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(12) (19) (CA) **Demande-Application**

(21) (A1) **2,334,383**

(86) 1999/05/27
(87) 1999/12/09

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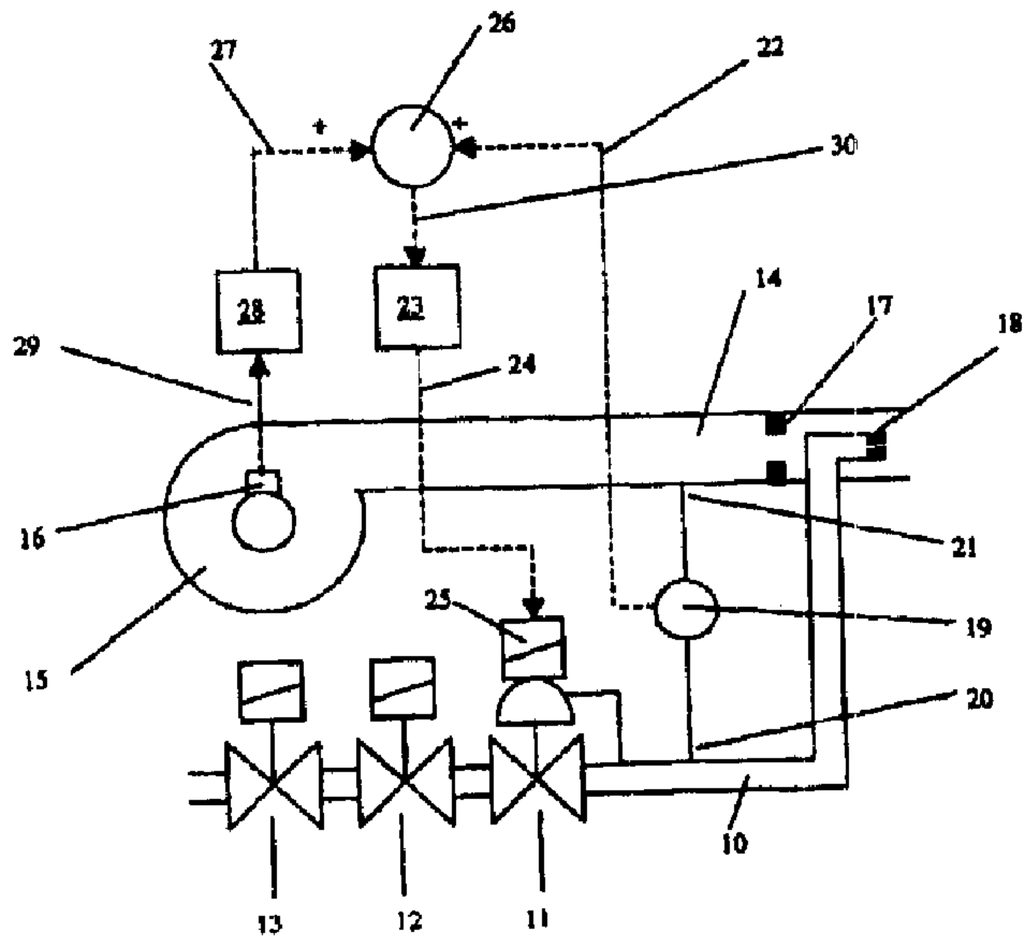
(51) Int.Cl.[6] F23N 1/02, F23N 5/18
(30) 1998/06/02 (198 24 524.6) DE

(54) **SYSTEME DE REGULATION POUR BRULEUR A GAZ**

(54) **REGULATING DEVICE FOR A GAS BURNER**

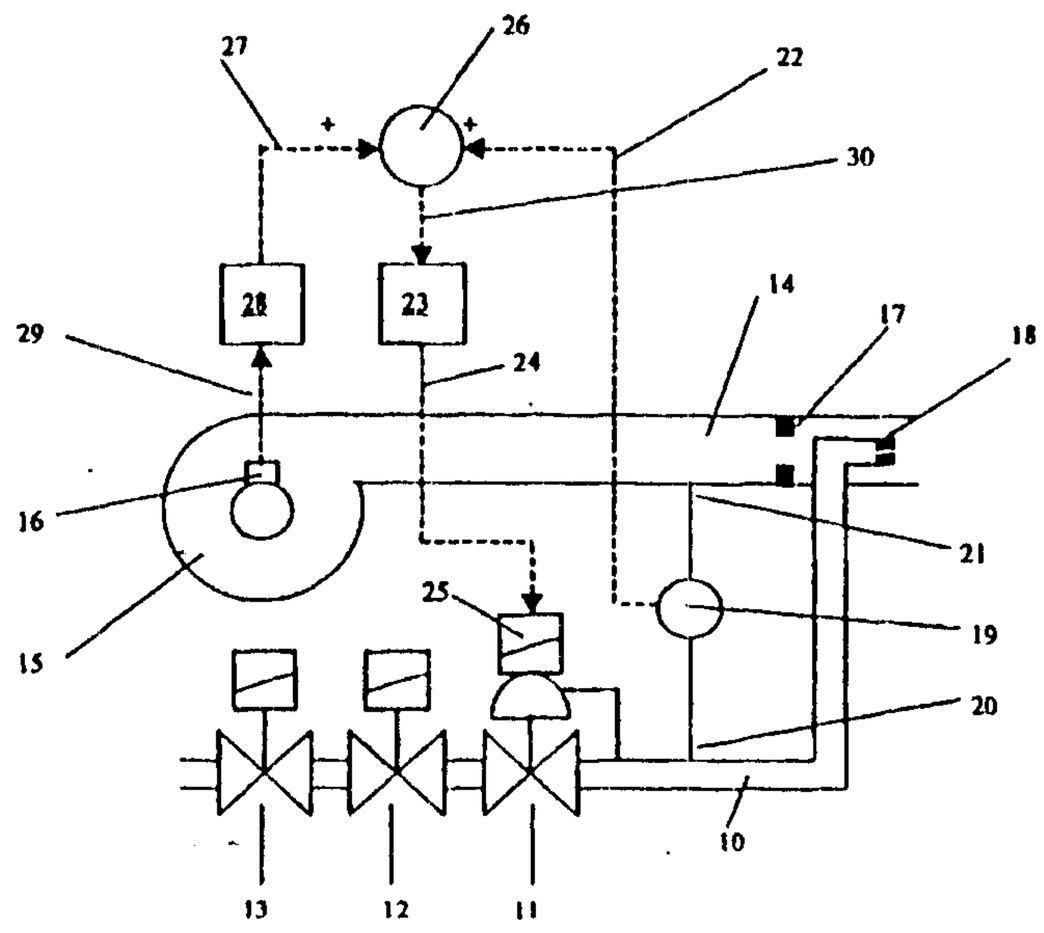


(57) L'invention concerne un système de régulation pour brûleur à gaz. Les systèmes de régulation pour brûleur à gaz servent à fournir un mélange gaz/air à un brûleur. On connaît des systèmes de régulation dans lesquels le rapport de transmission entre la pression du gaz et la pression de l'air de combustion ou entre le flux gazeux et le flux d'air de combustion est variable. Dans tous les systèmes de régulation connus, la mesure de pression nécessaire s'effectue pneumatiquement. Le système de régulation décrit dispose d'un détecteur (19) produisant un signal électrique ou électronique (22), ce détecteur étant disposé entre une première canalisation (10) guidant le flux gazeux, et une deuxième canalisation (14) guidant le flux d'air de combustion. En outre, le système de régulation comporte un système de sommation (26) qui calcule le signal électrique ou électronique (22) du détecteur (19) à l'aide d'un signal auxiliaire (27). Un signal de régulation (24) produit à partir d'un signal de sortie (30) du système de sommation (26) sert à modifier le flux gazeux.

(57) Regulating devices for gas burners are used to provide a gas/air mixture for a burner. Regulating devices are also known which have a variable transmission ratio between gas pressure and combustion air pressure or gas flow and combustion air flow. The required measurement of pressure in all known regulating devices is carried out pneumatically. The inventive regulating device has a sensor (19) that generates an electrical or electronic signal (22) and that is arranged between a first line guiding the gas flow and a second line (14) guiding a combustion air flow. The regulating device is also fitted with a summation device (26) that calculates the electrical or electronic signal (22) of the sensor (19) using an auxiliary signal (27). A regulating signal (24) generated from an output signal (30) of the summation device (26) is used to alter the gas flow.

(57) Abstract

Regulating devices for gas burners are used to provide a gas/air mixture for a burner. Regulating devices are also known which have a variable transmission ratio between gas pressure and combustion air pressure or gas flow and combustion air flow. The required measurement of pressure in all known regulating devices is carried out pneumatically. The inventive regulating device has a sensor (19) that generates an electrical or electronic signal (22) and that is arranged between a first line guiding the gas flow and a second line (14) guiding a combustion air flow. The regulating device is also fitted with a summation device (26) that calculates the electrical or electronic signal (22) of the sensor (19) using an auxiliary signal (27). A regulating signal (24) generated from an output signal (30) of the summation device (26) is used to alter the gas flow.



Regulating system for gas burners

The invention relates to a regulating system for gas burners according to the preamble of claim 1.

Regulating systems for gas burners serve to provide a gas/air mixture, that is, they serve to feed a gas flow and a combustion-air flow to a burner. In this case, the gas flow through a gas valve can be set as a function of the combustion-air pressure. Such regulating systems have been disclosed by DE 24 27 819 B2, Austrian Patent 190 195 and DE 37 07 883 C1.

Regulating systems for gas burners are known in which the transmission ratio between gas pressure and combustion-air pressure or between gas flow and combustion-air flow is variable. In all the known regulating systems, the requisite pressure measurement is carried out by means of a diaphragm, that is pneumatically. However, this pneumatic method has a large number of disadvantages, which all together restrict the range of application of known regulating systems. Thus the hysteresis properties of the diaphragm and the forces acting between the diaphragm and the gas valve restrict the working range and thus the range of application. Furthermore, the interplay between the requisite small actuating forces and the operating tolerances of the diaphragm, as a result of disturbances such as temperature fluctuations or the like, restricts the range of application of known regulating systems.

Against this background, the problem underlying the present invention is to provide a regulating system for gas burners which avoids the abovementioned

disadvantages and thus has a greater range of application.

This problem is solved by a regulating system for gas burners having the features of claim 1.

Further advantageous refinements of the invention follow from the subclaims and the description. A preferred exemplary embodiment of the invention is explained in more detail below with reference to the drawing, in which:

Fig. 1 shows a regulating system according to the invention with further modules in schematic representation.

The regulating system shown in the drawing serves to provide a gas/air mixture for a gas burner (not shown).

A gas flow can be fed to the burner (not shown) via a first line 10. A gas-regulating valve 11 and two gas safety valves 12, 13 are assigned to the first line 10 carrying the gas flow. The gas-regulating valve 11 and the gas safety valves 12, 13 may be of any desired design. The construction and mode of operation of gas safety valves and gas-regulating valves are sufficiently known from the prior art.

Furthermore, a combustion-air flow can be fed to the burner (not shown) via a second line 14. The combustion-air flow is produced by a fan 15, the rotational speed of which is determined by a motor 16 assigned to the fan 15.

A restrictor or choke point 17 is arranged inside the second line 14 carrying the combustion-air flow. In the region downstream of the choke point 17, the first line 10 carrying the gas flow opens into the second line 14 carrying the air flow. In this region, the

first line 10 carrying the gas flow is terminated by a gas nozzle 18.

A sensor 19 is arranged between the first line 10 carrying the gas flow and the second line 14 carrying the combustion-air flow. The sensor 19 is connected by a first measuring point 20 to the first line 10 carrying the gas flow, namely upstream of the gas nozzle 18 in the direction of flow of the gas. Furthermore, the sensor 19 is connected by a second measuring point 21 to the second line 14 carrying the combustion-air flow, namely upstream of the choke point 17 in the direction of flow of the combustion air.

The sensor 19 is designed as a differential-pressure sensor, in particular as a flow-rate meter or anemometer. The pressure difference between the gas pressure and the combustion-air pressure can therefore be determined by means of the sensor 19.

If the gas pressure matches the combustion air, the flow through the sensor 19 designed as a flow-rate meter or anemometer is equal to zero. If the combustion-air pressure is higher than the gas pressure, a flow from the second measuring point 21 in the direction of the first measuring point 20 can be detected. On the other hand, if the combustion-air pressure is lower than the gas pressure, a flow from the first measuring point 20 in the direction of the second measuring point 21 can be detected by the sensor 19. The pressure ratios of gas pressure and combustion-air pressure can therefore be determined by the sensor 19 from the rate of flow through the sensor 19 and from the direction of flow.

Depending on these pressure ratios, the sensor 19 generates an electrical or electronic signal 22. This

electrical or electronic signal 22 is fed to a control unit or regulating unit 23, which generates a regulating signal 24 for an actuator 25 of the gas-regulating valve 11.

To insure a variable transmission ratio between gas pressure and combustion-air pressure or gas flow and combustion-air flow, the electrical or electronic signal 22 of the sensor 19 is balanced with an auxiliary signal 27 in a summing device 26, specifically before the signal 22 is fed to the regulating unit 23. The output signal 30 of the summing device 26 is therefore fed as input signal to the regulating unit 23, the output signal 30 being an additive superimposition of the signals 22, 27.

The auxiliary signal 27 is a signal which functionally depends on a rotational speed of the fan 15. The auxiliary signal 27 is obtained in an evaluating device 28 from a rotational-speed signal 29 of the fan 15 or of the motor 16 of the fan 15. Since the auxiliary signal 27 functionally depends on the rotational speed of the fan 15, it directly follows that the auxiliary signal 27 depends on the combustion-air flow or combustion-air pressure.

Unlike the exemplary embodiment shown, it is possible to generate the auxiliary signal 27 in another way. Thus it is not absolutely necessary for the auxiliary signal 27 to be determined from the rotational speed of the fan. It is also conceivable to provide an additional sensor (not shown) for determining the combustion-air flow and thus for generating the auxiliary signal 27.

To provide a gas/air mixture with a variable transmission ratio between gas pressure and combustion-

air pressure, the procedure with the regulating system according to the invention is therefore as follows:

An electrical or electronic signal 22 which corresponds to the pressure difference between the gas pressure and the combustion-air pressure is determined by means of the sensor 19. This electrical or electronic signal 22 is balanced with an auxiliary signal 27. To this end, the electrical or electronic signal 22 and the auxiliary signal 27 are added. The auxiliary signal 27 depends on the combustion-air flow, in particular on the rotational speed of the fan 15. The output signal 30, determined from the signals 22, 27, of the summing device 26 is fed to a regulating unit 23, which generates a regulating signal 24 for the actuator 25 of the gas-regulating valve 11. In this case, the regulating signal 24 is determined in such a way that the regulating unit 23 changes the gas flow to the effect that the input signal for the regulating unit 23, that is the signal 30 determined from the signals 22, 27, assumes a value of zero.

A factor which determines the transmission ratio between gas flow and combustion-air flow can be determined in the evaluating device 28. This factor is a multiplication factor. The higher this multiplication factor is, the higher is the transmission ratio. The transmission ratio can be varied by varying the multiplication factor.

List of designations

10 Line
11 Gas-regulating valve
12 Gas safety valve
13 Gas safety valve
14 Line
15 Fan
16 Motor
17 Choke point
18 Gas nozzle
19 Sensor
20 Measuring point
21 Measuring point
22 Signal
23 Regulating unit
24 Regulating signal
25 Actuator
26 Summing device
27 Auxiliary signal
28 Evaluating device
29 Rotational-speed signal
30 Output signal

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September 14, 1999

PCT/EP99/03671

72325104 WO

Patent claims:

1. A regulating system for gas burners for providing a gas/air mixture, namely for feeding a gas flow and a combustion-air flow to a burner, the transmission ratio between gas pressure and combustion-air pressure being variable, having the following features:

a) a sensor (19) is arranged between a first line (10) carrying the gas flow and a second line (14) carrying the combustion-air flow,

b) the sensor (19) is coupled by a first measuring point (20) to the first line (10) carrying the gas flow and by a second measuring point (21) to the second line (14) carrying the combustion-air flow,

c) the sensor (19) generates an electrical or electronic signal (22),

d) a summing device (26) balances the electrical or electronic signal (22) of the sensor (19) with an auxiliary signal (27),

e) the auxiliary signal (27) functionally depends on the combustion-air flow,

f) an output signal (30) of the summing device (26) can be fed to a regulating unit (23), the regulating unit (23) generating a regulating signal (24) which acts on a gas-regulating valve (11) and is thus used for varying the gas flow.

2. The regulating system as claimed in claim 1, characterized in that the auxiliary signal (27) depends

on a rotational speed of a fan (15), the fan (15) providing for the combustion-air flow.

3. The regulating system as claimed in claim 1 or 2, characterized in that the first measuring point (20) is arranged upstream of a gas nozzle (18) in the direction of flow of the gas and the second measuring point (21) is arranged upstream of a choke point (17) in the direction of flow of the combustion air.

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AMENDED SHEET

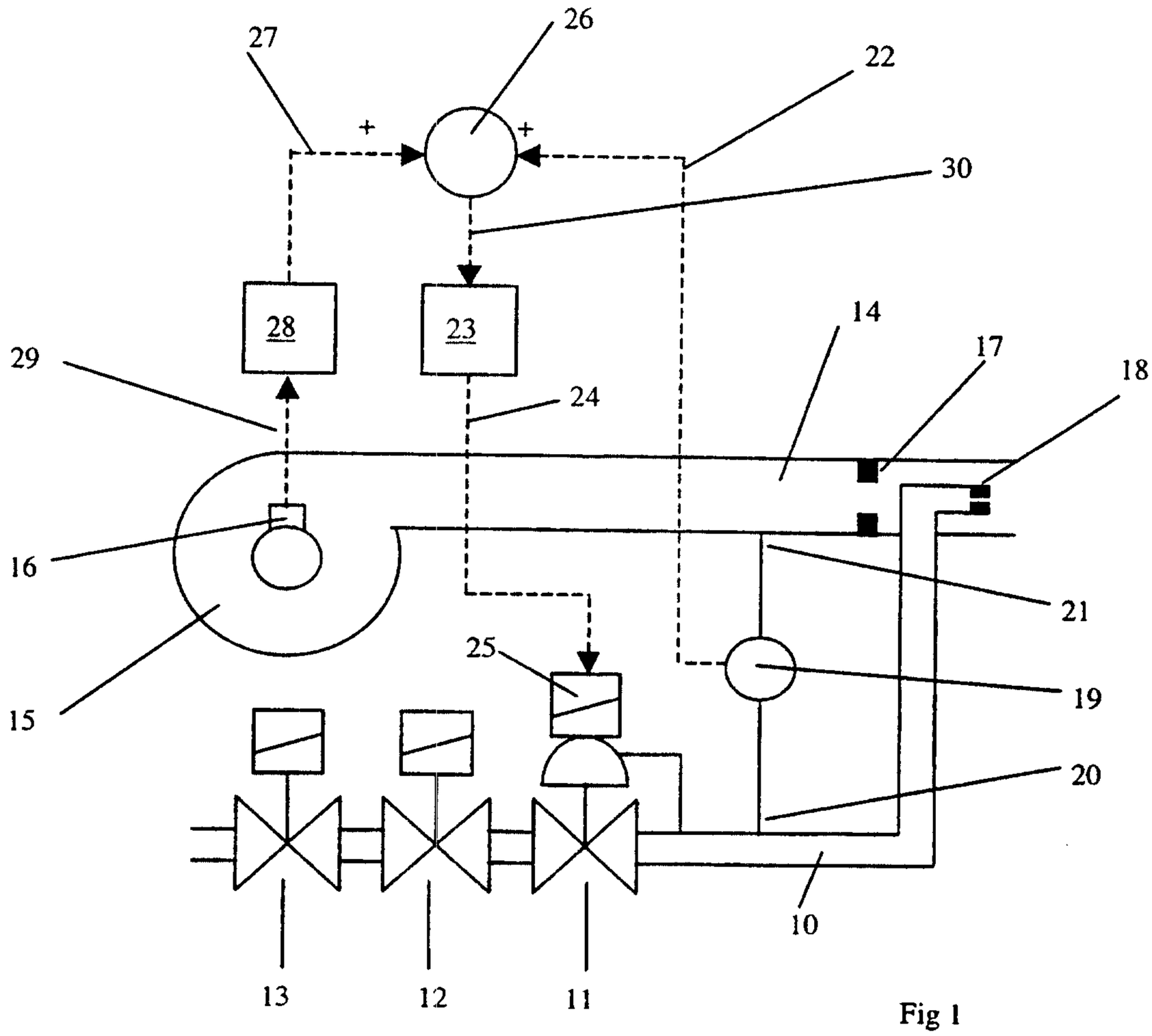
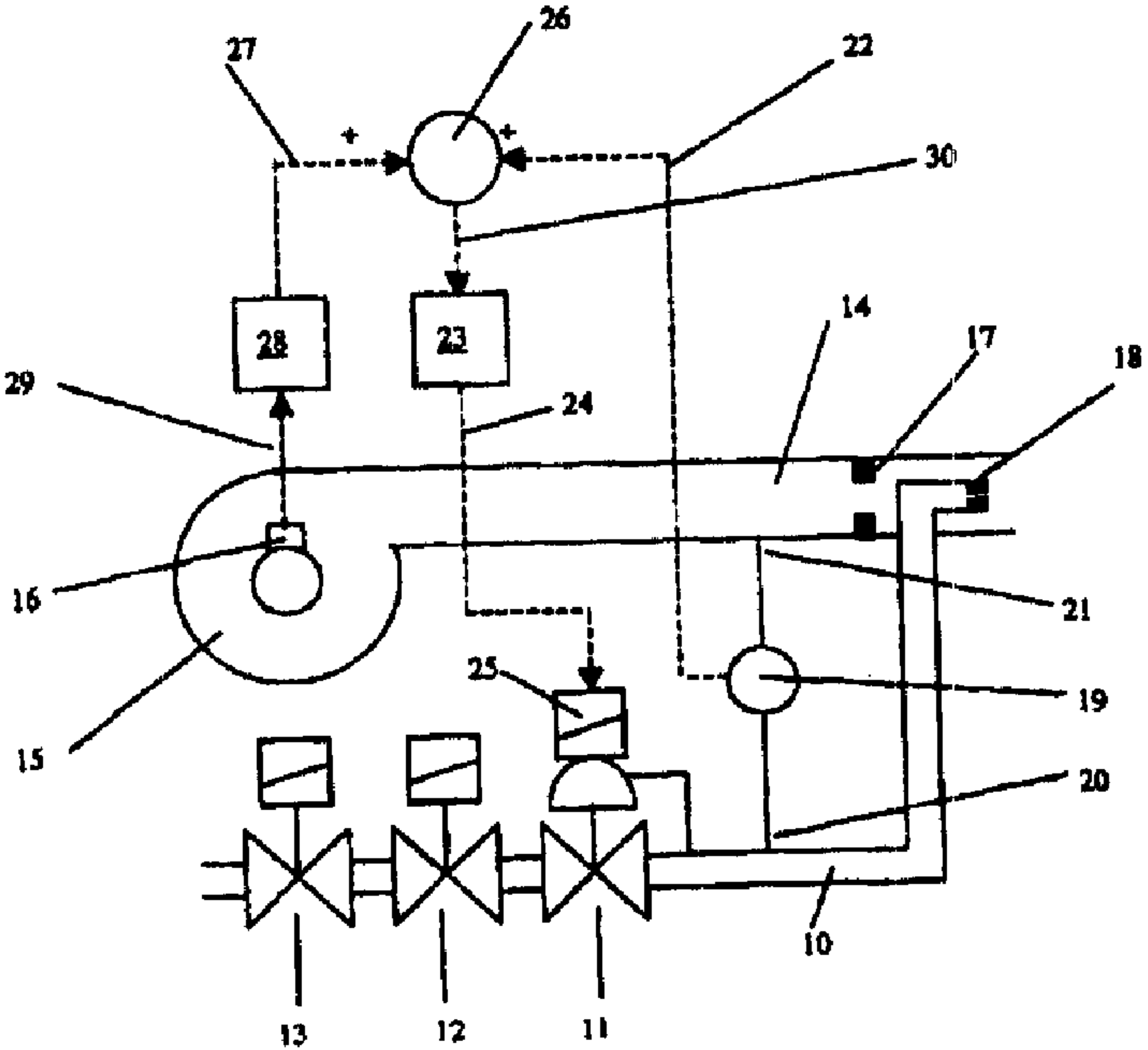


Fig 1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