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# (54) SYSTEM FOR EXPLOITING THE TOTAL VITROCERAMIC COOKING SURFACE

(57) A system to make good use of the whole surface of vitroceramic plates for cookers, comprising the incorporation of multiple resistances (2) arranged under the plate (1) and connecting only those which are situated under the base of the container (6) placed on the plate (1), using multiple wave emitters (3) and wave receivers (4), as well as resistances (2), the waves being either electromagnetic waves, radiofrequency waves, audiofrequency waves, or light waves, regardless of the spectrum thereof, such as infrared, ultraviolet, visible light or laser beam, so that the receivers detect the emitter waves which bounce onto the container base located on the plate, and interconnecting apropriate resistances.

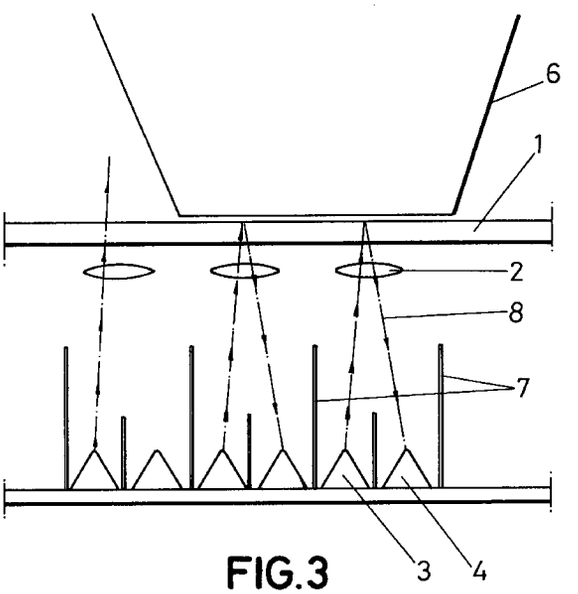


FIG.3

EP 0 831 675 A1

## Description

### BACKGROUND OF THE INVENTION

The system to make good use or availability of the whole surface of vitroceramic plates for cookers, as proposed by the invention, constitutes per se an evident novelty in its application field, since a total good use of the plate surface is obtained, as well as an energetic saving when turning it on or when acting only and exclusively on the plate area having a circular surface corresponding to the base of a receptacle placed on it, and only and exclusively when said receptacle is placed on the vitroceramic plate, ceasing heating when the own receptable is not placed on said area.

### FIELD OF THE INVENTION

This invention will find application in the industry destined to the manufacture of vitroceramic plates or similar.

### RELATED ART

At present, vitroceramic plates usually formed starting from four heat emitting sources having different sizes are known.

Among several disaventages, they present a limitation of emitting heat over the diameter of the connected resistance, whichever it is the base surface of a receptacle placed on it, which results in a poor energetic availability, and receptacles having large surcas at their bases cannot be heated because the heat cannot be uniformly distributed over the full surface of same.

The turning on of the vitroceramics of the last generation is made by induction, when a receptacle is placed on the vitroceramic plate surface, with the special feature that said receptacle must contain iron in its composition, that is to said, Fe, to be detected by magnets situated under the plate, and the heating area being also delimited.

The Applicant, on his part, has no knowledge about the existence of an invention fitted with the characteristics of same.

### SUMMARY OF THE INVENTION

The system to make good use of the whole surface of vitroceramic plates for cookers as proposed by the invention, constitutes per se an evident novelty in its application field.

In a most specific manner, the system to make good use of the whole surface of vitroceramic plates for cookers of the invention, is constituted starting from a plate of vitroceramic material, under which a number of adequate electric resistances are placed, which are distributed among a plurality of sites, so that the whole plate surface can heat a receptacle placed on any spot of same.

Each resistance operates through wave detection, which can be electromagnetic, radiofrequency or audiofrequency waves, or light waves whichever their spectrum may be; por example, infrared, ultraviolet, visible light or laser.

These waves are detected by a receiver, appropiate to each type of wave, placed under or close the resistance, so that this does not impede the wave reception which are threw by an emitter or emitters, located at the upper and external side of the vitroceramic plate, or located under the resistance together with the receiver.

If the emitter or emitters are located under the plate, the waves are detected to be reflected upon rebounding against the lower wall of the base of the receptacle to be placed on the vitroceramic plate.

If the wave emission is performed from outside, the absence of same in the receivers would be detected, as said waves don't pass through the receptacle.

In the above mentioned case, the wave emission must be performed from several sites separated in order to avoid shadows on the plate; for example, those produced by the receptacle handles or grips.

The vitroceramic plate can be divided, for example, into four portions or connection and control zones of temperature to independently use, only and exclusively, a part of the plate, if it is not necessary to utilize more surfaces, or else to use, in each zone, a different heat power.

In order not to alter the electrical consumption of the vitroceramic plate, a solution is that the utilized wave emitters do not act simultaneously, but in a stepped way, or in groups or rows, with an appropiate circuit such as, for example, a digital counter or a microprocessor- or microcontroller-controlled counter.

Likewise, the invention allows the vitroceramic plates, by means of an adequate connection, to operate in a similar manner as those existing at present in the - market, manually operating a determined zone of the plate, which normally has a circular shape, composed of several resistance..

An additional safety system would be to place a timing device between the moment of detecting the waves or the receiver, till the turning on of the resistance on which it acts.

It must be also pointed out that the invention has the advantage of being able to use receptacles having large base dimensions, heating it uniformly at all - points of same, and any other location of the vitroceramic plate being used, at the same time, if not occupied, if necessary.

Also, an important energetic saving could be obtained, by only using the punctual resistances located - just under the base of the receptacle, and only when the own receptacle is located on the resistances.

An additional advantage is configured by using this vitroceramic system by sightless persons, as it is only necessary to place the receptacle on any location of the

plate and to act on a main control, so connecting the invention with a high degree of safety and - comfort, this high degree being increased by the possibility of placing a timing device between the moment of the detection by the receiver, till the turning on of the resistance on which it acts.

## DESCRIPTION OF THE DRAWINGS

In order to complement this description and aid to a better understanding of the characteristics of the invention, the three appending drawing sheets, which are a part of this specification, show, by way of illustrative and non-limiting example, the following:

Figure 1 corresponds to a top plan view of the vitroceramic plate used in the invention, relative to a system to make good use of the whole surface of vitroceramic plates for cookers, showing the structure of a configuration relating to any of the resistances located under the plate.

Figure 2 shows a perspective view of an arrangement of the elements configuring the invention, in particular of the detection means for a receptacle base, according to the place where it is located on the plate.

Figure 3 shows, lastly, a detail about the manner in which the detection of the receptable base surface is made, by means of wave emitters and receivers.

## PREFERRED EMBODIMENT OF THE INVENTION

From these figures, it can be seen the manner in which the system to make good use of the whole surface of vitroceramic plates for cookers of the invention, is constituted starting from a plate of vitroceramic material (1), having resistances (2), located under the vitroceramic material plate (1), relying on a wave emitter (3), a wave receiver (4), controls (5), insulating walls (7), delimiting the emission and reception of waves, the receptacle placed on the plate being reference as (6), and the direction of the waves threw by the emitter being referenced as (8).

In a most definite way, the invention uses multiemitters (3) and multireceivers (4) of infrared (8), and each emitter (3) and receiver (4) assembly is only related to a resistance (2), having a circular configuration, located under the vitroceramic plate (1) for cookers.

In the embodiment illustrated in the drawings, it can be seen the existence of a hundred emitter (3), receiver (4) and resistance (2) assemblies.

The vitroceramic plate (1) is divided into four areas which are equal with regard to surface and number of resistances or heat spots. Each of these areas can be connected, independently, by a switch or a potentiometer, and, also, the four areas can be connected, in turn, by a fifth main control.

The emitters (3) and the receivers (4) are divided by means of insulating walls (7), suitably distributed, which delimit the direction of the waves (8) emitted, and the reception of them by the receiver (5).

So, the emitters (3) send infrared light (8) upwards, passing through the vitroceramic plate (1), and expanding if no obstable is encountered and not receiving the waves the receiver (4) corresponding to that emitter (3), this being the reason for which the resistance (2), with which it forms an assembly, cannot be connected.

If the base of a receptacle is on the plate (1), the infrared light (8) bounces on this base (6) downwards, being received by the receiver (4), which sends a command of turning on this resistance (2) under the base of the receptacle (6).

Between the receiver (4) and the resistance (2), - there is a timing device the function of which is to delay the fulfilment of the above mentioned command, if the receiver has giving it to its resistance, until certain time has elapsed, for example, 7 seconds, as a safety measure.

## Claims

1. A system to make good use of the whole surface of vitroceramic plates for cookers, characterized in that it is fitted with multiple resistances (2), located under a vitroceramic plate (1), of which there are only connected those arranged under the base of a receptacle (6), placed on the plate (1), there being, under the plate (1), a plurality of wave emitters (3) and wave receivers (4), as well as resistances (2), and the waves can be electromagnetic, radiofrequency, audiofrequency or light waves, whichever their spectrum may be, such as infrared, ultraviolet, visible light or laser ray, so that the wave receivers (4) detect the waves from the emitters (3), which waves bounce on the base of the receptacle (6), placed on the - plate (1), and causing to be connected the appropiate resistances (2).

2. A system to make good use of the whole surface of vitroceramic plates for cookers, according to claim 1, characterized in that the multiple resistances (2) placed under the plate (1) are only and exclusively - connected those located under the base of a receptacle (6) placed on the plate (1), relying on one or several wave emitters (3), outside and on the plate (1), the receptacle (6) on the plate (1) interrumping the wave spreading in that direction, and the receiver (4), located under the plate, detecting the absence of these waves, causing the resistance located under the base of the receptacle to be connected; several emitters (3) can be provided, suitably located, so avoiding the possibility of handle and grip shadows of the receptacles used (6).

3. A system to make good use of the whole surface of vitroceramic plates for cookers, according to the preceding claims, characterized in that the waves of different characteristics with varied spectrum, located in a same block, make a path passing under or near each of the resistances, and detecting the presence of the base surface of the receptacle (6), over the reflection or bounce system of waves, causing the resistances (2) located under the base of the receptacle (6) to operate.

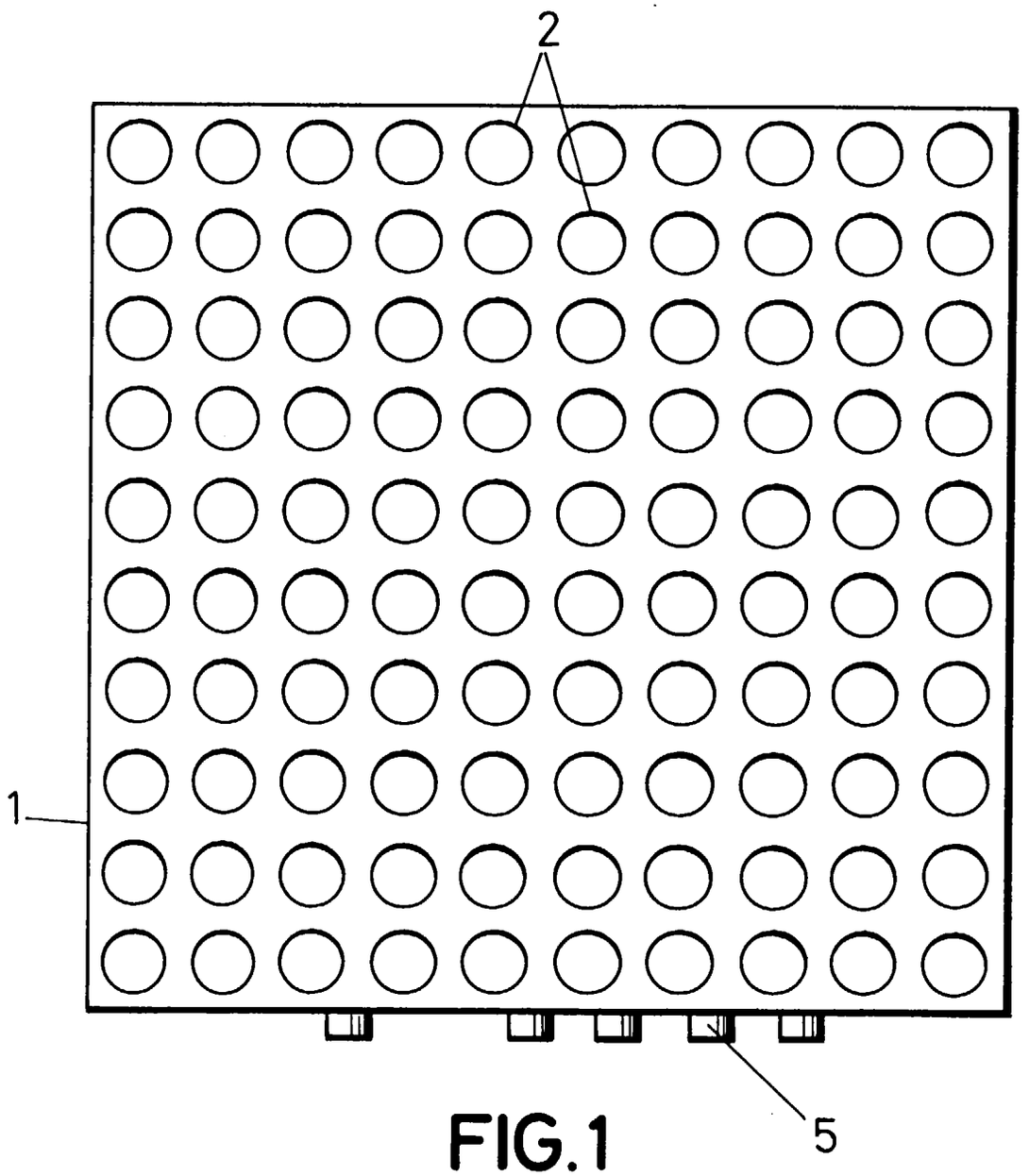


FIG.1

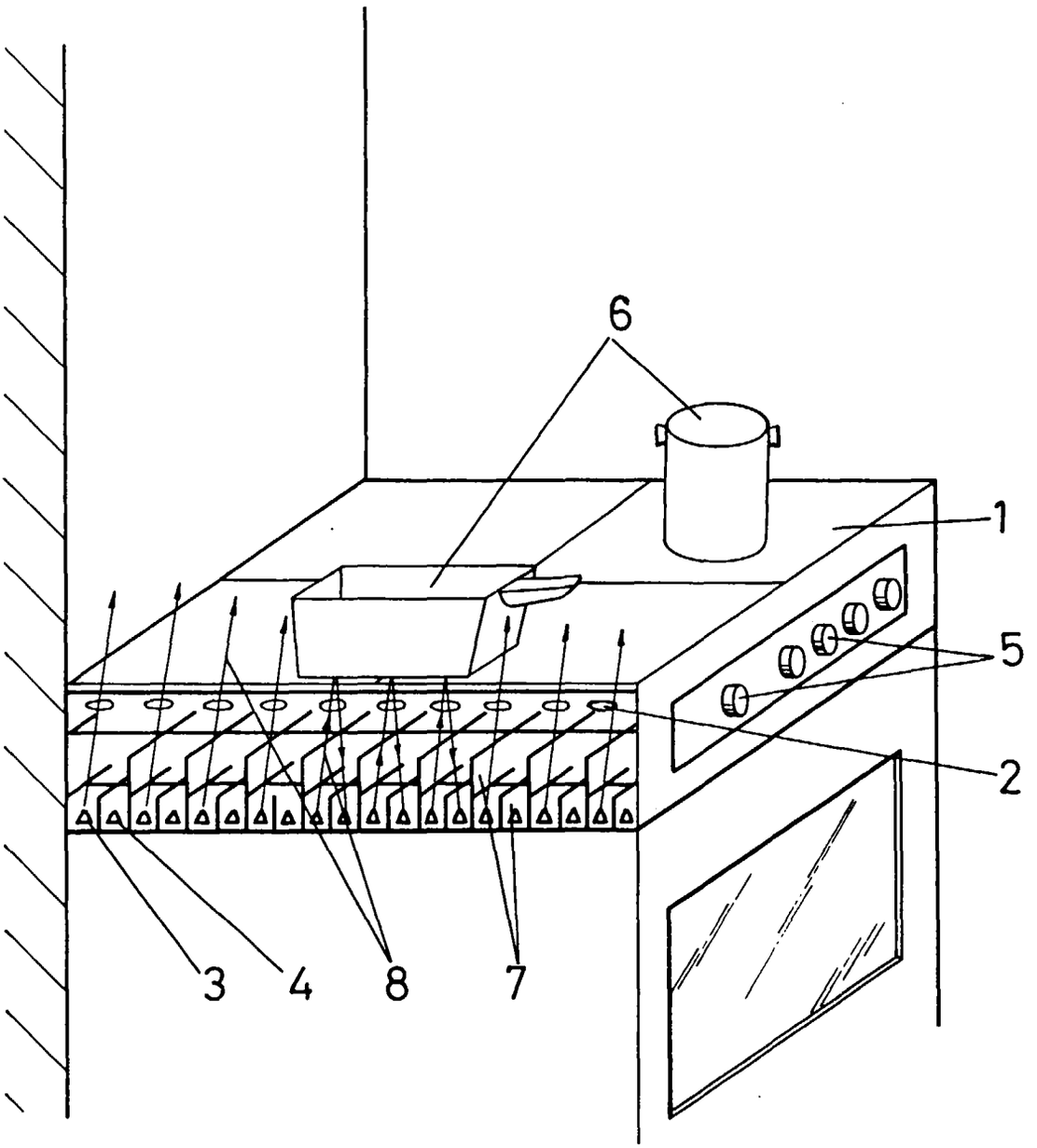


FIG. 2

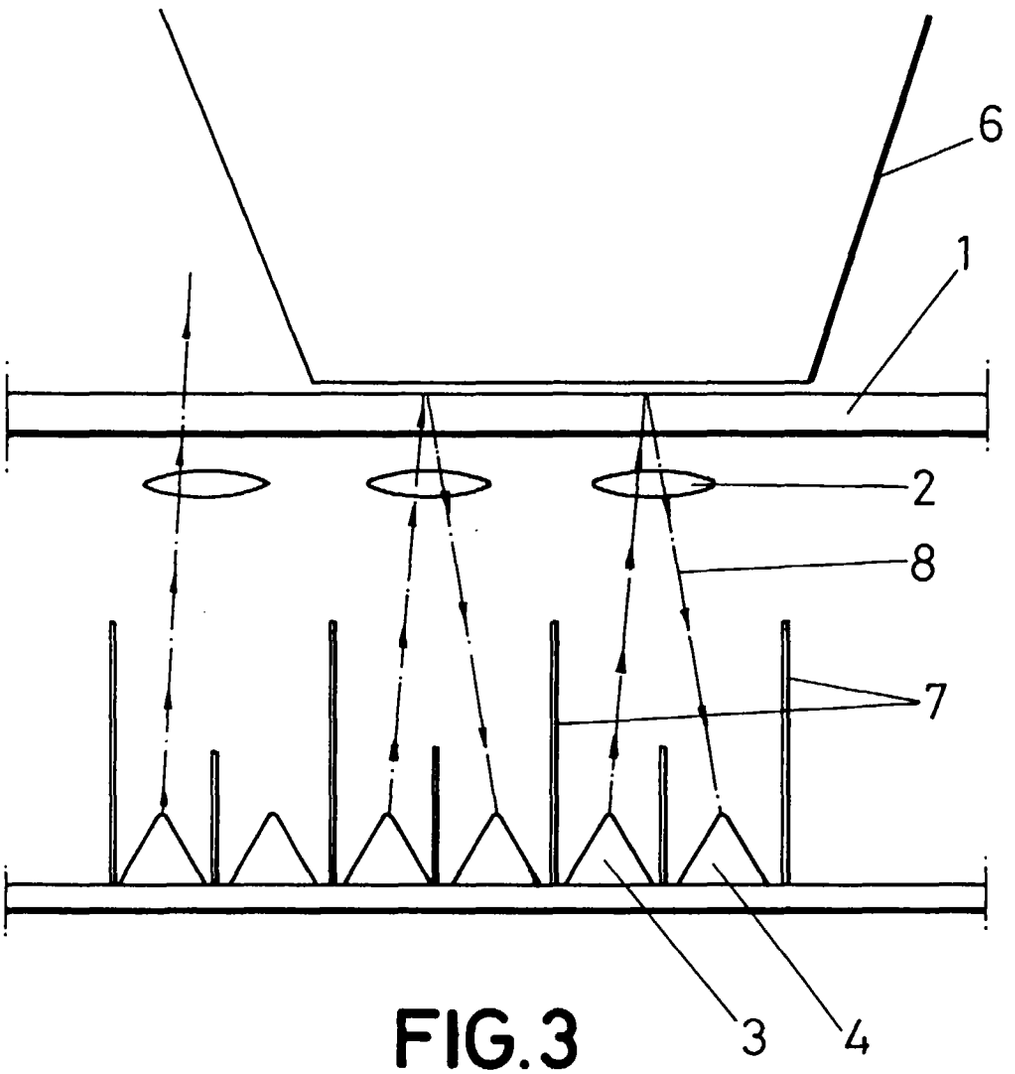


FIG.3

## INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 97/00073

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. 6 : H05B 3/74, F24C 7/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. 6 : H05B F24C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | DE 9105672 U (GRASS AG) 20 June 1991 (20.06.91)<br>page 6, paragraph 7; figures 1,2 | 1,3 |
| Y | DE 4007680 A (GRASS AG) 19 September 1991 (19.09.91)<br>page 1, lines 28-32; figure 3 | 1-3 |
| Y | US 5243171 A (WOOD SIMON J ET AL)<br>7 September 1993 (07.09.93)<br>column 6, lines 1-33; figures 4,5 | 1,3 |
| Y | ES 2006115 A (J.J. GOICOECHEA CELAYA)<br>1 April 1989 (01.04.89)<br>page 3, line 19 - page 4, line 64; claims 1,3 | 2 |
| A | DE 3327622 A (BLANC GMBH & CO)<br>7 February 1985 (07.02.85)<br>page 7, paragraph 2; figures 1,2 | 1,3 |
| | -/-- | |

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
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| 21 July 1997 (21.07.97) | 24 July 1997 (24.07.97) |
| Name and mailing address of the ISA/<br>S.T.P.O.<br>Facsimile No. | Authorized officer<br><br>Telephone No. |

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# INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 97/00073

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
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| A | US 3953711 A (ECK WALTER ET AL)<br>27 April 1976 (27.04.76)<br>claims 1-3; figure 1 | 1 |
| A | EP 0690659 A (BOSCH SIEMENS HAUSGERAETE)<br>3 January 1996 (03.01.96)<br>page 3, line 32 - line 45 | 2 |
| A | ES 2071841 A (E.G.O. ELKTROGERÄTE BLANC UND FISCHER)<br>1 July 1995 (01.07.95)<br>column 1, line 3 - column 2, line 65; figure 1 | 3 |

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