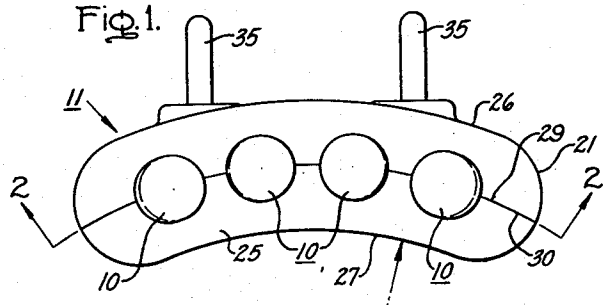
Nov. 26, 1946. A. G. FOOTE 2,411,568

LAMP UNIT

Filed April 23, 1943

Fig. 1.



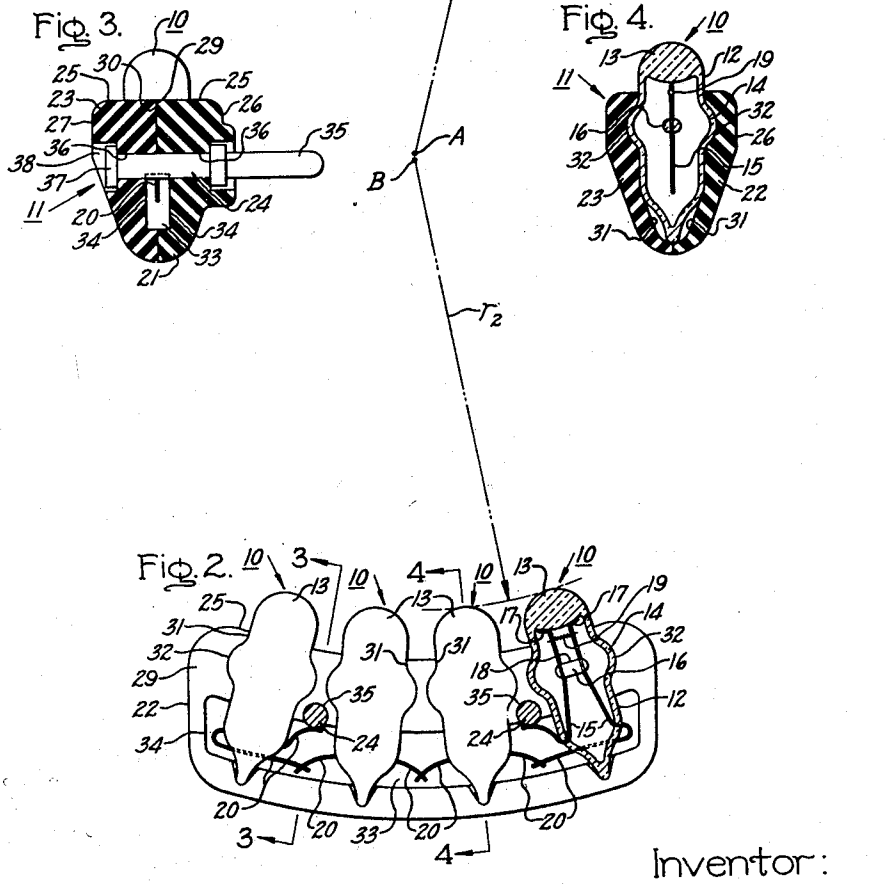


Fig. 3.

Fig. 4.

Fig. 2.

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LAMP UNIT

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Application April 23, 1943, Serial No. 484,211

9 Claims. (Cl. 176—32)

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My invention relates in general to a lamp unit comprising a plurality of individual lamp elements mounted in a common base or holder. More particularly, my invention relates to a base or holder construction for such lamp units.

As a means for denoting the variation in the oxygen content of the human blood stream, it has been proposed to direct a beam of light through a membraneous portion of the human anatomy such as the ear, and onto the light-sensitive element of a photoelectric cell connected to suitable indicator means. The current generated by the excited photoelectric cell actuates the indicator means to thereby give a ready indication of the oxygen content of the blood stream. Inasmuch as the light transmission of the blood stream varies in accordance with the oxygen content thereof, the light reaching the photoelectric cell, and therefore the magnitude of the current generated thereby, will vary in proportion to such oxygen content. Accordingly, the indicator means controlled by the photoelectric cell will give a reading as determined by the light transmission, and therefore the oxygen content of the blood stream. Such blood stream oxygen content-indicating devices are of particular utility as "oxygen want indicators" in cases where one is to be exposed to regions of rarified atmosphere and for that reason has equipped himself with suitable means for supplying his respiratory system with additional oxygen from an artificial source thereof. By means of the oxygen want indicator, such person is immediately informed of any falling-off in the oxygen content of his blood stream and, therefore, of the need of additional oxygen from the artificial supply.

As the source of the light beam for such oxygen want indicators, it has been proposed to employ a lamp unit comprising a plurality of miniature flashlight lamps mounted in a common base or holder member, the lamp unit being so constructed as to fit against the head of a human being at a point immediately behind the ear of such person. It is an object of the present invention to provide such a lamp unit which is simple in construction and which can be manufactured without the need of any jigs for holding the several lamp elements in proper relation with one another while they are being secured in place in the common base or holder member.

Further objects and advantages of my invention will appear from the following description of a species thereof and from the accompanying

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drawing in which Fig. 1 is a plan view on an enlarged scale of a lamp unit comprising my invention; Fig. 2 is a longitudinal section of the lamp unit shown in Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2; and Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring to the drawing, the lamp unit there shown comprises a plurality, preferably four, of lamp elements 10 mounted in a common base or holder 11. The lamp elements are of the type shown in Fig. 2 of United States Patent No. 1,983,362 issued December 4, 1934, to Geiger et al., each of said lamp elements comprising a small cylindrical glass bulb 12 formed with an integral double-convex lens 13 at its tip end and with an annular enlarged or protuberant portion 14 at an intermediate point thereof. Disposed within and butt-sealed into the bulb 12 is a mount structure comprising a pair of leading-in wires 15 having their inner end portions suitably spaced apart by a bead 16 of insulating material such as glass sealed around portions of the said wires. The innermost ends 17 of said leading-in wires 15 are bent outwardly at an angle, the said ends being located a definite predetermined distance from the surface 18 of the bead 16. A filament 19, preferably in the form of a linear coil of tungsten or other suitable refractory metal, is mounted on the leading-in wires 15 at a point intermediate the inner ends 17 thereof and the bead 16, the said filament being located at a predetermined distance from the surface 18 of the bead 16. The leading-in wires 15 are sealed through the wall of the bulb 12 at diametrically opposite points thereof and are formed with outer end portions 20 for connection to a source of electric current. The mount structure is butt-sealed into the lamp bulb 12 so that the outwardly bent inner ends 17 of the leading-in wires 15 engage the inner surface of the lens portion 13 of the bulb. Since the filament 19 bears a definite relationship to the ends 17 of the leading-in wires (both being located definitely with respect to the surface 18 of the bead 16), the said filament is therefore located in a definite predetermined relationship to the lens 13. By means of this construction, the leading-in wires and filament are fixedly supported with reference to the lens 13 throughout the life of the lamp, the said lens serving to direct the light rays from the filament into a more or less concentrated beam.

In accordance with the invention, the base or holder 11 for the several lamp elements 10 comprises an elongated arcuate-shaped casing or

housing 21 formed of insulating material and divided longitudinally into a pair of complementary halves or sections 22, 23 which are held together in assembled relation by suitable fastening means, such as a pair of rivets 24. The casing 21 is preferably made of a suitable plastic material such as that commonly known as "Textolite," for instance. The several lamp elements 10 are mounted in the base casing 21 in a row therealong and with just the tip or lens portions 13 of the lamp elements projecting above the upper surface 25 of the casing.

As shown in Figs. 1 and 2, the casing 21 is longitudinally curved in two planes at right angles to one another. Referring to Fig. 1, the casing 21 is curved in an arc about an axis A extending transversely of the casing and parallel to the front and rear sides 26, 27 thereof, the front side 26 having the convex curvature and the rear side 27 the concave curvature. The lamp elements 10 are mounted in the casing 21 in an arc corresponding in curvature to the curvature of the casing about the axis A. The concavity of the rear side 27 of the casing is such as to enable the said rear side to more or less fit against that portion of a person's head just behind the ear with the row of lamp elements 10 disposed adjacent and extending along the rear side of the ear. A radius of curvature r_1 of about 1½ inches for the rear side 27 of the casing has been found to be more or less suitable for such purpose.

To produce a convergence of the light beams projected by the row of lamp elements 10, the casing 21 is also curved, and the lamp elements 10 are disposed, in corresponding arcs about an axis B (Fig. 2) extending transversely of the casing and parallel to the upper surface 25 of the casing, the said upper surface 25 having the concave curvature. Because of such longitudinal arcuate disposition of the lamp elements 10 in the casing 21 about the axis B, the axes of the said lamp elements, and thus the light beams projected thereby, will therefore converge along the axis B of longitudinal curvature. The curvature of the longitudinal arcuate disposition of the lamp elements 10 about the axis B is preferably such as to cause the light beams from the lamp elements 10 to be concentrated substantially into the full "pick-up" area of the photoelectric cell (not shown) with which the lamp unit is to be used. In the instance shown, a radius r_2 of around 1¾ inches has been found to be satisfactory for the radius of curvature of the longitudinal arcuate disposition of the lamp elements 10 about the axis B, as measured from the exposed tips thereof.

For supporting the lamp elements 10 in place within the casing 21, the two interengaging faces 29, 30 of the casing sections 22, 23 are formed with a plurality of corresponding recesses 31 at spaced points therealong, which recesses match with one another, when the two sections are assembled, to thereby form individual sockets or chambers for the lamp elements. The said recesses 31, and therefore the lamp-receiving chambers formed thereby, are shaped to conform substantially to the configuration of, and completely enclose the annular protuberant portion 14 of, the lamp bulbs 12 so that the several lamp elements 10 snugly fit within the said chambers and are firmly retained and supported in place within the casing 21. As shown in Figs. 2 and 4, the lamp sockets formed by the matching recesses 21 are of cylindrical shape to conform to and snugly receive cylindrical wall portions of the lamp bulbs 12 adjacent each side of the annular protuberant portions 14 thereof. In addition, the said sockets are provided with annular enlargements or cavities 32 located entirely within the body of the casing or holder 21 and shaped to conform to and snugly receive the annular protuberant portions 14 of the lamp bulbs 12.

As shown in Fig. 2, the outer leads 20 of the lamp elements 10 are interconnected, as by soldering, in such a manner as to connect the said lamp elements in series with one another. To enable the connection of the outer lamp leads 20 to one another, an elongated passageway or channel 33 is provided in the casing 21 for the accommodation therein of the outer lamp leads 20, the said channel 33 being formed by a pair of matching recesses 34 in the opposed faces 29, 30 of the two casing sections 22, 23.

The external connection for the lamp elements 10 is provided by the connection, as by soldering, of each of the base fastening rivets 24 to one of the outer leads 20 of the lamp elements 10 at each end of the base casing 21, the said rivets thus serving both as a fastening means and as the terminal contacts for the base. For this purpose, the rivets 24 are formed with extensions 35 which project laterally from the convex front side 26 of the casing 21 to thereby constitute terminal posts or prongs. The rivets 24 extend through openings 36 in the casing sections 22, 23 and into the passageway 33 in the casing to thereby enable the soldering of the outer leads 20 of the end lamp elements 10 to the said rivets during the assembly of the lamp unit. Instead of utilizing the rivets 24 both as the base fastening means and as the terminal contacts for the lamp unit, separate terminal contact members may be provided instead and the rivets 24 then utilized solely as a base fastening or assembly means.

After the lamp elements 10 have been inserted in place in the recesses 31 in the front section 22 of the base casing 21 and the various lamp leads 20 have been properly connected to one another and to the base fastening rivets 24, the rear section 23 of the base casing is then fitted in place against the front section 22 thereof and the two sections riveted together by peaning over the hollow rear end of each rivet 24 to form a head 37. The holes 36 in the casing through which the rivets 24 extend are countersunk at the rear side of the casing, as shown at 38 in Fig. 3, to thereby provide enlarged recesses for the complete accommodation therein of the rivet heads 37.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A lamp unit comprising a plurality of lamp elements, a common holder for said lamp elements comprising a pair of complementary sections, terminal contact members on said holder shaped to engage a current supply connector, and conductor means connecting said lamp elements to said terminal contact members, said terminal contact members also being constructed and arranged to hold said sections in assembled relation with said lamp elements clamped therebetween so as to be firmly held in place in said holder.

2. A lamp unit comprising a plurality of lamp elements, a common holder for said lamp elements comprising a pair of complementary sections, fastening means for holding said sections together with the lamp elements clamped there-

between and firmly held in place in said holder, said fastening means being provided with prong-shaped extensions projecting outwardly of said holder to serve as terminal contacts, and conductor means connecting said lamp elements to said fastening means.

3. A lamp unit comprising a plurality of lamp elements each comprising a cylindrical glass bulb having an integral intermediate annular protuberant portion, a common holder for said lamp elements comprising a pair of complementary sections having abutting faces provided with matching lamp-receiving recesses which together form sockets for the lamp elements and include enlarged portions shaped to snugly receive the annular protuberant portions of said lamp bulbs, and fastening means for holding said sections together with said lamp elements clamped therebetween so as to be firmly held in place in said holder within the said sockets therein.

4. A lamp unit comprising a plurality of lamp elements each comprising a cylindrical glass bulb having an integral intermediate annular protuberant portion, a common holder for said lamp elements comprising a pair of complementary sections having abutting faces provided with matching identical lamp-receiving recesses which together form sockets for mounting the lamp elements within said holder, said sockets being of cylindrical shape to conform to and receive the cylindrical wall portions of the lamp bulbs and each of said sockets having an annular enlargement located within the body of said holder and shaped to conform to and receive the annular protuberant portions of the lamp bulbs, and fastening means for holding said sections together with said lamp elements clamped therebetween so as to be firmly held in place in said holder within the said sockets therein.

5. A miniature lamp unit sufficiently small to fit behind a person's ear comprising a plurality of miniature lens-end lamp elements, a common holder for said lamp elements comprising an elongated housing of insulating material divided longitudinally into two complementary sections, said housing being of arcuate shape in two planes longitudinally thereof so as to have a concave upper surface and a concave inner side and a convex outer side, said sections being provided at spaced points therealong with matching lamp-receiving recesses in their abutting faces aligned to form sockets having their axes convergently directed to a common focus the lamp elements mounted in said sockets in said holder with the lens ends thereof projecting from the concave upper surface of said holder and with the lamp elements inclined toward one another so as to concentrate the light beams emanating from the lens ends of said lamp elements, and fastening means for holding said sections together with the lamp elements clamped therebetween so as to be firmly held in place in said holder within the said recesses therein.

6. A lamp unit comprising a plurality of miniature lens-end lamp elements, a common holder for said lamp elements comprising an elongated housing of insulating material divided longitudinally into two complementary sections, said housing being of arcuate shape in two planes longitudinally thereof so as to have a concave upper surface and a concave inner side and a convex outer side, said sections being provided at spaced points therealong with matching lamp-receiving recesses in their abutting faces for mounting the lamp elements in said holder with the lens ends thereof projecting from the concave upper surface of said holder and with the lamp elements inclined toward one another so as to concentrate the light beams emanating from the lens ends of said lamp elements, fastening means for holding said sections together with the lamp elements clamped therebetween so as to be firmly held in place in said holder within the said recesses therein, said fastening means comprising a pair of elongated metal members extending laterally through said housing and having their inner ends terminating inwardly of the concave inner side of said housing and their outer ends formed with prong-shaped extensions projecting from the convex outer side of said housing to serve as terminal contacts for the lamp unit, and conductor means within said housing connecting said lamp elements to said fastening members.

7. A miniature portable lamp unit comprising an elongated holder divided longitudinally into sections having complementary laterally extending recesses arranged in a row along the length of the holder and aligned to form sockets and also having a pair of longitudinally extending complementary recesses forming a channel communicating with the sockets at their inner ends, a row of baseless miniature electric lamps disposed in said sockets and having lead wires extending therefrom into said channel with the lead wires of adjacent lamps mechanically and electrically connected together, and fastening means clamping said holder sections together and retaining said lamps therein.

8. A miniature portable lamp unit comprising an elongated holder divided longitudinally into sections having complementary laterally extending recesses arranged in a row along the length of the holder and aligned to form sockets, the axes of said sockes being convergently directed toward a common focus, a row of miniature electric lamps disposed in said sockets, and fastening means clamping said holder sections together and retaining said lamps therein.

9. A miniature portable lamp unit comprising an elongated holder divided longitudinally into sections having complementary laterally extending recesses arranged in a row along the length of the holder and aligned to form sockets, the axes of said sockets being convergently directed toward a common focus, a row of miniature electric lamps disposed in said sockets and having lenses at their ends for concentrating the light therefrom on said common focus, and fastening means clamping said holder sections together and retaining said lamps therein.

ALTON G. FOOTE.