

Feb. 22, 1966

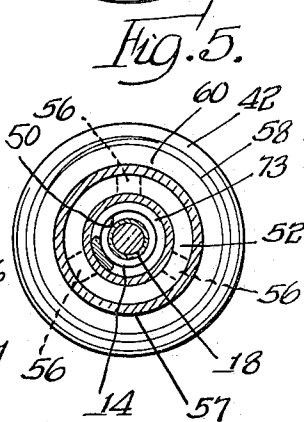
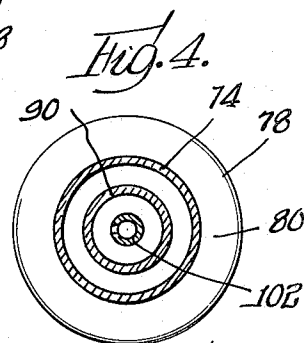
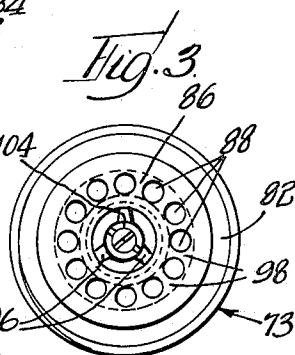
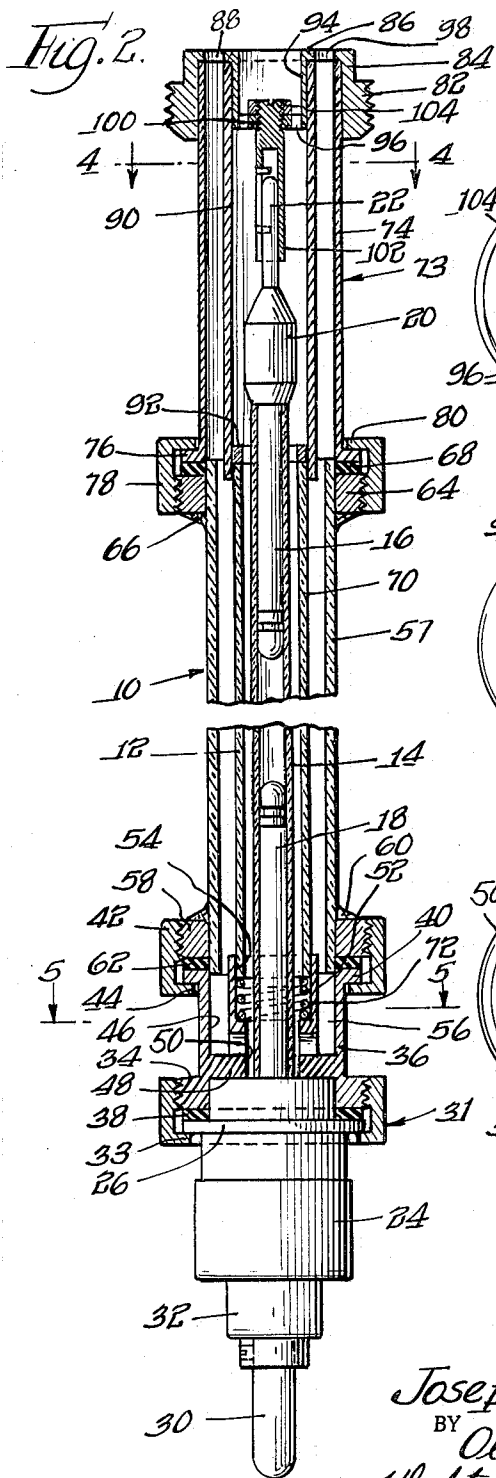
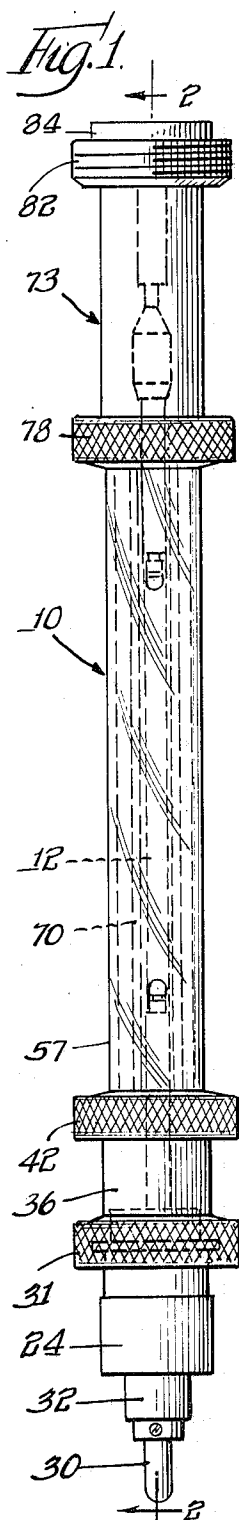
J. E. NORTON

3,237,005

LAMP FILTER HOUSING ASSEMBLY

Filed March 26, 1963

2 Sheets-Sheet 1



INVENTOR.
Joseph E. Norton
BY Olson, Treple
Wolter & Bushnell
attys

Feb. 22, 1966

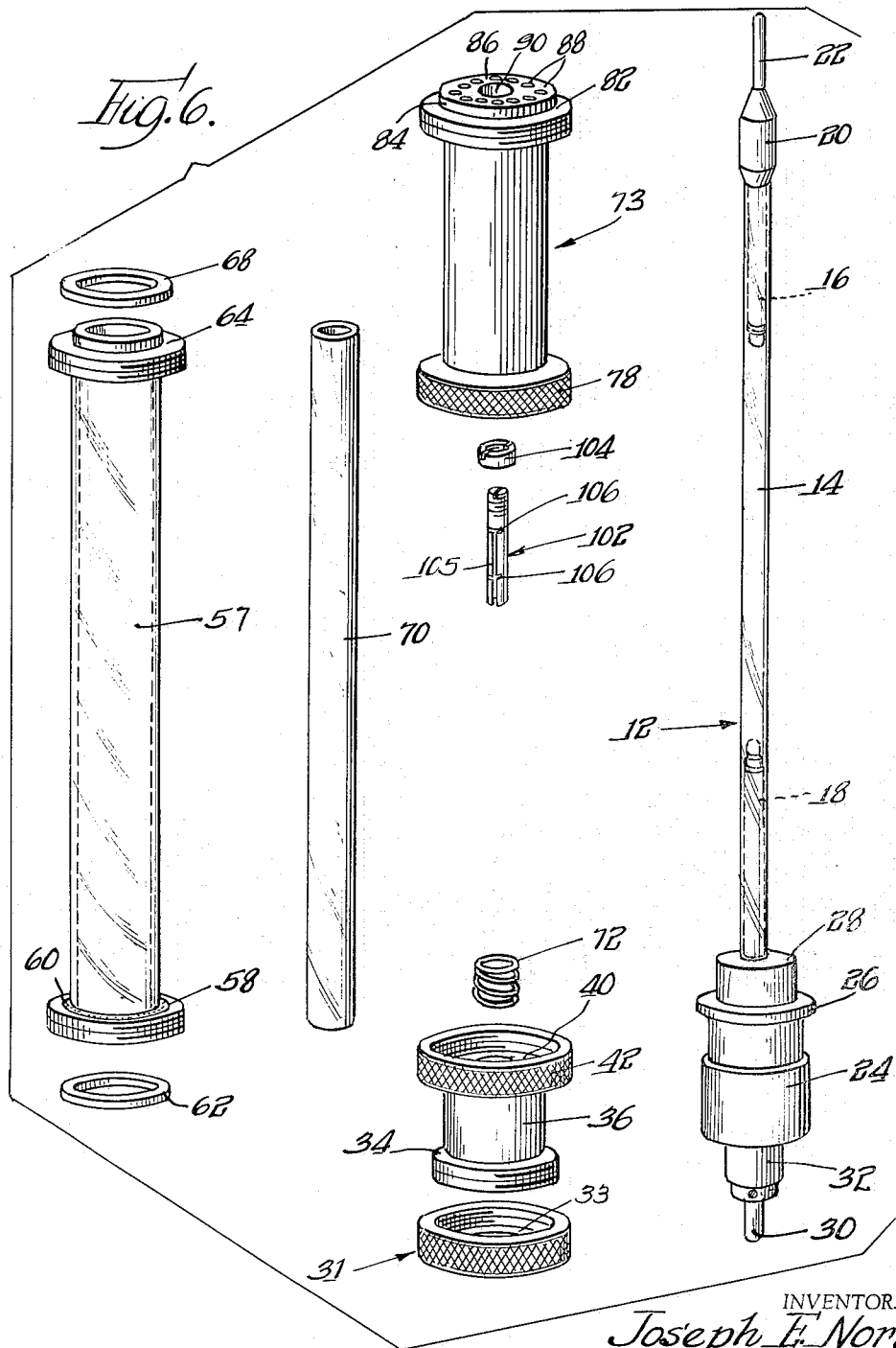
J. E. NORTON

3,237,005

LAMP FILTER HOUSING ASSEMBLY

Filed March 26, 1963

2 Sheets-Sheet 2



INVENTOR.
Joseph E. Norton
BY
Olson, Truxler
Wattus & Bushnell attys.

1

3,237,005

LAMP FILTER HOUSING ASSEMBLY

Joseph E. Norton, Chicago, Ill., assignor to Atlas Electric Devices Company, Chicago, Ill., a corporation of Illinois

Filed Mar. 26, 1963, Ser. No. 267,970
7 Claims. (Cl. 240—11.2)

This invention relates to the art of apparatus for testing weathering and fading properties of material, and more particularly relates to an improved xenon lamp filter housing for such purposes.

It is known that accelerated tests can be made of fabrics and other materials as to resistance to fading and weathering. Machines for these purposes have long been available, and machines of this type which have attained a very high reputation are manufactured and sold by Atlas Electric Devices Co. of Chicago, under the trademarks "Fade-Ometer" and "Weather-Ometer."

Such machines may use a xenon arc lamp emitting high intensity rays similar in wave length to sunlight. It is common practice to utilize extremely high power lamps in rather small housings. For example, a 6,000 watt xenon lamp or "burner" may be little more than 6" in length. A good deal of heat is generated in such a lamp and both to remove this and to filter out the undesired long infrared wavelength generated, water is circulated about the burner and through the lamp. In accordance with one such scheme, there are two concentric tubes surrounding a tubular lamp. Water goes in at one end to one of the tubes, and comes back out the same end through the other tube. This arrangement has worked reasonably well. However, the transmission properties of the tubes (which heretofore have generally been made of quartz) change with age so that after a time sunlight is no longer simulated, and the tubes must be replaced. Furthermore, physical changes take place within the tubes, and they become extremely susceptible to fracturing after a time, thus further increasing the need for tube replacement.

Heretofore, in replacing the inner and outer tubes surrounding the lamp, such tubes commonly being known as filters, it has been necessary also to replace substantial portions of the metal fittings accompanying the tubes. This has run up the cost of replacement quite appreciably.

Accordingly, it is a primary object of this invention to provide a housing for a xenon lamp in which the encircling filters or tubes are readily and inexpensively replaced.

It is further an object of this invention to provide such a housing wherein substantially only the light transmitting elements need be replaced.

Yet another object of this invention is to provide a housing of the aforesaid character wherein the filters are replaceable without the need of special tools.

Still another object of the present invention is to provide a lamp housing of the character described wherein each filter or tube is of uniform diameter throughout its length.

Other and further objects and advantages of the present invention will become apparent from the following description when taken in connection with the accompanying drawings wherein:

FIG. 1 is a front plan view on a slightly reduced scale of a 6,000 watt xenon lamp constructed in accordance with the principles of the present invention;

FIG. 2 is a longitudinal sectional view therethrough on a slightly enlarged scale, as taken along the line 2—2 in FIG. 1;

FIG. 3 is a top end view;

FIG. 4 is a cross sectional view as taken along the line 4—4 in FIG. 2;

FIG. 5 is a cross sectional view as taken along the line 5—5 in FIG. 2; and

2

FIG. 6 is an exploded perspective view showing the parts in disassembled relation.

Referring now in greater particularity to the figures, and first to FIGS. 1, 2 and 6, there is shown a complete lamp 10 including a quartz burner tube assembly 12. This is a well-known commercial item, and therefore need not be described extensively. It is sold by Atlas Electric Devices of Chicago, Illinois under Catalog No. M-2620, and comprises a quartz tube 14 having electrodes 16 and 18 at opposite ends thereof. The upper end thereof in the position shown in the drawings, includes a metallic enlargement 20 with an axially extending terminal or pin 22 of reduced diameter.

The opposite or lower end of the quartz burner tube assembly includes a metallic fitting 24 having a circumferential flange 26 near the upper end thereof, with a reduced diameter portion 28 immediately above the flange. A terminal or pin 30 extends axially from the metallic fitting 24 through an insulator 32 of porcelain or other suitable material.

A retaining nut 31 is slipped over the metal fitting 24, and has an inwardly directed flange 33 engageable with the underside of the fitting or body flange 26. Internal threads at the upper end of the nut 31 engage the threads on a circumferential flange 34 of a cylindrical adapter fitting 36. The threaded flange 34 is conveniently welded to the lower end of the cylindrical fitting 36. A rubber gasket 38, preferably of synthetic rubber, is clamped between the end of the fitting 36 and the flange 26 of the quartz burner tube assembly.

The upper end of the cylindrical fitting 36 is provided with a radially extending circumferential flange 40. A nut 42 has a radially inwardly extending circumferential flange 44 received beneath the flange 40.

The tubular fitting 36 is provided with a cylindrical bore 46, and is further provided near the lower end with a transverse partition 48 having a central bore 50. A tubular extension or collar 52 extends axially up within the tubular fitting 36 from the partition 48, and is counterbored at 54. As will be observed, the bore 50 is somewhat greater in diameter than the quartz burner tube 14 and enlargement 20 thereof. There are radial openings 56 just above the partition 48 running from the bore 50 to the outside of the tubular extension 52. These are symmetrically disposed, and conveniently are three in number.

An outer tube or filter 57 is provided, which preferably is made of Pyrex glass, quartz, or soda lime glass, depending on the light output requirements. An externally threaded ring 58 encircles the outer filter 57 just above the bottom end thereof, and the glass will be seen to be secured to the ring 58 by a bead of suitable cement 60 lying on top of the ring at the juncture of the ring and the outer filter tube.

A gasket 62, preferably of synthetic rubber, encircles the lower extending end of the filter tube 57 below the ring 58 and abuts the flange 40 of the fitting 36, the nut 42 being turned on to the threads of the ring 58 to clamp the gasket 62 between the ring 58 and the flange 40 of the fitting 36. It will be observed that the end of the outer filter tube extends part way into the central bore 46 of the fitting 36 with the tube sealed in fluid tight relation relative to the fitting.

The outer filter or tube 57 is longitudinally symmetric. At the end shown as the upper end in the drawings, there is provided an externally threaded ring 64 cemented to the tube at 66 with the upper end of the tube extending slightly above the ring 64 and receiving a gasket 68, preferably of synthetic rubber.

An inner tube or filter 70, also preferably constructed of Pyrex glass or quartz, is of smaller diameter and is received within the bore 54 of the upstanding tubular

extension 52, seating against a helical spring 72 therein. The fit of the inner tube or filter 70 within the bore 54 is a close, but not a tight fit. A fluid tight relation is not essential, since any leakage at that point would simply be between adjacent water channels. It will be observed that the inner filter 70 is of uniform diameter, is about the same length as the outer filter, and is completely devoid of appurtenances, having no fittings, rings, or other added parts thereon.

At the upper end of the housing, in the position shown in the drawings, there is an upper metallic fitting designated generally by the number 73. The top fitting 73 includes a tubular outer shell 74. This shell and the remaining parts of the upper fitting, as well as those of the previously mentioned fitting 36 are made of stainless steel. The inner diameter of the outer tubular shell 74 is substantially the same as the outer diameter of the outer filter 57, whereby the outer filter upper protruding end may extend into the shell 74 as shown in FIG. 2. A circumferential flange 76 is welded or otherwise suitably secured to the bottom end of the shell and abuts the washer 68. A nut 78 has an inwardly directed flange 80 overlying the flange 76 immediately about the outer diameter of the shell 74. The nut has internal threads engageable with the threads on the ring 64 to clamp the flange 76 against the gasket 68.

Adjacent the upper end of the outer shell 74 there is provided a circumferential, externally threaded ring 82 for cooperation with a plumbing fitting, not shown. The ring may be welded in place, or formed integral with the shell, and is provided with an upstanding end portion 84 having an inwardly directed wall 86 bearing an annular series of holes 88 extending axially through the wall. An inner tubular shell 90 depends from the inner edge of the wall 86 in concentric relation with the outer shell 74, and extends slightly past the bottom end of the outer shell. A small ring 92 is welded or otherwise suitably secured just above the bottom end of the inner tubular shell 90. The inner diameter of the inner tubular shell 90 is about the same as the outside diameter of the inner filter tube 70. Accordingly, the inner filter tube fits up within the depending inner tubular shell, and is limited by the ring 92.

A short cylindrical tubular member 94 depends within the inner tubular shell 90, being formed integral with the end wall 86, the inner shell 90 being welded or otherwise suitably secured to said member 94. Three short legs 96 extend from the lower end of the short cylindrical tube 94, and radially inwardly directed spacers 98 thereon support the nut member 100. A longitudinally split shell fixed terminal 102 is threaded into this nut member from below, and a lock nut 104 is threaded on the top thereof to lock the terminal clip. The upper extending pin or terminal 22 of the burner is resiliently received in this clip. As best may be seen in FIG. 6, the clip is provided with a longitudinal slot 105, and with pairs of short transverse slots 106 to impart resiliency to the sheet metal.

Installation of the complete lamp as shown in FIGS. 1 and 2 is the same as in the prior art. The lower end is received in an electrical connector, the terminal or pin being connected to one side of the electric line. At the upper end, a plumbing fitting is connected, so that water may flow in one direction through the inner tubular shell 90 and through the inner filter 70 about the burner tube 14, and in the other direction through the space between the inner and outer filters and between the inner shell 90 and outer shell 74, the water passing through the apertures 56 adjacent the bottom of the tubes. The ground side of the line is connected to the plumbing fitting.

It is to be observed that all metallic parts which are engaged by the water are of stainless steel. Some prior art devices have used chromium or the like plated brass, and first the plating and then the brass has failed, and

part of the metal has been picked up by the circulating water and deposited on the filter glasses and on the burner tube as oxides, thereby diminishing the light output of the lamp.

It further will be observed that no special tools are needed for assembly or disassembly. All of the nuts 31, 42, and 78 are externally knurled and can be installed and removed by the hand, or at most with the use of a readily available wrench. The terminal clip 102 normally does not require removal, but it further will be observed that removal and installation of this member and of the lock nut 104 readily is effected by a notched screw driver and a small screw driver.

As noted heretofore, both the inner and outer filters are made of a special Pyrex or other glass having transmission characteristics such that the radiation outside the housing is similar to that of sunlight at the earth's surface. The high level of radiation intensity progressively changes the transmission characteristics, and also tends to change the physical characteristics, rendering the glass subject to fracture. For these reasons, the filters must be replaced from time to time. Changes in the inner filter are more rapid, due to the proximity thereof to the burner tube. As a result, the inner filter generally should be replaced after about 400 to 500 hours of operation, while the outer filter and the burner tube can be expected to last for 1,500 to 2,000 hours of operation. Thus, it will be seen that the inner filter will have to be replaced about four times, or perhaps about five times as often as the outer filter.

Accordingly, it is noteworthy that the inner filter is simply a straight length of glass tubing with no metal fittings thereon, and with no designed variations in bore. Hence, cost of the inner filter is kept at a minimum, and replacement is of the utmost simplicity. All that is necessary to replace the inner filter is to unscrew the nut 78 of the upper fitting, thereby to lift off the fitting and pick up the inner filter or tube.

Replacement of the outer filter or tube is effected by the simple additional expedient of unscrewing the nut 42. It will be observed that all that need be replaced or thrown away in addition to the glass of the outer filter is the pair of threaded rings 58 and 64 thereon. The major metal parts, comprising the lower fitting 36 and the upper fitting 73, and the nuts associated therewith need never be replaced. Hence, replacement costs of the operating parts are kept at a minimum, along with the effort involved in making such replacement.

The specific example of the invention as herein shown and described will be understood as being for exemplary purposes only. Various changes in structure will no doubt occur to those skilled in the art, and will be understood as forming a part of the present invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A lamp filter housing comprising an outer filter tube of glasslike material having retaining means adjacent the opposite ends thereof, a first fitting having a pair of retaining means thereon, one of said retaining means being substantially complementary to and detachably interfitting with one of the outer filter tube retaining means, and the other retaining means being substantially complementary to and detachably interfitting with one end of a lamp, a second fitting having a pair of retaining means thereon, one of said second fitting retaining means being substantially complementary to and detachably interfitting with one of the outer filter tube retaining means and the other of said second fitting retaining means being substantially complementary to and detachably interfitting with a plumbing fitting, said first and second fittings having means thereon for releasably supporting an inner filter tube, and an elongated inner filter tube of glasslike material releasably supported adjacent its opposite ends thereby in concentric relation within said outer filter tube,

5

said second fitting having further means substantially complementary to and detachably interfitting with the opposite end of a lamp.

2. A lamp filter housing as set forth in claim 1 wherein the various retaining means comprise threaded retaining means.

3. A lamp filter housing as set forth in claim 2 wherein the retaining means on the outer filter tube comprise externally threaded means, and wherein the cooperating retaining means on the first and second fittings comprise internally threaded nut members having internal flanges thereon, said first and second fittings having external flanges engaged by the internal flanges of the nut members.

4. A lamp filter housing comprising an outer filter tube of glass-like material having retaining means adjacent the opposite ends thereof, a first fitting having a pair of retaining means thereon, one being substantially complementary to and detachably interfitting one of the outer tube retaining means, and the other being substantially complementary to and detachably interfitting with one end of a lamp, a second fitting having a pair of retaining means thereon, one of said second fitting retaining means being substantially complementary to and detachably interfitting with one of the outer filter tube retaining means and the other of said second fitting retaining means being substantially complementary to and detachably interfitting with a plumbing fitting, said first and second fittings having means thereon for supporting an inner filter tube, and an inner filter tube of glass-like material of uniform diameter throughout and devoid of fittings supported by said fittings inner filter tube supporting means in concentric relation within said outer filter tube.

6

5. A lamp filter housing as set forth in claim 1 for use with a lamp having a longitudinal protuberance at one end and a circumferential flange adjacent the other end, wherein the first fitting retaining means comprises a spring clip for receiving said protuberance, and wherein the second fitting retaining means includes a seat and means for clamping the lamp circumferential flange against said seat.

6. A lamp filter housing as set forth in claim 1 wherein said first fitting comprises a pair of elongated tubes, means supporting said tubes in concentric relation, and means supporting said lamp retaining means coaxially within the inner of said pair of tubes, the inner of said pair of tubes including the means for releasably supporting the inner filter tube.

7. A lamp filter housing as set forth in claim 4 wherein said filter tube supporting means comprises a pair of axially spaced cylinders, one of said cylinders having a stop, and the other of said cylinders having resilient means bearing against the end of said inner filter tube and pressing it axially against said stop.

References Cited by the Examiner

UNITED STATES PATENTS

2,312,232	2/1943	Bol	240—11.4
2,336,525	12/1943	Bourne et al.	240—11.4
2,344,122	3/1944	Bay et al.	240—1.1
2,836,707	5/1959	Stitt	240—1.1
3,098,167	7/1963	Jensen et al.	240—26 X

NORTON ANSHER, *Primary Examiner*.

C. R. RHODES, *Assistant Examiner*.