United States Patent

Kregal

[15] **3,646,843**

[45] **Mar. 7, 1972**

[54] KETTLEDRUM

[72] Inventor: **Jesse N. Kregal**, 6244 Washington Ct., Lake Grove, Oreg. 97034

[22] Filed: **Dec. 12, 1969**

[21] Appl. No.: **884,455**

[52] **U.S. Cl.** **84/419**, 84/421

[51] **Int. Cl.** **G10d 13/04**, G10d 13/02

[58] **Field of Search** 84/419, 411.1, 411, 421, 413

[56] **References Cited**

UNITED STATES PATENTS

1,391,437	9/1921	Wiedoeft	84/419
2,173,443	9/1939	Schuman	84/411
2,587,310	2/1952	Goodman	84/419
1,561,371	11/1925	Strupe	84/421 UX

FOREIGN PATENTS OR APPLICATIONS

815,297	6/1959	Great Britain	84/413
407,916	1/1925	Germany	84/419
453,444	11/1949	Italy	84/419

Primary Examiner—Richard B. Wilkinson

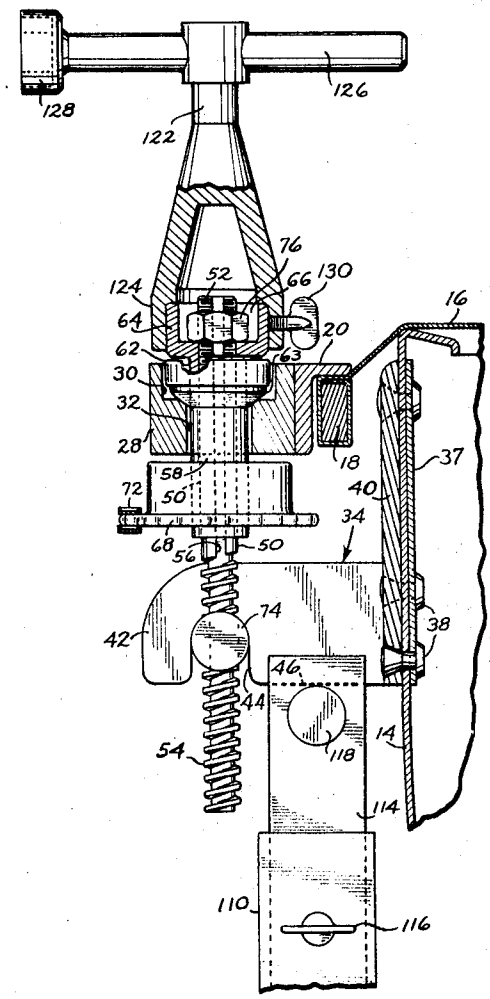
Assistant Examiner—John F. Gonzales

Attorney—Eugene D. Farley

[57] **ABSTRACT**

A kettledrum comprises a hollow, substantially hemispherical body, a hoop supporting a taut head over the open end of the body, a counterhoop in operative engagement with the hoop, and head tensioning means interengaging the body and counterhoop. The tensioning means comprise a plurality of pairs of spaced thrust bearings and brackets extending radially from the body at peripheral intervals. First clamp means associated with each pair and flexible drive means interconnecting all of the pairs adjust the tension of the head uniformly across its surface. Second clamp means associated with each first clamp means selectively adjusts the tension of the head in the area immediately adjacent. The drum is supported on the brackets, certain of which are freely supported interconnecting all of the pairs adjust the tension of the head uniformly across its surface. Second clamp means associated with each first clamp means selectively adjusts the tension of the head in the area immediately adjacent. The drum is supported on the brackets, certain of which are freely supported on associated leg members. The resulting drum suspension imparts a clear, unmuffled tone to the drum.

16 Claims, 8 Drawing Figures



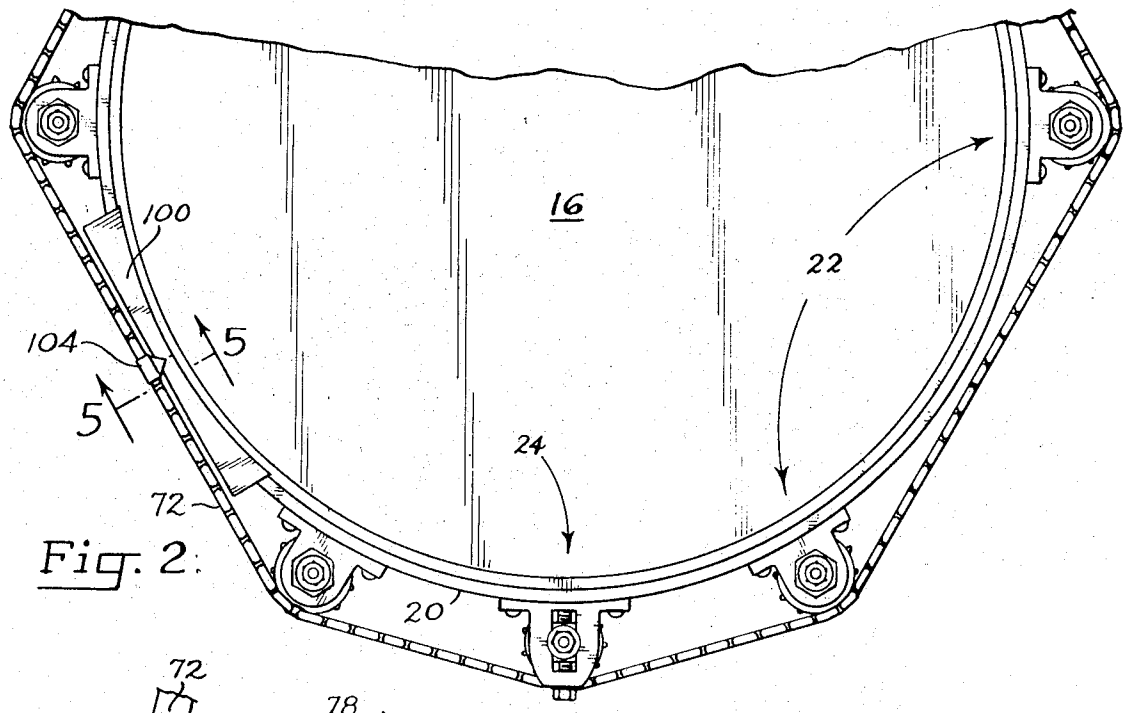


Fig. 2.

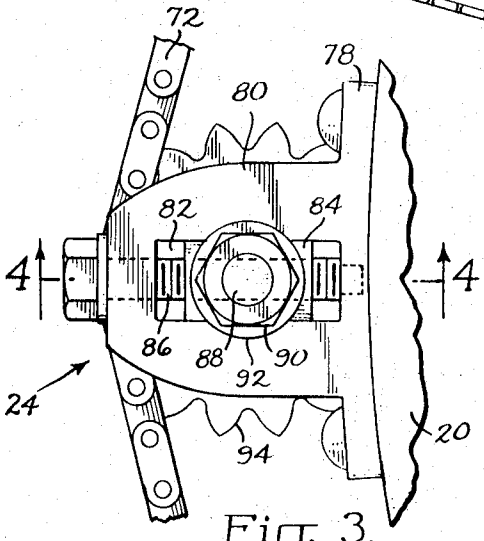


Fig. 3.

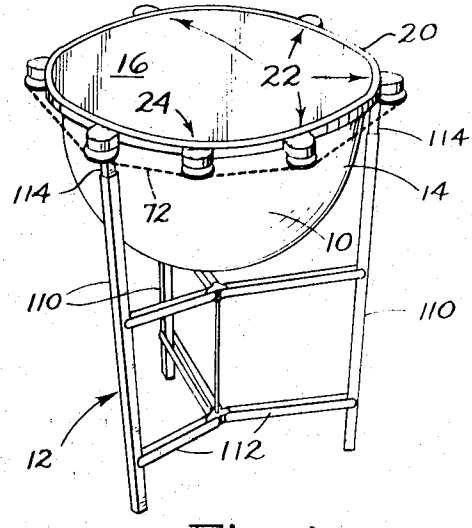


Fig. 1.

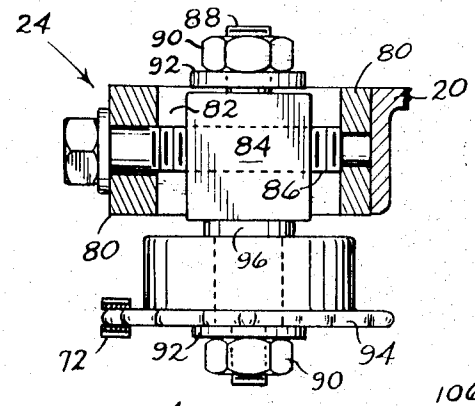


Fig. 4.

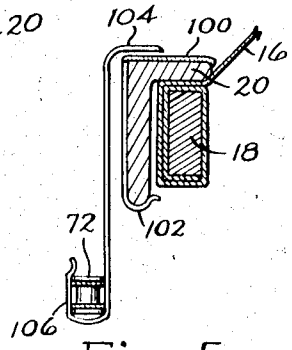


Fig. 5.

Jesse N. Kregal
INVENTOR
BY Eugene D. Farley
Atty.

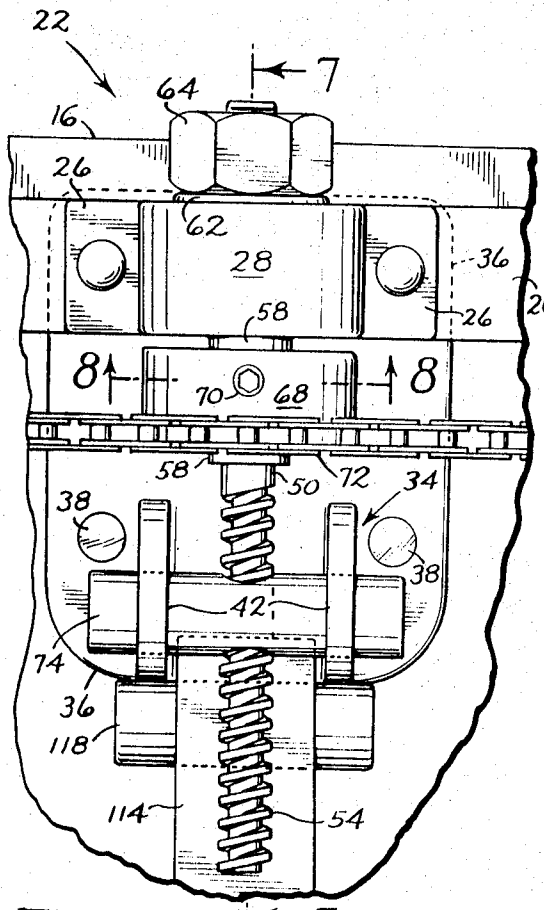


Fig. 6.

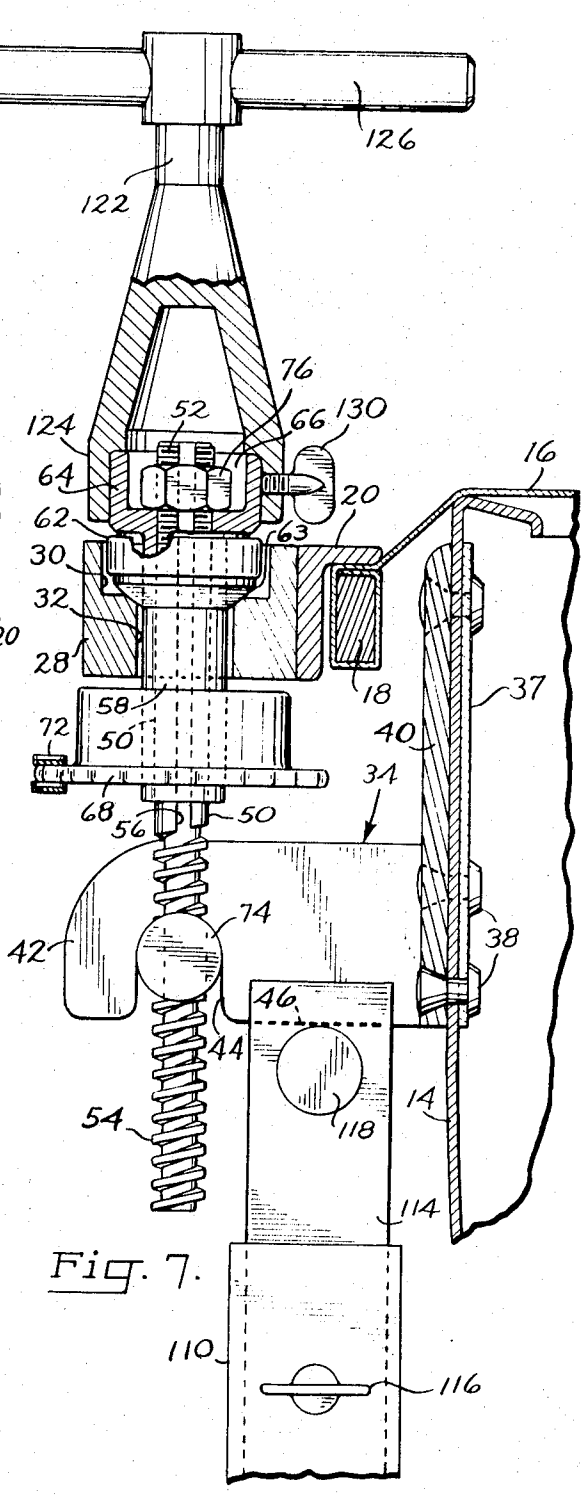


Fig. 7.

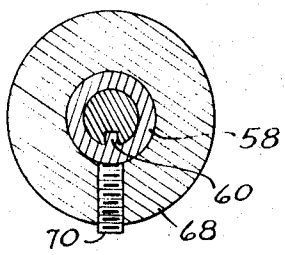


Fig. 8.

Jesse N. Kregal
INVENTOR

BY Eugene D. Farley
Atty.

KETTLEDRUM

This invention relates to kettledrums, also known as timpani. In particular, the present invention relates to kettledrums having an improved tuning mechanism and an improved suspension.

Kettledrums or timpani are unlike most other drums in that they have very definite pitch. The drumhead tension varies the pitch and gives each drum its pitch range. It is important that the drum be provided with tuning means so that the artist can change the pitch easily and accurately as required by the composition he is playing.

Two basic techniques are employed to vary the pitch of the kettledrums of the prior art. One is the provision of foot pedals with associated rods and levers which tension a plurality of posts evenly distributed around the circumference of the drum, and accordingly tension the head.

The second type is a hand-operated tuning attachment in which tension posts mounted on the drum are linked together with chain and sprocket, or cable and pulley.

Both categories of kettledrum tuning devices have been seriously deficient in providing accurate tuning and facile adjustment. It accordingly is the general purpose of the present invention to provide a kettledrum of the chain and sprocket type having an integral tuning mechanism which makes it possible to tune the drum accurately, easily and rapidly and which is characterized by the following additional advantages:

The tuning attachment itself freely suspends the drum on its legs providing a suspended kettle so that a pure, unmuffled tone is obtained. This enhances the purity of the sound produced by the instrument, and accordingly makes possible more accurate tuning.

The entire drum may be tuned to a new pitch or, where demanded by such factors as variations in drumhead texture, a selected area of the drumhead may be tuned separately to impart a uniform tone quality to the instrument.

The tuning mechanism is entirely below the plane of the drumhead. This allows the freest and most uninhibited movement by the artist and improves his performance correspondingly.

The tuning controls are readily accessible.

An accurate and easily read gauge is associated with the tuning mechanism so that the drum pitch is read easily, and reproducible tuning is possible.

A complete range of tuning is available, without mechanical limitations.

The tuning mechanism operates freely, does not fail at awkward moments and controls the pitch positively and accurately over a long service life.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the accompanying specification and claims considered together with the drawings, wherein:

FIG. **1** is a view in perspective of a kettledrum having the herein described tuning mechanism applied thereto;

FIG. **2** is a fragmentary plan view of the kettledrum;

FIG. **3** is a fragmentary plan view of a chain tensioning device applied to the kettledrum;

FIGS. **4** and **5** are sectional views taken along lines **4—4** of FIG. **3** and **5—5** of FIG. **2**; respectively;

FIG. **6** is a detail view in elevation of the tuning mechanism associated with the drum; and

FIGS. **7** and **8** are longitudinal and transverse sectional views taken along lines **7—7** and **8—8**, respectively of FIG. **6**.

Generally stated, the kettledrum of timpano of my invention comprises a hollow, substantially hemispherical body, a hoop supporting a taut head over the open end of the body, a counterhoop in operative engagement with the hoop and head tensioning means interengaging the body and counter hoop. First clamp means adjusts the tension of the head uniformly across its surface. Second clamp means associated with each first clamp means accurately adjusts the tension of the head in the immediately adjacent area. The drum is supported on a plurality of radially extending, peripherally spaced brackets, freely supported on associated leg members. This suspends the drum on the legs and imparts to it a desired clear, unmuffled tone.

Considering the foregoing in greater detail and with particular reference to the drawings:

The kettledrum assembly is shown generally in FIG. **1**. It includes a drum, indicated generally at **10**, supported on a stand, indicated generally at **12**.

The drum **10** includes a kettle or body **14** which is hemispherical in shape and open at its upper end. Its upper margin is reversely bent to form a rounded shoulder across which is stretched drumhead **16**. This preferably is made of rawhide, although it also may be made of plastic. The margin of the drumhead is secured to a hoop **18** of larger diameter than the diameter of the drum. The hoop in turn is retained in the usual manner by means of a counterhoop **20**.

A plurality of tuning units are secured to the drum at spaced peripheral intervals. These extend radially and are indicated generally at **22**. It is by means of these units that the tension of the head, and hence the drum pitch, are adjusted.

The construction, manner of mounting and mode of operation of the tuning units is shown in detail in FIGS. **6**, **7** and **8**.

In essence, each tuning unit comprises general clamping means for adjusting the tension of the entire head area, with associated selective clamping means for adjusting the tension of the head area immediately adjacent the particular tuning unit.

Each tuning unit includes a base **26** riveted or otherwise fixed to the exterior surface of counter hoop **20**. The base supports a thrust bearing **28** having an upper recess **30** and a central opening **32**. Cooperating with thrust bearing **28** is a bracket **34**. The bracket extends radially from the drum body a spaced distance below the thrust bearing, with which it is aligned vertically. It is fixed to the drum body, reinforced by plate **37** by means such as rivets **38**.

The bracket preferably is a U-shaped member including a base **40** and a pair of radially extending arms **42** spaced from and parallel to each other. The outer ends of the arms have recesses **44** forming inverted hooks. The lower edge surfaces **46** of the arms provide support and bearing surfaces by means of which the drum is suspended, as will appear hereinafter.

The clamping assembly mounted in each registering pair of thrust bearings **28** and brackets **34** includes a central shaft **50**. The shaft has a threaded upper end **52** and a threaded lower end **54**. The threads of these two ends are slow and fast for local and general drumhead tensioning, respectively. General tensioning, and hence tuning, thus may be done rapidly, as is necessary during the performance of a given musical number.

The central portion of the shaft is formed with a longitudinal keyway **56**.

Shaft **50** has an overall length such that it extends substantially above thrust bearing **28** and below bracket **34**. Its central portion is received in a sleeve **58** having a longitudinally extending key **60** by means of which the sleeve and shaft are coupled together so that they rotate as a single unit. The sleeve slides freely on the shaft in a longitudinal direction within the limits of keyway **56**.

Sleeve **58** rotates freely in bearing **28** and is journaled in a ball bearing **62** to permit easy adjustment under working loads.

The upper end of the sleeve is formed with an integral thrust bearing head (hex nut) **64**. This is the element by means of which torque is applied to the sleeve and shaft. Its upper surface is formed with a recess **66** communicating with sleeve **58**. Its undersurface bears against roller bearing **62** supported on a levelling washer **63** which in turn bears against thrust bearing **28**. This assembly is the one by means of which overall tuning of the kettledrum is obtained.

To this end a sprocket **68** also is mounted on sleeve **58** by means of setscrew **70**. Flexible interconnecting means such as chain **72** engages the sprockets of all of the assemblies. Hence by rotation of any one of sleeves **58**, all of the units may be adjusted in unison.

The desired adjustment is obtained by mounting on lower threaded section **54** of each shaft a bracket engaging member **74**. In the illustrated form of the invention this comprises a cylindrical nut threaded onto the lower end of the shaft and received in hook-forming recesses **44** of bracket **34**. Tightening and loosening bearing head **64** applies and releases clamping pressure on counterhoop **20**, and hence on drumhead **16**.

Selective tuning of the drumhead in the area immediately adjacent each tuning unit is achieved by including in the tuning unit a second bearing head **76**. This may comprise a hex nut threaded on the upper end **52** of shaft **50**. Its under surface bears against the bottom surface of the recess formed in head **64**.

Accordingly tightening and releasing bearing head **76** applies and releases clamping pressure on the drumhead in the area immediately adjacent the tuning unit without involving the remaining area of the drumhead. This is the case since head **76** can be tightened down or released on the fine threads of shaft upper end **52** without activating sprocket **68** and chain **72**. The inertia of these elements and associated clamping assembly is sufficient to inhibit their movement while torquing force is applied to head **76**.

A chain tightening unit **24** is provided for adjusting the tension of chain **72** as required to keep the chain taut and prevent slippage. The construction of this unit is shown in FIGS. **3** and **4**.

The unit comprises a base **78** riveted or otherwise fixed to counterhoop **20**. The base supports a bracket **80** which extends radially outwardly in the plane of chain **72**.

The bracket is provided with a radial slot **82** which acts as a slide. A slide block **84** moves freely in the slide. It is adjusted by means of a screw **86** which extends the length of the bracket and slide block.

Block **84** supports a vertical shaft **88**, the ends of which are threaded and mount retaining nuts **90** and washers **92**.

An idler sprocket **94** is mounted for free rotation on the shaft. It is spaced apart from block **84** by means of a washer **96**. Accordingly adjustment of screw **86** shifts the position of idler sprocket **94**, as required to adjust the tension on chain **72** engaged by the sprocket.

Indicating means are provided for indicating the pitch of the kettledrum in various conditions of tuning. Its construction and manner of mounting are illustrated in FIGS. **2** and **5**.

In providing the pitch indicator, advantage is taken of the fact that the tightness of drumhead **16**, and hence the pitch of the drum, are directly related to the displacement of chain **72**.

Accordingly a calibrated plate **100** is placed adjacent a stretch of chain **72**, parallel thereto. The plate is suitably supported, as by means of an integral spring clip **102** which engages the bottom margin of counterhoop **20**. A cooperating pointer **104** is fastened to chain **72** by means of a clip **106**. Plate **100** is calibrated in units such that as pointer **104** moves with chain **72**, it indicates the pitch of the drum in the assigned units.

It is a further feature of the invention that the same means which are employed to tune the kettledrum may be employed to support it in a freely suspended condition which imparts to it a superior and purer tone quality. The resulting purity of sound in turn makes it possible to tune the drum with a higher degree of accuracy. The drum-supporting elements are indicated in FIGS. **1**, **6** and **7**.

As shown in FIG. **1**, the drum is supported in a stand, indicated generally at **12**. The stand includes a plurality of legs **110** suitably braced for separation by links **112**.

Legs **110** are telescoping. Each mounts an extension segment **114** which may be maintained releasably in its predetermined degree of extension by means of a thumbscrew **116**.

Leg segment **114** has a cross section such that it may be inserted between arms **42** of the associated bracket **34**. A cross pin **118** mounted on the end of the leg segment bears against the undersurfaces **46** of the arms.

As is particularly evident in FIG. **7**, this provides a support on which the drum hangs freely. This is in direct and desirable contrast to one conventional mode of mounting the drum in which the latter is mounted on a tripod in direct engagement with the drum kettle, a situation which results in muffling of the drum tone.

OPERATION

To operate the herein described kettledrum, there is provided a wrench **122**, FIG. **7**. The wrench includes a body **122** having on one end a first head **124**, and on the other end a crossbar **126** mounting a second head **128**.

Wrench head **124** is dimensioned to engage thrust bearing head **64**. To permit a running adjustment, the wrench usually is left in position while the drum is being played. A thumbscrew **130** then is used to secure the wrench to the head and thus prevent rattling of the assembly.

Turning the wrench in its mounted position exerts or releases pressure on drumhead **16** through the agency of the clamp comprising sleeve **58** interlocked shaft **50**, counterhoop **20** which bears against the drumhead, and bracket engaging cylindrical nut **74** which bears against bracket **34**. This effect is transmitted uniformly to all of the companion units through the agency of sprockets **68** and chain **72**.

When it it is desired to tune an individual selected area of the drum head the adjacent tuning unit is selected, and wrench head **128** applied to nut **76**. This applies or releases clamping pressure to the area concerned only. The companion tuning units are not involved because of the inertia of the system. Contributing to this effect is the fine thread-coarse thread relationship of threaded ends **52**, **54** of shaft **50**.

Wrench head **128** also may be used to adjust the tension of chain **72** by applying it to the head of adjustment screw **86**, which is a component of chain tensioning unit **24**.

Having thus described my invention in preferred embodiments, I claim:

1. A kettledrum comprising
   a. a hollow substantially hemispherical body,
   b. hoop means supporting a taut head over the open end of the body,
   c. counterhoop means in operative engagement with the hoop means, and
   d. head tensioning means interengaging the body and the counterhoop means and comprising:
      1. a plurality of thrust bearings mounted radially at spaced peripheral intervals on the counterhoop means,
      2. a plurality of brackets secured radially at spaced peripheral intervals to the drum body, in substantially vertical registration with the thrust bearings,
      3. a plurality of adjustable clamp assemblies interconnecting the bearings and brackets, each clamp assembly comprising
         a. a shaft extending through one of the aligned bearing and bracket pairs,
         b. a sleeve rotatably and slidably mounted in the bearing, receiving and interlocked with the shaft,
         c. a first thrust bearing head integral with the upper end of the sleeve, bearing against the thrust bearing,
         d. flexible drive means interconnecting the sleeves of all of the clamp members,
         e. bracket engaging means on the lower end of the shaft,
         f. the sleeve and shaft being rotatable together,
         g. and the flexible drive means transmitting the torque to the shafts of all of the clamp assemblies, thereby adjusting the pressure applied to the bracket engaging means and correspondingly tensioning the drumhead,
         h. a second thrust bearing head on the upper end of the shaft, bearing against the first thrust bearing head and operable to adjust selectively the clamping pressure applied to the drumhead in the area immediately adjacent the clamping assembly.

2. The kettledrum of claim 1 wherein the upper surfaces of the thrust bearing members are recessed and receive bearings journaling the sleeve.

3. The kettledrum of claim 1 wherein the brackets comprise a pair of inverted hook-shaped arms and the bracket engaging means comprises a rod receivable in the hook portions of the arms.

4. The kettledrum of claim 1 wherein the sleeve and shaft are keyed together.

5. The kettledrum of claim 1 wherein the drive means comprise sprockets fixed one to each sleeve and a continuous chain engaging all of the sprockets.

6. The kettledrum of claim 1 wherein the first thrust bearing head comprises a hollow nut integral with the sleeve and the second thrust bearing head comprises a nut threaded on the shaft and received in a recess in the first thrust bearing head.

7. The kettledrum of claim 1 including tensioning means associated with the flexible drive means, the tensioning means comprising a radially slotted block secured to the peripheral surface of the body, a slide mounted in the slot, screw means threaded through the bracket and block for adjusting the position of the block in the slide, a vertical shaft mounted on the block and an idler wheel mounted for free rotation on the shaft and engaging the flexible drive means.

8. The kettledrum of claim 1 including a calibrated position scale secured to the body parallel to the flexible drive means and adjacent thereto and pointer means fixed to the flexible drive means in operative position relative to the scale.

9. The kettledrum of claim 1 wherein selected ones of the brackets are provided with support surfaces and including drum support legs engaging such surfaces, thereby freely supporting the drum.

10. The kettledrum of claim 9 wherein the bracket comprises a pair of parallel spaced-apart arms, the undersurfaces of which provide the support surfaces and wherein the leg is insertable between the arms and provided with a cross pin engaging the support surfaces thereof.

11. The kettledrum of claim 1 wherein the upper and lower ends of the shaft have slow-pitched and fast-pitched threads, respectively, and wherein the second thrust bearing head comprises a nut threaded on the upper end of the shaft and the bracket engaging means comprises a nut threaded on the lower end of the shaft.

12. A kettledrum comprising

a. a hollow substantially hemispherical body,

b. hoop means supporting a taut head over the open end of the body,

c. counterhoop means in operative engagement with the hoop means,

d. head tensioning means interengaging the body and counterhoop means, and

e. drum support means comprising

1. a plurality of radially extending brackets mounted on the body, each having a bearing support surface, and

2. a plurality of legs, each engaging the bearing support surface of a selected one of the brackets, thereby freely suspending the drum on the legs.

13. The kettledrum of claim 12 wherein each bracket comprises a pair of parallel spaced arms receiving between them the upper end of the associated leg, and wherein the leg is provided with a cross pin engaging and supporting the arm in bearing rela,ion.

14. A kettledrum comprising

a. a hollow, substantially hemispherical body,

b. hoop means supporting a taut head over the open end of the body,

c. counterhoop means in operative engagement with the hoop means, an;

d. head tensioning means interengaging the body and the counterhoop means and comprising:

1. a plurality of thrust bearing members mounted radially at spaced peripheral intervals on the counterhoop means,

2. a plurality of bracket members secured radially at spaced peripheral intervals to the drum body, in substantially vertical registration with the thrust bearing members,

3. a plurality of adjustable clamp assemblies interconnecting the bearing and bracket members, each clamp assembly comprising

a. a shaft threaded at its opposite ends with threads of different speed,

b. first adjusting means operatively engaging one threaded end of the shaft with one of the associated bearing and bracket members,

c. second adjusting means operatively engaging the other threaded end of the shaft with the other of the associated bearing and bracket members,

d. whereby relative rotation of the shaft and first adjusting means effects movement of the associated bearing and bracket members toward and away from each other at one predetermined rate and relative rotation of the shaft and second adjusting means effects movement of the associated bearing and bracket members toward and away from each other at a different predetermined rate, and

e. flexible connecting means interconnecting the plurality of adjusting means associated with the faster threads, whereby adjustment of clamping pressure by one of said adjusting means equally adjusts the clamping pressure applied by the remaining ones of said adjusting means.

15. The kettledrum of claim 14 wherein

a. the first adjusting means comprises a threaded nut on the faster thread of the shaft and engaging the bracket member, and a sleeve mounted on the shaft for simultaneous rotation therewith and for relative longitudinal movement of said shaft and sleeve, the sleeve engaging the bearing member,

b. the second adjusting means comprises a threaded nut on the slower thread of the shaft and engaging the sleeve, and

c. the flexible connecting means is secured to the sleeve,

d. whereby rotation of the plurality of sleeves and shafts effects simultaneous movement of the associated bearing and bracket members toward and away from each other at a predetermined rate and rotation of each second adjusting nut relative to its associated shaft effects movement of the associated bearing and bracket members toward and away from each other at a slower rate.

16. A kettledrum comprising

a. a hollow substantially hemispherical body,

b. hoop means supporting a taut head over the open end of the body,

c. counterhoop means in operative engagement with the hoop means, and

d. head tensioning means interengaging the body and the counterhoop means and comprising:

1. a plurality of thrust bearing members mounted radially at spaced peripheral intervals on the counterhoop means,

2. a plurality of bracket members secured radially at spaced peripheral intervals to the drum body, in substantially vertical registration, with the thrust bearing members,

3. a plurality of adjustable clamp assemblies interconnecting the bearing and bracket members, each clamp assembly comprising

a. first and second clamp members interconnected for simultaneous rotation and for relative longitudinal movement,

b. adjustment means interengaging the first and second clamp members for adjusting one longitudinally relative to the other,

c. means interengaging the first and second clamp members one with its associated bearing member

and the other with its associated bracket member for rotation relative thereto to move the bearing and bracket members toward and away from each other, and

d. flexible connecting means interconnecting each of said bearing-engaging clamp members, whereby adjustment of the clamping pressure by one of said bearing-engaging clamp members equally adjusts the clamping pressure applied by the remaining bearing-engaging clamp members.

* * * * *