

April 22, 1930.

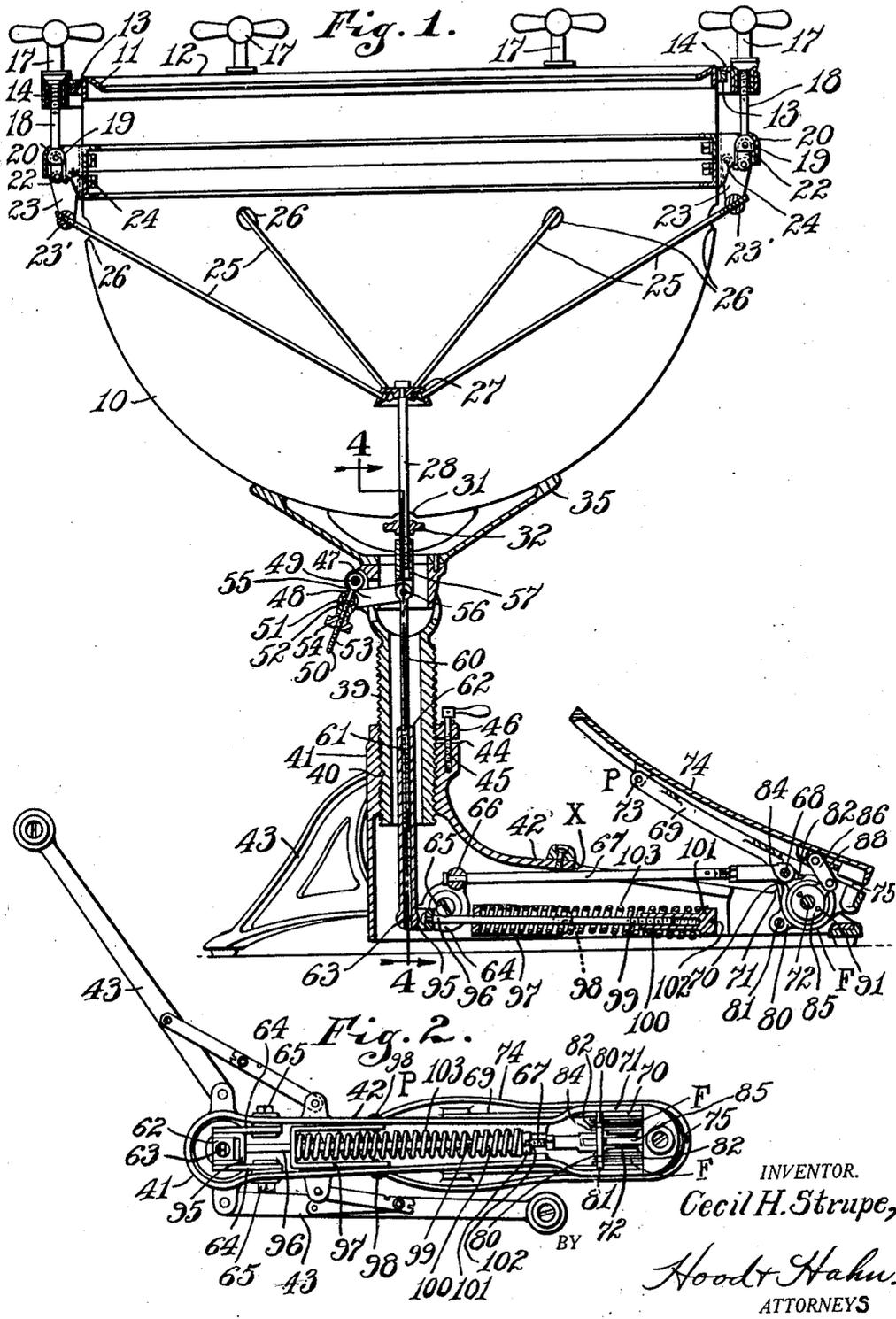
C. H. STRUPE

1,755,569

TYMPANO

Filed April 4, 1929

3 Sheets-Sheet 1



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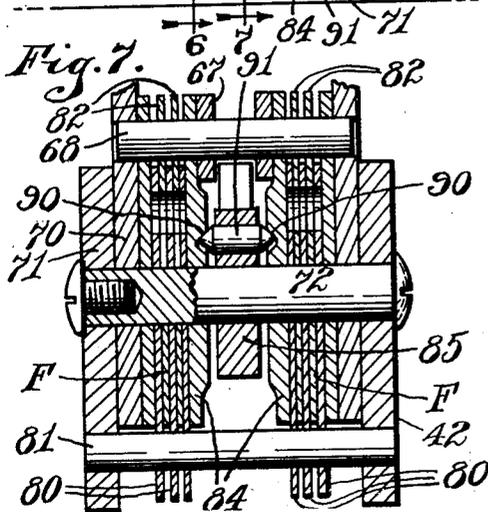
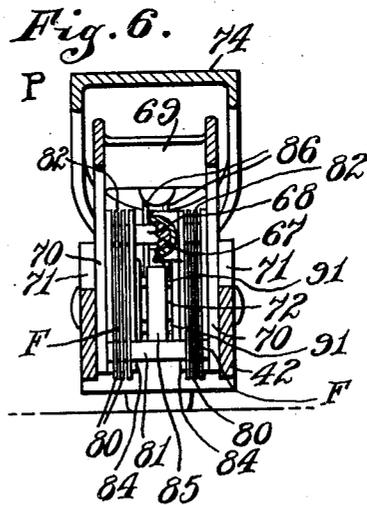
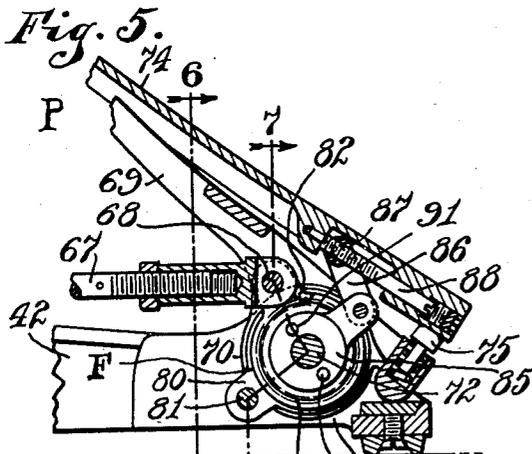
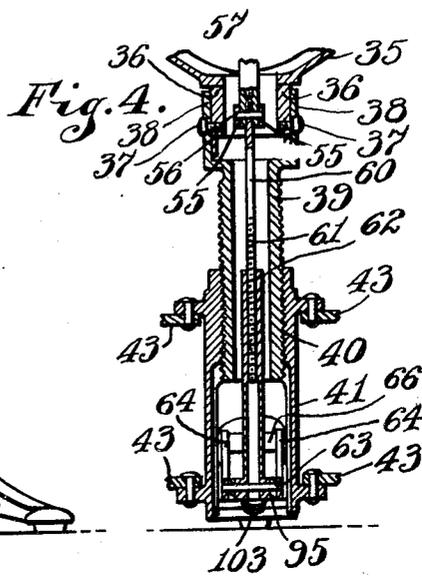
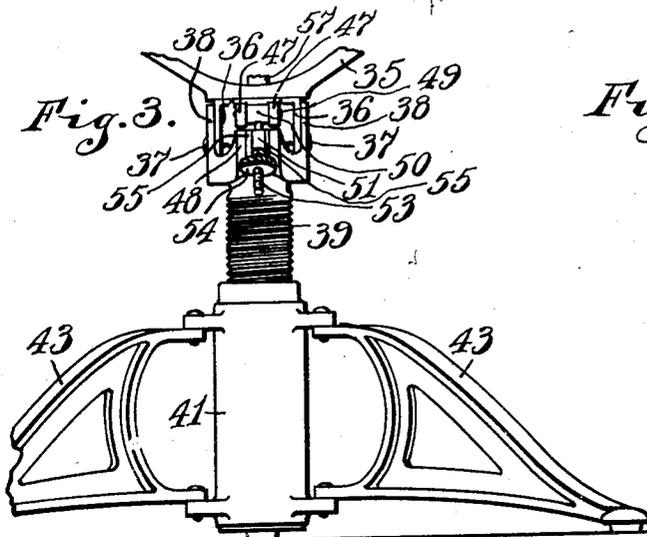
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3 Sheets-Sheet 2



INVENTOR.
Cecil H. Strupe,
 BY
Hood + Stahn.
 ATTORNEYS

April 22, 1930.

C. H. STRUPE

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TYMPANO

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3 Sheets-Sheet 3

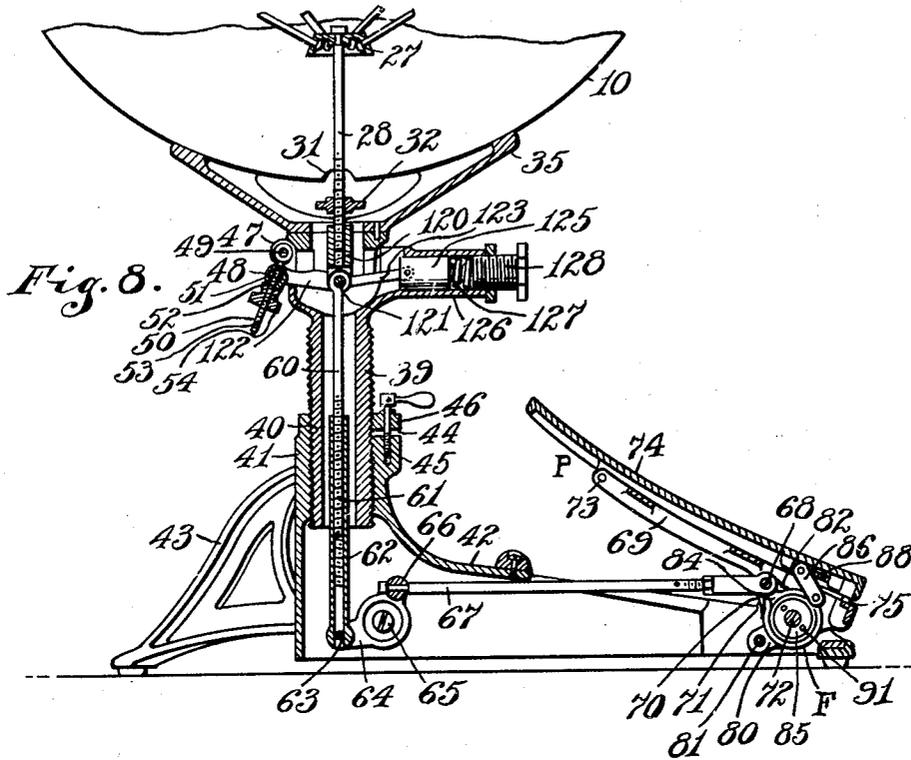
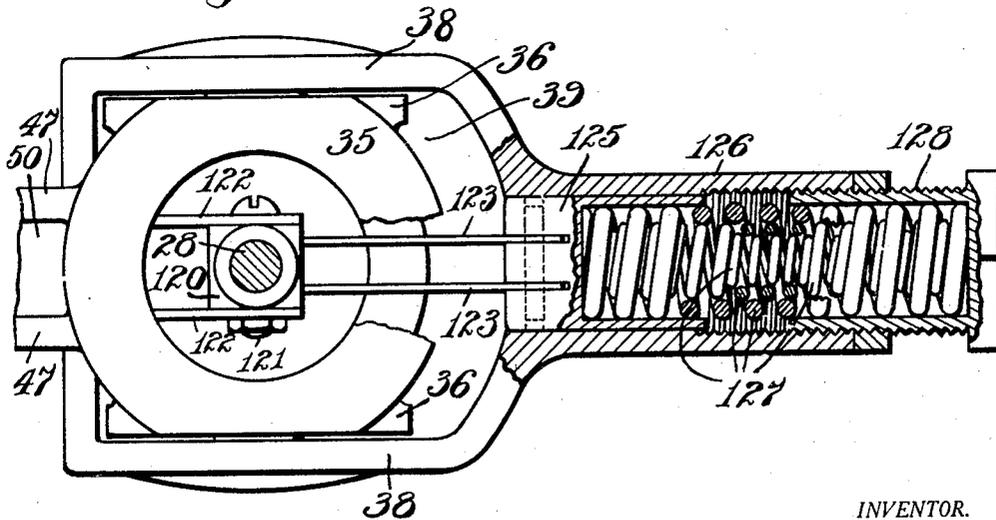


Fig. 9.



INVENTOR.
Cecil H. Strupe,

BY

Hood + Hahn.
ATTORNEYS

UNITED STATES PATENT OFFICE

CECIL H. STRUPE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO LEEDY MANUFACTURING COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA

TYMPANO

Application filed April 4, 1929. Serial No. 352,403.

The object of my invention is to provide an efficient pedal mechanism for tympani by means of which the pitch of the tone thereof may be quickly and accurately raised or lowered and then maintained until a new adjustment is performed.

The accompanying drawings illustrate my invention:

Fig. 1 is a side elevation, in partial vertical section of a tympano embodying my improvements;

Fig. 2 is an under plan of the pedal mechanism and immediately associated parts;

Fig. 3 is an end elevation;

Fig. 4 is a section on line 4—4 of Fig. 1;

Fig. 5 is a side elevation, in partial vertical section, on a larger scale, of the fulcrum of the pedal, the brake, and associated parts;

Fig. 6 is a section, on line 6—6 of Fig. 5;

Fig. 7 is a section on line 7—7 of Fig. 5, on a larger scale; and,

Fig. 8 is a vertical section of another embodiment of my invention; and

Fig. 9 a horizontal section through the spring chamber.

In the drawings 10 indicates a tympano shell or kettle provided with a suitable flange 11 and a head 12 carried by a head ring 13.

Mechanism is provided for tuning the head 12 to a desired low pitch and this mechanism is of such character as to be manipulable through the medium of a single pull rod and a pedal. The details of construction of this mechanism by means of which hand tuning may be obtained form no part of my present invention, and I have therefore illustrated, as a desirable construction, the details of the hand tuning mechanism disclosed in my Re-issue Patent No. 16,226, issued December 15th, 1925.

This mechanism comprises a pressure ring 14 adapted to engage the head ring 13 to depress it. Engaging ring 14 are hand manipulable nuts 17 into which are threaded rods 18, each provided at its lower end with a ball 19 engaging the downwardly presented socket 20 attached to the shell 10. Pivoted to the lower end of each rod 18 is a link 22, the lower end of which is pivoted to one arm of a bell crank lever 23 pivoted at 24 to shell

10. Each lever 23 carries a swinging nut 23' into which is threaded a pull rod 25, the several pull rods being projected through perforations 26 into the interior of the shell, their inner ends being connected to a central head 27 carried at the upper end of a central pull rod 28 projected downwardly through a perforation 31 through shell 10 and provided with a collar 32 adapted to limit the upward movement of rod 28 under the force exerted by head 12 when it is put under tension by the hand nuts 17, the arrangement being such that, the head 12 being brought to any desired tone pitch by adjustment of the nut 17, this tone pitch may be raised by a downward pull on rod 28.

My present invention relates to foot-controlled mechanism by means of which the tone of the head may be quickly and accurately raised or lowered throughout a considerable range above the pitch of the hand determined tone of the head which, for convenience will be hereafter referred to as the fundamental tone, it being understood that this so-called fundamental tone is a variable dependent at all times upon the adjustment of the nuts 17.

Shell 10 is supported in a cup-like bracket 35 having a pair of downwardly projecting ears 36 pivoted at 37 between a pair of upwardly projecting ears 38 carried by a tubular stem 39 which is externally threaded into the internal threads 40 of a pedestal 41 provided with a laterally extended hollow foot 42 and a pair of laterally extensible folding feet 43, 43. Near the upper end of pedestal 41 it is slotted, intermediate the length of threads 40, as indicated at 44, and clamping bolt 45 passed through the tongue 46 thus formed into the main body of the pedestal so that the stem 39 may be held in desired positions of vertical adjustment. Bracket 35 is provided with a laterally projecting pair of ears 47 and stem 39 is provided with a laterally projected mating pair of ears 48. Pivoted at 49 between ears 47 is an anchor bolt 50 projected through a block 51 pivotally mounted at 52 between ears 48. A projected end of bolt 50 is threaded at 53 to receive a thumb nut 54 which abuts against the lower face of block

51, the arrangement being such that the angular position of the shell supporting bracket 35 may be adjusted through the desired range of tilting of the drum head.

5 Pivoted upon the fulcrum pin of block 51 are two links 55, 55 which at their inner ends are pivoted upon pin 56 carried by an upwardly projected internally threaded sleeve 57 which is threaded to receive the lower
10 threaded end of pull rod 28. Connected to pin 56 and thus hinged to sleeve 57 is a downwardly projected pull rod 60, the lower end of which is threaded, at 61 into a threaded sleeve 62, said threads having the same pitch
15 as threads 40. The lower end of sleeve 62 is pivoted by means of cross pin 63, to the substantially horizontal arms of two bell crank levers 64, 64 pivoted at 65 upon opposite sides of the interior of the pedestal. Pivoted
20 at 66, between the upwardly projecting arms of lever 64 is a pedal rod 67 pivotally connected at 68 with the pedal lever 69 of a compound pedal P. Element 69 at its heel is provided with a pair of depending ears 70,
25 70 which are journaled and lie between a pair of upstanding ears 71, 71 carried by arm 42. Ears 70 are pivotally supported on a pin 72 extending between ears 71. Pivoted on pin 73 at the outer end of element 69 is the foot
30 piece 74 of the compound pedal P, pin 73 being approximately beneath the ball of the foot of the operator. The heel end of foot piece 74 is normally urged upwardly by a spring pressed plunger 75 mounted in the heel
35 of element 69.

Arranged between the ears 70, 70, on pin 72, are two groups F, F of interdigitated friction plates, each group comprising a plurality of plates 80 anchored upon a cross pin 81 carried
40 by arm 42, and a plurality of plates 82 anchored on pin 68. Mounted on pin 72 between the two groups F, F of friction plates are two clamping rings 84, 84 which are anchored on pin 68. Journaled on pin 72 between rings
45 84, 84 is an actuator 85 connected by a link 86 with a block 87 anchored in the heel of foot piece 74 by means of an adjusting screw 88 which is journaled in the foot piece and threaded through the block, the arrangement
50 being such that the clamping rings relative to the foot piece may be adjusted by turning screw 88. The actuator 85 and the clamping rings 84 are so formed that angular movement of the actuator relative to the clamping rings
55 (in a counter clockwise direction—Fig. 1) under the action of plunger 75, will cause said clamping rings to clamp the two groups F, F of friction discs against the ears 70 of the pedal lever 69 and thus hold the compound
60 pedal in any desired position of adjustment until the heel of the foot piece 74 is depressed.

Many different constructions could be adopted for this purpose and in the drawings (Fig. 7) I show one of these construc-

tions which has proven to be satisfactory, wherein the inner faces of the clamping rings are provided with two diametrically opposed cam surfaces 90, 90 and the actuator is perforated at diametrically opposed points to receive and carry two axially slidable pins 91, 91, the lengths of which are such that, when the actuator is in one extreme of angular position relative to the clamping rings, the pins are adjacent the lower points of the cams and
70 when the actuator is swung (in a counter clockwise direction), the pins will be forced between the opposed cams and thus force the clamping rings apart so as to firmly clamp the two groups of friction rings between the
75 clamping rings and the ears 70 of the pedal element 69. Rotation of screw 88 will cause an adjustment of block 87 to bring the several parts into proper relative positions whereby the force of the spring plunger 75
80 will be sufficient to firmly hold the compound pedal key in any angular position so long as the force of the spring plunger is not overcome by the heel of the operator.

Pivoted to pin 63 between the two bell
90 crank levers 64 and straddling the lower end of sleeve 62 is a bracket 95 carried by one end of a rod 96 projected through the base of a U-bracket 97 which is pivoted at 98 in the interior of arm 42. The outer end of rod 96
95 is threaded at 99 and receives a threaded sleeve 100 provided with a head 101 cross slotted at 102 to receive a screw driver. A balancing spring 103 is arranged between the base of bracket 97 and the head 101. The
100 pivotal point 98 is so placed relative to the position of pin 63 when levers 64 are swung as far as possible by the upward movement of pedal P, as indicated in Fig. 1, that balancing spring 103 is still capable of exerting
105 a counter clockwise turning moment upon the bell crank levers, further upward swing of the pedal being prevented by rod 67 coming into contact with the upper wall of arm 42 where said rod emerges from the
110 interior of the arm, at X, (Fig. 1).

In use pedal P is swung to its upper position against the frictional resistance offered by the friction groups F, F and nuts 17 are then adjusted, in the usual manner, to bring
115 the head 12 to the proper pitch and head 101 is then adjusted to put spring 103 under compression an amount sufficient to about carry the load produced by the tension of the drum head 12.
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Thereupon the operator by pressing downwardly with the ball of his foot upon the foot plate 74 may swing the pedal P downwardly, thereby pushing upon rod 67 and swinging the bell crank 64 in a counter clockwise
125 direction so as to pull down upon the pull rod system 62, 61, 60, 57, 28 and thus pull down upon the head ring 13 to increase the tension in the drum head 12 and thus raise its tone pitch. This movement increases the
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effectiveness of spring 103 on lever 64 by increasing the effective length of the lever arm but at the same time, by reason of the swing of the bell cranks, head 101 moves slightly to the right, thereby tending to slightly release spring 103. The general effectiveness of spring 103 on the drum head remains about the same but I have found that it is not practicable to attempt to rely upon the maintenance of exact balance between the force of the spring and the resistance of the drum head with the idea of having the parts in a dynamic balance in all positions of the foot pedal. It is for this reason that I provide the friction groups F, F to firmly hold the foot pedal P in all positions of adjustment, the tension in the drum head being at all times sufficient to return the parts to normal position whenever the friction groups are released. Whenever the operator desires a decrease in tension of the drum head 12, to bring it to a lower tone pitch, he exerts a pressure upon the heel end of the foot plate 74, thus swinging the actuator 85 in a clockwise direction (Fig. 1), thus releasing the clamping rings, whereupon that portion of the force induced by the tension in the drum head 12 in excess of the force of spring 103 will swing the free end of the pedal upwardly the amount which the operator permits by an upward movement of the ball of his foot, this upward movement of the pedal continuing until the operator releases the pressure which he is exerting by his heel, whereupon the parts come to a position of rest where they are held by the friction elements F, F.

I have found in practice that by the mechanism described an operator is able to very quickly and accurately change the pitch of his drum head, throughout the range of the apparatus and that any established tension in the drum head will be maintained until another manipulation of the pedal.

It will be noted that the only forces which are required to be exerted by the operator are downwardly exerted forces and that there are no required manipulations resulting from a swinging movement of the foot about the ankle joint. It has been found in practice that an operator may very accurately gage the exertion of downward forces, whereas accuracy of swinging movements of the foot about the ankle joint are difficult to attain both because of lack of muscular strength and because turning movements of the foot apparently cannot be gaged as accurately as straight downward movements.

In the form shown in Figs. 8 and 9 the lower end of rod 28 is threaded into a head 120 provided at its lower end with a cross-pin 121 on which is pivoted the upper end of rod 60—62, the lower end of which is pivoted, as in the other form, to lever 64 connected to the

foot lever 74 and associated parts as in the other form.

Pivoted to cross-pin 121 are the inner ends of two links 122, 122, the outer ends of which are pivotally anchored on a cross pin 52 pivoted in ears 48 carried by the upper end of stem 39' the adjacent parts being in the main, the same as bracket 35 of the other form. Bracket 35 is pivotally adjustable on stem 39'.

Two links 123, 123, have their inner ends also pivoted on pin 121 and their outer ends are pivoted to a plunger 125 slidably mounted in a spring casing 126 formed in an extension at the upper end of stem 39'. Acting upon plunger 125 is a nested group of springs 127, the effect of which may be adjusted by an adjustable abutment 128. The links 122 and 123 form a toggle linkage for transferring the force of springs 127 to the pull rod 28.

The parts are so proportioned that, when the drum head is at its lowest tension the inner ends of the two pairs of links 122 and 123 incline downwardly and the springs 127 thus exert a tensioning force on the drum head. As the foot lever 74 is depressed to increase the tensioning of the drum head, the inner ends of the links are drawn down and the angle of said links relative to rod 28 made more acute, thus increasing the effectiveness of the springs 127 more rapidly than their effectiveness is decreased by expansion and thus serving to keep substantially uniform the force tending to return the foot lever to initial- or low-tone position.

I claim as my invention:

1. A pedal tympano comprising a pedestal, a kettle supported by the pedestal, a head for the kettle, head tensioning means arranged to act upon said head, a pull rod for actuating said tensioning means, a foot pedal movably mounted upon the pedestal, a connection between said foot pedal and the pull rod, a friction brake arranged to hold the pedal against movement, and pedal controlled means by which the brake may be rendered active or inactive.

2. A pedal tympano comprising a pedestal, a kettle supported by the pedestal, a head for the kettle, head-tensioning means arranged to act upon said head, a pull rod for actuating said tensioning means, a foot pedal movably mounted upon the pedestal, a connection between said foot pedal and the pull rod, a friction brake arranged to hold the pedal against movement, an actuator for said brake by which it may be rendered active or inactive, said pedal comprising an element connected to said actuator, and means for normally urging the actuator to brake-active position.

3. A pedal tympano comprising a pedestal, a kettle supported by the pedestal, a head for the kettle, head tensioning means arranged to act upon said head, a pull rod for actuat-

- ing said tensioning means, a pedal-lever pivoted on the pedestal, a connection between said pedal lever and a pull rod, a foot plate pivoted on the pedal lever, a friction-brake arranged to act upon the pedal lever, a brake actuator movable to render the brake active or inactive, and a connection between said actuator and the foot plate.
4. A pedal tympano of the character specified in claim 3 wherein a spring is interposed between the pedal lever and foot plate to normally urge the brake actuator to brake-active position.
5. In a pedal tympano, a support, a pedal lever pivoted on said support, a foot plate pivoted on the pedal lever, a group of interdigitated friction disks coaxial with the pivot of the pedal lever, some anchored to said lever, some anchored to the support, an actuator pivotally coaxial with the pedal lever and capable of clamping the two groups of friction disks together, and a connection between said actuator and the foot plate.
6. A pedal tympano of the character specified in claim 5 wherein the interdigitated friction disks are arranged in two groups with the actuator between them.
7. A pedal tympano of the character specified in claim 5, wherein the connection between the actuator and foot plate is anchored on the foot plate by an adjustable block by which the actuator may be rotatively adjusted relative to the friction plates.
8. A pedal tympano of the character specified in claim 5, wherein the interdigitated friction disks are arranged in two groups with the actuator between them and the connection between the actuator and foot plate is anchored on the foot plate by an adjustable block by which the actuator may be rotatively adjusted relative to the frictional plates.
9. A pedal tympano comprising a pedestal, a kettle supported thereby and provided with a head, head-tensioning means comprising a pull rod projected into the pedestal, a bell crank lever fulcrumed in the pedestal and having an arm pivoted to the pull rod, an operating rod pivoted to the other arm of the bell crank, and to a foot pedal, and a friction brake normally holding the pedal against movement under force applied by the head on the pull rod.
10. A pedal tympano of the character specified in claim 9 wherein a balancing spring, anchored in the pedestal is arranged to act on the pull rod in opposition to the drum head.
11. A pedal tympano of the character specified in claim 9 wherein a balancing spring anchored in the pedestal is arranged to act directly on the first-mentioned arm of the bell crank in opposition to the drum head.
12. A pedal tympano of the character specified in claim 1 wherein a balancing spring is arranged to act on the pull rod in opposition to the drum head.
13. A pedal tympano of the character specified in claim 2 wherein a balancing spring is arranged to act on the pull rod in opposition to the drum head.
14. A pedal tympano of the character specified in claim 1, comprising a toggle linkage connected at its middle to the pull rod, and a spring abutment for said linkage.
15. A pedal tympano of the character specified in claim 2, comprising a toggle linkage connected at its middle to the pull rod, and a spring abutment for said linkage.
16. On a pedal tympano, a pull rod forming part of head tensioning means, a toggle linkage connected at its middle to said rod and inclined thereto in head-tensioning direction; and a spring abutment for one end of said linkage.
17. A pedal tympano of the character specified in claim 9, comprising a toggle linkage connected at its middle to the pull rod, and a spring abutment for said linkage.
- In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 2nd day of April, A. D. one thousand nine hundred and twenty-nine.
- CECIL H. STRUPE.

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