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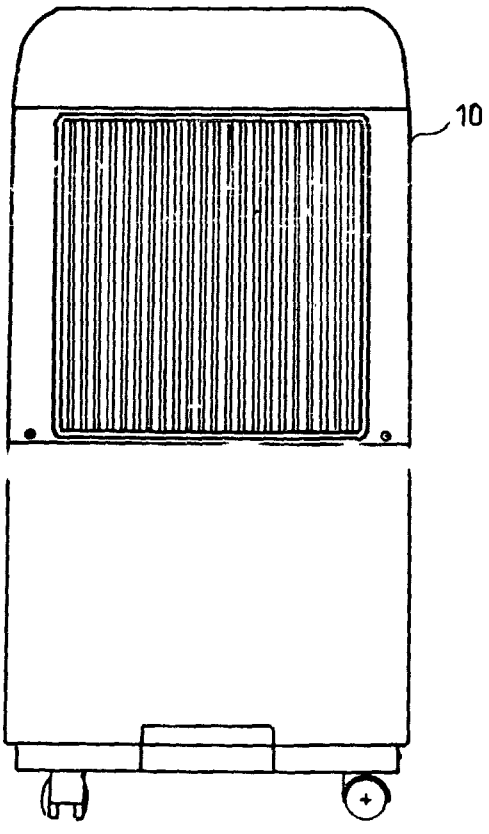
(54) **Title:** A METHOD AND DEVICE FOR RECOVERY OF WATER FROM THE ATMOSPHERIC AIR



(57) **Abstract:** The device for recovery of water from the humid atmospheric air has in combination an air filter filtering particulates and other contaminations in the humid atmospheric air. Suction means sucks atmospheric air into the air filter. An evaporator receives sucked humid atmospheric air, and transforming the humidity into vapour. A condenser in combination with compressor circulates refrigerant, receives and transforms the vapour into liquid. A water collecting tray for collects the vapour transformed water. A water filter filters water collected in the water collection tray. A container stores the filtered water. Discharge means for collected water.

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A METHOD AND A DEVICE FOR RECOVERY OF WATER FROM THE ATMOSPHERIC AIR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the field of extracting potable liquid, from the atmospheric air and a system therefore. More particularly, the invention is on extracting potable water from the atmospheric air, irrespective of pollution level, and a device therefore.

2. Description of the Related Art

It is not a secret that atmospheric air contains water in varying proportions at different seasons, and goes unused. Water is essential requirement for all living beings and other applications. Due to industrialization and other developments, water in the well, river, ponds and such other places has become extremely contaminated, and unhygienic for using for potable purposes. Consuming contaminated water causes diseases, and becomes health hazard. In residential premises, offices, factories and other work places, potable water requires to be stored from the mains supply wherever available and in case of non-availability of mains supply, have to depend on well water or river water supply. Therefore, water supplied by all sources requires to be treated by heating, filtering and other method of

purification for potable purpose. For treating contaminated water for potable purposes, there are water-treating devices are available. Popular among the water treating device are those using anion exchange resins and ultra violet treatment, which are installed on-line. These devices though treat water during their initial period of installation, they require periodical maintenance and repair, for which they frequently have to be removed and re-installed. Removal and re-installation requires skilled labour and also in terms of money. Moreover, on-line installed water treating devices require flow of water in the mains supply. No water in the mains, no treated water.

SUMMARY OF THE INVENTION

One of the objects of the invention is to render availability of pure and potable water irrespective of availability of water in the mains supply.

Another object of the invention is to make available pure potable water in any place, irrespective of availability of water supply and/or electricity, or conventional or unconventional energy.

Another object of the invention is to make available optimum amount of pure and potable water involving no health hazard for human beings and other living beings.

With above said objects among others, the invention provides a method and a device for recovery of bacteria-free and safe potable water from the atmospheric air. The device for recovery of bacteria-free and safe potable water from atmospheric air envisaged according to the invention draws warm humid air from the atmosphere into it's evaporator coils. Temperature of the atmospheric air drawn into the device of the invention is reduced to below the dew point condition and the water is collected on the condenser coil. During the condensation of the water, as the water vapour in the air gets transformed into liquid, latent heat is generated, which heat is collected by a refrigerant system along with the heat taken from the entering air stream. Along with the latent heat, the energy used to operate the compressor heat is then transferred by the refrigerant system to the condenser coil of the device, where it is added back into the air stream. Temperature of the discharged air is approximately 18°C - 20°C higher than the atmospheric air. The water vapour transformed into liquid form and deposited on the condenser coil drops into a collecting tray, which is made to pass through a metallic fine mesh filter, or other filtering device, before collecting into water container.

The recovery of pure and potable water from the atmospheric air comprises steps of filtering atmospheric humid air and feeding into a condenser, condensing and transforming water vapour in the filtered

air to liquid, i.e. water, collecting the water in a vessel, filtering of the water, and withdrawing filtered water for ultimate use.

The device for recovery of pure and potable water from the atmospheric air comprises in combination, at least an air suction unit, an evaporator, a condenser, a compressor, water collecting unit, water filter and control circuit for regulating recovery of water, and built into a compact and portable unit.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

In accordance with one embodiment of the present invention, a method and a device for recovery of water from humid atmospheric air is disclosed. The method envisaged according to an embodiment of the invention comprises the steps of blowing of the humid atmospheric air into a filtering device, where dust and unwanted particles in the air are filtered. The filtered air is fed into a condenser coil for transformation of the water vapour in the humid air into liquid, i.e. water, in a vessel or the like container. Passing the water so transformed through water filtering device, water purification device and cooling device, to ensure safety, and then drained for potable or other purposes.

In accordance with one embodiment of the present invention, a device for recovery of water from the humid atmospheric air is disclosed. The device for recovery of water from the humid atmospheric air comprises in combination at least one air filter, for filtering particulate and other contaminants in the air. Suction means for sucking atmospheric air into the air filter. An evaporator receiving the atmospheric air sucked-in by the suction means, which transforms humidity in the atmospheric air into vapour. A condenser receiving the vapour from the evaporator, and transforming the vapour into liquid form, i.e. water. A liquid collecting tray-collecting water produced by transforming the vapour into liquid by the condenser. Devices for filtering water, purification by disinfecting, and cooling the vapour transformed water. A water-collecting tray collecting vapour transformed water. An outlet for discharging of the filtered and disinfected water recovered from the humid atmospheric air.

The condenser comprises of a compressor with refrigerant composition for condensing of the water vapour in the atmospheric air sucked onto the condenser coil.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying illustrative drawing,

FIG. 1 is an illustrative block diagram of the device for recovery of water from the atmospheric air, envisaged according to one embodiment of the invention.

FIG.2 illustrates a blown-up view of the device for recovery of water from the atmospheric air, shown in FIG.1.

FIG.3 illustrates a cabinet mounted on a trolley, enclosing the components shown in FIGs.1 and 2.

FIG.4 illustrates top view of the cabinet shown in FIG.3, and

FIG.5 illustrates lay out of the printed circuit board for opening the assembly shown in FIG.1.

In the illustrative drawings, 101 is a blower for feeding atmospheric air into the device, 102 is an air filter for filtering particular materials in the air, 103 is a suction unit sucking filtered air, 104 is an evaporator transforming water vapour into liquid, 105 is a condenser separating liquid from the air, 106 is a water collecting vessel collecting water from the condenser 105, 107 is a water filter filtering water collected in the vessel 106, 108 is a

container collecting filtered water from the vessel 106, and 109 is an outlet for dispensing water from the container 108.

FIG.2 is a blown-up view of the device for recovering water from the humid atmospheric air. Blower 101, air filter 102, suction means 103, evaporator 104, condenser 105, water collecting vessel 106, water filter 107, container 108 and water outlet 109 are assembled and enclosed in a compact body 10, comprising a cabinet top cover 110, a chassis 111, a cabinet 112 and a front panel 113.

Blower 101 comprises of a housing 114, fan motor 115, fan blower 116, and nut 117 for securing blower 116 with the motor shaft 118. 119 is an air filter conveniently positioned within the body 10 to filter particles and other contaminating matters in the air blown by blower 101. Suction means 103 comprises of a suction pipe 120, which sucks the filtered air from the filter element 119 and feeds into an evaporator 121. In the evaporator 121 the water content in the atmospheric air transforms into vapour form, which is fed into a condenser 122. The condenser 105 comprises of coiled body and is in communication with a compressor 123, and contains refrigerant compositions. The refrigerant composition is circulated onto the coils of the condenser 122. 130 is the discharge tube, 131 is polyethylene sponge tube, 132 is capillary tube, 133 is charge tube, 134 is dryer of

the compressor assembly. The water content of the atmospheric air in the form of vapour impinge on the condenser coils and transforms into liquid. When the water content of the atmospheric air (humidity) is separated, the air becomes hot, and the hot air is discharged from the condenser 122. The liquid accumulating on the condenser coils (not shown) drops down, which is collected in a water collection tray 106. The collection tray 106 comprises of a drain pan 124, partition bucket 125, plate bucket 126, tank 127 and a floater 128. 129 is a handle provided with the tank 127. Filtered water accumulated in the container 108 is drawn out from the outlet (not shown) for end use, such as, potable purposes.

The top cover 110 of the body 10, includes lamp sets 135, printed circuit board PCB) 137, and humidity sensor 136. Lamp sets indicate operative and/or inoperative condition of the device, whereas humidity sensor 136 senses the ratio of humidity in the atmospheric air. 136 is a decorative plate on the top cover 110, and 137 is a handle for lifting the top cover 110.

Chassis 111 is a mounted on coaster wheels 135, which facilitates smooth movement of the device from place to place.

It is explicitly understood that though a preferred embodiment of the invention is discussed and illustrated, the applicant intends to include all the variations of the invention within the scope of appended claims.

What is claimed is:

1. A method of recovering water from atmospheric air comprises the steps of blowing of the humid atmospheric air into a filtering device; feeding the said filtered air into an evaporator for transforming water content in the air into vapour; impinging the said vapour from the evaporator upon the condenser coil for transformation of the water vapour into liquid, i.e. water drawn in drops; filtering the said water collecting in drops; and filtering the said water before withdrawal for end use.

2. A device for carrying out method of recovering of water from the humid atmospheric air as claimed in claim 1, comprises in combination at least one air filter filtering particulates and other contaminations in the humid atmospheric air; suction means for sucking atmospheric air into the said air filter; at least one evaporator receiving said sucked humid atmospheric air, and the said condenser transforming the humidity into vapour form; at least one condenser in combination with compressor circulating refrigerant, receiving and transforming the said vapour into liquid; at least one water collecting tray for collecting the vapour transformed water from the condenser; at least one water filter filtering water collected in the said water collection tray; a container for storage of

filtered water; and means for discharge of the said collected water from the device.

3. A device as claimed in claim 2, wherein a water purification device is provided for purification of the water collected in the said collecting tray.

4. A device as claimed in claim 2 or claim 3, wherein a water cooling system is provided for cooling of the water collected in the said collecting tray.

5. A device for recovery of water from the atmospheric air as claimed in claim 2 wherein a humidity sensing device is in-built to ascertain the humidity ratio in the atmospheric air.

6. A device for recovering of water from the atmospheric air as claimed in claims 2 or 3 wherein the filter for filtering of collected water is in-built with the collecting vessel.

7. A device for recovering of water from the atmospheric air as claimed in any of claims 2 to 4 wherein overflow discharge means is provided with the container receiving filtered water.

8. A device for recovering of water from the atmospheric air as claimed in any of claims 2 to 5 wherein ON/OFF indicator is provided to ascertain the operative and/or inoperative condition of the device.

9. A device for recovering of water from the atmospheric air as claimed in claim 6 wherein the said ON/OFF indicator are light emitting diodes [LEDs].

10. A device for recovering of water from the atmospheric air as claimed in any of claims 2 to 7 wherein the device is mounted on coaster wheels for smooth movement from place to place.

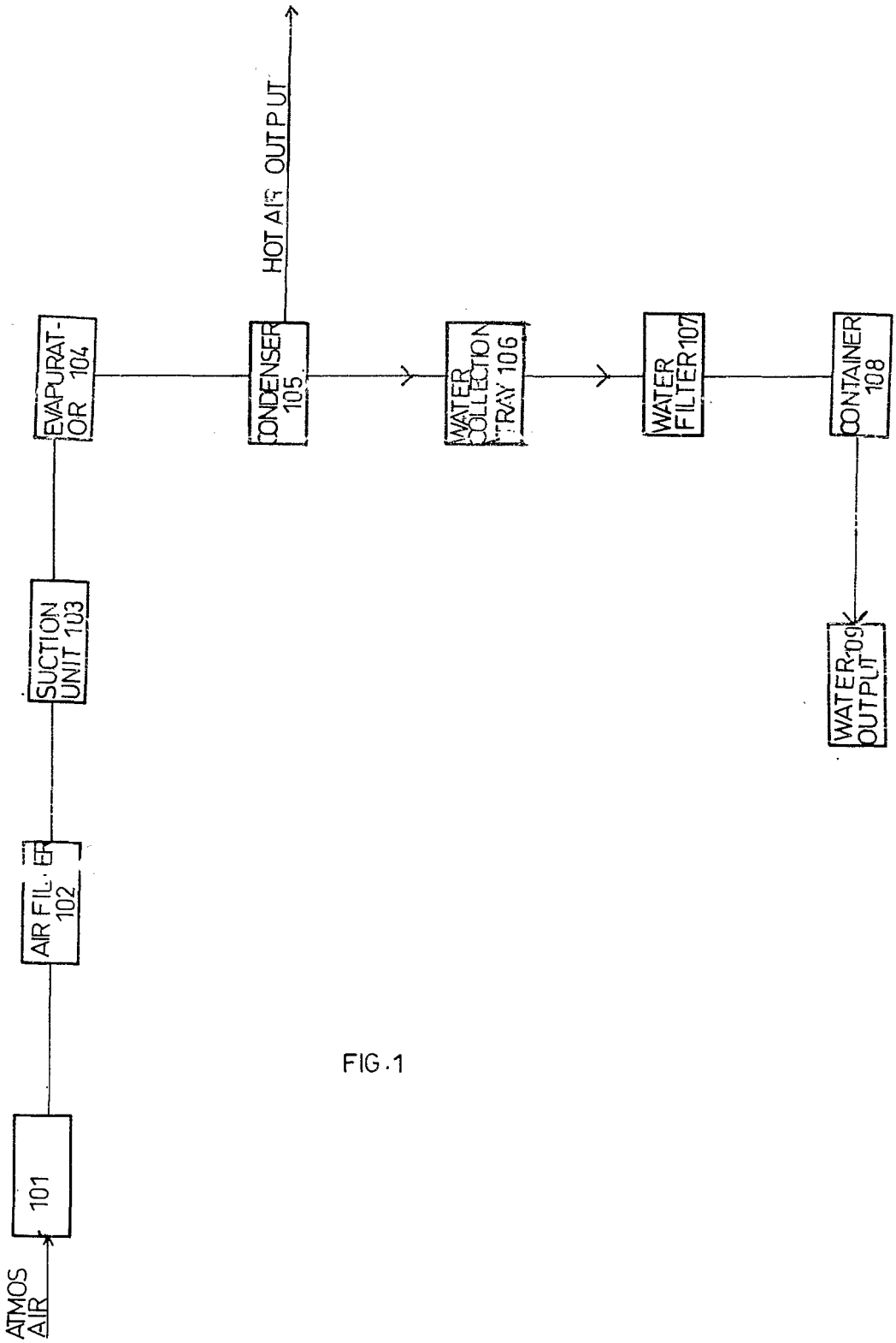
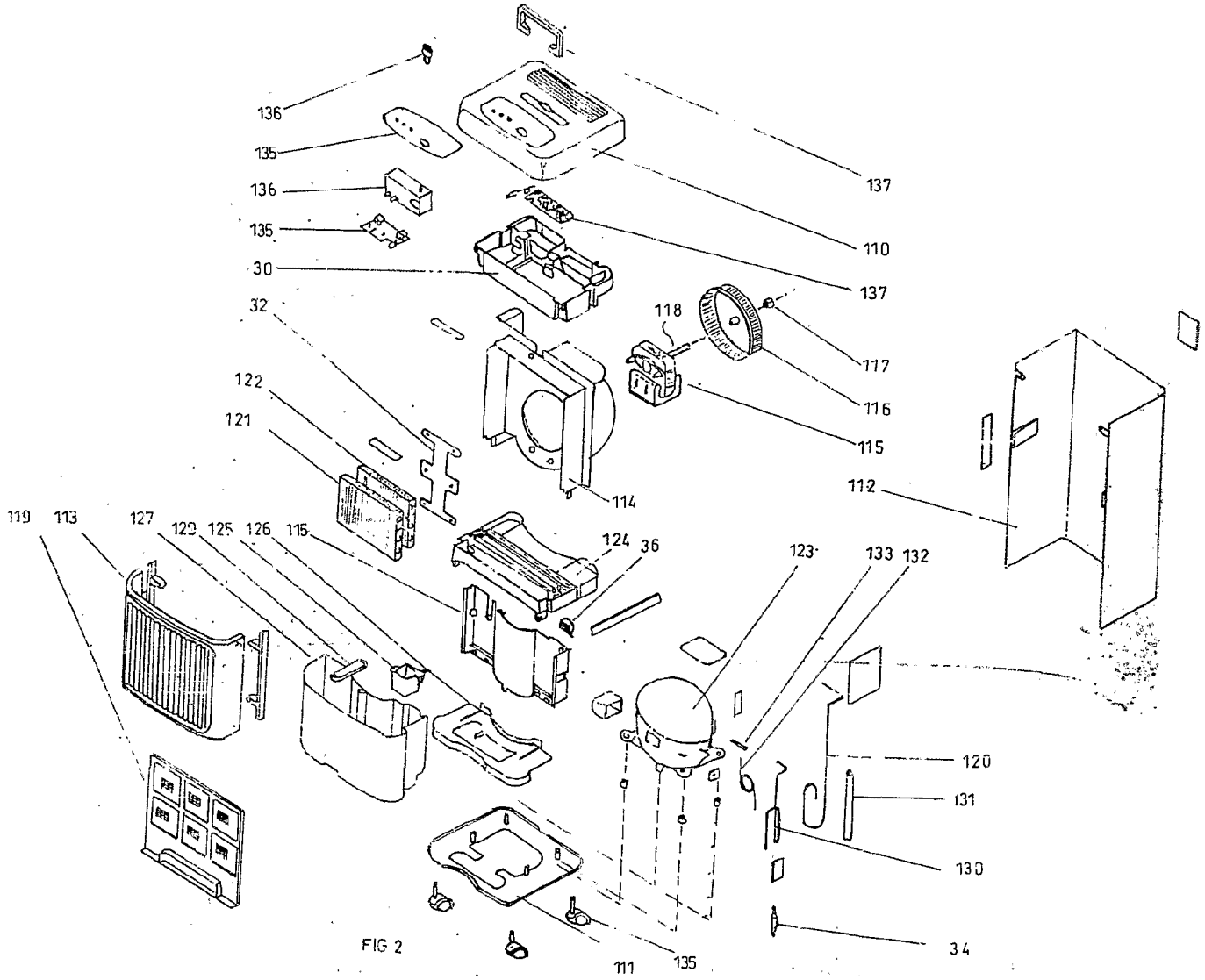

ATMOS AIR
101
AIR FIL-ER 102
SUCTION UNIT 103
EVAPURAT-OR 104
CONDENSER 105
HOT AIR OUTPUT
WATER COLLECTION TRAY 106
WATER FILTER 107
CONTAINER 108
WATER OUTPUT 109

FIG.1


136
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111
135

FIG 2

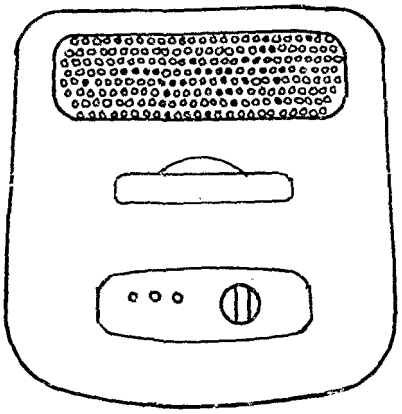

Fig 4

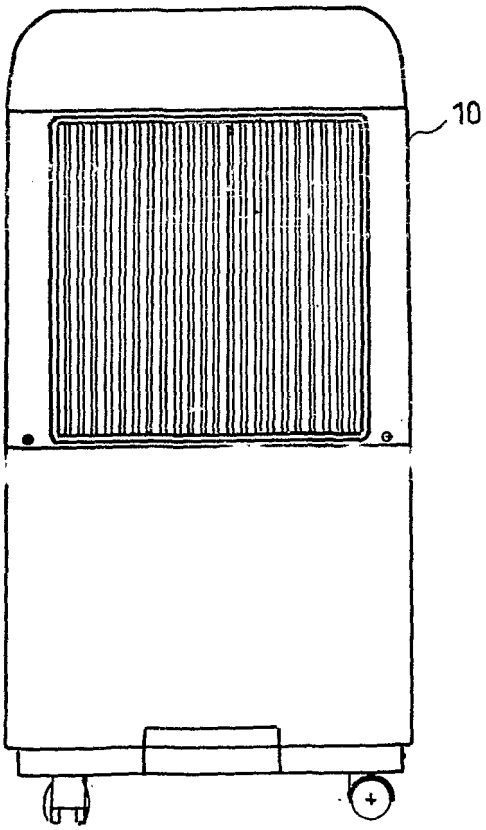

Fig 3

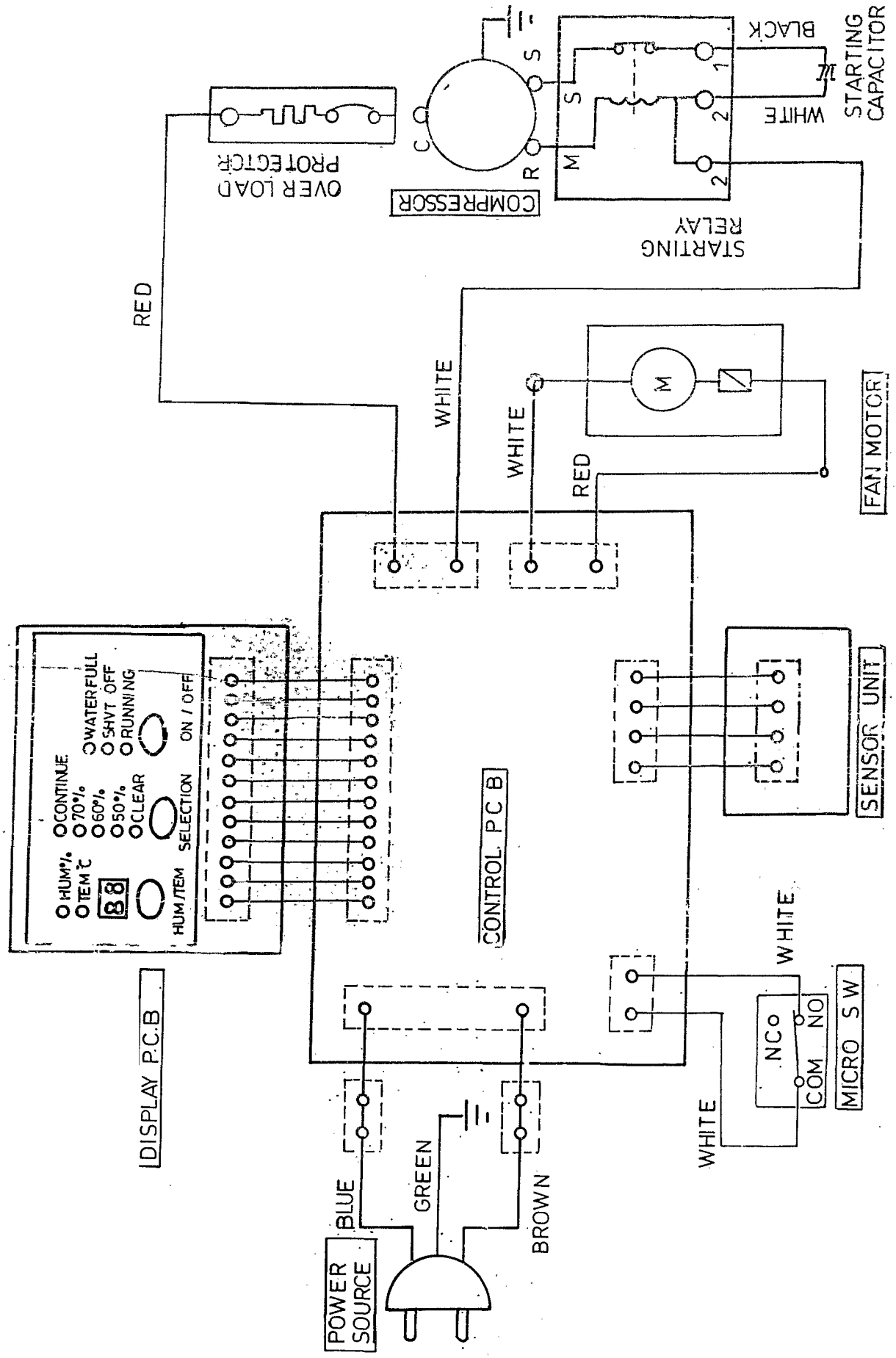
STARTING CAPACITOR
BLACK
WHITE
S
C
R
M
COMPRESSOR
OVER LOAD PROTECTOR
STARTING RELAY
RED
WHITE
WHITE
RED
FAN MOTOR
SENSOR UNIT
CONTROL P C B
DISPLAY P.C.B
HUM%
TEM°C
CONTINUE
70%
60%
50%
CLEAR
WATER FULL
SHUT OFF
RUNNING
ON / OFF
HUM/TEM SELECTION
WHITE
NC
NO
COM
MICRO S W
WHITE
BLUE
GREEN
BROWN
POWER SOURCE

FIG. 5