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(54) Electric lamp.

(57) The electric lamp has a lamp vessel (1) with a stemtube (4) which is sealed off with a pinch (3) and has an exhaust tube (5) inside. The lamp further has a lamp cap (7) provided with a metal shell portion (12) and a base portion (13), the latter carrying an insulator body (14). The insulator body (14) is made of synthetic resin and extends to inside the stemtube (4) of the lamp vessel (1) around a current supply conductor (10) to a contact member (8) at this insulator body (14). The lamp construction counteracts the risks of a discharge arc inside the lamp cap.

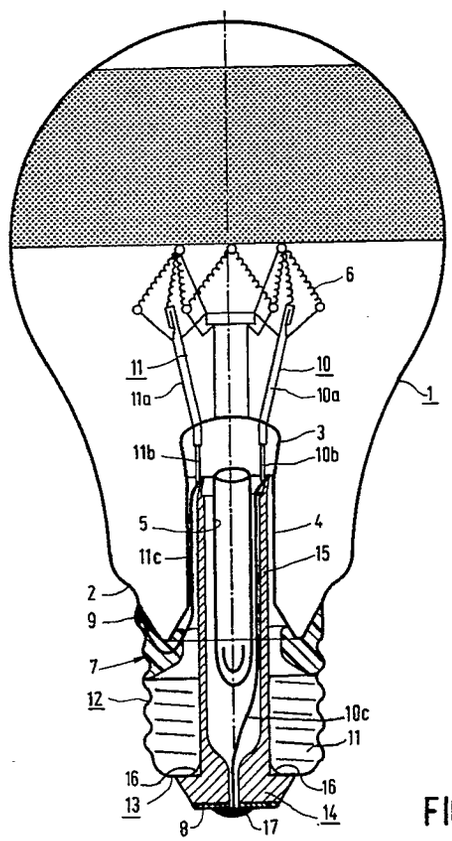

FIG.1

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ELECTRIC LAMP.

The invention relates to an electric lamp comprising

- a translucent lamp vessel with an end portion which comprises a stemtube, which stemtube is closed off with a pinch, with a sealed exhaust tube inside the stemtube,
- a light source in the lamp vessel,
- a lamp cap provided with contact members and fastened to the end portion of the lamp vessel,
- current supply conductors extending from the light source to respective contact members at the lamp cap and fastened thereto, a fuse being included in a current supply conductor,
- the lamp cap having a metal shell portion and a base portion which carries an insulator body at an outer surface of this base portion,
- the insulator body comprising a tubular portion which extends into the lamp cap and surrounds a first current supply conductor which extends to a contact member at said insulator body.

Such an electric lamp is known from GB 503.462 (1939-04-06).

The insulator body in the known lamp consists of glass. Its tubular section extends so far into the lamp cap that its free end is enveloped in a cement compound with which the lamp cap is also fastened to the lamp vessel. Furthermore, the lamp comprises a disc made of insulating material at the end portion of the lamp vessel, which disc renders the stemtube closed to the cement compound.

In lamps having lamp caps with a metal shell portion, there is a risk of the current supply conductor to the contact member at the base portion making contact with the shell portion, or of a discharge arc arising between the two. Such a contact or discharge arc can arise when a current supply conductor melts owing to an excessive current through the lamp. The shell portion can then become live or the circuit breaker, through which the lamp is supplied, can be triggered owing to short-circuit in the lamp cap. It is also possible for the lamp cap to become welded to the lamp holder. Removal of such a welded lamp cap is dangerous.

The construction of the known lamp has the disadvantage that an extra component, the disc of insulating material, is to be mounted during lamp assembly and also that it is uncertain whether the cement compound actually closes off the tubular section and prevents a discharge arc between the current supply conductor inside that section and the shell portion.

GB 1.184.300 (1970-03-11) discloses a lamp in which a separate hollow insulator body is present in the lamp cap, which body extends from the base portion into the cement compound with which the lamp cap is fastened. This lamp has the disadvantage that the lamp vessel and the lamp cap must be assembled with the lamp cap in bottom position in order to prevent the insulator body dropping from the lamp cap or assuming a skew position in the lamp cap. After assembly the lamp should then be reversed to bring the lamp cap in top position in order to achieve the fastening of the current supply conductor to the base contact member. Another disadvantage is that the insulator body, being an additional assembly component, has to be applied in the lamp cap first during lamp assembly.

US 2.141.146 (1935-09-17) discloses a similar lamp, but also a lamp in which the shell portion of the lamp cap is coated with an insulating compound at the inside. The compound may consist of the same material as the insulating material of the base portion, usually glass, and be integral with it. It has proved to be difficult, however, to apply sufficient insulating material the guarantee contact with the adhesive compound, but on the other hand to achieve that not so much insulating material is applied that the lamp cap is no longer certain to fit the end portion of the lamp vessel. If lamp caps with aluminium shell portions are used, furthermore, the use of the said insulating material for coating the shell portion is not possible since the lamp cap is heated too strongly during the application of this material, so that the shell portion becomes too soft and liable to lose its shape. The same disadvantages apply for the lamp caps disclosed in this US Patent which have a coating of cured cement.

GB 1.139.266 (1969-01-08) discloses a lamp which is realised with the use of a lamp cap in which a ring of material was pressed which generates a foam upon heating. This lamp has the disadvantage that, after foaming of the material and curing of the foam, rifts may be present in the foam which still render the shell portion accessible to a discharge arc. Moreover, the foam proves to be degenerated and pulverized at the end of lamp life. It has also proved necessary to check the lamp cap for the presence of the foam ring before lamp assembly.

US 2.076.582 (1937-04-13) discloses a lamp in which the current supply conductor to the base contact member is surrounded by a sleeve of insulating material. A disadvantage of this is that an extra component must be applied during the assembly of lamp cap and lamp vessel.

The invention has for its object to provide a lamp of the kind described in the opening para-

graph which is, among other characteristics, of a simple and reliable construction and which is easy to manufacture.

According to the invention, this object is achieved in that the insulator body is made of synthetic resin and extends into the stemtube.

An advantage of the lamp according to the invention is that the first current supply conductor is certain to be laterally separated from the lamp cap shell by insulators, i.e. by the insulator body and the stemtube together, or indeed by the insulator body alone in the case of a favourable embodiment, in which the insulator body extends into the stemtube to beyond the lamp cap. Contact between the enveloped current supply conductor and the lamp cap shell is thus impossible. The risk of a discharge arc arising between this conductor and the lamp cap shell is effectively counteracted.

In proportion as the first current supply conductor is surrounded by the insulator body over a greater portion of its length, there is a reduction in the risk of a discharge arc jumping over to the shell portion of the lamp cap when a current supply conductor is fused.

In a favourable embodiment, the insulator body extends up to the pinch of the stemtube. The first current supply conductor then is substantially completely separated from the other current supply conductor, so that the risk of a discharge arc arising between one current supply conductor to the other current supply conductor is minimized.

The tubular portion of the insulator body may enclose only the first current supply conductor and extend next to the exhaust tube in the stemtube. Alternatively, however, it is possible for the tubular section also to enclose the exhaust tube. An advantage of this is that the first current supply conductor is easily caught in the wide, tubular portion when the lamp cap is applied on the lamp vessel, because of the exhaust tube/current supply conductor ratio, and is guided to the relevant contact at the base portion of the lamp cap. It is favourable for the ease of assembly if the tubular portion extends to beyond the lamp cap.

In a favourable embodiment, the fuse is part of the enveloped current supply conductor. The fuse may easily lie entirely inside the insulator body and extend from the stemtube up to the contact member at the base portion. The current supply conductor then consists of no more than three portions connected in series: a first portion mainly inside the lamp vessel, a second portion sealed in a vacuum-tight manner from the pinch of the stemtube into the stemtube proper, and a third portion extending to the contact member.

For easy lamp manufacture it is favourable if the second current supply conductor is identical to the first. In the case of Edison lamp caps or Swan-s lamp caps, such a current supply conductor is connected to the shell of the lamp cap, usually in that this conductor is guided to the exterior of the shell through the space between the end portion of the lamp vessel and the lamp cap, and is fastened to this exterior. In the case of lamp caps having a contact member at the base portion also for a second current supply conductor, such as the Swan-d lamp caps, it is favourable if the other current supply conductor is also enveloped by the insulator body from the stemtube, enclosed in a separate cavity in this body. By enclosing the other current supply conductor in an own, separate cavity it is prevented that a discharge arc jumps over from one current supply conductor to the other.

It is favourable to form the insulator body, if it extends up to the pinch, in such a way at its free end positioned at this pinch that the body is deformable. An insulator body which is too long for a certain lamp from a series of lamps, owing to spread in stemtube length, can then be deformed during cap mounting in order to adapt itself to this stem tube length. The insulator body may at its free end have, for example, a wall which becomes thinner, stepwise or not.

An attractive result of the use of the insulator body of thermoplastic synthetic material is that the shell of the lamp cap can have a thinner wall. This is because the metal shell is no longer subjected to the high temperature of molten glass during lamp cap manufacture, which temperature renders the shell soft and thus less permanent in shape. This lack of permanence in shape renders it necessary to use shells of greater thickness when glass is used.

It is favourable if the insulator body is manufactured separately from the shell portion and is fastened to the base portion. This fastening may be realised in various ways.

The insulator body may be glued to the base portion, for example, by the use of an adhesive agent or by direct adhesion of the insulator body to the base portion. Alternatively, a mechanical connection, for example a clamp connection, may be used. The base portion may have a snap connection with the insulator body, for example around the tubular portion thereof. The parts may be united by a scrape connection, tongues projecting into the lamp cap bearing on the tubular portion with clamping fit. It is also possible for projections, for example pins, to be present on the insulator body, which projections enter openings in the base portion and are, for example, ultrasonically upset.

The contact member(s) at the insulator body may be formed at this body during manufacture of this body, such as is the case for conventional lamp caps with a glass insulator body at the base portion. However, it is also possible to provide the

insulator body with a stub, which may or may not be countersunk in the surface of this body, over which stub a current supply conductor is guided and around which a contact member, which may be, for example, tube- or bush-shaped, grips with clamping fit. In an alternative embodiment, a contact member is a metal disc which has a perpendicularly flanged split tongue which keeps a current supply conductor clamped in by way of piercing contact. The flanged tongue may be enclosed in a groove in the insulator body. The contact member may have a second, possibly split tongue which is also enclosed in a groove in order to give the contact member an additional fixation.

A wide variety of synthetic resins, for example thermoplastic synthetic materials, is eligible for use in the insulator body. Examples which can be mentioned are polyether imide, polyether sulphone, polyether etherketone, polybutylene terephtalate, polypropylene oxide, polyphenylene sulfide, polyamide imide and polyimide.

An incandescent body may be the light source of the lamp, but alternatively it may be a discharge arc.

This and other, more detailed aspects of the invention are described and explained with reference to the drawings.

In the drawing:

Fig. 1 shows a first embodiment in side elevation with the lamp cap in longitudinal cross-section,

Fig. 2 shows a second embodiment represented in the same way,

Fig. 3 shows another embodiment of the insulator body of Fig. 1,

Fig. 4 shows an elevation of a contact member for the body of Fig. 3,

Fig. 5 shows a further embodiment of the insulator body of Fig. 1,

Fig. 6 shows a contact member for the body of Fig. 5 in cross-section.

The electric lamp of Fig. 1 has a translucent lamp vessel 1 with an end portion 2 which comprises a stemtube 4, closed off with a pinch 3 and containing a sealed exhaust tube 5. The lamp vessel 1 surrounds a light source 6, while a lamp cap 7 provided with contact members 8, 9 is fastened to the end portion 2 of the lamp vessel 1. Current supply conductors 10, 11 extend from the light source 6 to respective contact members 8, 9 at the lamp cap 7 and are fastened thereto. A fuse 10c, 11c is included in a respective current supply conductor 10, 11. The lamp cap 7 has a metal shell portion 12 and a base portion 13, the latter carrying an insulator body 14 at an exterior surface thereof. The insulator body 14 has a tubular portion 15 which extends inside the lamp cap 7 and surrounds a first current supply conductor 10, which extends to a contact 8 at this insulator body 14.

The insulator body 14 is made of synthetic resin and extends into the stem tube 4. In the Figure, the insulator body extends to beyond the lamp cap 7 up to the pinch 3 of the stemtube 4. The insulator body 14 surrounds both the exhaust tube 5 and the first current supply conductor 10. The first current supply conductor 10 has, as has the other current supply conductor 11, three portions: a portion 10a which lies substantially inside the lamp vessel 1, a portion 10b which is sealed in a vacuum-tight manner and runs from the pinch 3 into the stemtube 4, and a portion 10c which has the function of a fuse and extends up to the contact member 8. The fuse 10c in the first current supply conductor 10 is entirely inside the insulator body 14.

The insulator body 14 is capable of deformation at its end adjoining the pinch 3. The material thickness of the body 14 there is smaller than at a greater distance from the pinch 3.

The insulator body 14 is a separately manufactured body which is fastened to the base portion 13 of the lamp cap 7, in the Figure by mechanical means. Clamping tags 16 are formed at the base portion 13 in the Figure, gripping around the insulator body 14, particularly around the tubular portion 15 thereof, and scraping themselves into this portion if said body 14 should be pulled from the lamp cap 7. The current supply conductor 10 is fastened to the contact member 8 with a solidified drop of metal 17.

In Fig. 2, identical parts have the same reference numerals and corresponding parts have reference numerals which are 20 higher than those in Fig. 1.

The lamp has a bayonet lamp cap 27 provided with two contact members 28, 29 at the base portion 33. An insulator body 34 of synthetic resin is fastened to the base portion 33 by upsetting of pins 36. The insulator body 34 extends with its tubular portion 35 to against the pinch 3 and surrounds both the exhaust tube 5 and the current supply conductor 10. The insulator body 34 has a separate cavity 38 for the current supply conductor 11, which extends to the stemtube 4, in the Figure to beyond the lamp cap 27.

In Fig. 3, the insulator body 54 made of, for example, polyether etherketone has a recess 55 for accommodating the contact member 48 of Fig. 4. The insulator body has a groove 56 which can accommodate a split tongue 49 of the contact member 48, which tongue keeps a current supply conductor clamped in by way of piercing contact. The tongue 49 is bent away from the contact surface of the contact.

In Fig. 5, the insulator body 74 has a substantially circular groove 76 which forms a recessed

stub 77. A current supply conductor emerging from the insulator body 74 to the exterior is bent back about this stub 77. A bush-shaped contact member 68 of Fig. 6 can enter the groove 76 with its substantially circular wall 69, thus clamping in the current supply conductor.

Claims

1. An electric lamp comprising
- a translucent lamp vessel (1) with an end portion (2) which comprises a stemtube (4), which stemtube is closed off with a pinch (3), with a sealed exhaust tube (5) inside the stem tube,
- a light source (6) in the lamp vessel (1),
- a lamp cap (7) provided with contact members (8, 9) and fastened to the end portion (2) of the lamp vessel (1),
- current supply conductors (10, 11) extending from the light source to respective contact members (8, 9) at the lamp cap (7) and fastened thereto, a fuse (10c, 11c) being included in a current supply conductor,
- the lamp cap (7) having a metal shell portion (12) and a base portion (13) which carries an insulator body (14) at an outer surface of this base portion,
- the insulator body (14) comprising a tubular portion (15) which extends into the lamp cap (7) and surrounds a first current supply conductor (10) which extends to a contact member (8) at said insulator body (14),

characterized in that the insulator body (14) is made of synthetic resin and extends into the stemtube (4).

2. An electric lamp as claimed in Claim 1, characterized in that the insulator body (14) extends into the stemtube (4) to beyond the lamp cap (7).

3. An electric lamp as claimed in Claim 1, characterized in that the insulator body (14) extends up to the pinch (3) of the stemtube (4).

4. An electric lamp as claimed in Claim 2 or 3, characterized in that the insulator body (14) encloses both the exhaust tube (5) and the current supply conductor (10).

5. An electric lamp as claimed in Claim 1 or 2, characterized in that the first current supply conductor (10) comprises a fuse (10c).

6. An electric lamp as claimed in Claim 5, characterized in that the fuse (10c) lies entirely inside the insulator body (14).

7. An electric lamp as claimed in Claim 6, characterized in that the fuse (10c) extends up to the contact member (8) at the baseportion (13).

8. An electric lamp as claimed in Claim 1, characterized in that a second current supply conductor (11) is accommodated in an own, separate cavity (38) in the insulator body (34) up to inside the stemtube (4) and extends to a second contact member (29) at the base portion (33) of the lamp cap (27).

9. An electric lamp as claimed in Claim 3, characterized in that the insulator body (14, 34) is capable of deformation at its end adjoining the pinch (3).

10. An electric lamp as claimed in Claim 1, characterized in that the insulator body (14, 34) is a separately manufactured body which is fastened to the base portion (13, 33) of the lamp cap (7, 27).

11. An electric lamp as claimed in Claim 10, characterized in that the insulator body (14) has a clamp connection (16) to the base portion (13).

12. An electric lamp as claimed in Claim 10, characterized in that the insulator body (34) has upset pins (36) projecting through openings in the base portion (33).

13. An electric lamp as claimed in Claim 1, characterized in that the insulator body (74) has a stub (77) around which the first current supply conductor (10) is bent and around which a contact member (68) grips with clamping fit.

14. An electric lamp as claimed in Claim 1, characterized in that the insulator body (54) has a groove (56) accommodating a split tongue (49) of a contact member (48), thus clamping in the first current supply conductor (10) by way of piercing contact.

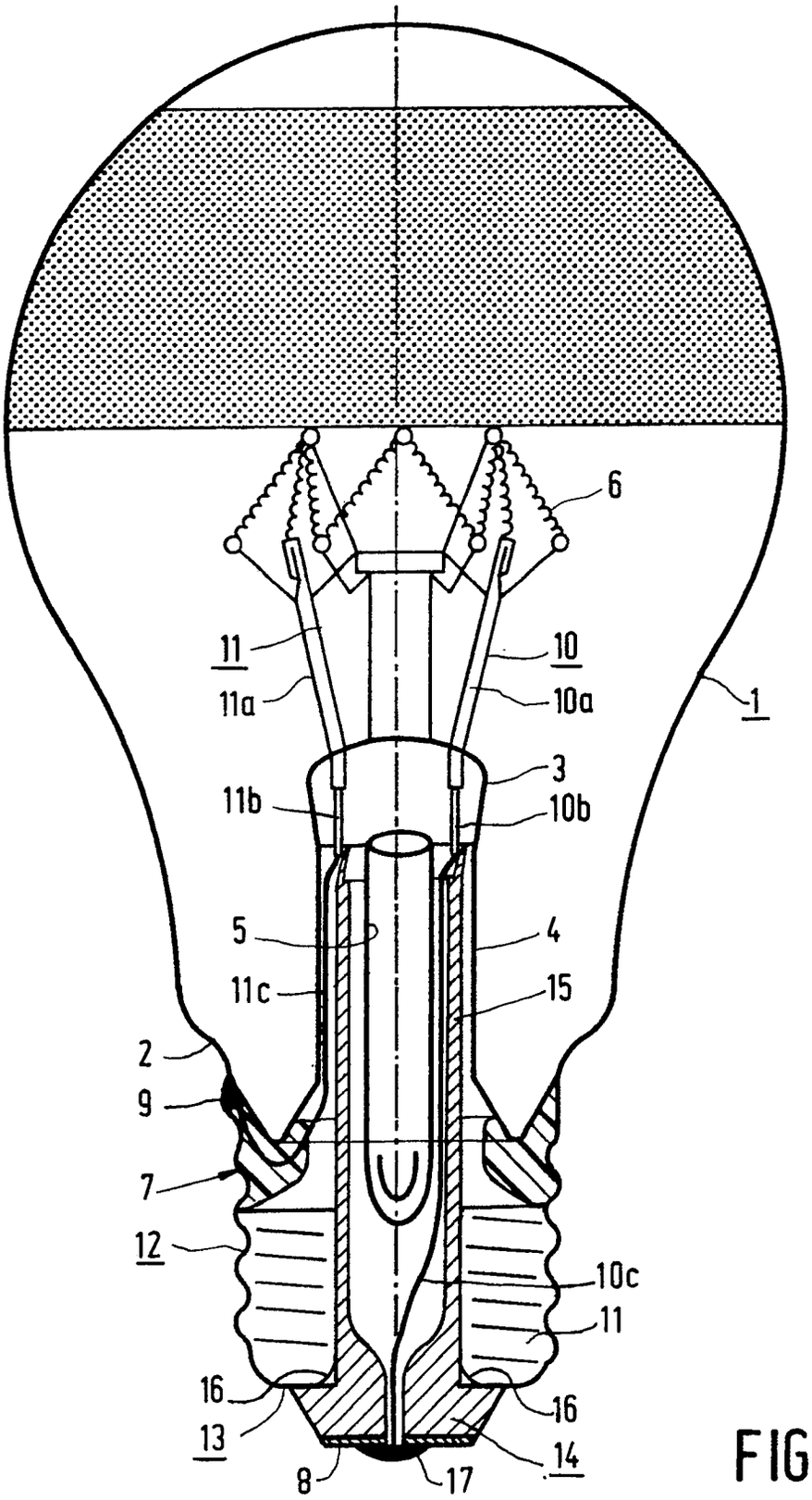
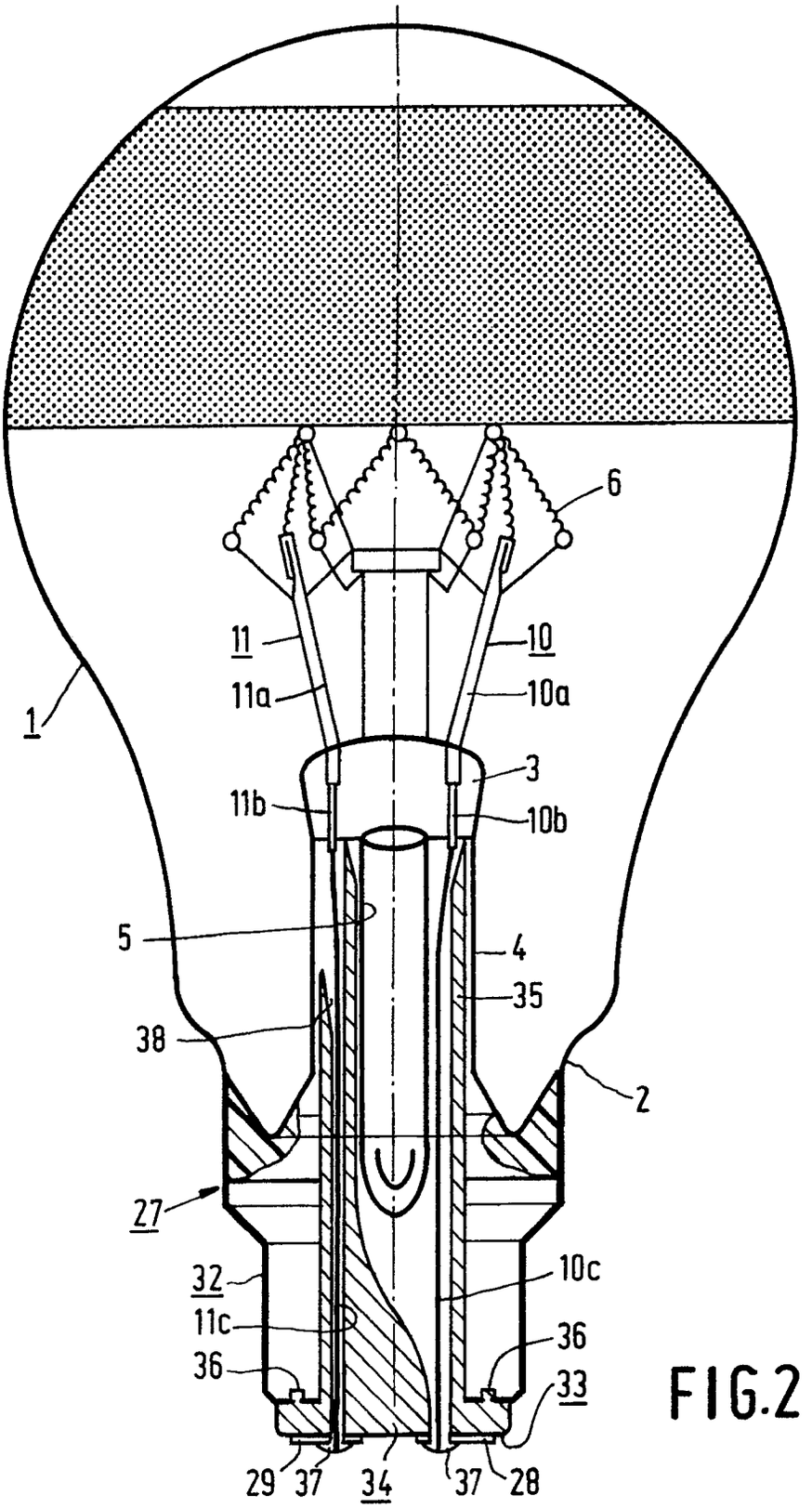


FIG.1


6
11
10
11a
10a
1
3
11b
10b
5
4
35
38
2
27
32
10c
11c
36
36
33
29
37
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37
28

FIG.2

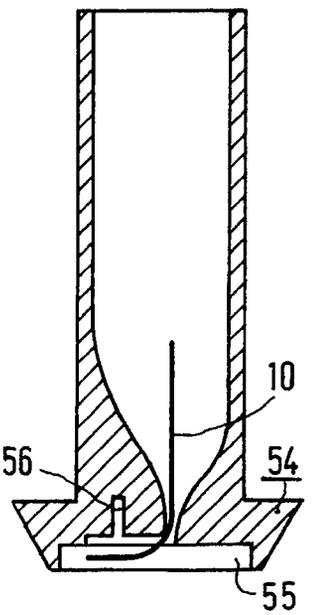

FIG.3

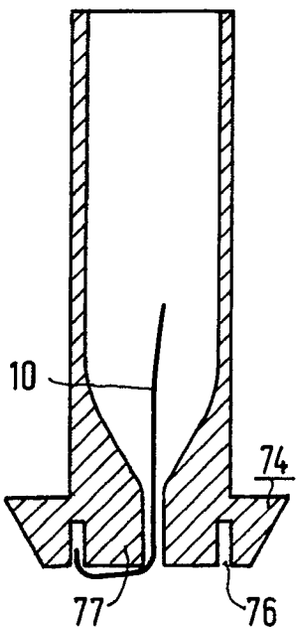

FIG.5

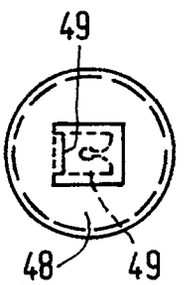

FIG.4

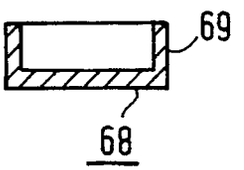

FIG.6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 20 0224

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)
D,Y,A	US-A-2 076 582 (LINDER) * the whole document *	1,2-7,9, 10	H 01 K 1/46 H 01 K 1/66 H 01 J 61/36
Y,A	FR-A-1 099 072 (CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE) * page 1, left-hand column, paragraphs 3 - 5 * * page 1, right-hand column, paragraph 5; figure *	1,2,3	
A	PATENT ABSTRACTS OF JAPAN vol. 3, no. 130 (M-78) 27 October 1979, & JP-A-54 107178 (TOKYO SHIBAURA DENKI K.K.) 22 August 1979, * the whole document *	5,-7	
A	FR-A-2 631 739 (DUMAS) * page 3, line 13 - page 5, line 16; figures *	1-3	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

H 01 K
H 01 J

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	24 April 91	SCHAUB G.G.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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