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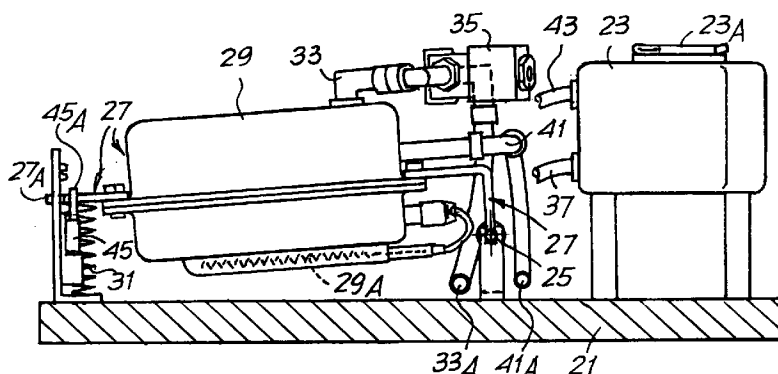
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(54) Apparatus for the rapid production of steam to be supplied to irons or steam cleaners

(57) The boiler (29), which supplies the steam to a flexible pipe (33, 33A) for the iron, is located on a moving member (27) which oscillates about a horizontal hinging axis (25) and is supported by a spring (31); with the reduction in the quantity of water inside the boiler,

the moving member (27) is raised by the spring (31) and acts on a microswitch (45) which operates an electric pump for supplying a limited quantity of water to the boiler via a flexible pipe (41, 41A).

Fig. 4



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Description

The currently known boilers for producing steam to be supplied to irons (or other domestic appliances such as steam cleaners) consist of a heated container with a cap for topping up the water content when the quantity of water previously introduced inside the boiler is about to run out. This results, among other things, in:

1. having to wait longer for the steam to emerge, since, after filling, all the water must be heated before steam can be produced again;
2. less efficient initial operation since, when the boiler is full, water droplets also frequently emerge together with the steam.

With the invention substantially continuous operation is obtained, with the supply of limited and frequent quantities of water, thus making it possible to achieve numerous advantages, including:

- continuous ironing which need not be interrupted for filling of the boiler and without one thus having to wait for the boiler to start boiling again;
- rapid ironing because the water which is heated in each case consists only of a small quantity and not the entire contents of the boiler;
- savings in electrical energy, owing to the small amount of water which has to be heated in each case;
- more efficient operation since the boiling water is kept at a near constant and relatively low level, thus preventing droplets from emerging together with the steam.

The apparatus with a boiler for producing steam intended for an iron, a steam cleaner or the like according to the invention substantially comprises a moving member on which the boiler is mounted and which is raised and lowered depending on the variation in weight of the boiling water inside the boiler, and a control system which is based on the displacements of said moving member and which controls the supply of limited quantities of water to the boiler.

In practice, the said moving member is supported by at least one resilient element and more particularly said moving member may be hinged on a horizontal axis and supported by at least one spring at a distance from said axis.

The apparatus comprises an electric pump for supplying the water to the boiler and a switch, in particular a microswitch, which is actuated by the displacement of the said moving member and which operates the said electric pump.

In order to ensure that the moving member may be easily displaced, both the pipe supplying the steam from the boiler and the delivery pipe of the pump for supplying the water to the boiler have a deformable section;

advantageously said deformable sections extend adjacent and parallel to the said hinging axis of the moving member.

The invention will be better understood with reference to the description and the accompanying drawing which shows a practical non-limiting example of the invention. In the drawing,

Fig. 1 shows a cross-sectional diagram of the apparatus;

Fig. 2 shows a plan view of said apparatus;

Fig. 3 shows a constructional embodiment of the apparatus; and

Figs 4, 5 and 6 show cross-sectional views along IV-IV, V-V and VI-VI in Fig. 4.

A fixed tank 1 is connected by means of a draw-off pipe 2 to an electric pump 3 which forces the water through a supply pipe 4 into the boiler 5 heated by the resistor 6. The boiler is mounted on a moving member 7 which is joined to a surface 8 - on which the tank 1 is situated - by means of a hinge 9 with a horizontal axis; said moving member 7 is supported by a spring 10. When, upon operation of the pump 3, the quantity of water inside the boiler 5 exceeds a predetermined level, owing to the increase in weight, the moving member 7 compresses the spring 10 on which it rests and is thus lowered until it acts on a switch 11, which interrupts operation of the pump 3, interrupting the introduction of water into the boiler. In the meantime, the steam which is generated inside the boiler continues to reach the user via the connection pipe 12. With evaporation of the water inside the boiler 5, the weight of the latter decreases and hence the moving member 7 is raised by means of the spring 10, causing tripping of the switch 11, which starts operation of the pump 3 again, thus repeating the normal working cycle and supplying each time a limited quantity of water to the boiler.

The temperature of the boiler is controlled by a thermostat 14.

The boiler is provided with at least one pressure-regulating valve 13 which will allow the steam to escape from the boiler in the event of excessive pressure inside the boiler itself.

According to that illustrated in Figs 4 to 6, the water tank 23 is located in a fixed manner on a base 21; a lid 23A allows periodic filling of this tank 23, independently of the frequency with which the boiler is supplied for generation of the steam.

25 denotes a horizontal oscillation axis for a moving member 27 which comprises in particular also the boiler 29; at a distance from the hinging axis 25, this moving member 27 rests on a spring 31 so that, with the variation in the load of the moving member 27 comprising the boiler 29, it is possible to obtain a variation in the compression of the spring and hence gradual raising of the moving member itself as water inside the boiler 29 is used up for the production of steam supplied to the iron.

33 denotes the pipe for conveying the steam from the boiler 29 to the iron (not shown); said pipe 33 is flexible and the section 33A thereof extends in the vicinity of the hinging axis 25 and parallel to this oscillation axis so that the movement of the moving member 27 about the axis 25 produces only a very small torsional deformation of the said section 33A of the pipe 33. 35 denotes a solenoid valve for effecting removal of the steam from the boiler; said solenoid valve 35 is controlled by a pushbutton or other operating member which is present in the iron; thus the user is able to request a supply of steam, as required, by operating said pushbutton or the like using the same hand with which the iron is gripped.

The water is supplied from the tank 23 to the boiler 29 via a pipe 37 which reaches an electric pump 39. A delivery pipe 41 extends from the pump 39, said delivery pipe being flexible and extending with a section 41A in the vicinity of and approximately parallel to the axis of rotation 25, so that this pipe 41 also undergoes a very limited degree of torsional deformation with the movement of the moving member 27 of the boiler 29 about the axis 25. 43 denotes a return pipe from the pump 39 towards the tank 23, allowing the flowback of pumped water exceeding the predefined throughput for supply of the boiler itself.

A bracket 27A, forming part of the moving member 27 and positioned at a distance from the hinging axis 25, is used for resting on the spring 31 and for acting on the actuating arm 45A of a microswitch 45 which controls the motor of the electric pump 39.

29A (Fig. 4) denotes the heat source - for example an electric resistor - which serves to generate the steam inside the boiler 29. This heat generator is controlled by a pressure switch and/or a thermostat, as mentioned above.

As the quantity of boiling water contained in the boiler is reduced owing to the generation of the steam supplied (via 33 and 33A) to the iron, the moving member 27 is gradually raised by the spring 31 until raising of the moving member 27 is such that it triggers, via the microswitch 45, operation of the pump 39 so as to allow a desired and limited quantity of cold water to be introduced from the tank to the boiler 29; this quantity of pumped water is limited with respect to the residual quantity of water which is already boiling, so that there is practically no variation in the capacity of the boiler to deliver steam to the iron.

Claims

1. Apparatus for producing steam intended for an iron, a steam cleaner or the like, characterized in that it comprises a moving member (27) on which the boiler (29) for producing steam is mounted and which is raised or lowered depending on the variation in weight of the boiling water inside the boiler, and a control system - based on the displacements of said moving member - which controls the supply

of limited quantities of water to the boiler.

2. Apparatus according to Claim 1, characterized in that said moving member (27) is supported by at least one resilient element.
3. Apparatus according to claim 1 or 2, characterized in that said moving member (27) is hinged on a horizontal axis (25) and is supported by at least one spring (31) at a distance from said axis.
4. Apparatus according to at least one of the preceding claims, characterized in that it comprises an electric pump (39) for supplying the water to the boiler (29) and a switch, in particular a microswitch (45), which is actuated by the displacement of said moving member and which operates the said electric pump.
5. Apparatus according to at least one of the preceding claims, characterized in that the pipe (33) supplying the steam from the boiler and/or the delivery pipe (41) of the pump (39) for supplying water to the boiler (29) have a deformable section (33A; 41A).
6. Apparatus according to Claim 5, characterized in that said deformable sections (33A, 41A) extend adjacent and parallel to the said hinging axis (25).

Fig.1

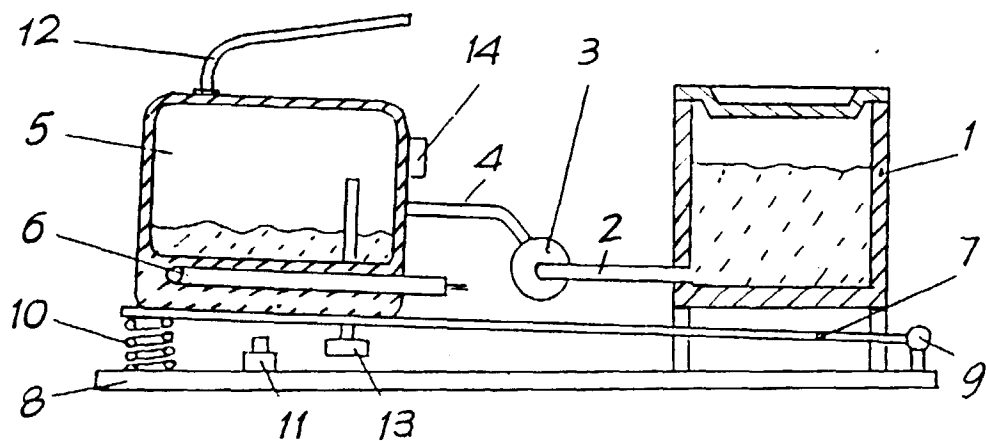


Fig.2

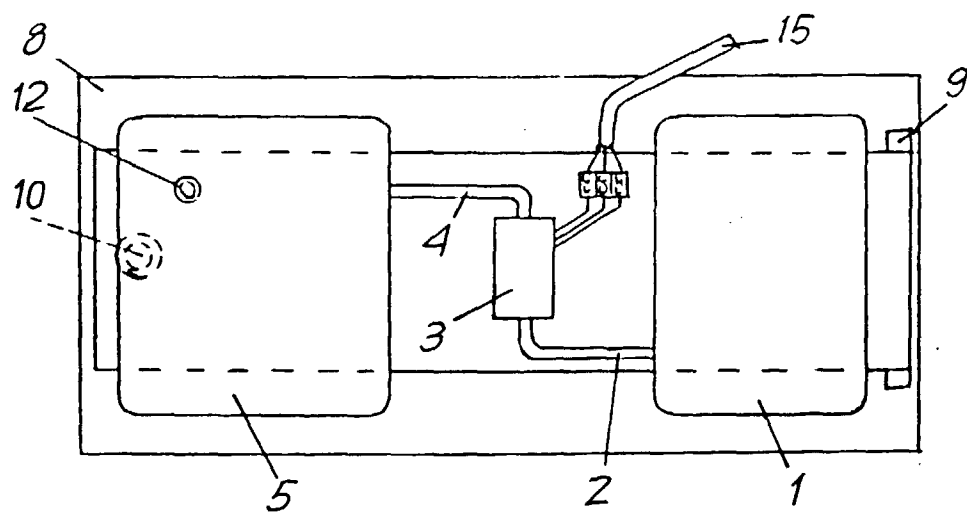


Fig. 4

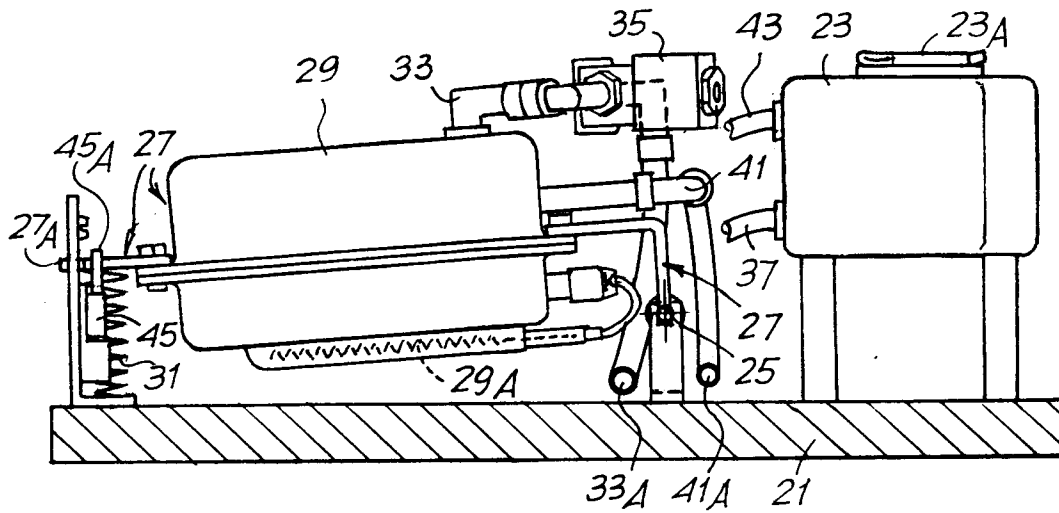


Fig. 3

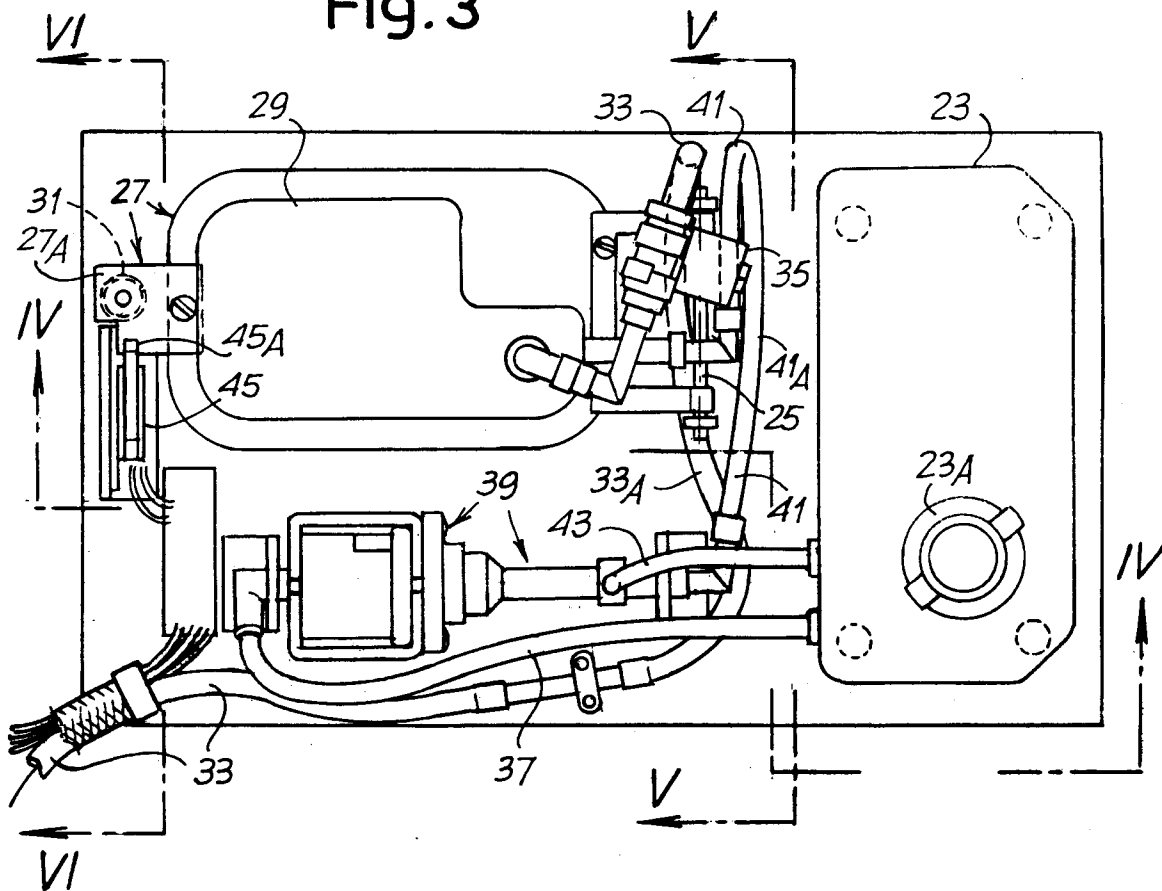


Fig. 5

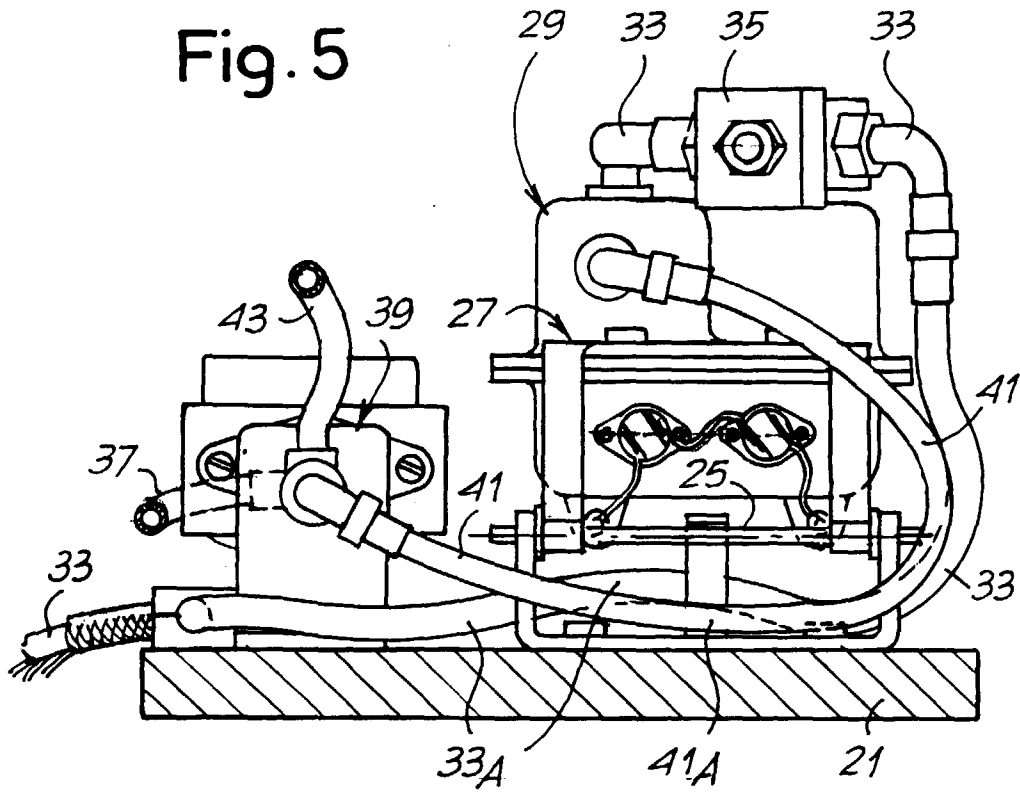
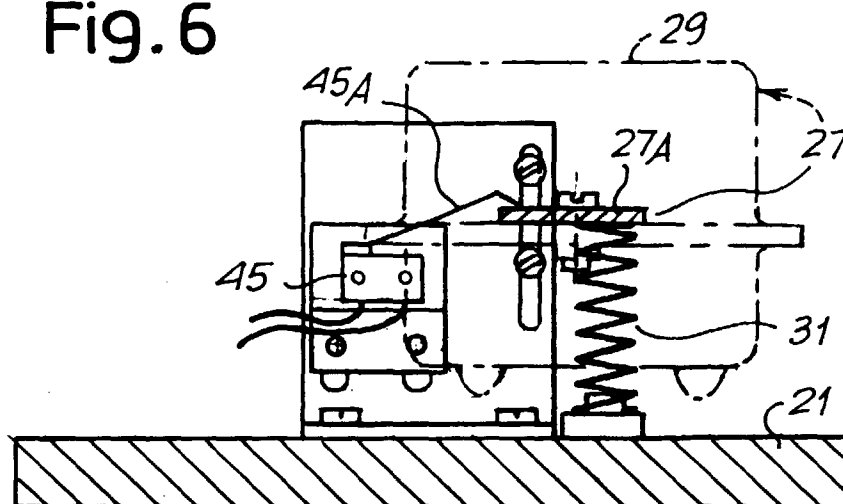


Fig. 6





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EUROPEAN SEARCH REPORT

Application Number
EP 97 83 0015

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.6)
X	EP 0 438 112 A (DARIO) * column 4, line 15 - line 27; figures * ---	1,2,4	F22B1/28
X	EP 0 239 822 A (DEGUSSA) * the whole document * ---	1-3	
X	GB 477 870 A (CONILL) * the whole document * ---	1,2,5	
X	FR 1 525 214 A (THOMSON HOUSTON-HOTCHKISS BRANDT) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F22B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 June 1997	Examiner Van Gheel, J
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