Dec. 18, 1928. 1,695,600

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VIBRATION DAMPENER FOR VACUUM TUBES

Filed March 23, 1927

Fig. 1.

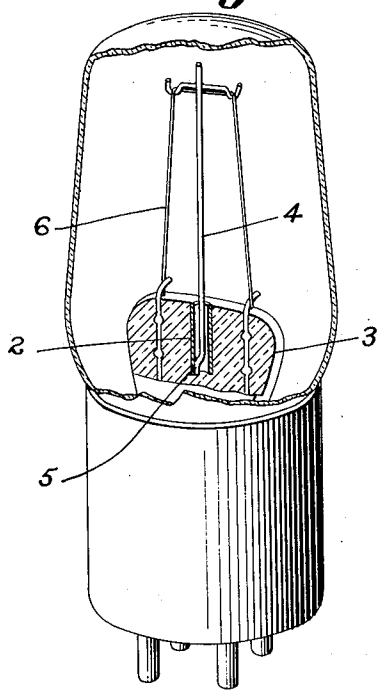


Fig. 2.

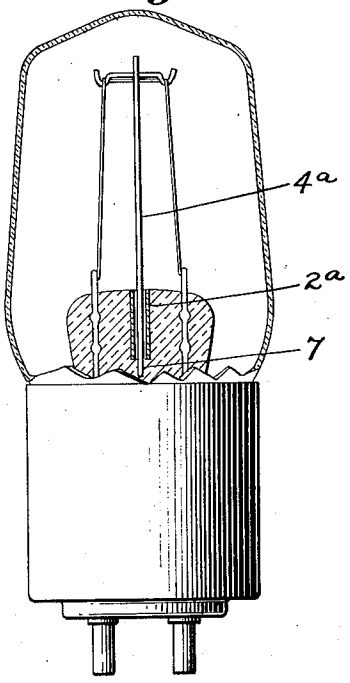


Fig. 3.

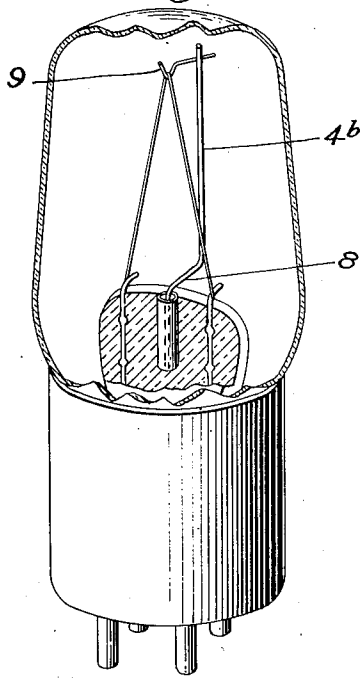
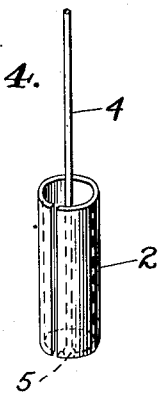


Fig. 4.



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UNITED STATES PATENT OFFICE.

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VIBRATION DAMPENER FOR VACUUM TUBES.

Application filed March 23, 1927. Serial No. 177,591.

This invention relates to a vibration dampener for vacuum tubes such as three electrode tubes and especially to a filament support which will have a low period of vibration. The object of the present invention is to generally improve and simplify the construction and operation of filament supports such as employed in three electrode vacuum tubes and the like; to provide a filament support which will have a low period of vibration; to provide a filament support of a length longer than could be ordinarily employed; to provide a filament support of such flexibility that it will vibrate in resonance with low periods only and dampen completely the high periods of vibration and further to provide a three electrode vacuum tube in which the vibration dampener is built within the tube. The invention is shown by way of illustration in the accompanying drawings in which:

Fig. 1 is a sectional view of a vacuum tube partially broken away showing one form of the filament support.

Figs. 2 and 3 are similar views showing other forms of filament supports,

Fig. 4 is an enlarged detail view of the sleeve to which the filament support is secured.

The present invention provides a sleeve or bushing such as indicated at 2 set into the stem 3 of the tube with a filament support in the form of a wire or rod such as indicated at 4 welded or otherwise attached at a point adjacent the lower end of the sleeve as indicated at 5. By securing the filament support 4 in the manner illustrated, the support may be substantially twice as long as the leg of the filament indicated at 6 and as such will permit a low period of vibration. As all vibrations, either mechanical or air vibrations on the wall of the tube must pass up the filament support, the natural period of the support being very low, all higher vibrations are effectively dampened.

When using a sleeve such as here indicated, a lively or springy filament support is obtained because the rod or wire 4 is guarded from movement in all directions by the encompassing wall of the sleeve. This sleeve or guard allows free motion for vibrations but reduces tendency for any considerable displacement which might cause shorting. In Fig. 2 the rod or filament support indicated at 4^a is secured by passing it through the sleeve or guard 2^a and it is then embedded in the glass as indicated at 7. In Fig. 3 the filament support or rod indicated at 4^b is welded to the sleeve 2 or it may be embedded in the glass at the lower end of the sleeve as shown in Fig. 2, the rod being in this instance preferably offset as indicated at 8 and a hook-shaped support 9 being welded or otherwise secured at the upper end of the rod as indicated at 9 to support the filament. The several forms disclosed all serve the same function, to wit, that of providing a filament support of considerable length which will not respond to the higher vibrations and these are accordingly effectively dampened out.

While the present invention has been described in connection with vacuum tubes of the three electrode type, it is obvious that other applications are possible. It is for this reason that no description or illustration of the plate and grid has been resorted to.

While certain features of the present invention are more or less specifically described and indicated, I wish it understood that various changes may be resorted to within the scope of the appended claims; similarly, that the materials and finish of the several parts employed may be such as the manufacturer may dictate or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a vacuum tube a hollow metal sleeve sealed into the stem of the tube and a filament support secured at a point adjacent the lower end of the sleeve.

2. In a vacuum tube a hollow metal sleeve sealed into the stem of the tube, an elongated filament support extending downwardly through the sleeve and centrally thereof and an offset portion on the filament support adapted to be welded to the lower end of the sleeve.

3. In a vacuum tube a hollow metal sleeve sealed into the stem of the tube, a rod-like filament support extending downwardly through the sleeve and centrally thereof, means securing the lower end of the rod with relation to the lower end of the sleeve, said rod-like filament support being free to vibrate interiorly of the sleeve and being sup-

ported against excess vibration or movement by the inner wall of the sleeve.

4. A vacuum tube having a stem, there being a depression in said stem, an elongated filament support secured at a point adjacent the bottom of the depression, and extending outwardly therefrom.

5. In a vacuum tube a non-microphonic filament support constructed so as to be sensitive to a low period of vibration only, said filament support being attached to the stem of the tube at a point below that at which other electrode supports are attached.

6. A tube of the character described, having a stem, a metallic sleeve sealed into the stem, a rodlike filament support extending downwardly through the sleeve and disposed centrally thereof, and means to secure said filament support adjacent the bottom of the sleeve.

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