March 31, 1942. C. L. McMULLEN 2,278,126

SUPPORT FOR TONE TUBES

Filed Dec. 26, 1940

Fig 3

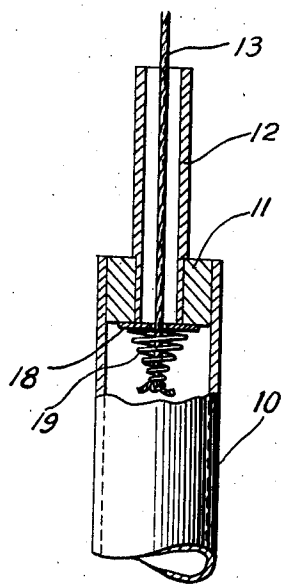


Fig. 1

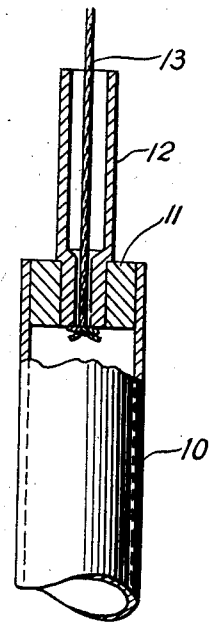


Fig. 4

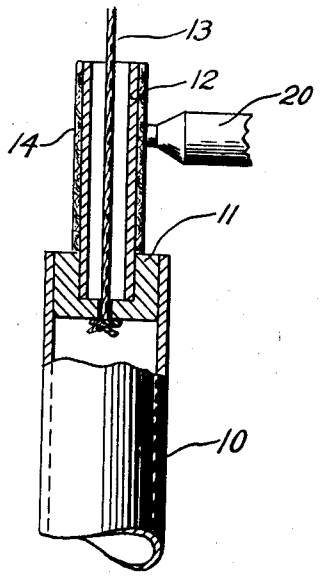


Fig. 5

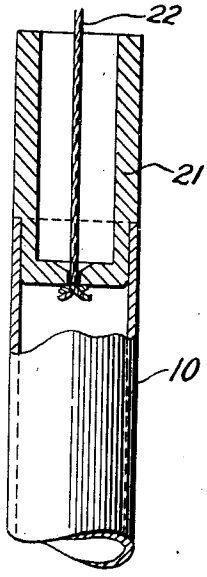


Fig. 2

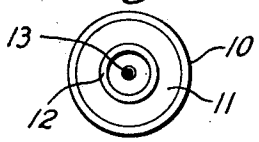


Fig. 7

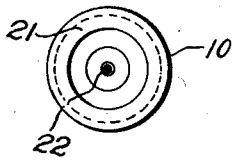
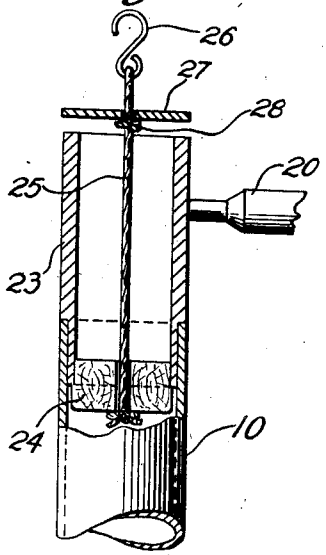


Fig. 8



Fig. 6



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SUPPORT FOR TONE TUBES

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Application December 26, 1940, Serial No. 371,676

10 Claims. (Cl. 84—403)

This invention relates to annunciator chimes and more particularly to means for supporting the tone tubes in a manner to accurately locate them relatively to their strikers and to develop the most pleasing tone quality.

A primary object of the invention is to provide an improved mounting or support for a tone tube for application to an annunciator chime or musical instrument.

A feature that enables the above object to be accomplished is that the tube at its upper end is provided with a member extending axially from the tube, the extended portion of which forms an anvil adapted to be struck by a plunger or striker mounted in the unit on which the tube is hung to produce the tone.

Another object of the invention is to provide a flexible support in the form of a cord or string passing centrally or axially through the member by means of which the tube may be supported in a vertical position and to hang freely downward.

Another object of the invention is to provide an improved anvil enabling the tube to give a pure musical tone the volume of which can be reduced or varied by a non-metallic sleeve secured to the extension forming part of the plug.

And finally it is an object of the invention to form the plug in its preferred form with an integral extension having the full diameter of the tube, the portion entering the tube being reduced in diameter to form a shoulder abutting against the end of the tube.

This application is based in part on my prior and co-pending application 331,445, filed April 24, 1940.

With the above and other objects in view the invention may include the features of construction set forth in the following specification and illustrated in the accompanying drawing.

In the accompanying drawing annexed hereto and forming a part of this specification, I have shown the invention embodied in cylindrical tone tubes for annunciator chimes but it will be understood that the invention can be otherwise embodied and that the drawing is not to be construed as defining or limiting the scope of this invention, the claims appended to this specification being relied upon for that purpose.

In the drawing:

Fig. 1 is a fragmentary longitudinal view partly in section of a tone tube provided with one form of the present invention.

Fig. 2 is a plan view of the parts shown in Fig. 1.

Fig. 3 is a view similar to Fig. 1 and showing a tubular striking anvil passing through a tube supporting plug pressed into the end of the tube.

Fig. 4 is a view similar to Figs. 1 and 3 showing a tubular striking anvil passing partially through a supporting plug pressed within the end of the tube, the anvil being surrounded by a tone modifying plastic sleeve tightly or adhesively fitting the anvil.

Fig. 5 is a longitudinal sectional view of a combined striking anvil and tube supporting member formed by a recessed cylinder having a diameter corresponding to the tone tube and recessed substantially throughout its length.

Fig. 6 is a view similar to Fig. 5 and showing an anvil formed from tubular material and having a plug inserted within its lower end by means of which the tone tube may be suspended by a central cord or string.

Figs. 7 and 8 are plan views of the constructions shown respectively in Figs. 5 and 6.

In the above mentioned drawing, there have been shown several embodiments of the invention which are now deemed preferable but it will be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly and in its preferred aspect, the invention may include the following principal parts: First, a tone tube of suitable length and preferably of circular cross section. The material, length, thickness and other characteristics of the tube may be selected to give the desired pitch and musical quality desired; second, a metal plug or extension pressed into or otherwise secured within the upper end of the tube; third, in some embodiments of the invention a separate projection secured centrally within the plug, or in other embodiments the metal plug being extended beyond the end of the tube and having an integral portion extending within the tube; fourth, a flexible cord or string attached to or extending through the plug and its extended portion or extension member or suitably looped so that a supporting hook may be provided on its upper end; and fifth, in some embodiments a non-metallic sleeve tightly surrounding the projection or extending portion of the plug, this sleeve preferably being made of plastic material.

Referring more in detail to the figures of the drawing and first to the construction shown in Figs. 1, 2, 3 and 4, several tone tubes 10 are shown, each similarly formed of thin metallic tubing, the length thereof being varied in any pair or group to give the desired tones of different pitch. At the upper end of the tubes 10

there are inserted metal plugs 11 preferably and as shown in Figs. 1, 3 and 4 of annular form, the upper ends being flush with the end of the tube. These plugs 11 may be pressed firmly within the tubes to frictionally retain them therein so that the tubes may be supported therefrom.

Centrally mounted within the plugs 11 are extensions 12, those shown in the above mentioned figures being of smaller diameter than the tone tubes 10 and having tube supporting means in the form of a cord or string 13 passing centrally through them.

In Fig. 1 the extension 12 is formed from a solid metal rod turned down at one end to form a shoulder, the smaller diameter being pressed firmly into its plug 11. Centrally the extension in this form of the invention is drilled throughout its length through which the supporting cord 13 may pass. For a substantial distance from its free or upper end the rod 12 is counterbored so that the cord 13 will not engage the walls of this recess. Also by varying the diameter of the hole in the counterbored portion and consequently varying the wall thickness the tone quality and resonance may be controlled.

The extension shown in Fig. 3 is formed of metal tubing having an opening of uniform diameter extending throughout its length. At one end it is turned down as in Fig. 1 to firmly fit an opening centrally disposed within and extending through the plug 11. In order to support the tube by means of a central cord 13 a thin disk 18 is placed below the plug 11 and a coiled spring 19 below the disk. A knot formed at the lower end of the cord 13 retains the cord 13 in position substantially centrally of the extension and out of contact with its walls. By means of the spring 19 the tube 10 is resiliently supported. As the disk 18 of metal or fibre may be of relatively large diameter the cord 13 in this form of the invention is maintained centrally of the tube.

In Fig. 4 the plug 11 is formed with a central opening sufficient for the cord 13 to pass through, the upper portion of the plug being recessed or counterbored to permit a length of tubing to be firmly pressed therein. Surrounding the portion of the tubing 12 projecting from the plug 11 is a sleeve 14 preferably of plastic material closely adhering to the walls of the metal tubing 12. Other non-metallic materials, however, may be used. The purpose of the plastic or non-metallic material 14 surrounding the projection 12 is to soften or modify the tone of the tube 10 when struck by the hammer or plunger 20. By varying the thickness of the wall of the plastic material 14 the tone modification can be controlled over a wide range. To support this form of tone tube 10 the cord 13 passes centrally and axially through the plug 11 and tube 12.

Fig. 5 shows an extended plug 21 formed from a solid rod of circular cross section at least equal in diameter to the tone tube 10. The lower end of this plug or extension 21 is turned down to fit firmly within the upper end of the tube 10. Centrally the plug 21 is provided with an axially extending recess extending substantially the length of the plug. This recess as shown in Fig. 5 is of substantial diameter so that the wall of the extended portion is reduced to the desired thickness. By varying the size of the hole or recess and consequently controlling the wall thickness of extension 21, the quality, resonance and loudness can be varied when struck by a hammer or plunger 20. The lower end of the plug has a small central hole through which the cord 22 may pass axially of the tube 10 and plug 21.

In Fig. 6 the extension or sleeve 23 is formed from a piece of metal tubing and is reduced in outside diameter at one end to fit firmly within the upper end of a tube 10. An opening of uniform diameter extends throughout the length of the sleeve or extension 23. The tone quality and resonance of the tube 10 can be varied by selecting extensions having thicker or thinner walls. Entering the lower end of the extension 23 is a small non-metallic plug 24, preferably of wood, fitting loosely within the extension, a portion of which enters the opening within the extension 23. The outside diameter of the plug 24 is such that it does not contact the wall of the tube 10. Centrally the plug 24 is provided with a small hole through which a looped cord 25 may be passed and the ends knotted below the plug 24 to prevent the cord from being pulled from the plug. A hook 26 is mounted on the upper end of the cord by means of which the tone tube may be supported. To prevent separation of the plug 24 cord 25 and hook 20 from the extension 23 a disk 27 may be mounted on the cord as shown in Fig. 6. The diameter of this disk is as shown sufficiently large to prevent its being drawn through the opening through the extension 23. To prevent the disk 27 contacting the upper end of the extension 23 when the tube 10 is being sounded and when the tube is suspended in position within a chime unit, a knot 28 may be tied in the cord 25 a short distance below the hook 26.

To sound the tubes 10 the strikers, plungers or hammers indicated at 20 in Figs. 4 and 6 are advanced into contact against the wall of the projections 12 or 23 by any means such as an electric solenoid or clockwork. By varying the vertical position of the tubes 10 so that the strikers 20 contact the extensions at different distances from the upper end of the tubes 10, different qualities of tone, resonance and volume may be obtained within a wide range.

I claim:

1. In an annunciator in combination, a tone tube, a plug secured within the upper end of said tube, a projection on said plug extending axially of said tube, and a supporting member for said tube extending axially through said plug and projection.

2. In an annunciator in combination, a tone tube, a plug secured within the upper end of said tube, a projection forming an integral portion of said plug and extending axially from said tube, and a supporting member for said tube extending axially through said projection.

3. In an annunciator in combination, a tone tube, a plug secured within the upper end of said tube, a projection forming an integral portion of said plug and extending axially from said tube, said projective portion having a diameter equal to that of the tube, and a supporting member for said tube extending through said projection.

4. In an annunciator in combination, a tone tube, a plug secured within the upper end of said tube, a projection on said plug extending axially of said tube and formed integrally therewith, supporting means for said tube extending axially through said plug and extension, and striking means for said tube positioned to contact an intermediate part of said projection.

5. In an annunciator in combination, a tone tube, a plug secured within the upper end of said

tube, a projection on said plug extending axially of said tube, said plug and projection having an opening extending axially from end to end, and a supporting member for said tube extending through said opening.

6. In an annunciator in combination, a tone tube, a plug secured within the upper end of said tube, a projection on said plug extending axially of said tube, said plug and projection having an opening extending axially from end to end, a flexible supporting cord for said tube extending through said opening, and a spring within said tube below said plug and resiliently mounting said tube.

7. In an annunciator in combination, a tone tube, a sleeve fitted within the upper end of the tube and extending axially therefrom, a plug closing the lower end of said sleeve, and a supporting cord for said tube passing centrally through said plug and sleeve.

8. In an annunciator in combination, a tone tube, a sleeve fitted within the upper end of said tube and extending axially therefrom, said sleeve having a diameter equal to that of said tube, a small plug closing the lower end of said sleeve, and a supporting cord for said tube passing centrally through said small plug and sleeve.

9. In an annunciator in combination, a tone tube, a sleeve fitted within the upper end of said tube and extending axially therefrom, a small plug closing the lower end of said sleeve, a supporting cord for said tube passing centrally through said small plug and sleeve, and a hook mounted on the upper end of said cord.

10. In an annunciator in combination, a tone tube, a sleeve fitted within the upper end of said tube and extending axially therefrom, a small plug closing the lower end of said sleeve, a supporting cord for said tube passing centrally through said small plug and sleeve, a hook mounted on the upper end of said cord, and means preventing removal of said cord from said plug and sleeve.

CARLTON L. McMULLEN.