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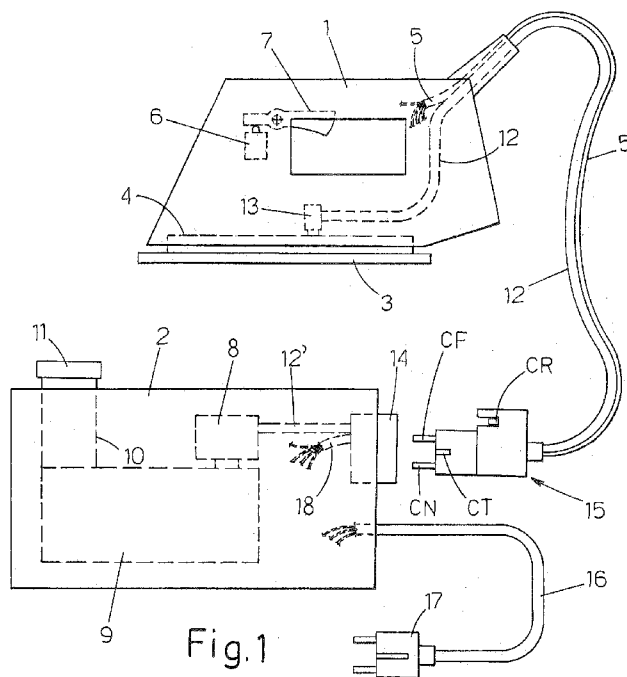
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: IRONING SYSTEM WITH SEPARABLE IRON AND MACHINE BODY



(57) Abstract: The ironing system, comprising an iron (1), a machine body (2) provided with means (9) for producing steam or delivering water directly to the iron (1), a pipe (12) delivering steam or water from the machine body (2) to the iron (1) and an electrical cable (5) for supplying the iron (1), characterized in that said pipe (12) and said electrical cable (5) coming from the iron (1) comprise a first multi-function connector (15, 15') bearing a series of electrical contacts (CN, CR, CT, CF) and suited to be connected, according to a first operating mode of the system, to a second connector (14) connected to a portion (12') of the pipe for the passage of water or steam inside the machine body (2) and to a portion (18) of electrical cable inside the machine body (2), or, according to an additional operating mode of the system, directly or by means of an appropriate adapter (215) to the electricity distribution system, thus excluding the machine body (2).

TITLE**IRONING SYSTEM WITH SEPARABLE IRON AND MACHINE BODY****DESCRIPTION**

5 The present invention relates to an ironing system.

Normally the ironing systems comprise an iron and a machine body connected indissolubly and inseparably by means of an electrical cable and a pipe suited to deliver water or steam to the iron, depending on the fact that the machine body comprises a water tank with pump and said water is vaporized directly in the iron, or
10 by directly comprising the steam generating means housed in the machine body.

The following description will refer principally to the case wherein means for generating steam to be sent to the iron are provided directly in the machine body, but, as will be easily understood, the invention will present the same advantages that will be described also in case the machine body comprises means for delivering
15 water to be vaporized directly in the iron. In other words, the advantages that will be extensively described hereinafter and obtainable by the present invention remain unchanged regardless of the fact that either water or steam is flowing in the pipe connecting the machine body to the iron.

Said machine body can therefore comprise steam generation means therein,
20 such as a boiler, associated with a solenoid valve to enable delivery of said means toward the iron. Said solenoid valve is controlled by a switch operable by a button placed on the iron box-shaped body and pressed by the user during normal ironing operations. The iron normally has a lower soleplate provided with outlet steam holes and with an electrical resistance for heating the soleplate.

25 The fact that the machine body and the iron are connected indissolubly to each other by means of said electrical cable and by means of said pipe delivering water or steam represents a substantial limitation to these systems, in fact, the iron can be only used when the machine body is switched on and therefore, even for small ironing operations the whole ironing system, which is generally relatively bulky and
30 heavy, must be moved. The fact that the iron must always be used together with the

machine body also leads to substantial consumption of electricity, even in cases in which only smaller amounts would be necessary. Moreover, in the event of a fault in the machine body or in the iron, the user generally is required to replace the entire ironing system.

5 In patent applications GE2012A000049 and GE2012A000115, belonging to the applicant of the present application, ironing systems that can operate according to at least two operating modes are described, i.e. a first mode in which the iron is connected to the machine body and a second mode wherein the iron can be separated from the machine body and can be used separately therefrom, for
10 example for small ironing operations in which the use of the machine body it is not essential.

Said ironing systems are provided with a first connector connected to the iron by means of an electrical cable and by means of a pipe delivering steam or water from the machine body to the iron. This connector can be connected to a socket provided
15 on the machine body or can be connected to a normal electrical power supply cable. Said connector therefore is bearing both the electrical connections and the fittings for supplying steam to the iron.

By way of said ironing systems provided in the previous two applications, it is possible to disconnect the connector which connects the machine body to the iron
20 and connect it, by means of an additional connecting cable, to the normal electricity distribution system.

The main purpose of the present invention is to provide a more practical and efficient system for connecting and disconnecting the iron from the machine body than that described in the two applications mentioned.

25 This object is achieved by the present invention by means of an ironing system with separable iron and machine body, as claimed in claim 1.

Advantageously, this ironing system comprises a single multi-function connector provided with electrical contacts and suited to be connected, according to a first operating mode of the system, with a second connector connected inside the
30 machine body. Said connection is obtained both from the electrical point of view and

from the fluid dynamics point of view, that is, for the passage of water or steam then to be delivered to the iron by means of the multifunction connector connecting the pipe with the iron. According a further operating mode of the system the multifunction connector may be connected directly or by way of an appropriate adapter to a normal electrical supply socket, without the use of additional electrical cables or other.

Furthermore, to optimize the ironing system at least downstream of the connector connecting the iron to the body machine according to the invention further safety means will be provided with respect to those already comprised in the systems of the two patent applications mentioned and which prevent any eventual water backflow in the pipe connecting the iron with the machine body from flowing towards the electrical parts of the connector. Said water backflow from the pipe can be caused by condensation of steam, if the machine body delivers steam, or may be caused by residual water in the pipe, if the body machine delivers or had delivered water towards the iron.

Advantageously then, the present ironing system is provided with anti-backflow means arranged at least downstream of the multi-function connector connecting the iron, being the downstream positioning referred to the steam or water flow direction through the connector. Said anti-backflow means may for example be a non-return valve which can be arranged on a steam or water pipe portion placed on the connector or even in a subsequent pipe section. This non-return valve is normally

in the closed position and then prevents, in said pipe, any residual water from flowing back towards the connector and to come into contact with the electrical parts of the same.

Preferably said first connector comprises a hollow tube suited to be fitted on the second connector of the machine body and having a seat housing said anti-backflow means, for example, said non-return valve.

From the manufacturing point of view, the non-return valve may comprise in a simple and effective way a shutter kept in closed position by a respective contrast spring; said spring is suited to compress in response to a suitable pressure of the

steam flow or water flow coming from the machine body, therefore opening the shutter and allowing the passage of the water or steam flow.

The connector possibly connecting the machine body to the iron can be made in two parts and comprises a first component where the anti-backflow means are arranged and suited to be connected directly to the machine body or, by way of a second adapter component, directly to a standard electrical supply socket.

The machine body of the present ironing system further comprises on a wall, for example a side wall, a single second connector for connecting said first multifunction connector.

The present ironing system moreover comprises a further electrical cable permanently connected to the machine body and useful in case the system is used with a machine body connected to the iron, said cable can in fact be connected to a main electricity distribution socket.

Further characteristics and advantages of the present invention will be better understood in the course of the following description, considered by way of non limiting example and with reference to the accompanying drawings, wherein:

- Fig. 1 shows a schematic view of a first embodiment of an ironing system wherein the iron is separable from the machine body and provided with a plug or multifunction connector connected to the iron by means of a pipe for the passage of water or steam and an electrical cable;
- Fig. 2 shows a side elevation view where further details of the multifunction plug of Fig. 1 are visible and provided with a non-return valve according to the present invention;
- Fig. 3 shows a schematic enlarged view of the area of the multifunction plug where the non-return valve is provided;
- Fig. 4 shows a front view of the multifunction plug illustrated in Fig. 2;
- Fig. 5 shows a schematic view of a second embodiment of the new ironing system where an alternative of the multifunctional plug previously illustrated is provided;
- Fig. 6 shows a further alternative of the multifunction plug wherein the use

of an adapter with standard contacts applicable to the plug of Fig. 5 is provided;

- Fig. 7 shows the multifunction plug with the adapter shown in Fig. 5 mounted and provided with a non-return valve;
- 5 - Fig. 8 shows a longitudinal section view of the multi-function plug comprising the non-return valve provided on a tubular element for the connection to the iron.

With reference to the accompanying drawings and with particular reference to Fig. 1 thereof, with numbers 1 and 2 are respectively indicated an iron and a machine
10 body of an ironing system according to the present invention. The iron 1 comprises at the bottom a soleplate 3 for delivering steam provided with a series of small holes, not visible in the figure. Above the soleplate 3 a chamber 4 is arranged wherein a series of cavities are formed, known per se, communicating with the steam delivery holes. Said soleplate 3 will also be provided with heating means, such as an
15 electrical resistance or the like. The iron 1 and the machine body 2 are connected by means of a water or vapor transmission pipe 12 from the machine body 2 to the iron 1 and by means of a multipolar electrical cable 5 which runs parallel to said pipe 12. Said electrical cable 5 and said pipe 12 have a first multifunction connection plug 15
20 suited to be connected with a first connection socket 14 placed on an outside wall of the machine body 2. In the iron 1 a switch 6 is arranged, controlled by a button 7 operable by the user and connected by means of the multi-polar cable 5 to a solenoid valve 8 of the machine body 2. The water or the steam coming from the pipe 12 arrives to a fitting 13 arranged above the chamber 4 of the iron 1. The machine body 2 internally comprises means 9 for producing steam, for example a boiler, in which
25 water is introduced from an admission channel 10 closed at the top by a cap 11. Alternatively, as mentioned, said means 9 may be a water tank associated with a pump delivering water directly to the iron 1 through the pipe 12. The water is then vaporized in the iron 1 by way of known system, for example a dripping system or other. Returning to the example of the steam, the solenoid valve 8 controls the steam
30 supply from said means 9 and is connected, through a pipe portion 12', to the first

connection socket 14 placed on the external wall of the machine body 2. A three-pole electrical cable 16 is provided for the machine body electricity supply and is provided with a standard plug 17 connected to the normal electrical system. A portion 18 of multipolar electrical cable is connected to one end to the socket 14, and by means of appropriate contacts will be then connected to the multipolar cable 5; said portion 18 of electrical cable will be connected, at the other end and by means of a clamp not shown, to the electricity supply three-pole cable 16. Said cable portion 18 will carry an additional conductor wire connected to the solenoid valve 8. The multifunction plug 15 comprises four electrical contacts: a phase electrical contact CF; a neutral electrical contact CN; a grounding electrical contact CT; and a return electrical contact CR, which connect the switch 6 of the iron 1 to the solenoid valve 8. In practice, in this embodiment of the present system the multifunction plug 15 is compatible with both the socket 14, which will obviously be provided with appropriate connection seats for the contacts listed above, either directly with a regular electricity distribution outlet, such as a household socket. For description purposes of the present invention, the connecting of the various electrical wires and of the various internal contacts to the iron 1 and to the machine body 2 have been omitted for reasons of clarity and for the fact that they fall outside the scope of the present invention, in each case for more details about said connecting, and said contacts please refer to the descriptions of the two patent applications GE2012A000049 and GE2012A000115 mentioned previously. Similarly to what has been said concerning the steam, in case of using water pumped from the machine body 2, said water would pass through the solenoid valve 8, the pipe portion 12', the socket 14, the plug 15 and thus the pipe 12. In this case the water sent to the iron 1 would vaporize directly inside the same.

In Fig. 2 the multifunction plug 15 is shown which comprises in addition to the electrical contacts previously described also a hollow tube 43, internally hollow, in which a non-return valve 19 is inserted or any other anti-backflow means. As described in patent applications mentioned above, said hollow tube 43 can be fitted on one side on the pipe 12 which leads steam to the iron 1 and on the other side, on

the pipe portion 12 inside the machine body 2.

In Fig. 3 the area where the hollow tube 43 is provided is illustrated in a larger scale, which essentially is a rigid or flexible tubular element, inside which the non-return valve 19 is arranged. Said non-return valve 19 advantageously has the function of preventing that any residual water in the steam supply pipe 12, by gravity, can come into contact with the electrical parts of the multifunction plug 15. It is therefore evident that said non-return valve 19, or any other means to be used having the same function, has the same advantages and performs the same function even if from the machine body 2 water and not steam will be sent into the iron 1, always through the pipe 12.

To better understand how the multifunction plug 15 is made the front view of Fig. 4 is seen, where both the hollow tube 43 for the passage of steam and the return electrical contact CR are shown.

The diagram of Fig. 5 shows an alternative of the present ironing system in which a multifunction plug 15' is provided having a first component 115 provided with the hollow tube 43 for the passage of steam and with appropriate electrical contacts. Said component 115, will engage directly into the socket 14 of the machine body.

Said multi-function plug 15' to be connected even to a normal household electrical supply socket requires a second adapter component 215 shown in Fig. 6 and comprising the grounding CT, neutral CN and of phase CF electrical contacts. The electrical return contact CR is already arranged in the first component 115, which will engage with the pipe portion 12' inside the body.

In Fig. 7 the complete multifunction plug 15' of the first component 115 and of the adapter component 215 is shown. The non-return valve 19 will be placed in the component 115 inside the tubular element or hollow tube 43 which, as also seen in the front view of Fig. 4 concerning the first embodiment of the plug 15, is located beside the non-return contact CR.

In Fig. 8 the non-return valve 19 is shown arranged inside the hollow tube 43 and suited to prevent the electrical parts of the plug 15 from getting wet by any residual water descending along the pipe 12. The description of the valve 19 makes

reference to the plug 15 of the first embodiment, but may be related in a similar way also to the plug 15', wherein the hollow tube 43 is arranged in the component 115. As can be seen the hollow tube 43 is fitted on the right end, looking at the figure, inside an end portion of the pipe 12 for transporting water or steam V, which will be fed by the machine body when the present system is expected to function with the iron connected to the machine body. Even in the case of supplying water from the machine body the travelling direction of said water will always be the direction indicated by V, as well as the steam. Said valve 19 comprises a shutter 119 and a return spring 219 and is housed inside a tubular seat 143 formed inside the hollow tube 43 and having a larger cross section with respect to the rest of the hollow tube 43. In the annular step 243 that is formed in the border area between the portion of the hollow tube 43 with smaller section and the seat 143 with greater section an abutment seat for said shutter 119 is then obtained, which is normally maintained in the illustrated closed position by the spring 219. Said spring 219, at the opposite end with respect to the shutter 119, is fixed on a support tubular element 319, which keeps it in position and is also housed inside the seat spring 143. Said return spring 219 is set to allow the passage of the steam in the direction V shown, and then following the passage of the steam inside the hollow tube 43 compression of said spring 219 will occur and a consequent detachment of the shutter 119 from the abutment seat 243, so as to let the steam flow towards the pipe 12. When the steam supply from the ironing system machine body is interrupted, the valve 19 automatically closes due to the spring 219 that expands and returns the shutter 119 to the closed position, which will return into abutment on the annular step 243.

The present ironing system can operate in a first mode wherein the iron 1 is connected to the machine body 2 and according to another operation mode wherein the iron 1 is disconnected from the machine body 2 and is directly connected to the normal electrical supply socket. Considering for example the first embodiment of the multifunction plug 15, when the present system will work connecting the iron 1 to the machine body 2, the steam produced by the boiler 9, or the water pumped from the machine body 2, will pass through the solenoid valve 8, of the pipe portion 12', and

then through the socket 14 and the multifunction plug 15, therefore will flow into the pipe 12 and then will reach the iron 1. As said the steam flow or water flow pressure will be such as to compress the spring 219 of the non-return valve 19, for which the shutter 119 will translate towards left, looking at Fig. 8, and will let the steam flow go
5 into the pipe 12. When the pressure is lowered below a certain limit, said shutter returns to the closed position pushed by the spring 219 and the non-return valve 19 closes automatically.

In the second operation mode of the present system, i.e. with the iron 1 is separated from the machine body 2, the non-return valve 19 remains advantageously
10 always closed and the electrical cable 5 of said iron 1 may be directly connected to the electrical supply socket via the plug 15 as in the diagram of Fig. 1, or a simple adapter component 215 may be provided which is connected to the component 115 of the plug 15' illustrated as alternative embodiment in Fig. 5, 6 and 7.

Regarding the non-return valve 19, or any other appropriate anti-backflow
15 means, the important aspect is that the latter is positioned downstream of the electrical components of the plug 15 with respect to the steam or water flow V, so in essence downstream of the various contacts CR, CN, CF and CT, for which the latter may possibly also be arranged directly within a portion of the pipe 12 rather than inside the tubular element or hollow tube 43, which in turn will be fitted to the pipe
20 portion 12' inside the machine body 2 and can itself cooperate with a further non-return valve provided in said portion 12'.

Once again we want to emphasize that, the same advantages obtainable by the present invention and widely described above can be obtained also if within the machine body 2 a tank associated with means for pumping water towards the iron 1,
25 always via the pipe 12, is provided, which in this case will deliver water and not steam to said iron 1. Said water will be vaporized directly inside the iron 1 by means of known systems, such as drip systems or the like.

As it has been seen, the ironing system according to the invention has important versatility and safety characteristics, as it is provided that the iron may be directly
30 connected to a household electrical supply socket or may be used in combination

with the machine body in a simple and secure way, thus ensuring that the electrical parts of the multifunction plug remain in any case isolated from any water backflow inside the supply pipe to the iron.

CLAIMS

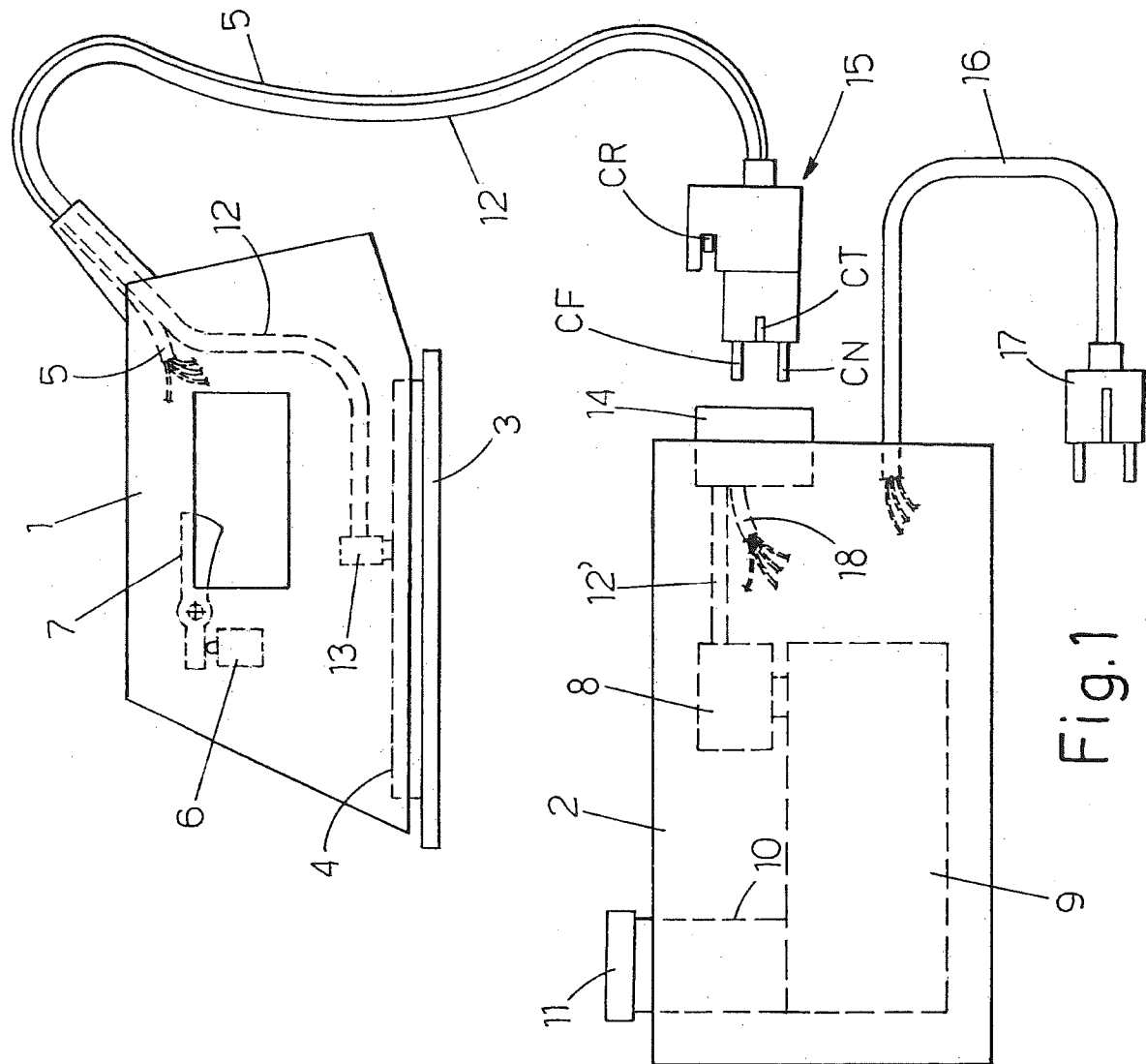
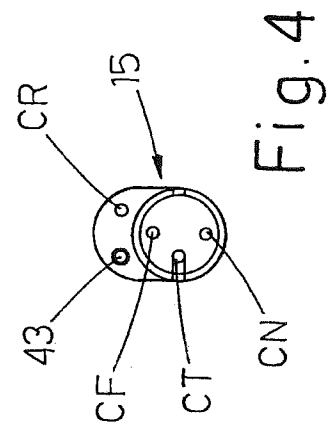
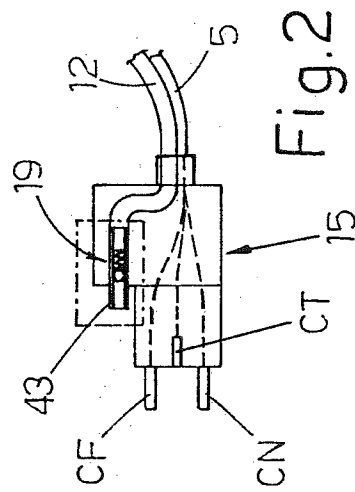
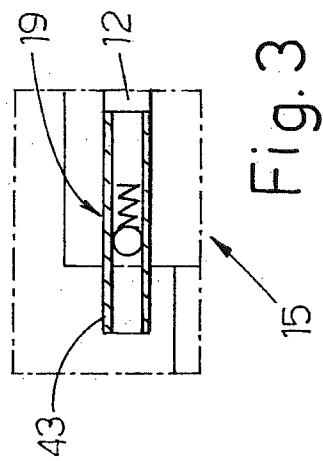
1. An ironing system, comprising an iron (1), a machine body (2) provided with means (9) for producing steam or delivering water directly to the iron (1), a pipe (12) delivering steam or water from the machine body (2) to the iron (1) and an electrical cable (5) for supplying the iron (1), characterized in that said pipe (12) and said electrical cable (5) coming from the iron (1) comprise a first multi-function connector (15, 15') provided with a series of electrical contacts (CN, CR, CT, CF) and suited to be connected, according to a first operating mode of the system, to a second connector (14) connected to a portion (12') of the pipe for the passage of water or steam inside the machine body (2) and connected to a portion (18) of electrical cable inside the machine body (2), or suited to be connected, according to a further operating mode of the system, directly or by means of an appropriate adapter (215) to the electricity distribution system, thus excluding the machine body (2).
2. The ironing system according to claim 1, characterized in that at least in a portion (43, 12) of the tubular element for the passage of water or steam (V) arranged downstream of said electrical contacts (CN, CR, CT, CF) anti-backflow means (19) are positioned, which means are suited to prevent that any residual water in said pipe (12) would come into contact with said electrical contacts (CN, CR, CT, CF) of the multifunction connector (15, 15').
3. The ironing system according to claim 2, characterized in that said first connector (15, 15') comprises a hollow tube (43) that can be fitted on the second connector (14) of the machine body (2) and bearing a seat (143) for housing said anti-backflow means (19).
4. The system according to claim 2, characterized in that said connector (15') comprises a first component (115) where said anti-backflow means (19) are arranged and connectable directly to the machine body (2) or, by way of a second adapter component (215), directly to a standard electrical power supply socket.
5. The ironing system according to claim 2, characterized in that said means comprise at least one non-return valve (19).

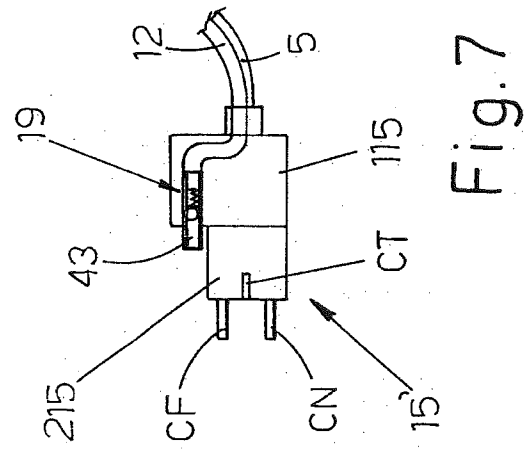
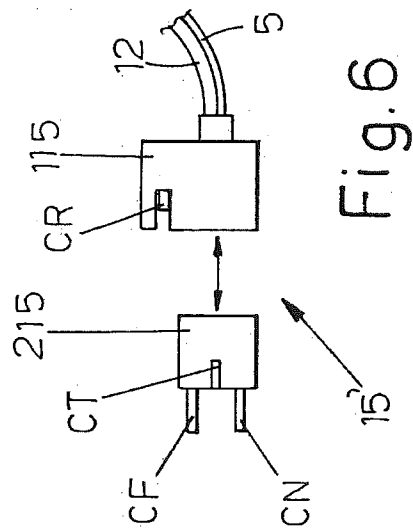
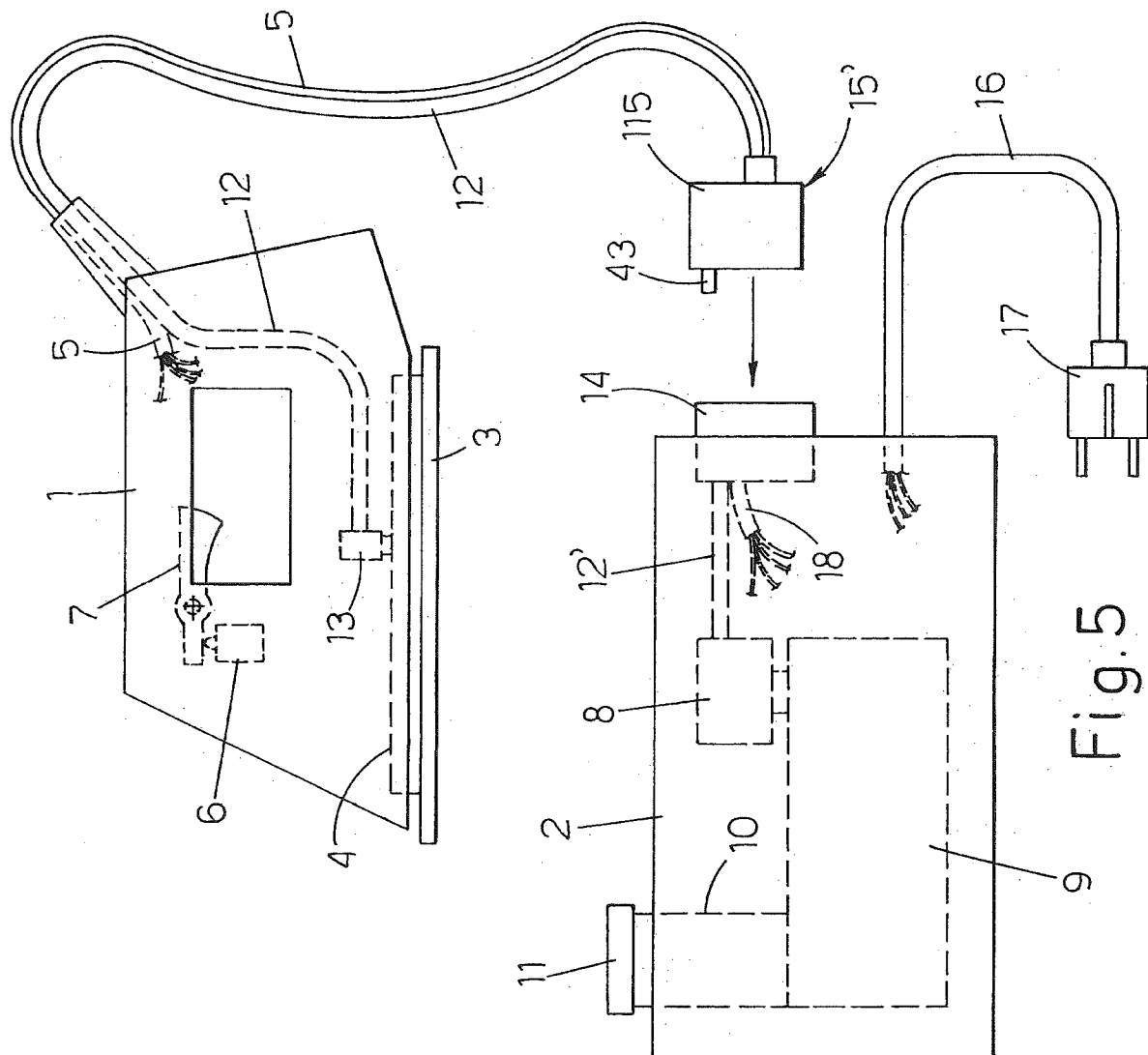
6. The ironing system according to claim 5, characterized in that said non-return valve (19) is placed in said multi-function connector (15, 15').

7. The system according to claim 5, characterized in that said non-return valve (19) comprises a shutter (119) maintained in the closed position by a corresponding contrast spring (219), being that said spring (219) is suited to be compressed following a suitable pressure of the steam flow (V) or of water coming from the machine body (2).

8. The ironing system according to claim 1, characterized in that the machine body (2) comprises on a wall of a single second connector (14) for the connection to said first connector (15, 15').

9. The ironing system according to claim 1, characterized by comprising a further electrical cable (16) permanently connected to the machine body (2).





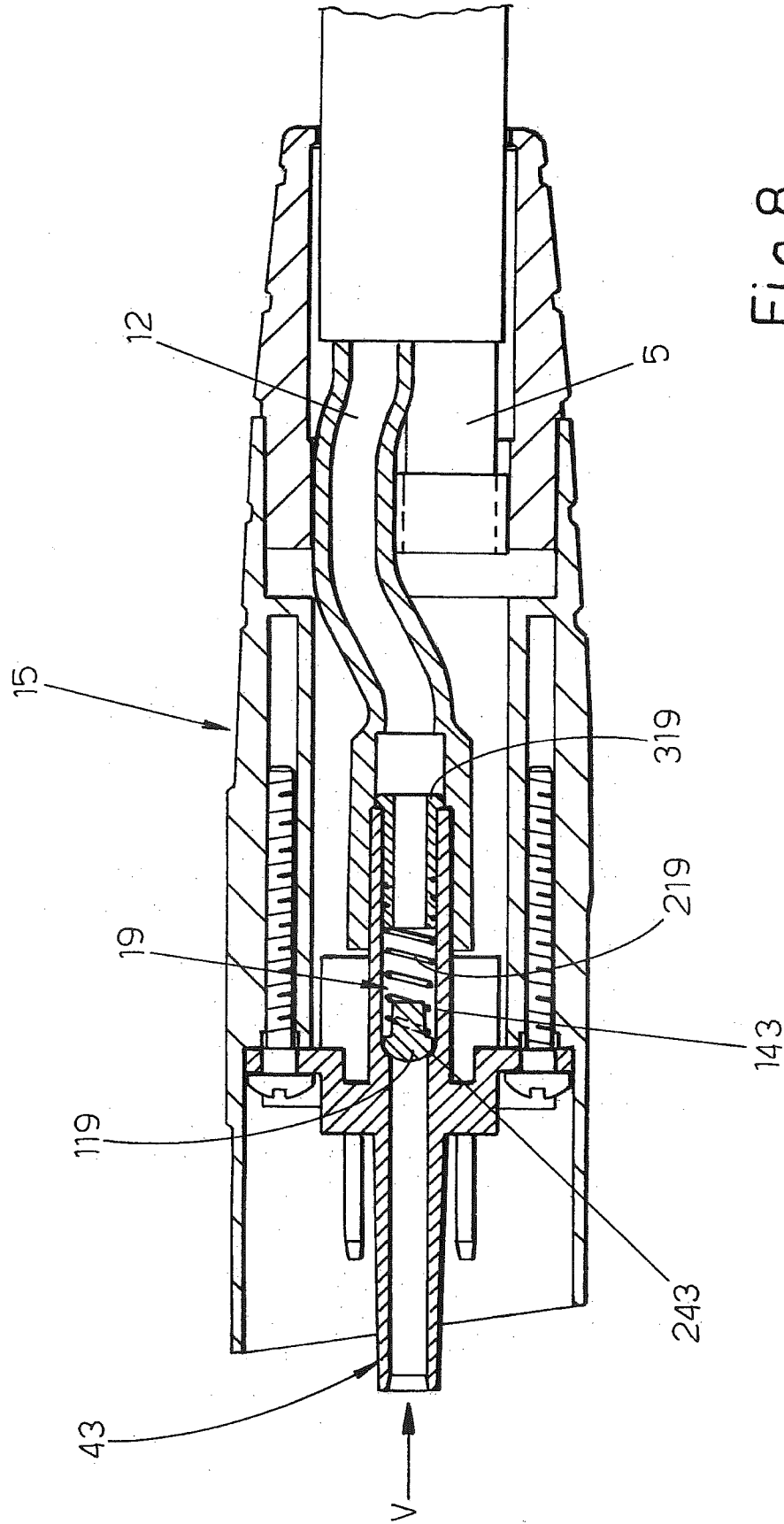


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2014/065089

A. CLASSIFICATION OF SUBJECT MATTER

INV. D06F75/32 D06F75/02 D06F75/06 D06F75/12
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 2013/167700 A1 (LONGHI APPLIANCES S R L DIVISIONE COMMERCIALE ARIETE DE [IT]) 14 November 2013 (2013-11-14) page 3, line 20 - page 10, line 15; figures 1-12	1-9
A	----- EP 0 574 602 A1 (MIRALFIN SRL [IT]) 22 December 1993 (1993-12-22) column 4, line 21 - column 4, line 46; figure 1	1
A	----- EP 0 618 324 A1 (SEB SA [FR]) 5 October 1994 (1994-10-05) column 2, line 56 - column 3, line 49; figures 1-3	1
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

16 January 2015

Date of mailing of the international search report

28/01/2015

Name and mailing address of the ISA/

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Fachin, Fabiano

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2014/065089

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00/06945 A1 (FERRANTE MARCELLO [IT]) 10 February 2000 (2000-02-10) page 4, line 7 - page 6, line 8; figure 1 -----	1
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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