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## (54) Non-pollution steam boiler.

(57) This invention relates to a non-fuel and non-pollution steam boiler taking advantage of the long waves of a Laser as a heat energy source to generate steam in a boiler. The integral equipments contains 1. a Laser transmitter which includes a set of storage batteries to provide high voltage, via vibrator, to emit an intermittent pulse laser through ruby or carbon dioxide to achieve an energy of heat. 2. a unit of heating unit that can entirely receive heat energy from light of laser. 3. a similar to conventional fire-tube steam boiler at the bottom of which are installed heating unit in small pipe/pipes instead of fire-tube. 4. an electrogenerator driven by steam turbine specially to charge storage battery.

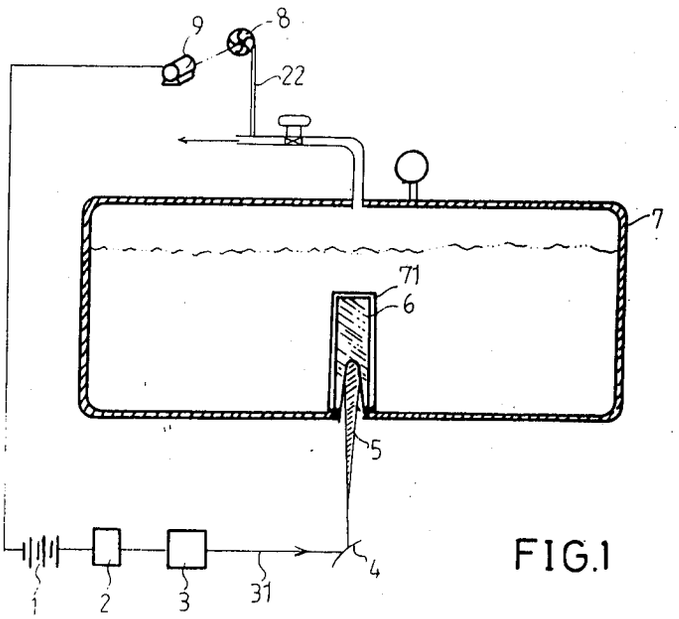


FIG.1

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This invention of non-pollution steam boiler is different from a conventional steam boiler which procures heat-energy from burning materials, it exhausts heavy smoke and toxic gas so as to effect environment badly; moreover, petroleum energy get out of order from supply and demand due to the cause of political and military problem that makes energy crisis at times. In order to get rid of such problem on energy crisis and environmental pollution, the inventor in view of the fact studies diligently with quiet mind, finally the inventor created the new idea and constructur of non-pollution steam boiler after many times of experiment. It is a great achievement in the history of development of steam boiler. In order to specify further to the examinator, the inventor describes it as follows:

A. the new idea for non-pollution steam boiler is taken adventage of energy source from infrared rays of laser to provide heat for a boiler instead of conventional burning materials, the key point is that the water in boiler can not accept heat direct from laser, the heat should be by means of a medium of heating-unit which can accept heat of laser to transfer that heat to be accepted by the water in boiler. This heating unit, therefore, has to be accompanied with 3 conditions as following.

a). The heating unit is able to directly accept heat from laser and to accept the heat as higher percentage as possible.

b). The heating-unit should be made of a good conductor with conductivity for heat as higher as possible.

c). The material of the heating unit with a higher melting point but should not be higher than that point of boiler steel.

In view of above-mentioned conditions, the best material of an alloy made from brass and silver with good conductivity is the most suitable material for the heating unit.

The means of transforming heat by heating unit is one of main equipments in this invention.

B. First this invention adopts the light of laser transmitter owing to the use of heat energy generated by the long waves of carbon dioxide infrared light of laser or by the long waves of ruby light of laser.

Secondary, this invention adopts heating by light of laser to the heating unit which radiates the heat directly to the water, which accept the heat from light of laser not for cutting or fusion; thus, the beam of laser needs not to focus on the heating unit which requires adequate big amount of pulse waves.

C. This invention adopts steam boiler entitled it is similar to conventional fire-tube steam boiler but it adopts one or several pipe(s) in which a concave heating unit is set, to accept heat energy from light of laser, the most high temperature from light of laser is concentrated and transfered in a very short time into the water, and fast convection comes to the boil, without large area as conventional steam boiler to accept heat.

As for these facilities such as water feed, water softening insallation, water level gauge, pressure meter, thermometer, and release valves should be equipped but boil flue, uptake, chimnel, electrostatic dust collector, filter, and installations for environmental protection are no more needed that saves a lot of money.

D. To use small part of steam from the said boiler transports to drive turbine for electro-generator to charge storage battery.

## DRAWINGS:

Fig. 1 is a schematic drawing of a pollution-free steam boiler according to the present invention;
Fig. 2 is the ultra-high voltage pulse generating circuit diagram;
Fig. 3 is the electric network circuit diagram;
Fig. 4 is the transistor circuit diagram;
Fig. 5 is a rectangular heat source performance chart; and
Fig. 6 is a perspective view illustrating the arrangement of the present invention (Picture).

## NUMBER CODES:

(1) Storage battery;
(2) Oscillator coil type of ultra-high voltage generator;
(3) Laser generator;
(31) Laser;
(4) Reflector;
(5) Laser beam;
(6) Heat element;
(7) Boiler;
(8) Steam turbine;
(9) Electric generator;
(71) Small cylinder;
(72) Steam pipe.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

Referring to Fig. 1, 12V lead batteries are used for the storage battery 1 (because of the properties of high output capacity, high durability, high stability and low cost) to provide the oscillator coil type of ultra-high voltage generator 2 with a low voltage current so as to drive it to produce a high voltage over 25,000V which is sufficient to energize a flashing tube to generate laser. The energy from power source to the pumping light is treated through an

enabled circuit (TVig). Because the air pressure in the pumping light is very high, ultra-high voltage pulse is required to pass through the air pressure and cause it to produce glow discharge so as to induce an arc light to discharge. Therefore, ultra-high voltage pulse generating circuit is required. Fig. 2 illustrates an example of capacity charge charging power supply. Pumping light working voltage for continuous laser operation is generally provided at 100V; other current at 30-50A; continuous power supply at 200-500V; DC voltage stabilized at 20-60A; DC output power supply is treated through a three phase rectification process by means of a silicon controlled rectifier (SCR) so as to regulate output voltage value and the value of the discharged current from the pumping light. Pulse power supply is cycling from full load to no load. The power supply output at full load is similar to short circuit. It is comprised of transforming, rectifying, surging, energy storage and discharging circuit, enable and control system, forming into an electric network as shown in Fig. 3. The main circuit is a DC high voltage rectifying and charge charging device. High voltage pulse capacitor is used as an energy storage element to ensure stabilized DC high voltage output and to regulate voltage value within 0-2500V. The electric energy for every pulse output is:

P = 1/2CV2 (C: capacity; V: voltage)

Fig. 4 illustrates an example of transistor circuit to obtain a high voltage (20-40KV) from a lower voltage power supply (12V).

The aforesaid statement indicates the procedure and program in generating electric energy according to the present invention. The electric energy thus generated is sent to a heat element 6 which has a light sensitive portion to absorb laser power and convert it into heat energy. The heat conducting alloy of the heat element 6 is to protect against heat damage (anti laser). The light sensitive portion of the heat element 6 may be made in a conical shape, the front end of the heat element 6 may be made in a spherical shape or darkened to increase its incident energy absorbing capability.

Laser heating is provided by an oscillator. Laser beam is focused into a high energy density of minor pot acted onto the heat element (workpiece) causing it to evaporate. The improved rectangular heat source provides better performance as shown in the rectangular heat source performance chart in Fig. 5.

According to the definition of temperature distribution in Gauss's form of heat energy distribution,

$$d = \frac{Do}{f} \times Z$$

wherein: Do is the diameter of the 1/e2 forming a parallel beam; f is the focus of the lens; Z is the deviation from the focus. In the calculation, the maximum surface temperature does not exceed the melting point which is designated as the upper limit temperature. All heat sources are compared under this point of view and, carbon steel is used as the preferable material.

The heat source formed through the aforesaid radiant energy is sent to the heat element 71 of the boiler 7 to produce steam which is then guided through steam pipe to drive the steam turbine 8 to carry the electric generator 9 to generate electricity for charging the storage battery 1. This circulation is repeated again and again. Through this circulation, the steam boiler works efficiently without consuming any fuel and therefore, it does not cause any pollution problem. The installation of the steam boiler is shown in Fig. 6 (picture).

Advantages of the invention.

(a). Use no fuel or coal, no flame and smoke, no pollution.

(b). Save energy: (1) Although energy source from light of of laser has to supply high current voltage for flash tube to stimulate active material ( such as ruby or carbon deoxide), yet the most energy comes from active material, as nergy level lowers down, the photons are released out and enlarged by several reflections to achieve more large energy, as a matter of fact consumption of the electrocity is limited.

(2) efficient use of energy, the heat from light of Laser can be accepted and used up to 90% or more, in comparasion with conventional Steam boiler in which the boiler inlet, furnace, boiler flue, and funnel flue are lost considerable partion of heat, above all in chimeny.

(c). Lower costs: in spite of the non-pollution steam boiler which are equipped with one or several sets of laser installation are still more economical than that costs of conveyor and refactory materials used in boiler flue, funnel flue, furnace, etc. in addition to protective installations for environmental pollution.

(d). In general, this invention of non-pollution steam boiler is a revolutionary invention and a big achievement to save costs and energy; moreover, to have merits to the environment.

## Claims

1. The nature is a non-pollution steam boiler taking advantage of heat from light of laser instead of fuel or coal burning in furnace for conventional steam boiler. The main apparatus consist of one set or several sets of Laser transmitter to emit light of laser onto the heating unit(s) which is/are made by alloy with good conductor of heat and which is/are set up in pipe(s) to be able to accept heat over 90 % from light of laser, and rise temperature and conduct heat in a very short time to the entire water coming to the boil in the boiler , and generate vapor and transport a part of steam to drive an electro-generator for charging storage battery so as to make up consumption of the power on emitting light of laser. this circular running keeps systematic operation endless.

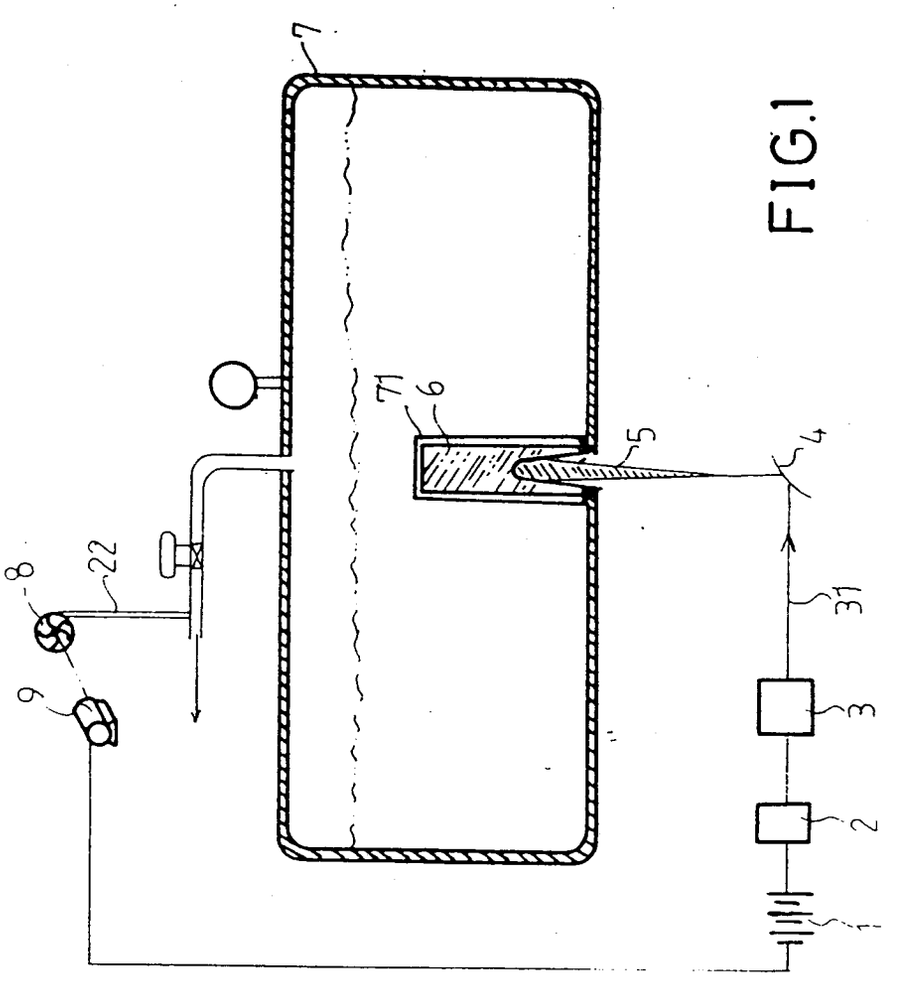


FIG.1

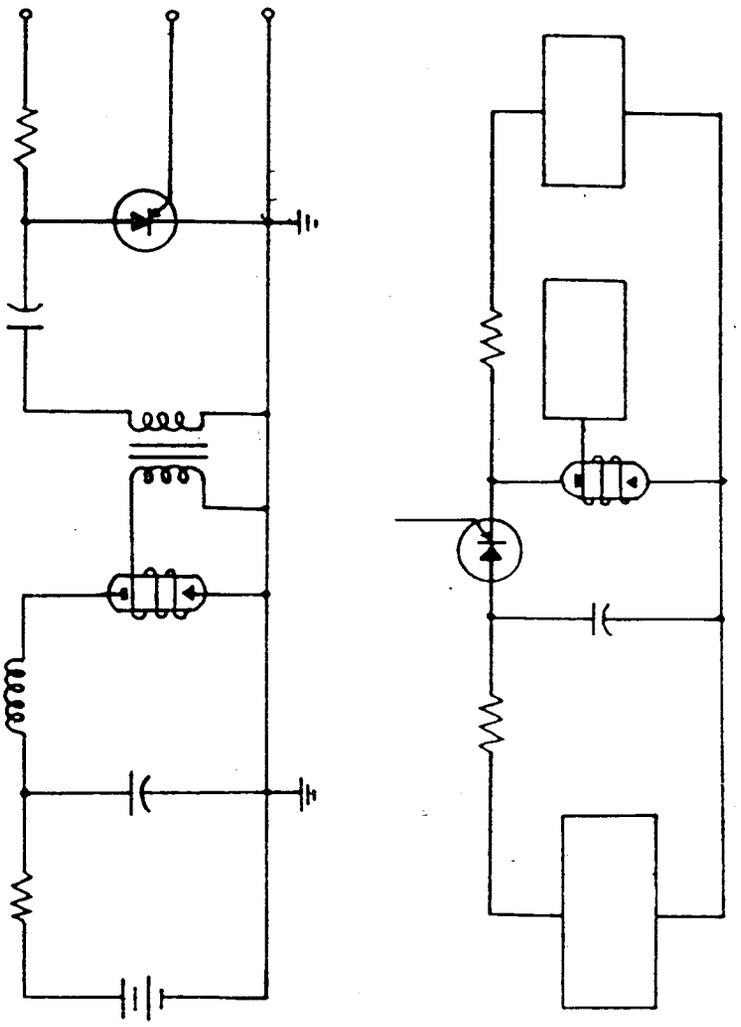

FIG.2

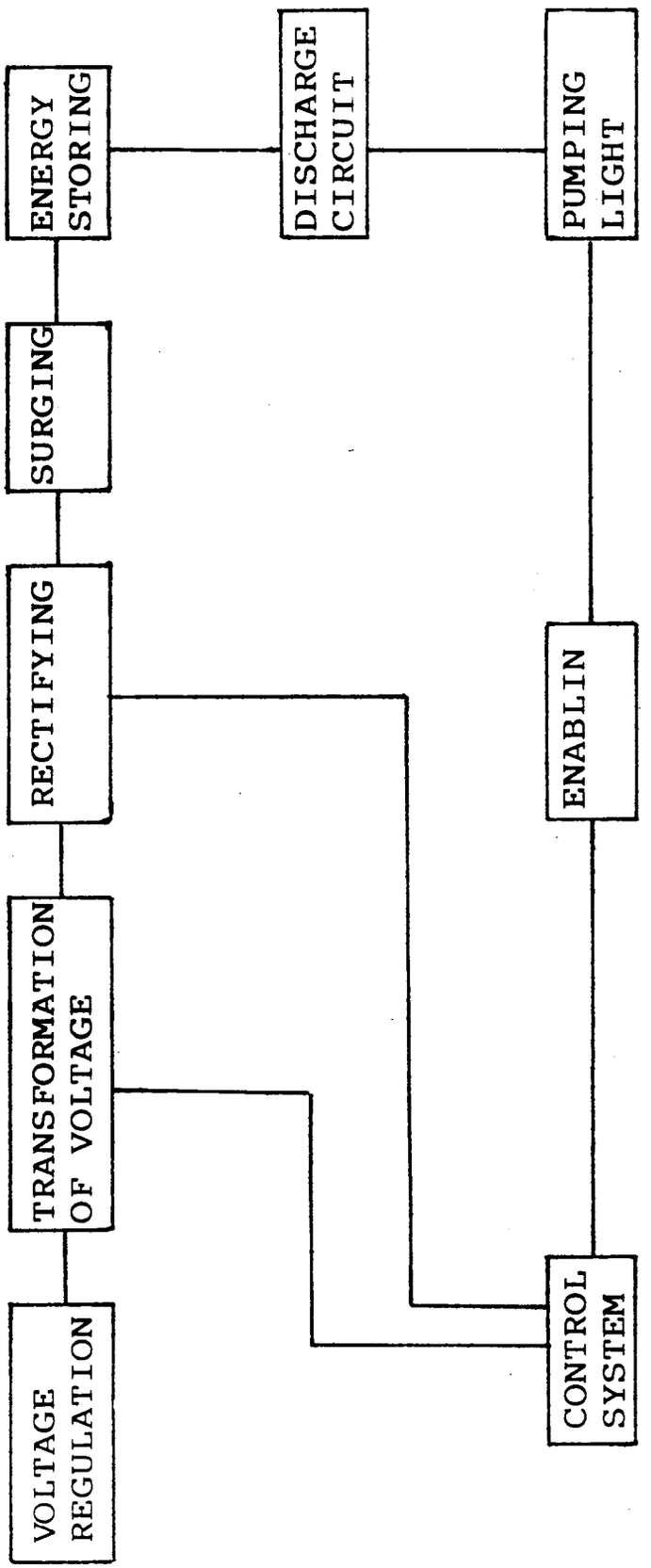
VOLTAGE REGULATION
TRANSFORMATION OF VOLTAGE
RECTIFYING
SURGING
ENERGY STORING
DISCHARGE CIRCUIT
PUMPING LIGHT
ENABLIN
CONTROL SYSTEM

FIG.3

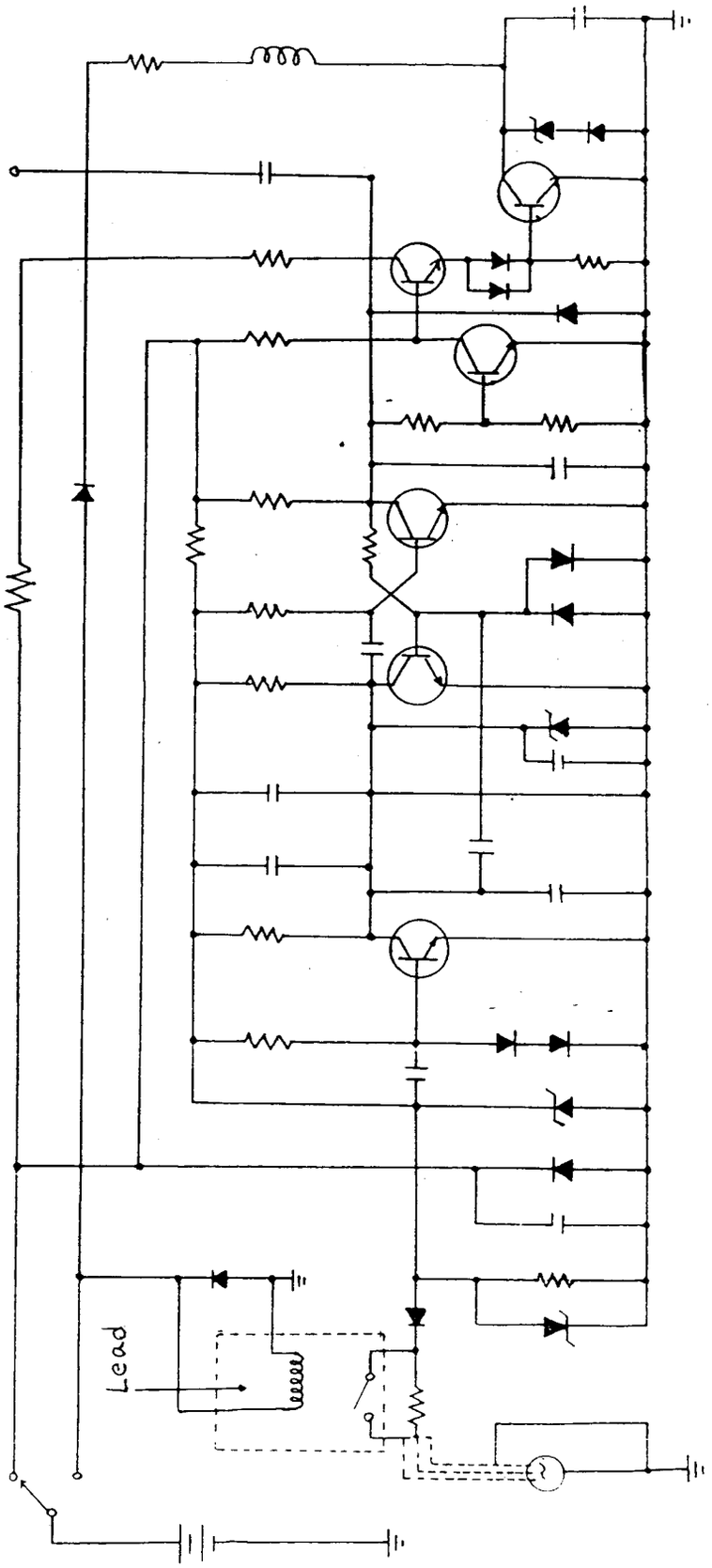


FIG.4

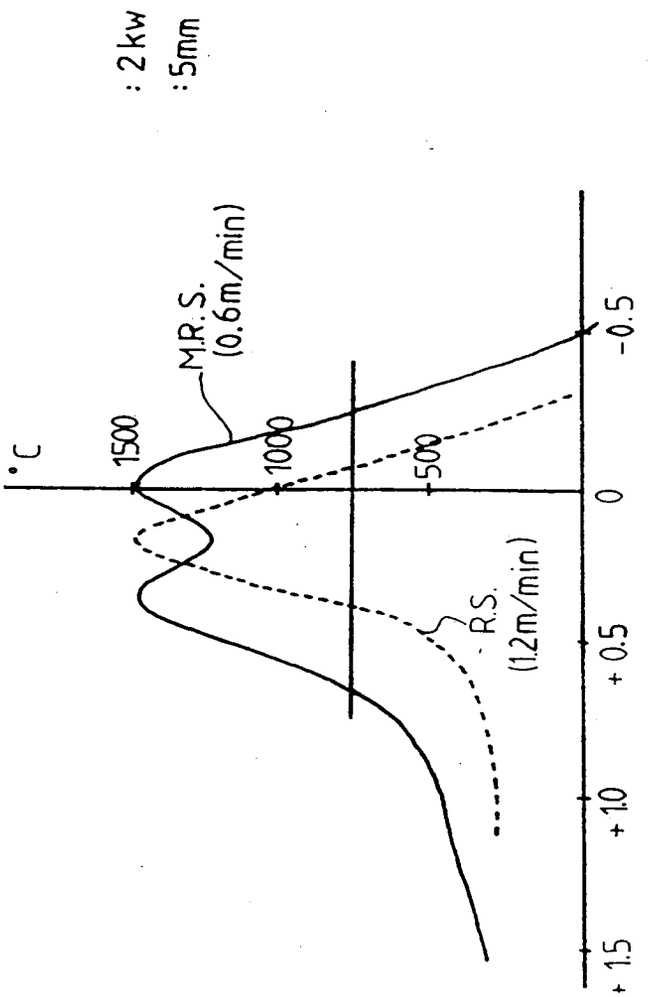


FIG.5

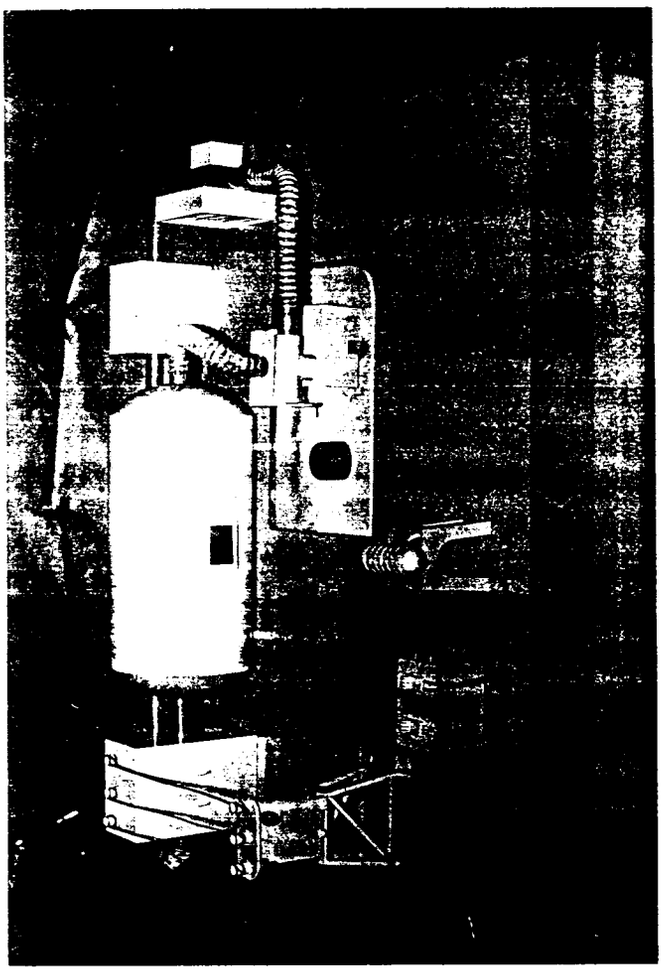

FIG.6

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# EUROPEAN SEARCH REPORT

Application Number

EP 92 10 0686

## 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.5 ) |
|---|---|---|---|
| Y | US-A-4 644 169 (HUNT)<br>* column 2, line 45 - column 3, line 52; figures *<br>--- | 1 | F22B1/00 |
| Y | US-A-3 977 198 (BERRY)<br>* abstract; figures *<br>--- | 1 | |
| A | US-A-4 658 115 (HEATH)<br>* column 3, line 10 - column 4, line 47; figures *<br>----- | 1 | |

TECHNICAL FIELDS SEARCHED (Int. Cl.5 )

F22B
H01S
F24H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 11 SEPTEMBER 1992 | VAN GHEEL J.U.M. |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

& : member of the same patent family, corresponding document

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