(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 037 643**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **81301037.8**

(22) Date of filing: **12.03.81**

(51) Int. Cl.³: **H 05 B 6/70**
H 05 B 6/80

(30) Priority: **26.03.80 GB 8010160**

(43) Date of publication of application:
14.10.81 Bulletin 81/41

(84) Designated Contracting States:
DE FR GB IT SE

(71) Applicant: **THORN DOMESTIC APPLIANCES LIMITED**
Thorn House Upper Saint Martin's Lane
London, WC2H 9ED(GB)

(72) Inventor: **Russ, Edward Alan**
8, Wallers Way
Hoddesdon Hertfordshire, EN 11 9LH(GB)

(72) Inventor: **Smith, Robert David**
117, Penton Drive
Cheshunt Hertfordshire, EN8 9RU(GB)

(74) Representative: **Marsh, Robin Geoffrey**
THORN EMI PATENTS LIMITED Blyth Road
Hayes Middlesex, UB3 1BP(GB)

(54) **Improvements in microwave cookers.**

(57) A microwave cooker having two adjacent cookers (3,5). A source of microwave energy is mounted in a wave guide (15) having two branches (19, 21) each connecting with an oven so as to direct microwave energy thereto. A deflector means (29) is provided to selectively block one or other of the branches so as to direct radiation to the other oven. One of the ovens also has a heating element thereby enabling the oven to be heated by the element and/or microwave energy directed thereto

EP 0 037 643 A1

./...

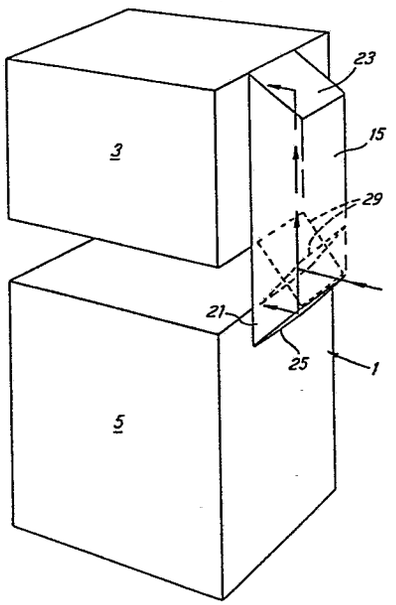

FIG.1a

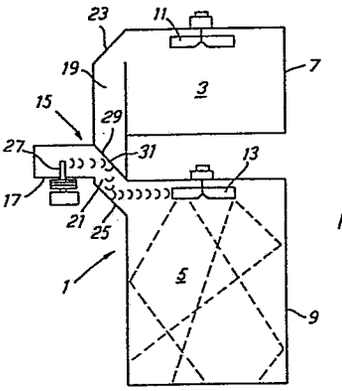

FIG.1b

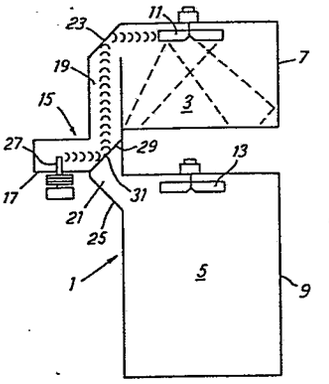

FIG.1c

IMPROVEMENTS IN MICROWAVE COOKERS

This invention relates to microwave cookers. It is known to provide a double oven cooker in the same built in framework in which one of the ovens is a microwave oven and the other a conventional oven. It is further known to provide heating elements in a microwave oven in order to provide a so-called browning facility when using microwave energy. The browning facility produces more thorough cook of the outer regions of the food.

Also the heating elements, which are utilised with the microwave energy to provide the browning facility, can be used alone for conventional cooking, i.e. primarily by convection, within the oven.

The known arrangements referred to lack a certain operational flexibility and it is an object of the present invention to provide an improved microwave cooker which offers wider utilisation possibilities than has been the case hitherto.

According to the invention there is provided a microwave cooker comprising two adjacent ovens, a mode stirrer disposed in each oven, a source of microwave energy and a wave guide accomodating said source and having respective branches which connect with the ovens so as to guide microwave energy towards the corresponding mode stirrer, characterised in that the wave guide includes deflector means for directing microwave energy exclusively along one or other of the branches and that one of the ovens includes a heating element enabling said one oven to

be heated by said element and/or microwave energy directed thereto.

In one form of the invention the ovens are disposed one above the other and the wave guide is located with the branches thereof respectively opening through the rear walls of the ovens.

The invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1a is a perspective view of a microwave cooker according to the invention as viewed from the rear thereof;

Figures 1b and 1c are side elevations of the microwave cooker shown in Figure 1a and illustrate different modes of operation,

Figures 2a, 2b and 2c respectively illustrate perspective, plan sectional and sectional perspective views of the deflector means used in another embodiment of the invention, Figure 2b being drawn to a larger scale than Figures 2a and 2c, and Figure 3 shows the deflector means used in another embodiment of the invention.

Referring to Figures 1 of the drawings, a microwave cooker generally indicated by the reference 1 includes two adjacent ovens 3 and 5 disposed one above the other and each formed with closure doors (not shown) in respective front walls 7 and 9 thereof. Motor driven mode stirrer devices 11 and 13 of known form are mounted in the top walls of the ovens 3 and 5 and each serves, during microwave operation of the associated oven, to rotate the standing wave pattern of microwaves around the oven cavity to prevent cold spots being established in food being cooked.

Wave guide conduit means, generally indicated by the reference 15, are provided at the rear of the ovens and include a horizontally disposed supply conduit 17 leading to vertically extending branches 19 and 21 which at their ends remote from the supply conduit 17 open respectively into the ovens 3 and 5. Adjacent the corresponding ovens, the branches 19 and 21 include side wall deflector elements 23 and 25 which when microwave

energy passes through the corresponding branch each serve to reflect that energy on to the associated mode stirrer device 11 or 13.

Disposed in the supply conduit 17 is a source 27 (such as a magnetron) of microwave energy which directs a stream of microwaves towards a deflector means, in this example a flap 29. The flap is pivotally mounted at pivot 31 for rotation about a horizontal pivotal axis. The flap is rotated by an appropriate drive means so that it can occupy either of the positions shown in Figures 1b and 1c and illustrated by the broken lines in Figure 1a. In the position shown in Figure 1b and flap 29 totally seals the branch 19 from the flow therethrough of microwave energy whilst in the position shown in Figure 1c the deflector totally seals the branch 21 from the flow of microwave energy therethrough. As will be observed, the alternative positions of the flap 29 are disposed at 45^{o} to the axis of the supply conduit 17 whilst the deflector elements 23 and 25 are respectively disposed at 45^{o} to the axes of the branches 19 and 21. Thus, in the position shown in Figure 1b microwave energy emitted in a horizontal beam from the source 27 is deflected by the flap 29 and deflector element 25 to provide a horizontal beam of microwave energy directed towards the mode stirrer 13. Likewise, in the condition of operation depicted in Figure 1c, the flap 29 and deflector element 23 deliver the beam from the source 27 as a horizontal beam directed towards stirrer 11.

The oven 5 is provided with heating elements (not shown) to allow that the oven to be used either without microwave energy as a conventional oven or with microwave energy to provide microwave cooking with a browning facility.

Suitable interlock circuitry is provided to ensure, on the one hand, that microwave energy from the source is not transmitted unless the flap 29 is in one or other of the positions illustrated in the drawings of Figure 1 and on the other hand to ensure that microwave energy is not transmitted when the flap 29 is in one of its alternative positions unless

the door of the oven to which the microwave energy would be deflected is closed.

In another embodiment of the present invention, the two branches 19 and 21, and the supply conduit 17 are linked by a common housing having a generally rectangular construction shown at 30 in the perspective and plan sectional views of Figure 2a and 2b respectively. The housing has a cylindrical bore 31 which accomodates a cylindrical deflector block 34, mounted for rotation about a vertical axis X of the housing. Drive means (not shown in the drawings) are also provided for effecting rotation of the block 34. The branches are connected to the housing at opposite side faces 35, 36 thereof and communicate with the bore 31 via coaxially extending ducts 35' and 36'. The supply conduit 17, on the other hand, is connected to a remaining side face 37 of the block and communicates with the bore via a further duct 37', orthogonally inclined to ducts 35' and 36'. In this example, the ducts 35', 36' and 37' lie in a common plane and the block 34 has a generally arcuate passageway 38 for selectively connecting the supply conduit exclusively to one or other of the branches. In one orientation of the block (shown in Figure 2b, for example) microwave energy is directed from the supply conduit along the branch 19. By rotating the block 34 through an angle of 90^{o}, however, the supply conduit may be coupled exclusively to the other branch 21. The arrangement of the housing and the deflector block is also illustrated in the perspective sectional view of Figure 2c.

In a yet further embodiment of the invention, illustrated in the plan sectional view of Figure 3, each branch 19, 21 is provided with a slidable shutter 19a and 21a which is guided within respective slots 19b and 21b. Each shutter may be selectively located so as to close of the associated branch so that energy is directed exclusively to the other branch.

The double oven microwave cooker construction described provides great flexibility as regards cooking possibilities. Thus, for example, it is possible to employ one or both ovens solely for microwave cooking. Similiarly, oven 5 can be

employed purely for conventional cooking by utilising the heating elements which are provided therein. Furthermore the heating element provided in oven 5 can be used to brown food items cooked therein by microwave, or alternatively oven 5 can be used solely for conventional cooking whilst oven 3 is being used for microwave cooking.

What we claim is:-

1. A microwave cooker comprising two adjacent ovens (3, 5), a mode stirrer (11, 13) disposed in each oven, a source of microwave energy (27) and a wave guide (15), accomodating said source and having respective branches (19, 21) which connect with the ovens so as to guide microwave energy towards the corresponding mode stirrer, characterised in that the wave guide includes deflector means (29) for directing microwave energy exclusively along one or other of the branches and that one of the ovens includes a heating element enabling said one oven to be heated by said element and/or microwave energy directed thereto.

2. A microwave cooker according to Claim 1 characterised in that said deflector means comprises a flap, disposed within the wave guide and a drive means for moving the flap into a respective position appropriate for blocking one or other of the branches to prevent passage of microwave energy therethrough.

3. A microwave cooker according to Claim 2 charactised in that the source of microwave energy is situated in a common portion of the wave guide, the flap being pivotally mounted at the junction between the common portion and the branches.

4. A microwave cooker according to Claims 2 or 3 characterised in that the flap in each said respective position thereof, is inclined to the axis of the common portion to thereby direct energy along the respective branch.

5. A microwave cooker according to Claim 1 characterised in that the source is mounted within a common portion of the wave guide and that the deflector means comprises a block which is mounted for rotation about a fixed axis at the junction between the common portion and the branches and has a drive means for effecting its rotation, the block having a passageway which is shaped to connect the common portion exclusively to one or other of the branches in dependence on its position to thereby direct energy to the corresponding oven.

6. A microwave cooker according to Claim 5 characterised in that the block is cylindrical and is mounted within the bore of the

housing to which the said branches and the common portion of the wave guide are connected, the housing having ducts which communicate between the bore and a respective branch or common portion, so as to permit energy to be directed to one or other of the ovens via the passageway in the block.

7. A microwave cooker according to Claim 1 wherein each branch has a slidable shutter member which may be selectively located so as to block the associated branch and thereby direct energy exclusively along the other branch.

1/3

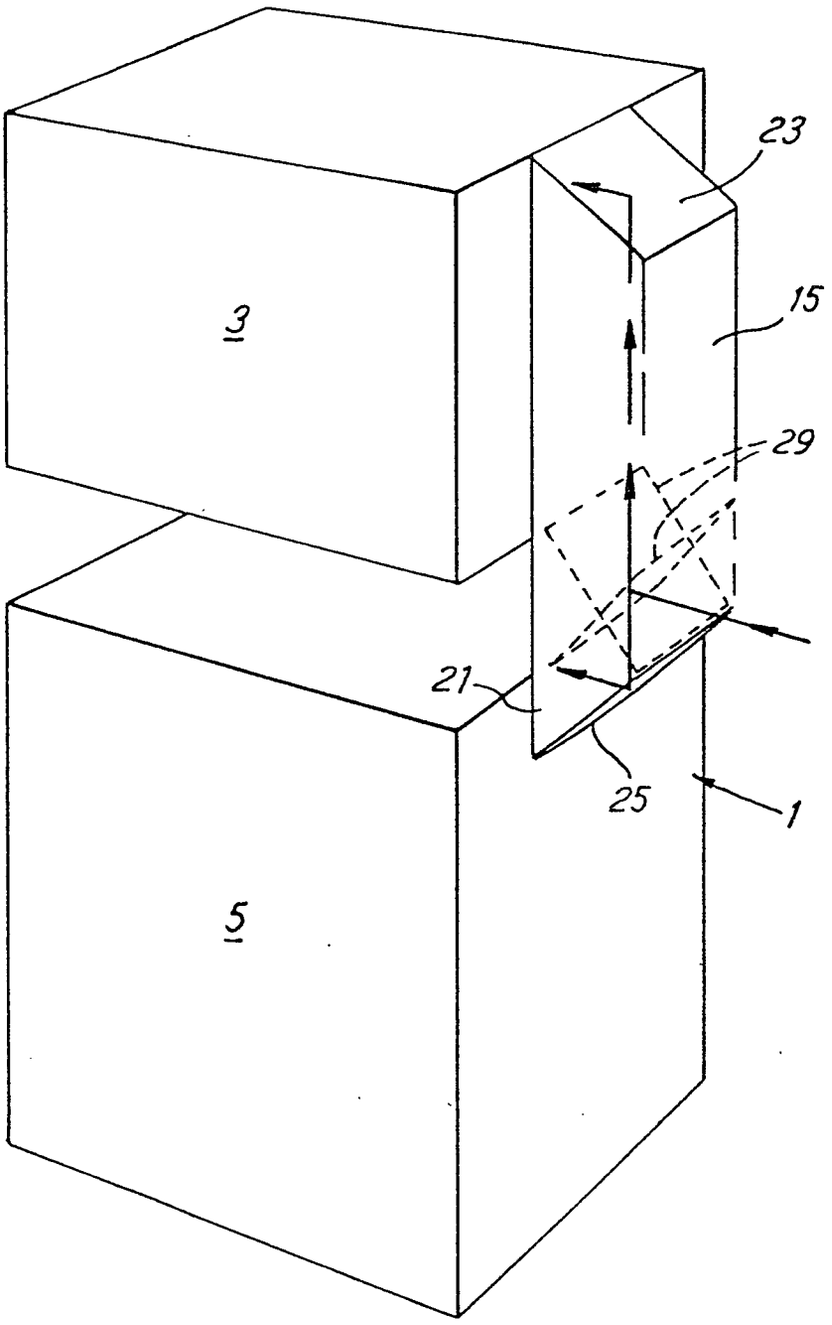

FIG. 1a

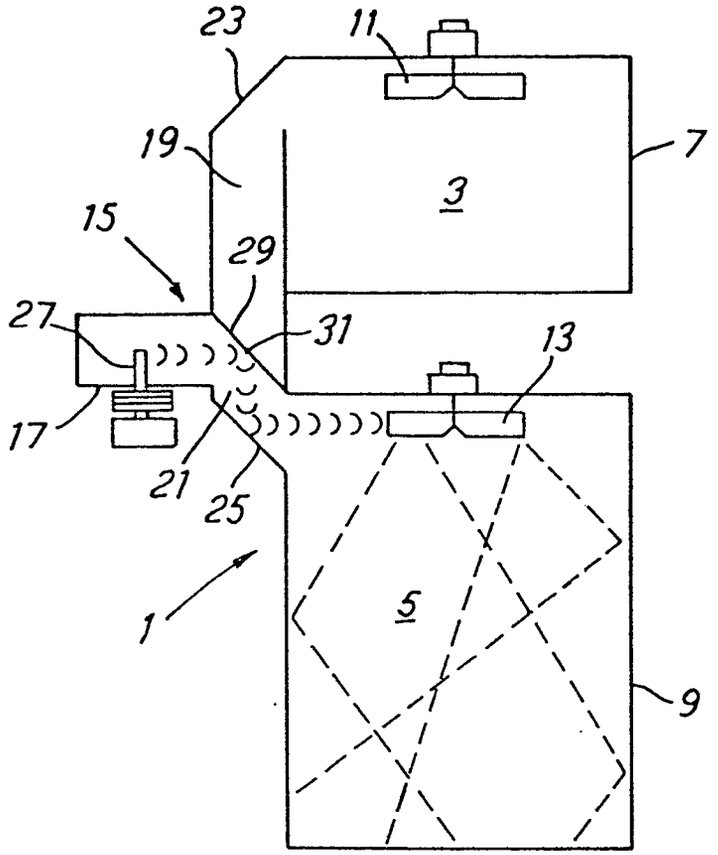
23
11
19
7
3
15
29
27
31
13
17
21
25
1
5
9

FIG. 1b

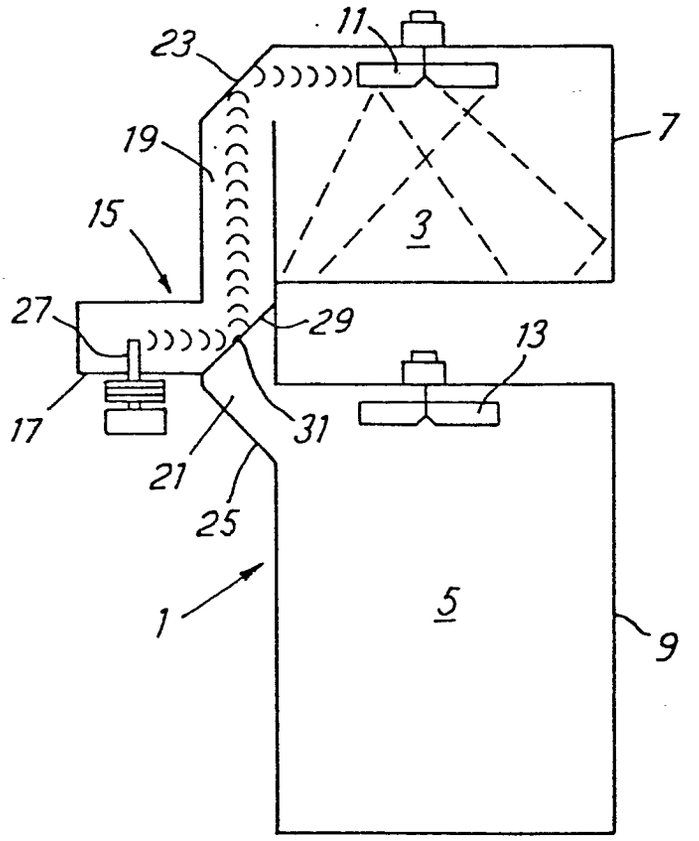
11
23
19
7
3
15
27
29
13
17
31
21
25
1
5
9

FIG. 1c

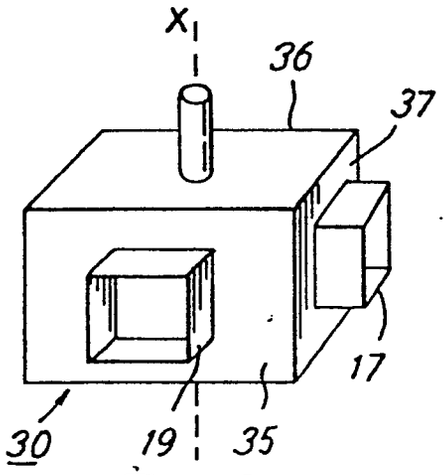

FIG. 2a

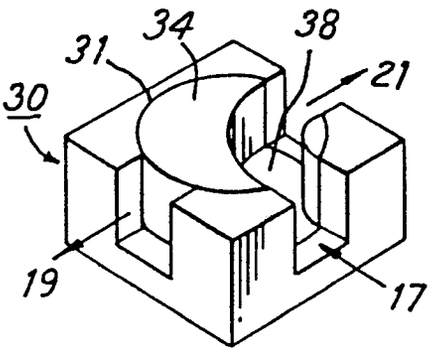

FIG. 2c

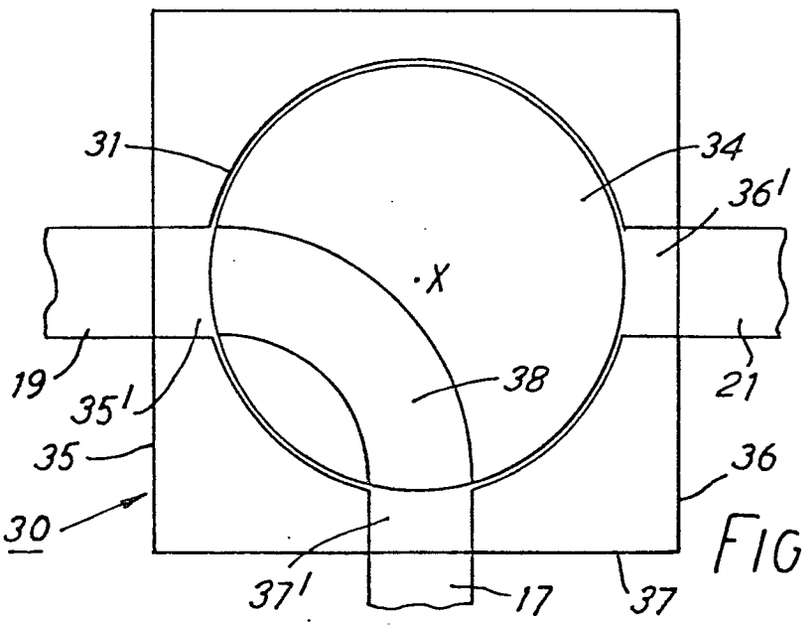

FIG. 2b

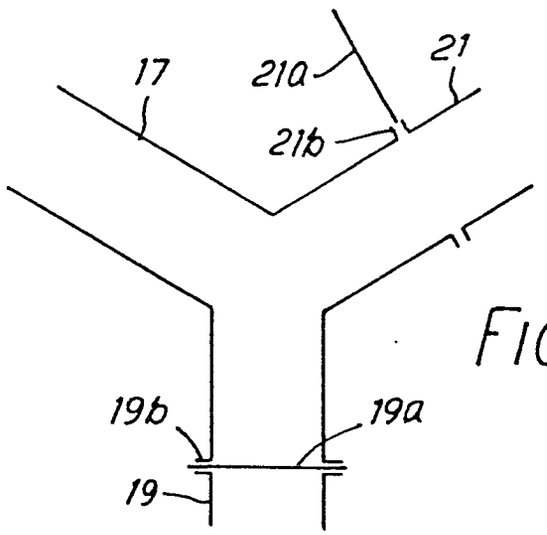

FIG. 3

0037643

European Patent Office

Application number

EP 81 30 1037

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	US - A - 3 810 248 (RISMAN et al.) * Column 2, lines 39-51; figure 2 *	1-3
	DE - B - 1 145 730 (SIEMENS) * Column 3, line 49 - column 3, line 6; figures *	1,5,6
	FR - A - 1 254 316 (MIWAG) * Page 2, left-hand column, lines 14-20; figure 2 *	1,7
A	US - A - 3 430 023 (TINGLEY) * Column 1, lines 56-67; figure 1 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

H 05 B 6/70
6/80

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

H 05 B 6/70
6/72
6/80

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	09-06-1981	RAUSCH