, it closes or opens an electrical circuit associated to the corresponding switch.

[0003] Document WO 2009040115 A2 discloses a cooking appliance of this type, in which each actuator comprises an associated switch whose state changes when said actuator is operated, so that the switch has two positions: closed when the actuator is on (when it is being operated), or open when said actuator is off (when it is not being operated).

BRIEF DISCLOSURE OF THE INVENTION

[0004] It is an object of the invention to provide a cooking appliance as described in the claims.

[0005] The cooking appliance of the invention comprises at least one heat source, an actuator associated to the heat source, which is operated by a user to act on said heat source and which comprises at least one associated switch whose state changes when said actuator is acted on, and a connection to an external power supply through which said appliance is powered, and which comprises at least two terminals.

[0006] The switch associated to the actuator is connected in series to the connection, at least to one of the terminals of said connection, so that unless the actuator is acted on, the appliance does not consume energy from the external power supply due to the fact that the electrical circuit through which said appliance is connected to said power supply is not closed.

[0007] As a result, the appliance of the invention consumes no energy unless the user wishes to switch on a heat source, for which purpose the user acts on the associated actuator, thereby resulting in said appliance not consuming energy if it is not being used. In addition, no type of supply is required in order to switch on or start the appliance, so that said appliance is switched off, without consuming any energy at all, in a situation in which the appliances in the prior art are on standby and consuming energy.

[0008] These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

DESCRIPTION OF THE DRAWINGS

[0009]

Figure 1 partially shows an arrangement of the appliance of the invention.

Figure 2 schematically shows switches, locking members, adaptors, a supply unit and a control unit of a first embodiment of the appliance of Figure 1.

Figure 3 shows the optocouplers comprised by the adaptors of Figure 2.

Figure 4 shows the rectifiers comprised by the locking members of Figure 2.

Figure 5 shows a feedback unit for the first embodiment of the appliance of Figure 1.

Figure 6 schematically shows switches, a complete locking member, adaptors, a supply unit and a control unit of a second embodiment of the appliance of Figure 1.

Figure 7 shows the rectifier comprised by the complete locking member of Figure 6.

Figure 8 shows a feedback unit for the second embodiment of the appliance of Figure 1.

Figure 9 schematically shows switches, locking members, adaptors, a supply unit and a control unit of a third embodiment of the appliance of Figure 1.

DETAILED DISCLOSURE OF THE INVENTION

[0010] The cooking appliance 100 of the invention is used to cook and/or heat food, and comprises at least one heat source 1, although it may comprise more heat sources 1, an actuator 2 associated to each heat source 1 and which is operated by a user to act on the corresponding heat source 1 and which comprises at least one associated switch 3; 3a and 3b whose state changes when the user acts on said actuator 2, and a connection I to an external power supply through which said appliance 100 is powered, and which comprises at least two terminals T1 and T2.

[0011] Figure 1 partially shows an arrangement of the cooking appliance 100 of the invention, which corresponds by way of example with an appliance 100 that comprises three heat sources 1, comprising three actuators 2 (one for each heat source 1), each actuator 2 preferably corresponding with a tap or handle. The user

thus acts on an actuator 2 to activate it when he/she wishes to switch on a heat source 1, or to deactivate it when he/she wishes to switch off said heat source 1. The heat source 1 of the appliance 100 may be of gas, electrical, of the induction type, or, when there is more than one heat source 1, said heat sources 1 may also be a combination of the three types mentioned, for example. For the purposes of coherence and clarity, the rest of the figures in the application represent an appliance 100 with three heat sources 1, such as the one shown in Figure 1.

[0012] The switch 3; 3a associated to the actuator 2 is connected in series with at least one of the switches T1 or T2 of the connection I, so that the appliance 100 does not consume energy from the external power supply unless the actuator 2 is acted on. As a result, the appliance 100 does not consume any energy unless a user acts on it, thereby preventing said appliance from consuming energy on standby.

[0013] Preferably, as shown in Figures 2 to 9, the appliance 100 comprises a supply unit 5 adapted to adapt the voltage it receives from the external power supply through the connection I to all the voltages necessary in the appliance 100, such as continuous voltages such as 3.3V, 5V or 12V, and at the necessary power levels. Preferably, the external power supply corresponds with the main alternating voltage supply, said connection I acting as a socket, although it may also be another type of external power supply, such as a continuous voltage supply.

[0014] Preferably, the appliance 100 comprises a plurality of heat sources 1, each heat source 1 comprising an associated actuator 2 that is operated by a user to act on the corresponding heat source 1 and which, in a first embodiment shown in Figures 2 to 5 and in a second embodiment shown in Figures 6 to 8, comprises a single associated switch 3 whose state changes when the user acts on said actuator 2, although in a third embodiment shown in Figure 9, it may comprise two associated switches 3a and 3b.

[0015] The appliance 100 also comprises a control unit 4 adapted, when at least one of the actuators 2 has been operated on, to detect a change of state of the switches 3; 3b and to identify which actuator 2 (or which actuators 2) have been operated on in accordance with the state of said switches 3; 3b, said switches 3; 3b being associated to said control unit 4.

[0016] In the first two embodiments, a first end of each switch 3 associated to an actuator 2 is connected to the connection I, to a terminal T1 of said connection I, and a second end of each switch 3 is connected to the control unit 4. The control unit 4, which preferably corresponds with a microprocessor, a microcontroller or an equivalent device, is supplied by a continuous voltage (generally in the region of 5V, although it may also be in the region of 3.3V, for example), preferably generated by the supply unit 5, and does not support alternating voltages. Thus, when the appliance 100 is adapted to be connected to an external power supply that corresponds with an alternating power supply, said appliance 100 comprises an adaptor 6 for each switch 3, which adapts the alternating voltage to a continuous voltage acceptable to the control unit 4, the second end of each switch 3 being connected to said control unit 4 by means of a respective adaptor 6. In the first embodiment of the invention, which corresponds with the preferred embodiment, and in the second embodiment, the adaptor 6 preferably corresponds with a conventional optocoupler that comprises a diode on the side of the switch 3 and a transistor on the side of the control unit 4, the collector of which is connected to said control unit 4 and the emitter of which is connected to ground M.

[0017] In the first and second embodiments the supply unit 5 is connected to a terminal T1 of the connection I through the switches 3, which are disposed in parallel to each other. As a result, each switch 3 is connected to the terminal T1 at a first end and to the supply unit 5 and to the control unit 4 at a second end. As a result, the supply unit 5 is not reached by the supply originating from the connection I unless one of the actuators 2 is acted on, which causes the corresponding switch 3 to close, the appliance 100 not being powered until this time. Said appliance 100 thus consumes no energy while it is not being acted on (on an actuator 2), thereby preventing said appliance 100 from consuming on standby. In short, if no actuator 2 is acted on all the associated switches 3 are open and the appliance 100 is switched off from the external power supply, so that it does not consume energy from said external power supply. When a user acts on an actuator 2, the corresponding switch 3 closes so that the terminal T1 also remains connected to that supply unit 5, which is being supplied, said supply unit 5 supplying the rest of the appliance 100. The supply unit 5 corresponds with an internal power supply of the appliance 100, that is not shown as it is widely used and is not the object of the invention, a known conventional power supply being capable of being used.

[0018] In the first embodiment, the supply unit 5 is connected directly to the other terminal T2 of the connection I. The appliance 100 also comprises a locking member 8 through which the terminal T1 of the connection I connected to the switch 3 is connected to the supply unit 5, a terminal T1 thereby being connected to said supply unit 5 through the locking member 8 and the other terminal T2 of the connection I directly. The locking member 8 is connected to the second ends of the switches 3, and attaches said second ends to each other with the result that the voltage in the second end of each switch 3 depends on the state of the switch 3, in other words, the locking member 8 is capable of carrying the same voltage to the supply unit 5 at the same time as it maintains the independence of each of the second ends of the different switches 3. As a result, the control unit 4 can determine which actuator 2 is active and which one is not as it receives one signal or another corresponding to each switch 3 depending on whether said switch 3 has been operated or not. If no locking member 8 is used, when at

least one actuator 2 is activated the second ends of all the switches 3 are connected and the control unit 4 is not capable of identifying which actuator 2 is active and which is not.

[0019] In the first embodiment, as shown by way of example in Figure 4, the locking member 8 comprises a rectifier 7 associated to each switch 3, said rectifier 7 being connected at a first end to the second end of the corresponding switch 3 and the second end of the different rectifiers 7 being connected to each other, said second ends of said rectifiers 7 also being connected to the supply unit 5. In said first embodiment each rectifier 7 corresponds with a diode, the anodes of said diodes being connected to the second end of the corresponding switch 3 and the cathodes of said diodes being connected to each other and to the supply unit 5. In this case, the supply unit 5 (the power supply) does not require a rectifier stage as this would be provided by the locking member 8.

[0020] An explanation of an example of identification in the first embodiment of the invention is provided below. If no actuator 2 has been operated on, in other words, if all the actuators 2 are deactivated, the appliance 100 is, in practical purposes, switched off and does not consume energy. When an actuator 2 is activated the corresponding switch 3 is closed and supply reaches the supply unit 5, which generates the supplies or voltages necessary for the rest of the appliance 100, said appliance 100 being powered. The control unit 4 is thus supplied, so that said control unit 4 is capable of determining which actuators 2 are active and which are not. When an actuator 2 is active its associated switch 3 is closed, so that a specific current passes through the diode of the optocoupler, which causes a current between the collector and the emitter of the transistor of said optocoupler. The collector is thus connected to ground M and the control unit 4 interprets a 0 logic, determining that the corresponding actuator 2 is activated. If an actuator 2 is not activated, the collector is not connected to ground M and the control unit 4 interprets a 1 logic, determining that said actuator 2 is not active (the collector can comprise a pull-up for example, internal or external to the control unit 4, thereby enabling said control unit to interpret a 1 logic when the actuator 2 is deactivated).

[0021] In the second embodiment, the appliance 100 differs from the first embodiment in that the supply unit 5 is not connected directly to any of the terminals T1 and T2 of the connection I. In said second embodiment, said appliance 100 comprises a complete locking member 8' through which both terminals T1 and T2 are connected to the supply unit 5. The complete locking member 8' is connected at one side to the second ends of the switches 3 and to the terminal T2 that is not associated to said switches 3 (the inputs of said complete locking member 8'), and to the supply unit 5 at the other side (the output of said complete locking member 8'), said complete locking member 8' associating said second ends to each other so that the voltage in each second end depends on the state of the corresponding switch 3. If no complete locking member 8' is used, when at least one actuator 2 is activated the second ends of all the switches 3 are connected and the control unit 4 is not capable of identifying which actuator 2 is active and which is not.

[0022] The complete locking member 8' comprises a full-wave rectifier 7', said rectifier 7' being composed of a diode branch 70' for each switch 3 and an additional diode branch 71' for the terminal T2 that is not connected or associated to said switches 3, each diode branch 70' and 71' comprising two diodes connected in series, the switch 3 and the terminal T2 being connected between the two diodes of the corresponding diode branch 70' and 71'. As in the first embodiment, in this case the supply unit 5 (the power supply) does not require a rectifier stage as that is provided by the locking member 8'.

[0023] In the first and second embodiments the appliance 100 can also comprise a feedback unit 10; 10' adapted to carry the terminal T1 connected to the switches 3 to the supply unit 5, when the last actuator 2 is no longer acted on, the control unit 4 thereby being capable of being powered to perform the function of indicating that a heat source 1 remains hot, for example, by means of an indicator 9 associated to each heat source 1. Without a feedback unit 10; 10' such as the one proposed in the appliance 100, all the heat sources 1 would switch off when all the actuators 2 are deactivated, and the appliance 100, and therefore the control unit 4, would no longer be powered and would thereby, by way of example, be incapable of performing the aforementioned function. As a result, the function of said feedback unit 10; 10' is to enable said control unit 4 to continue being supplied for at least a specific time period sufficient to allow any heat source 1 to cool to a temperature that is not dangerous to users, or for the specific time period sufficient to carry out any other requisite temporary function, said terminal T1 remaining connected to the supply unit 5 for said preset time period. At the end of said preset time, which begins when the control unit 4 detects that the last actuator 2 that was active has been deactivated, the control unit 4 causes said feedback unit 10; 10' to stop connecting the terminal T1 to the supply unit 5, the appliance 100 no longer being supplied as a result.

[0024] In the first embodiment (the preferred embodiment), the feedback unit 10 preferably corresponds with an opto-thyristor, as shown in Figure 5, comprising a diode on the side of the control unit 4 and a thyristor on the other side. The anode of the diode is connected to the control unit 4 and the cathode to ground M, and said control unit 4 strikes said diode when the first actuator 2 is activated, keeping it struck the whole time (by "struck" it should be understood that a current is caused to pass through it). The anode of the thyristor is connected directly to the terminal T1 to which the switches 3 are also connected, while the cathode of said thyristor is connected to the supply unit 5. As a result, when the diode is primed the supply unit 5 is connected to the terminal T1 also through the feedback unit 10, and if all the actuators

2 are deactivated the supply unit 5 continues to be connected to both terminals T1 and T2, the control unit 4 thereby continuing to be supplied and continuing to be capable of priming said diode of the feedback unit 10 for the preset time.

[0025] In the second embodiment, the feedback unit 10' preferably corresponds with an opto-triac, as shown in Figure 8, comprising a diode on the side of the control unit 4 and a triac on the other side. The anode of the diode is connected to the control unit 4 and the cathode to ground M, and said control unit 4 strikes said diode when the first actuator 2 is activated, keeping it struck the whole time (by "struck" it should be understood that a current is caused to pass through it). One side of the triac is connected directly to the terminal T1 of the connection I to which the switches 3 are also connected, while the other side of said triac is connected to a diode branch 11 that is connected to the supply unit 5, in parallel with the diode branches 70' and 71' of the complete locking member 8'. As a result, when the diode is struck the supply unit 5 is connected to the terminal T1 also through the feedback unit 10, and if all the actuators 2 are deactivated the supply unit 5 continues to be connected to both terminals T1 and T2, the control unit 4 thereby continuing to be supplied and continuing to be capable of striking said diode of the feedback unit 10 for the preset time.

[0026] In a third embodiment shown in Figure 9, each actuator 2 comprises two associated switches 3a and 3b whose state change when said actuator 2 is operated, a first switch 3a being connected to a terminal T1 of the connection I at a first end and to the supply unit 5 at a second end, performing the same function with regard to consumption as the switch 3 of the two first embodiments explained. A second switch 3b is connected at a first end to a continuous voltage (Vcc) that preferably generates the supply unit 5, but which can run directly from the external power supply for example, and to the control unit 4 at a second end. If one of the actuators 2 is acted on, the corresponding first switch 3a closes and the two terminals T1 and T2 connect to the supply unit 5, which generates the voltages necessary in the appliance 100. At the same time, the corresponding second switch 3b also closes and the control unit 4 detects that said actuator 2 has been operated, as the signal originating from said second switch 3b is substantially equal to VCC (1 logic). The signal of the rest of the second switches 3b, which remain open, corresponds with a value substantially equal to ground M (0 logic) thanks to a pull-down or equivalent member. In this third embodiment, unlike in the first two embodiments, no locking member 8 or 8' is required between the first switches 3a and the supply unit 5, nor any adaptor 6 between said first switches 3a and the control unit 4.

[0027] As in the two preceding embodiments, the third embodiment may also comprise a feedback unit (not shown in the figures) adapted to connect the terminal T1 of the connection I connected to the first switches 3a to the supply unit 5, when the last actuator 2 is no longer acted on. Said feedback unit is, preferably, analogous to that of the first embodiment.

Claims

1. Cooking appliance comprising
at least one heat source (1),
an actuator (2) associated to the heat source (1), which is operated by a user to act on the corresponding heat source (1), and which comprises at least one associated switch (3; 3a, 3b) whose state changes when the user acts on said actuator (2), and
a connection (I) to an external power supply through which said appliance (100) is powered, and which comprises at least two terminals (T1, T2),
characterised in that
the switch (3; 3qa, 3b) associated to the actuator (2) is connected in series to the connection (I), so that the appliance (100) does not consume energy from the external power supply unless the actuator (2) is acted on.

2. Appliance according to claim 1, comprising a plurality of heat sources (1), each heat source (1) comprising an associated actuator (2) that is operated by a user to act on the corresponding heat source (1) and which comprises an associated switch (3) whose state changes when the user acts on said actuator (2), the appliance (100) also comprising a control unit (4) adapted, when at least one of said actuators (2) has been operated on, to detect a change of state of the switches (3) and to identify which actuator (2) has been operated on in accordance with said switches (3), a first end of each switch (3) being connected to the connection (I) and a second end of each switch (3) being connected to said control unit (4).

3. Appliance according to claim 2, wherein it is adapted to support an external power supply that corresponds with an alternating voltage supply, the second end of each switch (3) being connected to the control unit (4) by means of a respective adaptor (6) that, when the corresponding actuator (2) has been operated on, adapts the alternating voltage present in said second end to an acceptable voltage for said control unit (4).

4. Appliance according to claim 3, wherein the adaptor (6) corresponds with an optocoupler.

5. Appliance according to any of claims 2 to 4, comprising a supply unit (5) adapted to adapt the voltage present in the connection (I) to all the voltages necessary in the appliance (100), each switch (3) being connected to one of the terminals (T1, T2) of said

connection (I) at a first end and being connected to the supply unit (5) at a second end, the appliance (100) also comprising a locking member (8) through which the terminal (T1) of the connection (I) connected to the switch (3) is connected to the supply unit (5), a terminal (T1) being connected to said supply unit (5) through the locking member (8) and the other terminal (T2) of the connection (I) being connected directly to said supply unit (5), the locking member (8) being connected to the second ends of the switches (3) and said locking member (8) associating said second ends to each other so that the voltage in said second ends depends on the state of the corresponding switch (3).

6. Appliance according to claim 5, wherein the locking member (8) comprises a rectifier (7) associated to each switch (3), said rectifier (7) being connected at a first end to the second end of the switch (3) and a second end of the different rectifiers (7) being connected to each other, said second ends of said rectifiers (7) being connected to the supply unit (5).

7. Appliance according to claim 6, wherein each rectifier (7) corresponds with a diode, the anodes of said diodes being connected to the second end of the corresponding switch (3) and the cathodes of said diodes being connected to each other and to the supply unit (5).

8. Appliance according to any of claims 2 to 7, comprising a feedback unit (10) adapted to connect the terminal (T1) of the connection (I) connected to the switches (3) to the supply unit (5), when the last actuator (2) is no longer activated.

9. Appliance according to claim 8, wherein the feedback unit (10) comprises an opto-thyristor, one diode of said opto-thyristor being powered by the supply unit (5) and the thyristor of said opto-thyristor being connected to the terminal (T1) connected to the switches (3) by the anode and connected to the supply unit (5) by the cathode.

10. Appliance according to any of claims 2 to 4, comprising a supply unit (5) adapted to adapt the voltage present in the connection (I) to all the voltages necessary in the appliance (100), and a complete locking member (8') through which both terminals (T1, T2) of the connection (I) are connected to the supply unit (5), the complete locking member (8') being connected to second ends of the switches (3) and to the terminal (T2) that is not associated to the switches (3) at one side and to the supply unit (5) at the other side, said complete locking member (8') associating said second ends to each other so that the voltage in said second ends depends on the state of the corresponding switch (3).

11. Appliance according to claim 10, wherein the complete locking member (8') comprises a full-wave rectifier (7'), said rectifier (7') being composed of a diode branch (70') for each switch (3) and an additional diode branch (71') for the terminal (T2) of the connection (I) that is not connected or associated to said switches (3), each diode branch (70', 71') comprising two diodes connected in series and the corresponding switch (3) and terminal (T2) being connected between the two diodes of the corresponding diode branch (70', 71').

12. Appliance according to either of claims 10 or 11, comprising a feedback unit (10') adapted to connect the terminal (T1) of the connection (I) connected to the switches (3) to the supply unit (5), when the last actuator (2) is no longer activated.

13. Appliance according to claim 12, wherein the feedback unit (10') comprises an opto-triac, a diode of said opto-triac being powered by the supply unit (5) and the triac of said opto-triac connected to the terminal (T1) being connected to the switches (3) at one end and connected to the supply unit (5) at the other end.

14. Appliance according to claim 1, comprising a plurality of heat sources (1), each heat source (1) comprising an associated actuator (2) that is operated by a user to act on the corresponding heat source (1) and which comprises two associated switches (3a, 3b) whose state changes when the user acts on said actuator (2), the appliance (100) also comprising a control unit (4) adapted, when at least one of said actuators (2) has been operated on, to detect a change of state of the switches (3a, 3b) and to identify which actuator (2) has been operated on in accordance with said switches (3a, 3b), one switch (3a) being connected in series with the connection (I) and the other switch (3b) being associated to said control unit (4).

15. Appliance according to claim 14, comprising a continuous supply (Vcc) from the connection (I), the switch (3b) associated to the control unit (4) being connected to said control unit (4) at one end and connected to said continuous supply (Vcc) at the other end.

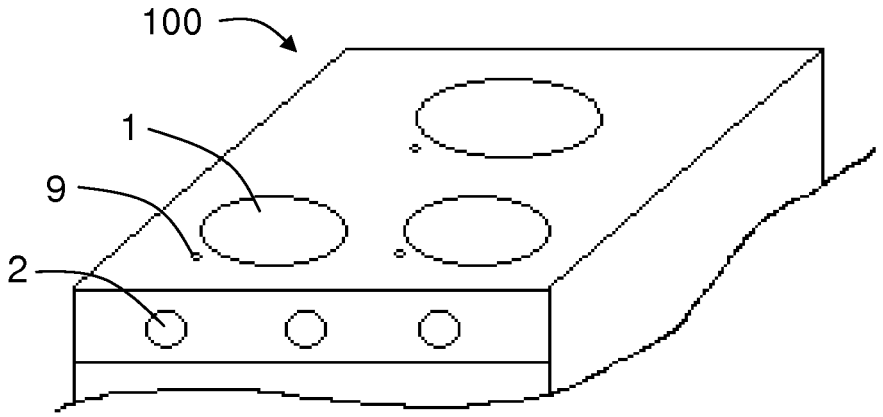

Fig. 1

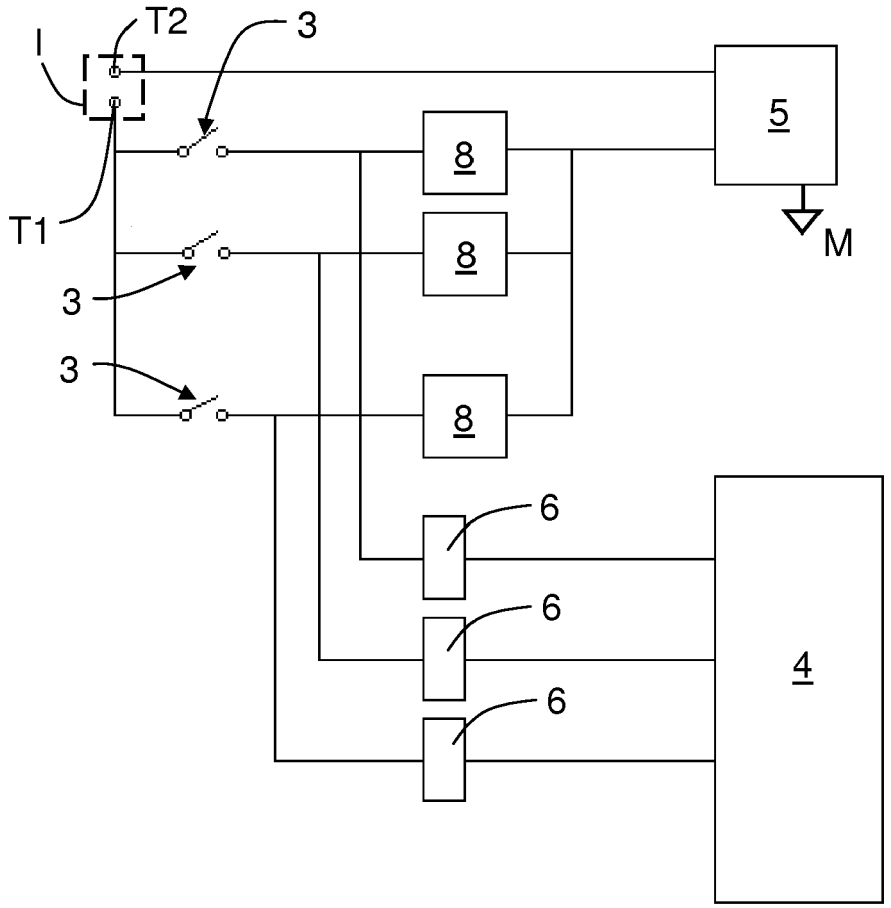

Fig. 2

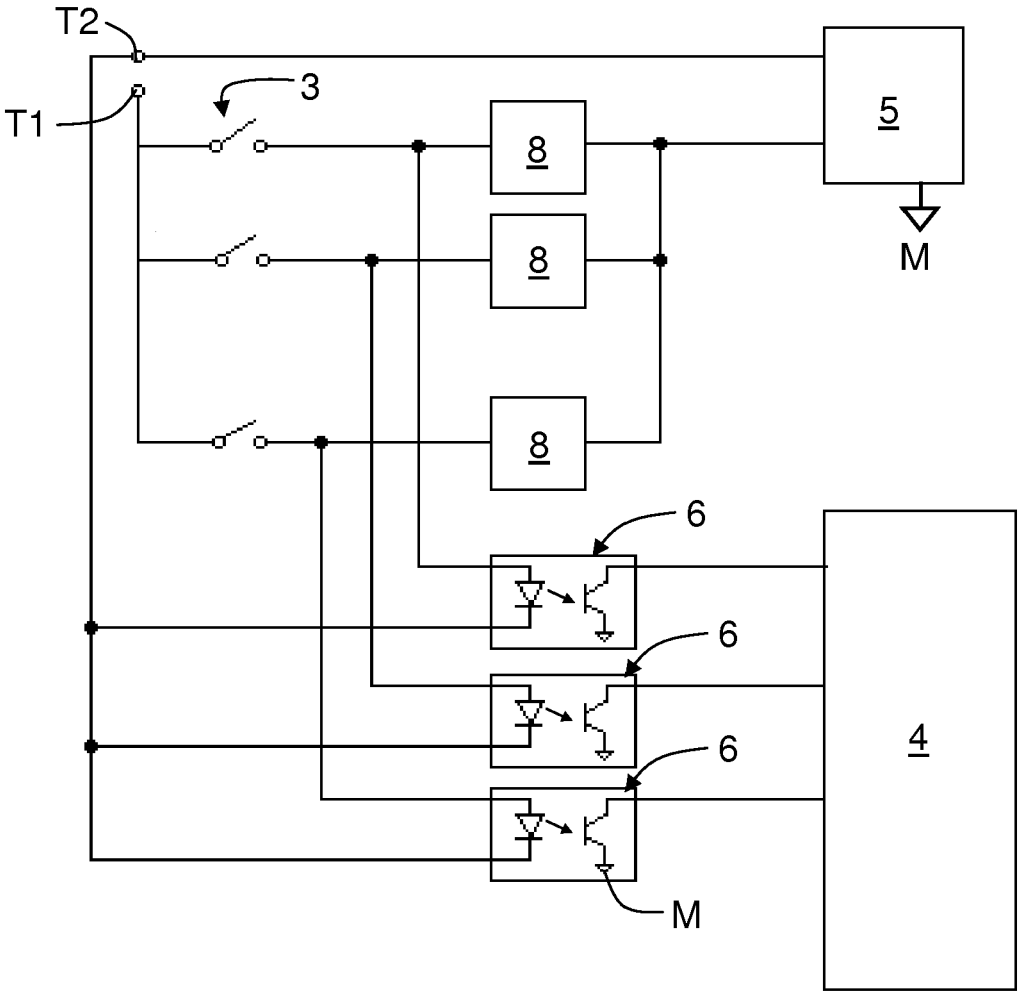

Fig. 3

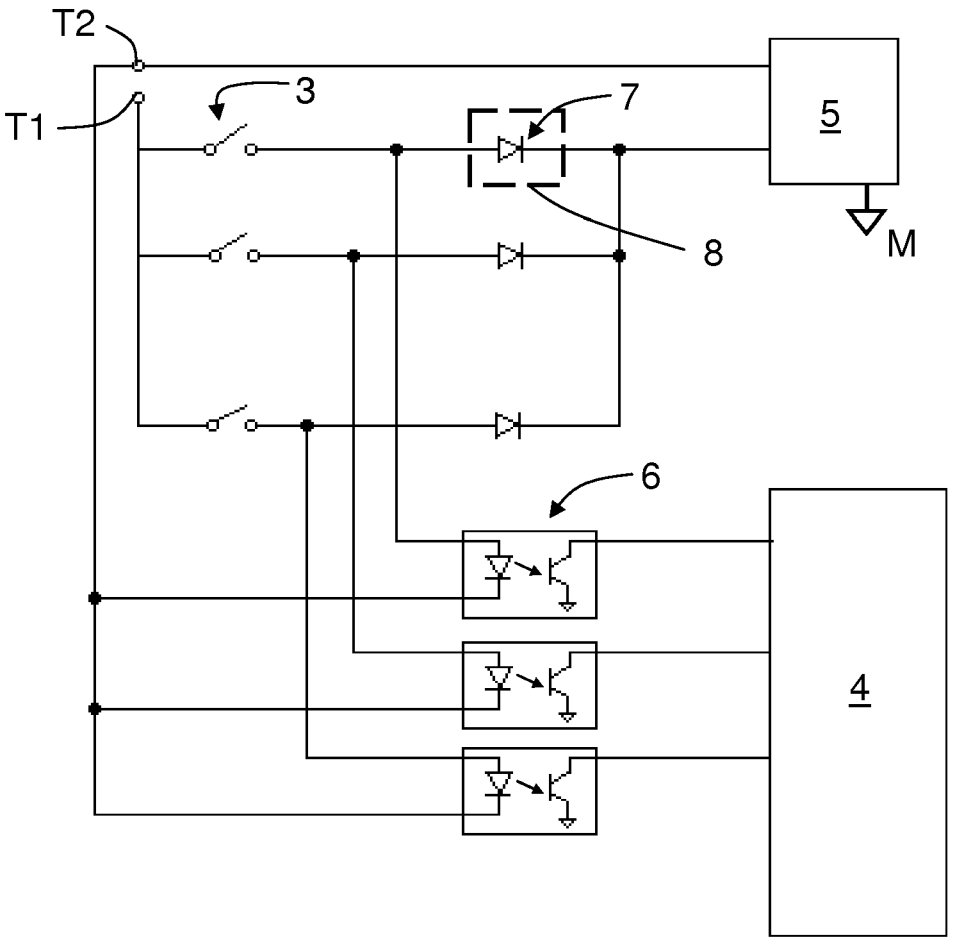

Fig. 4

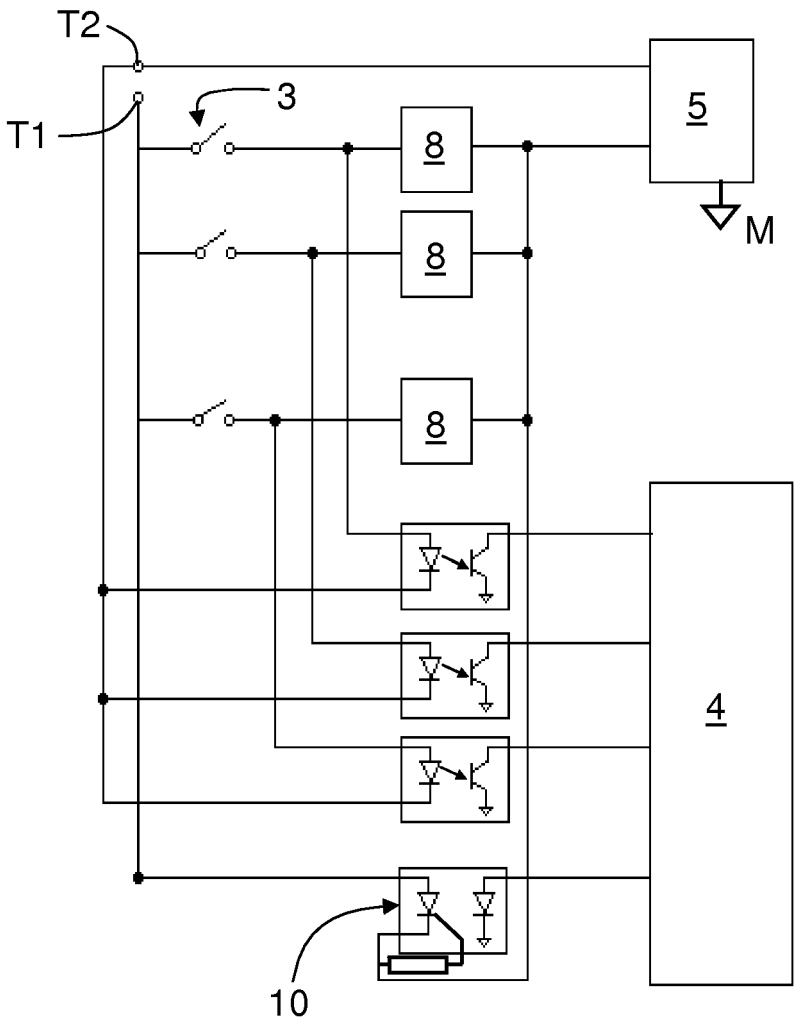

Fig. 5

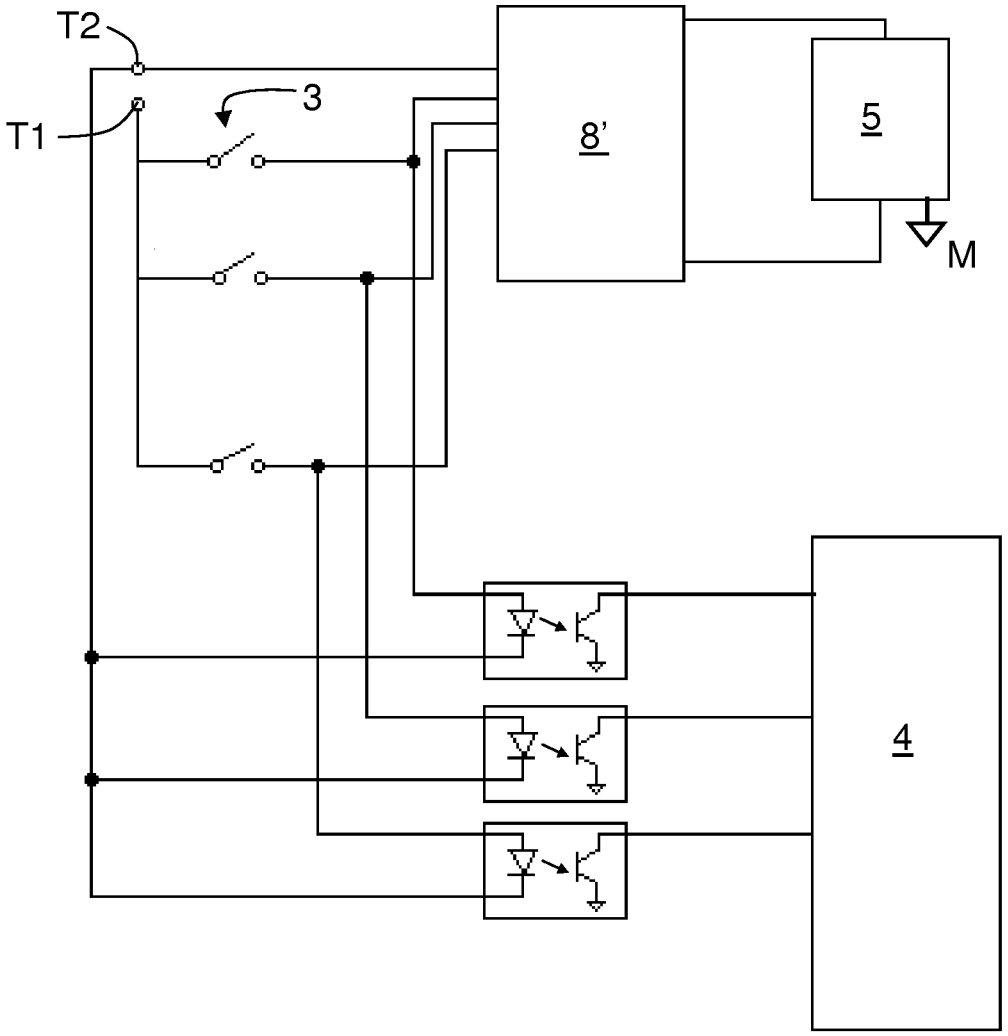

Fig. 6

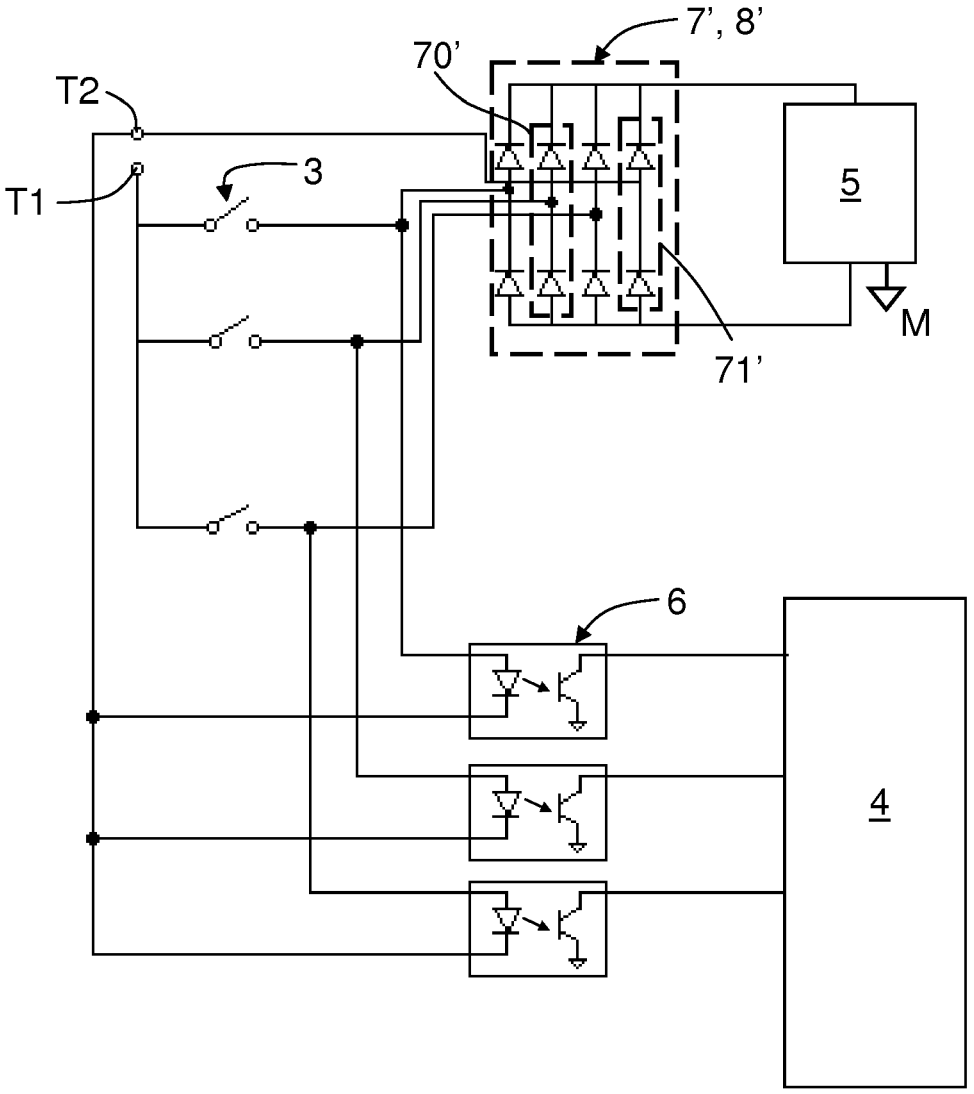

Fig. 7

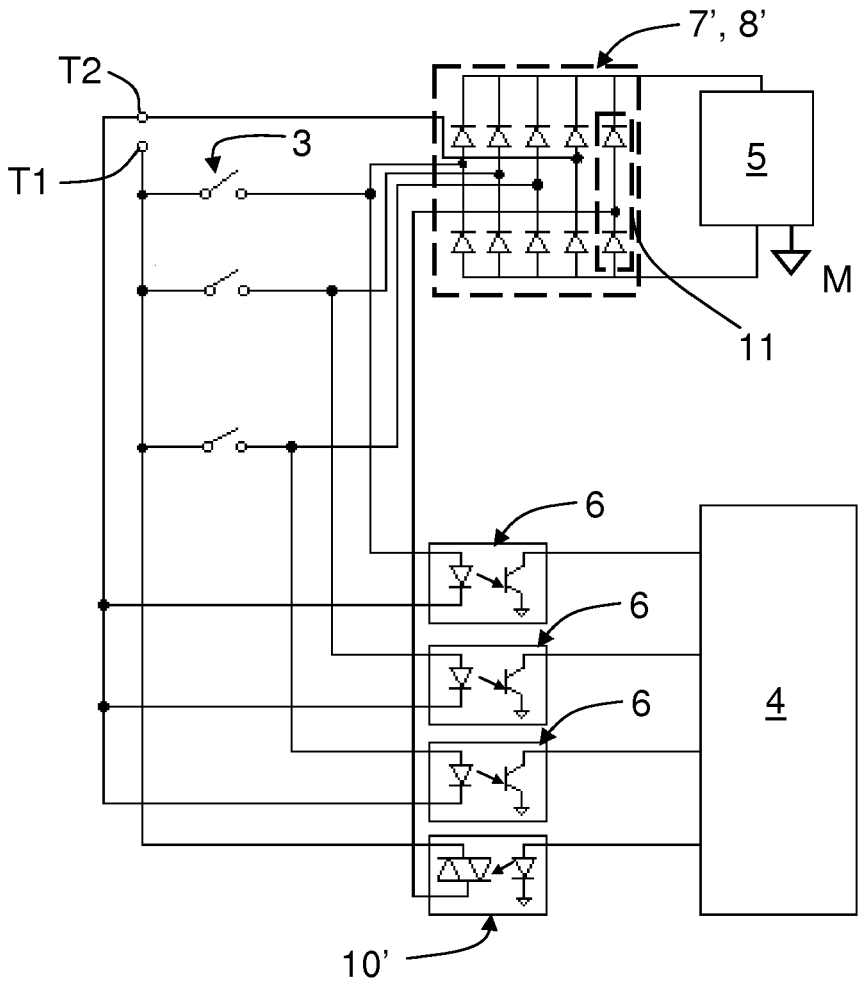

Fig. 8

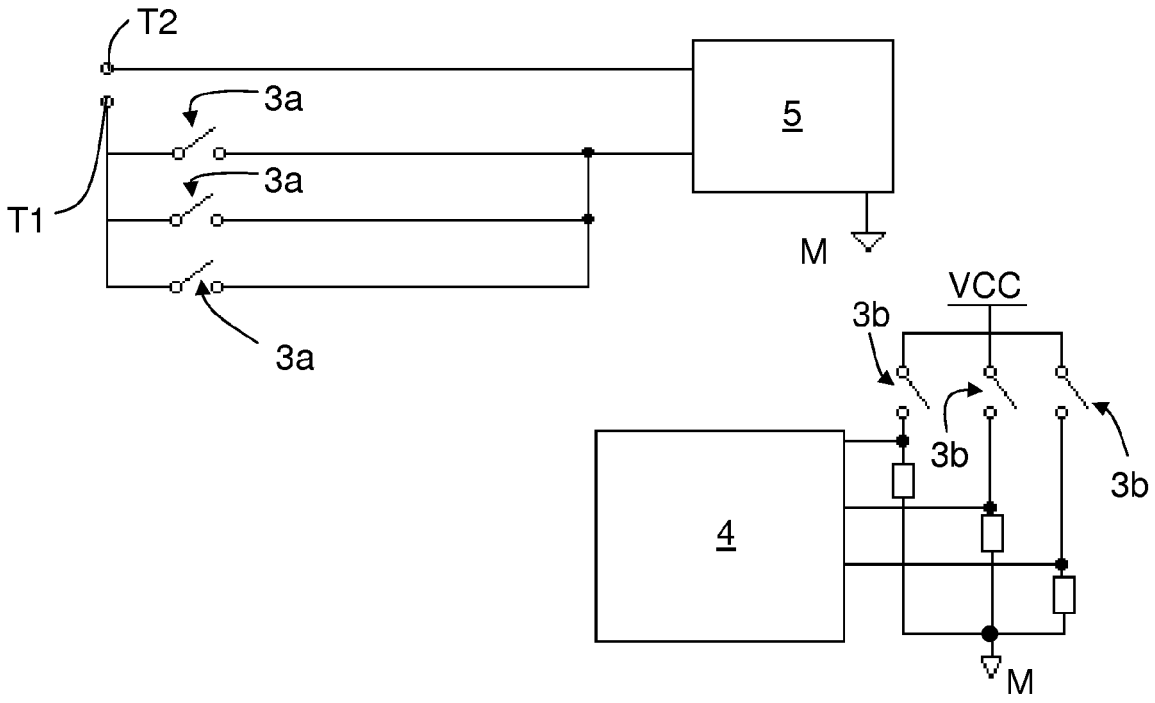

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 10 38 2324

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 Y	US 4 634 843 A (PAYNE THOMAS R [US]) 6 January 1987 (1987-01-06) * paragraphs [0008] - [0010], [0014]; figure 1 *	1-3,5-8, 10-15 4	INV. F24C7/08
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Place of search	Date of completion of the search	Examiner
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