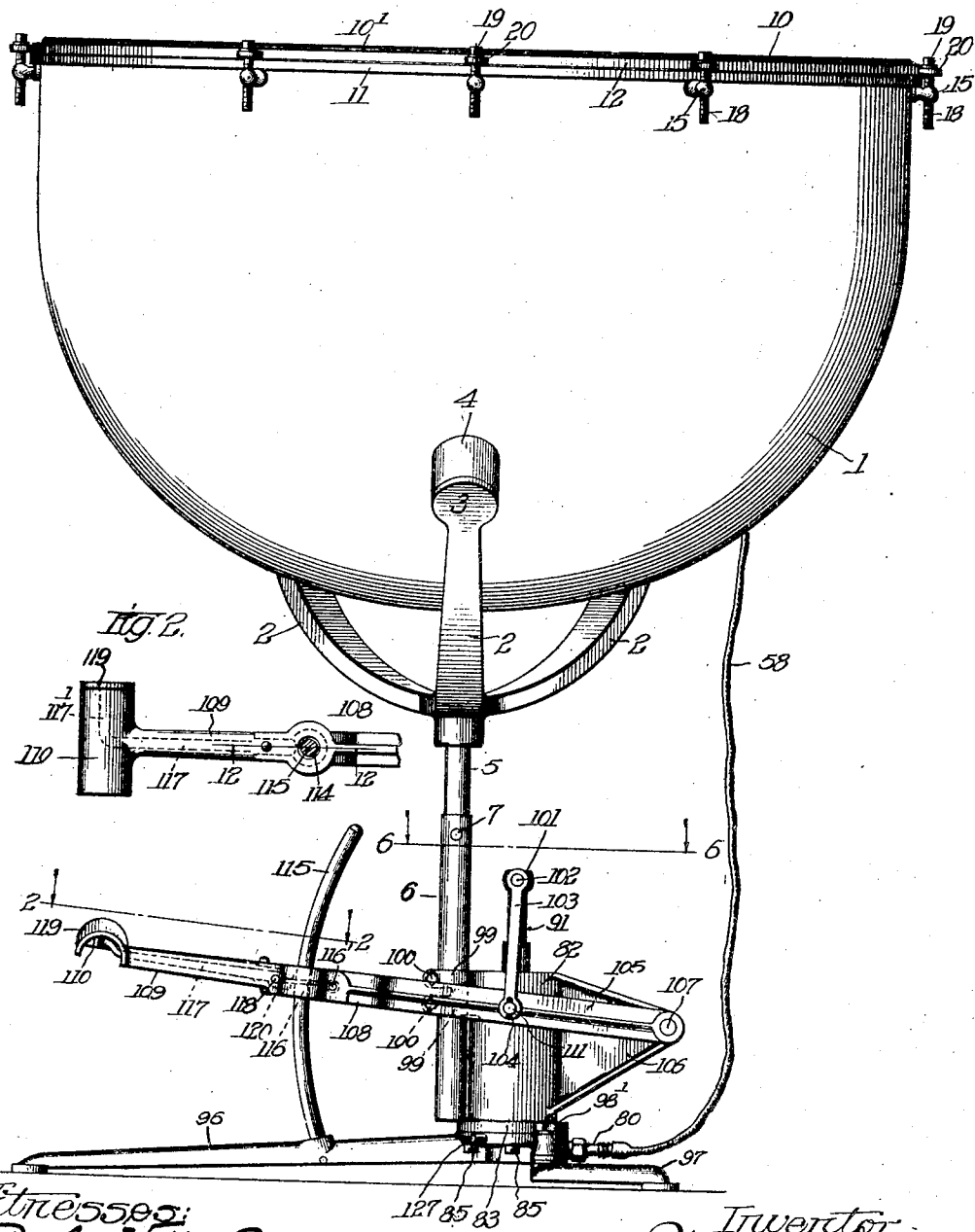


W. F. LUDWIG.
MUSICAL INSTRUMENT.
APPLICATION FILED APR. 28, 1911.

1,054,009.

Patented Feb. 25, 1913.
6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Robert H. Weir
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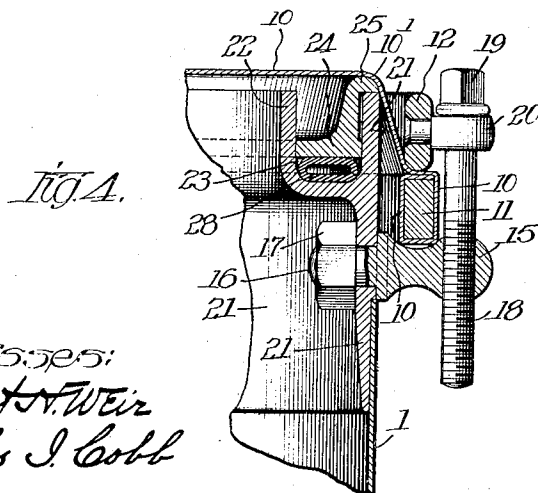
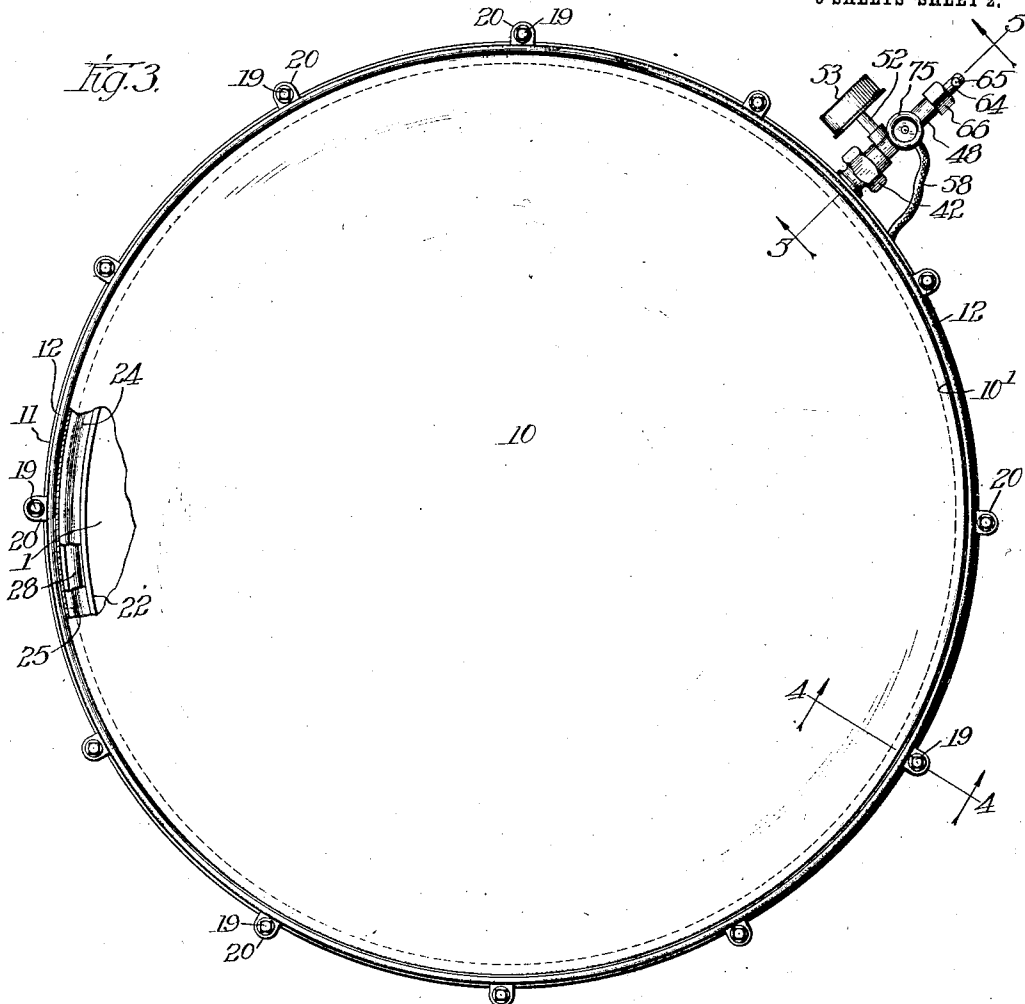
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6 SHEETS-SHEET 2.



Witnesses:
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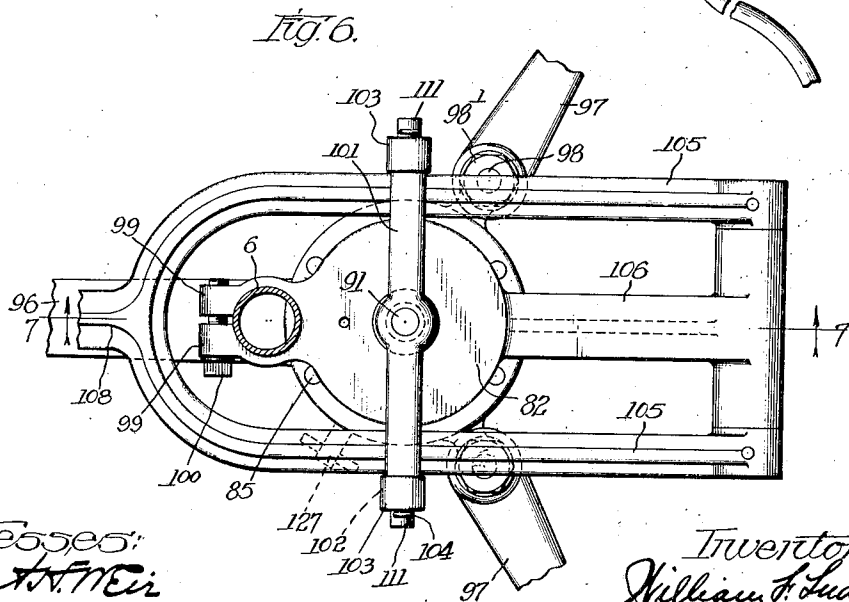
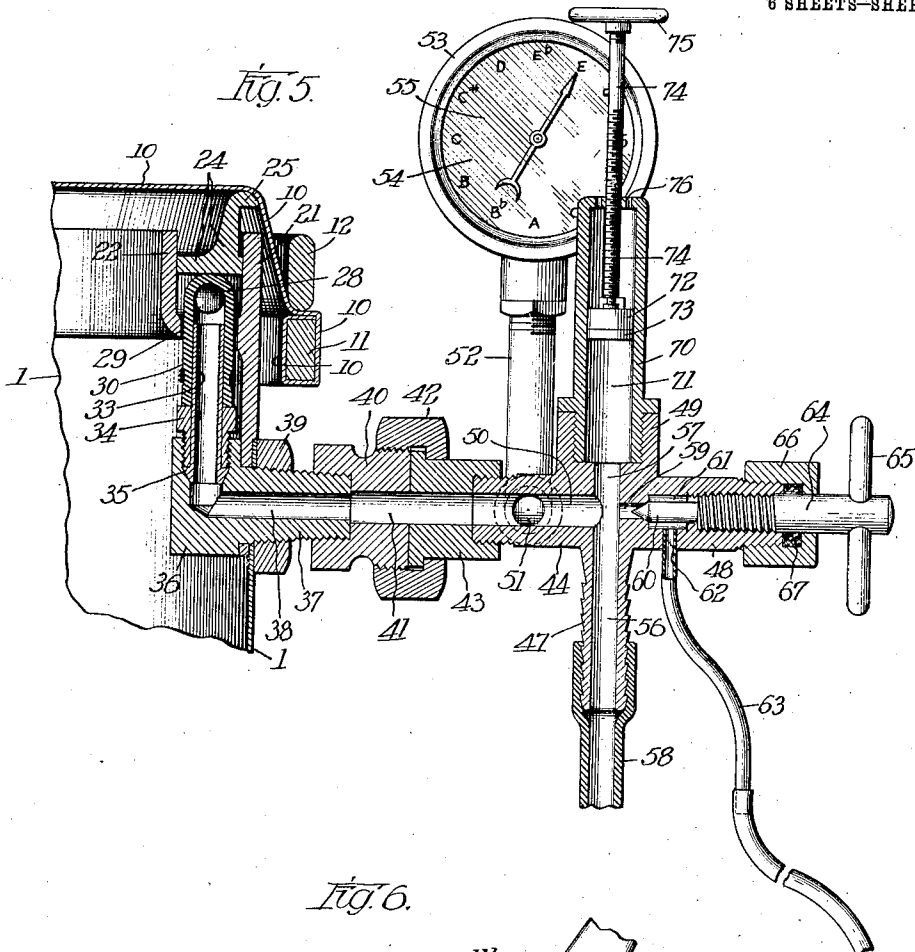
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6 SHEETS—SHEET 3.



Witnesses:
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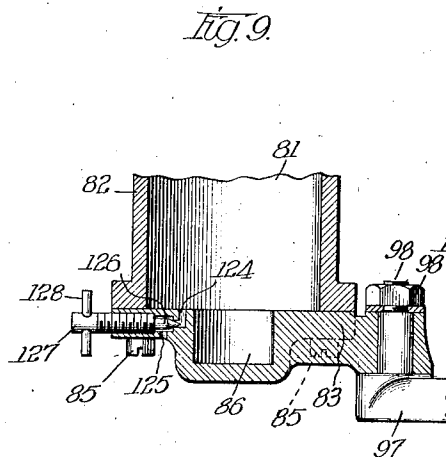
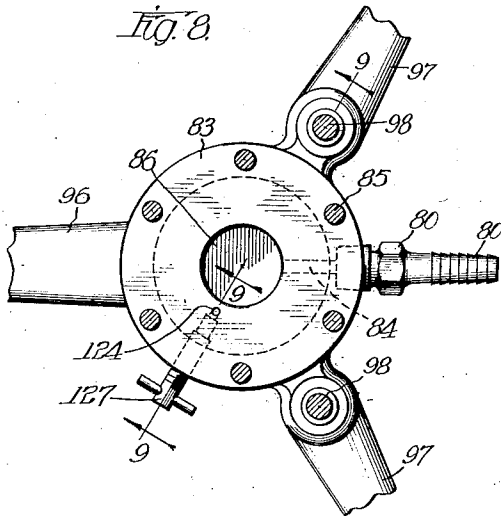
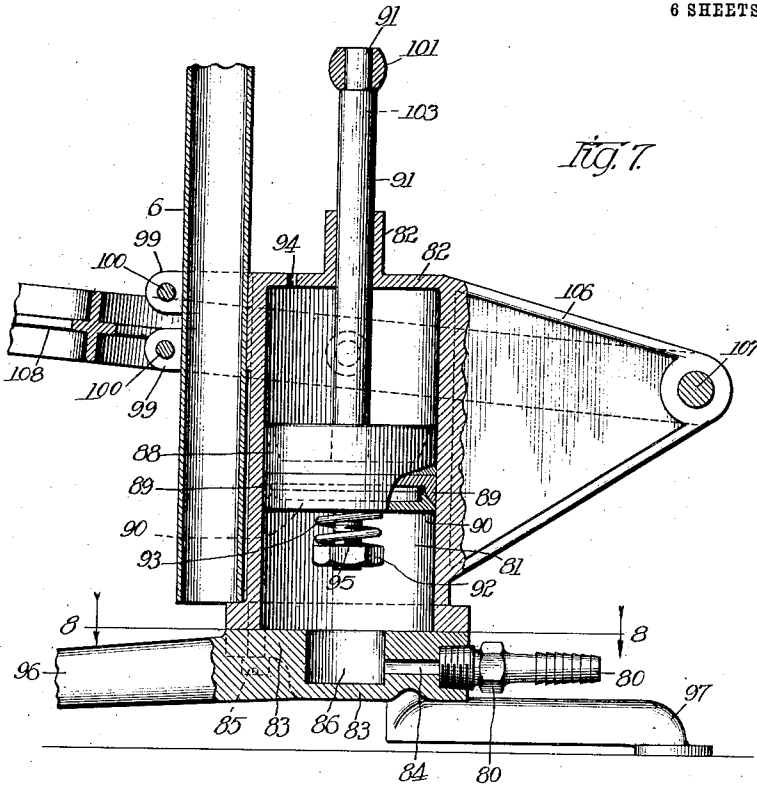
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6 SHEETS—SHEET 4.



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6 SHEETS—SHEET 5.

Fig. 10.

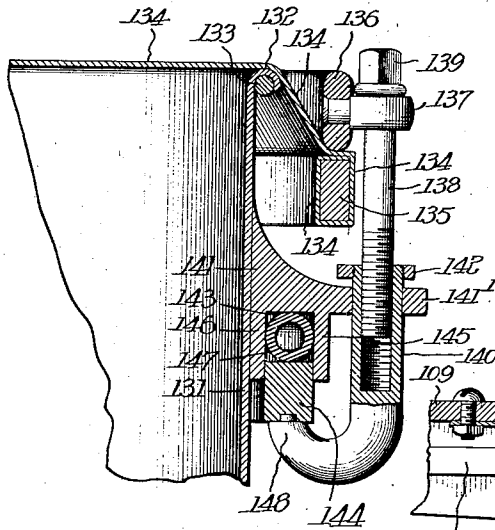


Fig. 12.

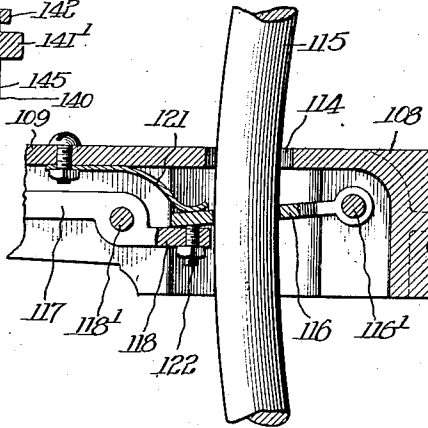


Fig. 11.

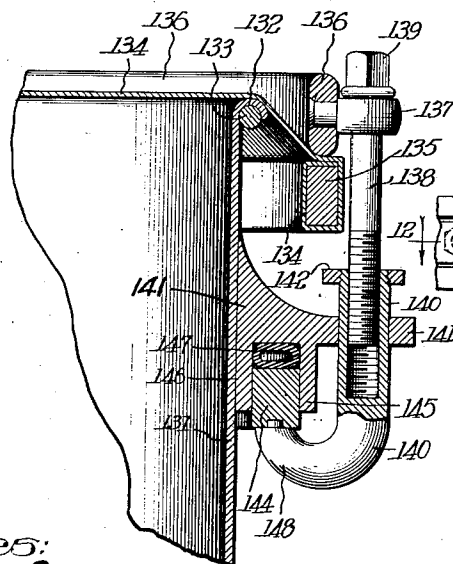
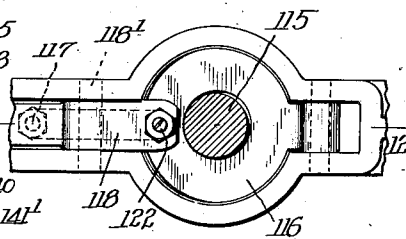


Fig. 13.



Witnesses:
Robert A. Meir
Charles J. Cobb

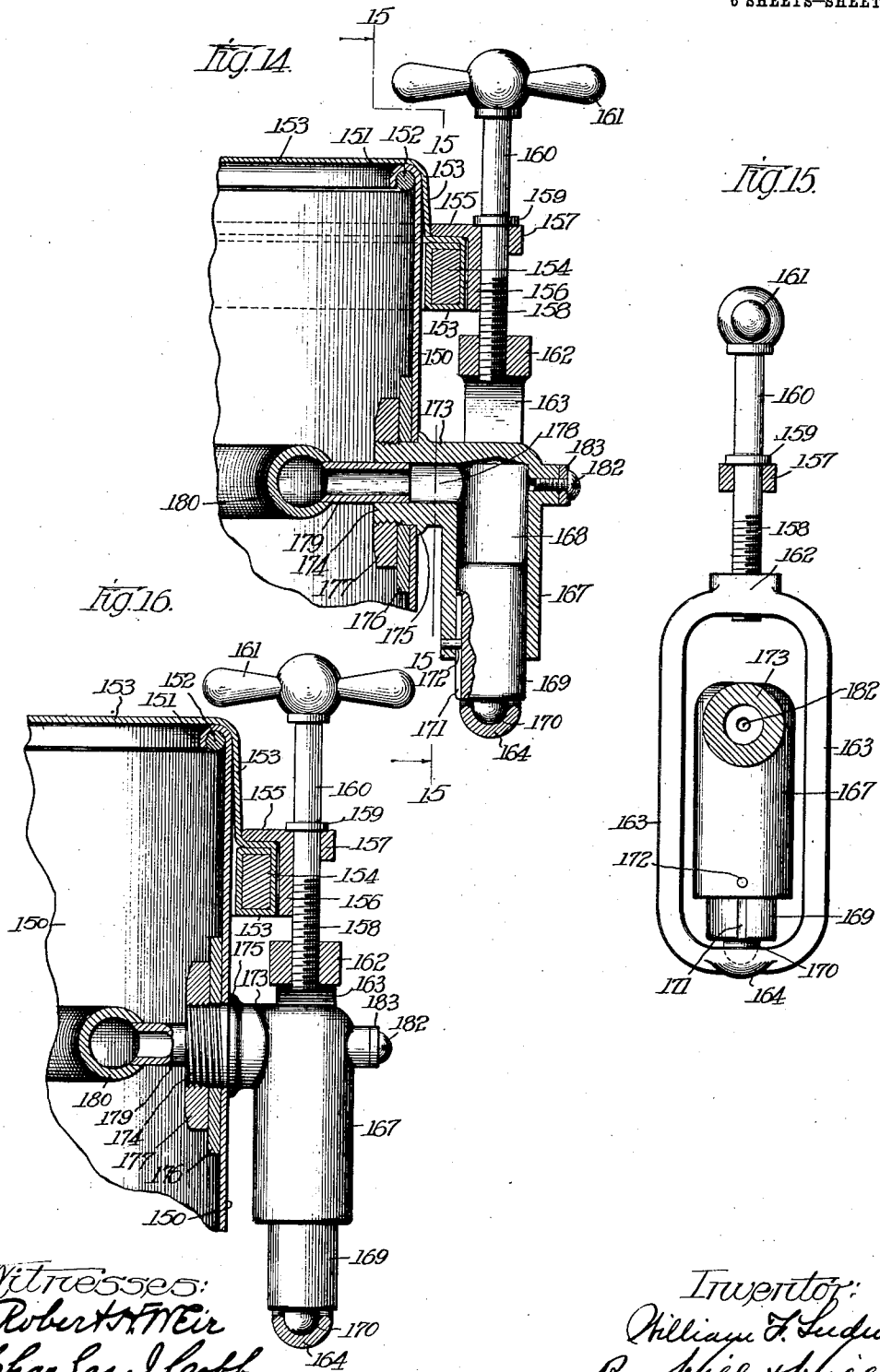
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APPLICATION FILED APR. 28, 1911.

1,054,009.

Patented Feb. 25, 1913.

6 SHEETS—SHEET 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM F. LUDWIG, OF CHICAGO, ILLINOIS.

MUSICAL INSTRUMENT.

1,054,009.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed April 28, 1911. Serial No. 623,909.

To all whom it may concern:

Be it known that I, WILLIAM F. LUDWIG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Musical Instruments, of which the following is a description.

My invention belongs to that general class of devices known as musical instruments, and relates particularly to a tuning mechanism for those instruments known as tympana, or kettle drums, and similar instruments, provided with a suitable head. Instruments of this character are tuned by varying the tension of the head, and my improvements are for novel means for so controlling or varying the tension to produce the desired pitch. The preferred construction comprises fluid controlled mechanism, and suitable means for controlling the fluid.

My invention has among its objects the production of a simple, convenient, efficient, rapid and satisfactory tuning mechanism for the class of instruments described, whereby the instrument may be readily and satisfactorily tuned to produce the desired pitch.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings wherein like reference characters indicate like or corresponding parts, Figure 1 is a side elevation of a kettle drum, stand and controlling mechanism. Fig. 2 is a detail view of the pedal taken substantially on line 2, 2 of Fig. 1. Fig. 3 is a plan view of the complete drum, a portion being broken away. Fig. 4 is an enlarged sectional view taken substantially on line 4, 4 of Fig. 3. Fig. 5 is an enlarged sectional view taken substantially on line 5, 5 of Fig. 3, the parts in slightly different positions. Fig. 6 is a sectional view taken substantially on line 6, 6 of Fig. 1. Fig. 7 is a sectional view taken substantially on line 7, 7 of Fig. 6. Fig. 8 is a sectional view taken substantially on line 8, 8 of Fig. 7. Fig. 9 is a sectional view taken substantially on line 9, 9 of Fig. 8. Fig. 10 is a sectional view substantially similar to Fig. 4 of a modified construction. Fig. 11 is a similar sectional view, showing the parts in slightly different positions. Fig. 12 is a sectional view taken substantially on line 12, 12 of Fig. 13. Fig. 13 is a plan view of the

under side of the same. Fig. 14 is a sectional view substantially similar to Figs. 4 and 10, showing a slightly modified construction. Fig. 15 is a sectional view taken substantially on line 15, 15 of Fig. 14, and Fig. 16 is a view similar to Fig. 14, showing the parts in different positions.

Referring to the drawings, in which the preferred form of my device is shown, 1 represents the body of the drum of any desired size, shape or material, which may be supported in any suitable way. As shown, the drum is supported by a stand, comprising the arms 2, which are carried by a support 5, which last mentioned support may be carried as hereafter described. The free ends 3 of the arms 2, which carry the drum are preferably provided with pads 4 of felt or equivalent material. Over the end of the drum is arranged the usual head 10 of calfskin or equivalent material. Musical instruments of this kind are tuned by stretching or slacking the head, that is varying the tension on the same, and my invention consists in novel means for accomplishing this.

Referring particularly to Fig. 4, 11 is the flesh hoop, about which may be arranged the head 10, the head being securely held on the flesh hoop by the tension hoop 12. Arranged about the body of the drum are brackets 15, which may be extended through the body of the drum, or as shown in the figures, through a ring 21, arranged on the interior or exterior (shown on the interior) and secured to the drum, said brackets being secured in place by nuts 17 engaging the ends 16 of the brackets. The tension hoop 12 is provided with brackets 20, through which pass bolts 18, which engage the brackets 15, the bolts 18 being preferably provided with enlarged and squared ends 19, which engage the brackets 20 on the tension hoop. The usual way of tuning is by operating the bolts 18, thereby pushing down the flesh hoop 11 and stretching the head 10, or by reversing the operation so as to decrease the strain on the head.

With the construction shown in the Figs. 1 to 9, the drum is tuned by raising or lowering the ring 24, provided with an extended end or edge 25, over which the head passes. As shown, the ring 24 is arranged between the ring 21 and the extending part 22, which parts form a pocket. In the space 23 below the ring 24, I provide a tube 28 of rubber or other suitable material, and control or

vary the position of the ring 24 by forcing in or withdrawing a fluid from the tube. Any suitable fluid may be used, for example water or air, or their equivalents, but of the
 5 two mentioned, I preferably use water, as it is denser, and not so elastic as air. As is obvious, if the ring 25 is raised, the head will be stretched, while if the ring is lowered, the strain on the head will be decreased.
 10 In this manner the drum may be tuned to the desired pitch.

Any suitable apparatus may be employed for forcing the fluid into the tube 28, or withdrawing the same, as desired. In the
 15 drawings I show two pumps for this purpose which are suitably connected to the tube, and either of which, or both, may be used. One pump is particularly convenient for use for tuning the drum by hand, or
 20 for very accurate tuning, while the other is arranged so that the drum may be tuned by operating a suitable foot pedal, or the equivalent. It is obvious that of course the tube may be connected to the pumps, or con-
 25 trolling devices mentioned, in any preferred or satisfactory manner. As shown, the tube 28 is provided with a connection 30, which extends down through an opening 29 in the ring or extension 22. Within the con-
 30 nection 30 is arranged a shell or coupling 33, which is connected by a coupling 34 to a part 36. The tube 30 may be secured to the coupling 33 in any suitable way, as for ex-
 35 ample by winding the same with cord or wire, and it will be noted by referring particularly to Fig. 5, that the coupling 33 is preferably provided with an enlarged end
 35. The part 36 is provided with an extended part 37, extending to the outside of
 40 the ring 21 and the body 1 of the drum, the same being secured in position by a nut 39, or its equivalent. Secured to the extending part 37 is a coupling made up of parts 40 and 43 and coupling nut 42, and to part 43
 45 is secured a part 44 provided with means for the attachment of the controlling devices mentioned. The parts 37, 40 and 43 are provided with a continuous duct or
 50 openings 38, 41 therethrough, which are connected with a duct or opening 50 in the part 44. The part 44 is preferably provided with an extending part 47, or its equivalent, having a duct 56 connected with the duct 50,
 55 to which part 47 may be secured a hose or tubing 58 connecting the device with the foot controlling apparatus before mentioned and hereafter described. The part
 44 may also be extended as at 49 and provided with a duct 57. Where a hand con-
 60 trolling or regulating device is not employed, part 49 may be suitably closed. As shown in Fig. 5, however, a device for controlling or tuning by hand is shown. Where the foot regulation is also employed the
 65 hand tuning device may be made compara-

tively small and used for fine adjustment rather than for entirely or completely controlling the device. This is merely mentioned so that it may be understood that the proportions of the parts or capacity of the same will depend upon the devices used, and may be varied as may be found desirable. Referring to the device shown, 70 is a cylinder or casing provided with a chamber 71 therein, in which is arranged a piston 72, 73 being suitable packing. The piston may be controlled or operated in any way. As shown, it is provided with a piston rod 74 provided for convenience with a hand wheel 75, or the equivalent. The casing 70 is provided with one or more air vents 76, proximate the top or where convenient. As shown, a gage 53 is also provided having a dial 54 and an indicator 55, the gage being connected by a pipe 52 having a duct 51 connecting the gage with the duct 50 in the part 44. The purpose of the gage is to visibly indicate to the drummer the approximate pitch of the instrument. The dial 54 or letters are preferably made adjustable so that the indicator 55 will indicate properly. The part 44 is also provided with an extended part 48, having a chamber 61 therein, which is open to a tube 63, having a duct 62 therein. The passage of fluid, however, from the duct 57 through the duct 59 into the chamber 61 is controlled by a valve 60. The valve arrangement may be of any desired construction. As shown, the valve is provided with a stem 64, having a pin 65 through the end thereof for convenience in operating, the stem 64 being arranged to screw into part 48. The stem is suitably packed by packing material 67 maintained in position by the part 66. The parts just described are used in filling various parts with fluid, as will be hereafter described.

The foot controlling pump, or controlling device, is connected to the tube 58. The foot
 110 pump may be of any form. As shown, it comprises a casing 82 provided with a base 83, which may be secured thereto by means of screws 85, or their equivalents. The base 83 is preferably formed with a pocket
 115 86 therein, as most clearly shown in Figs. 7 and 9. The chamber 81 within the casing 82 is connected or open with the pocket 86, and the tube 58 is connected to a part 80, 84 being
 120 a duct through the base and through the part 80. The casing 82 and base 83 are provided with a plurality of legs 96 and 97, or their equivalents, the legs 97 being preferably pivotally secured to the base so as to permit
 125 folding. As most clearly shown in Fig. 9, the legs 97 are provided with an extending part 98 passing through the base, the legs being locked in position by nuts 98¹. The base for the casing is also preferably arranged to act
 130 as a support and base for the kettle drum.

Referring particularly to Figs. 1, 6 and 7, the casing is provided with an extension 99, through which extends a tube or rod 6, the same being adjustably locked in position by the screws or bolts 100. To the tube 6 and telescoping therein, the rod or tube 5 on the stand may be secured by a thumb screw 7, or the equivalent. It will be seen from this that the height of the drum may be as desired by adjusting the tube 5 in the tube 6, or by adjusting the tube 6 in the clamping parts 99, or by raising or lowering both of them.

Within the casing 82 is arranged a piston 88, 89 being a packing ring of suitable material, as for example, leather, which is normally expanded and maintained in close contact with the inner walls of the casing by an expander 90. The expander 90 is resiliently maintained in position by a spring 93, and a nut 92 arranged upon the shaft or rod 95. To the piston is secured a piston rod 91, upon the end of which is arranged a cross-bar 101, having depending links 103 secured to the ends 102 thereof (see Fig. 1). The links 103 are pivotally connected to pins 111 upon a yoke 105, pins 104 locking the same in position. The forked yoke 105 is pivotally secured at 107 on a bracket 106 at the side of the casing 82 and extends past, both sides of the casing being continued in a single piece, as at 108. The end 108 is further extended as at 109 and provided with an enlarged end 110. The part 108 is preferably provided with an opening 114 therethrough (see Fig. 12) through which extends a rod or member 115. Secured to the part 108 by a pin 116¹, or its equivalent, is a washer 116, the same being arranged on the member 115. Carried by the part 109, which is part 108 extended, is a rod 117, which extends backward, and thence laterally as at 117¹ to the side of the foot part 110, at the end of which it is provided with an end 119. The rod 117 is preferably pivotally secured at 118¹ and extended as at 118, so as to engage the free side or edge of the washer 116, whereby the same may be raised by depressing upon the end 119. A spring 121, or its equivalent, is preferably provided for maintaining the washer 116 substantially as shown in Fig. 12, 122 being a screw on the end 118 of the rod 117 for affording adjustment. When the washer is in the position shown in Fig. 12, the part 108 is locked by the washer engaging or biting the part 115, but by depressing upon the part 119, the washer is raised at its free side so as to unlock the pedal. It may be mentioned that the washer preferably locks the pedal and prevents its rising under the pressure of the fluid in the system, but when constructed as shown, the pedal may be depressed without raising the washer.

In the base 83, and preferably as shown,

is provided a duct 124, 125 to the exterior, the passage of fluid therethrough being controlled by a valve 126 having a stem 127, in which is arranged a small cross-bar 128 to facilitate operating the valve. The purpose of the ducts and valve 126 will be explained hereafter.

The operation of the device in tuning the drum, assuming the same to be equipped with the parts shown and described, may be briefly described as follows: First, in order to fully explain the purpose of the valve 60, tube 63 and the pocket 86 and ducts 124, 125 and valve 126, in the base, it may be assumed that the tube 28 and the other parts of the system are free from water, which is the preferred fluid, or from any similar fluid, but that there is some air in the system. It might be mentioned at this time that where water is used the same is preferably removed in shipping or transporting the drum, so that it is frequently done where a drummer is moving about considerably. The foot pedal 110 is depressed, the valve 126 having been previously opened. At the end of the downward stroke of the piston the valve 126 is closed and the foot pedal partly raised, thereby raising the piston. This draws all the air from the tube 28 and the other parts of the system down into the chamber 81 in the casing, and the tube 28, owing to the vacuum, is deflated. A receptacle containing water, or the desired fluid, is then arranged and the tube 63 submerged so that its lower or open end is below the water level. The valve 60 is now opened, and there being a vacuum in the system, water is drawn into the same, including the tube 28, the gage 53, the space below the piston 72 and the tube 58, and the same flows down into the pocket 86 and chamber 81. It should be mentioned, however, that the lower end of the tube 63 should be kept submerged at all times, so that more air will not be drawn into the system. The valve 60 is now shut and the valve 126 opened, the pump piston being in its raised position. Any water above the level of the water contained in the pocket 86 can flow out through the duct 124, 125. It may be noted that during the filling of the system the pump is preferably raised to a level above the drum and tube 28. The foot pedal is then again depressed, preferably somewhat slowly, so that the air below the piston is forced out through the duct 124, 125 past the valve 126. Owing to the fluid pocket 86, the air may be completely discharged from within the cylinder. The valve 126 is now closed and the valve 60 again opened, the end of the tube being previously submerged as before. The piston is now slowly raised to full distance, thereby drawing more water into the system and filling same. The valve 60 is now closed. At this time

the tension bolts should be adjusted to give the lowest pitch of the instrument. Assuming that the ring 24 is in substantially the position shown in Fig. 4 and the tube 28 partially deflated, the head 10 being stretched over the end 25 of the ring and secured to the flesh hook 11, if now the pedal is depressed, the fluid contained within the chamber 81 and in the tube 28 will be forced up into the tube 28, raising the ring 24, thereby stretching the head 10 to raise the pitch. Any desired tension may be put upon the head by further depressing the pedal, or the tension may be reduced to lower the pitch by raising the washer 116 and permitting the pedal to move back to where desired. If a little finer or closer tuning is desired, the piston 72 may be operated in either direction so as to further inflate the tube 28, or to relieve the pressure within the same. The note or pitch is indicated by the gage 53, and it may be noted that any suitable characters may be provided on the dial.

Referring to the modified construction shown in Figs. 10 and 11, a tube similar to the tube 28 is placed on the exterior of the drum and the tension brought upon the flesh hoop through the tension bolts somewhat similar to the construction wherein adjustment or tuning is brought about by adjusting the tension bolts or screws. Referring to the figures mentioned, 141 is a ring member arranged about the exterior of the drum 131 and provided with extending parts 145 and 146, forming a recess or chamber 143. Arranged in and movable therein, is a ring 144, 147 being a flexible tube similar to the tube 28. The connection to the tube 147 for supplying the fluid may be substantially similar to that heretofore described for the other construction, or constructed in an equivalent manner. The ring 141 is provided with extending parts 141¹, through which extend parts 140 each provided with a hooked end 148 adapted to contact with or engage the movable ring 144. Over the end 132 of the drum, which may be reinforced by a rod 133, is extended the head 134, the same being preferably arranged about the flesh hoop 135 and maintained thereon by the tension hoop 136. The tension hoop 136 is provided with the brackets 137, similar to the other construction heretofore described and provided with bolts 138 having heads 139, which bolts engage with the parts 140. The downward movement of the parts 140 is limited by stops 142. The operation of this construction may be described as follows: Assuming that the system has the fluid therein and with the head 134 is stretched and positioned substantially as shown in Fig. 11, the collapsible or inflatable tube 147 being more or less free from fluid or deflated. After the head is stretched and the parts arranged as

shown, if fluid is pumped into the tube 147, the ring 144 will be forced downward, (see Fig. 10), drawing down the members 140, and consequently the tension bolts 138 and tension hoop 136. This draws the flesh hoop 135 downward, thereby increasing the tension of the head and changing the pitch of the instrument, and removing a portion of the fluid in the tube 147, reduces the tension on the head and lowers the pitch.

Referring to the construction shown in Figs. 14, 15 and 16, 150 represents the drum, which may be turned at its edge as at 151, and reinforced by a rod 152, if desired. The head 153 is arranged on the flesh hoop 154 similar to the other constructions, the flesh hoop being controlled in this case by a tension ring, which is preferably formed of angle iron 155, 156, and provided with a plurality of extending parts 157. Arranged through each of the extended parts 157 is a tension bolt 158, which is provided with a collar 159, extending up at 160 and provided with a handle 161. The tension bolt 158 is secured to a yoke, comprising ends 162, 164 and sides 163, 163. Arranged between the sides 163 and connected to the drum, is a casing 167, having a chamber 168 therein, in which is arranged a plunger 169 having an end 170 arranged to seat in the end 164 of the yoke, the end of the yoke being preferably cup-shaped so as to retain the plunger in position. The casing 167 is extended as at 173 and secured to the drum 150, the same being locked in position by a washer 176 and nut 177 arranged on the end 174, 175 being a collar or shoulder abutting against the drum. Preferably within the drum, is arranged a tube or pipe 180 which is connected by a smaller pipe 179 with the chamber 168 in the casing 167. If desired, a small opening may be provided in the casing, preferably in alinement with the tube 179, which is normally closed by a screw 182 and washer 183, the purpose of the same being to facilitate cleaning. This construction is slightly different than the construction heretofore described, in that the plungers are arranged about the drum at the tension bolts, there being any desired number. Assuming that the parts are substantially in the position shown in Fig. 14, the fluid is pumped into the pipe 180 and thence into the chambers 168 in the casings 167, which forces the plungers 169 downward, thereby drawing down upon the tension bolts, and this draws down the tension hoop 155, 156 and the flesh hoop 154, thereby stretching the head 153. This is illustrated in Fig. 16, in which the parts are in different positions. Relieving the pressure, the elasticity of the head draws the plunger parts upward, relieving the tension and changing the pitch.

With any of the constructions shown and described, the tension is equalized about the

head and not different at the different points, thereby improving the pitch.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact form, construction or combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:—

1. A drum, comprising a body, a head therefor, fluid operated means for establishing a tension on said head, and separate means for varying the fluid pressure to vary the tension on said drum head and thereby vary the pitch of the drum.

2. A drum, comprising a body, a head therefor, adjustable means for setting a tension on said head, and fluid operated means for varying said tension.

3. A drum, comprising a body, a head therefor, adjustable means for setting a ten-

sion on said head, fluid operated separate means for more minutely varying said tension, and means for varying the fluid pressure as desired.

4. A drum, comprising a body, a head therefor, adjustable means for setting a tension on said head, and fluid operated means operating on said setting means for varying said tension.

5. A drum, comprising a body, a head therefor, adjustable means for setting a tension on said head, fluid operated means operating on said setting means for varying said tension, and separate means for more minutely varying the fluid pressure as desired.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM F. LUDWIG.

Witnesses:

ROY W. HILL,
CHARLES I. COBB.