Feb. 28, 1961 H. E. PLISHKER 2,973,451

ELECTRIC LAMP

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FIG. 1.

T-19 COOL

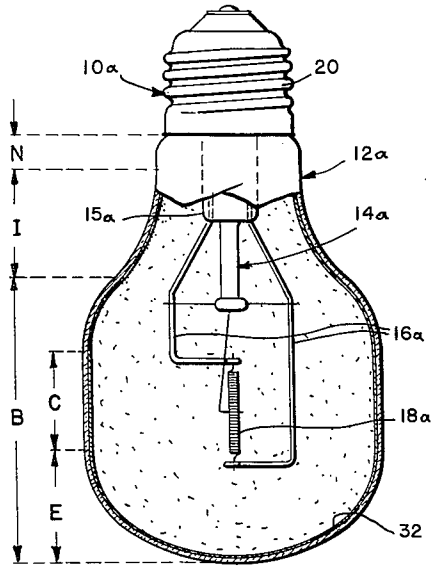


FIG. 2.

T-16

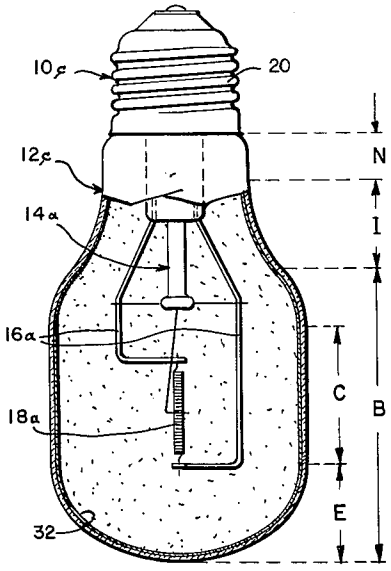


FIG. 3.

T-19 SHORT

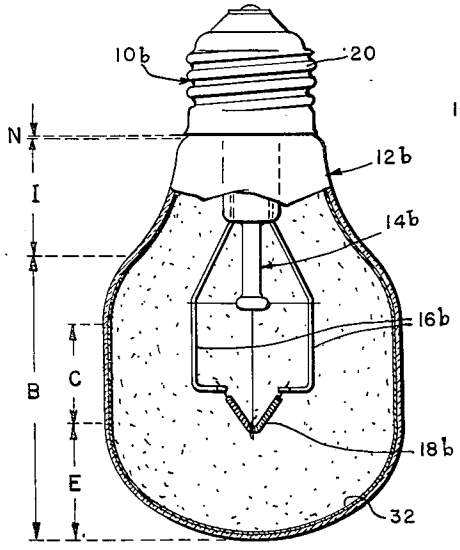


FIG. 4.

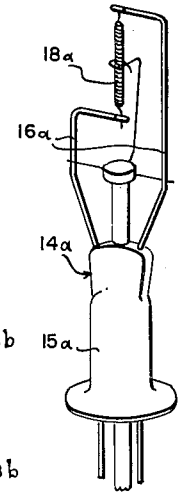
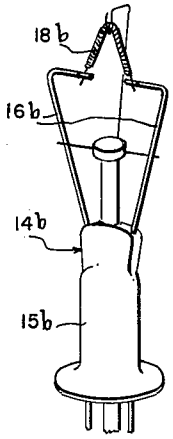


FIG. 5.



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ELECTRIC LAMP

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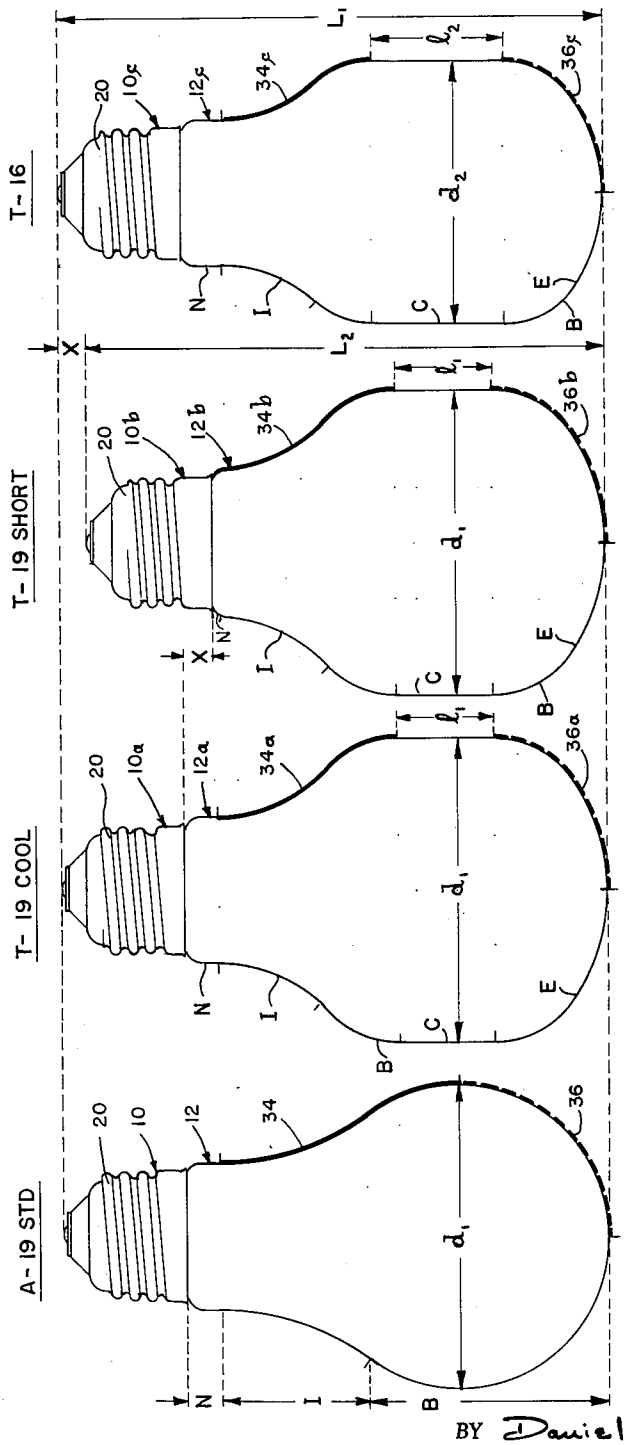


FIG. 6.

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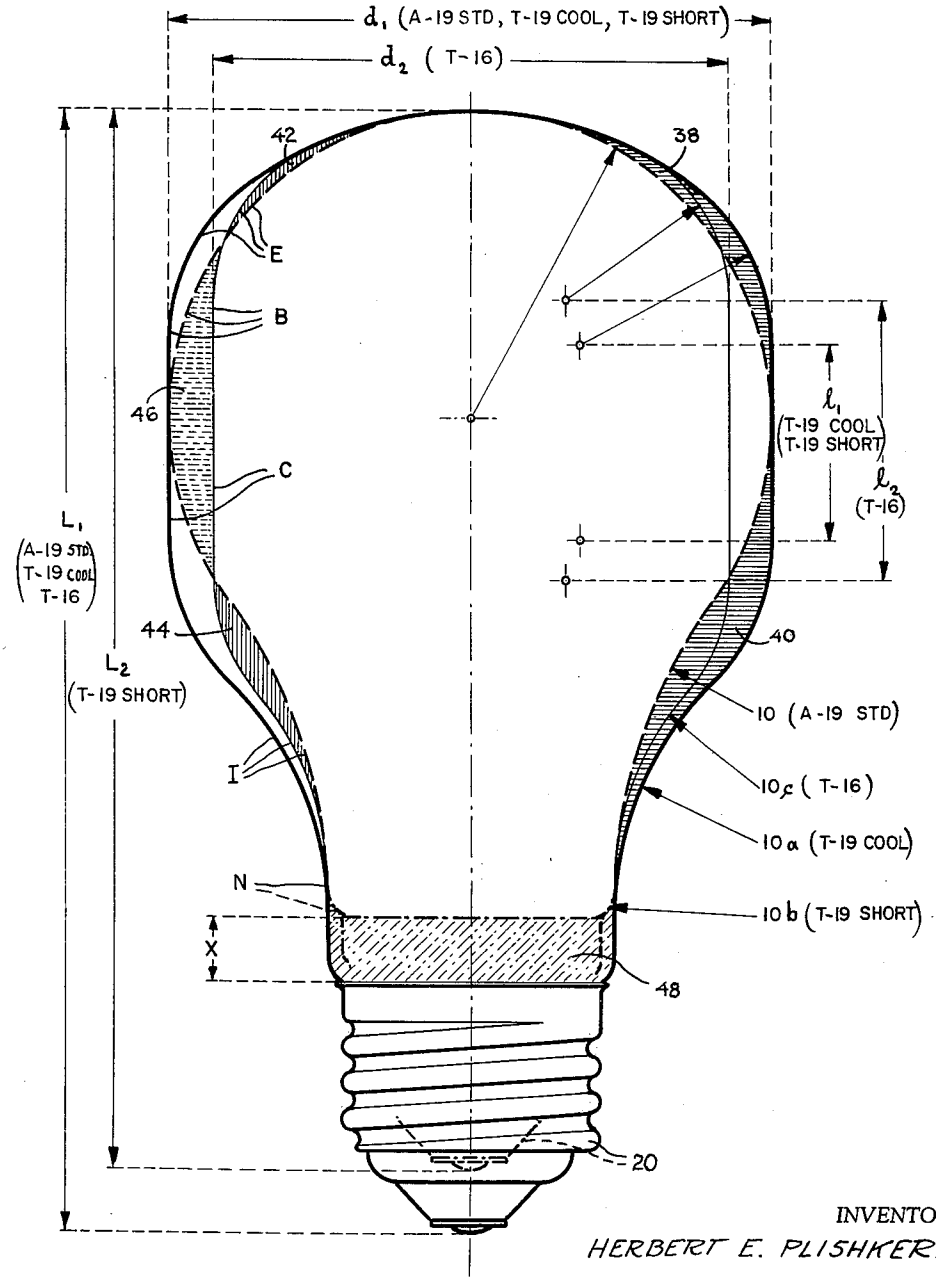
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FIG. 7.



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2,973,451

ELECTRIC LAMP

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Filed Sept. 3, 1959, Ser. No. 837,869

11 Claims. (Cl. 313—317)

This invention relates to electric lamps and, more particularly, to an improved incandescent lamp for general lighting service.

In order to achieve higher levels of illumination with existing or more compact luminaires and thus provide better lighting, the lamp industry has been constantly striving to reduce the physical size of general lighting incandescent lamps without decreasing their efficiency, life or lumen maintenance, or exceeding the permissible temperature limit established for sockets, etc. In accordance with this objective there has recently been introduced a 100 watt incandescent lamp wherein, by positioning a coiled-coil filament along rather than transversely of the longitudinal axis of the lamp, the bulb size for this wattage lamp was reduced from an A21 to an A19 and the overall lamp length decreased by ⅞ of an inch to 4 7/16 inches without generating excessive base or socket temperatures or decreasing the life or efficiency of the lamp. As is customary in the art, the numerical portion of the foregoing bulb designations represents the maximum diameter of the bulb in eighths of an inch whereas the letter "A" signifies that the bulb is of the well-known pear-shaped variety conventionally employed for such general lighting incandescent lamps. Thus, the aforesaid recently-introduced 100 watt A19 lamp is also ⅜ or ¼ of an inch smaller in diameter than the regular 100 watt A21 lamp which it replaced and, as a result, has the same overall dimensions as and is interchangeable with standard 50, 60 and 75 watt lamps.

While the aforementioned 100 watt A19 lamp does not exceed the permissible temperature limit of 125° C. established for so-called paper-lined metal sockets, it approaches this limit and may exceed it if the luminaire in which the lamp is used is improperly or poorly designed. Hence, a wider margin of safety in this respect would be desirable. In addition, since the A19 bulb has exactly the same pear-shape configuration as the A21 bulb which it replaced and is only ¼ of an inch smaller in diameter, the portion of the bulb surface that is laterally disposed when the lamp is burned in a base-up or base-down position (that is, the dust-collecting area of the lamp) is only very slightly reduced. Hence, the amount of light lost during the life of the lamp due to the masking effect of dirt that gradually accumulates on the laterally-disposed portions of the bulb surface is only slightly less than in the case of the larger A21 100 watt lamp so that the percent decrease in lumen maintenance due to surface dirt—which can be quite high and thus constitute a major problem, particularly when the lamp is burned base-up in a dusty atmosphere—remains substantially the same as before.

It is accordingly the general object of the present invention to avoid and overcome the foregoing and other deficiencies of the prior art by providing an improved electric lamp.

Another object of this invention is the provision of an electric lamp that has a higher lumen maintenance than

prior art lamps of the same overall dimensions and wattage rating.

Another and more specific object of this invention is the provision of an incandescent lamp that has less dust-collecting area when burned base-up or base-down than prior art lamps of the same wattage, efficiency, and overall dimensions and which has a base temperature that affords a greater margin of safety as regards socket temperature.

Still another object of this invention is the provision of an incandescent lamp that is not only more compact than prior art lamps of the same wattage and efficiency rating having pear-shaped bulbs but which has substantially the same base temperature and exhibits an improved lumen maintenance through life, particularly when used in a dusty atmosphere.

The foregoing objects, and others which will become apparent to those skilled in the art as the description proceeds, are achieved according to the present invention by employing in conjunction with an axially-extending filament a tubular-shaped (T) bulb instead of the conventional pear-shaped (A) bulb initially adopted by the industry and used down through the years as the standard bulb type for general lighting lamps. Specifically, the bulbous or enlarged portion of the envelope is straight-sided in the region of its maximum diameter intermediate its ends thus providing a cylindrical section thereat which is coaxial with the lamp and filament and encloses the latter. The bulbous portion is accordingly of tubular configuration rather than spherical as in the conventional A type bulbs used heretofore.

In addition, the dimensions of the cylindrical section are maintained within preselected limits to provide a novel T bulb for general lighting lamps which bulb, by virtue of its straight-sided bulbous portion, not only is greater in volume but has less dust-collecting area, than an A bulb of the same diameter and length and is thus able to minimize the loss of light output from accumulated surface dirt during the life of the lamp. Lamps incorporating the new T bulbs also exhibit a lower base temperature than prior art lamps of the same wattage, efficiency, over all dimensions, and filament construction having A bulbs, thereby affording a greater safety margin with regard to socket temperature.

Alternative lamp embodiments are also provided wherein by properly adjusting the dimensions of the cylindrical section of the T bulb and correlating them with the overall dimensions of the lamp, the aforementioned decrease in the base temperature is translated into a reduction in either the overall length or diameter of the lamp without impairing its performance quality and, in the latter case, effecting an even further reduction in the dust-collecting area and improvement in the maintenance of light output during life.

For a better understanding of this invention reference should be had to the accompanying drawings wherein:

Fig. 1 is a side elevational view of a 100 watt electric incandescent lamp which incorporates this invention, the major portion of the lamp envelope being broken away to show the disposition and character of the filament mount assembly;

Fig. 2 is a similar view of an alternative lamp embodiment wherein a T bulb having a cylindrical section of increased length but smaller diameter is employed;

Fig. 3 is a similar view of still another lamp embodiment having the same size T bulb as that shown in Fig. 1 but which is slightly shorter in overall length and has a different type filament mount assembly sealed therein;

Figs. 4 and 5 are perspective views of the filament mount assemblies employed in the lamp embodiments shown in Figs. 1–2 and Fig. 3, respectively;

Fig. 6 is an elevational view of the lamp embodiments

illustrated in Figs. 1 to 3 arranged in side-by-side contrasting relationship with a prior art lamp of the same wattage rating having a conventional A type bulb; and

Fig. 7 is a composite enlarged view in elevation of the lamps shown in Fig. 6 further illustrating the differences in the overall length, volume and area therebetween and the famly of lamp shapes and sizes provided by this invention.

While the present invention may be advantageously employed in any type electric lamp that requires a bulbous envelope and a concentrated light source it is particularly adapted for use in incandescent lamps for general lighting service having axially-extending filaments and has accordingly been so illustrated and will be so described.

In Fig. 1 there is shown a 100 watt T19 general lighting lamp **10***a* which incorporates the present invention and comprises generally a sealed light-transmitting envelope **12***a* containing a mount assembly **14***a* (Fig. 4) which includes an elongated filamentary light source such as a coiled-coil filament **18***a*. As shown, the filament **18***a* is supported in substantially coincident relationship with the longitudinal axis of the lamp by means of a so-called CC8 type mount which comprises the usual stem tube **15***a*, a pair of suitably shaped and spaced lead wires **16***a* and a center support. The envelope **12***a* is terminated at one end by a neck portion N and at the other end by a bulbous portion B that is joined to the aforesaid neck portion by a tapered and smoothly merging intermediate portion I. The closed end segment E of the bulbous portion B opposite the intermediate portion I is of hemispheroidal configuration as here shown but may be hemispherical or even flat if desired. The bulbous portion B in accordance with this invention is straight-sided intermediate its ends and in the region of its maximum lateral dimension thereby providing a cylindrical section C of predetermined length and diameter the axis whereof substantially coincides with the longitudinal axis of the lamp **10***a*. The usual base **20** is attached to the neck portion N and is joined to the lead wires **16***a* to facilitate connecting the lamp to an electrical power supply. The envelope **12***a* contains a filling of inert gas such as a mixture of nitrogen and argon and is preferably rendered light-diffusing as by acid etching its inner surface or applying thereto a coating of finely-divided material such as silica or the like as is well known. As shown, the filament **18***a* is positioned within and is preferably centrally located with respect to the cylindrical section C.

As illustrated in Figs. 6 and 7, the overall length L1 and maximum diameter *d*1 of the T19 lamp **10***a* are the same as those of a standard prior art 100 watt A19 lamp **10** that has a generally spherical rather than a cylindrical bulbous portion, which dimensions L_1 and d_1 are $4\frac{7}{16}$ inches and $2\frac{3}{8}$ inches respectively. Comparative tests have shown that the base and resultant socket temperature of a 100 watt lamp having the foregoing dimensions and the same axially-extending filament and mount construction is reduced by at least 5° C. when the T19 bulb **12***a* is employed instead of the conventional A19 bulb **12**. The 100 watt T19 lamp **10***a* accordingly runs cooler and provides a greater safety margin with regard to the permissible socket temperature limit than the standard A19 lamp **10** of the same wattage and size. The T19 lamp **10***a* can thus be termed a "cool" lamp as compared to the standard A19 lamp **10** and has accordingly been so designated in the drawings and will be thus characterized in the description which follows.

It has been found that the aforementioned reduction in the base and socket temperature effected by the substitution of a T bulb for a conventional A bulb of the same diameter and length may be translated into a reduction in either the overall length or diameter of the lamp. Specifically, since the cool T19 lamp **10***a* has a larger volume and surface area than the standard A19 lamp **10** of the same length and diameter (as indicated by the shaded areas **38** and **40** in Fig. 7 and as also noted in Tables I and II below) and thus has a lower base temperature, either the diameter or overall length of the aforesaid cool T19 lamp can be decreased to provide a lamp that is more compact than but has substantially the same base and socket temperature, light output and life as the standard 100 watt A19 lamp **10**. In other words, by virtue of the reduction in the base and socket temperature effected by substituting a T envelope for a conventional A bulb of the same length and diameter in accordance with this invention, either the diameter (that is, the bulb size) or overall length of a lamp of a given wattage and construction may be proportionately reduced and the physical size of the lamp thus decreased without exceeding the base or socket temperature which the lamp would have had if it were fabricated with the larger A type bulb.

The first alternative of reduced diameter or bulb size is illustrated by the 100 watt T16 lamp **10***c* shown in Fig. 2 which lamp is of the same overall length L1 as the cool T19 lamp **10***a* and the standard A19 lamp **10** (see Figs. 6 and 7) but has an envelope **12***c* the maximum diameter *d*2 (or diameter of the cylindrical mid-section C) whereof is only 2 inches or $\frac{3}{8}$ of an inch smaller than either the T19 or A19 bulb. Even though the length l_2 (see Figs. 6 and 7) of the cylindrical section C of the T16 envelope **12***c* is considerably greater than that of the T19 envelope **12***a*, the volume of the 100 watt T16 lamp **10***c* is smaller (by about 8.5%) than that of the standard 100 watt A19 lamp **10**, as evidenced by the data given in Table I below. This is illustrated by the fact that the shaded increments **42** and **44** (Fig. 7) added by lengthening the cylindrical section C of the T16 envelope are considerably smaller than the spherical segment **46** lost by decreasing the maximum diameter of the bulb by $\frac{3}{8}$ of an inch and making the bulb tubular in this region. Despite this difference in volume, however, comparative normal life tests and temperature tests have surprisingly shown that a 100 watt T16 lamp having an axially-extending filament and the dimensions listed in Table I below has the same light output, efficiency, lumen maintenance, life, and base and socket temperatures—in short, the same quality and operating base temperature—as the standard 100 watt lamp **10** having the same filament mount construction and overall length but larger A19 bulb 12. It should also be noted that since the volume of the T16 lamp 10*c* is considerably less than that of the standard A19 lamp **10** the amount of fill gas required and thus the cost per lamp will also be proportionately less.

The other alternative of shorter overall lamp length permitted by reduction of the base temperature effected by the use of a T shaped envelope is illustrated in Fig. 3 wherein is shown a 100 watt lamp **10***b* having a T19 envelope **12***b* the neck portion N whereof has been so shortened by a length *x* (see Figs. 6 and 7). This dimension is such that the neck N is practically eliminated as illustrated. The lamp **10** accordingly has an overall length L_2 of approximately $4\frac{1}{16}$ inches and is about $\frac{3}{8}$ of an inch shorter than both the cool T19 lamp **10***a* and standard A19 lamp **10**. The volume of the short T19 lamp **10***b* is thus reduced by an amount equivalent to the volume occupied by the shaded generally cylindrical section **48** as shown in Fig. 7. Calculations have shown that the overall length L2 of the short T19 lamp **10***b* could be reduced even further without decreasing its volume or total area below that of the standard 100 watt A19 lamp, but this would necessitate changing the contour of the intermediate portion I to provide the neck portion necessary to seal off the bulb and is thus not too practical from a design standpoint.

It has been found that the foregoing decrease in the base and socket temperatures of a general lighting lamp of a given wattage and construction, or the alternative reductions in size thereof, without decreasing the efficiency or performance quality of the lamp can only be

achieved when the dimensions of the cylindrical section of the T-shaped envelope are properly correlated with respect to the overall size of the lamp, more specifically its volume and overall length, and maintained within preselected limits. As a specific example, the various parameters for the 100 watt CC8 lamps described above are given in the following table designated Table I:

TABLE I

100 watt CC8 general lighting lamp—A19 versus T19 and T16

Lamp Type	Bulb Diameter (d_n) In Inches	Vol. (V) In Inches [3]	Length (l_n) of Cylindrical Section (C) In Inches	Overall Lp. Length (L_n) In Inches	V/d_n	d_n/l_n	L_n/l_n
A19 Std.	2.375 (d1)	8.02	----------	4.438 (L1)	3.37	------	------
T19 Cool	2.375 (d1)	9.29	.750 (l_1)	4.438 (L1)	3.91	3.17	5.92
T19 Short	2.375 (d1)	9.07	.750 (l_1)	4.063 (L2)	3.82	3.17	5.42
T16	2.0 (d2)	7.33	1.063 (l_1)	4.438 (L1)	3.66	1.88	4.17

As indicated in Table I, the desired reduction in the base temperature or the alternative reduction in the overall length or bulb size of this particular type of lamp without decreasing its efficiency can be achieved by maintaining the ratio of the overall length of the lamp to the length of the cylindrical section C (L_n/l_n) within the range of 4.1 to 6, the ratio of the diameter of the cylindrical section C to the length thereof (d_n/l_n) within the range of 1.8 to 3.2 and the ratio of the total volume of the lamp to the diameter of the cylindrical section C (V/d_n), when measured in cubic inches and inches respectively, within the range of 3.6 to 4. The permissible ratio ranges are as follows: V/d_n within about 3.3 to 4, L_n/l_n within about 4 to 6, and d_n/l_n within about 1.5 to 3.5. The lower limit of 3.3 for the ratio V/d_n corresponds to the value for the 100 watt A19 standard lamp 10 and represents the case where a T19 envelope is reduced in length sufficiently or is otherwise contoured to have exactly the same volume as the aforesaid standard 100 watt A19 lamp. While the aforesaid permissible and preferred ranges are critical in the sense that they are necessary to achieve the optimum results set forth above, it will be recognized that lamps of satisfactory quality and having sufficiently low base temperatures can be fabricated with T bulbs which do not fall within one or more of the ranges. For example, by substituting a T17 for the T16 bulb and shortening the T16 lamp 10*c* by using a flattened end segment rather than a hemispheroidal end segment E as here illustrated, a 100 watt T17 lamp could be provided that is ½ of an inch shorter than but has approximately the same volume as the aforesaid T16 lamp in which case the ratio L_n/l_n would be 3.938/1.063 or about 3.71.

It should also be noted that the present invention is not limited to 100 watt lamps or to the use of axially-mounted light sources of linear configuration such as the CC8 filament **18***a* but may also be advantageously applied to lamps of other wattages having filamentary light sources of different configuration. As a specific example, the light source could comprise a coiled-coil filament **18***b* held (by means of suitably shaped and disposed lead wires **16***b* and a center support) in the shape of an inverted V in which case the light source would extend and be substantially symmetrical about rather than coincident with the axis of the cylindrical section C and constitute part of a so-called C–2V mount assembly **15***b*, such as that shown in Fig. 5. As illustrated in Fig. 3, when a mount assembly of this character is used, especially in the short T19 lamp **10***b*, it is desirably positioned in a manner such that the mid-point of the V-shaped filament **18***b* is slightly beyond the centerline of the cylindrical section C toward the end segment E of the envelope **12***b* so as to minimize the heating effect of the filament on the base **20**. The present invention accordingly contemplates the use of various types and configurations of light sources, the only limitation being that the light source have a longitudinal axis and that said source be located substantially centrally of and extend along the axis of the cylindrical section C.

In addition to the aforementioned cooler base temperature or alternative reduction in the physical size of the lamp, the use of a T shaped envelope in accordance with the present invention also affords the additional advantage of reducing by a rather surprising amount the laterally-disposed portion or dust-collecting area of the lamp when the latter is burned either in a base-up or a base-down position. This is illustrated in Fig. 6 wherein the laterally-disposed segments of the A19 standard lamp **10**, cool T19 lamp **10***a*, short T19 lamp **10***b* and T16 lamp **10***c* (that is their dust-collecting areas) in a base-up burning position are indicated by the solid line segments **34**, **34***a*, **34***b* and **34***c* of their respective envelopes, whereas the dust-collecting area for each of the lamps when burned base-down is indicated by the broken line segments **36**, **36***a*, **36***b* and **36***c*, respectively, of the lamp envelopes. The total area and the dust-collecting areas in the aforesaid base-up and base-down burning positions of the 100 watt lamps shown in Fig. 6 are compared in the table below designated Table II:

TABLE II

Total and dust-collecting area—A19 versus T19 and T16 100 watt lamps

Lamp Type	Total Area in Inches [2]	Percent Deviation From A19	Dust-Collecting Area in Inches [2]			
			Base-Up Burning	Percent Deviation From A19	Base-Down Burning	Percent Deviation From A19
A19 Std.	20.72	----------	11.12	----------	8.85	----------
T19 Cool	22.69	+9.5	8.72	−21.6	7.50	−15.3
T19 Short	21.82	+5.3	8.72	−21.6	7.50	−15.3
T16	19.65	−5.2	6.88	−38.1	5.61	−26.6

As indicated in Table II, while the total bulb area of the cool 100 watt T19 lamp **10***a* is 9.5% greater than that of the standard 100 watt A19 lamp **10**, the base-up dust-collecting area for this particular T19 lamp surpris-

ingly is 21.6% less than that of the standard A19 lamp. The reduction in base-up dust-collecting area is even greater for the 100 watt T16 lamp **10***c* which has 38.1% less such area and in thus less susceptible to the light-attenuating effects of surface dirt by a proportionate degree. While the percent reductions in dust-collecting area of the T lamps are not as great when the lamps are disposed in a base-down burning position, they are nonetheless surprisingly high and will accordingly effect proportionate improvements in the lumen maintenance of the respective T lamps during use. Comparative tests have shown that even after a relatively short period of exposure to a dusty atmosphere in a base-up position the lumen output of the cool T19 100 watt lamp **10***a* was 3.1% higher than that of the standard 100 watt A19 lamp **10**.

It will be recognized from the foregoing that an improved general lighting lamp has been provided by utilizing a tubular shaped envelope instead of the conventional pear-shaped envelope used heretofore. By properly correlating the dimensions of the straight sided cylindrical section C of the T envelope the dust-collecting area of the lamp and thus the drop in light output thereof in dusty atmopsheres is not only minimized but a substantial reduction in the base temperature is effected without any increase whatsoever in the overall length or maximum diameter of the lamp.

Alternative lamp embodiments have also been provided wherein the aforesaid reduction in base temperature is utilized to effect a proportionate reduction in either the diameter or overall length of the lamp thereby permitting the fabrication of general lighting lamps that are more compact and have better lumen maintenance than prior art lamps yet have substantially the same base temperature.

While several embodiments have been illustrated and described, it will be obvious that various modifications in the configuration and dimensions of both the bulb and the enclosed light source can be made without departing from the spirit and scope of this invention.

I claim:

1. An electric lamp comprising a sealed light-transmitting envelope having a neck portion at one end and a bulbous portion at the other end that is joined to said neck portion by a tapered intermediate portion, said bulbous portion being of maximum lateral dimension in a region intermediate of its ends and having straight sides thereat which define a cylindrical section of predetermined length and diameter the axis whereof is substantially coincident with the longitudinal axis of said lamp, an elongated light source in said envelope substantially coaxial with and located within said cylindrical section, and means carried by said neck portion for connecting said light source to an electrical power supply, the ratio of the overall length of said lamp to the length of said cylindrical section being within the range of about 4 to 6, and the ratio of the diameter of said cylindrical section to the length thereof being within the range of about 1.5 to 3.5.

2. An electric lamp comprising a sealed light-transmitting envelope having a neck portion at one end and a bulbous portion at the other end that is joined to said neck portion by a tapered intermediate portion, said bulbous portion being of maximum lateral dimension in a region intermediate of its ends and having straight sides thereat which define a cylindrical section of predetermined length and diameter the axis whereof is substantially coincident with the longitudinal axis of said lamp, an elongated light source in said envelope substantially coaxial with and located within said cylindrical section, and means carried by said neck portion for connecting said light source to an electrical power supply, the ratio of the overall length of said lamp to the length of said cylindrical section being within the range of about 4 to 6, the ratio of the diameter of said cylindrical section to the length thereof being within the range of about 1.5 to 3.5, the said neck and intermediate portions and the non-cylindrical segments of said bulbous portion having a configuration such that the ratio of the total volume of said envelope to the diameter of said cylindrical section, when measured in cubic inches and inches respectively, is within the range of about 3.3 to 4.

3. An incandescent lamp comprising a sealed light-transmitting envelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, said bulbous portion including intermediate its ends a cylindrical section of predetermined length and diameter that constitutes a coaxial segment and the region of maximum diameter of said envelope, an incandescible light source in said envelope centrally located within said cylindrical section and having a longitudinal axis that is substantially coincident with the axis thereof, means secured to said neck portion for connecting said incandescible light source to an electrical energy power supply, the ratio of the overall length of said lamp to the length of said cylindrical section being within the range of about 4 to 6, and the ratio of the diameter of said cylindrical section to the length thereof being within the range of about 1.5 to 3.5.

4. An incandescent lamp comprising a sealed light-transmitting envelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, the closed end segment of said bulbous portion opposite said intermediate portion being of generally hemispheroidal configuration, said bulbous portion intermediate its ends and in the region of its maximum lateral dimension being straight sided and defining a coaxial cylindrical section of predetermined length and diameter, an elongated incandescible light source in said envelope located within and substantially coaxial with said cylindrical section, a base secured to said neck portion and electrically connected to said incandescible light source, the ratio of the overall length of said lamp to the length of said cylindrical section being within the range of 4.1 to 6, and the ratio of the diameter of said cylindrical section to the length thereof being within the range of 1.8 to 3.2, and the ratio of the total volume of said envelope to the diameter of said cylindrical section, when expressed in cubic inches and inches respectively, being within the range of 3.6 to 4.

5. An incandescent lamp compirsing a sealed light-transmitting-and-diffusing envelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, said bulbous portion intermediate its ends and in the region of its maximum dimension being straight-sided and defining a coaxial cylindrical section of predetermined length and diameter, a filamentary light source of elongated configuration located within said cylindrical section, and a base secured to said neck portion and electrically connected to said incandescible filament, the ratio of the overall length of said lamp to the length of said cylindrical section being within the range of about 4 to 6, the ratio of the diameter of said cylindrical section to the length thereof being within the range of about 1.5 to 3.5, said filamentary light source being substantially symmetrical about and extending along the axis of said cylindrical section.

6. An incandescent lamp comprising a sealed light-transmitting envelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, the mid-section of said bulbous portion being straight-sided and defining a coaxial cylindrical section of predetermined length and diameter that constitutes the region of maximum diameter of said bulbous portion, a coiled-coil filament in said envelope, a light-

diffusing coating on the inner surface of said envelope, and a base secured to said neck portion and electrically connected to said filament, the ratio of the overall length of said lamp to the length of said cylindrical section being within the range of about 4 to 6, the ratio of the diameter of said cylindrical section to the length of said section being within the range of about 1.5 to 3.5, said filament being centrally located within said cylindrical portion and having its longitudinal axis substantially coincident with the axis thereof.

7. An incandescent lamp comprising a sealed light-transmitting enevelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, the closed end segment of said bulbous portion opposite said intermediate portion being of generally hemispheroidal configuration, the mid-section of said bulbous portion being straight-sided and defining a coaxial cylindrical section of predetermined length and diameter that constitutes the region of maximum diameter of said bulbous portion, a mount assembly in said envelope including a coiled-coil filament of elongated configuration, a base attached to said neck portion and electrically connected to said filament, and a light-diffusing coating on the inner surface of said envelope, the ratio of the total volume of said envelope to the diameter of said cylindrical section, when expressed in cubic inches and inches respectively, being approximately 3.9, the ratio of the overall length of said lamp to the length of said cylindrical section being approximately 5.9, the ratio of the diameter of said cylindrical section to the length thereof being approximately 3.2, said filament being located within said cylindrical section and having its longitudinal axis substantially coincident with the axis thereof.

8. An incandescent lamp comprising a sealed light-transmitting envelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, the closed end segment of said bulbous portion opposite said intermediate portion being of generally hemispheroidal configuration the mid-section of said bulbous portion being straight-sided and defining a coaxial cylindrical section of predetermined length and diameter that constitutes the region of maximum diameter of said bulbous portion, a mount assembly in said envelope including a coiled-coil filament of elongated configuration, a base attached to said neck portion and electrically connected to said filament, and a light-diffusing coating on the inner surface of said envelope, the ratio of the total volume of said envelope to the diameter of said cylindrical section, when expressed in cubic inches and inches respectively, being approximately 3.8, the ratio of the overall length of said lamp to the length of said cylindrical section being approximately 5.4, the ratio of the diameter of said cylindrical section to the length thereof being approximately 3.2, said filament being located within said cylindrical section and having its longitudinal axis substantially coincident with the axis thereof.

9. An incandescent lamp comprising a sealed light-transmitting envelope terminated at one end by a neck portion and at the other end by a bulbous portion that is joined to said neck portion by a tapered intermediate portion, the closed end segment of said bulbous portion opposite said intermediate portion being of generally hemispheroidal configuration, the mid-section of said bulbous portion being straight-sided and defining a coaxial cylindrical section of predetermined length and diameter that constitutes the region of maximum diameter of said bulbous portion, a mount assembly in said envelope including a coiled-coil filament of elongated configuration, a base attached to said neck portion and electrically connected to said filament, and a light-diffusing coating on the inner surface of said envelope, the ratio of the total volume of said envelope to the diameter of said cylindrical section, when expressed in cubic inches and inches respectively, being approximately 3.7, the ratio of the overall length of said lamp to the length of said cylindrical section being approximately 4.2, the ratio of the diameter of said cylindrical section to the length of said section being approximately 1.9, said filament being located within said cylindrical section and having its longitudinal axis substantially coincident with the axis thereof.

10. An electric lamp as set forth in claim 1 wherein said light source is of non-linear configuration and is substantially symmetrical about the axis of said cylindrical section.

11. An electric lamp as set forth in claim 1 wherein said light source comprises a V-shaped filament that is substantially symmetrical about the axis of said cylindrical section.

References Cited in the file of this patent

UNITED STATES PATENTS

D. 28,931	Lister	June 28, 1898
D. 109,716	Kende	May 17, 1938
D. 167,819	Yanks	Sept. 23, 1952
299,708	Welsh	June 3, 1884
2,214,143	May	Sept. 10, 1940