Dec. 9, 1947. R. J. MILLETTE 2,432,435

TUBE CLAMPING APPARATUS

Filed Feb. 12, 1945

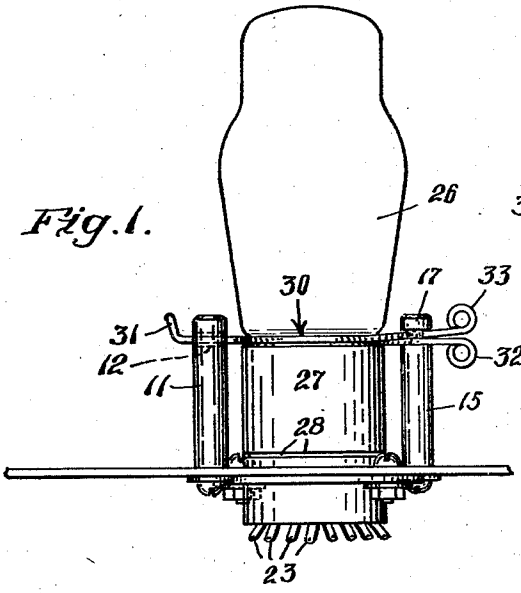



Fig. 1.

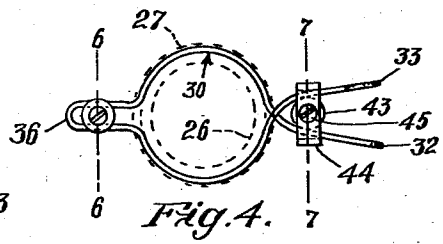



Fig. 4.

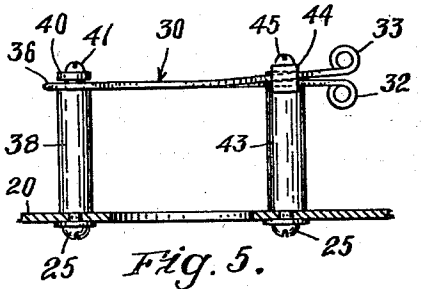



Fig. 5.

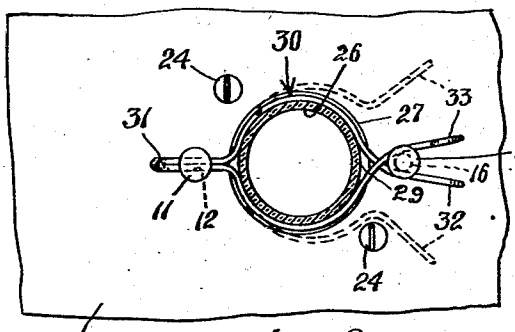



Fig. 2.

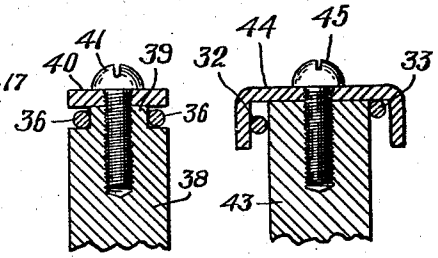



Fig. 6. Fig. 7.

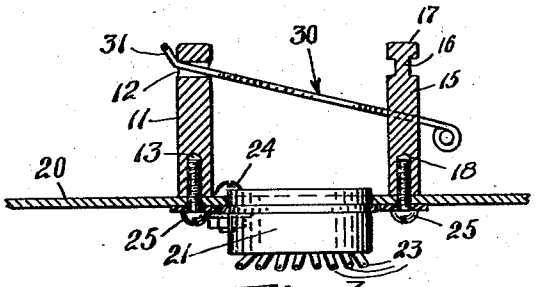



Fig. 3.

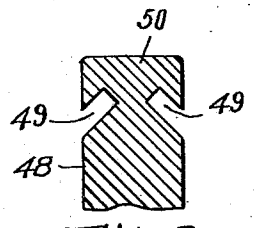



Fig. 8.

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## TUBE CLAMPING APPARATUS

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14 Claims. (Cl. 248—361)

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This invention relates to clamping apparatus to hold radio tubes and the like in a fixed position.

In many uses radio tubes or the like are subject to sudden changes in position, or are used in upside down position, or are subject to a great deal of vibration, any one of which conditions may loosen the tube from its socket so that it fails to function or falls out. The principal object of my invention is to provide clamping apparatus that will firmly hold radio tubes or similar articles in a fixed position under all conditions of use. Another object is to provide such apparatus that can easily and quickly be clamped to and unclamped from a radio tube, yet, if desired, will stay in clamped position indefinitely without any diminution in the clamping effect.

A further object is to make said clamping apparatus so simple that it can readily be manufactured and assembled for use at relatively low cost.

The foregoing and other objects which will appear as the nature of the invention is better understood, may be accomplished by a construction, combination and arrangement of parts such as is disclosed by the drawings and specification. The nature of the invention is such as to render it susceptible to various changes and modifications, and, therefore, I am not to be limited to said disclosure; but am entitled to all such changes therefrom as fall within the scope of my claims.

In the drawings:

Figure 1 is a front elevational view of a radio tube clamped in fixed position by my clamping apparatus.

Figure 2 is a plan view thereof, the dotted lines indicating the position of the clamping spring before the end portions are moved to clamping position.

Figure 3 is a longitudinal, sectional view of my clamping apparatus in clamping position; the tube being omitted.

Figure 4 is a plan view of a modified form of my clamping apparatus in clamping position. Figure 5 is a side elevational view of the said apparatus shown in Figure 4. Figure 6 is a sectional view taken on the line 6—6 of Figure 4.

Figure 7 is a sectional view taken on the line 7—7 of Figure 4.

Figure 8 is a longitudinal sectional view of another modification of a clamping post.

As illustrated, my apparatus has a clamping post 11 through which a hole 12 extends laterally slightly below the top. It has a vertically extending screw-threaded hole 13 that commences at the bottom of said post 11 and extends upwardly. Said apparatus also has another retaining post

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15 which has a reduced or neck portion 16 spaced from the top, and a head 17 just above said reduced portion 16. It also has a screw-threaded hole 18 similar to said hole 13.

Said posts 11 and 15 are anchored to a chassis 20 which is the usual supporting means for a radio tube, later described. Said chassis 20 has mounted thereto a tube socket 21 which is held to said chassis 20 by screws 24. The usual contact lugs 23 extend from said socket. Screws 25 pass through said chassis 20 and screw into said holes 13 and 18 to hold said posts 11 and 15 firmly to said chassis.

As shown, the radio tube consists of the usual shell 26 set in a base 27 which has a plurality of prongs at the bottom thereof. The top of said base 27 provides a shoulder 29 on which portions of my tube retainer or clamping spring 30 rests. An end portion of said clamping spring 30 extends through said lateral hole 12 in said post 11 and terminates outside said post 11 in a hooked end extremity 31 which is preferably looped. This prevents that end of said clamping spring from being pulled out of said hole 12.

At the other extremity of said clamping spring 30 are two free end portions one of which terminates in a looped end extremity 32, the loop extending from the adjacent portion of said spring 30 downwardly and when in clamping position preferably being the lower of said free end portions as shown in Figure 1 of the drawings. The other free end portion has a looped end extremity 33, the loop extending from the main body of said retainer spring upwardly and when in clamping position preferably being the upper of the two free end portions.

Said loops at the end portions 32 and 33 facilitate the operation of moving said clamping spring free end portions to clamping and unclamping position around the said reduced portion 16 of said post 15 since they enable the two fingers which perform in this operation to function without interfering with each other. Thus said free end with the lower said looped end extremity 32 is easily moved into its correct (lower) position around said reduced or neck portion 16, and said other free end with the upper looped end extremity is easily moved into its correct (upper) position around said reduced portion 16. When said free ends are in position around and bearing against said neck portion 16 said tube is clamped tightly in place. By merely spreading said end extremities 32 and 33 apart they can be released from their clamping position by moving them and said

free ends upwardly to clear said post 15, and said tube can readily be removed from said socket 21.

In Figure 4 the clamping spring is provided with a looped end 36 instead of the hooked end 31 previously described. Said looped end 36 is held to a clamping post 38 which has a reduced or neck portion 39 at the top which said looped end 36 fits over. A retaining washer 40, and a screw 41 that screws into said post 38, hold said looped end to said post 38.

In Figure 4 of the drawings there is also shown another kind of clamping post 43 on which an overhanging washer 44 is mounted by a screw 45 that screws into said post 43. Said clamping spring free ends extend into the space between said post and the sides of said overhanging washer 44.

In Figure 8 of the drawings another form of clamping post 48 is shown to which said clamping spring 30 may be attached by inserting it into the diagonally extending space 49 surrounding a reduced portion, and above which is an integral head 50 that will retain said clamping spring 30 in place.

What I claim is:

1. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means extending at substantially a right angle to said means and substantially parallel with said tube, each said post having a cut-away portion, a clamping spring in holding relation to said tube embodying an end portion which is associated in holding relation with said cut-away portion of one said post, and embodying two other end portions which are associated in holding relation with a said cut-away portion of the other said post to thereby hold said tube in position.

2. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, each said post having a cut-away portion spaced from the top thereof, a clamping spring in holding relation to said tube embodying an end portion which is associated in holding relation with a said cut-away portion of one said post, and embodying two other end portions which cross each other and are associated in holding relation with a said cut-away portion of the other said post to thereby hold said tube in position.

3. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, a clamping spring in holding relation to said tube embodying an end portion which is associated in holding relation with and bears against a portion of one said post, and embodying two other end portions which cross each other and are associated in holding relation with and bear against two different portions of the other said post to thereby hold said tube in position.

4. Clamping apparatus in combination with a tube, comprising supporting means, two upright posts extending parallel with said tube attached to said means, one said post having a hole extending laterally therethrough, the other said post having a reduced portion, a clamping spring embodying an end portion which extends through said hole, said clamping spring embodying two other end portions which cross each other one of which bears against a part of said reduced portion when in locking position and the other of which bears against another part of said reduced portion.



5. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, one said post having a hole spaced from the top thereof and extending laterally therethrough, the other said post having a reduced portion spaced from the top thereof, a clamping spring embodying an end portion which extends through said hole and has a hooked end extremity, said clamping spring embodying two other end portions one of which bears against a part of said reduced portion when in locking position and the other of which bears against another and higher part of said reduced portion.

6. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, one said post having a hole extending laterally therethrough, the other said post having a reduced portion, a clamping spring embodying an end part which extends through said hole and has a hooked end extremity, said clamping spring embodying two end portions each of which has a loop at its end extremity and one of which end portions bears against a part of said reduced portion when in locking position and the other of which bears against another part of said reduced portion.

7. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, one said post having a hole extending laterally therethrough, the other said post having a reduced portion, a clamping spring embodying an end part which extends through said hole and has a hooked end extremity, said clamping spring embodying two end portions one of which bears against a part of said reduced portion when in locking position and the other of which bears against another part of said reduced portion, one said end portion having a loop at its end extremity which extends downwardly and the other having a loop at its end extremity which extends upwardly.

8. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, one said post having an opening therein, the other said post having a reduced portion of less width in one direction than the top extremity thereof, a clamping spring embodying an end part which extends into said opening, said clamping spring embodying two portions the first of which extends around one side of said tube and bears against said reduced portion at a side which is opposite to said tube side, the second of which extends around the other side of said tube and bears against said reduced portion at a point higher than said first end portion and at a side which is opposite to the latter-mentioned tube side, the said first portion having a loop at its end extremity which extends downwardly and the said second portion having a loop at its end extremity which extends upwardly.

9. Clamping apparatus in combination with a tube, comprising supporting means, two posts at opposite sides of said tube attached to said means, one said post having a hole extending laterally therethrough spaced from the top of said post, the other said post having a reduced portion below the top thereof, a clamping spring embodying an end part which extends through said hole and has a hooked end extremity on the outer side of said post farthest from said tube, said clamping spring embodying two portions the first of which extends around one side of said tube and bears against said reduced portion at a side which is

opposite to said tube side, the second of which extends around the other side of said tube and bears against said reduced portion at a point higher than said first end portion and at a side which is opposite to the latter-mentioned tube side, the said first portion having a loop at its end extremity which extends downwardly and the said second portion having a loop at its end extremity which extends upwardly.

10. Clamping apparatus in combination with a tube, comprising supporting means, two posts attached to said means, one said post having a hole extending laterally therethrough spaced from the top of said post, the other said post having a reduced portion below the top thereof, a clamping spring embodying an end part which extends through said hole and has a hooked end extremity on the outer side of said post farthest from said tube, said clamping spring embodying two portions the first of which extends around one side of said tube and bears against said reduced portion at a side which is opposite to said tube side, the second of which extends around the other side of said tube and bears against said reduced portion at a point higher than said first end portion and at a side which is opposite to the latter-mentioned tube side, the said first portion having a loop at its end extremity which extends downwardly and the said second portion having a loop at its end extremity which extends upwardly.

11. Clamping apparatus comprising supporting means, two posts attached to said means, one said post having a hole therethrough spaced from the top of said post, the other said post having a reduced portion that extends below the top thereof, a clamping spring embodying an end part which extends through said hole, said clamping spring embodying two portions which are adapted to extend to and bear against said post reduced portion, each of said two portions terminating in a loop.

12. Clamping apparatus comprising supporting means, two posts attached to said means, one said post having a hole extending laterally therethrough spaced from the top of said post, the other said post having a reduced portion that extends below the top thereof, a clamping spring



embodying an end part which extends through said hole and has a hooked end extremity, said clamping spring embodying two portions which are adapted to extend to and bear against said post reduced portion, each of said two portions terminating in a loop, one of which extends downwardly and the other of which extends upwardly.

13. Clamping apparatus comprising supporting means, two posts attached to said means, one said post having a hole extending laterally therethrough spaced from the top of said post, the other said post having a reduced portion spaced from the top thereof, a clamping spring embodying an end part which extends through said hole and has a hooked end extremity, said clamping spring embodying two portions which extend from said end part laterally in diverging directions and then converge and cross each other, said converging portions being adapted to bear against said post reduced portion, each of said two portions terminating in a loop, one of which loops extends downwardly and the other of which loops extends upwardly.

14. Clamping apparatus in combination with a tube embodying a base having a top edge that provides a shoulder, said apparatus comprising supporting means, two posts attached to said means, a clamping spring resting on said shoulder in holding relation to said tube embodying an end portion which is associated in holding relation with and bears against a portion of a said post and embodying two other end portions which cross each other and bear against two different portions of the other said post to thereby hold said tube in position.

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