

Oct. 30, 1928.

1,690,056

M. V. COLEMAN

RENEWABLE FILAMENT LAMP

Filed May 15, 1926

2 Sheets-Sheet 1

Fig. 1.

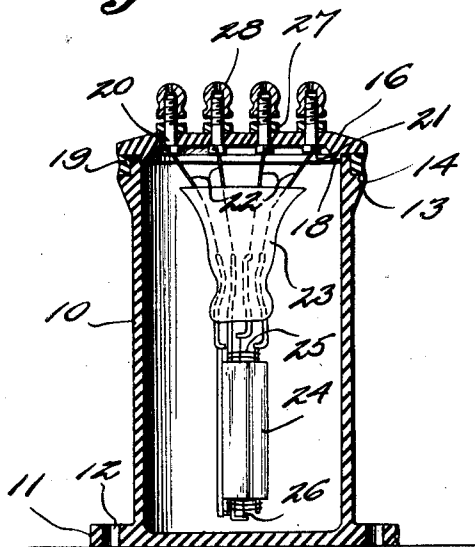


Fig. 3.

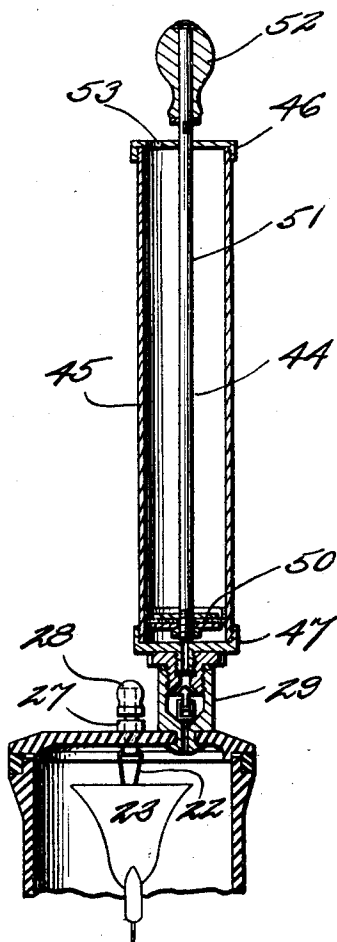
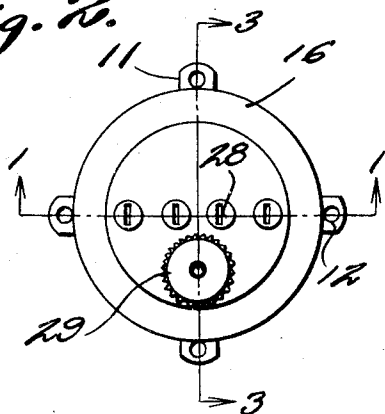


Fig. 2.



Melvin Vance Coleman

INVENTOR

BY *Victor J. Evans*

ATTORNEY

R. E. Wise

WITNESS:

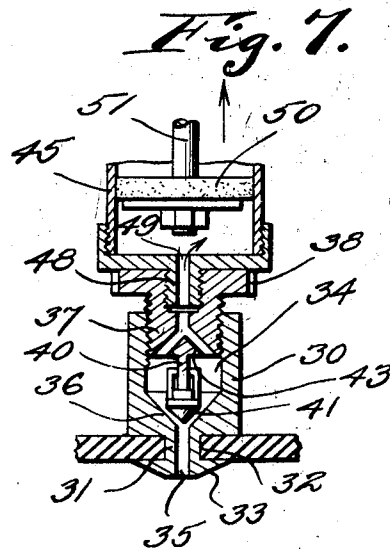
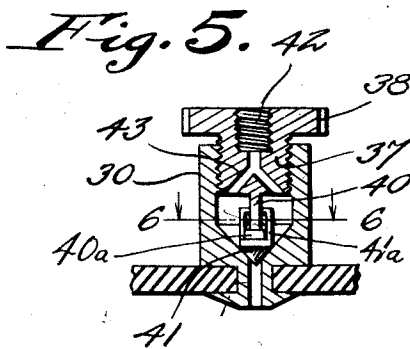
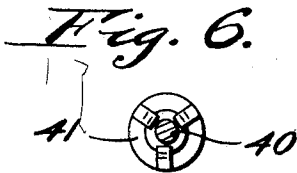
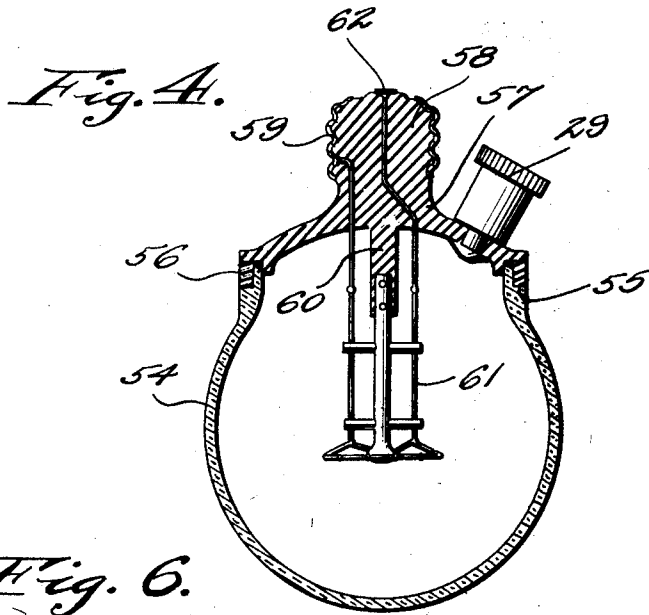
Oct. 30, 1928.

1,690,056

M. V. COLEMAN
RENEWABLE FILAMENT LAMP

Filed May 15, 1926

2 Sheets-Sheet 2



Melvin Vance Coleman

INVENTOR

BY *Victor J. Evans*

ATTORNEY

WITNESS

UNITED STATES PATENT OFFICE.

MELVIN VANCE COLEMAN, OF CUMBERLAND, MARYLAND.

RENEWABLE-FILAMENT LAMP.

Application filed May 15, 1926. Serial No. 109,367.

This invention relates to electric incandescent lamps, radio tubes and the like, and has for its object the provision of a novel construction for devices of this class whereby disassembling may be easily effected for the purpose of renewing a broken or burned out filament, and reassembling just as easily effected without the employment of elaborate and expensive apparatus.

An important and more specific object is the provision of a bulb or tube or other lamp device having a filament, so constructed that the parts thereof will be held together by the necessary vacuum and capable of separation by the simple act of releasing the vacuum when repairing is needed.

Another object of the invention is to provide a novel valve structure whereby a suction pump may be easily attached for the purpose of exhausting the air after the parts have been disassembled, a new filament placed in position, and the parts reassembled.

An additional object is to provide a lamp or tube structure which will be comparatively simple and inexpensive in manufacture, easy to repair, positive in action, efficient and durable in service, and a general improvement in the art.

With the above and other objects and advantages in view, the invention consists in the novel construction and arrangement of elements to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which:—

Figure 1 is a longitudinal section through a radio vacuum tube constructed in accordance with the invention, this view being taken on the line 1—1 of Figure 2.

Figure 2 is a plan view.

Figure 3 is a section taken on the line 3—3 of Figure 2 but showing a suction pump applied for exhausting the air subsequent to repairing.

Figure 4 is a longitudinal section through an incandescent lamp, rectifier, bulb or the like showing it constructed in accordance with the invention.

Figure 5 is a detail section through the valve used in connection with either form of tube or bulb.

Figure 6 is a detail section on the line 6—6 of Figure 5, and

Figure 7 is a view similar to Figure 5 but showing, in enlarged section, the lower end of the suction pump applied thereto.

Referring more particularly to the drawings, and especially to Figures 1 to 3 inclusive, I have shown a radio vacuum tube including a receptacle or casing 10 of suitable material here shown as having attaching seats 11 apertured at 12 for the passage of securing screws or the like whereby it may be fastened down if such is desired. At its upper end or edge, this casing is thickened as indicated at 13 and formed with a ledge or shoulder 14.

The device further includes a cap or cover 16 adapted to fit upon the upper edge of the casing 10 and provided with a depending flange 18 fitting within the casing. To insure a tight joint, use is made of a suitable rubber or other flexible gasket 19 which fits upon the ledge or shoulder 14 and which engages beneath the outer portion of the cover. Extending through the cover are terminal members preferably formed as screws 20 which have their heads 21 located beneath the cover and which have suitably secured thereto conductors 22 which extend down into the supporting structure 23 and which are anchored therein. Carried by this supporting structure 23 are the plates, grid and filament elements necessary in a vacuum tube, these elements being indicated respectively by the numerals 24, 25, and 26. The conductors 22 are connected, within the supporting member 23, with the respective terminals of these vacuum tube elements and it will therefore be apparent that all the vacuum tube elements are supported from the cover so that when the cover is removed from the casing 10, all these elements will be removed along with it. Clearly, it is easily possible to provide clamping nuts 27 on the screws 20 for holding them in place, and it is equally clear that the terminal screws carry binding nuts 28 by means of which connections with the different elements in a radio set or the like may be made.

The cover 16 also carries a valve device indicated generally by the numeral 29, the valve device including a cup-like body 30 secured upon the cover as for instance by means of having a reduced neck 31 passing through an opening 32 in the cover, the neck being subsequently upset or flattened out as indicated at 33 to provide a retaining head. The member 30 is formed with a chamber 34 having a relatively small passage 35 communicating therewith, a valve seat, preferably of conical shape and indicated by the numeral 36 being provided at the juncture

of this passage with the chamber. The upper portion of the chamber is threaded as indicated and normally engaged therein is an externally threaded cap 37 having a knurled or milled head 38 so that it may be readily grasped and turned. Depending from the center of the underside of the cap member 37 is a stem 40 carrying a valve 41 which contacts with the seat 36 for sealing the same. The cap 37 is formed with a threaded recess 42 with which communicates a V-shaped passage 43 so that when the cap is unscrewed communication between the interior of the casing 10 and the atmosphere will be obtained. In combination with the device, use is made of a pump 44 which is shown as including a barrel or cylinder 45 closed at its ends by caps 46 and 47, the latter of which is provided with a depending threaded extension 48 adapted to be screwed into the threaded recess 42, this reduced extension having a passage 49 therein. Slidably mounted within the pump barrel or cylinder 45 is a piston or plunger 50 of suitable construction carried by a plunger rod 51 which is slidable through the cap 46 and which carries an operating handle 52. The cap 46 is provided with an air vent 53.

In the operation, it will be apparent that when the vacuum tube or other device shown in Figures 1 and 2, as well as 3, needs to have its filament replaced, it is merely necessary that the operator or user unscrew the cap 37 so as to disengage the valve 41 from the seat 36. When this is done, atmospheric pressure or air enters the casing 10, as will be readily apparent. The cover 16 should then be detached from the casing 10, all the interior mechanism being removed with the cap. When this is done, it is of course apparent that the broken or burnt out filament may be readily replaced with a new one, subsequently to which the cap is replaced in position so that the working parts will again be arranged or disposed within the casing 10. While the cap 37 is still unscrewed to such an extent that the valve 41 is out of engagement with the seat 36, the reduced extension or nipple 48 of the pump is screwed into the threaded recess 42 and the pump plunger or rod, and the piston carried thereby, should then be reciprocated so as to exhaust the air from the interior of the casing 10. It is of course obvious that the valve device 41 carried by the stem or extension member 40 must be slidable with respect thereto so as to constitute a check valve. Clearly, then, upon each upward movement of the pump plunger or piston 50, a certain amount of air will be drawn out of the casing 10, the valve 41 immediately reseating as soon as the movement of the piston or plunger ceases. By operating the pump for a sufficient length of time, it is quite apparent that the air within the casing 10 will be rarefied or exhausted to a sufficient

extent, a small portion at a time. After a sufficient evacuation of the casing has been accomplished, the cap 37 is screwed down tightly so that the valve 41 will be forced into firm and close engagement with the seat 36, thus effecting an adequate seal. Obviously, the vacuum or lack of pressure within the casing 10 will operate to hold the cover 16 firmly seated so there will be no chance of leakage, especially as the flexible gasket 19 is provided between the cover and the ledge or shoulder 14.

In Figure 4, I have shown the same principle applied to an incandescent lamp, though of course it is equally well applicable to a rectifier bulb or the like. Referring to this figure in detail, it will be apparent that the reference character 54 designates the bulb which is provided at its open end with a ledge or shoulder 55 upon which is mounted a resilient gasket 56 operating to form a seal with the removable cover member 57 which is, in the present instance, formed with an extension 58 equipped with a threaded metallic shell 59 so as to be capable of being screwed into an ordinary electric light socket in a well known and customary manner. Depending from the cover member 57 is a support 60 which carries the filament 61, the terminals of which are brought out through the extension 58, one being connected with the shell 59 and the other being connected with the central contact 62 of the bulb. The valve device indicated in general by the numeral 29, and described in full above, is provided on the cover 57 in exactly the same manner as on the first described form of the invention which discloses a vacuum tube for radio purposes or the like. The operation is of course exactly the same for this form of the device as for the first described form and further elaboration should therefore be unnecessary.

It might be mentioned in passing, that the specific construction of the check valve device embodies guide arms 41^a carried by the valve 41 and slidable with respect to the stem 40, though engageable with an enlargement 40^a on the lower end of the stem 40 so as to limit the movement.

From the foregoing description and a study of the drawings, it will be apparent that I have thus provided a comparatively simple and inexpensive construction for radio vacuum tubes, rectifier bulbs, incandescent lamps or any other object or devices embodying a filament, and in which the filament is necessarily operated in a vacuum. Obviously, by providing a construction in which the parts may be disassembled to permit replacement of a burnt out or broken filament, a great saving will be effected inasmuch as it is not necessary to discard the entire tube, bulb or the like whenever a replacement is needed. It is really believed that the construction, operation and advantages will be

readily apparent to one skilled in the art without further explanation.

While I have shown and described the preferred embodiment of the invention, it should be understood that I reserve the right to make such changes in the form, construction and arrangement of parts as will not depart from the spirit of the invention or the scope of the subjoined claim.

Having thus described the invention, I claim:—

In a renewable filament vacuum tube, a bulb of glass having one end open and formed with a thickened reinforcing por-

tion provided with a seat, a cover of insulating material telescopically engaged with said seat, gasket means between the cover and the seat, a plurality of terminal elements rigidly secured to and carried by the cover, a filament, a grid and a plate electrode located within the bulb and supported by conductors connected with said terminal elements, said cover having a casing provided with an inwardly closing check valve and with means for attachment of a vacuum pump thereto.

In testimony whereof I affix my signature.

MELVIN VANCE COLEMAN.