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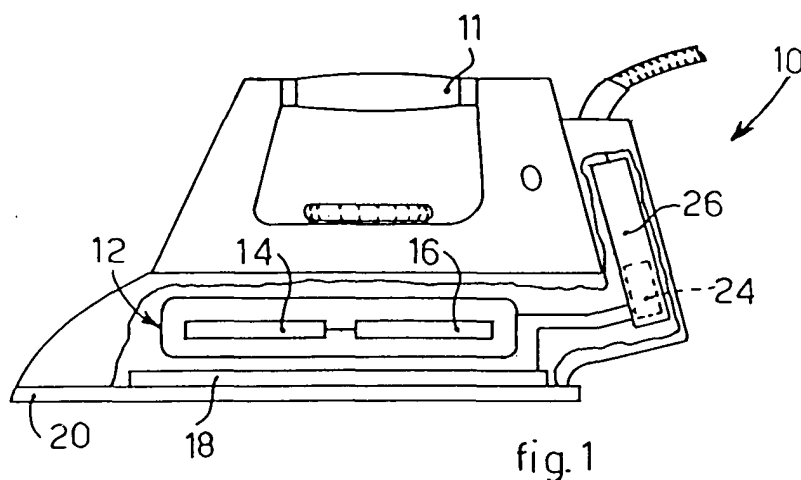
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(54) **Electric device for electric domestic appliances such as a vacuum cleaner, liquid suction device, steam iron and suchlike, for domestic and/or professional use**

(57) Electric device (10) for electric domestic appliances, such as vacuum cleaners, liquid suction devices, irons or suchlike. The device (10) comprises three autonomous absorption elements (14, 16, 18) to absorb electric loads, able to be selectively connected to the electric network. An electric connection element (24) can be selectively activated to connect, in a first oper-

ating condition, a first element (14) directly to the electric network and to exclude the other two elements (16, 18) from electric feed and, in a second operating condition, the first element (14) in series with a second (16) of the elements and, simultaneously, a third (18) of the elements in parallel with the first two, in order to distribute the electric power between the three elements (14, 16, 18).



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Description

FIELD OF THE INVENTION

[0001] The present invention concerns an electric device for an electric domestic appliance, such as a vacuum cleaner, a liquid suction device, a steam iron or suchlike, which can have both domestic and professional applications. The electric device comprises at least three autonomous absorption elements to absorb a determinate electric load, connected to the same electric feeder. A switch, or other electric connection means, is able to connect the feeder, in a first operating condition, to only one of the loads, and in a second operating condition, to all three loads, to distribute in a balanced manner, and exploit to the maximum, all the electric power available in order to make the electric domestic appliance function.

BACKGROUND OF THE INVENTION

[0002] An electric device is known for a steam iron, comprising a first electric resistance R1 and a second electric resistance R2, arranged one above the other inside a boiler to transform water into steam, and a third electric resistance R3 to heat the plate of the iron. Advantageously, $R2 = R3$.

[0003] In a first operating condition, the first and second electric resistance are connected in parallel by means of a monopole type switch of a conventional type, for example a relay, while the third electric resistance is excluded from the electric feed.

[0004] In a second operating condition, the electric switch excludes the second resistance from the electric feed and connects the third electric resistance in parallel to the first, still keeping the maximum power absorbed by the network unvaried.

SUMMARY OF THE INVENTION

[0005] The present invention is set forth and characterized essentially in the main claim, while the dependent claims describe other innovative characteristics of the invention.

[0006] The purpose of the present invention is to achieve a device for electric domestic appliances, such as a vacuum cleaner provided with a boiler to generate steam, a liquid suction device, a steam iron or suchlike, by means of which it is possible to connect selectively and in optimum manner the electric feed only to one of the absorption elements to absorb the electric loads of the electric appliance, or to all the electric absorption elements of the same appliance.

[0007] In accordance with this purpose, an electric device for electric domestic appliances comprises at least three autonomous absorption elements to absorb electric loads, able to be selectively connected to a same feeder of electric power. Electric connection means can

be selectively activated to connect, in a first operating condition, a first of the elements directly to the feeder and to exclude the other two elements from the electric feed, and to connect, in a second operating condition, the first element in series with a second element and, simultaneously, a third element in parallel with the first two, in order to distribute the electric power between the three elements.

[0008] Each of the absorption elements comprises a corresponding electric resistance able to absorb a pre-set maximum electric power, for example to heat a plate of an iron, to heat water in a boiler to generate steam, to drive an electric motor installed in an aspirator, a fan or suchlike.

[0009] The electric connection means comprise, for example, a switch of the bipolar type, which can be activated either manually or electronically, and is able, in the second operating condition, to simultaneously connect all three elements.

[0010] The first and the second element are able to absorb, for example, a maximum power equal to the electric power delivered by the feeder, while the third element is able to absorb a maximum power less than that delivered by the feeder, preferably half.

[0011] Consequently, in the first operating condition, all the power of the feeder is absorbed by the first element, while in the second operating condition the power is distributed between the three elements according to the corresponding maximum power of absorption.

[0012] For example, in one application of the electric device according to the present invention, the feeder is able to deliver a power equal to 2200W, the first and the second element are able to absorb a maximum power of 2200W, whereas the third element is able to absorb a maximum power of 1100W. In the second operating condition, therefore, the electric power of the feeder is distributed equally between the third element, which absorbs 1100W, and the pair of the first two elements which in series absorb the remaining power of 1100W.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic view of a steam iron provided with the electric device according to the present invention;
- fig. 2 is an electric diagram of the device according to the present invention in a first operating condition;
- fig. 3 is the electric diagram of fig. 2 in a second operating condition.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT OF THE INVENTION

[0014] With reference to fig. 1, an electric device 10 according to the present invention is shown applied to an electric domestic appliance 11, represented here by a steam iron of a conventional type. It is clear that the electric device 10 can also be applied to any aspirator of a conventional type, such as a vacuum cleaner, a liquid suction device or suchlike.

[0015] The electric device 10 comprises a first electric resistance 14 and a second electric resistance 16, arranged one next to the other, inside a water accumulation tank, or boiler 12, in order to transform water into steam.

[0016] The electric device 10 also comprises a third electric resistance 18, arranged directly in contact with an ironing plate 20, in order to heat the latter. The third electric resistance 18 can also represent the load of the aspirator.

[0017] An electric switch 24 is able to selectively connect, in a first operating condition shown schematically in fig. 2, the first electric resistance 14 directly to the feeder 22 and exclude the other resistances 16 and 18. In a second operating condition, on the contrary, the electric switch 24, as shown schematically in fig. 3, is able to connect in series the first electric resistance 14 and the second electric resistance 16 and, in parallel to the other two, the third resistance 18, so as to distribute between the three resistances the power of the feeder 22, corresponding, for example, to 2200W.

[0018] Therefore, in the first operating condition, only a single electric load, consisting of the first electric resistance 14, is connected to the feeder 22. In this way, the electric resistance 14 can absorb a load of up to 2200W and the feeder 22 supplies all the available power to it. The resistance 14, furthermore, is able to be always immersed in the water of the boiler 12, and hence ensures a constant transmission of heat to the water contained in the boiler 12.

[0019] On the contrary, the second operating condition is selectively activated when a double electric load is required, on the one hand to transform water into steam inside the boiler 12, and on the other hand to feed the third electric resistance 18 to heat the plate 20, or to make the suction power available.

[0020] The second electric resistance 16 is able to absorb a maximum power equal to, for example, 2200W, while the third electric resistance 18 is able to absorb a maximum power less than that of the first two, equal for example to 1100W.

[0021] The maximum power available of 2200W, in said second condition, is distributed equally between the three resistances 14, 16, 18. To be more exact, the third resistance 18 absorbs up to 1100W, while the first resistance 14 and the second resistance 16 together absorb the remaining 1100W.

[0022] In this double load condition, the arrangement

in series of the first electric resistance 14 and the second electric resistance 16, compared to the state of the art and given the same power absorbed, allows to double the surface of heat exchange for heating the water in the boiler 12, and consequently to obtain a reduction in the heating time of the water itself.

[0023] According to another variant, the switch 24 is of the electronic type, and is automatically commanded by means of an electronic unit 26, according to the temporary requirements of the iron 10.

[0024] It is clear however that modifications or additions of parts may be made to the electric device 10 as described heretofore, but these shall remain within the field and scope of the present invention.

[0025] It is also clear that, although the present invention has been described with reference to specific examples, a person of skill shall certainly be able to achieve many other equivalent forms of electric device 10, all of which shall come within the field of protection of the present invention.

Claims

1. Electric device for electric domestic appliances, such as vacuum cleaners, liquid suction devices, irons or suchlike, comprising at least three autonomous absorption elements (14, 16, 18) to absorb electric loads, able to be selectively connected to a feeder (22) of electric power, **characterized in that** electric connection means (24) are able to be selectively activated to connect, in a first operating condition, a first of said elements (14) directly to said feeder (22) and to exclude the other two elements (16, 18) from the electric feed and, in a second operating condition, said first element (14) in series with a second (16) of said elements and, simultaneously, a third (18) of said elements in parallel with the first two, in order to distribute the electric power between said three elements (14, 16, 18).
2. Electric device as in claim 1, **characterized in that** said absorption elements (14, 16, 18) each comprise a corresponding electric resistance able to absorb a pre-set maximum power.
3. Electric device as in claim 1 or 2, **characterized in that** said first element (14) and said second element (16) are individually able to absorb a power equal to that supplied by said feeder (22) or available from the electric network.
4. Electric device as in any claim hereinbefore, **characterized in that** said first element (14) and said second element (16) are able to absorb together in a serial-type connection an electric power equal to half that supplied by said feeder (22).

5. Electric device as in any claim hereinbefore, **characterized in that** said third element (18) is able to absorb at most an electric power equal to half the power delivered by said feeder (22). 5
6. Electric device as in any claim hereinbefore, **characterized in that** said electric connection means comprise a switch of the bipolar type (24). 10
7. Electric device as in any claim from 1 to 4 inclusive, **characterized in that** it also comprises another absorption element to absorb an electric load, able to be connected by means of said electric connection means (24) in parallel to at least one of said three elements (14, 16, 18) in said first operating condition or in said second operating condition. 15
8. Electric device as in any claim hereinbefore, **characterized in that** said feeder (22) is able to deliver a power at least equal to 2200W. 20
9. Electric device as in any claim hereinbefore, **characterized in that** said electric connection means comprise a switch (24) able to be activated electronically and to be commanded by an electronic control unit (26). 25

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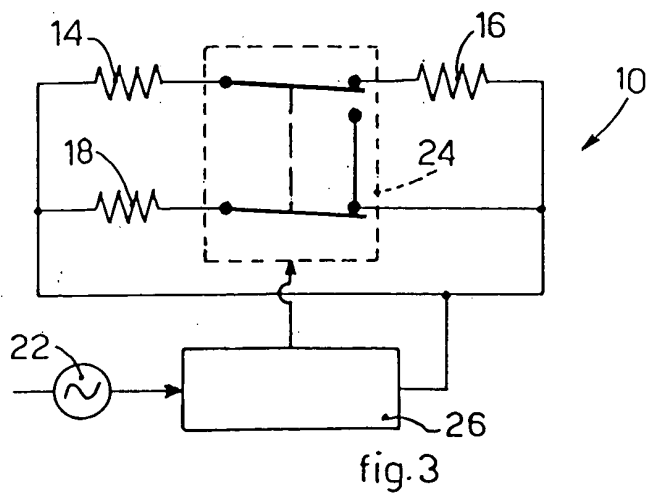
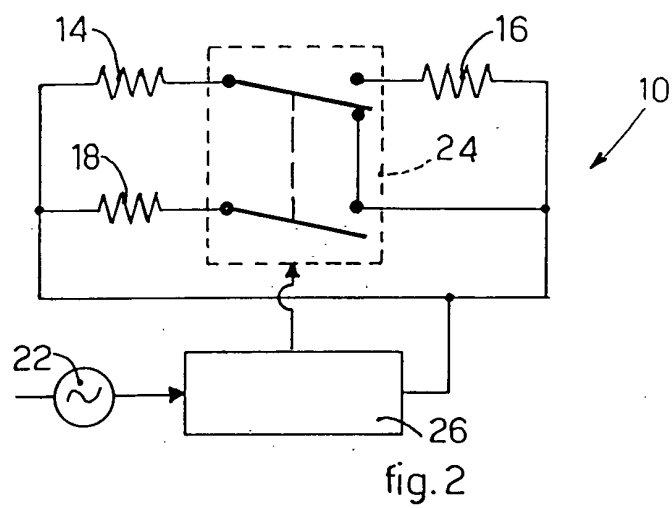
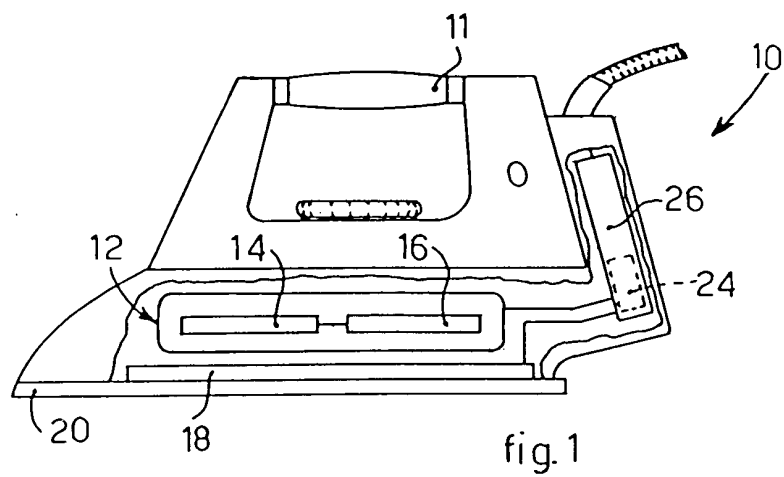
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EUROPEAN SEARCH REPORT

Application Number
EP 03 01 5008

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 517 673 A (NUOVA ROSSI S A S DI PECORARI) 9 December 1992 (1992-12-09) * the whole document *	1	D06F75/24 A47L11/34 A47L9/28 D06F75/12 H05B1/02
A	US 4 939 342 A (FRENS GERRIT ET AL) 3 July 1990 (1990-07-03) * the whole document *	1	
A	US 6 263 596 B1 (BRANDOLINI JEAN-LOUIS ET AL) 24 July 2001 (2001-07-24) * the whole document *	1	
A	US 4 046 989 A (PARISE CARL ET AL) 6 September 1977 (1977-09-06) * the whole document *	1	
A	US 5 555 595 A (LIGMAN JAMES R) 17 September 1996 (1996-09-17) * the whole document *	1	
A	US 2002/056170 A1 (PILEGGI EUGENE J) 16 May 2002 (2002-05-16) * the whole document *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 3 940 826 A (PHILLIPS PAUL E ET AL) 2 March 1976 (1976-03-02) * the whole document *	1	D06F A47L H02J H05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 November 2003	Examiner Norman, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 01 5008

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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26-11-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0517673	A	09-12-1992	IT 1246562 B	24-11-1994
			AT 122417 T	15-05-1995
			DE 69202398 D1	14-06-1995
			DE 69202398 T2	14-09-1995
			EP 0517673 A1	09-12-1992
			ES 2072129 T3	01-07-1995
US 4939342	A	03-07-1990	NL 8600048 A	03-08-1987
			AT 52288 T	15-05-1990
			BR 8700211 A	01-12-1987
			CN 87100117 A ,B	19-08-1987
			DE 3762436 D1	31-05-1990
			EP 0232924 A1	19-08-1987
			HK 88891 A	15-11-1991
			JP 62164500 A	21-07-1987
			SG 89890 G	21-12-1990
US 6263596	B1	24-07-2001	FR 2766502 A1	29-01-1999
			AU 8866298 A	16-02-1999
			BR 9810918 A	15-08-2000
			CN 1264441 T	23-08-2000
			DE 69804315 D1	25-04-2002
			DE 69804315 T2	10-10-2002
			EP 0998603 A1	10-05-2000
			ES 2174471 T3	01-11-2002
			WO 9905355 A1	04-02-1999
			JP 2002509466 T	26-03-2002
			TR 200000184 T2	23-10-2000
US 4046989	A	06-09-1977	NONE	
US 5555595	A	17-09-1996	NONE	
US 2002056170	A1	16-05-2002	NONE	
US 3940826	A	02-03-1976	AU 7422174 A	15-04-1976
			BE 820955 A1	11-04-1975
			DE 2449021 A1	24-04-1975
			JP 50066057 A	04-06-1975

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82