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EP-A- 0 246 907
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PATENT ABSTRACTS OF JAPAN, vol. 12, no. 241 (M-716)[3088], 8th July 1988; & JP-A-63 32 241 (DAIKIN IND. LTD) 10-02-1988
PATENT ABSTRACTS OF JAPAN, vol. 10, no. 277 (M-519)[2333], 19th September 1986; & JP-A-61 99 044 (MATSUSHITA ELECTRIC IND. CO., LTD) 17-05-1986

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Description

The present invention relates to an air conditioning device according to the preamble of claim 1 (JP-A-33496/1982).

Figures 5 and 6 shows the essential parts of a conventional inverter drive type of air conditioning device. Figure 5 is a block diagram showing the control unit of the conventional air conditioning device. Figure 6 is a cross sectional view showing the outlet port of a ceiling mounted or wall mounted type of air conditioning device as for example disclosed in Japanese Examined Patent Publication No. 33496/1982. In Figures 5 and 6, reference numeral 10 designates an electric motor (compressor motor) which is an element constituting an electrically driven compressor. The compressor, an indoor heat exchanger, a decompression device and an outdoor heat exchanger are connected in series to form a refrigerant compression cycle. Reference numeral 11 designates a control unit which is constituted by compressor frequency generating circuit (inverter) 12 as frequency changing means for the motor 10 and a microcomputer 13 as control means. The control unit controls the frequency of three phase a.c. power applied to the motor 10, based on a room temperature detected by a temperature sensor 14. Reference numeral 15 designates a blade which is used for changing the flowing direction of air (conditioned air) blown off from an outlet port 17 into the room, and which is arranged in a supply port 18 at a position in the vicinity of its central portion so as to be rotatable about a shaft 19. Reference numeral 16 designates a blade driving electric motor as flowing direction changing means, which is used to rotate the blade 15. Reference numeral 20 designates the upper end of the outlet port. Reference numeral 21 designates a lower guide wall in a curved form, which has the front surface formed with a guiding surface made of heat insulating material 22 having a predetermined thickness.

In the conventional inverter drive type of air conditioning device, the blade 15 is arranged in the supply port 18 in the vicinity of its central portion so as to be rotatable about the shaft 19. As a result, the conditioned air which flows from the supply port 18 into the outlet port 17 flows along the blade 15, and is blown off from the outlet port 17 in either an upward direction, a lower direction or the horizontal direction depending on the incline of the blade 15.

The blowing direction of the conditioned air is usually determined taking the temperature distribution in the room and the sense of a user in the room into account.

Specifically, if cool air which is blown off on room cooling operation is blown off downwardly, it will little spread in the room and hit the user directly, coupled with its tendency to head downwardly due to its heaviness. A user who is in a normal condition, not in an abnormal condition, generally feels that the cool air hit himself directly is uncomfortable.

For the reasons, the cool air is usually blown off upward in the room, i.e. it is blown off in the horizontal direction in the wall mounted or ceiling mounted type of air conditioning device because such device is mounted at an upper portion in the room, and it is blown off upwardly in an air conditioning device which is put on the floor or mounted on the wall at a lower portion. This allows cool air blown off upwardly in the room to cool the space around a user at a lower portion in the room while it is spreading throughout the inside of the room.

Any type of air conditioning devices have been prevented from blowing off cooled air downwardly with intention. Conversely, if warm air is blown off upwardly in the room, the warm air which has risen once does not come down, thereby preventing the space around a user at a lower portion in the room from becoming warm. For the reason, any type of air conditioniong devices have blown off the warm air downwardly in the room so that the warm air blown off downwardly is spreading and rising in the room to warm the entire inside of the room.

The conventional air conditioning devices have been gradually decreasing the frequency of a.c. power applied to the compressor motor 10 as the actual temperature approaches to a set temperature or when the actual temperature has reached a set temperature once, in both room cooling and room heating operation.

Now, another conventional air conditioning device having an upper outlet port and a lower outlet port as described in Japanese Unexamined Patent Publication No. 105140/1980 will be explained in reference to Figures 7 to 9.

In Figure 8, reference numeral 21 designates an indoor unit housing of the air conditioning device which can carry out room cooling and room heating operation. The housing is provided with a upper outlet port 22 and a lower outlet port 23 in the upper and lower portions, and with an intake port 24 in the central portion of the front end. Reference numerals 25 and 26 designate cross flow fans which are arranged in the housing so as to correspond to the upper and lower outlet ports 22 and 23. Reference numeral 27 designates an indoor heat exchanger which is arranged in the housing so as to correspond to the intake port 24, and which functions as an evaporator on room cooling operation and as a condenser on room heating operation. Reference numeral 28 designates an air filter which is provided in the intake port 24. Reference numerals 29 and 30 designate fan casings which are placed around the cross for fans 25 and 26.

The refrigerant circuit of this air conditioning device is constituted by a compressor 31, a four port valve 32, an outdoor heat exchanger 33, a capillary tube 34 for room heating operation, a capillary tube

35 for room cooling operation, two check valves 36 and 37, the indoor heat exchanger 27 and a receiver 38, as shown in Figure 15.

The electric circuit of this air conditioning device will be explained in reference to Figure 7. An electric motor 39 for the compressor 31 is connected to power through a main switch 40, a switch 41 having a "cooling" contact and a "heating" contact for selecting either room cooling operation or room heating operation, and a thermostat 42 which is actuated depending on the detection of a room temperature. A relay coil 43 for the four port valve 32 has one end connected to a "heating" contact of the switch 41, and the other end connected to power. Reference numeral 44 designates a switch (hereinbelow, referred to as a sleep switch) which is actuated when a user goes to bed, and which comprises a pair of two switches, the respective switches having one end connected to the "cooling" contact and the "heating" contact of the switch 41 and the other end connected to power through the relay coils 45 and 46, respectively. A fan motor 47 for the upper cross flow fan 25 connected to the main switch 40 through a normally closed relay contact 48 actuated by the relay coil 46, and through a switch 49. A lower fan motor 50 for the lower cross flow fan 26 is connected to the main switch 40 through a normally closed relay contacts 51 actuated by the relay coil 45 and through a switch 52.

In the air conditioning device having such strcuture, when a normal room cooling or room heating operation is carried out, the main switch 40 is closed, the switch 41 is placed in the position of either the "cooling" contact connection or the "heating" contact connection, and both switches 49 and 52 or either one is closed so as to actuate the compressor 39 and the fan motors 47 and 50, thereby carrying out room cooling or room heating operations.

If the user desires to obtain room cooling or room heating operations when sleeping, he can close the "sleep" switch 44 with the main switch 40 and the switches 49 and 52 closed, thereby obtaining his desired operation. On room cooling operation, the relay coil 45 is energized to open the relay contact 51, thereby stopping the operation of the lower fan motor 50 while continuously driving the upper fan motor 47. As a result, cool air is blown off only from the upper outlet port 22 of the housing 21 which is mounted on an upper portion of the wall of the room. Thus, this system can carry out room cooling operation appropriate to the time when the user sleeps in bed. On the other hand, on room heating operation, the relay coil 46 is energized to open the relay contact 48, thereby stopping the operation of the upper fan motor 47 while continuously driving the lower fan motor 50. As a result, warm air is blown off from the lower outlet port of the housing 21 which is amounted at an upper portion of the wall of the room. Thus, the system can carry out room heating operation appropriate to the time when the user sleeps in bed.

Another conventional air conditioning device having an upper outlet port and a lower outlet port as described in Japanese Examined Patent Publication No. 38383/1986 will be explained in reference to Figure 10 which is a schematic vertical cross sectional view of the device.

In Figure 10, reference numeral 61 designates an indoor unit housing. Reference numeral 62 designates an upper cross flow fan which is arranged at an upper portion in the housing 61. Reference numeral 63 designates a lower cross flow fan which is arranged at a lower portion in the housing 61. Reference numeral 64 designates an indoor heat exchanger which is arranged near to the front end of the housing 61 and between the upper cross flow fan 62 and the lower cross flow fan 63. Reference numeral 65 designates an upper outlet port which is formed in an upper front end of the housing 61. Reference numeral 66 designate a lower outlet port which is formed in a lower front end of the housing 61.

When the upper and lower cross flow fans 62 and 63 are driven, air which has been inspired from the front end of the housing 61 through the indoor heat exchanger 64 is blown off from the upper outlet port 65 and the lower outlet port 66 into the room in the routes as indicated by arrows 67.

In addition, speed changing means can drive both upper and lower fans 62 and 63 alternately in a higher speed and in a lower speed to make conditioned air blown off from both outlet ports 65 and 66 flow alternately in the routes indicated by arrows A and C and in the routes indicated by arrows B and D in Figure 11, thereby uniforming air flow distribution in the room to be air conditioned. Time signal producing means can control the times of the higher speed and the lower speed of both fans 62 and 63.

In the conventional air conditioning devices, when the room temperature has reached a set temperature once on room cooling operation, the frequency of a.c. power applied to the compressor motor 10 is decreased. In addition, the frequency is being gradually decreased as the room temperature approaches to a set temperature. As a result, the temperature of the conditioned air on room cooling operation is not so low, and the conditioned air is blown off in the horizontal direction or an upward direction so that the conditioned air is prevented from hitting a user directly. This creates a problem wherein it is difficult to give enough cooling air comfort to the user when since he is hot as he feels after, for example, having bath, he desires to allow cool air hit himself directly.

In addition, since the conventional air conditioning devices are constructued as above, warm air is blown off from both upper and lower outlet ports on normal room heating operation. As a result, the temperature of the warm air blown is low. This creates a

problem wherein it is difficult for the user to hit the warm air to himself to warm the body, and the lowness in the temperature of the warm air could give even cool air feeling to the user.

Further, in the conventional air flow control device for air conditioning device as explained above, the upper and lower fans 2 and 3 are driven alternately in the higher speed and in the lower speed in a predetermined pattern by the speed changing means, and the times of the higher speed operation and the lower speed operation are controlled in a predetermined pattern by the time signal generating means. This allows the upper air flow and the lower air flow to get in interference with each other and be agitated, thereby obtaining good temperature distribution in the entire inside of the room. However, the air volume control by such system creates the following problem because this system is directed to air condition a single room. Specifically, even if the user desires to air condition simultaneously a room with the indoor unit installed and a room which adjoins the room with the unit through an openable or detachable partition, he can not obtain satisfactory air conditioning in the adjoining room by a single air conditioning device. This is because the presence of an upper part of the partition which remains in an upper portion between the room with the unit and the adjoining room after having opened or detached a lower part of the partition prevents conditioned air from flowing in the adjoining room even if the air volume blown off from the air conditioning device is increased, though good air conditioning can be obtained in the room with the indoor unit.

From EP-A-0 246 907 a room air conditioner is known which has a switch to be operated by the user in order to control the blowing rates of upper and lower blowers and thereby the discharge direction of air.

It is an object of the present invention to solve the described problems and to provide an air conditioning device capable of giving sufficient cool air feeling to a user on room cooling operation.

The air-conditioning device of the invention is defined in claim 1.

In drawings:

Figure 1 is a block diagram showing a first embodiment of the present invention;

Figures 2 through 4 are operation flow charts of the first embodiment;

Figures 5 and 6 show the essential parts of the conventional inverter drive type of air conditioning device, Figure 5 being a block diagram and Figure 6 a vertical cross sectional view of the outlet port;

Figure 7 is an electric circuit diagram of the conventional device;

Figure 8 is a vertical cross sectional view of the indoor unit of the conventional device;

Figure 9 is a refrigerant circuit of the conventional device;

Figure 10 is a vertical cross sectional view of the indoor unit of the conventional device; and

Figure 11 is an illustration showing the air blowing state of the conditioned air blown off into a room with the indoor unit.

Now, the present invetion will be described in detail with reference to a preferred embodiment illustrated in the accompanying drawings. In Figure 1 a control unit 11 is constituted by a compressor frequency generating circuit (inverter) 12 as frequency changing means for an electric motor 10 for a compressor, and a microcomputer 13 as control means. The microcomputer 13 controls three phase a.c. power to be applied to the motor 10 based on a room temperature detected by a temperature sensor 14. The microcomputer 13 also controls an electric motor 16 for driving a blade 15 which is arranged in a supply port. The control unit of the first embodiment is provided with a "spot" switch 4 which is depressed when a user desires to allow cool air hit himself directly. The "spot" switch 4 is connected to the microcomputer 13 as one of inputs. When the "spot" switch is on, the microcomputer 13 controls the inverter 12 to change the frequency of a.c. power applied to the motor 10 to the maximum frequency. As a result, the frequency of a.c. power applied to the compressor motor 10 is changed to a value higher than the frequency on normal room cooling operation by the inverter 12. The microcomputer 13 also controls the blade 15 through the blade driving motor 16 to place the direction of the blade 15 downwardly, thereby allowing cool air to be blown off downwardly.

The operation of the first embodiment will be described in reference to the flow chart as shown in Figure 2.

When the "spot" switch 4 is in the off state, it is judged at a step S-20 that the normal mode is selected. In the normal mode, the frequency of a.c. power applied to the compressor motor 10 is controlled by the microcomputer 13 and the inverter 12 so as to make the room temperature approach a set temperature at a step S-21. In this case, there is little case wherein the compressor motor 10 is driven in the maximum frequency which can be attained by the motor 10 because a normal temperature control is carried out.

After the frequency control have been carried out, the direction of the blade 15 is controlled by the blade driving motor 16 so as to blow off conditioned air in the horizontal direction at a step S-22.

On the other hand, when the "spot" switch 4 is turned on, it is judged at a step S-20 that a spot mode is selected. In the spot mode, the compressor motor 10 is driven the maximum frequency by the inverter 12 to lower the temperature of the conditioned air at a step S-23. After that, the microcomputer 13 controls the blade driving motor 16 to place the blowing direc-

tion of the conditioned air downwardly at a step S-24. In this way, cool air hits the user, allowing him to feel cool air sense.

If the time of the spot operation is restricted after it has been judged whether the spot mode or the normal mode is selected, there is no possibility that frost is formed on the indoor unit at the time of room cooling operation, and that even if the user forgets to return the air conditioning operation from the spot mode to the normal mode, he is adversely affected by the air conditioning in the spot mode. Figure 3 is a flow chart wherein such restriction of the spot mode operation is carried out at a step S-25.

If the air volume given by a fan (not shown) in the indoor unit is increased after the flowing direction of the conditioned air is placed downwardly, it is possible to improve cool air sense given to the user in comparison with the embodiment as shown in Figure 2. In case of the normal mode, the air volume given by the fan is made normal. Figure 4 is a flow chart showing wherein increasing the air volume is carried out at a step S-26 and the air volume is made normal at a step S-27.

Although placing the blowing direction of the conditioned air downwardly and maximizing the frequency for the compressor are carried out in the spot mode, even only placing the blowing direction of the conditioned air can attain the purpose of giving cool air sense to the user, which is offered by the present invention.

As explained, in accordance with the described embodiment, when the user desires to allow cool air hit himself directly on room cooling operation, the blowing direction of the conditioned air into the room is controlled to be directed downwardly, thereby giving cool air sense to the user directly.

Claims

1. An air conditioning device comprising:
a refrigerant compression cycle having an electrically driven compressor,
an electric motor (10) for driving the compressor, frequency changing means (12) for changing the frequency of a.c. power to be applied to the motor, an outlet port for blowing off conditioned air, flowing direction changing means (15,16), comprising at least one blade (15) operated by a driving motor (16) for changing the flowing direction of the conditioned air from the outlet port, and
control means (13) for controlling the frequency changing means and the flowing direction means,
characterized in that a switch (4) is provided which is actuated by a user and that upon actuation of the switch (4) during room cooling operation, the control means (13) outputs to the driving motor (16) a signal for turning the blade (15) such that the conditioned air from the outlet port is directed downwardly.

2. Air conditioning device according to claim 1, **characterized** in that upon actuation of the switch (4) the frequency of the compressor motor (10) is raised to a maximum.

3. Air conditioning device according to claim 1 or 2, **characterized** in that the cooling operation time due to actuation of the switch (4) is restricted.

Patentansprüche

1. Klimaanlage mit einem Kompressorkreislauf für den Kälteträger, welcher einen elektrisch-betriebenen Kompressor hat, mit einem elektrischen Motor (10) zum Antrieb des Kompressors, mit einem frequenzumformenden Mittel (12) zum Ändern der Frequenz des Wechselstromes, mit dem der Motor versorgt wird, mit einer Auslaßöffnung zum Ausblasen der klimatisierten Luft, mit einem fließrichtungsändernden Mittel (15, 16), das mindenstens eine von dem Motor (16) angetriebene Umlenkplatte (15), mit der die Fließrichtung der klimatisierten Luft aus der Auslaßöffnung veränderbar ist, und mit einem Kontrollmittel (13) zum Kontrollieren des frequenzändernden Mittels und des fließrichtungsändernden Mittels, **dadurch gekennzeichnet,** das ein Schalter (4) ausgebildet ist, der von einem Benutzer betätigt wird, und daß durch die Betätigung des Schalters (4) während des raumkühlenden Betriebs die Kontrolleinrichtung (13) ein Signal an den Motor (16) abgibt, infolgedessen die Umlenkplatte (15) derart gedreht wird, daß die klimatisierte Luft aus der Auslaßöffnung nach unten gerichtet wird.

2. Klimaanlage nach Anspruch 1, dadurch gekennzeichnet, daß durch das Bedienen des Schalters (4) die Frequenz des Kompressormotors (10) auf das Maximum erhöht wird.

3. Klimaanlage nach Anspruch 1 oder 2, gleich gekennzeichnet, daß die Dauer des raumkühlenden Betriebs durch die Betätigung des Schalters (4) beschränkt wird.

Revendications

1. Dispositif de conditionnement d'air comprenant:
un cycle de compression réfrigérant ayant un compresseur actionné électriquement,
un moteur électrique (10) pour actionner le compresseur, des moyens de changement de

fréquence (12) pour changer la fréquence d'une alimentation alternative à appliquer au moteur, un orifice de sortie pour souffler de l'air conditionné, des moyens de changement de direction de circulation (15, 16), comprenant au moins une lame (15) actionnée par un moteur d'entraînement (16) pour changer la direction de circulation de l'air conditionné en provenance de l'orifice de sortie, et des moyens de commande (13) pour commander les moyens de changement de fréquence et les moyens de direction de circulation, caractérisé en ce qu'il est prévu un interrupteur (4) qui est actionné par un utilisateur et en ce que lors de l'actionnement de l'interrupteur (4) pendant une opération de rafraîchissement de la pièce, les moyens de commande (13) délivrent un signal au moteur d'entraînement (16) pour faire tourner la lame (15) de telle façon que l'air conditionné en provenance de l'orifice de sortie soit dirigé vers le bas.

2. Dispositif de conditionnement d'air selon la revendication 1, caractérisé en ce que lors de l'actionnement de l'interrupteur (4) la fréquence du moteur (10) du compresseur est augmentée à un maximum.

3. Dispositif de conditionnement d'air selon la revendication 1 ou 2, caractérisé en ce que la durée de l'opération de rafraîchissement due à l'actionnement de l'interrupteur (4) est limitée.

FIGURE 1

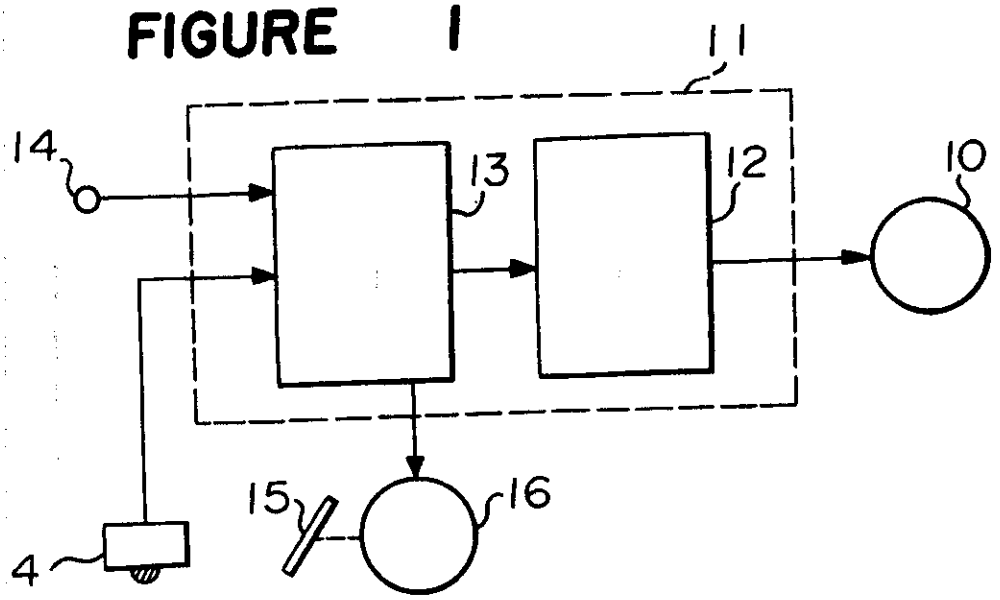


FIGURE 2

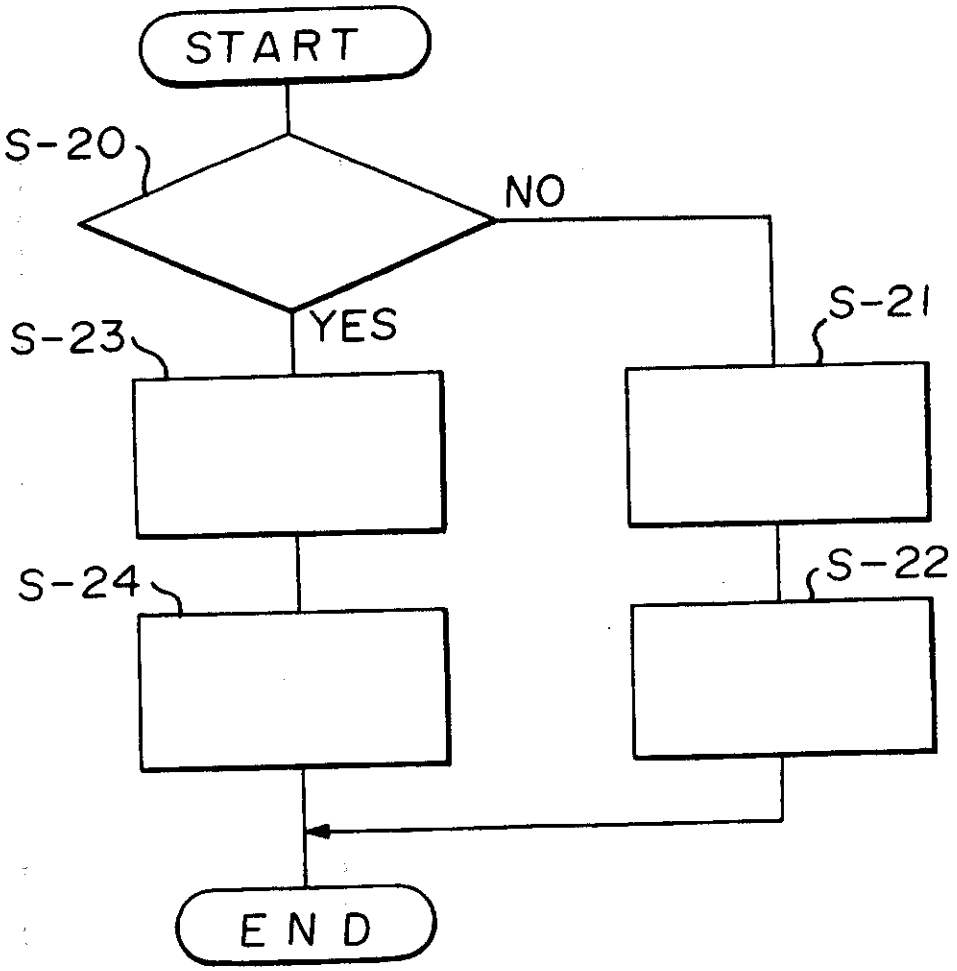


FIGURE 3

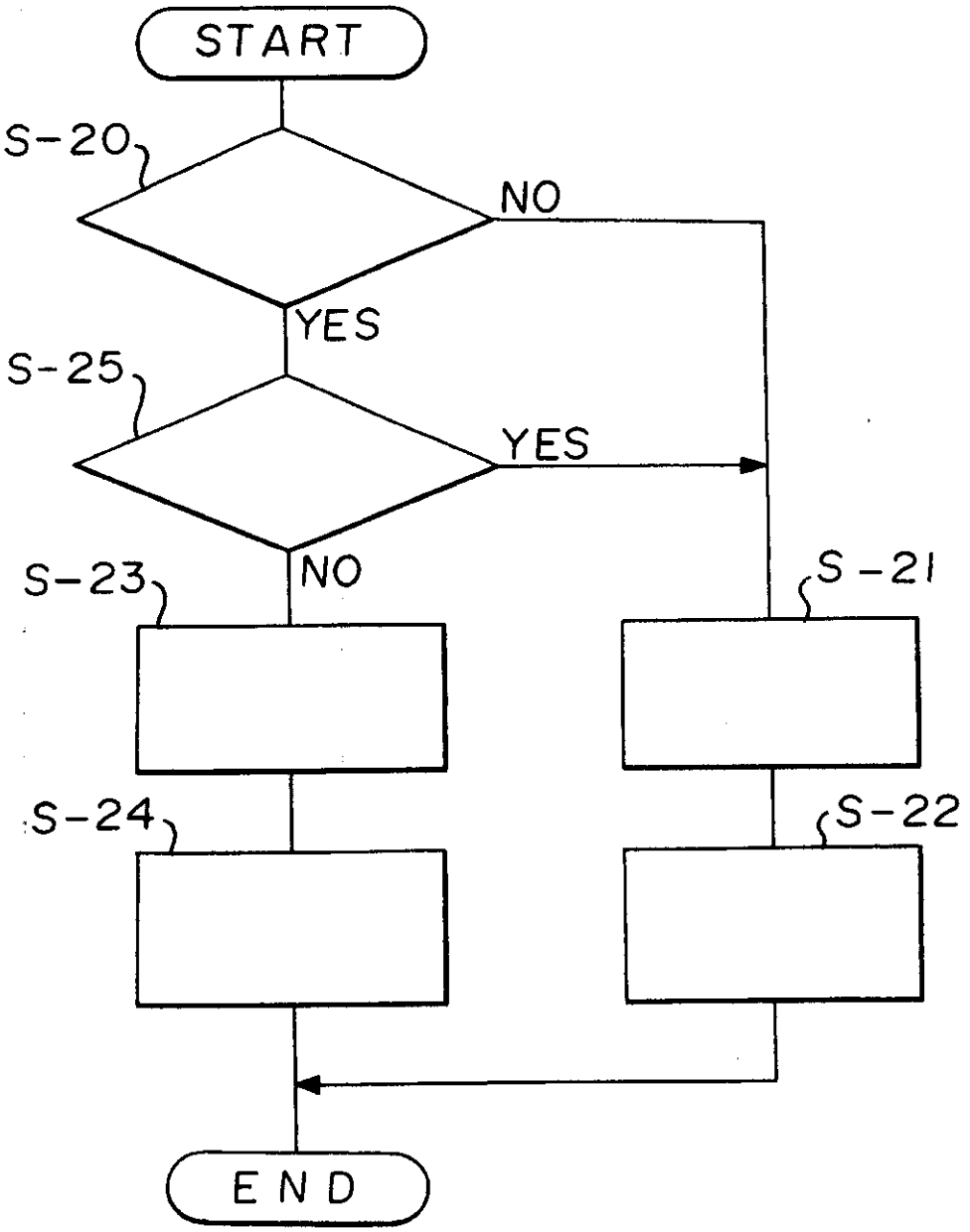


FIGURE 4

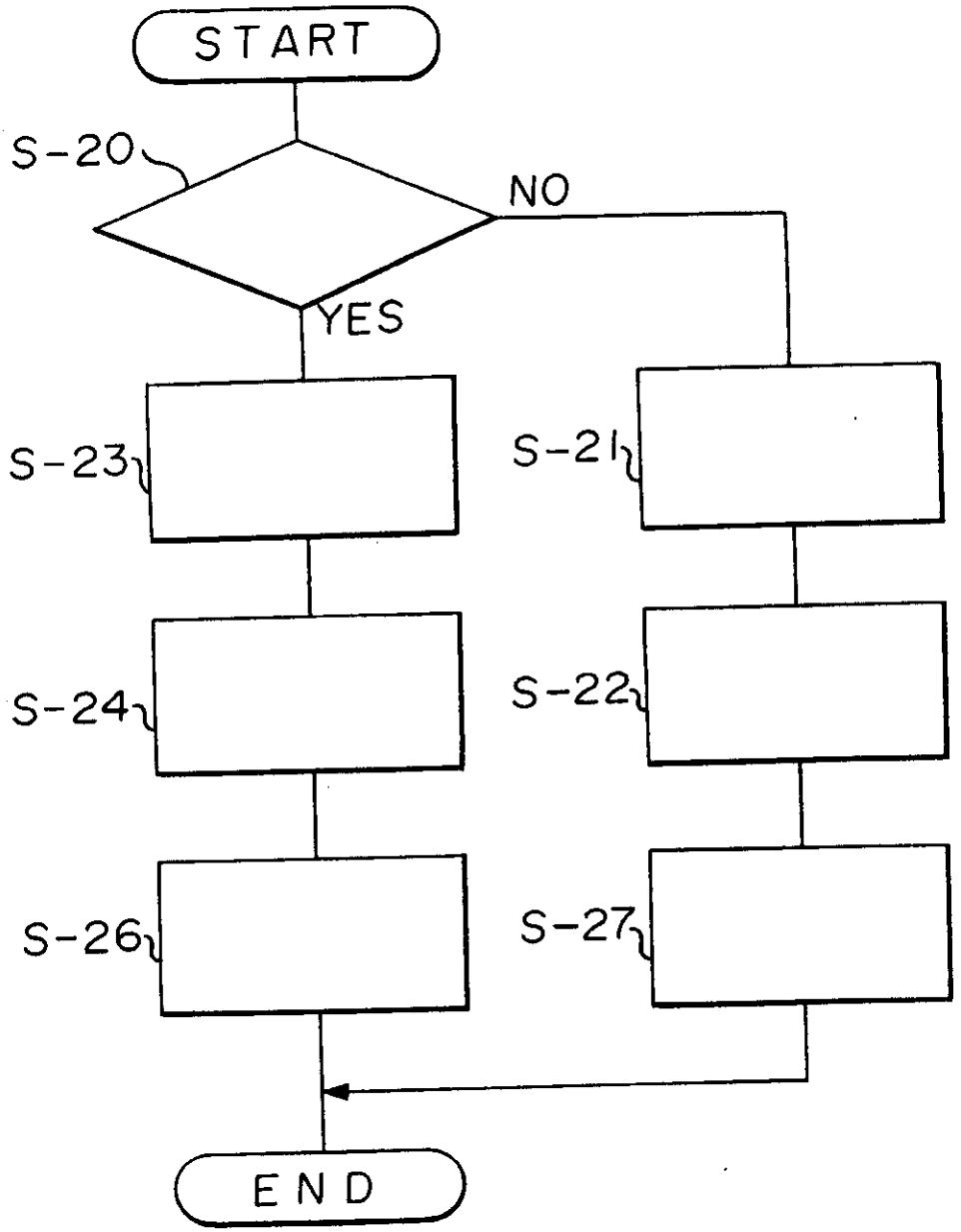


FIGURE 5

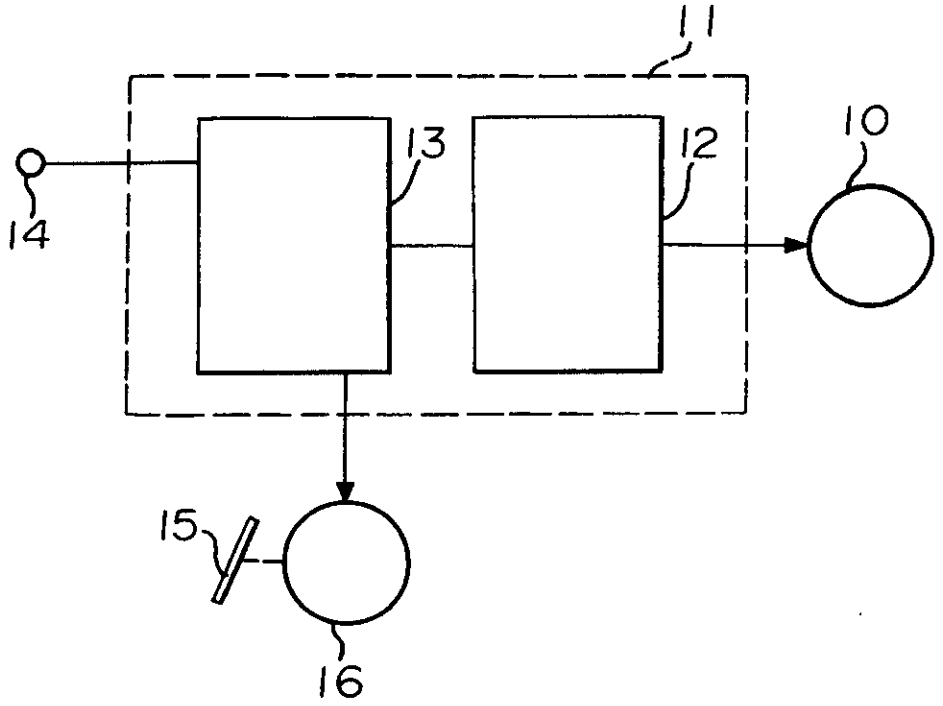


FIGURE 6

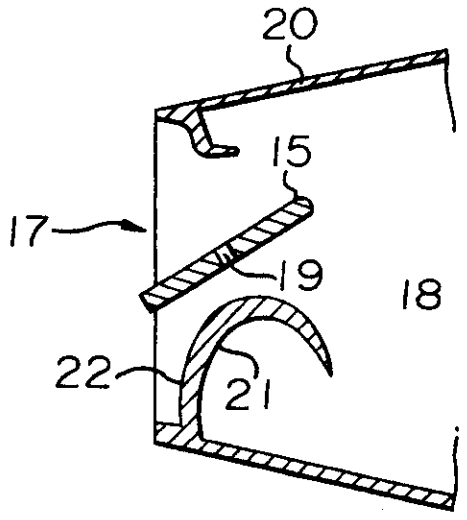


FIGURE 7

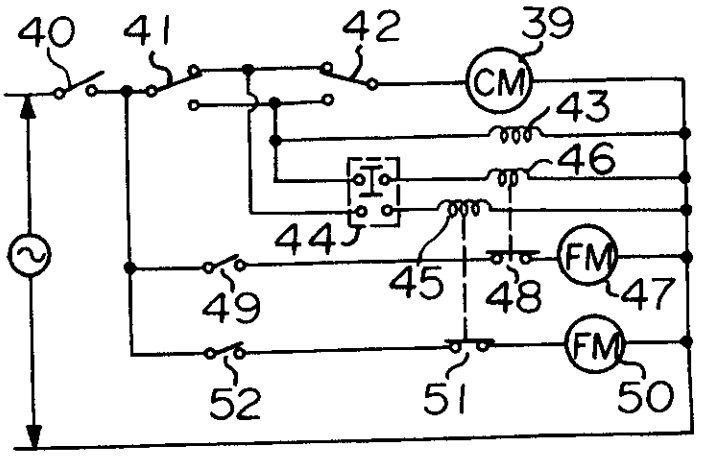


FIGURE 8

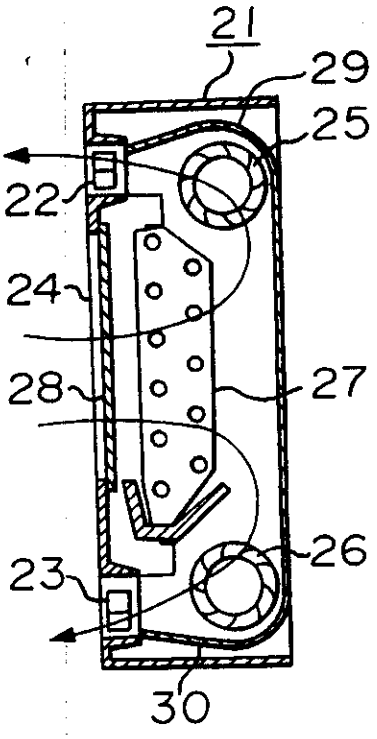


FIGURE 9

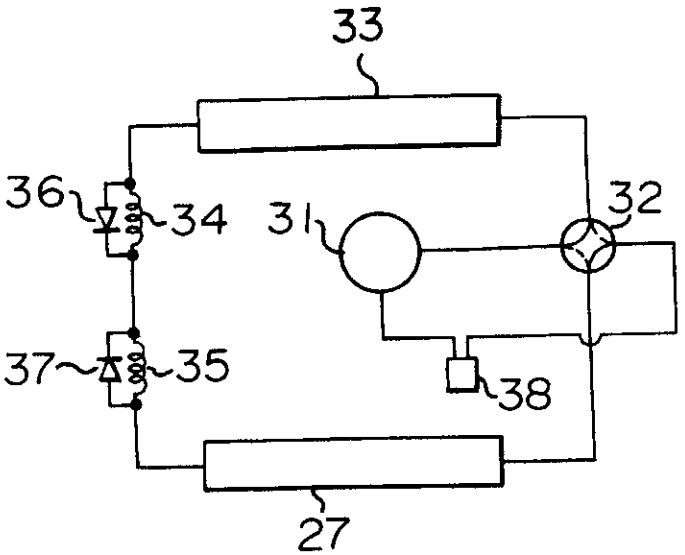


FIGURE 10

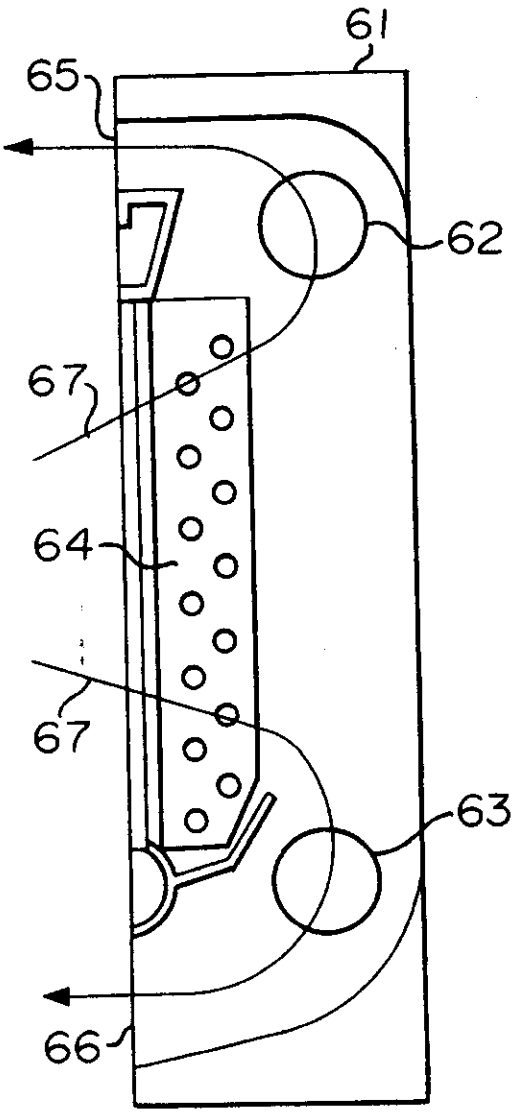
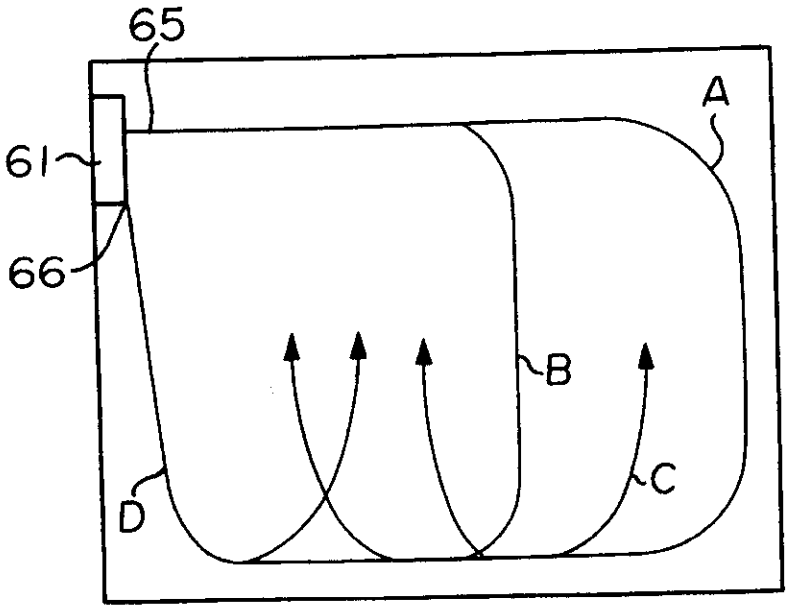


FIGURE 11



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18.03.1988 in Japan - doc: 63065182

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