

12

EUROPEAN PATENT APPLICATION

21 Application number: 86308424.0

51 Int. Cl.⁴: **H 01 K 1/28**

H 01 K 7/00, H 01 K 9/00

22 Date of filing: 29.10.86

30 Priority: 09.11.85 GB 8527682

43 Date of publication of application:
20.05.87 Bulletin 87/21

84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

71 Applicant: **THORN EMI plc**
THORN EMI House Upper Saint Martin's Lane
London, WC2H 9ED(GB)

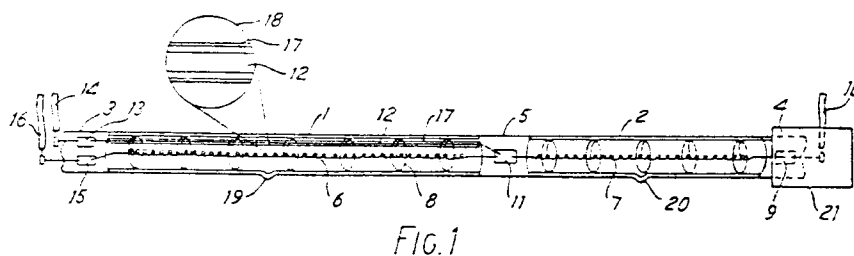
72 Inventor: **Halberstadt, Alex Leopold**
20, Parkway
Golders Green London, NW11 0EX(GB)

72 Inventor: **Letchford, John Albert**
29, Glebe Avenue
Enfield Middlesex, EN2 8NZ(GB)

74 Representative: **Marsh, Robin Geoffrey et al,**
Thorn EMI Patents Limited The Quadrangle Westmount
Centre Uxbridge Road
Hayes Middlesex, UB4 0HB(GB)

54 **Incandescent lamp.**

57 An incandescent lamp includes two envelopes (1,2) each sealed at one end by respective pinch seals (3,4) and the adjacent ends of the envelopes (1,2) are sealed by a common pinch seal (5). Each envelope (1,2) contains a filament (6,7) and the filaments (6,7) are electrically connected to each other by a foil strip (11) in the pinch seal (5) and to a power supply via an electrical wire (12) contained in a quartz tube (17) extending through one envelope (1), so that the filaments (6,7) can be energised independently or concurrently in series or parallel.



: 1 :

INCANDESCENT LAMP

This invention relates to incandescent lamps and, in particular, though not exclusively, to such lamps for use in a heating unit mounted adjacent the underside of a glass ceramic cooktop to produce a hotplate area of a cooking hob, as shown in
5 UK Patent Application No. 2132060A.

In a preferred embodiment of the heating unit in the above-mentioned patent application, four tungsten-halogen tubular lamps are supported, in a side-by-side arrangement, above a layer of infra-red-reflective, thermally-insulative
10 material, and a switching arrangement provides a number of series and/or parallel connections of the tungsten filaments to generate a number of discrete power outputs selectable by a user of the cooking hob.

Conventionally, wire-wound, resistive heating elements are
15 used as the heating means in glass ceramic cooking hobs, and these elements can comprise, in one hotplate area, two concentric, spiralled heating elements, wherein the inner element can be energised independently of the outer element, if a small cooking utensil placed on the cooktop is to be heated,
20 rather than heating the whole hotplate area.

It has thus been considered desirable to utilise this facility, consisting of a portion of the hotplate area being independently heatable, in the aforementioned cooking hob having tungsten-halogen lamps as the heating means.

25 To this end, a number of alternative lamp arrangements have been envisaged, but so far none have proved to be successful. One such arrangement, for example, included a filament of length

0222553

commensurate with the inner hotplate area supported in an envelope of length commensurate with the whole hotplate area. However, when the filament was energised, because the end of the envelope outside of the inner hotplate area was relatively cool,
5 halogen condensation and blackening of the lamp envelope tended to occur.

It is therefore an object of the present invention to provide an incandescent lamp which, when incorporated in a heating unit of a glass ceramic cooking hob, alleviates the
10 above-mentioned problems encountered in providing an independently heatable portion of the hotplate area formed by the unit.

According to the present invention there is provided an incandescent lamp characterised in that it comprises first and
15 second filaments supported in respective sealed envelopes of high silica content, said envelopes being joined at one end by a common pinch seal having sealed therein common electrical connection means between the respective filament ends adjacent said common pinch seal and an electrical connector emergent from
20 said common pinch seal to connect said filament ends to a power supply, said common electrical connection being arranged so that at least one of said filaments is capable of being energised independently of the other of said filaments.

Preferably, the electrical connector comprises an
25 electrical wire, which extends through one of the envelopes and is emergent from the end of the envelope remote from the common pinch seal.

The electrical wire is preferably enclosed in a quartz tube within the envelope to avoid any contact with the filament
30 supports and/or the filament itself.

The region of the common pinch seal may be provided with a suitable coating to reduce the amount of visible radiation, emitted from one filament, being transmitted to the envelope containing the other filament.

25 It can thus be envisaged that, by incorporating a number of lamps, each in accordance with the present invention, in a unit

for heating a hotplate area of a glass ceramic cooking hob, the whole hotplate area can be heated by energisation of both filaments of each lamp and a portion of the hotplate area can be independently heated by energisation of only one of the
5 filaments of each lamp.

The invention will now be further described by way of example only with reference to the accompanying drawings, wherein:-

Figure 1 shows a side view of one embodiment of the
10 invention,

Figure 2 shows a side view of a second embodiment, and

Figure 3 shows a plan view of a heating unit incorporating a number of the lamps, each as shown in Figure 1, for mounting in a cooking hob.

15 In Figure 1, an incandescent lamp includes two envelopes 1,2, formed from a material of high silica content, preferably quartz, which are each sealed at one end by respective pinch seals 3,4, and the adjacent ends of the envelopes 1,2 are sealed by a common pinch seal 5.

20 Each envelope 1,2 contains a filament 6,7, respectively, preferably made of tungsten wire, supported by a number of spaced spiral supports, such as at 8, which are connected to the filament and contact the inner wall of the envelope.

A conventional pinch seal is provided at 4, and this has a
25 foil strip 9, preferably made of molybdenum, sealed therein, which provides an electrical connection between the end of the filament 7 and an external electrical connector 10, such as a flying lead, for connection to a power supply (not shown) to energise the filament 7.

30 The pinch seal 5, also having a foil strip 11 sealed therein, electrically connects the other end of filament 7 to the power supply via a return wire 12, preferably made of tungsten, which extends through the envelope 1 and terminates in pinch seal 3, wherein another foil strip 13 electrically
35 connects the return wire 12 to an electrical connector 14 for

connection to the power supply.

The foil strip 11 in the pinch seal 5 also electrically connects one end of the filament 6 to the power supply, also via the return wire 12, and the other end of filament 6 is
5 connectable to the power supply via another foil strip 15 also sealed in pinch seal 3 and another electrical connector 16.

It can thus be seen that any one of the following combinations of filaments 6 and 7 can be achieved:-

- (a) energisation of filament 6 independently of filament 7
10 by connecting connectors 14 and 16 to the power supply,
- (b) energisation of filament 7 independently of filament 6 by connecting connectors 14 and 10 to the power supply,
- (c) energisation of both filaments 6 and 7 in series by connecting connectors 10 and 16 to the power supply, and
- 15 (d) energisation of both filaments 6 and 7 in parallel by connecting all three connectors 10, 14 and 16 to the power supply.

The return wire 12 is preferably accommodated within a quartz tube 17 within the envelope 1, as shown more clearly in
20 magnified circle 18 in Figure 1, to avoid contact between the return wire 12 and the spiral supports 8 or the filament 6.

It may also be preferable to provide the regions of the pinch seals, particularly the common pinch seal 5, externally with a suitable opaque coating (not shown) to reduce the amount
25 of visible radiation transmitted from one envelope to the other, particularly if only one filament is energised.

Each envelope 1,2 has a respective sealed exhaust tip 19,20, through which the envelope is evacuated, during manufacture of the lamp, and filled with a gas, preferably
30 including a halogen. Also, through this tip 19,20, an inert gas is blown during the making of the pinch seals, particularly the common seal 5, so that the pinch seal 5 is in an inert atmosphere internally at each end, which makes the seal capable of withstanding temperatures up to 900°C without oxidation of
35 the sealing foil 11 and wires thereto.

0222553

The pinch seals 3,4 can each be enclosed in a ceramic end cap 21, the end cap for pinch seal 3 having been removed for reasons of clarity. The ceramic end cap, as described in European Publication No. 120,639, can protect the pinch seals from damage due to overheating and/or mechanical damage during fitting of the lamp in its working environment.

Figure 2 shows a lamp of similar construction to that shown in Figure 1, and like parts are labelled with like reference numerals, with respect to Figure 1.

The lamp construction shown in Figure 2 differs only by the manner of support of each filament 6,7. The spiral supports, as shown at 8 in Figure 1, have been replaced in Figure 2 by quartz backbone supports 27,28 located respectively in the envelopes 1,2. Each backbone support 27,28 consists of a quartz rod 22,23, which are themselves supported by wires, such as at 24,25, which are respectively sealed into the pinch seals 3 and 5. Spaced along each backbone support are a number of filament support wires, such as at 26, which are connected at one end to the filament to be supported and inserted at the other end into the quartz rod 22. The construction of this backbone support is described and claimed in European Publication No. 34,030.

Alternative arrangements of the lamp, in accordance with the present invention, can of course be envisaged. For example, more than two envelopes, together with the required number of filaments and pinch seals, could be constructed in a single lamp, with a suitable arrangement of return wires to connect each filament to the power supply. Also, the return wire 12 may be located in the other envelope 2 or in a separate envelope or sleeve joined to the common pinch seal 5.

The filaments 6,7 are shown as single coil filaments, but they may be coiled coil filaments, which tend to be more robust than single coil filaments.

Figure 3 shows one application of a tungsten-halogen lamp, incorporating the features of the present invention.

In Figure 3, a heating unit 30 comprises a circular shallow

metallic tray 31 containing a layer of infra-red-reflective, thermally-insulative material 32, such as a microporous material. Four tungsten-halogen lamps 33 to 36 are supported at their ends above the thermally-insulative material 32 by a shaped ceramic fibre ring 37. The unit 30 is intended to be mounted beneath a glass ceramic cooktop (not shown) to form a hotplate area of a cooking hob (also not shown). The unit also includes a thermal limiting device 39 to prevent damage to the glass ceramic cooktop due to overheating.

Each envelope is preferably coated on the side adjacent the thermally-insulative material with an infra-red-reflective coating to reflect infra-red radiation generated by the filaments towards the glass ceramic cooktop.

By energisation of all of filaments 40 to 47 of the four lamps 33 to 36, the whole of the hotplate area of the cooktop can be heated. However, if only a portion of the hotplate area is required to be heated, this can be achieved by energising only filaments 40,42,44 and 46 or only filaments 41, 43, 45 and 47.

Furthermore, by switching the filaments of each lamp into series and/or parallel arrangements, a number of heat outputs selectable by a user of the cooking hob can be provided.

The filaments of each lamp may be any length and either of equal or different lengths, as well as being either the same or different wattages, as required.

CLAIMS

(1) An incandescent lamp characterised in that it comprises first and second filaments (6,7) supported in respective sealed envelopes (1,2) of high silica content, said envelopes (1,2) being joined at one end by a common pinch seal
5 (15) having sealed therein common electrical connection means (15) between the respective filament ends adjacent said common pinch seal and an electrical connector (12,13) emergent from said common pinch seal (5) to connect said filament ends to a power supply, said electrical connection being arranged so that
10 at least one of said filaments is capable of being energised independently of the other of said filaments.

(2) A lamp as claimed in claim 1 wherein said electrical connector (12,13) comprises an electrical wire (12), extending through one (1) of said envelopes (1,2) and emergent from the
15 end of said envelope (1) remote from said common pinch seal (5).

(3) A lamp as claimed in claim 2 wherein said electrical wire (12) is enclosed in a quartz tube (17) within said envelope (1) to avoid contact with supports (8) supporting said filament (16) and/or said filament (16).

(4) A lamp as claimed in any preceding claim wherein the
20 region of said common pinch seal (5) is provided externally with an opaque coating to reduce the amount of visible radiation, emitted from one of said filaments (6,7), which is transmitted to said envelope (1,2) containing the other of said filaments
25 (6,7).

(5) A lamp as claimed in any preceding claim wherein said filaments (1,2) are supported in said respective envelopes (6,7) by a number of spiral supports (8) spaced along the length of each of said envelopes (1,2).

(6) A lamp as claimed in any one of claims 1 to 4 wherein
30 said filaments (6,7) are each supported in said respective envelopes (1,2) by a supported quartz rod (22) extending substantially parallel to said filament (6) within said envelope (11), said rod (22) supporting said filament (16) by a number of

wire supports spaced along its length and connected to said filament (16).

(7) A lamp as claimed in any preceding claim wherein the ends of said envelopes (1,2) remote from said common pinch seal (5) are each sealed by a pinch seal (3,4), each of said pinch seals (3,4) being enclosed within a ceramic end cap (21).

(8) A heating unit for heating a hotplate area of a cooking hob, said unit incorporating a number of lamps, each as claimed in any preceding claim, the filaments (6,7) of said lamps being formed from tungsten wire and said envelopes (1,2) containing gas including halogen.

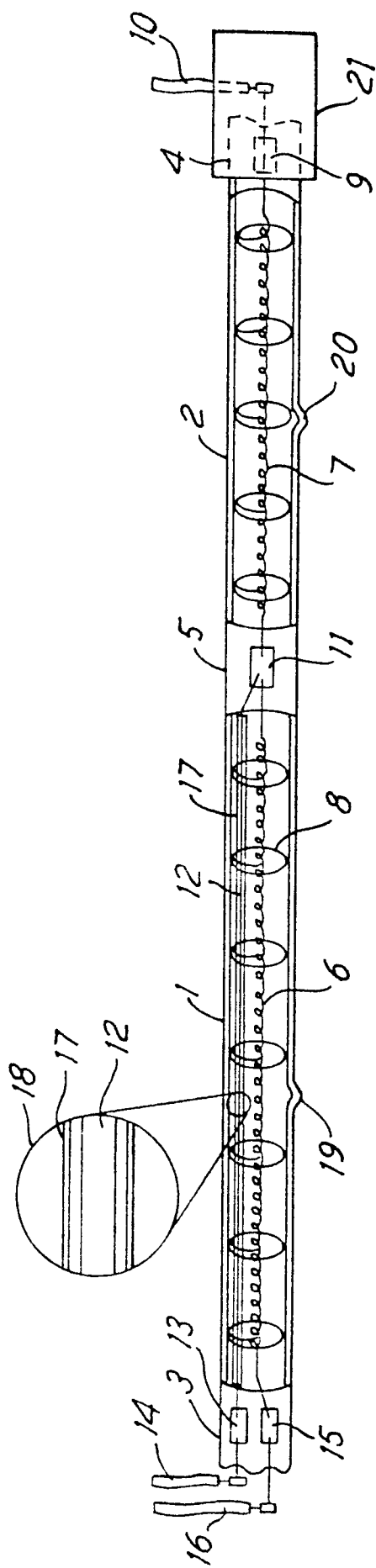


FIG. 1

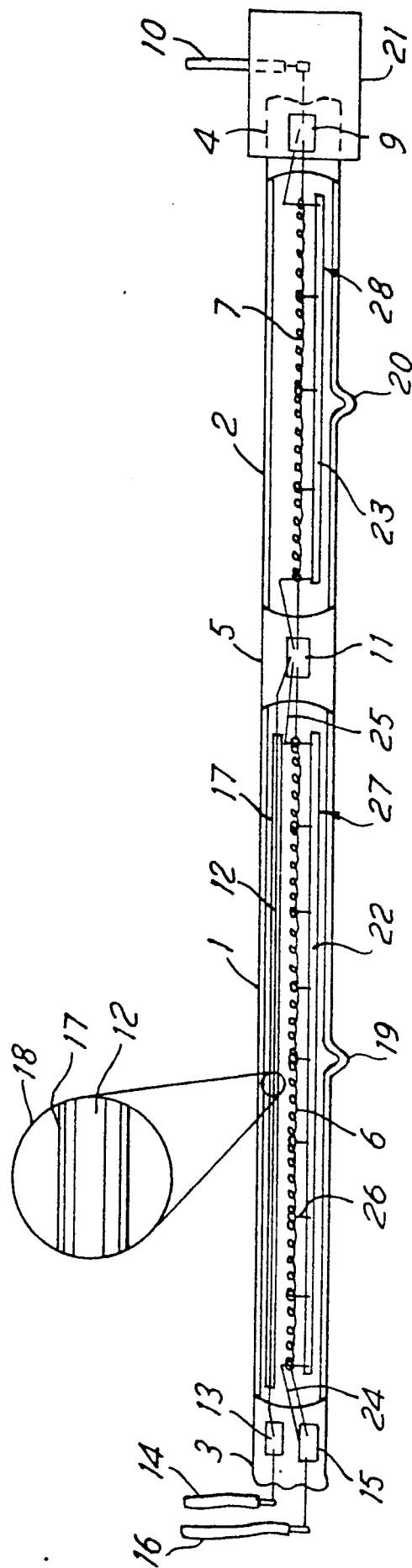


FIG. 2

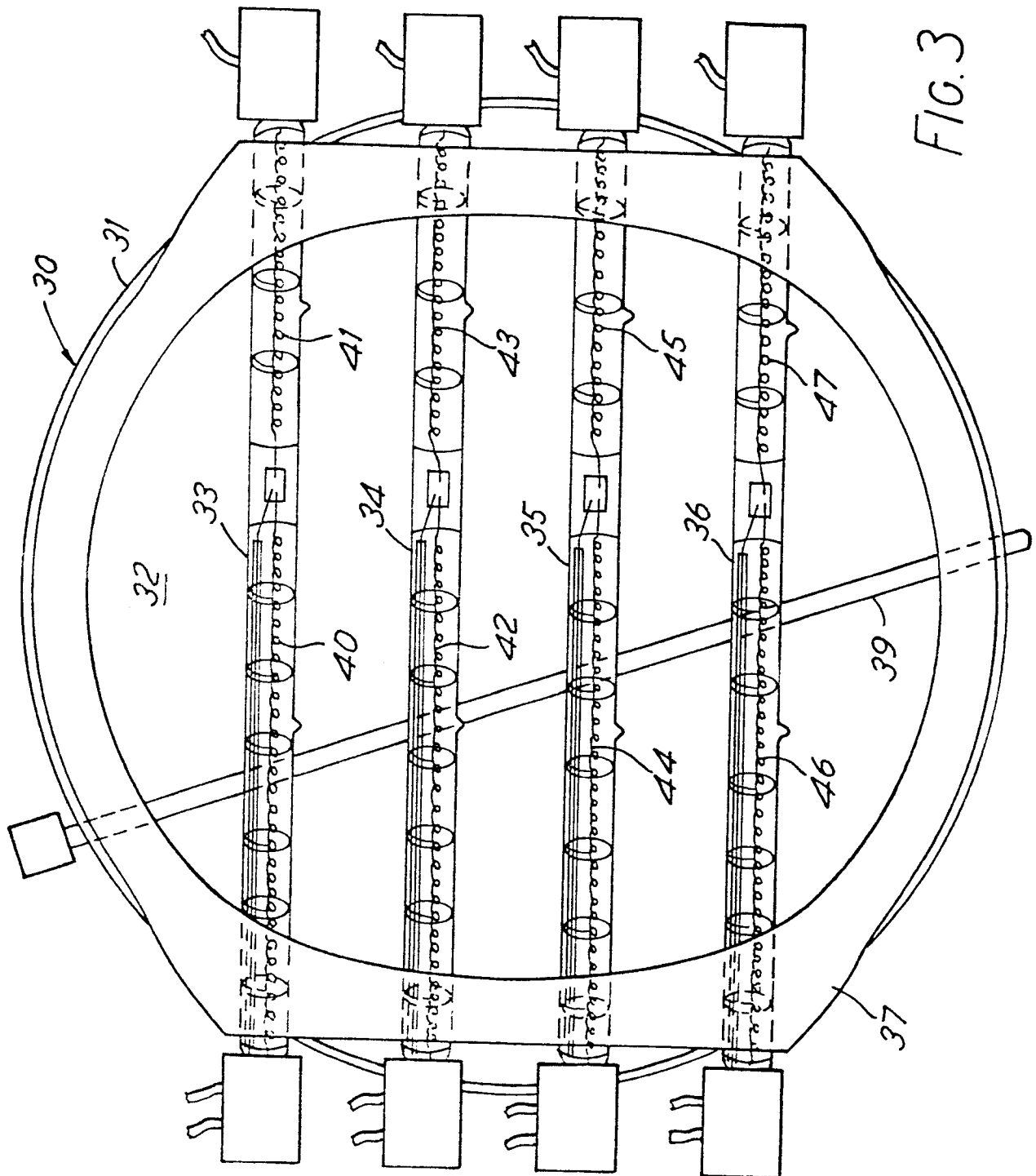


FIG. 3