Dec. 10, 1929. H. J. CHRISTOPHER 1,738,524

DEVICE FOR LOCKING EVACUATED TUBES

Filed Dec. 17, 1924

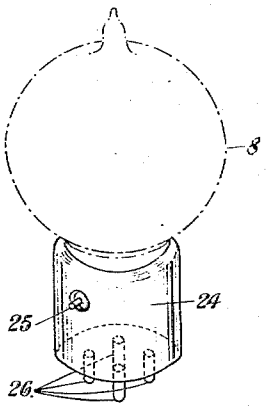


Fig. 1

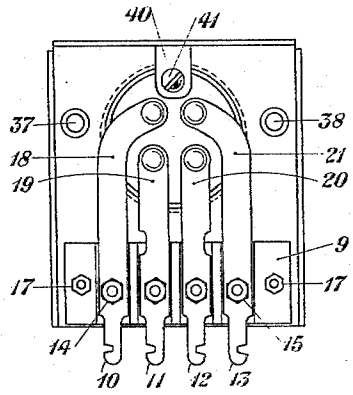


Fig. 4

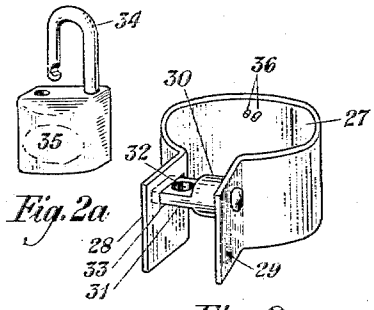


Fig. 2a

Fig. 2

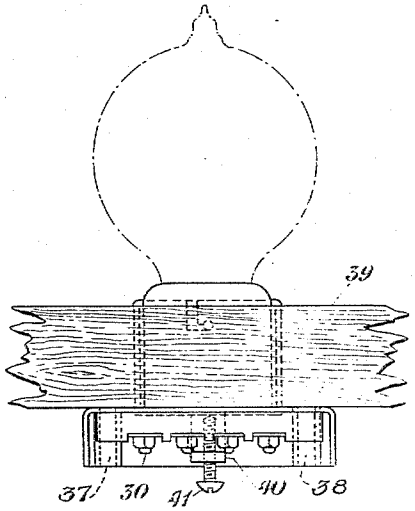


Fig. 5

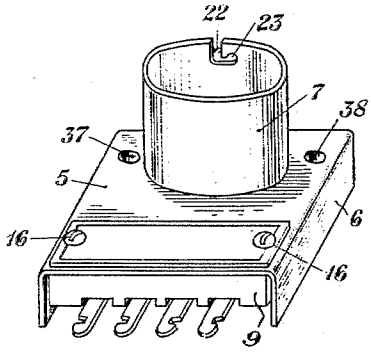


Fig. 3

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UNITED STATES PATENT OFFICE

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DEVICE FOR LOCKING EVACUATED TUBES

Application filed December 17, 1924. Serial No. 756,596.

This invention relates to devices for locking evacuated tubes in their sockets in such manner as to prevent the unauthorized removal thereof.

The unauthorized removal of evacuated tubes from their sockets has resulted in considerable inconvenience, not alone because of the loss represented by the tubes themselves, but, in addition, the impairment of their associated circuits which depend upon the presence of the tubes in order to function properly. This is especially true with respect to evacuated tubes of the audion type, which are used in connection with telephone circuits. Accordingly, it is an object of this invention to provide a simple and inexpensive form of locking device which will effectually prevent the unauthorized removal of evacuated tubes from their sockets.

Other and further objects will be apparent from the following description, when considered in connection with the accompanying drawing in which are illustrated certain embodiments of the invention.

Referring to the drawing in which the first four figures are shown in perspective, Figure 1 illustrates an evacuated tube; Fig. 2 is a locking collar therefor; Fig. 2ª is a lock which may be used in connection with the collar; Fig. 3 is a socket and base for said tube; Fig. 4 is a bottom view of Fig. 3, and Fig. 5 is an elevation of the tube, illustrating a second modification by which it may be locked in its socket.

In the drawing, in which the improved attachment is described and shown as applied to a certain form of tube and socket for the purpose of illustration, the reference 5 represents a casting of brass or other suitable material of which 6 is the base and 7 the socket proper into which an evacuated tube 8 with suitable terminals may be inserted, as will hereinafter appear. Secured to the bottom of the base 6 are spring contact elements such as is shown in Fig. 4. These elements comprise a strip of insulating material 9 with spring elements 10, 11, 12 and 13 affixed thereto in any suitable manner. These springs may be secured to the insulating strip by bolts 14 which in connection with the nuts 15 hold the respective spring elements in a rigid position with respect to the strip 9, and these spring elements may be placed in grooves. The insulating strip 9 may be secured rigidly to the base plate 6 by means of screws 16 engaging with nuts 17.

The various spring members 10 to 13, inclusive, project into the base to such an extent that their terminals 18, 19, 20 and 21 are suitably disposed below the opening of the socket member 7 in order to make contact with the terminals of the evacuated tube 8 to be used in connection therewith. In this case these terminals are shown as forming, respectively, the corners of a square, the center of which square falls upon the axis of the socket 7.

The socket 7 is provided with a slot 22 comprising a vertical portion and a horizontal portion, the latter portion having a recess 23.

The evacuated tube 8 is provided with the usual base 24 which is secured thereto by any suitable sealing material and is of such dimensions as to fit snugly into the socket 7. On the side of the base 24 is placed a small projection or pin 25 and on the bottom of said base are disposed four terminals 26. To place the tube in the socket, the pin 25 is inserted in the vertical portion of the slot 22 and then turned to the right into the horizontal portion of the slot until it becomes positioned in the recess 23. The pin 25 thus forms with the slot 22 a bayonet joint, and these elements are so positioned with respect to each other that the four terminals indicated by the numeral 26 will make contact respectively with the spring terminals 18, 19, 20 and 21. The terminals 26 are of such length that a suitable contact pressure is obtained with the spring terminals 18, 19, 20 and 21 to force and retain the pin 25 of the evacuated tube against the upper wall of the recess 23.

Surrounding the socket 7 is a flexible collar 27, illustrated in Fig. 2, which is substantially the same height as the socket. This collar may be composed of some suitable material such as brass, and is provided with extended ends 28 and 29. The end 29 has a stud 30 affixed to its inner face, from which extends a flattened portion 31 which is provided with an opening 32. The portion 31 is

adapted to extend through a horizontal slot 33 provided in the end portion 28 a sufficient distance to permit the ring portion 34 of a padlock 35 to be inserted through the opening 32 to hold the collar in a contracted position so that it tightly engages the surface of the socket 7. On the interior of the collar 27 and at the rear thereof are affixed projections or pins 36. These pins are in parallel relation, and one of the pins is shorter than the other in order to facilitate the removal of the pins from the slot, as will presently appear. When the collar is in contracted position the pins register in the horizontal portion of the slot 22 provided in the socket and prevent the transverse movement of the evacuated tube. To release the evacuated tube the padlock 35 is removed from the opening 32 in the stud 30 and the extended ends 28 and 29 of the flexible collar are opened thus permitting the expansion of the collar. The expansion of the collar provides just enough clearance between its inner surface and the outer surface of the socket 7 to permit the shorter of the pins 36 to become disengaged from the horizontal portion of the slot 22. When the collar is rotated in a counter clockwise direction looking from the top, the shorter pin bears against the outer surface of the socket and causes the collar to be sprung outward so that the longer pin may be also disengaged from the slot. The tube may be released from the socket at this time by pressing it downward against the spring terminals 18 to 21, inclusive, and turning it until the pin 25 lies in the vertical portion of the slot 22, thus permitting the tube to be lifted out of the socket.

To retain the base 6 in position two holes 37 and 38 are provided therein through which screws may be introduced and fastened to the supporting surface upon which the base is mounted.

In Fig. 5 the socket 7 is shown as positioned in a panel 39 in which an opening is provided for its reception. The thickness of this panel is sufficient to prevent the extension of the socket therethrough a sufficient distance so that the slot 22 appears above the top surface thereof. Affixed to the rear portion of the base 6 is an L-shaped lug 40, which is provided with a threaded opening through which a screw 41 extends upwardly. The screw is adapted to engage the lower surface of the base 24 of the tube and is tightened so as to exert sufficient pressure thereon to keep the pin 25 positioned against the upper part of the recess 23 in the socket and thus prevent the withdrawal of the tube therefrom. By loosening the screw 41, the tube may be removed from the socket, as previously outlined.

In Fig. 5 the top surface of the base 6 lies flatly against the bottom surface of the panel 39, and may be secured thereto by screws introduced through the holes 37 and 38. The panel 39 may serve as a cover for an enclosed box, cabinet or the like to which it may be hinged. This cabinet may contain a number of tubes mounted therein, and a lock may be provided therefor in order to prevent access to its interior by unauthorized persons.

The locking collar illustrated in Fig. 2 may be used in combination with the locking means indicated in Fig. 5 whereby the tube is retained in its socket by the tension applied by the screw which engages the base portion of the tube. A double locking means may be thus provided for the tube.

From the foregoing, it is thought that the construction, operation and many advantages of the present invention will be apparent to those skilled in the art, and it will be understood that, while the improved arrangement is shown and described in connection with a certain type of socket, it may be used with other forms of socket without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. The combination of an evacuated tube having a projection thereon and a socket having a slot with a vertical portion and a horizontal portion provided therein whereby said tube and socket may be coupled in a bayonet joint connection. a flexible collar surrounding said socket, the ends of said collar being adapted to be locked together, and a pair of closely associated parallel studs of different length carried on the interior of the collar which engage the horizontal portion of said slot to lock the tube in the socket when the collar is in contracted position, the shorter of said studs engaging with the socket in the expanded position of the collar to cause its associated stud to be displaced from the slot upon the rotation of the collar to permit the release of the tube from the socket.

2. The combination of an evacuated tube having a projection thereon and a socket having a slot with a vertical portion and a horizontal portion provided therein whereby said tube and socket may be coupled in a bayonet joint connection, a flexible collar surrounding said socket, the ends of said collar being adapted to be locked together, and a pair of associated parallel studs carried on the interior of the collar, said studs being of different lengths and separated from each other a sufficient distance to approximately fill with the positioned projection of the tube the entire horizontal portion of the socket slot to lock the tube therein when the collar is in contracted position, and which disengage the slot in said socket to permit the release of said tube when the collar is in an expanded position, one of said studs cooperating with the socket to facilitate the removal of its associated stud from the slot and the release of

said tube and collar therefrom when the latter is in an expanded position.

In testimony whereof, I have signed my name to this specification this 15th day of December 1924.

HARRY J. CHRISTOPHER.