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(71) Applicant: **HANDLE ZENITH ENTERPRISE COMPANY LIMITED**
No. 60, Lane 465, Lien Tsun Road Lien Tsun Li
Feng Yuan City Taichung Hsien(TW)

(72) Inventor: **Hsieng, Kent Chi-Sheng**
No. 1, Lane 64, Ta Lien Road
Pign Tung City(TW)

(74) Representative: **Arthur, Bryan Edward et al**
Withers & Rogers 4 Dyer's Buildings Holborn
London EC1N 2JT(GB)

(54) **Control system for automatic gasified kerosene fueled stove and water heater.**

(57) Disclosed herein a push button type control system for automatic gasified kerosene fueled stove which applies push buttons or remote controller to preheat, ignite, reignite kerosene, increase or decrease intensity of fire for kerosene fueled stove to eliminate the defect of improper fuel injection, incomplete kerosene cumbustion or unnecessary waiting till ignition, or mechanical breakdown dur to pushing and turning with external force, or leakage.

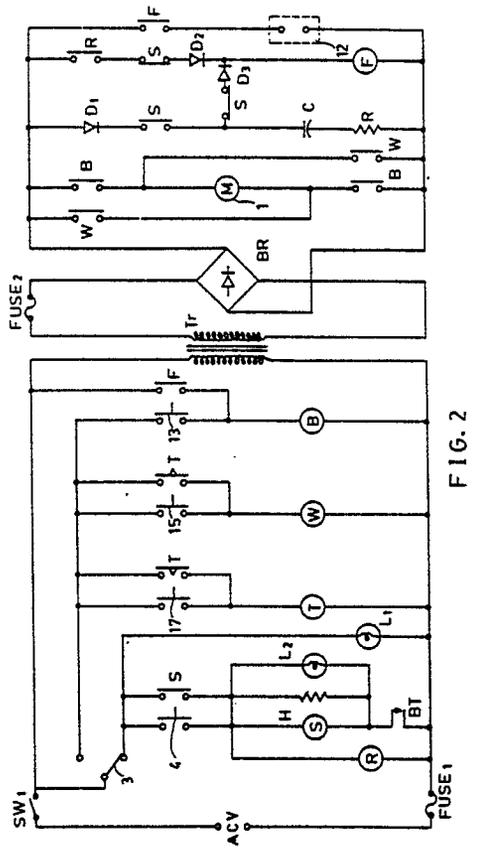

FIG. 2

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CONTROL SYSTEM FOR AUTOMATIC GASIFIED KEROSENE FUELED STOVE AND WATER HEATER

Liquidified petroieum gas (LPG) has been used as fuel for stove or water heater for more than twenty years. It has been considered as a convenient and clean fuel. However, its application is riskful, since the general consumers do not have good knowledge about this high pressurized gas, defects in production or prolonged using of gas appliances, such as gas stove, water heater, gas cylinder as well asnegligence of user or environmental factors may cause serious accident, such as gas poisoning dur to incomplete combustion of gas which resulted inn existence of a colorless and oderless toxic gas, carbon monoxide, breathing in of which will cause poisoning. Gas leakage will cause fire and explosion which affect safety of human being and properties directly.

Kerosene is a downstream product of petrochmical industry. In comparison with LPG, it is a safe and economic fuel. Using of kerosene as a fuel in home is a safe economic and energy conservative mea sure. However, self combustin of kerosene is difficult because of its high burning point, and direct combustion of kerosene will generate a lot of black smoke. It is not suitable for application at home. It combustion will not generate black smoe if it burns after gasification by means of heating. However, with reference to the latest design of kerosene stove in 1985-86, preheating of kerosene will take about 2-5 minutes. Then, there is a long waiting time before "high voltage igniter" is pushed. Moreover, according to some data from distributors of stoves, regulation valve would wear in different rate according to the strength of force applied for turning it, and prolonged using would result in leakage so that unnecessary comgustion might occur in stove. Damaged regulating valve would cause fire and accidents. Therefore, the existing design of kerosene fueled stove is not good enough.

the inventor created the present invention with efforts in study and experiments devoted for the past years to eliminate the defects of gas stove and kerosene fueled sotve and water heater, and provide the kerosene fueled stove with some new functions and characteristics for convenient and safe operation of kerosene fueled stove.

The present invnetion is mianly characterized by the design of an automatic igniter to eliminate the need for waiting preheating stage.

The present invention is further characterized by the provision of an easy and safe operation push button controlled type kerozene fueled stove with buttons to control preheating, intensity of fire, re-ignition and timer. Wrong operation of button will not cause incomplete kerosene combustion or underirable fuel injection.

The present invention is further characterized by the use of a driving motor to replace manual operated knobs for control over regulating valve in order to prevent from accident due to leakage or mechanical breakdown arisen from improper manual operation. the presnt invention can furher apply fully automatic operation or remote controller to become an advanced kerosene fueled stove.

Fig. 1 is a flow chart for a control system according to the present invention.

Fig. 2 is a circuit diagram for a preferred embodiment of the present invention.

Fig. 3 illustrates a perspective view of thepreferred embodiment.

Fig. 4 is a perspective view of the present invention.

Fig. 5 illustrates installation of the driving motor, cam switch, stove and main body according to the present invention.

Fig. 6 is a circuit diagram for another embodiment of the present invention.

As shown in Fig. 1 and 2, the present invention, the gasified kerosene stove and water heater, comprises of the following:

a driving motor 1 to drive the system;

a regulating valve 2 to control the output of gasified kerosene, having a valve rod 2b connecting to the main shaft 1a of the driving motor 1 directly in order to open or close the regulation valve 2 directly while the driving motor 2 is running; a cam switch 3 coupled to the driving motor 1, rotating following the rotation of the main shaft 1a of the driving motor to generate two different signals-positioning and acting -for function as a switch, in the preferred embodiment described herein, composed of a cam 3a and two micro switches 3b and 3c, in which the cam 3a has a projection 3d along its circumference to change the internal contacitng state of the micro switches 3b and 3c for sending positioning and acting electric signal;

a starter button 4 to give preheating, ignition and reignition instruction while the cam switch 3 is at positioning point;

an indicator I5 which can operate when the cam switch 3 is at positioning point to indicate the regulating valve 2 has been closed, thereis no gasified kerosene output, and the system is ready for operation, coded as L1 in the preferred embodi-

ment;
a preheating driving device 6, incorporated with a memory element for self-holding, driving a heater 8, a combustion driver 11 and turn on an indicator II 9 upon receipt of a preheating and automatic ignition instruction from the starter button 4, for which a relay S R Y is used in the preferred embodiment herein;
a temperature detector-switch 7, connected in series with the dpreheating driving device 6 to detect gasification temperature, in open circuit while the gasification temperature is that the set level in order to stop driving action of the preheating driving device 6, for which a bimetal switch BT is used in the preferred embodiment herein; a heater 8, connected parallel to the preheating driving device 6 to preheat or heat kerosene in a fuel tank; for which an electric heater H is used in the preferred embodiment herein;
an indicator II 9, connected parallel to and give driven by the preheating driving device, indicating gasification temperature is too low, coded as L2 in the referred embodimant herein;
a re-ignition driving device 10, connected parallel to the preheating driving device 6 and the temperature detector-seitch 7, without self-holding function, interlocked with the preheating driving device 6; either it or the preheating driving device 6 will function subject to the decision made by the temperature detector-switch 7 while the starter button 4 is pushed, for which a relay R R Y is used in the preferred embodiment herein;
a combustion driving device 11 to drive a high voltage igniter 12 to ignite and the regulating valve to open upon receipt of driving signal from the preheating driving device 6 and the re-ignition driving device 10, including a charger circuit to charge while the preheating driving device 6 is functioning, discharge after the temperature detector-switch 7 turns off the preheating driving device 6 and drives the combustion driving device 11 in order to drive the high voltage igniter 12 to ignite and the regulating valve 2 to deliver gasified kerosene, or driven directly by the re-ignition driving device 10, for which a relay F RY is used in the preferred embodiment and the charger circuit is composed of a capacitor C and a resistor R, charging and discharging are determined by diodes D1, D2 and D3; a high voltage igniter 12 composed of two electrodes, igniting gasified kerosene delivered by the regulating valve 2 while it is driven by the combustion driving device 11, duration of ignition is determined by RC timing of the charge circuit if the combustion driving device 11 is driven by the preheating ddriving device 6, or equal to the duration of starter button 4 pushing if the combustion driving device 11 is driven by the re-ignition driving device 10; an intensifier button 13 to give instruction for increasing intensity of fire, workable only the cam switch 3 is at acting point;
an intensity increasing device 14 to drive the driving motor 1 for normal rotation in order to enlarge the rgulating valve 2 opening upon receipt of instruction from the intensifier button 13 or signal from the combustion driving device 11, for which is srelay B R Y is used in the preferred embodiment herein;
a reducing button 15 to give instruction for reducing intensity of fire, workable only the cam switch 3 is at acting point;
an intensity reducing device 16 to drive the driving motor 1 for reverse roataion in order to reduce the regulating valve 2 opening upon receipt of instruction from the reducing button 15 or driving signal from a timer 18 for a set time, for which a relay W R Y is used in the preferred embodiment herein;
a timing button 17 to give signal for action of a timer 18, workable only the cam switch 3 is at acting point; and
a timer 18 to set duration of time for oeration of the system, drive the intensity reducing device 16 in order to drive the driving motor 1 for reverse rotation and close the regulating valve 2 opening at end of the set time.

Fig. 3 illustrates the appearance of a preferred embodiment of a kerosene stove according to the present invention. It is substantially similar to the stove available from the market. It has a control panel mounted with four push buttons 4, 13, 15 and 17 and two or three indicators 5, 9 and a power source indicator. It is an easy-to-operate device, wrong operating sequence will not cause danger of any nature.

Fig. 4 illustrates a sectional view of the present invention. In addition to the general outer case 22, the coiled pipe 26, the cold water pipe 27, the hot water pipe 28, the outlet of gas 29 and 30, the burner 31, the air mixing chamber 20, the embodiment of the present invention also includes a preheating air tank 19, a regulating valve 2, a driving motor 1, and a heater 8.

Fig. 5 illustrates the installation of motor, cam switch and other mechanical elements according to the present Invention. Besides the driving motor 1 and the cam switch 3m, the temperature detector-switch 7, fuel tank 19, regulating valve 2, air mixing chamber 20 are essential components of a kerosene stove.

Fig. 6 is a circuit diagram for another embodiment according to the present invention. It besides that shown in Fig. 2, includes three remote control contacts 23, 24 and 25 for connecting a remote controller connected parallel to the starter button 4, intensifier button 13 and reducing button 15 re-

spectively for remote control over preheating, ignition, reignition, intensity increasing and descreasing. It is a useful device of home automation, particularly usful for disabled men.

In comparison with the tradition stove or water heater and its control, the present invention has at least the following merits:

1. Safety-premits safe combustion of kerosene without any risk of gas poisoning or explosion, wrong operation will not cause mechanical breakdown nor accident. Furthermore, it can prevent from leakage as usually found in the traditional stove or accident combustion such as that caused by children.

2. Easy-to-operate-Only pushing lighting is required. It is not necessary to apply a force and turn. Mechanical trouble is thus avoided, and unnecessary waiting till ignition is eliminated. The present invention can be incorporate with a remote controller, and even connected to home automation or computer.

3. Low operating cost-In addition to the use of low-cost kerosene, production cost of the presnt invention is low for its structure which is simple, maintenance cost is low too for possibility is breakdown is very low.

The above description refers to a preferred embodiment of the presnt invention, and neither of the particulars described herein will limit the scope of the present invention. The claims below shall include any modification, alternation or change in the shape, structure or characteristics of any components, such as replacement of electrical/mechanical part to electronic part by any person skilled in the art.

Claims

1. A push button type control system for automatic gasified kerosene fueled stove and water heater comprising:

a driving motor to drive the system;

a regulating valve to control output of gasified kerosene, having a valve rod connecting to the main shaft of the driving motor directly in order to open or close the regulating valve directly while the driving motor is running;

a cam switch coupled to the driving motor, rotataing following the rotation of the main shaft of the driving motor to generate two different signals-positioning and acting-for funciton as a switch, in the preferred embodiment described herein, composed of a cam and two micro switches and, in which the cam has a projection along its circumference to change the internal contacting state of the micro switches for sending positioning and acting electric signal;

a starter button to give preheating, ignition, and reignition instruction while the cam switch is at positioning point;

an indicator I, lighting while the a cam switch is at positioning point to indicate he regulating valve has been closed, there is not gasified kerosene output, and the system is ready for operation;

a preheating driving device, incorporated with a memory elemnt for self-holding, driving a heater, a combustion driver and turn on an indicator II upon receipt of a preheating and automatic ignition instruction from the starter button;

a temperature detector-switch, connected in series with the preheating driving device to detect gasification temperature, in open circuit whil the gasification temperature is at the set level in order to stop driving action of the preheating driving device;

a heater, connected parallel to the preheating driving device to preheat or heat kerosene in a fuel tank;

an indicator II, connected parallel to and driven by the preheating driving device, indicating gasification temperature is too low;

a re-ignition driving device, connected parallel to the pre-heating driving device and the temperature detector-switch, without self-holfing function, interlocked with the preheating driving device, either it or the preheating driving device will function subject to the decision made by the temperature detector-switch while the starter button is pushed;

a combustion driving device to drive a high voltage igniter to ignite and the regulating valve to open receipt of driving signal from the preheating driving device and the re-ignition driving device, including a charger circuit to charge while the preheating driving device is functioning, discharge after the temperature detector-switch turns off the preheating driving device and drives the combustion driving device in order to drive the high voltage igniter to ingite and the regulating valve to deliver gasified kerosene, or driven directly by the re-ignition driving device;

a high voltage igniter composed of two elctrodes, igniting gasified kerosene deliverd by the regulating valve while it is driven by the combustion driving device;

an intensifier button to give instruction for increasing intensity of fire, workable only the cam switch is at acting point;

an intensity increasing device to drive the driving motor for normal rotation in order to enlarge the regulating valve opening upon receipt of instruction from the intensifier button or signal from the comfustion driving device;

a reducing button to give instruction for reducing intensity of fire, workable only the cam switch is at acting point;

an intensity reducing device to drive the driving motor for reverse rotation in order to reduce the regulating valve opening upon receipt of instruction from the reducing button or driving signal from a timer for a set time.

a timing button to give signal for action of a timer, workable only the cam swithc is at acting point; and

a timer to set duration of time for oepration of the system, drive the intensity reducing device in order to drive the driving motor for reverse rotation and close the regulating valve opening at end of the set time.

2. A push button type control system for automatic gasified fueled stove and water heater as claimed in Claim 1 wherein the cam switch is composed of a cam and two micro switches, the cam has a projection along its circumference to change the internal contacting state of the two micro switches for sending positioning and acting electric signals respectively.

3. A push button type control system for automatic gasified fueled stove and water heater as claimed in Claim 1 wherein a remote controller is further connected to the starter button, intensifier button and the reducing button respectively in parallel.

4. A push button type control system for sutomatic gasified fueled stove as claimed in Claim 1 which is applicable to gasified kerosene fueled water heater.

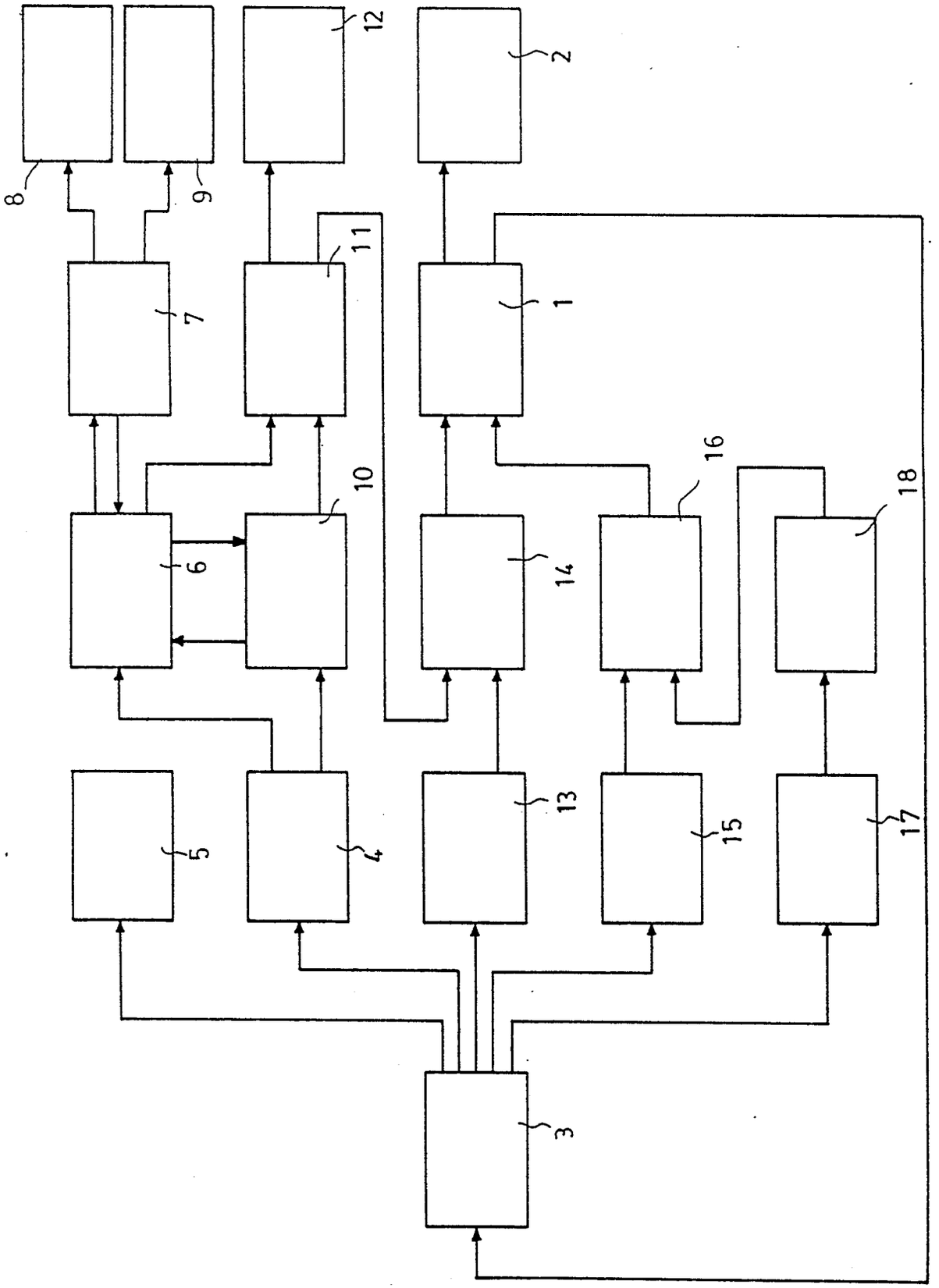

FIG. 1

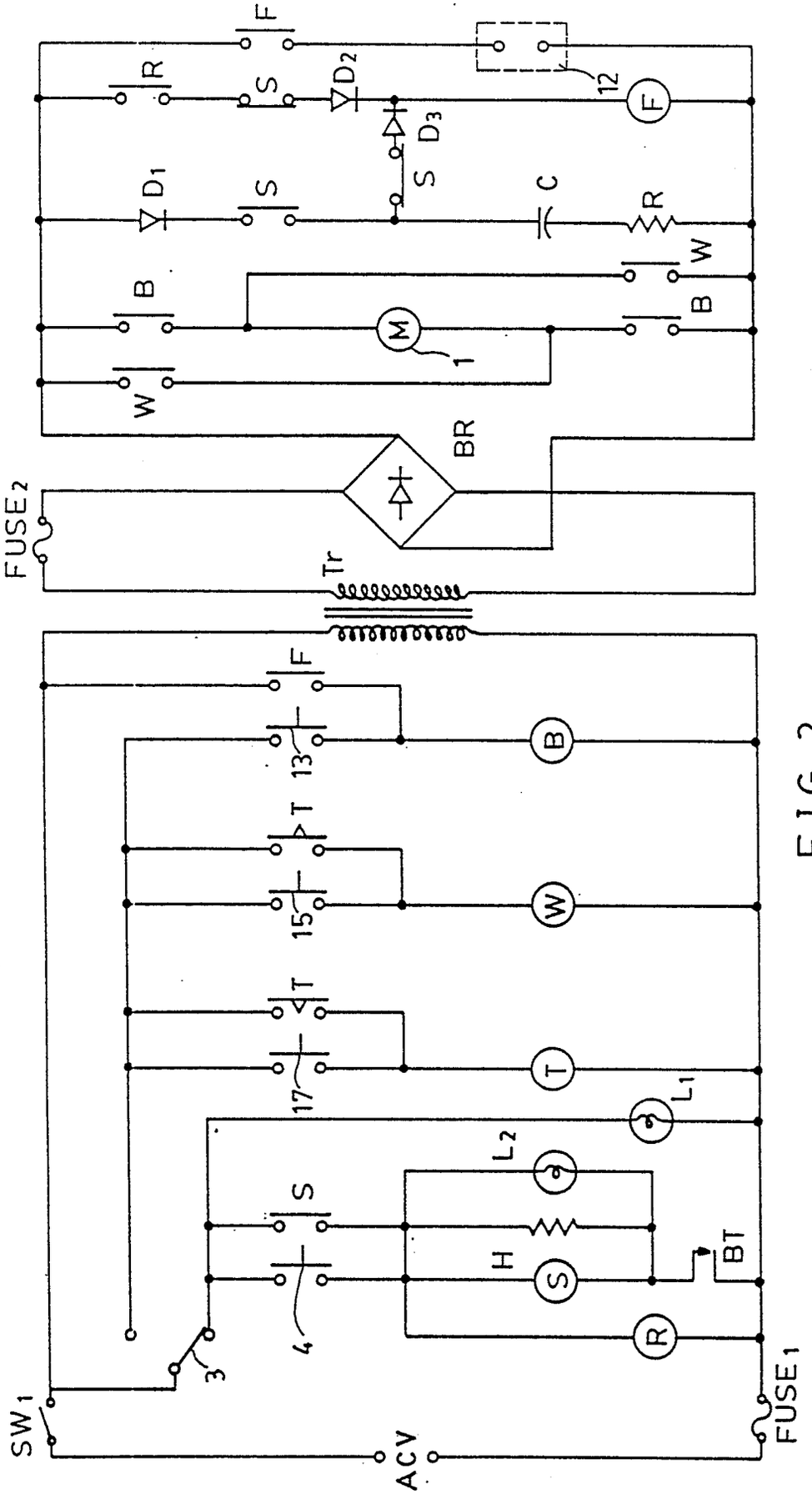
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FIG. 2

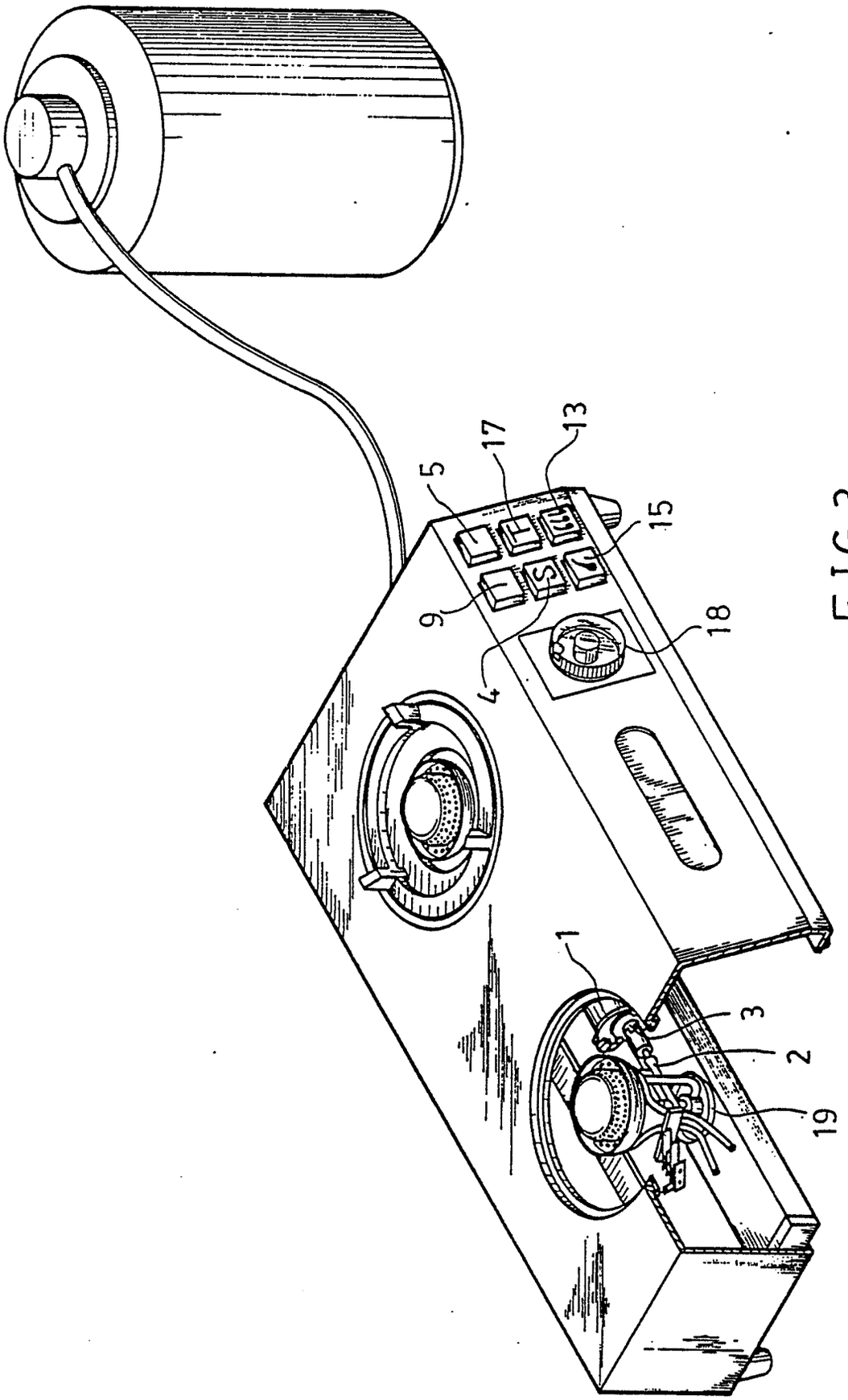

FIG.3

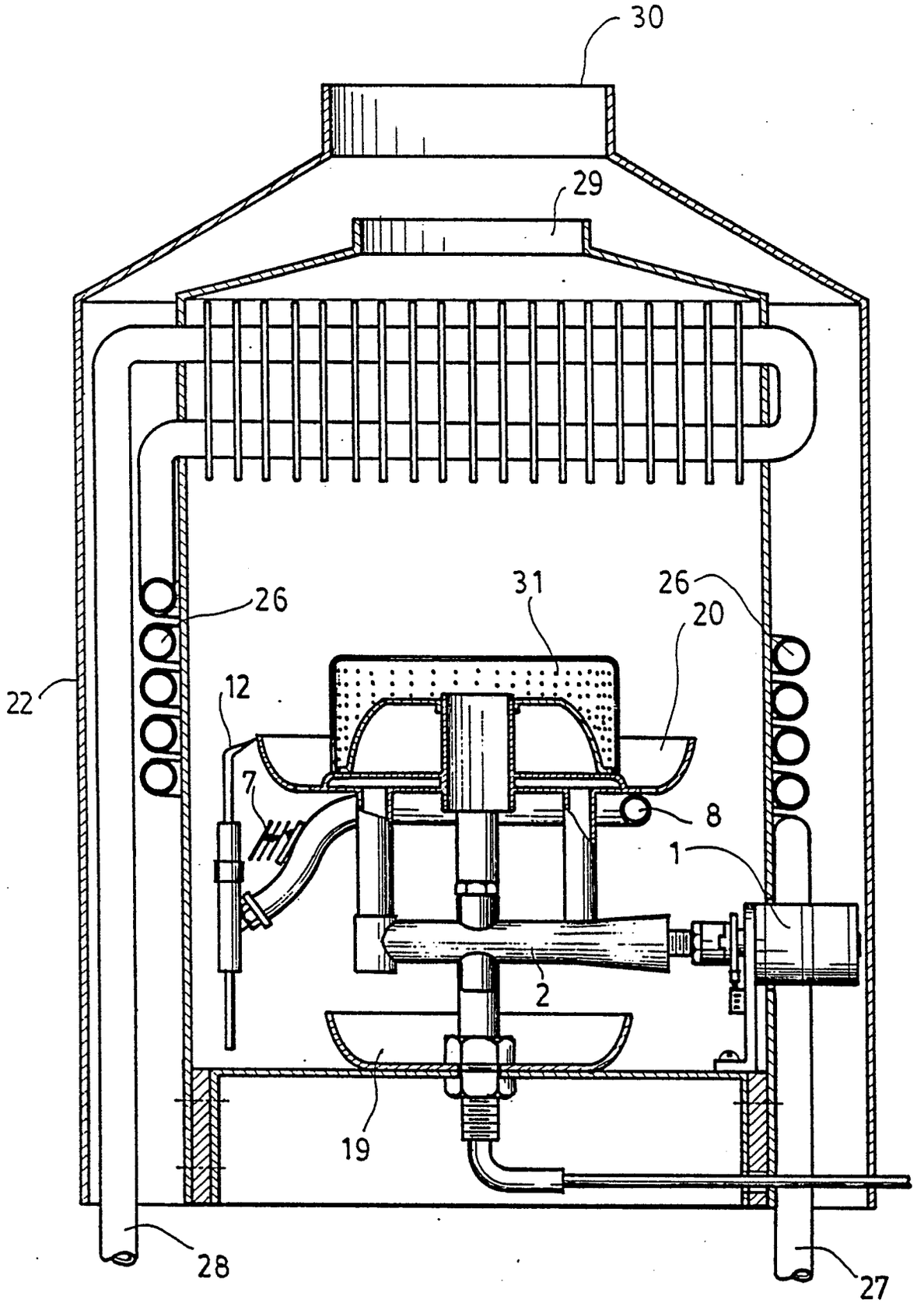

FIG.4

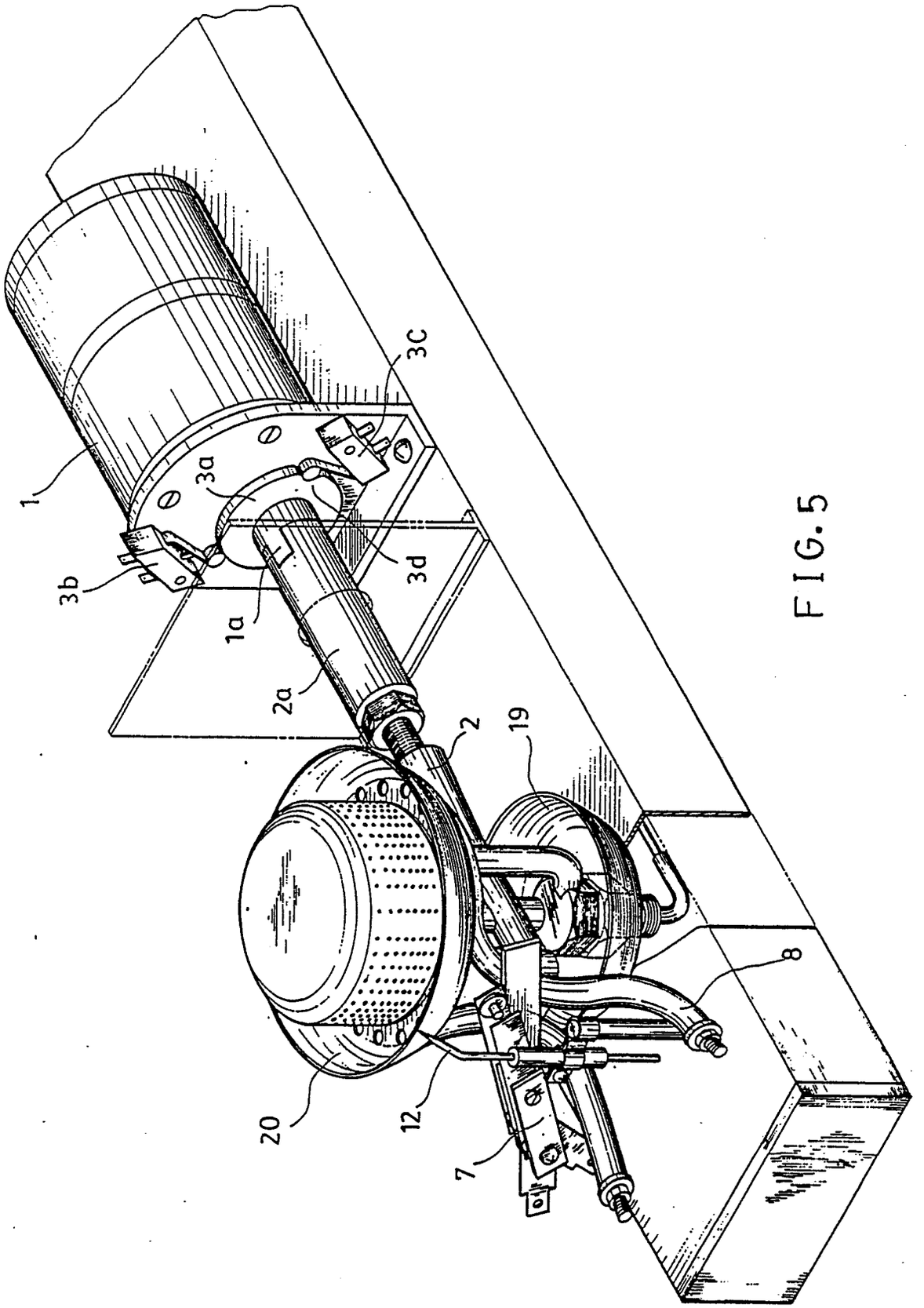

FIG.5

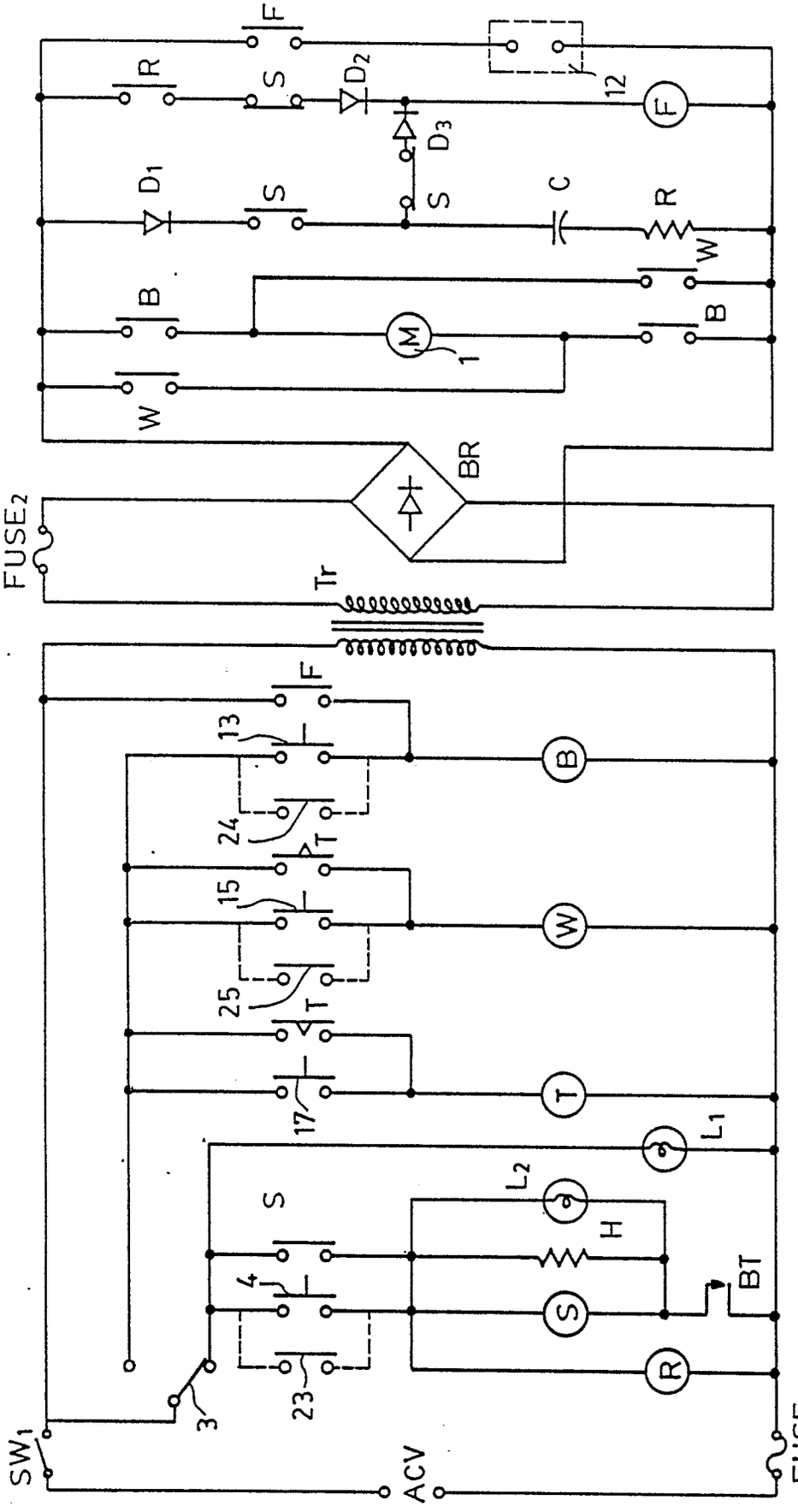
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FIG.6

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 86 30 5201

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.4)
A	GB-A-2 102 556 (TZENG-CHENG CHEN) * Figure 1; abstract *	1	F 24 C 5/16 F 23 D 11/46 F 23 N 5/02
A	US-A-4 391 265 (SI-YU CHEN) * Figures 1,2; abstract *	1	
A	US-A-4 081 234 (D.A. MUELLER)		
A	FR-A-1 345 586 (EBERLE & KOEHLER KG)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

F 24 C
F 23 D
F 23 N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27-02-1987	THIBO F.

CATEGORY OF CITED DOCUMENTS

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