

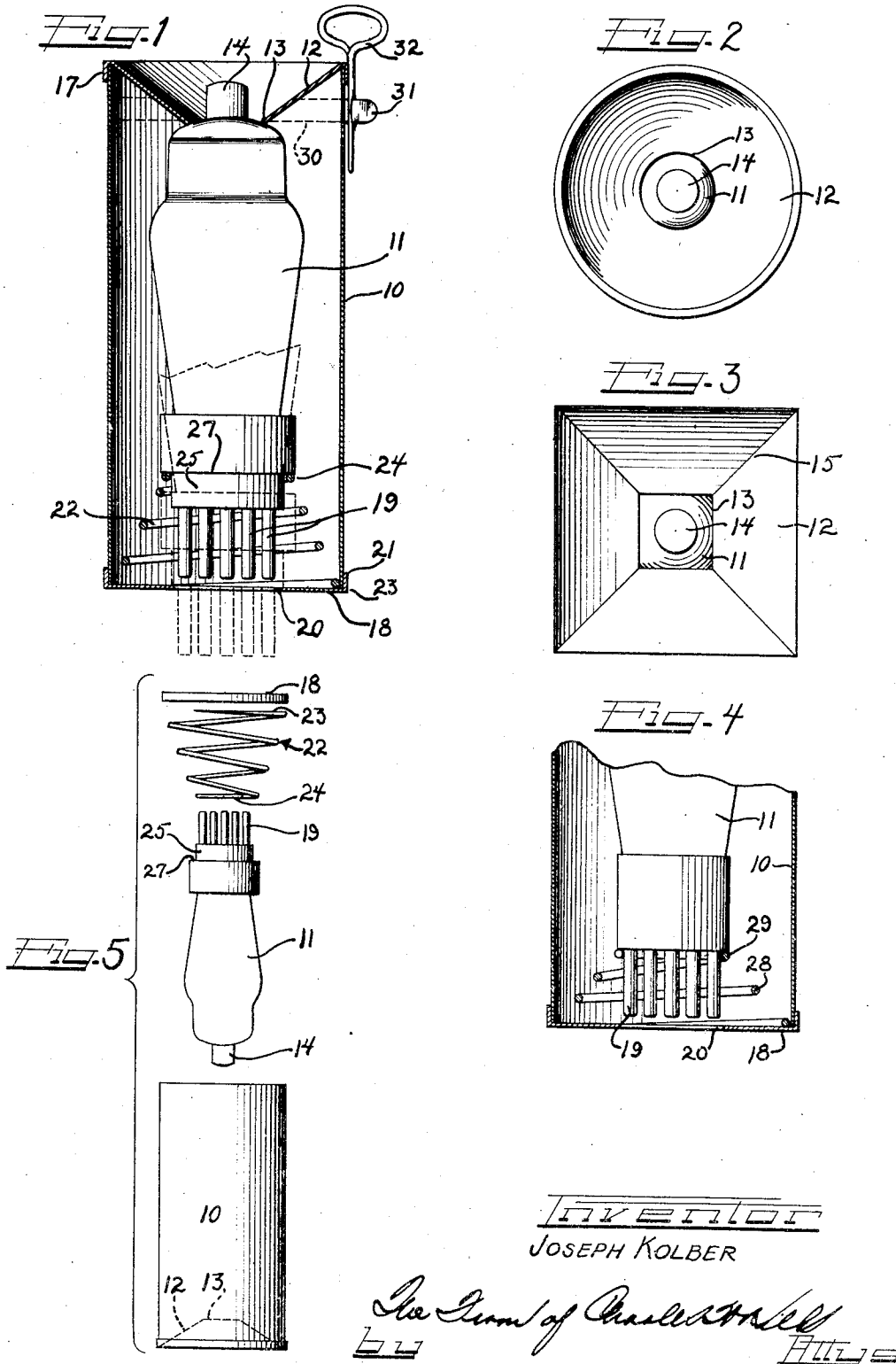
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RADIO TUBE PACKAGE

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RADIO TUBE PACKAGE

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1

This invention relates to improvements in the packaging of radio tubes and more especially concerns improvements in containers especially adapted for protectively enclosing radio tubes so that the radio tubes can be safely stored, shipped and handled and so that surreptitious use of the enclosed radio tubes is effectively prevented.

Because of their relatively delicate structure and high unit cost, physical protection of a fairly high order is warranted for radio tubes to enable safe storage, shipment and handling. In addition, since the life of the radio tube is limited by use, protection should be afforded the ultimate user against the palming off of used radio tubes as new. On the other hand, the protective medium or container must be economical and practical, both as to initial cost and cost of assembly with the radio tube, consistent with the protection afforded.

An important object of the present invention is to provide a simple, low cost, fully protective radio tube unit package.

Another object of the invention is to provide a radio tube container which is particularly adaptable to be manufactured from sheet metal in the manner of the well known tin can.

Another object of the invention is to provide a novel container which, although constructed from a relatively thin material such as sheet metal, will fully protect a radio tube against physical damage under conditions of even unusually severe handling or abuse and more effectively than much more elaborate container devices made from more yieldable materials ordinarily considered as affording superior protection for relatively delicate instrumentalities of this character.

A further object of the invention is to provide a novel container for individual radio tubes which is substantially tamper-proof in that a radio tube enclosed therein cannot be used in a radio set, but on the other hand can be easily and conveniently tested in the customary testing equipment.

Still another object of the invention is to provide a protective container for individual radio tubes which must be entirely destroyed before the radio tube can be used in a radio set.

Yet another object of the invention is to provide a key-opening type of container for individual radio tubes.

An additional object of the invention is to provide a container for individual radio tubes which is not only itself susceptible of mass production methods of manufacture, but is also especially adapted for mass production assembly line filling and sealing.

A still further object of the invention is to

2

provide a radio tube container in which, although the container itself is made from a relatively thin material such as sheet metal, the radio tube is supported therein resiliently. As an ancillary to this object is it also an object to provide a radio tube having a novel base especially adapted to cooperate with such a resilient support for a radio tube within the container.

Other objects, features and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying one sheet of drawings in which:

Figure 1 is a vertical sectional view through a radio tube and container assembly embodying the features of the present invention;

Figure 2 is a top plan view of the container;

Figure 3 is a top plan view of a slightly modified form of the container;

Figure 4 is a fragmentary vertical sectional view through the base portion of the radio tube container, but showing a modified form of resilient suspension for the radio tube; and

Figure 5 is an exploded assembly view of the container structure and a radio tube to be assembled therewith.

In a preferred embodiment of the invention a container is provided having a relatively elongated body 10 which is slightly longer than the overall length of a radio tube 11 and is of at least slightly greater internal diameter than the greatest width of the radio tube.

The container body 10 may be of the economical cylindrical form, as best indicated in Figure 2, or it may be of rectangular form, as shown in Figure 3, or of any other appropriate cross sectional outline.

At its crown end, the container body 10 is provided with a tube retainer 12 of preferably axially reentrant form providing a tube-engaging shoulder 13 providing a seat for the crown of the radio tube 11 and defining an opening of ample diameter to expose a sufficient crown portion of the radio tube to enable manipulation hereinafter, for testing purposes. Where the radio tube 11 is provided with an axially protruding terminal boss 14, the reentrant retainer 12 is preferably of such depth, at least slightly greater than the length of the terminal 14, as to maintain the tip of the terminal within the extremity plane of the crown end of the container.

In a cylindrical container the tube retainer 12 may be of substantially frusto-conical shape and the shoulder 13 annular. In a container of an-

3

gular cross-section as shown in Figure 3 the retainer 12 may be conformably shaped as, for example, in pyramidal shape, being formed with creases 15 to accommodate the corners of the container body and having the shoulder 13 thereof square. Where the retainer member 12 is formed separately from the container body 10, it may be provided with an outer marginal flange 17 of any preferred structure for attachment by any preferred means to the crown end of the container body 10.

At its base end the container is provided with a simple closure member 18 which is so constructed that base prongs 19 of the radio tube can be extended therethrough for testing purposes, but the main base of the radio tube will be held against leaving the container. To this end, the base end closure 18 is formed, in the particular embodiment disclosed, with an axial tube-testing opening 20 which is of sufficient diameter to permit the tube prongs 19 to project therefrom (broken outline position of Figure 1) but which is of smaller size than the end diameter of the radio tube base. Where the base closure 18 is formed separate from the container body 10, it may be provided with an attachment flange structure 21.

The centered, fully retracted condition of the radio tube 11 within the container, with the crown of the tube seated against the shoulder 13 and the prongs of the tube wholly inside of the container, is maintained by suitable resilient suspension means such as a helical spring 22. The base end of the spring 22 is formed as a coil 23 seating upon the inside of the closure 18 and of an outside diameter substantially equal to the inside diameter of the container body 10. The opposite end of the spring is formed as a coil 24 loosely embracing a reduced diameter portion 25 of the radio tube base and engaging a shoulder 27 formed at the inner end of the reduced diameter portion at a point intermediate the length of the radio tube base. The spring 22 is of inexpensive, light construction but possessed of ample tension and resilience to urge the crown of the radio tube 11 firmly against the seat or shoulder 13 with sufficient force to maintain the relatively rounded crown centered on its seat 13, while at the same time the close conformity of the spring coil 23 to the inside diameter of the container maintains the spring and thereby the supported base end of the radio tube centered within the container. When it is desired to test the tube 11, the spring 22 will yield readily in response to digital pressure applied to the crown end of the radio tube to press the tube axially baseward until the prongs 19 protrude to a sufficient distance beyond the testing opening 20 in the base closure of the container, as shown in broken outline in Figure 1.

The construction of the spring 22 and the reduced diameter portion 25 of the tube base to accommodate the same, as shown in Figure 1, presumes that the spring may be made of metal and therefore should remain out of contact with the prongs 19. However, where it is preferred to make the spring from a dielectric substance, such as one of the synthetic plastics or other material suitable for this purpose, it may be modified as indicated at 28 in Figure 4, so that its end coil 29 loosely embraces the prongs 19 of the radio base, or at least those of the prongs which are nearest the circumference of the base and bears directly against the outer end of the base. This construction of the spring 28 and its relationship to the radio tube will avoid the

4

need for a special formation of the radio tube base, and adapts the present container structure to the handling of radio tubes with conventional bases.

While the present radio tube container may obviously be constructed from various types of material, such as paper board, molded fibrous or plastic materials, sheet plastic material or the like, it is particularly adapted to be made from thin sheet metal such as the well known tin can. Available can-making machinery can be utilized in the manufacture of the container. Hence, available can-sealing apparatus can be utilized for the final sealing of the base closure member 18 of the container after the radio tube is assembled therein. In a typical procedure, the container body 10 and the crown retaining member 12 may be secured together as a unit at the can factory and supplied to the tube manufacturer with the bottom closure member 18 detached, substantially as indicated in Figure 5. Then the tube manufacturer can place the body part, the base closure, and the suspension spring 22 on an assembly line, where one of the radio tubes 11 is assembled with each container as, for example, by placing the same inverted into the inverted container body, with the spring 22, or the spring 28, as the case may be, in place on the base of the tube. Then the base closure 18 is applied to the container body 10 to place the helical spring under the preferred compression which is thereafter maintained by permanently securing the base closure member 18 to the container body 10 by any preferred sealing or securing method. The assembled container and radio tube are now ready for packing and shipment and are adapted to be handled as a unit until the tube is removed from the container for use.

It will be understood, of course, that any preferred manner of uniting the crown retaining member 12 and the base closure member 18 with the container body 10 can be employed, and that the simple flanges 17 and 21, respectively, are merely representative of one suggested manner in which this can be effected, such flanges being soldered or brazed in place. On the other hand, a special crimp joint, or the like, may be effected if desired.

Where the container is made from a molded material, either end of the container construction may be molded integrally with the container body and the remaining end structure formed separately and then united permanently in any preferred fashion. On the other hand, the container body could obviously be made in two ready-shaped parts with the end structures integrally formed with or attached to the respective parts of the container body and the two parts of the container body permanently united together after the radio tube has been assembled therewith.

In any event, after the assembly has been completed and the container sealed closed, the radio tube 11 will be maintained therein in permanently coaxial position so that it is at all times held out of contact with or in spaced relation to the container body 10 and bears against the container structure only at the shoulder 13 of the crown retainer 12. However, due to the fact that the retainer member 12 is directed at all points at a diagonal angle to the axis of the radio tube, and the base of the radio tube is resiliently supported, impact against any point of the container will be prevented from having any ill effect upon the radio tube. The diagonal relationship of the retaining member 12 assures that shocks incident

to impacts against the crown end of the container will at no time or at any point be transmitted damagingly to the radio tube, because if such shocks are imparted to the container in a radial direction or in an axial direction they are absorbed by the container body 10 and the reinforcement for the crown end thereof afforded by the retaining member 12. If the blow is in the plane of the retaining member 12, the frustoconical shape of the retaining member so thoroughly strengthens and stiffens it that it quite effectively resists point transmission of the shock of the blow. In addition, the retaining member shoulder 13 engages the radio tube 11 at virtually the strongest part of the glass envelope thereof, namely, at the rounded crown, so that if the blow against the crown portion of the container is of such magnitude that some of its force is transmitted on the diagonal line of the retaining member 12, it will be so dissipated due to its oblique angularity to the tube axis that it will have no shattering effect upon the radio tube 11.

In addition, the resilient suspension afforded by retaining springs 22 or 28 assures against damaging effect of blows, jostling or dropping of the container. Not only does the spring permit longitudinal yielding of the tube in a basewise direction but it also permits some resilient lateral movement of the tube in all directions, with the tube being brought back to its co-axial relationship within the container after any such disturbance.

After the radio tube 11 is permanently enclosed within the container, assurance is had that the tube will remain unused until it is removed from the container. While the radio tube can be conveniently manipulated by pressing against its exposed crown to project the contact or terminal pins 19 from the base end thereof for testing purposes, withdrawal of the pressing finger from the tube crown permits the base retaining spring to snap the tube back into the container so that the crown again comes automatically into centered seating relation to the retaining seat 13. Furthermore, the container provides a bulky impediment to placing the radio tube within a radio set. It may also be noted that if by some contrivance the radio tube were to be placed in a radio set for use, its confinement within the container 10 would cause it to overheat due to lack of air circulation and burn out. Therefore, the ultimate purchaser will have reasonable assurance that the radio tube is fresh and unused.

Any convenient means can be employed for destructively opening the container to remove the radio tube when it is to be used. Where the container is of the tin can type it can be provided with an integral shear strip 30 formed in well known manner in the container wall 10 by spaced parallel weakened annular lines and terminating in a bendable tongue 31 adapted to be received in the eye of an opening key 32. The key 32 is adapted to be turned to rip the strip 30 open in the usual manner where this type of opening expedient is employed. Where the container is made from other types of materials, such as fibrous material, tear strips or strands or other expedients may be employed for destroying the can or container when the radio tube is to be removed therefrom.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon other-

wise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A radio tube package comprising, in combination, a radio tube having a set of base prongs at one end and a terminal boss at the other end, a container for the radio tube including a tubular body longer and of substantially greater internal diameter than the radio tube, an apertured closure at one end of the tubular body engaging the crown of the tube and permitting projection therethrough of the terminal boss of the tube and at such end having means maintaining the tube in substantially centered spaced relation to the tubular body and the terminal boss in centered relation in the aperture, a centrally apertured closure for the opposite end of the tubular body and enclosing the base end of the radio tube but permitting projection of the base prongs of the tube for testing purposes, and a helical spring within the container having a base loop of a diameter to fit uniformly within the corner afforded by the base closure and the end portion of the tubular body and also having a substantially reduced diameter opposite end loop engaging the base of the radio tube and normally urging the radio tube toward and into engagement with the centering means of said crown closure and for maintaining the radio tube base prongs retracted, the engagement of said base loop with the tubular body retaining the base loop against movement in its plane and the spring centered in the container and the spring thereby holding the base end portion of the radio tube substantially centered in the container and spaced from the tubular container body but yieldable transversely for shock absorbing purposes.

2. A radio tube package as defined in claim 1 wherein the base portion of the radio tube has a generally rabbet groove formation affording a shoulder opposing the small supporting loop of the spring and engaged by such loop and maintaining the loop out of contact with the prongs of the radio tube.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
293,256	Languereau	Feb. 12, 1884
1,313,739	Ryerson	Aug. 19, 1919
1,373,842	Stretton	Aug. 5, 1921
1,493,624	Freund	May 13, 1924
1,506,587	Hunt	Aug. 26, 1924
1,611,575	Aulbach	Dec. 21, 1926
1,652,398	Everett	Dec. 13, 1927
1,963,994	Herrmann	June 26, 1934
1,991,223	Ledig et al.	Feb. 12, 1935
2,014,809	Kuhle et al.	Sept. 17, 1935
2,190,788	Horn	Feb. 20, 1940
2,263,573	Erb	Nov. 25, 1941
2,275,490	Barber	Mar. 10, 1942
2,287,366	Younghusband	June 23, 1942
2,358,664	Shailer	Sept. 19, 1944
2,393,180	Merrill	Jan. 15, 1946

FOREIGN PATENTS

Number	Country	Date
25,377/35	Australia	Nov. 22, 1935
368,462	Great Britain	Mar. 10, 1932
507,034	Germany	Jan. 17, 1928