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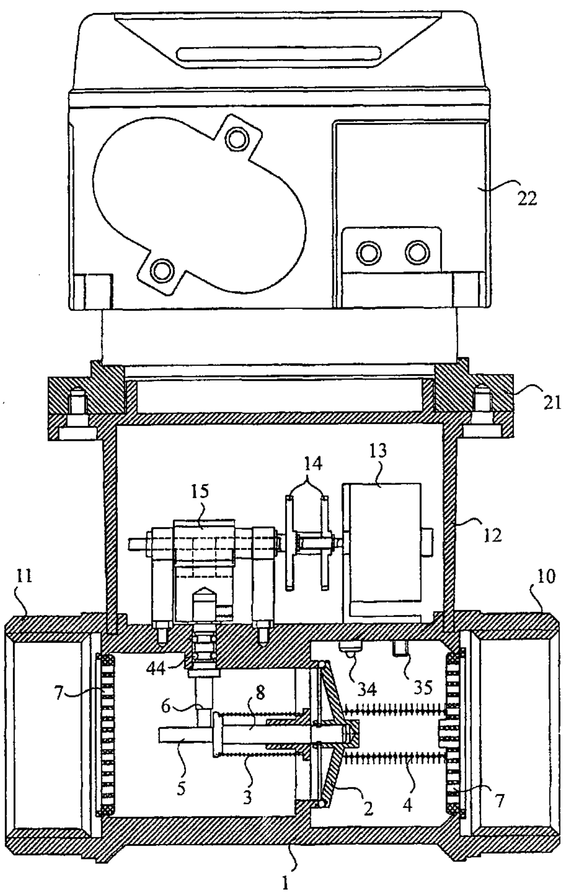

(57) Abstract: The electrically operated gas valve consists of the valve body (1), the valve flap (2) with a movable head, located in the said valve body (1) and placed on a sliding axis (8), a flap spring (3) and flap stabilization spring (4), a cam (5) that serves to open and close the flap (2) by pushing the said axis (8), a cam shaft (6) rotating the cam (5), a worm gear (15) and its counter gear (16), the electric motor (13) which drives the gears (14), a microswitch cam (17) that reports the position of the flap (2) and the control unit (22) wherein the local assessment and control unit (24) providing the opening /closing of the valve and the valve control and measurement unit (30) are contained as well as the pressure sensor (35) measuring the gas pressure in the valve, the heat sensor (34) the accelaration sensor (36) measuring the vibration and the flanges (9) with movable heads that provide easy connection to the flange pipes.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTELLIGENT VALVE

The present invention is related to the electrically operated gas valves that control the gas flow.

In the state of art, the electrical valves that control the gas flow are produced in two types, namely the solenoid valves and the motor valves. A high electrical energy is required for the operation of the electrical valves. There are valves that are operated by the city mains voltage as well as those that operate with such potential values as 12V, 24V. High powers are required for the operation of the valves, for instance 45-50 W for the operation of the motor valves and 80-90 W for the solenoids. The valves continue consuming energy when they are at the open position and are automatically closed when the power is cut-off. Both types of the valves are not suitable to operate on a battery for a long time, hence they need to be connected to the city network. Such valves are of a cumbersome, expensive, heavy type that consumes a lot of energy, with large surfaces to be isolated against gas leakages.

The valves with big diameters have flanges and are connected to the flanged pipes. However as the screw holes of the valve and pipe flanges have to be brought opposite to each other in order to realize the connection, the valve is not mounted in the optimum position but in a position matching to the pipe flanges or the pipe flanges are cut and re welded according to the position of the valve.

In the state of art today, the valves cut off the gas flowing to the burner when the electrical power supply is interrupted or when a fire alarm is transmitted and an uninterrupted city mains is required in order to keep the valve open. Furthermore as these valves do not contain any pressure-, heat- and the like, sensors, they cannot be utilized as volume correctors together with the meters.

The object of the present invention is to provide the operation of the electrical valves used in order to control the gas flow, with less energy consumption.

Another object of the present invention is to provide the operation of the electrical valves with a battery for a long time without being connected to the city mains.

Yet another object of the present invention is to provide the volume correction of the gas passing through the valve by measuring its pressure and heat.

Another object of the present invention is to provide the production of an electrical valve, the gas isolation surface of which is minimized.

One more object of the present invention is to provide an easy and simple mounting of the electrical valve to the flange pipes.

The embodiment of the valve realized in order to attain the above objects of the present invention, has been illustrated in the attached drawings, wherein :

Figure 1, is the section view of the valve.
Figure 2, is the view showing the cam position when the valve flap is open.
Figure 3, is the view of the cam that performs proportional switching
Figure 4, is the view of the flanges with movable heads
Figure 5, is the view of the driver unit
Figure 6, is the electronic circuit diagram of the control unit
Figure 7, is the electronic circuit diagram of the valve control and measurement unit.
Figure 8, is the electronic circuit diagram of the local assessment and control unit.
Figure 9, is the electronic circuit diagram of the power unit.

The reference numerals of the components shown on the drawings are as follows :

1. Valve body
2. Flap
3. Flap spring
4. Flap stabilization spring
5. Cam
6. Cam shaft
7. Filter sieve
8. Axis
9. Flange with movable cap
10. Gas inlet port
11. Gas outlet port
12. Driver unit
13. Electrical motor
14. Gear
15. Worm gear
16. Counter
17. Microswitch cam
18. Microswitch
19. Power unit
20. Battery
21. Connection adapter
22. Control unit
23. Serial channel control bas
24. Local assessment and control unit
25. Local assessment and control unit microprocessor
26. Local assessment and control unit ee prom
27. Infrared communication unit
28. Sound warning unit

29. Indicator unit
30. Valve control and measurement unit
31. Valve control and measurement unit microprocessor
32. Valve control and measurement unit eeprom
33. Gas pulse detector
34. Heat sensor
35. Pressure sensor
36. Acceleration sensor
37. Amplificator
38. Cable communication interface
39. Radio (wireless) communication interface
40. Data processing and crediting channel interface
41. Gas pulse inlet filter circuit
42. Connection control inlet filter circuit
43. Flap sealing
44. Cam shaft passage sealing
45. Battery cover and meter contact control connections
46. Flap position control connection
47. Motor control unit
48. Battery test unit

The electrically operated gas valve consists of the valve body (1), the valve flap (2) with a movable head, located in the said valve body (1) and placed on a sliding axis (8), a flap spring (3) and a flap stabilization spring (4), a cam (5) that serves to open and close the flap (2) by pushing the said axis (8), a cam shaft (6) rotating the cam (5), a worm gear (15) and its counter gear (16), the electric motor (13) which drives the gears (14), a microswitch cam (17) that reports the position of the flap (2), and the control unit (22) wherein the local assessment and control unit (24) providing the opening/closing of the valve and the valve control and measurement unit (30) are contained, as well as the pressure sensor (35) measuring the gas pressure in the valve, the heat sensor (34), the acceleration sensor (36) measuring the vibration and the flanges (9) with movable heads that provide easy connection to the flange pipes (Fig.1).

Flanges (9) with movable heads that are rotatable around the axis of the valve body (1) and that have a certain number of perforations for the mounting of the pipes, are placed on both ends of the valve body (1). During the installation of the valve, these flanges (9) are fitted, by turning, into the stationary flanges on the pipes laid in advance, so that the screw holes match with each other, and are fixed by using bolts and nuts. Sealing is provided by gaskets. The position of the valve may be adjusted in conformity with its environment, without any need to cut and reweld the stationary flanges of the pipes (Fig.4).

The valve body (1) comprises the filter sieve (7), axis (8), valve flap (2), flap sealing gasket (43), flap stabilization spring (4), flap spring (3), cam (5), cam shaft (6), cam shaft passage gasket (44) and the pressure sensor (35) and the heat sensor (34) placed optionally in the valve body (1). The filter sieve (7) is placed on the gas inlet port (10) and the gas outlet port (11) of the valve body (1).

The valve flap (2) is placed inside the valve body (1), vertically to its axis, between the gas inlet and outlet ports (10,11) of the valve. The flap (2) is dome-shaped and has a central cavity wide enough for receiving an end portion of the axis (8). The flap (2) is fixed onto the axis (8) by mounting an end portion of the axis (8) which is placed in parallel to the axis of the valve body and which moves on this axis.

The fluttering of the flap (2) is prevented by placing a flap stabilization spring (14) which retains the valve flap (2) in the closed position, between the filter sieve (7) disposed at the valve gas inlet port (10) and the lower surface of the valve flap (2). As the valve flap (2) is provided with a movable head, a complete closing is provided even if the flap (2) is not attached square with the cam shaft (6) axis. The flap spring (3) is placed between the upper side of the flap (2) and the rabbet formed at the other end of the axis (8), in parallel to the sliding axis (8) in order to enable the valve flap (2) to be in equilibrium, in the closed position.

The only place that requires a gas leak-proof sealing in the valve is the point with a minimum surface area, where the cam shaft (6) that rotates the cam (5) projects out of the valve body (1). Here the gas sealing is provided by an o-ring which is a standard cam shaft passage gasket (44) suitable for the purpose. Furthermore, in a portion of the valf body (1), between the filter sieve (7) put in the valve gas inlet port (10) and the valve flap (2), a pressure sensor (35) measuring the pressure of the gas entering the valve and a heat sensor (34) are placed. In case these sensors (34,35) are used, the holes opened on the valve body (1) are sealed using epoxy resin which is resistant to heat and gas, during the mounting of the sensors.

The opening and closing of the valve is provided by rotating the cam (5), which opens or closes the valve by working against the flap stabilizing spring (4). On the axis (8) a cam (5) which is rotated by the cam shaft (6) and the rotational axis of which is on the axis (8) is placed. This cam (5) has such a structure that, the outer surfaces of its long and short leg are sloped outwards whereas the inner surfaces are straight and the short leg intersects with the long leg perpendicularly and the sides being straight in a L-shaped structure. The rotational axis of the cam (5) is located at the top point of the long leg, and on the axis (8).

This cam (5), to which the rotational movement obtained by the electrical motor (13) is transmitted by means of the cam shaft (6) which is rotated by the gears (14), moves the axis (8) and thus provides the opening/closing of the valve flap (2). Where the flap stabilizing spring (4) and the flap spring (3) keeps the flap stationary in a closed position, the gas pressure applies force on the flap (2) in the closing direction and thereby helps to provide a full closing (Figure 2).

The motor control unit (47) provides the to-and fro-rotation of the motor (13) by means of the valve control and measurement unit microprocessor (31) and the braking of the motor (13) in order to stop the cam (5) exactly at the desired position at the end of the motor driving operation. The required information about the position of the cam (51) used for the closing / opening operation is provided by the microswitch cam (17) and the microswitch (18). Motor control unit (47) is located in the drive unit (12).

The drive unit (12) containing more than one gear (14), worm gear (15), batteries (20), electrical motor (13), microswitch cam (17) and microswitch (18) is placed over the valve body (1). The electrical motor (13) running with a low voltage and current, drives the worm gear (15) by means of the gears (14), which in turn turns the counter gear (16) (wormgear gear system).

The gears (14) activate the cam (5) which is connected to the cam shaft (6), by rotating the cam shaft (6). When the top point of the short leg of the cam (5) contacts with the axis (8), the flap (2) comes to the maximum open position. This position of the cam (5) is transmitted to the motor control unit (47) by means of the microswitch cam (17) and the microswitch (18) which are located on the counter gear (16) in an almost contact position with each other. At this position, the motor control unit (47) applies electronic braking to the electrical motor in order to stop the cam (5) at the top point. To close the valve, a much less rotation of the motor (13) and dropping the cam (5) down from the top point would be sufficient. In this case, the flap stabilization spring (4) closes the valve rapidly. An extra power is not consumed by the valve in order to maintain its position (Fig.5).

By increasing or decreasing the number of the gears (14) depending on the diameter and pressure of the valve and on the rigidity of the springs (3,4), various torque forces and closing speeds can be obtained so that the electrical motor (13) drives using a minimum energy. Thus the valves produced for the diameters 20,50, 100 mm can be closed respectively in 0.05, 0.2 and 0.8 seconds by a power of 180, 400, 1200 mw. The control unit (22), comprising the indicator unit (29), cable communication interface (38), (wireless) radio communication interface (39), valve control and measurement unit (30), and local assessment and control unit (24), is connected to the valve by a connection adaptor (21). The connection adaptor (21) can be fastened to the valve by turning at 90° angles and the control unit (22) can be installed on the valve (vertical, perpendicular and at both directions) a position that is most suitable to the valve, by means of the said connection adaptor (21).

The communication of the valve with the external control units is provided by the cable communication interface (38) and the (wireless) radio communication interface (39). The cable communication interface (38) is provided by a USART that provides connection to normal PCs or to POS stations at RS 232 or RS 485 standards; whereas the (wireless) radio communication interface (39) is an interface that provides the meter readings as AMR (Auto maticol Meter Reading) and the remote bidirectional control of the valves through the wireless. The valve control and measurement unit (30) comprises a motor control unit (47), a valve control and measurement unit microprocessor (31), a valve control and measurement unit Eeprom (32), a gas pulse detector (33), heat sensor (34), pressure sensor (35), acceleration sensor (36), battery cover and meter junction control connections an amplificator (37) (Fig.7).

The analog signals from the heat sensor (34), pressure sensor (35) and acceleration sensor (36) are amplified by the amplificator (37) and are converted to digital signals by the ADC (analog to digital converter) and transferred to the valve control and measurement unit micro processor (31), wherein such data as close/open commands related to the valve, and such measurement readings as the gas pulse, heat, pressure, acceleration, and battery energy level are received the required calculations are made and these informations are sent to the local assessment and control unit microprocessor (25) by means of the serial channel control bus (23). This serial channel control bus (23) contains and carries the I^2C

bus signals serving for the communication between the valve control and measurement unit (30) and the local assessment and control unit (24), as well as the signals required for the distribution of the power provided by the power unit (19) and the control signals of all units. The valve can be used as a volume corrector valve and as industrial control valves connected to computer systems in the industrial area, when pressure and heat sensors (35, 34) are attached to it.

By means of these sensors (35, 34) measuring the pressure and heat of the gas passing through the valve, the measurement values of the gas mater con be corrected according to the measured pressure and heat values. In other words the valve can also be used as a volume corrector. The connections may be with or without cable or as a multi-drop bus connection. When the heat (34), pressure (35) and acceleration (36) sensors are mounted, and with radio command, the valve may be used for the purpose of cutting off the gas in case of fire or earthquake, the valve is able to cut off the gas flow upon a warning from the acceleration sensor (36) situated on itself. In order to avoid false alarms, the valve can be closed by a warning from the central control, by mounting a wireless communication interface (39) on it. Sensitive seismic sensors located at different points sense the seismic waves and transfer to the center via radio. An evaluation is made at the center by determining when an earthquake warning comes after a particular number of the said sensors and if it is decided as the result of this evaluation, that an earthquake is occurring, transmits this information from its own transmitting antenna. When the valve receives this transmission through the radio placed on it self, it cuts off the gas flow. The time interval to pass between the transmission of the warning by the sensors and the gas flow cut off, is below one second.

The battery cover and meter junction control connections (45) consist of the reed switch used in order that the interventions to be made to the valve could be sensed by the valve control and measurement unit microprocessor (31) and of the battery (20) and device cover contacts determining the position of the battery cover.

In such applications when the valve is used in connection with the gas meter, the pulses coming in a frequency that is proportional to the amount of the gas passing through the meter, are detected by a gas pulse detector (33). The gas pulse inlet filter circuit (41) consisting of a coil and capacitor circuit elements, provided in the said gas pulse detector (33) protects the gas pulse from interferences. The gas pulse passing through the filter reaches the valve control and measurement unit microprocessor (31) after its logic level is checked by an inverter. Whereas the pulse cable connection control inlet filter circuit (42) consisting of a coil and capacitor circuit elements, protects the connection control between the meter pulser and the valve electronics. The connection control data passing through the pulse cable connection control inlet filter circuit (42) reaches the valve control and measurement unit microprocessor (31) after its logic level is checked by an inverter.

The valve control and measurement unit EE prom (32) is used to retain such data as the position, heat, pressure and acceleration values of the valve in the memory, in case there is an energy interruption due to any reason. The electric motor (13) is turned in two directions by a bridge circuit formed by the CR1, CR2, CR4, CR5 diodes and Q1, Q2, Q3 ve Q4 transistors.

When the ends A and B from the valve control and measurement unit microprocessor (31) are simultaneously at logic "0" level, the operation of the electric motor (13) is inhibited. The electrical motor (13) is turned in one direction when the end A takes the value logic "1" and B takes the value logic "0"; and it turns in another direction when the end A takes the value logic "0" and B takes the value logic "1". Even if the ends A and B are not foreseen in the valve control and measurement unit microprocessor (31) programme, and even if they are at logic "1" level simultaneously, the undesired operation of the electric motor is still inhibited by the removal of the transistors Q 5 and Q 6 from transmission. The relay contact K1 is used to immediately stop the movement of the electric motor (13). The power supply to the electric motor (13) is cut by making the outputs A and B from the valve control and measurement unit microprocessor (31), logic "0" signal, and the K2 relay coil is energized by applying the logic "1" signal to the end C; in order to stop the electrical motor (13). This trips the K1 relay contact and applies braking by short-circuiting the electrical motor (13).

The local assessment and control unit (24) consists of the local assessment and control unit microprocessor (25), local assessment and control unit EE prom (26), the indicator unit (29), a sound warning unit (28) and infra red communication unit (27); (Figure 8).

The local assessment and control unit microprocessor (25) is a central microprocessor which receives the information calculated and assessed by the valve control and measurement unit microprocessor (31) by means of the serial channel control bus (23) and which provides the required operations in line with the received data and displays the said data on the LCD display screen at the indicator unit (29).

The local assessment and control unit EE prom (26) which keeps all information in its memory when energy is interrupted due to any reason.

The sound warning unit (28) which is used to give sound warning signals and consists of a buzzer, a transistor and resistances. The infrared communication unit (27) which is used to provide infrared communication with the external devices and consists of a transmitter and a receiver.

The power unit (19), used by the data processing and crediting channel interface (40), the radio communication interface (39), valve control and measurement unit (30), local assessment and control unit (24) interfaces, is fed by the internal battery (20). The system energy is provided by a low level DC source that can be connected to the external low level DC source input ends. The diode and a resistance located at the inlet of the low level DC source, enable these two sources to feed the system without flowing into one another. Two resistors and one condensator located at the internal battery (20) entry, enables the level detector to generate warning when the battery (20) is dismounted.

Furthermore, the potential value at the end of the condensator is lowered to a level suitable for use in the logic circuits and this value is kept constant. Three condensators connected to the potential regulator serve as filters. Diode, resistance and capacitor circuit members are used that another level detector in the power unit (1) creates a logic “0” value at the reset level. Two resistors connected to the said level detector provide the application of the reset signal to the bus. The electrical load contained in the battery (20) is defined by measuring the battery potential and impedance. This is done by passing current with two different values through the battery and by measuring the voltage of the battery at these current values by means of the valve control and measurement unit microprocessor (31) ADC; and finally its impedance is calculated, in order to decide whether the battery could be used or not.

The battery test unit (48) is connected to the valve control and measurement unit microprocessor (31) by four wires. These are, the first and second current control ends connecting the potentials at which different currents wile pass to the battery, and the first and second battery level ends connecting the battery voltage to the value control and measurement unit microprocessor (31) ADC. The power unit is provided with U1 potential detector, in order to see whether the internal battery is connected or not. If the internal battery is connected, a logic “0” signal is sent to the serial channel control bus, not a logic “1” signal.

The R17 resistance provides a zero value for the potential detector inlet, when there is no battery; whereas R18 is the pull-up resistance of the potential detector collector outlet. A CR6 zener diode provides the insulation so that the C_{11} capacitor value is not effected. Moreover, U2 potential regulator serves to prevent the circuit from being effected from a potential loss that may occur in the internal battery. Power shifting is prevented by using the CR7 and CR8 circuit members. By using the reset circuit, the internal battery is enabled to give a start up signal when connected to the circuit. Additionally, the two different battery potential values obtained from ADC are measured in the battery test unit (48) in order to assess the impedance of the battery to decide whether to replace it or not (Fig.9).

The valve may be used with the devices that have to be operated by battery (20) for a long time. Its open/close position is changed by consuming very little energy and does not need extra energy to maintain its position.

The valve can also perform proportional opening/closing. For this purpose, the shape of the cam (5) placed on the axis (8) is changed and made elliptical (Fig. 3). The position information of the cam (5) used for proportional opening/closing is obtained by the rotation of the feed-back potentiometer used instead of the microswitch (18), by a gear (14) used for the microswitch cam (17) and pro cessing the potential value being read by the potentiometer by ADC and assessing it by the value control and measurement unit microprocessor (31). Therefore, the flap position control connection (46) consists of an inverter, a valve position control microswitch (18) showing whether the valve is completely open or closed, which is connected to the valve control and measurement module microprocessor and of an amplificator (37) to the ADC end of which the valve control and measurement unit microprocessor (31) of the potentiometer is connected.

For a proportional control, a negative or positive mean bridge current is provided by giving the signals at the ends A and B, at disymmetrical periods in the course of the time.

CLAIMS

1. An intelligent valve characterized in that flanges (9) with movable heads that are rotatable around the axis of the valve body (1) and that have a certain number of perforations for the mounting of the pipes, are placed on both ends of the valve body (1), which during the installation of the valve are fitted, by turning, into the stationary flanges on the pipes laid in advance, so that the screw holes match with each other, and are fixed by using bolts and nuts, and that the position of the valve may be adjusted in conformity with its environment, without any need to cut and reweld the stationary flanges of the pipes.

2. An intelligent valve as claimed in Claim 1, characterized in that a valve flap (2) is placed inside the valve body (1), vertically to its axis, between the gas inlet and outlet ports (10.11) of the valve, the flap (2) being dome-shaped with a central cavity wide enough for receiving an end portion of the axis (8), and that the flap (2) is fixed onto the axis (8) by mounting an end portion of the axis (8) which is placed in parallel to the axis of the valve body and which moves on this axis, wherein a flap spring (3) is placed on its lower surface in order to keep it in balance, in the closed position and its swinging of the flap (2) is prevented by placing a flap stabilization spring (14) on its upper surface.

3. An intelligent valve as claimed in Claim 1 and 2, characterized with a flap spring (3) that keeps the flap (2) in balance in the closed position, which is placed between the filter sieve (7) disposed at the valve gas inlet port (10) and the lower surface of the valve flap (2).

4. An intelligent valve as claimed in Claim 1 to 3, characterized with a flap stabilizing spring (4) that is placed, around the axis (8), between the upper side of the flap (2) and the rabbet formed at the other end of the axis (8) and which prevents the swinging of the flap (2).

5. An intelligent valve as claimed in Claim 1 to 4, characterized with a cam (5) placed on the axis (8), rotated by the cam shaft (6), which has such a structure that, the outer surfaces of its long and short leg are sloped outwards whereas the inner surfaces are straight and the short leg intersects with the long leg perpendicularly and the sides being straight in a L-shaped structure and the rotational axis of which is on the axis (8), wherein the said cam (5) to which the rotational movement obtained by the electrical motor (13) is transmitted by means of the cam shaft (6) which is rotated by the gears (14), moves the axis (8) and thus provides the opening/closing of the valve flap (2) to which the axis is connected.

6. An intelligent valve as claimed in Claim 1-5, characterized with a drive unit (12) consisting of an electrical motor (13) running with a low voltage and current; gears (14); worm gear (15); counter gear (16) (worm gear gear system); the microswitch cam (17) and the microswitch (18) which are located on the counter gear (16) in an almost contact position with each other; the microswitch cam (17) transferring data about the position of the cam (5) used for opening/closing, to the motor control unit (47) and also opening and closing the microswitch (18); the said drive unit (12) being the one which provides the to-and fro-rotation of the motor (13) by means of the valve control and measurement unit microprocessor (31) and the braking of the motor (13) in order to stop the cam (5) exactly at the desired position at the end of the motor driving operation.

7. An intelligent valve as claimed in Claim 1-6, characterized with the pressure sensor (35) measuring the pressure of the gas entering the valve and the heat sensor (36) measuring its heat, placed in a portion of the valf body (1), left between the filter sieve (7) put an the valve gas inlet port (10) and the valve flap (2), so that the valve may be used as a volume corrector after the measurement values of the gas meter are corrected.

8. An intelligent valve as claimed in Claim 1-7 characterized with the cable communication interface (38) provided by a USART provides connection to normal PCs or to POS stations at RS 232 or RS 485 standards.

9. An intelligent valve as claimed in Claim 1-8 characterized with the (wireless) radio communication interface (39), which is an interface that provides the meter readings as AMR (Automatical Meter Reading) and the remote bidirectional control of the valves through the wireless.

10. An intelligent valve as claimed in Claim 1-9 characterized with the valve control and measurement unit microprocessor (31), that gives the commands for the valve opening/closing operations, that makes the necessary calculations using such measurement data as the gas pulse data obtained from the gas pulse detector heat data obtained from the heat sensor (35), pressure, obtained from the pressure sensor (35) and acceleration, battery (20) energy level data, and which transmits the above mentioned data to the local assessment and control unit microprocessor (25) by means of the serial channel control bus.

11. An intelligent valve as claimed in Claim 1-9 characterized with the valve control and measurement unit EE prom (32) which is used to retain such data as the position, heat, pressure and acceleration values of the valve in the memory, in case there is an energy interruption due to any reason.

12. An intelligent valve as claimed in Claim 1-11 characterized with the local assessment and control unit microprocessor (25), contained in the local assessment and control unit (24) together with local assessment and control unit EE prom (26), the indicator unit (29), a sound warning unit (28) and infra red communication unit (27); which receives the information calculated and assessed by the valve control and measurement unit microprocessor (31) by means of the serial channel control bus (23) and which provides the required

operations in line with the received data and displays the said data on the LCD display screen at the indicator unit (29).

13. An intelligent valve as claimed in Claim 1-12, characterized with the local assessment and control unit EE prom (26) which keeps all information in its memory when energy is interrupted due to any reason.

14. An intelligent valve as claimed in Claim 1-13, characterized in that the cam (5) placed on the axis (8) is elliptical in order that the valve can perform a proportional opening /closing.

15. An intelligent valve as claimed in Claim 1-14, characterized with a valve control and measurement unit microprocessor (31) which processes and evaluates the position information of the cam (5) used for proportional opening/closing obtained by the rotation of the feed-back potentiometer by a gear (14), and the processed potential value being read by the potentiometer by ADC.

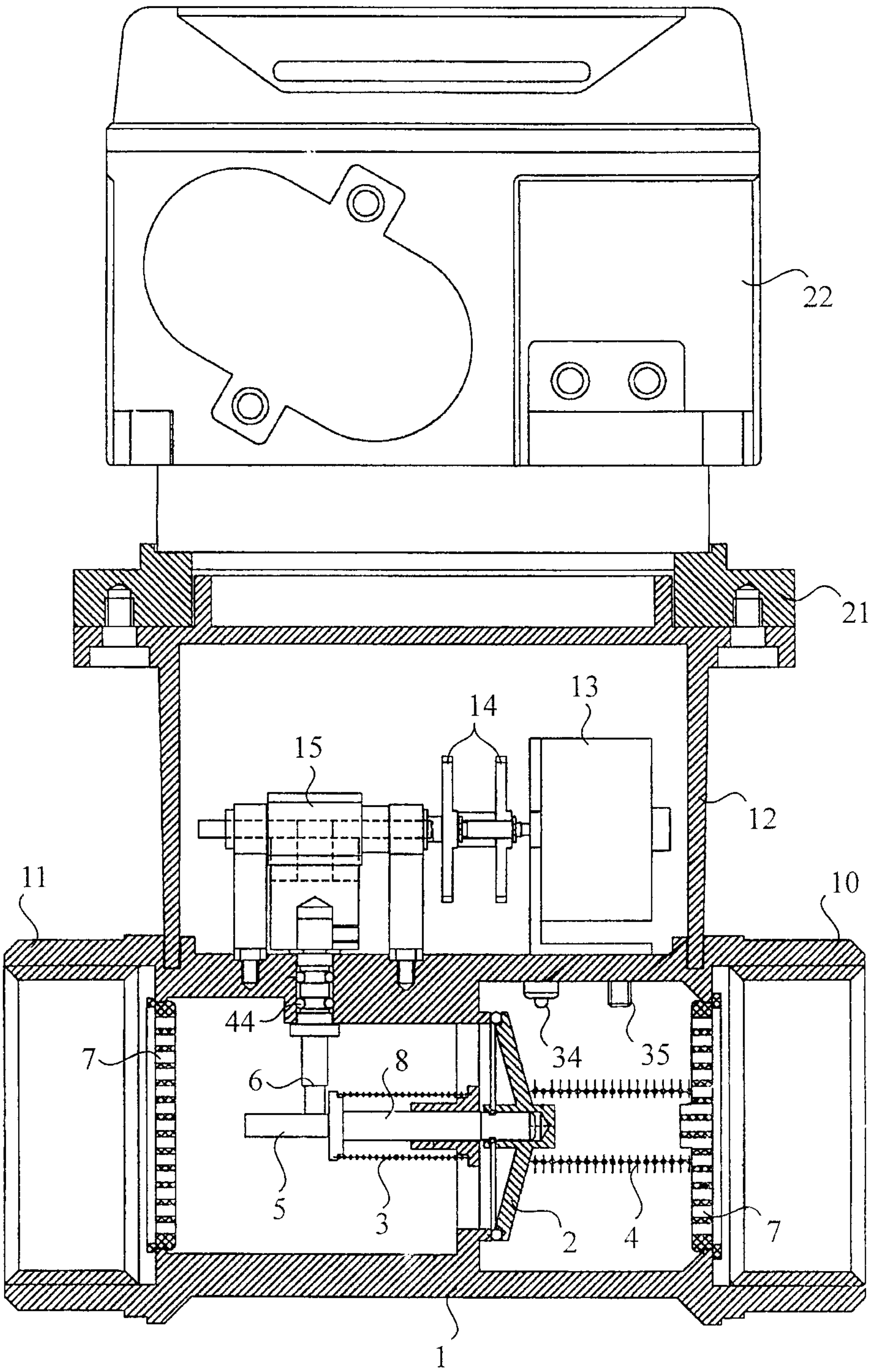
16. An intelligent valve as claimed in Claim 1-15, characterized with the infrared communication unit (27) which is used to provide infrared communication with the external devices and consists of a transmitter and a receiver.

17. An intelligent valve as claimed in Claim 1-16, characterized with the internal battery (20) which provides the power used by the data processing and crediting channel interface (40), the radio communication interface (39), valve control and measurement unit (30), local assessment and control unit (24) interfaces.

18. An intelligent valve as claimed in Claim 1-17, characterized with the power unit consisting of a low level DC source that can be connected to the input ends of an external low level DC source and which provides the power used

by the data processing and crediting channel interface (40), the radio communication interface (39), valve control and measurement unit (30), local assessment and control unit (24) interfaces.

Figure 1



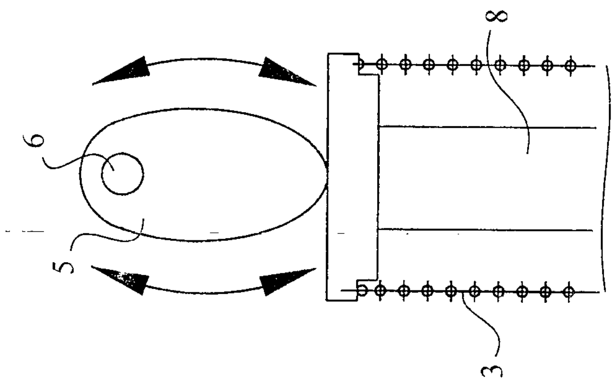


Figure 3

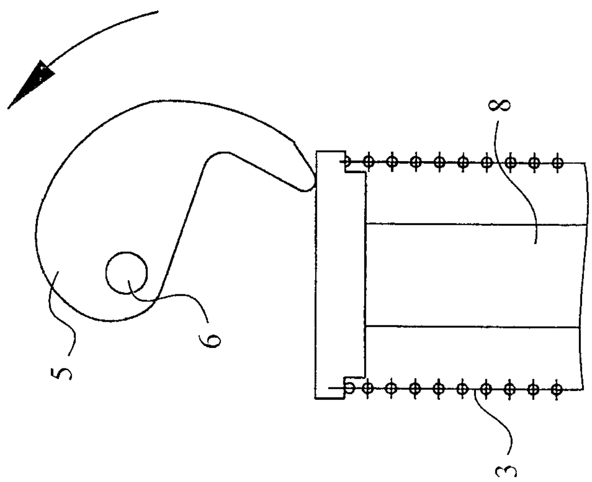


Figure 2

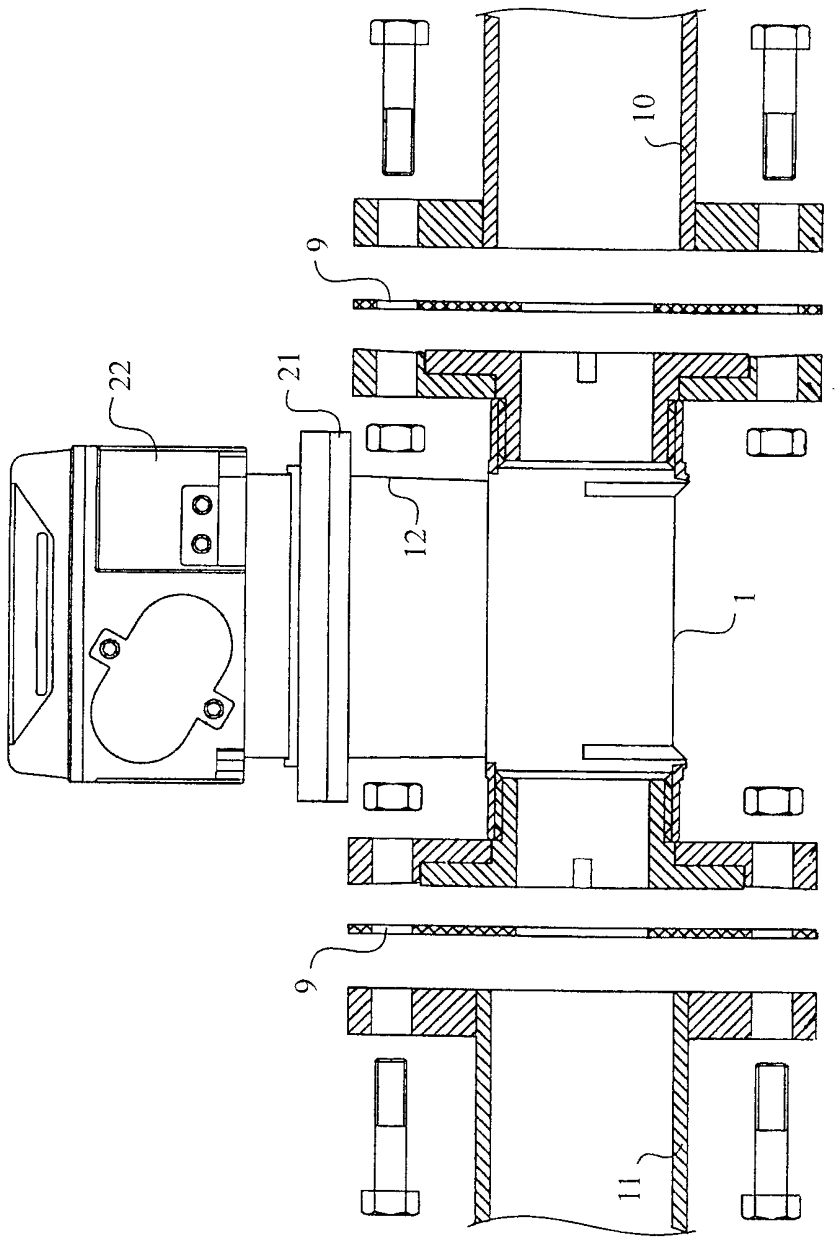


Figure 4

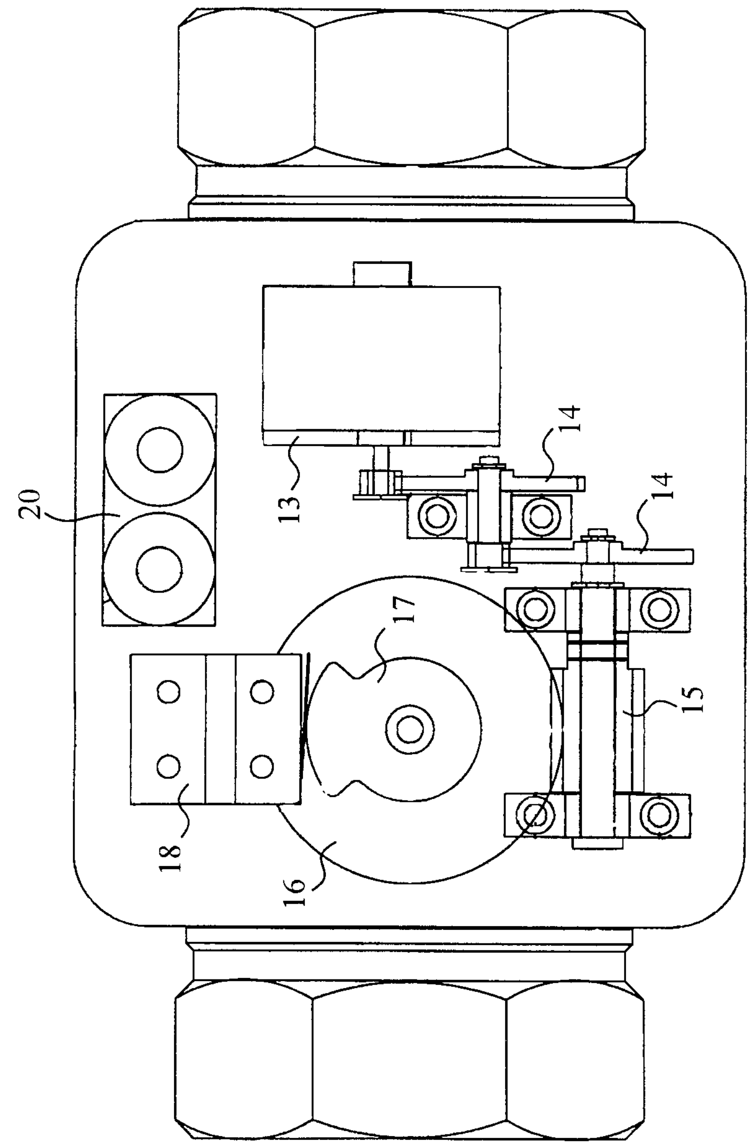


Figure 5

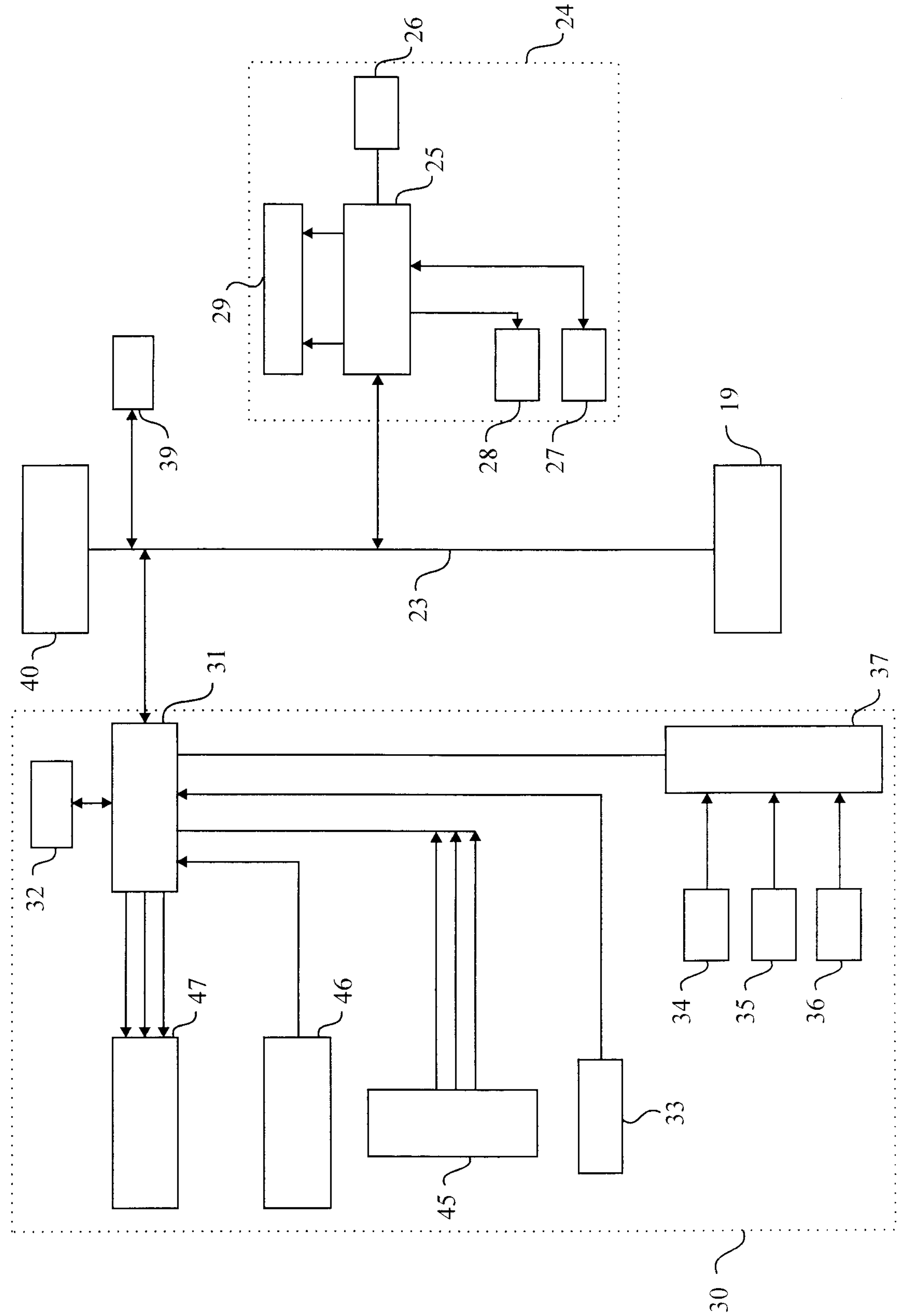


Figure 6

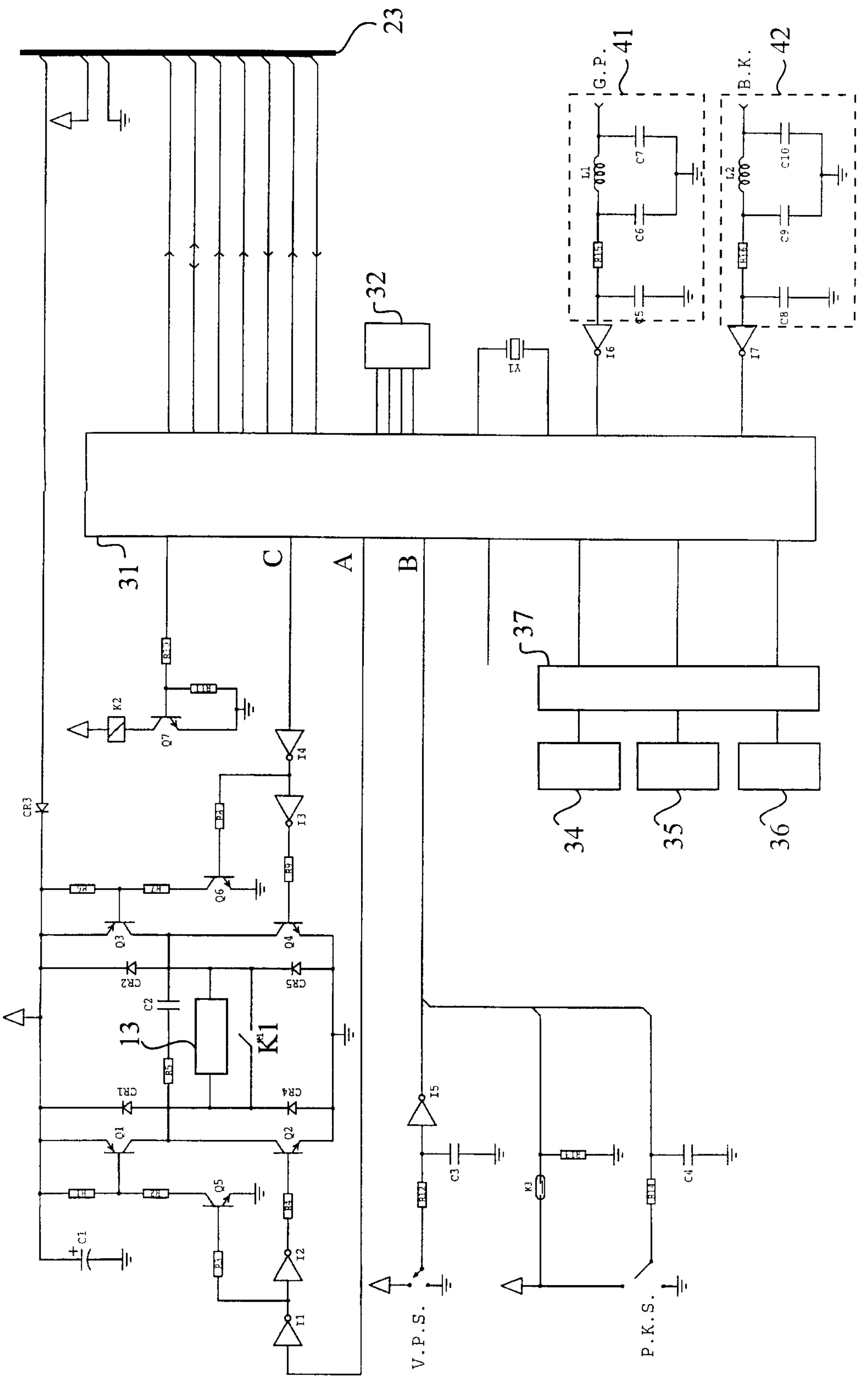


Figure 7

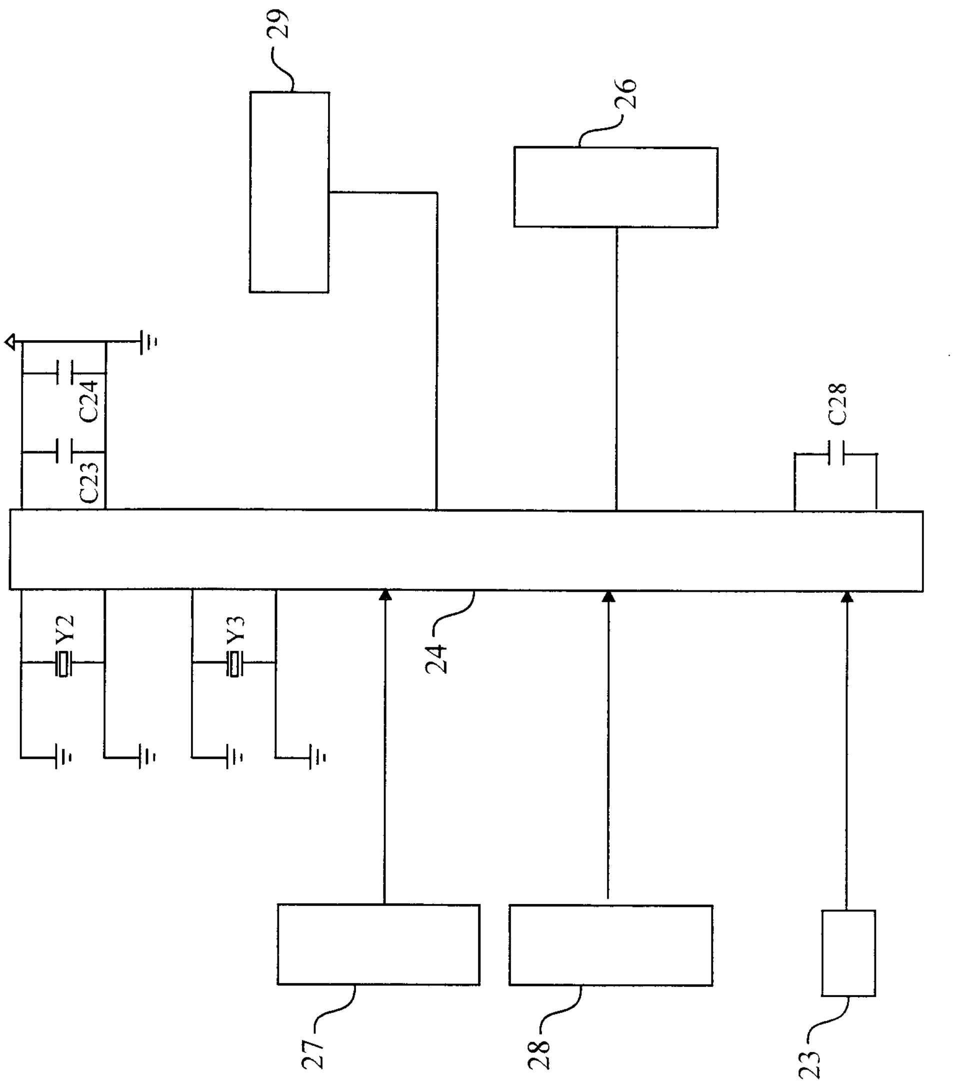


Figure 8

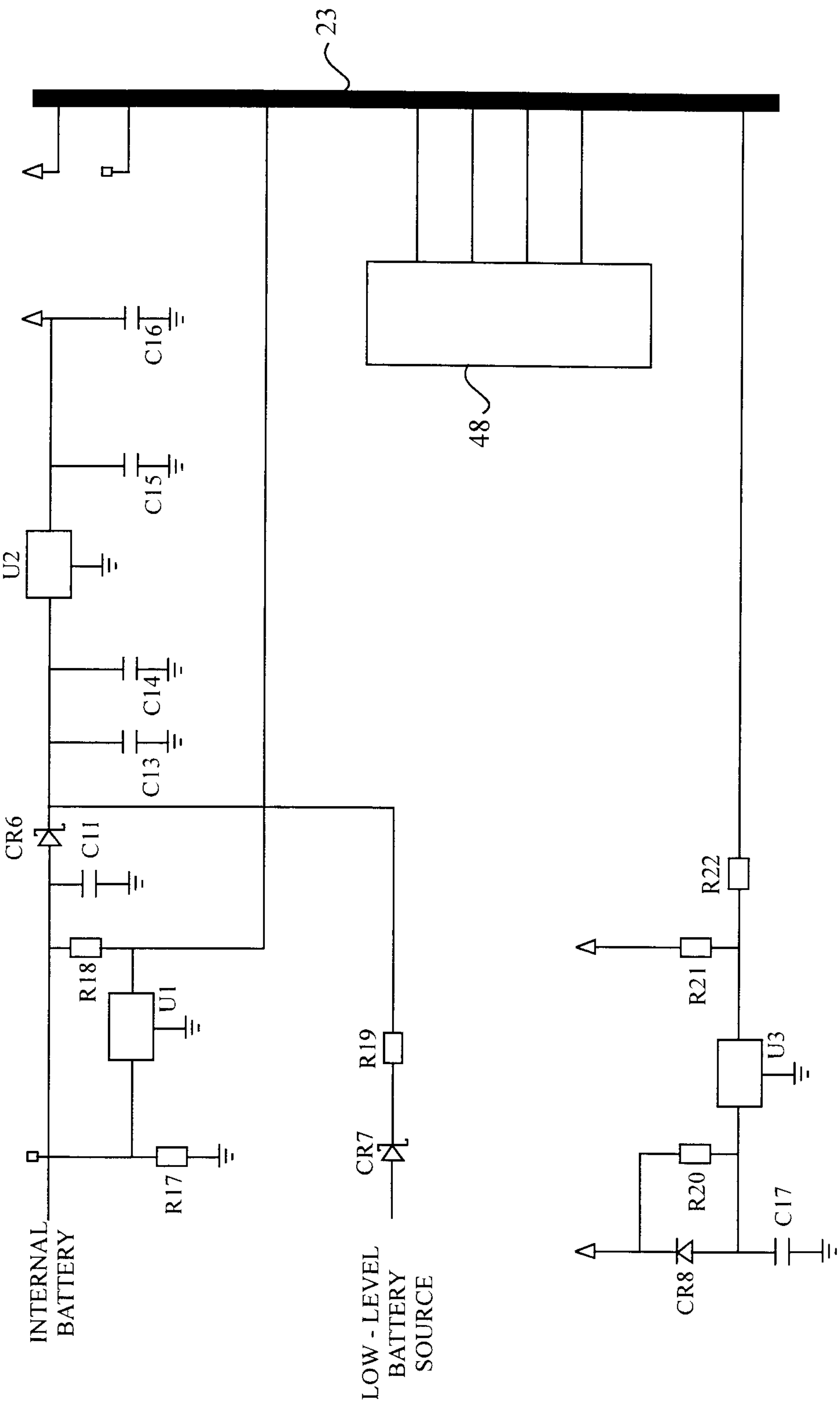

23
48
U2
C16
C15
C14
C13
CR6
C11
R18
U1
R17
INTERNAL BATTERY
R19
CR7
LOW - LEVEL BATTERY SOURCE
R22
R21
U3
R20
C17
CR8

Figure 9