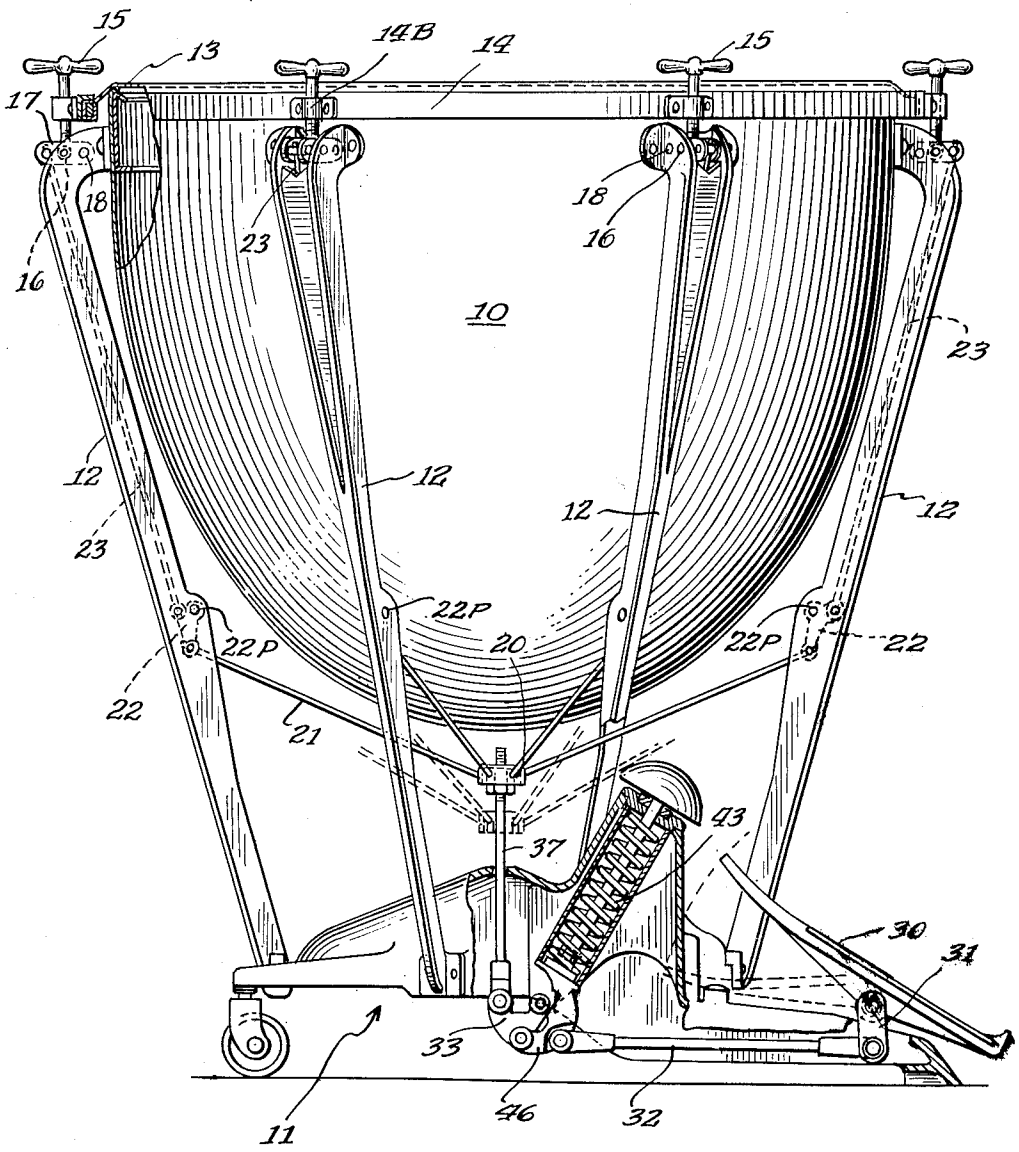
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TUNING MECHANISM FOR DRUMS

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Inventor
William F. Ludwig
By Mann, Brown and McWilliams,
Attys.

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TUNING MECHANISM FOR DRUMS

William F. Ludwig, 1421 Forest Ave., River Forest, Ill.

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This invention relates to tuning mechanisms for drums and, more particularly, is concerned with an improved kettle drum or tympani construction wherein the tuning mechanism is arranged entirely externally of the kettle.

In the prior art, most commercially produced drums have utilized tuning mechanisms having their pull rods arranged internally of the kettle, and while it has been recognized that the many openings in the kettles required in this type of drum construction interfere with the instrument's tone and that access to the enclosed mceahnism for lubricating the working parts is difficult, if not impossible, no satisfactory alternative construction has been available heretofore.

Drums having external tuning mechanisms are known, but they have employed rather expensive and cumbersome constructions having exposed working parts that are subject to damage when the instruments are moved around in trunks.

The principal object of the present invention is to provide a drum construction having external pull rods that are protectively shielded from mechanical damage while being readily accessible for lubrication and adjustment.

Another object is to provide an external actuating linkage for the pull rods that develops an increasing mechanical advantage as the head tension increases to provide security in holding the pitch in tuning.

Briefly, the invention employs an arrangement wherein the kettle is suspended from adjacent its upper end by a plurality of supporting struts. The tensioning mechanism includes intermediate pull rods arranged in shielded relation along the inside of each strut and connected to suitable tuning levers mounted adjacent the upper end of the kettle, with intermediate bell crank levers being pivoted to the struts and connected to external, generally radial pull rods that are simultaneously controlled by a tuning mechanism mounted to a common support for the struts.

A tuning mechanism of the counterbalanced foot pedal actuated type is preferably employed to develop a balanced tuning action that tends to hold the pitch to which it is tuned. The effectiveness of this balanced action is enhanced by the additional leverage afforded by the bell crank levers inside the supporting struts.

Other objects and advantages will become apparent during the course of the following description.

In the drawing, a kettle drum of tympanum constructed in accordance with this invention is illustrated in side elevation, with parts thereof broken away and sectioned for convenience of disclosure.

The drum includes a kettle **10** preferably parabolic in form and made of copper or aluminum and base structure, generally designated at **11** and including a plurality of upstanding struts **12** supportingly connected to the kettle adjacent its upper end. As is apparent from the drawing, the kettle is free of openings such as are commonly employed in drum arrangements using internal pull rods and is freely suspended from adjacent its upper end by the supporting struts **12** for developing a better tone.

As is conventional, the kettle is provided with a resonant drumhead **13** and an anchoring hoop **14** that is in telescoping relation over the top end of the kettle for drawing the drumhead taut. The anchoring hoop is provided with a plurality of bosses **14B** at spaced points about its outer periphery, with each boss being provided with a manually operable adjustment screw **15** for making initial adjustments in setting the tensioning of the drumhead. At their lower ends, the adjustment screws are threadedly engaged in pins **16** that are rotatably carried in tuning levers **17** which are suitably pivoted to the struts, as indicated at **18**. These tuning levers are connected to and variably positioned by a novel tensioning linkage mechanism for selectively tuning the resonant head **13**, as will be made clear presently.

According to this invention, the tensioning linkage includes a common connection head **20** that is disposed beneath and vertically shiftable along the axis of the kettle, a plurality of generally radially extending pull rods **21** each being pivotally anchored at one end to the connection head and at the other end to an intermediate lever **22** in the form of a bell crank that is anchored to each supporting strut by a suitable pivot pin **22P**, and a plurality of intermediate pull rods **23** arranged to extend along the struts and each being pivotally anchored at its lower end to one of the bell cranks **22** and at its upper end to one of the tuning levers **17**.

For purposes of this disclosure, the connection head **20** of the tensioning linkage is shown in operative connection to a manually adjustable tuning mechanism of the counterbalanced pedal-actuated type, such as is shown in FIG. 3 of Ludwig et al. Patent 1,561,789. For convenience, the general organization and operation of the tuning mechanism is described briefly and, where possible, reference characters identical with the aforesaid patent are applied to corresponding parts. In general, the tuning mechanism includes a main pull rod **37** that is anchored in the connection head **20** and shiftable along the axis of the kettle for varying the tension of the drumhead under the control of a foot pedal **30**. The foot pedal carries a depending rock arm **31** operatively connected by a horizontal rod **32** and a bracket **46** to a pivotally anchored reverse-motion member **33** which is in turn drivingly connected to the main pull rod **37**. The arrangement includes counterbalancing facilities in the form of a compression spring **43** which acts upon the other end of the bracket **46** to develop a counterbalancing force that allows the pedal **30** to remain at the particular position at which it is set even though the nautral tendency of the drumhead to contract applies a restoring force to the tuning mechanism through the pull rods **23** and **21** of the tensioning linkage.

In the drawing, the approximate low note and high note positions of the connection head **20**, pull rods **21**, and foot pedal **30** are shown in full lines and dotted lines, respectively.

One of the important advantages of the present arrangement resides in the fact that the tensioning linkage employs the additional set of bell crank levers **22** to provide increased leverage and thereby reduce the actuating force required for tensioning the drumhead. In addition, these bell crank levers **22**, as well as the tuning levers **17**, are arranged to develop a mechanical advantage that increases as the tensioning on the drumhead increases. In the drawing, the levers **17** and **22** are shown in the position which they occupy when the drum is tuned to its low range, and as the tensioning is increased, the levers rotate in such a manner that their effective lever arms increase.

Probably the most important advantage of the drum arrangement of this invention is the fact that the tensioning linkages, while arranged externally of the kettle for reasons explained previously, are nevertheless effectively shielded from mechanical damage. It will be noted that the supporting struts **12** of this disclosure have the general shape of a channel and define a protected guideway that opens inwardly towards the kettle. The intermediate pull rods **23** are received within this guideway, while the bell

crank levers 22 and tuning levers 17 are pivoted directly to the struts and disposed within the guideway, with suitable tolerances being provided to accommodate all necessary movements of these parts. Finally, the radial pull rods 21 are in an out-of-the-way location beneath the kettle and thus require no direct shielding. The struts themselves are rugged enough to withstand shocks incident to moving these instruments about and, in any event, damage to the strut would not normally impair the operation of the tuning mechanism and tension-transmitting linkages. The invention has been described in connection with a counterbalanced pedal-actuated type of tuning mechanism, and it will be appreciated that the additional leverage afforded by the extra set of bell cranks alleviates the stresses which are set up when the drumhead is under severe tension and thereby reduces the required effectiveness of the counterbalancing. Thus, the foot pedal action is better equalized.

Another advantage of the disclosed arrangement is the fact that the kettle is supported and contacted only at its upper end and is free of openings, and these kettle arrangements have been found to develop an improved tone.

It should be understood that the description of the preferred form of the invention is for the purpose of complying with Section 112, Title 35, of the U.S. Code and that the claims should be construed as broadly as prior art will permit.

I claim:

1. In a drum, a kettle, a resonant head spanning the upper end of said kettle, a plurality of means spaced circumferentially about said kettle for tensioning said head on said kettle, base structure, manually adjustable means mounted to said base structure and including a vertically shiftable connection head located beneath said kettle, a plurality of external struts secured to the base structure at points thereof spaced circumferentially about and located lower than said connection head, said struts extending upwardly and supportingly engaged to the kettle at points thereof spaced circumferentially about the upper end thereof for suspending the kettle in spaced relation above said base structure with said connection head disposed intermediately therebetween, and a plurality of mechanical linkages spaced externally about said kettle and individually associated with separate ones of said struts, each linkage extending between said connection head and a separate one of said tensioning means to transmit motion

therebetween, each linkage having means intermediately therealong engaged to the corresponding strut to mount such linkage for movement about a fixed point located intermediately along the corresponding strut and thereby maintain the linkage spaced from contact with the kettle.

2. In a drum, a kettle having a resonant head and an anchoring hoop for the head, base structure, a manually adjustable tuning mechanism of the counterbalanced foot pedal actuated type mounted to said base structure and including a main tuning rod shiftable along a vertical axis passing through said base structure centrally thereof, said tuning rod carrying a connection head spaced beneath said kettle, a plurality of external struts secured to the base structure at points thereof spaced about said axis and located lower than said connection head, said struts extending upwardly to supportingly engage the kettle at points thereof spaced circumferentially about the upper end thereof, and a head-tensioning mechanism including a plurality of tuning levers pivotally anchored adjacent said points about the upper end of said kettle and having means connected to the anchoring hoop, a plurality of intermediate levers pivoted to said struts intermediately therealong, intermediate pull rods extending along said struts and connecting said intermediate levers to said tuning levers, and a plurality of generally radial pull rods connecting said connection head to said intermediate levers.

3. The arrangement of claim 2 wherein each of said struts is in the shape of a channel to define a guideway that receives and mechanically shields said intermediate pull rods, with said tuning levers being disposed on said struts for pivotal movement within said guideways adjacent the upper end thereof and with said intermediate levers being disposed on said struts for pivotal movement within said guideways, said tuning levers and intermediate levers providing a mechanical advantage that increases as the tensioning of the resonant head is increased by the tuning mechanism.

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