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(54) **Title:** DEVICE FOR INDICATING THE STATUS OF A GAS BURNER

(54) **Bezeichnung:** EINRICHTUNG ZUR STATUSANZEIGE EINES GASBRENNERS

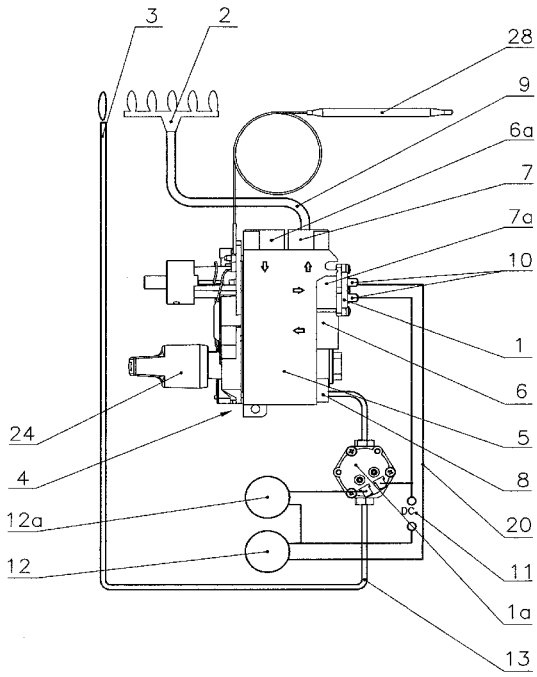


Fig.1

(57) **Abstract:** The aim of the invention is to create a device for indicating the status of a gas burner, which device functions independently of the circumstances of the specific gas burner design and arrangement. This aim is achieved, according to the invention, in that the device (1), which is connected to an outlet (7a) of the gas control apparatus (4) for the gas burner (2), consists of a housing (14), which has at least two chambers connected to each other, which are separated gas-tight by a membrane (16) connected on one side to an electrically conductive component (15), wherein: the chamber A (17) is connected to the gas outlet (7a) of the gas control apparatus (4); the membrane (16), to which the gas pressure of the gas burner (2) is applied through an opening (18) in the chamber A (17) when the gas valve is open, produces a stroke; by means of the stroke, the chamber B (19), in which the side of the membrane (16) having the connected electrically conductive component (15) is positioned, closes a circuit (20) via contact elements (10) led outward and suitably (12) indicates the operating status. The device for indicating the status of a gas burner can be used in the case of gas-operated heating apparatuses having gas control apparatuses having a liquid-filled temperature controller.

(57) **Zusammenfassung:** Es soll eine Einrichtung zur Statusanzeige eines Gasbrenners geschaffen werden, die unabhängig von den Gegebenheiten der konkreten Gasbrennerausführung und Anordnung funktioniert. Erfindungsgemäß wird das Problem dadurch gelöst, dass die an einem Ausgang (7a) des Gasregelgerätes (4) zum Gasbrenner (2) verbundene Einrichtung (1) aus einem Gehäuse (14) besteht, die mindestens zwei miteinander verbundene Kammern aufweist, die durch eine einseitig mit einem elektrisch leitenden Bauteil (15) verbundenen Membran (16) gasdicht getrennt sind, wobei die Kammer A (17) mit dem Gasausgang (7a) des Gasregelgerätes (4) verbunden ist, die Membran (16) durch eine Öffnung (18) in der

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Kammer A (17) bei geöffnetem Gasventil mit dem Gasdruck des Gasbrenners (2) beaufschlagt einen Hub erzeugt, die Kammer B (19), in der die Seite der Membran (16) mit dem verbundenen elektrisch leitenden Bauteil (15) positioniert ist, durch den Hub über nach außen geführte Kontaktelemente (10) einen Stromkreis (20) schließt und den Betriebsstatus in geeigneter weise (12) anzeigt. Die Einrichtung zur Statusanzeige eines Gasbrenners kann bei gasbetriebenen Heizgeräten mit Gasregelgeräten mit flüssigkeitsgefülltem Temperaturregler benutzt werden.

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DEVICE FOR INDICATING THE STATUS OF A GAS BURNER

TECHNICAL FIELD OF THE INVENTION

The invention relates to a device for indicating the status of a gas burner when it is operated with a gas control apparatus with a liquid-filled temperature controller.

BACKGROUND OF THE INVENTION

It is desirable for the operating status of gas-fired kitchen equipment to be indicated to enable the operator to determine whether the pre-set operating temperature has been reached, that is whether the deep fryer can be re-loaded for example. Nowadays, electrical appliances are fitted as standard with an LED to indicate that the pre-set operating temperature has been reached and that the heating element is switched off. In the case of gas appliances this indication is as yet available only on those appliances that operate with an electronic temperature control. The one crucial disadvantage of gas appliances with an electronic temperature control, apart from higher costs, is that they cannot be used during a power outage. Gas control apparatuses with a liquid-filled temperature controller are used to enable gas appliances to be operated more economically, as well as independently of the electricity supply.

Unlike gas control apparatuses with electronic temperature control, the actual temperature cannot be compared with the pre-set set point in the case of gas control apparatuses with liquid-filled temperature controllers unless modifications are made. The flame of the gas burner can be used by means of temperature measurement as a signal for switching the gas burner on and off. The disadvantage of this method is that an electronics system is required to evaluate the signal. Problems are also presented by the arrangement of the sensor, especially because of the diversity of gas burner designs and arrangements.

SUMMARY OF THE INVENTION

The invention addresses the problem of devising a solution for a device for indicating the status of the gas burner when using a gas control apparatus with a liquid-filled temperature controller, said solution being simple in structure, simple to

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manufacture and capable of functioning independently of the circumstances of the specific gas burner design and arrangement. The device is intended to be suitable both for indicating the status of the gas burner and for other indications as well, e.g. ignition gas. This device is intended to be capable of being retrofitted in existing installations.

In accordance with a first aspect of the invention, there is provided a device for indicating the status of a gas burner when operated with a gas control apparatus with a liquid-filled temperature controller, the device arranged to be connected to an outlet of the gas control apparatus for the gas burner, and comprising: a housing which has at least two interconnected chambers; a membrane which separates in gas tight manner the otherwise separated two chambers; an electrically conductive component carried by the membrane and located in a second one of the two chambers (chamber B), wherein a first one of the two chambers (chamber A) is connectable to the gas outlet of the gas control apparatus, wherein the membrane is arranged to be exposed to gas pressure of the gas burner through an opening in the chamber A when a gas valve is open and produce a stroke by means of which the electrically conductive element in chamber B closes an electric circuit via contact elements mounted to the housing and extending into chamber B, thereby suitably indicatingthe operating status of the gas burner.

When the gas valve is closed, the stroke of the membrane returns to the starting position based on its own spring constant. The circuit is opened and the operating status is no longer indicated.

A solution has therefore been found which eliminates the disadvantages of the prior art set out above.

Advantageous embodiments of the invention are set out below and the embodiments described with reference to the accompanying drawings.

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For example, a favourable embodiment of the device has proved to consist in designing chamber A of the housing with two connection points instead of one, to serve additionally as a status indicator for the pilot gas on connection to the pilot gas outlet in the supply line between gas control apparatus and pilot gas burner.

An additional favourable embodiment of the device consists in arranging the chamber A of the housing, which is constructed with two connection points, as a fitting in the supply line between gas control apparatus and gas burner.

Another possible embodiment consists in connecting to the contact a relay instead of a status indicator, which can in turn switch external components as a function of the membrane stroke.

A further favourable embodiment consists in the membrane having a spring constant that with sufficient stroke dispenses with the use of a separate restoring spring to open the circuit when the gas valve of the gas control apparatus is shut.

The device's simple structure and mode of operation eliminate the need for a pressure setting of the device adjusted to the installation situation.

Exemplary embodiments of the device according to the invention are described below in more detail.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

Fig. 1 schematically illustrates a device according to the invention fitted to the gas control apparatus as status indicator for agas burner and apilot gas burner,

Fig. 2 is a sectional view of a device according to the invention in open position,

Fig. 3 is a sectional view of a device according to the invention in closed position,

Fig. 4 is a sectional view of a device according to the invention with chamber A for direct connection to the gas control apparatus by means of thread and sealing element,

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Fig. 5 is a sectional view of a device according to the invention with chamber A for gas-tight installation in a supply line to the burner, and

Fig. 6 is a sectional view of a device according to the invention with connection to an adaptor for gas-tight installation as a fitting in a supply line to the burner without sealing elements.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

Fig. 1 depicts an exemplary structure including the devices 1 and 1a according to the invention for indicating the status of a gas burner 2 and a pilot gas burner 3 connected to a gas control apparatus 4 with a liquid-filled temperature controller that is preferably intended for a gas-fired heating appliance or the like. The gas control apparatus 4 enables a gas burner 2 to be operated and monitored and the required temperature to be set and controlled by controlling the volume of gas flowing to the gas burner.

In this example the gas control apparatus 4 comprises a housing 5 that has gas inlets 6 and 6a marked with directional arrows as well as gas outlets 7 and 7a marked with directional arrows, and a pilot gas outlet 8. The following functional units are housed in the housing 5 looked at in the flow direction of the gas:

- Start-up with safety pilot valve (not depicted)
- Control unit with a liquid-filled temperature controller for the volume of gas flowing to the main burner (not depicted)

The structure and mode of action of the gas regulating fitting are known to those skilled in the art. A more detailed depiction and explanation has therefore not been provided in this execution example.

As depicted in Fig. 1 the device 1 according to the invention is fitted gas-tight to one of the two outlets 7a of the gas control apparatus 4. The supply line 9 is connected to the gas burner 2 on the second gas outlet 7. The gas inlet 6 or 6a that is not connected to the gas network is sealed with a sealing element (not

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depicted), preferably a threaded plug. The electrical contact elements 10 of the device 1 are electrically connected to the voltage source 11 and the LED 12. A second modified device 1a according to the invention, which is depicted in Fig. 5, is installed in the pilot gas supply line 13. Its electrical contact elements 10 are electrically connected to the voltage source 11 and the LED 12a.

As depicted in Fig. 2 the device 1 according to the invention comprises a housing 14 with two interconnected chambers, the chamber A 17 and the chamber B 19. The chamber A 17, which for safety reasons is made of metallic material, is connected to the gas outlet 7a of the gas control apparatus 4, in this execution example by a gas and pressure-tight screwed connection 25 made on the threads. A screwed connection with cylindrical thread 27 and a sealing element 26, as depicted in Fig. 4, can serve as an alternative connection to the gas control apparatus by means of a modified chamber A 17a. Both chambers are sealed from each other by a membrane 16. The external circumferential bead of the membrane serves here as a positive sealing element.

Both chambers are interconnected in this execution example by a screwed connection (30). An electrically conductive, centrally perforated disc 15 is fitted on one side of the membrane 16 by means of a snap-on fastener. The membrane with the fitted disc is positioned in the direction of the chamber B 19. The chamber B 19, which is made of non-electrically conductive material, preferably plastic, houses two contact elements 10 insulated from each other. These contact elements 10 are inserted by slits in the chamber B 19 into the interior and positioned by electrically conductive fastenings 10a and firmly attached in a suitable manner, in this example by shaping the fastenings.

The device according to the invention depicted in Fig. 2 is shown in the open position, that is the membrane is located on the lower stop 21 because no burner pressure has been applied. The circuit 20 is open and no status indication is given. If pressure is applied to the gas burner 2 by opening the main valve in the gas control apparatus, the pressure is transferred through the opening 18 into the interior of the device 1 according to the invention on to the lower side of the

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membrane 16. It is advantageous here if the size of the opening 18 is such as to prevent an ignitable, impermissibly high volume of gas escaping if the membrane 16 is destroyed in the event of a breakdown. In addition, this design enables the chamber B 19 to be manufactured inexpensively from plastic. The membrane 16 moves under the pressure applied up to the upper stop formed by both electrically conductive fastenings 10a.

The final position of the membrane 16 under the applied pressure is depicted in Fig. 3. When the membrane 16 reaches its final position, both fastenings 10a are electrically connected by the disc 15, the circuit 20 is closed and the status is indicated by the connected LED 12. The status is continuously indicated as long as pressure is applied to the gas burner 2. The status indicator goes out and LED 12 is off if the valve of the gas control apparatus 4 controlled by the liquid-filled temperature controller 28 closes.

The second device 1a according to the invention depicted in Fig. 1 and shown in detail in cross-sectional view in Fig. 5, has a chamber A 17b with a modified structure. This chamber A has two connection points as inlet 22 and outlet 23, designed in this case preferably as metallically sealing compression fittings, for installation in a supply line, in this example the supply line 13 to the pilot burner 3. The structure and mode of operation of the status indicator corresponds in this example as well to the device 1 according to the invention.

Unlike device 1 the status is indicated here via a second LED 12a as a function of the pressure on the pilot gas burner 3. On activation of the start-up 24 of the gas control apparatus 4, a safety pilot valve (not depicted) is opened and pilot gas is released to the pilot burner and ignited. As the device 1a is installed directly in the supply line 13, the pressure here on the pilot burner leads to the stroke movement of the membrane 16. The circuit 20 is closed in the same way as in the previous example via the fastenings 10a and contact elements 10. If the gas control apparatus is taken out of service, the pilot gas pressure goes to zero. The membrane 16 moves back to the lower stop 21, the circuit 20 is opened and the status indicator, LED 12a, goes out.

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If no direct connection to a gas outlet of the gas control apparatus 4 is available for the device 1 according to the invention, a fitting can be installed via a modified chamber A 17c, as depicted in Fig. 6, enabling direct installation of the device in the supply line to the gas burner. In this example gas and pressure-tight screwed connections made on the threads are used as inlet 22 and outlet 23. The device 1 according to the invention can be used universally in this embodiment as a status indicator for a gas burner and/or can be retrofitted in existing gas appliances.

The device according to the invention is not, of course, restricted to the execution examples depicted. On the contrary changes, modifications and combinations are possible without departing from the scope of the invention.

An extended field of application is therefore opened up if a relay is connected for status indication instead of the previously described circuit. Components such as a fan can be switched on and off via this relay as a function of the prevailing pressure at the burner.

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List of reference numerals

1	Device according to the invention
1a	Device with modified chamber A
2	Gas burner
3	Pilot gas burner
4	Gas control apparatus
5	Housing (gas control apparatus)
6	Gas inlet (bottom)
6a	Gas inlet (side)
7	Gas outlet (side)
7a	Gas outlet (bottom)
8	Pilot gas outlet
9	Supply line (gas burner)
10	Contact elements
10a	Upper stop (fastenings)
11	Voltage source
12	LED (operating status of gas burner)
12a	LED (operating status of pilot gas burner)
13	Supply line (pilot gas)
14	Housing (device)
15	Disc
16	Membrane
17	Chamber A (Fig. 2 Fig. 3)
17a	Chamber A (Fig. 4)
17b	Chamber A (Fig. 5)
17c	Chamber A (Fig. 6)
18	Opening
19	Chamber B
20	Circuit
21	Lower stop
22	Inlet
23	Outlet

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24 Start-up
25 Thread, conical
26 Sealing element
27 Thread, cylindrical
28 Temperature controller
29 Fitting
30 Screwed connection

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Claims

1. Device for indicating an operating status of a gas burner when connected to a gas burner control apparatus with a liquid-filled temperature controller, comprising:
- a housing having a connection by way of which the device is connectable to a gas outlet of the gas control apparatus;
- at least two interconnected chambers defined within the housing;
- a membrane arranged in the housing and separating the two interconnected chambers in gas-tight manner;
- an electrically conductive component carried by the membrane and disposed in a second one of the two interconnected chambers; and
- electrical contact elements carried by the housing and extending into the second chamber;
- wherein a first one of the interconnected chambers is arranged to be pressurised by gas through an opening in the first chamber when the device is connected to the gas outlet of the gas control apparatus and a gas valve is open;
- wherein the membrane is arranged to produce a stroke when gas pressure of the gas burner is applied through the opening in the first chamber, the stroke causing the electrically conductive component to be displaced and close an electric circuit with the contact elements, thereby indicating an operating status of the burner; and
- wherein the membrane is returned back to a non-displaced starting position under its own spring constant when the gas valve is closed, thereby opening the electric circuit and indicating a non-operating status of the burner.

2. Device according to claim 1, characterised in that the housing has a second connection by way of which the device is connectable to a pilot gas outlet in a supply line between the gas control apparatus and a pilot gas burner, thereby serving as a status indicator of the pilot gas.

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3. Device according to claim 1 or 2, characterised in that the device is arranged as a fitting in a supply line between the gas control apparatus and the gas burner.

4. Device according to claim 1, further comprising a relay connected to the electric contact elements for switching of external components as a function of displacement of the membrane.

5. Device according to claim 1, characterised in that the membrane has a spring constant that with sufficient stroke eliminates the use of a separate restoring spring to open the electric circuit when the gas valve of the gas control apparatus is shut.

6. Device according to claim 1, characterised by the absence of a pressure setting arrangement or device.

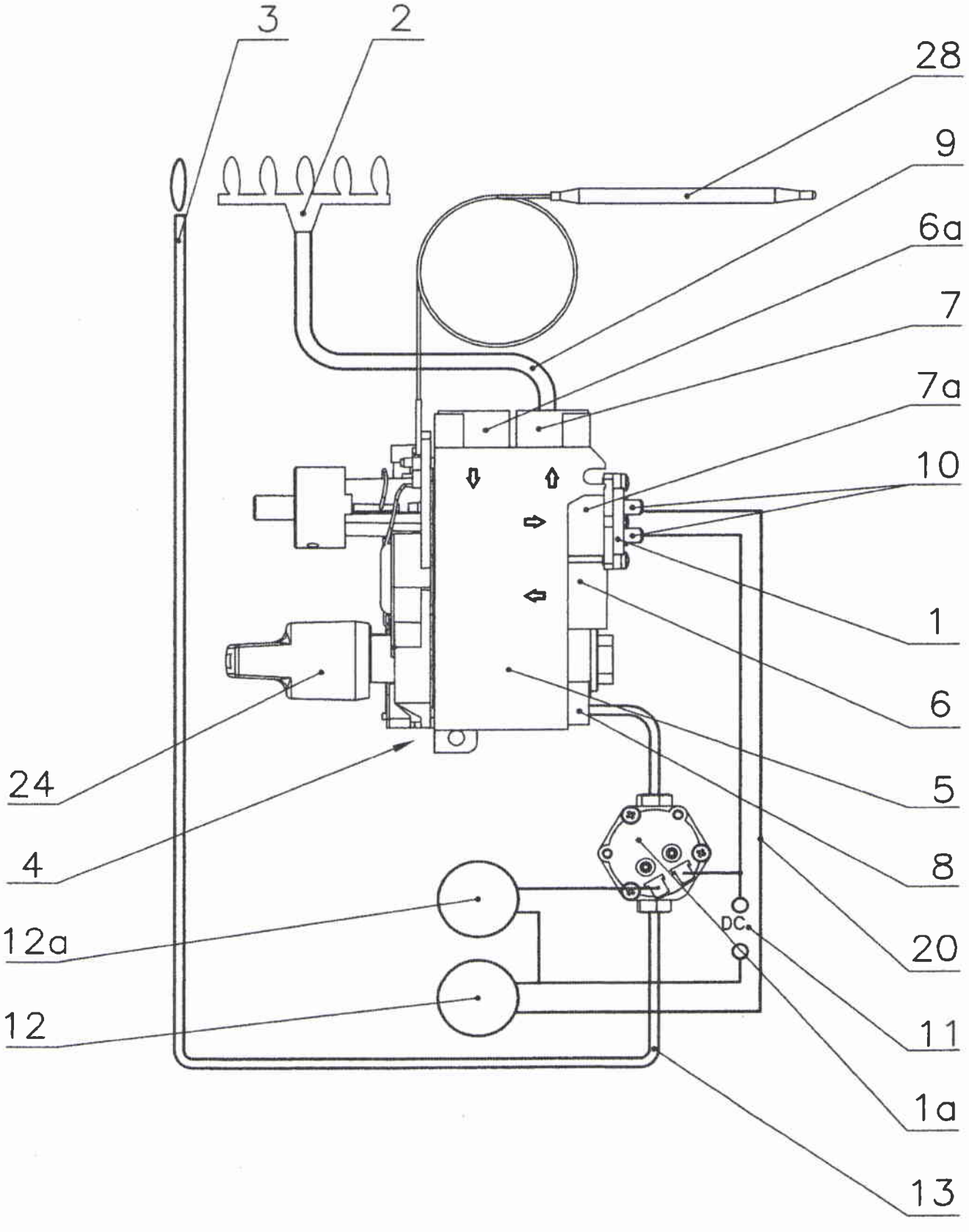


Fig.1

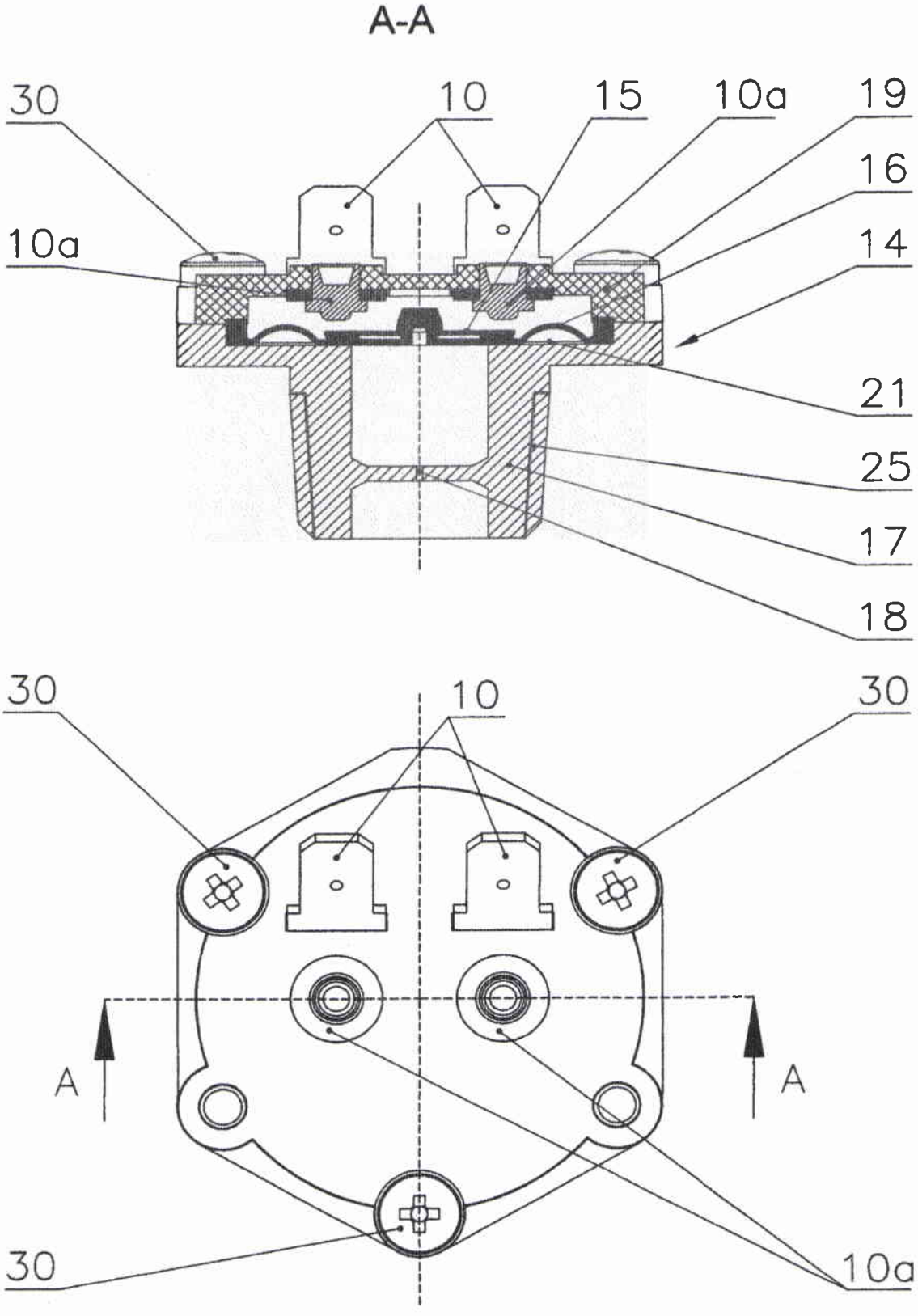


Fig.2

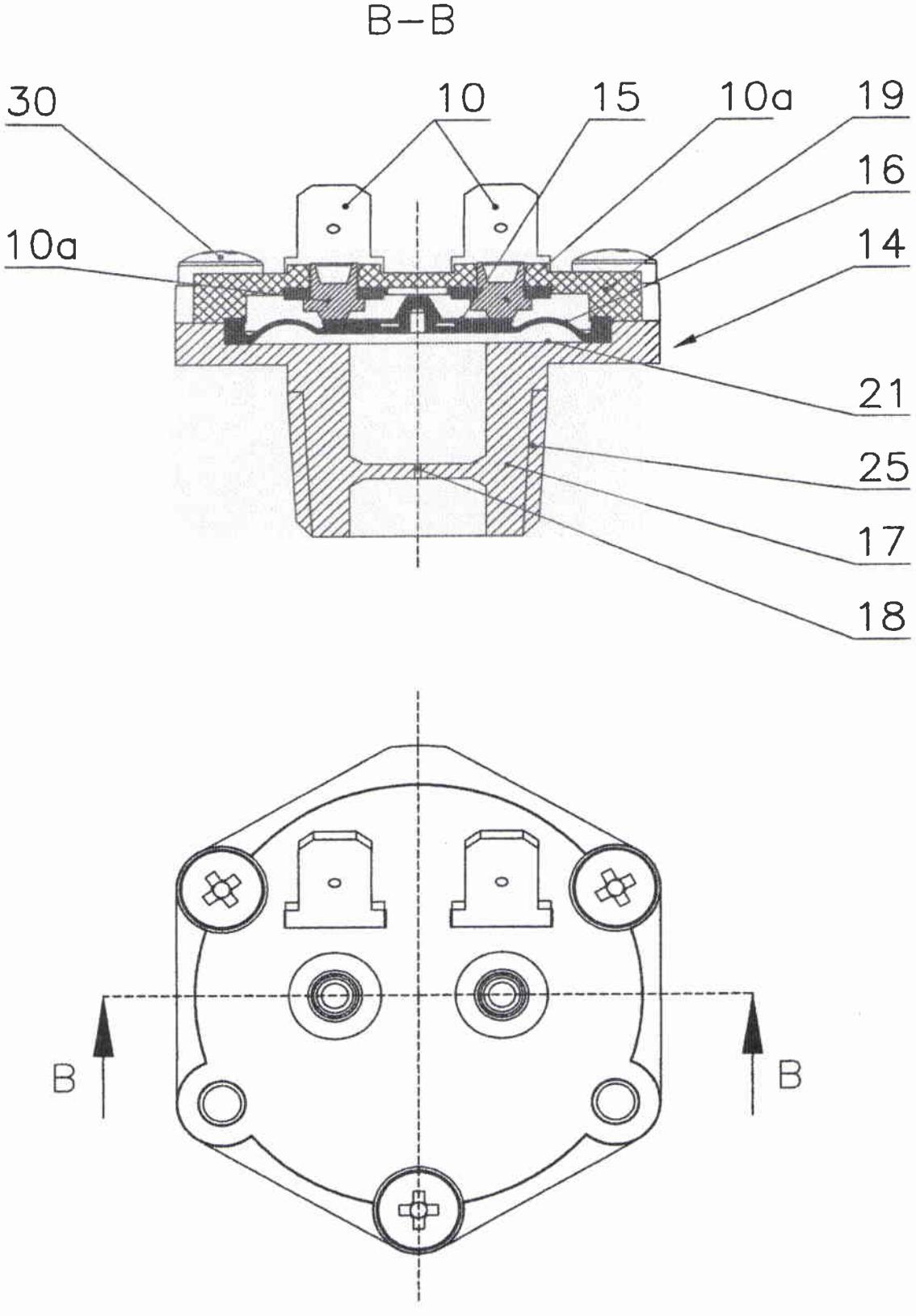


Fig.3

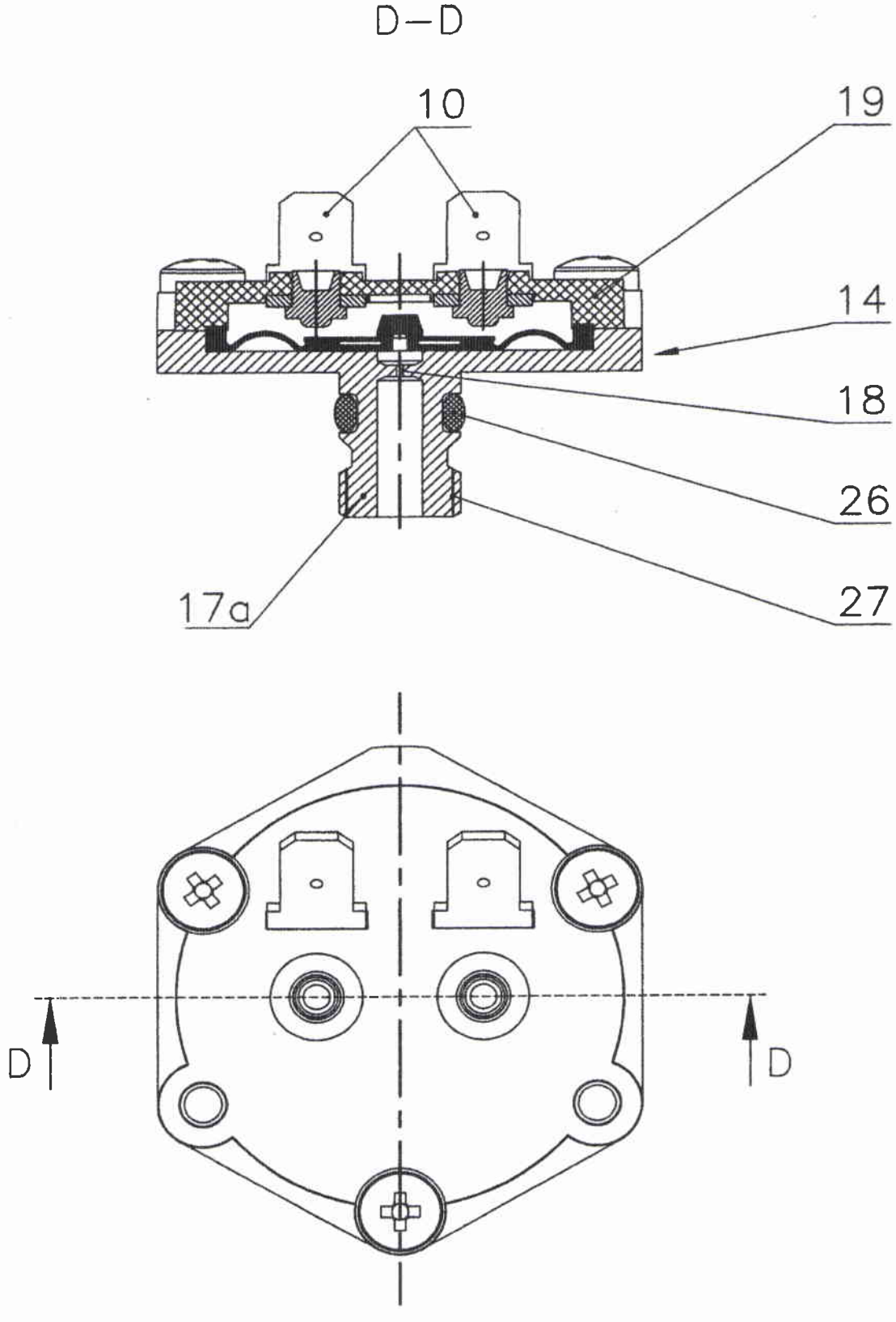


Fig.4

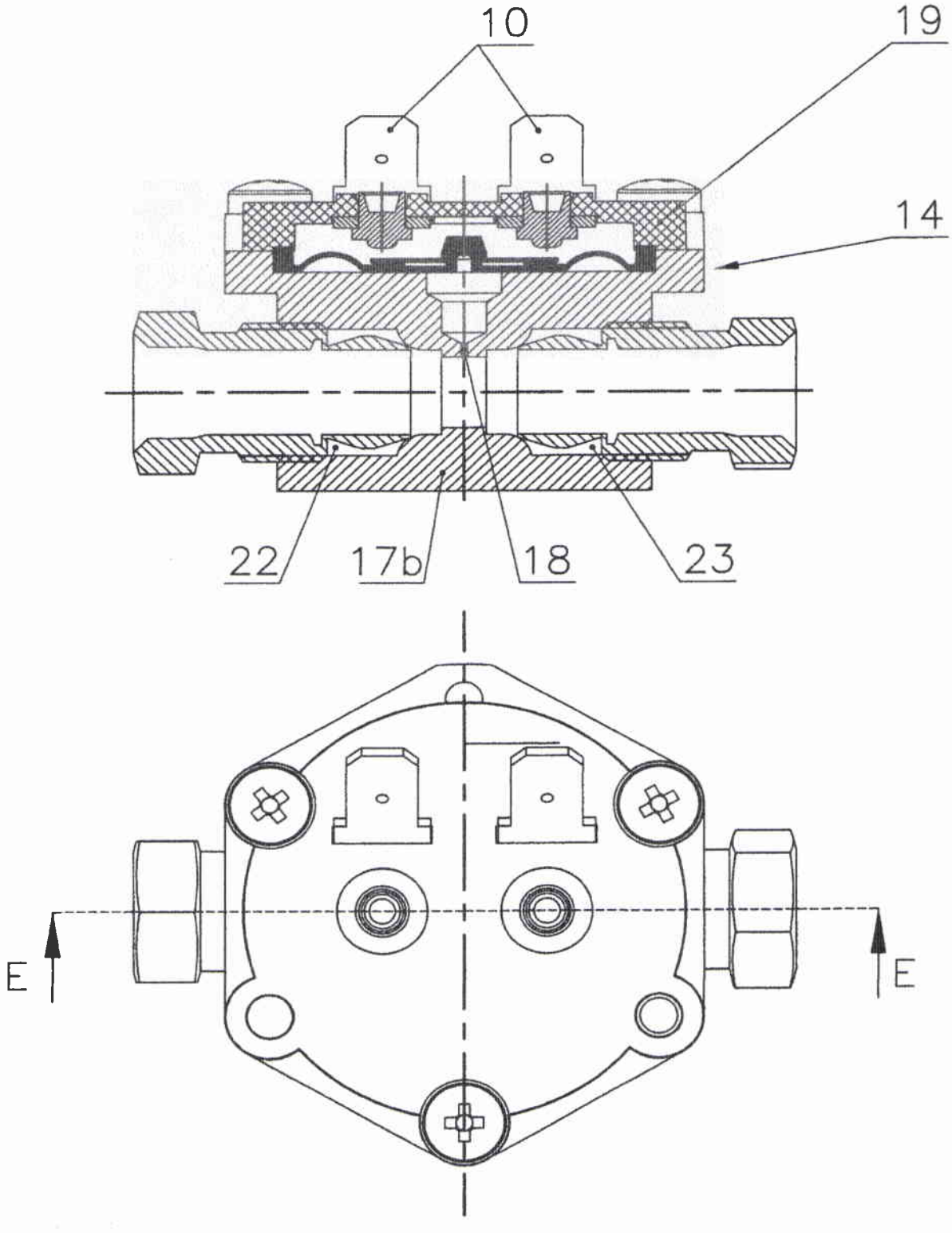


Fig.5

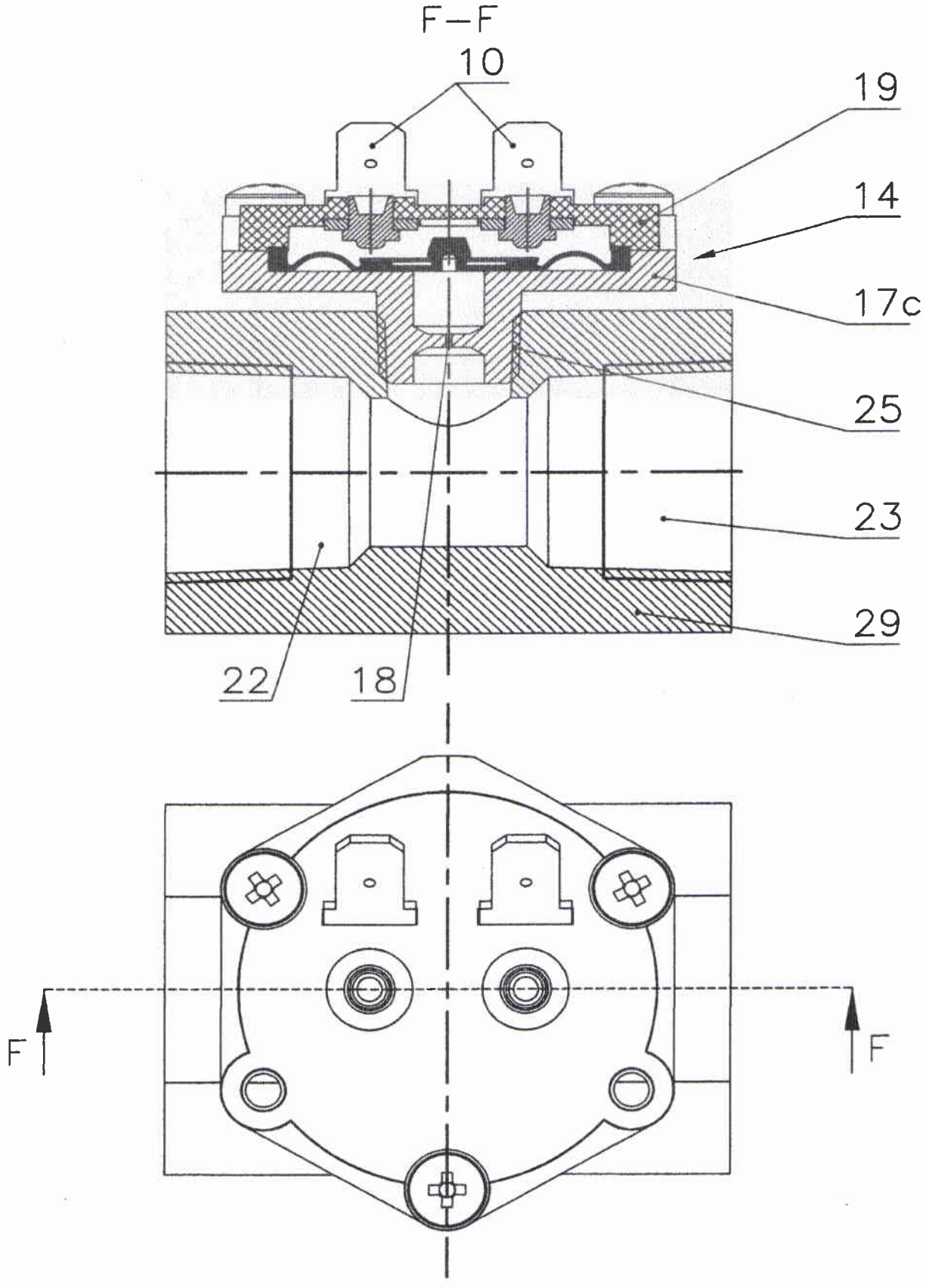


Fig.6