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(71) Applicant: **SMEG S.p.A.**
Via Circonvallazione Nord, 36
Guastalla (Reggio Emilia) (IT)

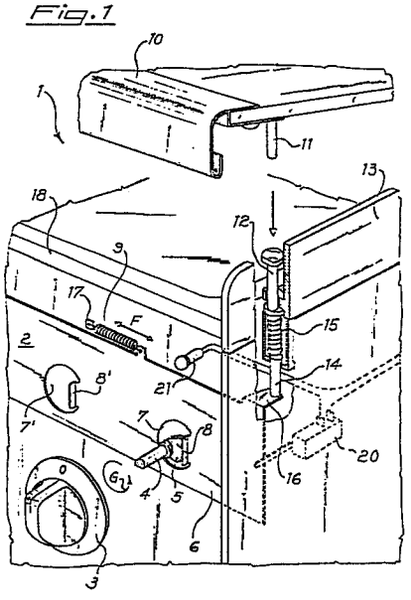
(72) Inventor: **Orosei, Giuseppe**
Via Bartolomeo Spani, 16
Reggio Emilia (IT)

(74) Representative: **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A. Via Carducci, 8
I-20123 Milano (IT)

(54) Safety preventing incidental rotation of the control knobs in electric or gas operated cooking appliances.

(57) A safety device is described to prevent incidental opening of the control knobs in electric or gas-kitchens, hobs or ovens. This safety device is actuated when the top cover is lowered to a position of closure as each control knob to be locked at an "OFF" position is integrally formed with a shaped cam coincident, at this position, with an opening in a sliding plate which is movable along a first direction upon rotation of at least one knob to the "ON" direction. A spring biases said slider to the opposed direction when all the knobs are "OFF", there being also provided, integrally with the cover, means cooperating, when the latter is lowered, with a means for preventing said movement of the slider which is thus locked at the position corresponding to all the knobs being "OFF". Otherwise an "ON" position of at least one knob shifts the slider so as to impede the complete lowering of the cover, through said integral means. There may also be provided visual safety means such as light signals associated with the position of said slider or actual locks either to keep the cover lowered or the slider at the position corresponding to all the knobs being "OFF".

Fig.1



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Description

SAFETY DEVICE PREVENTING INCIDENTAL ROTATION OF THE CONTROL KNOBS IN ELECTRIC OR GAS OPERATED COOKING APPLIANCES

The present invention is directed to a safety device preventing incidental opening of the gas-taps or switches in the gas operated or respectively electric kitchens, hobs or ovens. In particular a simple mechanical device, actuated by lowering of the kitchen or hob cover, prevents any control knob from an incidental rotation, whenever the utilization of gas-burners or electric hot-plates is to be excluded, at the same time being avoided a complete lowering of the cover whenever at least one of the controls is not at an "OFF" or "closed" position.

It is known in fact the serious danger consequent to an incidental actuation of the control knobs (gas-taps, switches or thermostats) of kitchens or hobs, especially of the gas-type, in particular when children are around without being continuously looked after by grown-ups. In addition to this main aspect of danger represented by a possible gas leakage consequent to an incidental operation (often due to a child's game) of the control knobs, it is known that cooking appliances are frequently damaged owing to the cover being lowered onto the cooker plane with a gas-ring or an electric plate inadvertently left burning. As a result of statistics carried out by the technical services for appliances of this type, a considerable number of cooker covers, most of which are made of glass, must be replaced just for this reason.

It is true that safety devices have been designed to prevent an incidental gas escape from the burners through cocks provided with valves which allow the correct ignition of a specific gas-burner only by means of certain accurate operations impossible to be carried out by children, but however difficult and not very handy even for adults, which furthermore cause the product to be excessively expensive. On the other hand these safety measures would not overcome however the above-mentioned second inconvenience, namely the possibility that the cover is lowered onto a hot gas-burner or electric plate.

Therefore it is the object of the present invention to provide a safety device which overcomes both the above-mentioned drawbacks while being of simple construction and not very expensive, as well as easy to be used. Furthermore, if cooperating with simple looking means, the device of the invention can provide a complete prevention measure against an incidental opening of the gas-taps or electric switches, so as to involve a necessarily voluntary intervention of the user to operate the control knobs.

This is obtained with a device characterized in that it comprises an elongated rigid element, substantially bi-dimensional and suitable to be slidably reciprocated in the direction of its length, parallel to and at the inside of a front control panel to which said knobs to be checked are mounted by means of pivotable pins, in association with each knob said element being formed with a shaped opening having a protruding tongue along part of its periphery, said tongue being able to engage an eccentric cam fixed to said knob pin whenever the knob is at a different position from the "OFF" position, whereby said element is moved away, against the bias of a spring, from a first rest position to which it is urged again by said spring whenever all the knobs are at the "OFF" position, there being also provided a means integral with the appliance cover which is adapted to control, with the cover lowered, a downward movement of a latch means with a return spring able to lock said elongated element at said rest position, thus preventing anyone of said knobs from rotating, as they are kept at said "OFF" position.

According to a particular aspect of the present invention, a position of said elongated element different from said rest position, thereby corresponding to at least one knob rotated from "OFF", causes an abutment against the bottom of said latch means which cannot move downward, thus obstructing the complete closure of the cover which remains partly upraised.

According to a further possibility provided by the invention the slidable element or slider in its traverse from the rest position as a consequence of the operation of at least one knob causes, by means of a microswitch contact, a circuit to be made which lights a warning lamp provided on the control panel, thus furnishing as a further safety measure a visual signaling of a situation in which at least one tap or switch is "ON". Another possibility of obtaining a total reliability is given by the device according to the invention if it is associated with simple cover locking means to keep it closed down, or means for locking the slider at the rest position, so as to render impossible the knob operation unless through an intervention onto proper release means such as push-buttons, locks, etc.

These and further advantages, objects and characteristics of the present invention will be apparent to those skilled in the art by the following description of a preferred embodiment, given by way of a non-limiting example, with reference to the drawings in which:

FIGURE 1 shows a perspective, partial view of a cooking appliance (electric or gas kitchen) provided with the safety device of the invention, partly sectioned to better illustrate the same; and

FIGURE 2 shows a similar view to Fig. 1 wherein, with the cover being completely lowered, the safety device of the invention is actuated.

With reference to the drawings, the safety device of the invention provides that the rotation pin 4 of each control knob 3 is formed with a cam 5 being equally shaped for all the knobs and having the same orientation when considering the knobs all at the same position. It should be noted that the term "knob" as used in this specification means a rotatory

control whichsoever (gas-tap, switch or thermostat) suitable to electric or gas-kitchens (and the associate oven) or cooking hobs, electrically or gas operated as well, of the built-in type. In the example shown all the knobs 3 are mounted on the control panel of a gas kitchen 1 which in the following will be generally called "appliance" bearing in mind that, within the objects of the invention, no substantial differences would be appreciated if it were an electric range or electric or gas hob.

With this preliminary definition in mind, the device of the invention further comprises an elongated element or slider 6, substantially bi-dimensional, formed of a plate extending throughout almost the whole width of the appliance and being positioned at the inside thereof, out of sight, parallel to the control panel 2, guided for sliding longitudinally with a reciprocating movement, as shown by the double arrow F. At each pin 4 with cam 5, the element 6 that will be called "slider" is formed with an opening 7, preferably shaped as an arc of circle having its centre on the rotation axis of pin 4. Opening 7 is also provided, along a portion of its preiphery, a rectilinear tongue 8 outwardly projecting to close at one side the arc portion of opening 7, and having a distance from the centre of the latter which is less than the cam 5 length. The eccentric shape of the cam is such as to allow the same to be normally housed within opening 7 with the knob being at its "OFF" position, but suitable to engage the tongue 8 as soon as the knob is rotated to the direction of arrow G. This engagement does not cause the knob to stop, but the slider 6 to be traversed in either direction of the double arrow F (to the right hand direction in the angle shown).

Therefore it is sufficient that a single knob is operated from "OFF" position to cause slider 6 to traverse toward a side of appliance 1 against the opposing bias of a spring 9 having one end fixed to the slider 6 and the other end to a member 17 of the appliance. Said spring 9 causes the slider 6 to return to its initial position when all knobs are brought again to the "OFF" position, as appropriate sliding guides (not shown) for slider 6 are provided at the inside of the appliance.

It will be seen that the slider 6 is driven in operation towards the appliance side where is provided the remaining portion of the safety device comprising a pin 11 fixed to the appliance cover 10 and mounted directed downwardly to the lower side of the cover near to a side edge thereof (on the right-hand side in this case) and in proximity of the front edge. A latch means 14, aligned with said pin 11, can slide vertically being guided at the inside of a side 13 of the appliance, so that at a lowered position reached against a spiral spring 15 reaction, its bottom engages, as it is seen in Fig. 2, the right hand side of slider 6 and in particular a portion 16 thereof inwardly bent to such an extent to cause this engagement. The latch 14 is pushed downward under action of the pin 11 with cover 10 completely lowered, preferably through an intermediate rod 12 which during the usual operation extends from the upper plane 18 of the appliance within a through hole 19 thereof guiding its vertical movement.

Thus it can be seen that, while one or more knobs 3 can be rotated in the arrow G direction when cover 10 is raised, as a consequent movement of slider 6 to the right-hand side does not tamper with the latch 14 (see Fig. 1), upon lowering of cover 10 all the knobs must be positioned on "OFF" and the slider 6 at its rest position on the left-hand side, to which it automatically returns under action of the spring 9, no longer stretched as it is shown in Fig. 1.

It will be sufficient therefore to take the measure of closing down the cover 10 each time that the appliance 1 has not to be used, to avoid that a child will be able to rotate anyone of the control knobs 3, unless he keeps raised cover 10 at the same time, with an operation certainly difficult for him. On the other hand this safety level, satisfactory although relative, can be rendered absolute by means of simple devices for keeping the cover locked at the lowered position or the slider 6 at the rest position of Fig. 2. Mechanism for obtaining said locking actions may comprise push-buttons, coupling means, magnetic clamps, key-locks, etc.

It is also clear that in the situation of Fig. 1, wherein at least one of the knobs 3 is at an operating position, the cover 10 cannot be completely lowered because, as pin 11 rests onto the head of rod 12, the latter cannot push downwards the latch 14 due to the cover weight, since the slider 6 and in particular the inwardly protruding portion 16 will obstruct a further lowering of the latch itself. This forbids a direct contact between heat source and cover, and provides for a immediately visible signalling of an anomalous situation in which a knob has not been reset to an "OFF" position, e.g. through an oversight.

Finally a further visual safety system can be provided, associated to the device of the invention, according to which the slider 6 in its movement due to the working of a knob, i.e. towards the right-hand side in Fig. 1, causes a microswitch 20 to trigger for closing a feeding circuit of a light source 21 which thereby signals turning on of at least one gas-tap or heating of at least one electric plate.

As a consequence of the foregoing, the device according to the invention is substantially comprised of simple metallic parts, which in practice cannot be altered or warped through their work and form a mechanism being out of sight as it is housed in the control panel 2, with only the almost negligible exception of pin 11 and partly of the rod 12, both being of very small size. This device is reliable in operation and, above all, does not need to be connected to the electric network, whereby it can work even if the feeding cable of the kitchen or hob (if at least partially electric or, if totally gas operated, for auxiliary services such as oven lighting, etc.) is not plugged in the socket. Also the additional light signalling as described above can namely be battery-fed.

Possible additions and/or modifications could be adopted by those skilled in the art as to the above-described and illustrated embodiment of the safety device according to the invention without going beyond the scope of the invention itself. In particular the elongated control element or "slider",

the seats formed therein for cooperating with the cams associated to the knob pins and the respective engagement members, as well as the mechanical coupling between cover and latch for locking said elongated element, could be of a construction different from the one described and illustrated herein, and replaced with mechanical equivalents having the same functions.

Claims

1. A safety device preventing incidental rotation from a rest or "OFF" position of the control knobs (3) of cooking appliances (1) having a cover (10), characterized by the fact of comprising an elongated element (6) substantially bi-dimensional, adapted to slide with a reciprocating movement in the direction of its length, parallel to and within a front control panel (2) to which said knobs to be checked are mounted by means of pivoting pins (4), in association with each knob (3) said element (6) being formed with a shaped opening (7) having a protruding tongue (8) along part of its periphery, said tongue (8) being able to engage an eccentric cam (5) fixed to said knob pin (4) whenever the knob (3) is at a different position from "OFF" position, whereby said element (6) is moved away, against the bias of a spring (9), from a first rest position to which it is urged again by said spring (9) whenever all the knobs are at the "OFF" position, there being also provided means (11) integral with the cover (10) for controlling, with the cover lowered, a downward movement of a latch means (14), with a return spring (15) being able to lock said element (6) at said rest position, thus preventing anyone of said knobs (3) from rotation, as they are locked at said "OFF" position.

2. A device according to claim 1, characterized by the fact that, at a position of said element (6) different from said rest position and corresponding to at least one knob (3) not being at "OFF" position, one end of said element (6), on the side in the direct ion to which the latter has moved from the rest position, engages the lower portion of said latch (14), whereby a downward movement thereof is obstructed and the full closing down of the cover (10) is prevented.

3. A device according to claim 1 or 2, characterized by the fact that, at said rest position of element (6), each one of said openings (7) is defined, in addition to said tongue (8) which is substantially rectilinear and directed to the front side of the appliance (1), by an arc of circle having its centre on the axis of said pin (4) and being capable of housing said cam (5) while the associate knob (3) is positioned on "OFF", the distance of said tongue (8) from the centre of said arc of circle being shorter than the radial length of said cam (5).

4. A device according at least one of the preceding claims, characterized by the fact that said means (11) is formed as a pin directed vertically downwards, being mounted to the lower side of said cover (10) near the appliance side toward which said element (6) moves in case of rotation of at least one knob (3) from "OFF" position, at a short distance from the front side of the cover (10), there being provided at the end of said element (6) on the same side of pin (11) a member (16) integral with element (6), inwardly directed to an extent such as to form a stop for the lower position of said latch (14), aligned with said pin (11).

5. A device according to claim 4, wherein directly above said latch (14) and housed within a side flank (13) of the appliance (1) there is provided, aligned to the latch and freely vertically slidable, a rod (12) for transmitting to the latch (14) through the pin (11) the weight of cover (10) whereby the latch (14) is pushed, against the action of spring (15), to such a position that its bottom is at a lower level than said portion (16) of element (6).

6. A device according to at least claim 1, characterized by further comprising a microswitch (20) for closing a feeding circuit of a light signal (21) by means of contacts controlled by said element (6) in its movement from said rest position upon rotation of at least one knob (3).

7. A device according to at least claim 1, characterized by further comprising known locking means for keeping the cover (10) closed down or element (6) at said rest position.

Fig.1

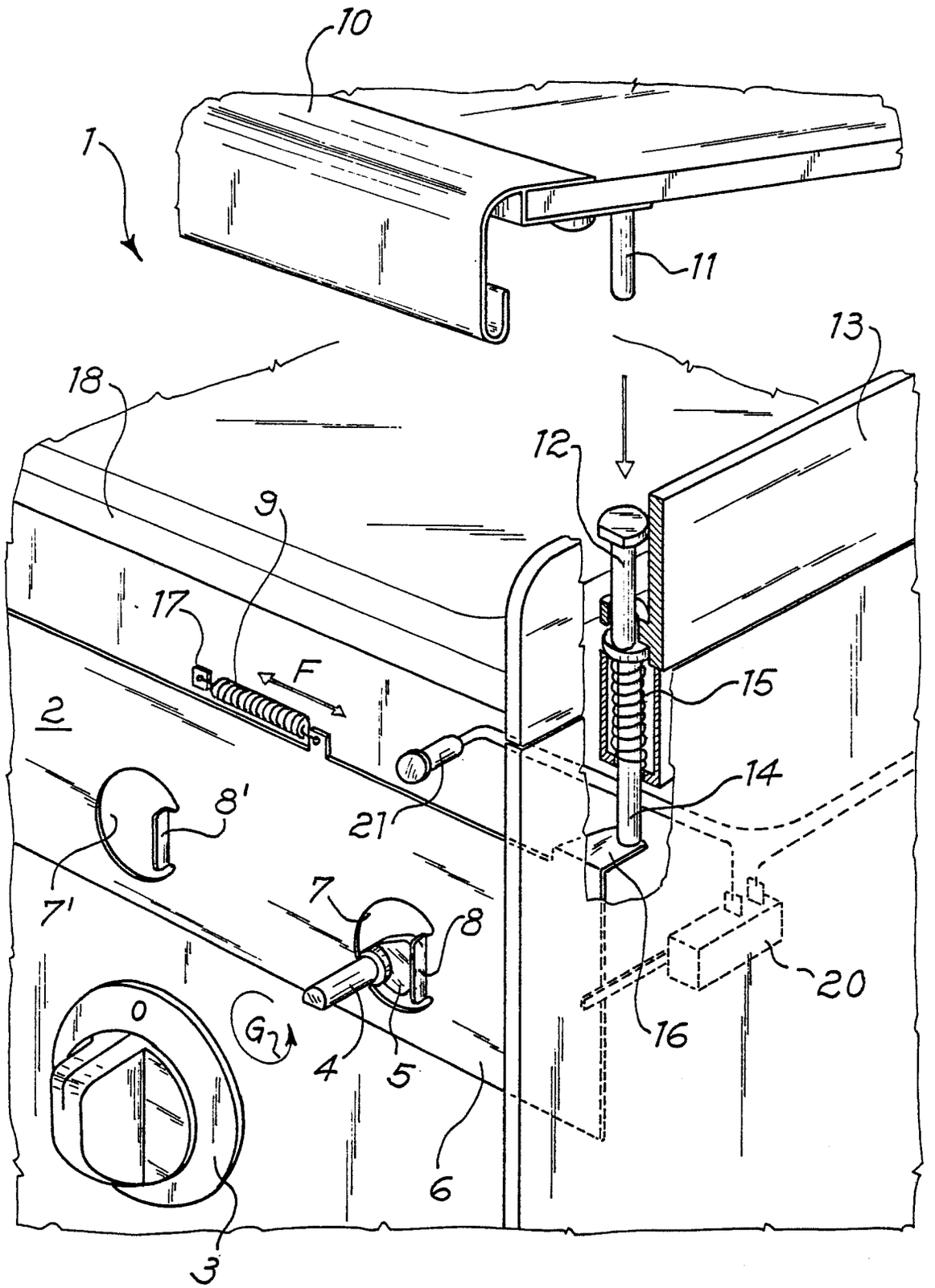
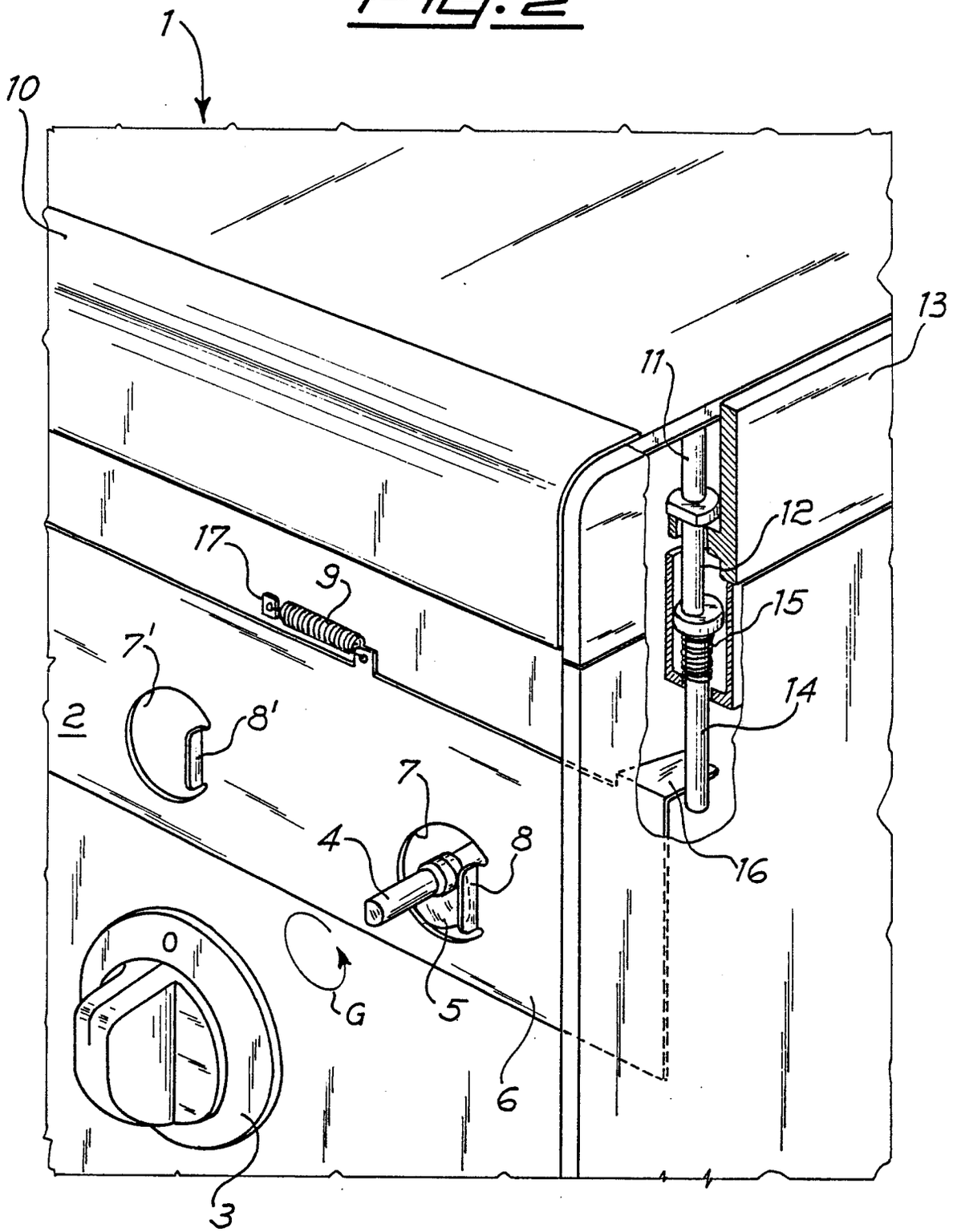


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 88 83 0109

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.4)
X	GB-A-2 177 790 (TI NEW WORLD) * Paragraphs 8,9; claims 1-20; figures * ---	1,6	F 24 C 3/12
E	GB-A-2 195 176 (THORN EMI) * Whole document * ---	1,2	
P,X	GB-A-2 181 534 (TI NEW WORLD) * Paragraph 5; claims; figures * ---	1	
A	US-A-2 116 885 (FRIEDMAN) * Whole document * ---	1	
A	US-A-2 777 316 (MELLO) * Column 2, lines 34-46; column 3,4; claims; figures; * ---	1,6	
A	US-A-2 390 234 (APPLEBAUM) * Paragraph 2, claim 1; figures * -----	1,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4) F 24 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29-06-1988	VANHEUSDEN J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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