

(18)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 069 858**A1**

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 82104883.2

(51) Int. Cl.³: **F 22 B 1/28**
D 06 F 75/06

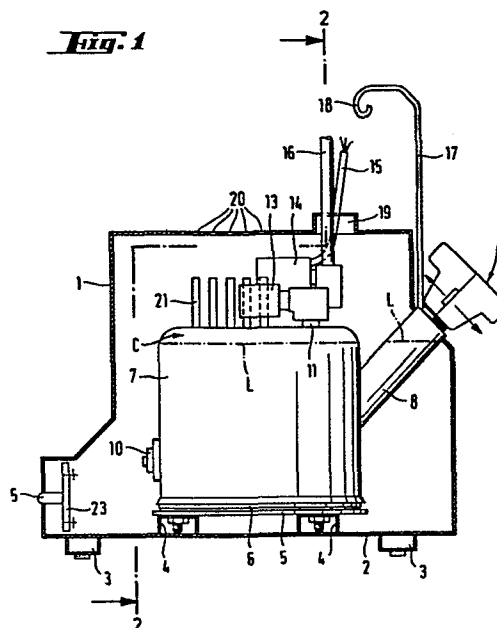
(22) Date of filing: 03.06.82

(30) Priority: 02.07.81 IT 2270481

(43) Date of publication of application:
19.01.83 Bulletin 83/3(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE(71) Applicant: Fumagalli, Luigi
Via Sacco d'Aragona 20
I-20065 Inzago Milano(IT)(72) Inventor: Fumagalli, Luigi
Via Sacco d'Aragona 20
I-20065 Inzago Milano(IT)(74) Representative: Riccardi, Sergio
Riccardi & Co. Via Macedonio Melloni, 32
I-20129 Milano(IT)

(64) Electrical household appliance for producing and feeding steam to an electric iron.

(57) The invention relates to an electric household appliance for producing steam which is then delivered to an electric steam iron which can operate in a rapid and efficient way like the big industrial ironing machines. The appliance is particularly safe and reliable as it is provided with precise safety devices, that is a pressure switch to adjust the pressure, a thermostat checking lack of water in the boiler, and a safety valve to avoid overpressure and accidents due to untimely opening of the boiler plug.

Fig. 1**EP 0 069 858 A1**

- 1 -

"Electrical household appliance for producing and feeding steam to an electric iron"

The present invention relates to an electric household appliance of little size but great performance, adapted to produce in few minutes steam of the quantity and quality required to feed continuously, safely and economically a household steam iron, which can then carry out the performance of a true industrial ironing machine.

It is a long time that electrical steam irons are commonly used, but they have several inconveniences, such as the little capacity of the reservoir, the need of using distilled water to avoid fouling, the scarce power of delivered steam, the risk of short circuits and other failures, and so on.

As steam ironing gives undoubtedly satisfactory results on a broad range of textile articles, the use of steam irons is more and more common in spite of these inconveniences, and therefore it was recently devised to improve the performance of the steam irons by coupling them to a little electrical boiler producing and feeding the steam for the iron. However it was noted that these little boilers are extremely dangerous, as it was not taken into account the fact that their use in a domestic environment dictates the use of supplemental safety measures to avoid serious risks in the event of wrong manoeuvres e.g. by a child or a housewife, who generally are not aware of the phenomena caused by the pressures involved in steam generation.

The electrical household appliance according to the present invention just solves

these problems and gives the maximum safety and reliability with minimal sizes, as it is provided with precise safety devices especially designed for this particular use.

More particularly, the appliance according to the present invention comprises a pressure switch to adjust the steam pressure, a thermostat to check lack of water in the boiler and a safety valve to avoid overpressures and accidents due to untimely opening of the boiler plug, as well as a number of other characteristic measures which will be apparent and clear from the following detailed description of a preferred embodiment, given as a non limiting example only, and making reference to the various figures of the accompanying sheets of illustrative drawings, in which:

Fig. 1 is a diagrammatic side sectional view, taken along line 1-1 of Fig. 2, showing the appliance as a whole;

Fig. 2 is a diagrammatic front sectional view, taken along line 2-2 of Fig. 1, also showing the appliance as a whole;

Fig. 3 is an exploded view showing the various elements of the boiler plug with safety valve;

Fig. 4 is an exploded view showing the various elements of the pressure; and

Fig. 5 is a plan view of the printed board electric circuit providing the various connections of the control panel of the appliance.

With reference now to the various figures of the accompanying drawings, and more particularly referring first to the diagrammatic general views of the appliance of Figs. 1 and 2, the electric household appliance according to the present invention comprises an outer body or housing 1 preferably of insulating and shock resistant material such as ABS resin, mounted on a base 2 of sheet plate, from which the feet 3 as well as the brackets 4 are made, to which a flange 5 is fixed, on which the plate 6 is supported, containing the electric resistances for heating the overlying boiler 7 of stainless steel

so as to avoid formation of calcareous deposit.

The boiler 7 of stainless steel preferably has a circular shape, to make its construction the easiest possible, and a filler 8 the end of which is an internally threaded mouth in which the plug 9 is screwed, said plug being provided with a bleed
5 hole and a safety valve, as it will be illustrated in greater detail hereinafter, with reference to Fig. 3.

On its lateral surface the boiler 7 has a thermostat 10 measuring the temperature of the metal surface of the boiler near the electric resistances 6 and switches off the current when such a temperature exceeds a predetermined value (80-90°C) which
10 generally occurs when water is missing in the boiler.

On the dome or top the boiler 7 there are two fittings 11 and 12, slightly projecting inside the boiler so as to be used also as a drip, one of which is connected to a pressure switch 13 measuring the steam pressure and triggering a microswitch when the value exceeds a predetermined pressure, as it will be illustrated in greater detail with
15 reference to Fig. 4, while the other fitting is connected to an electric valve 14 made of stainless steel, which is controlled by a push button arranged on the iron (not shown), to which it is connected by the electrical cable 15 and the sheathed rubber hose 16 for high pressure operation: when the push button of the electric iron is pressed, valve 14 opens and steam is fed to said iron, which was properly modified by
20 providing said push button and a suitable adaptor to the steam feeding hose 16 replacing the filling plug presently used for steam irons; however these are the only little modifications that have to be made to the conventional electric steam irons. It is also advisable that the appliance is provided with a rod 17 having a hook 18 to hang the electric cable 15 and the steam feeding hose 16 so that their weight does not affect
25 the outgoing block 19, where a bend and a wear spot of said cable and hose could be

created.

The boiler 7 is arranged at the center of the housing 1 and well spaced from it along all sides, so as to obtain an efficient air circulation all around the lateral surface of the boiler as well as above and under it, so that the electric valve, the pressure switch, the thermostat, the electric circuits and the same housing of the appliance are
5 all kept well cooled and are minimally subject to the influence of the boiler heat. More particularly air can enter inside the body at the bottom from the slots obtained by cutting the brackets 4, at the top from a set of openings 20 and on the sides through similar sets of openings 21, while on the perimetral faces of the boiler 7 there is an
10 isolating layer 22 of rock wool.

It has also to be noted that the filler 8 was designed inclined so that its maximum filling level indicated by the line L is at such a height that inside the boiler 7, above said level L, there is always an air chamber C in the boiler dome or top, allowing to bring efficiently the steam to the desired pressure and temperature, as much free as
15 possible of water at the liquid state.

On the front side the appliance has the controls consisting of two switches and three lamps, the whole connected to a printed circuit board 23 operating at the normal voltage of the mains, so as to remove the need of providing a voltage reduction for the control circuits, making the entire electric network of the appliance simpler, safer and
20 stronger, a measure which up to now was never adopted on little electric household appliances.

The printed circuit 23 shown in detail in Fig. 5 comprises the contacts 24 of the switch for inserting the boiler heating resistances, with contacts 25 for the corresponding light which is switched off when the desired steam pressure is reached,
25 contacts 26 for the light S indicating that the appliance is live, the contacts 27 of the

switch feeding current to the iron with contacts 28 of the corresponding light which is always lit until there is current fed to the iron, being as usually provided with its own thermostat and corresponding light to adjust the temperature of the ironing plate according to the kind of textile to be pressed. The printed circuit 23 is then complete with permanent fast-on connections²⁹ with the various above mentioned electric components.

With reference now to Fig. 3, the closure plug 9 with its safety valve is illustrated in detail. The plug consists of a body 30 which is embedded in the control knob 31 and having a threaded end 32 with a teflon sealing washer 33, said end 32 being screwed in the filler 8 and having the bleed hole 34 for discharging the pressure as soon as the plug starts to be unscrewed, so that the user is immediately made aware of the presence of steam under pressure and desists from further unscrewing the plug until the bleed is ended. Inside the body 30 there is the safety valve, in turn comprising a teflon washer 35, a polygonal faceted body 36, a stainless steel spring 37 and an adjustment screw 38 with relief hole 39, while faceting of the body 36 is discharging through the safety holes 40 of the plug body 30.

The safety valve is calibrated to close at 2 atm and discharge at 2.4 - 2.5 atm in the practical embodiment described herein.

Going now to Fig. 4, the details of the pressure switch 13 are illustrated, consisting of a plug 41 which is connected through the threaded stem 42 to the fitting 11 and is screwed on the central body 43, from which through a setting nut 44 the body 45 extends to the outside, being a guide for the plunger or needle 46 of stainless steel, on the head 47 of which there is a O-Ring 48 and an adjustment screw 49 to press the spring 50 placed around its stem.

The guide body 45 is provided with aeration holes 51 so as to cool the microswitch

52 fixed to it.

In the described embodiment, the pressure switch is calibrated at 2 atm, i.e. as soon as the calibration pressure is exceeded, the pressure pushes plunger 46 against the force of spring 50 and the free end of said plunger 46 pushes the contact head 53 of the microswitch 52, so as to break the current feed to the electric resistances, while
5 as soon as the pressure falls under the calibration value, the spring 50 causes the plunger 46 to move back and microswitch 52 switches on again the electric resistances so as to produce again steam.

From the preceding detailed description one can therefore clearly see the structure
10 and the great advantages which can be obtained with the appliance of the present invention, but it has again to be pointed out that only an illustrative embodiment was described and shown in the drawings, and therefore many modification, additions, substitutions and variations of elements may be resorted to said appliance, without departing however from its spirit or from its objects, nor from its protection scope.

CLAIMS

1) Electrical household appliance for producing and feeding steam to an electric iron, characterized by the fact of comprising a boiler of stainless steel, heated by electric resistances and arranged at the center of an outer housing or body of insulating and shock resistant plastic material, said boiler being provided with a pressure switch to adjust the steam pressure, a thermostat checking lack of water in the boiler and a safety valve to avoid overpressure and accidents due to untimely opening of the boiler plug.

2) Appliance according to Claim 1, characterized by the fact that the boiler is of circular shape and is spaced from the bottom and the top housing, as well as from all its lateral surfaces, where it is preferably placed an isolating material such as rock wool, to obtain an adequate air circulation inside the housing, keeping cooled the various control and adjustment elements and the electric circuits, said air being introduced through suitable sets of aeration slots and openings made in said housing.

3) Appliance according to Claim 1, characterized by the fact that the boiler has an inclined filler, causing the maximum water level in the boiler not to reach the boiler top, always leaving an upper dome or air chamber for steam generation.

4) Appliance according to Claims 1 and 3, characterized by the fact the filler is closed by a plug that, when unscrewing is started, clears a bleed hole which signals and discharges the steam pressure existing inside the boiler.

5) Appliance according to Claims 1 and 4, characterized by the fact that the plug has a safety valve which releases steam pressure when this exceeds a predetermined value of calibration of said valve.

6) Appliance according to Claim 1, characterized by the fact that the thermostat is arranged on the lateral outer surface of the boiler and measures its temperature, so as

0069858

to break current feed to the electric resistances when the temperature exceeds a predetermined value indicative of lack of water inside said boiler.

7) Appliance according to Claim 1, characterized by the fact that the pressure switch is in communication with the boiler dome and with its plunger actuates a microswitch breaking current feed to the electric resistances when the steam pressure
5 exceeds the calibration value of said pressure.

8) Appliance according to one or more of the preceding claims, characterized by the fact that the control circuits, the switches and the lamps are all connected to a printed circuit board which is mounted behind the control area of the appliance and
10 operates at the normal voltage of the mains.

9) Appliance according to one or more of the preceding claims, characterized by the fact that the steam produced is delivered to the electric iron through a steam electric valve which is connected to the boiler dome, is controlled by a push button placed on the iron and delivers steam thereto through a hose for high pressure, said
15 hose and the electrical cable for the connection with the iron being supported by a hooked rod mounted on the appliance body.

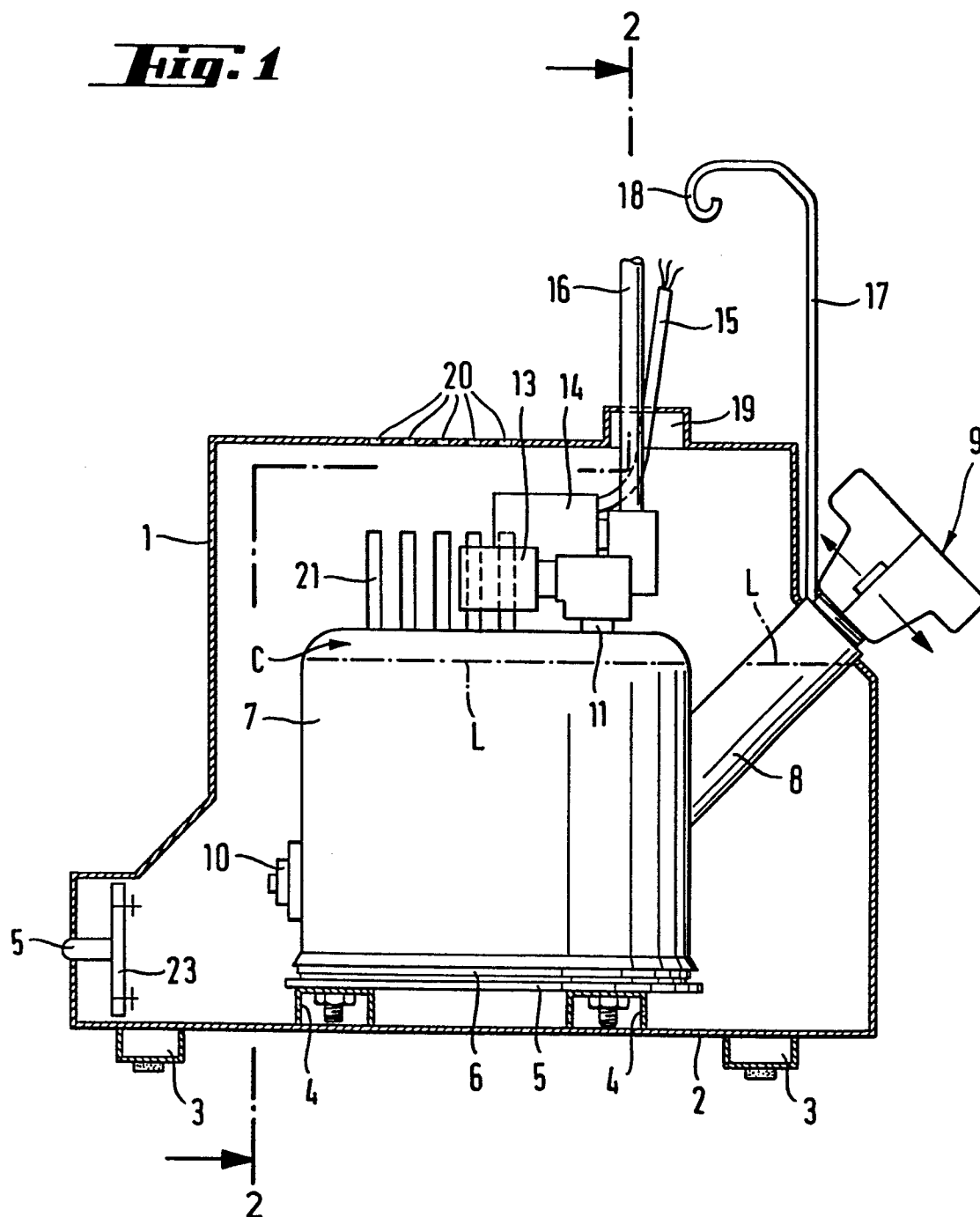
Fig. 1

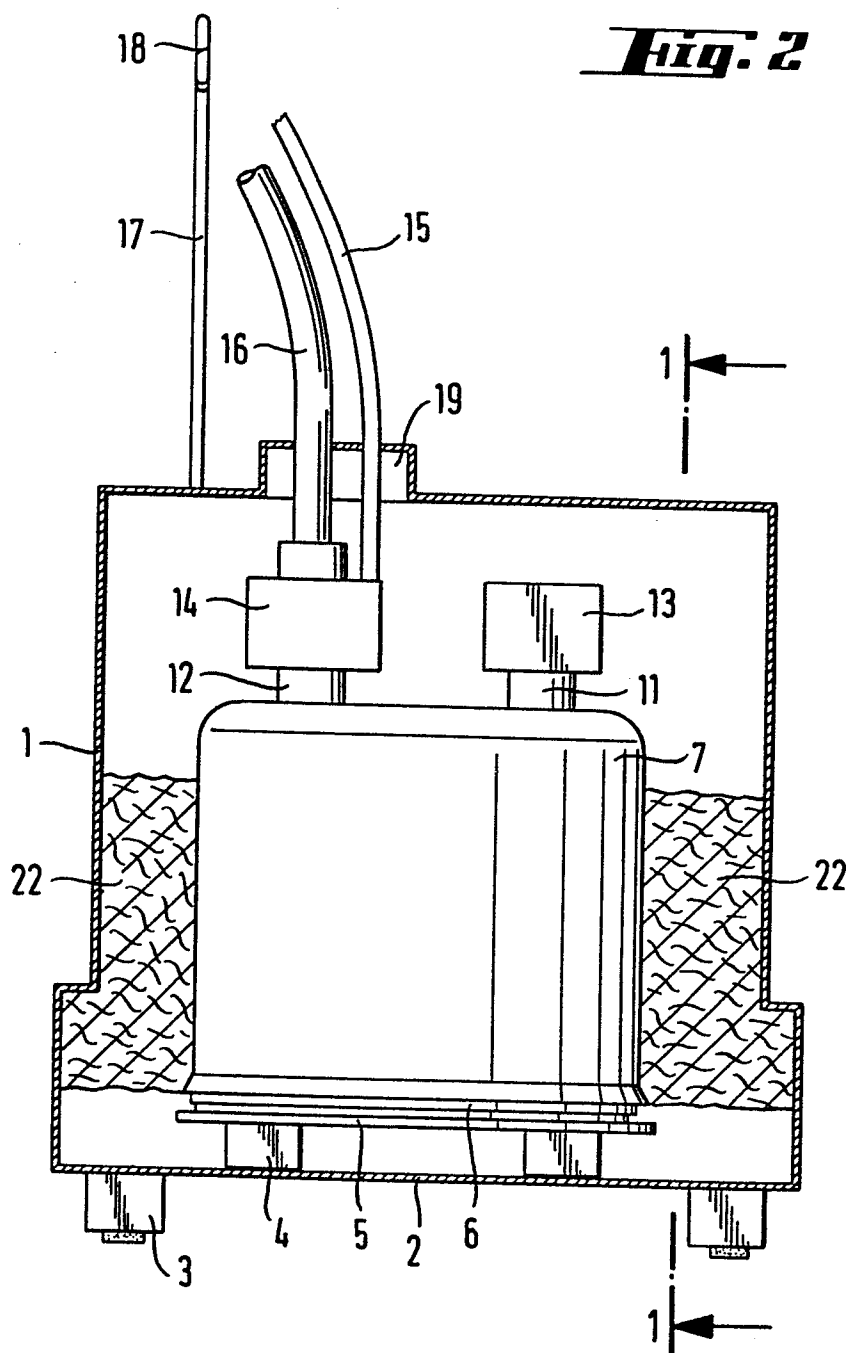
Fig. 2

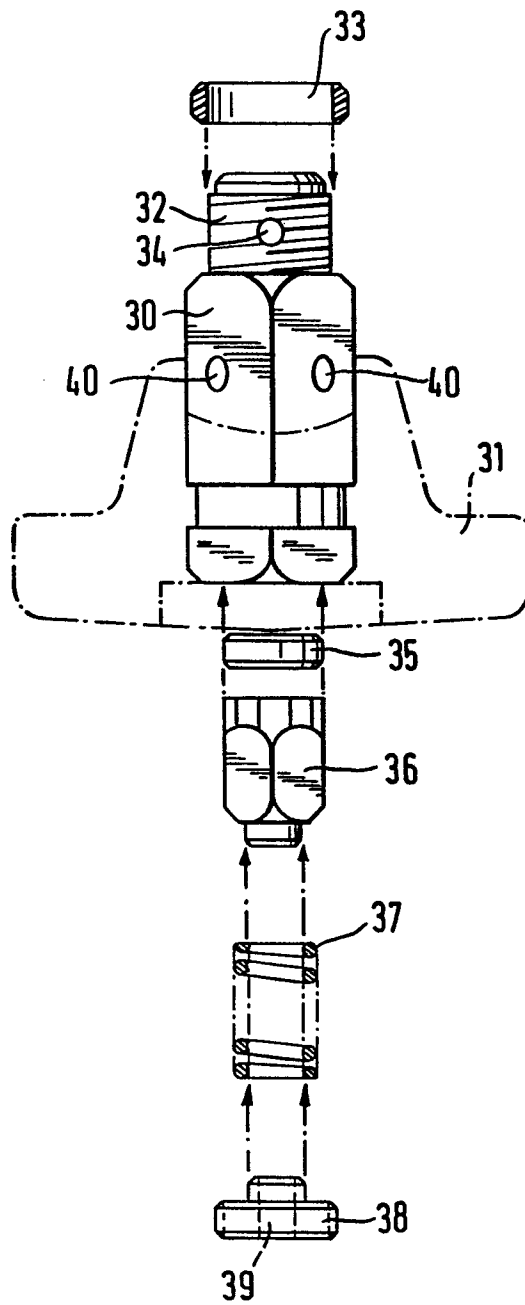
Fig. 3

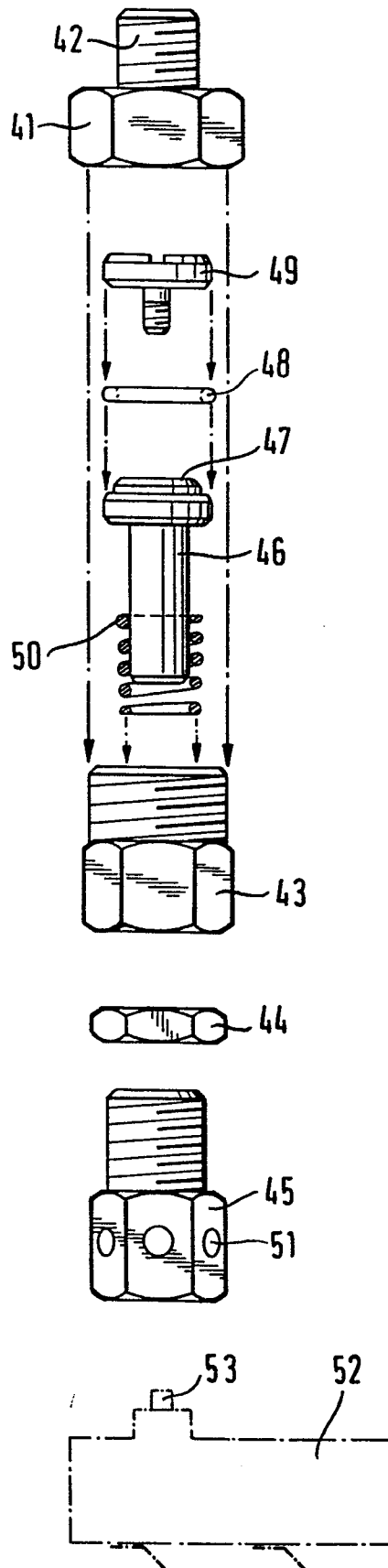
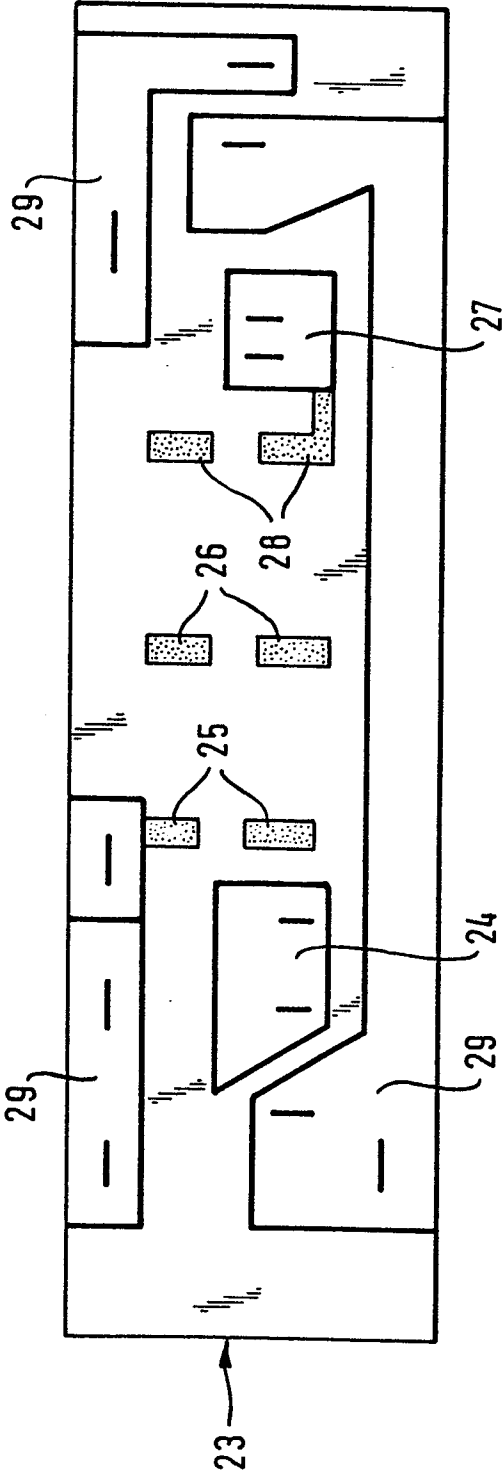
Fig. 4

Fig. 5





European Patent
Office

EUROPEAN SEARCH REPORT

0069858

Application number

EP 82 10 4883

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. 3)
A	--- FR-A-1 237 897 (CEVIN) * the whole document *	1,2,3,5	F 22 B 1/28 D 06 F 75/06
A	--- FR-A-2 260 749 (SETRIG) * page 5, lines 22-40; page 6, lines 1-21; figures *	1,2	
A	--- US-A-3 025 381 (PICKERING) * column 1, lines 62-72; column 2; column 3, lines 1-59; figures *	1,6,7	
A	--- US-A-2 785 272 (BALY) * column 2, lines 7-59; column 4, lines 36-75; column 5, lines 1-9; figures *	1,2,3,6,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
A	--- US-A-2 014 836 (COWAN) * page 1, left-hand column, lines 25-55; right-hand column, lines 1-22; figures *	1,2	F 22 B D 06 F
A	--- US-A-2 590 620 (HOLBIK) * column 4, lines 50-63; figures *	4	
A	--- US-A-2 627 015 (HACKMAN) * column 4, lines 45-62; figures *	7,8	
	--- -/-		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11-10-1982	Examiner VAN GHEEL J.M.U.
CATEGORY OF CITED DOCUMENTS		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	
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			



DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2												
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)												
A	US-A-3 436 852 (STANSBURY) * the whole document *	8,9													
A	--- US-A-3 823 497 (SOLOMON) * column 3, lines 35-68; column 4, lines 1-65; figures *	9													
A	--- DE-A-2 237 735 (TÜRK) -----														
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)												
Place of search THE HAGUE		Date of completion of the search 11-10-1982	Examiner VAN GHEEL J.M.U.												
<table border="0"><tr><td>CATEGORY OF CITED DOCUMENTS</td><td>T : theory or principle underlying the invention</td></tr><tr><td>X : particularly relevant if taken alone</td><td>E : earlier patent document, but published on, or after the filing date</td></tr><tr><td>Y : particularly relevant if combined with another document of the same category</td><td>D : document cited in the application</td></tr><tr><td>A : technological background</td><td>L : document cited for other reasons</td></tr><tr><td>O : non-written disclosure</td><td>& : member of the same patent family, corresponding document</td></tr><tr><td>P : intermediate document</td><td></td></tr></table>				CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention	X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date	Y : particularly relevant if combined with another document of the same category	D : document cited in the application	A : technological background	L : document cited for other reasons	O : non-written disclosure	& : member of the same patent family, corresponding document	P : intermediate document	
CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention														
X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date														
Y : particularly relevant if combined with another document of the same category	D : document cited in the application														
A : technological background	L : document cited for other reasons														
O : non-written disclosure	& : member of the same patent family, corresponding document														
P : intermediate document															