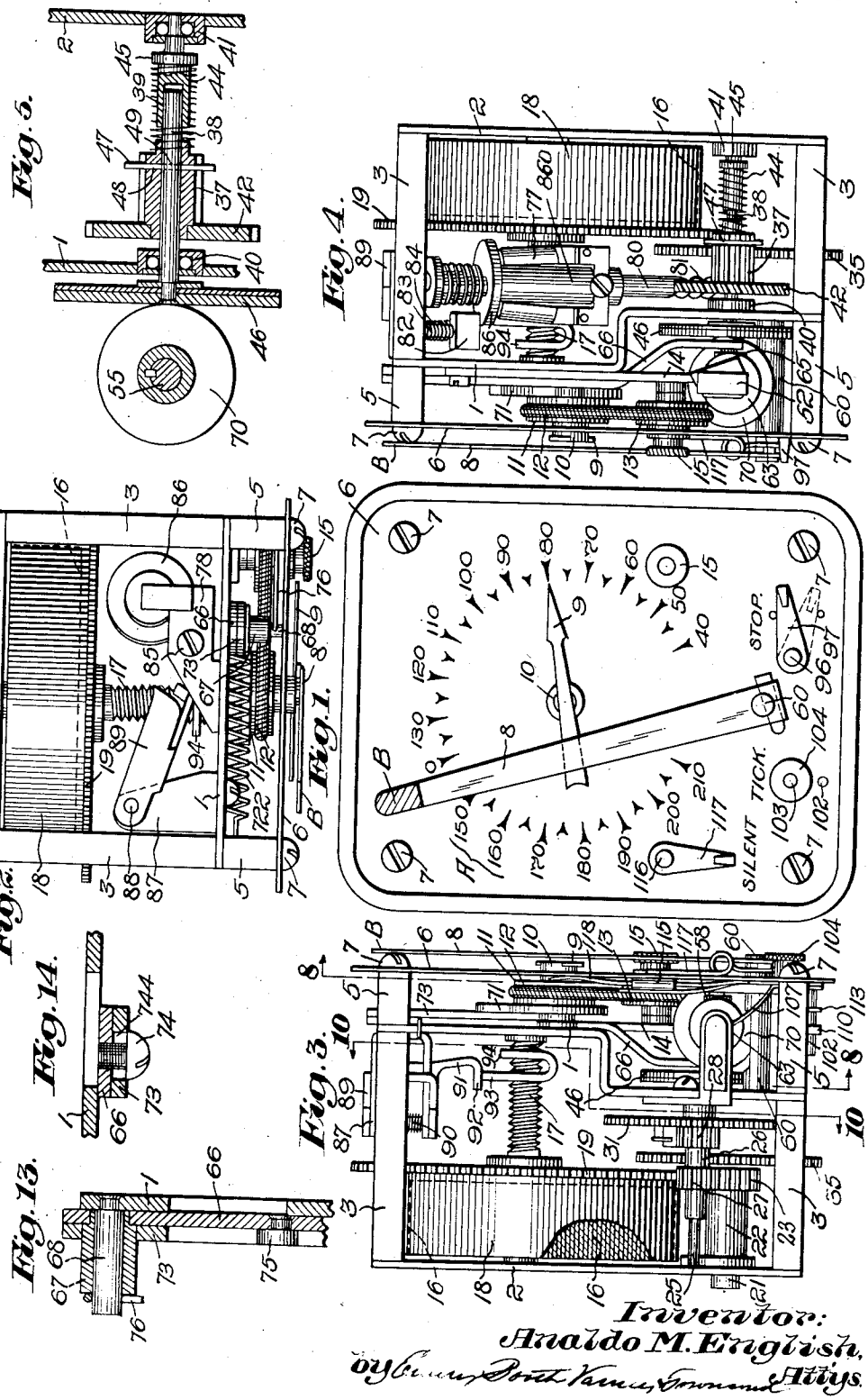
Oct. 5, 1937. A. M. ENGLISH 2,095,213

METRONOME

Filed July 20, 1934 3 Sheets-Sheet 1

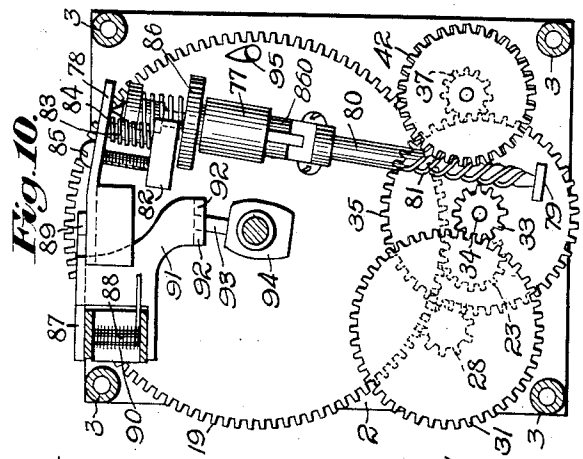


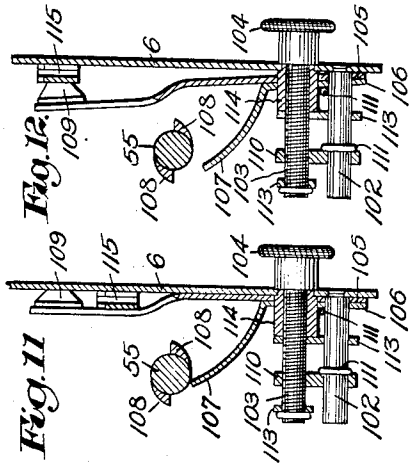
Inventor:
Amaldo M. English,
by Cushman, Darby & Cushman Attys.

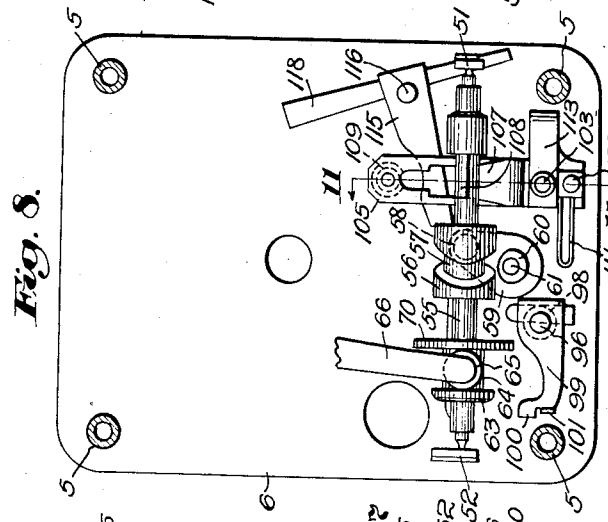
Oct. 5, 1937. A. M. ENGLISH 2,095,213

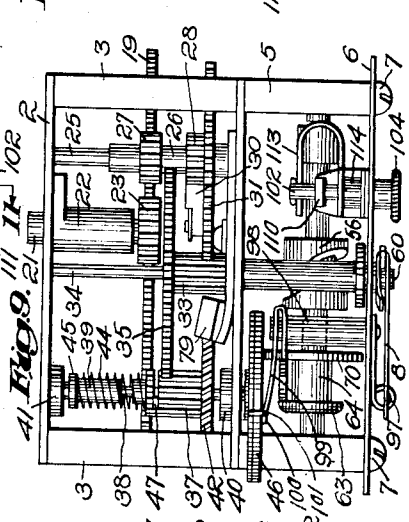
METRONOME

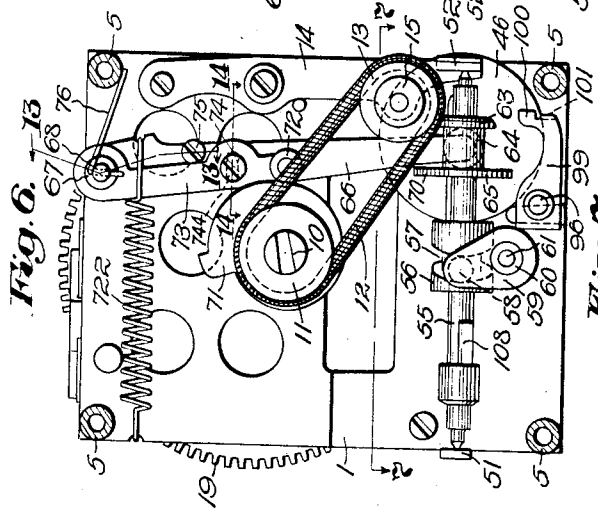
Filed July 20, 1934 3 Sheets-Sheet 2

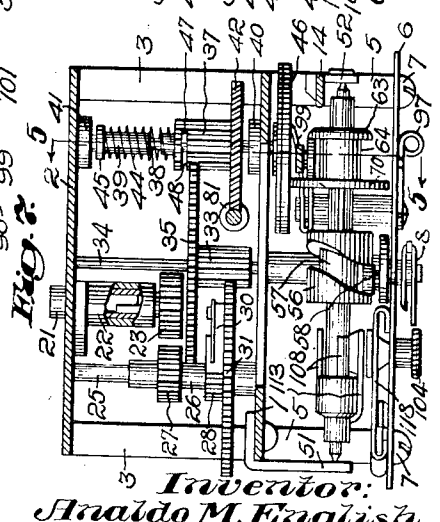










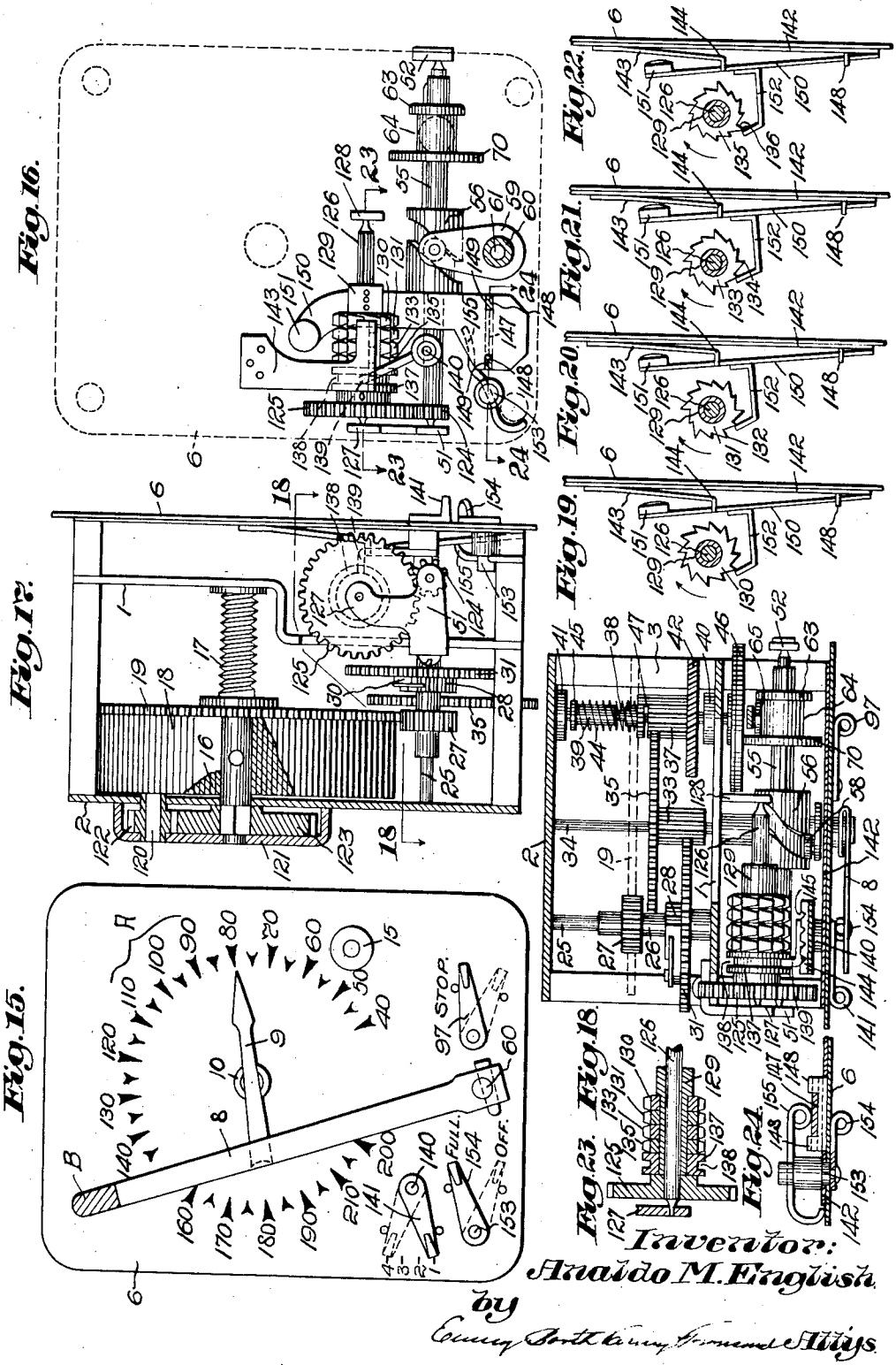


Inventor:
Arnaldo M. English.
by Emery Booth Varney Vanderpool & Attys.

Oct. 5, 1937. A. M. ENGLISH 2,095,213

METRONOME

Filed July 20, 1934 3 Sheets-Sheet 3



Inventor:
Amaido M. English
by
Emery Booth Varney Armond & Mays

Patented Oct. 5, 1937

2,095,213

UNITED STATES PATENT OFFICE

2,095,213

METRONOME

Analdo M. English, Hartland, Vt., assignor to Mary E. Church, Boston, Mass.

Application July 20, 1934, Serial No. 736,229

4 Claims. (Cl. 58—130)

This invention relates to mechanism for producing reciprocating swinging motion, either silent or audible, and more particularly to an improved and novel form of metronome for students of music, and it has, among others, the advantages and novel features hereinafter described and illustrated in the drawings.

In the drawings of one embodiment of my invention selected for illustration and description herein:

Fig. 1 is a front elevation;

Fig. 2, a plan or top view, with the casing removed;

Fig. 3, a side elevation from the left;

Fig. 4, a side elevation from the right;

Fig. 5, a perpendicular detail section on the line 5—5, Fig. 7, from the right, showing certain elements in elevation and enlarged;

Fig. 6, a front elevation with the dial face removed;

Fig. 7, a horizontal partial section on the line 7—7, Fig. 6, looking down, showing parts in full lines;

Fig. 8, a partial section and elevation on the line 8—8, Fig. 3, looking toward the rear of the dial face;

Fig. 9, a bottom end view showing also the parts shown in Fig. 8;

Fig. 10, a vertical section on the line 10—10, Fig. 3;

Fig. 11, a vertical, partial section on the line 11—11, Fig. 8, from the right on an enlarged scale;

Fig. 12, a similar view, with certain elements in different positions;

Fig. 13 is a detail section on line 13—13 of Fig. 6;

Fig. 14, a similar detail section on line 14—14 of Fig. 6;

Fig. 15 is a front elevation, without the case, of a modified form of construction;

Fig. 16 is a front view of the same, with the front plate removed, but dotted in for convenience;

Fig. 17, a side elevation from the left, corresponding to Fig. 3, with a few elements, not changed, omitted, for convenience;

Fig. 18, a horizontal, partial section, on the line 18—18, Fig. 17, and corresponding substantially to Fig. 7;

Figs. 19, 20, 21, 22 are, respectively, detail views of a modified form of construction of the variable, selective, tick-making ratchets and hammer;

Fig. 23, a longitudinal, vertical section through the sleeve carrying the tick-making ratchets with the driving gear and tick gears thereon;

Fig. 24, a horizontal, partial section on the line 24—24 of Fig. 16, showing the electively usable tick-producing lever.

Referring first to Figs. 1–4, my novel metronome comprises a frame comprising a front plate 1 the lower half of which may be offset inwardly for convenience, rear plate 2, connected and supported by a plurality of, herein four, corner bars or posts 3. At each corner of the plate 1 is a laterally extended post 5, upon the outer end of which is carried a dial face 6, and held in position by screws 7 in the posts.

Upon the dial face, Fig. 1, and arranged in circular form, are a series of suitable characters, as groups of numerals A, each group indicating the number of oscillations or beats per minute at which a pointer or time beating baton 8 may be set to operate, and corresponding to the tempo of various musical compositions. The pointer 8 may be of any desired color, and its outer end may be of any contrasting color, if preferred, as by slipping a short sheath B of the desired color over the end. Rotatable upon a stub shaft 10, extended through the dial face, is a beat identifier 9, of arrow or any other suitable shape, which points to and identifies the frequency, for instance, 80 beats a minute, with which the member 8 is operating.

This indentifier, Figs. 1–4 and 6, is mounted upon the hub of a speed changing pulley 11, carried by the stub shaft 10 in the plate 1, and is rotated and adjusted by means of a belt spring 12 running over the pulley 11 to a speed controlling hub or knob-carrying pulley 13, Figs. 3, 4, 6, mounted upon the outer face of an arm 14 on the front plate 1, and the knurled hub 15 of which Fig. 11, is extended through an opening in the dial plate 6, and thus conveniently accessible.

The driving mechanism may comprise, in part, any suitable clock motion construction, and herein includes, Figs. 2, 3, 4, dotted lines, a coiled spring 16, the inner end being secured to the plate 2, while the outer end drives a shaft 17 through the housing 18 and gear 19, carrying said housing and fixed to the threaded shaft 17 mounted in the plates 1 and 2. The spring 16 is secured to the shaft 17 within a housing 18, which, in turn, is carried by a driving gear 19 on the shaft 17.

For winding up the spring 16, Figs. 3, 7, and 9, there is provided a short horizontal shaft 21, mounted in an elongated bearing 22 on the rear

plate 2, the outer end of the shaft being projected through the plate 2, and provided with any suitable clutch element, not shown, to receive temporarily or permanently a similarly equipped winding key or handle, not shown. The inner end of the shaft 21, Figs. 7, 9, carries a pinion 23, in engagement with the gear 19, and by which the latter and the housing 18 thereon are rotated, and the spring 16 therein wound.

Adjacent the shaft 21, Fig. 9, and on a shaft 25 mounted in the plates 1, 2, is an elongated hub 26, carrying two pinions, a rear one, 27, also in mesh with the gear 19, and by which the hub 26 and pinion 27 are rotated, and a forward one, 28, engaged by a pawl 30 on the face of a gear 31, also on the shaft 25.

When the shaft 21 is rotated for winding the spring 16, the hub 26 is rotated freely through the pinion 27 by the gear 19 and yielding action of the pawl 30 on the gear 31, engaging the pinion 28.

The gear 31, Figs. 7, 9, also meshes with a pinion 33 on a shaft 34 mounted in the plates 1, 2, and the pinion 33 is fast at one end to a gear 35 also on the shaft 34.

This gear 35 meshes with a pinion 37 fast on one part 38 of a two-part shaft, slidable axially in a hollow section 39 thereof, mounted in ball bearings 40—41 on the plates 1, 2, respectively, the pinion 37 having fast thereto at one end a governor driving gear 42.

The shaft section 39 carries a coil spring 44, which is seated against a collar 45 on that section, and against the pinion 37 on the section 38, and acts to maintain said shaft and a driving disk 46 on the inner end thereof under sufficient pressure for a purpose to be explained presently. In this instance, the pinion 37, Fig. 5, is fastened to the shaft 38 by a key 47 seated in a keyway 43 in the pinion and a keyway in the shaft, not shown.

Mounted for rotation in a bearing 51 on one edge of the front plate 1, Figs. 7, 16, 17, 18, and a bearing in an arm 52, Figs. 4, 16, 18, secured to the arm 53, Fig. 6, on the arm 14 pivoted on said plate, is a cam-shaft 55 carrying a cam driving roll 56 with a path 57, in which rides a roll 58 on a short arm 59, Fig. 6, on a hollow shaft 60 rotatable on the short horizontal post 61. This shaft 60 is extended through the dial plate 6, Fig. 1, and carries the pointer or baton 8 adjacent the dial face already described.

The shaft 55, Fig. 7, also carries a driving roll 63 splined thereon, and with a channel or race 64 in the roll face, and in which rides a roll 65, also shown in dotted lines in Fig. 6, on a roll adjusting lever 66 with a hub 67 on its upper end, by which it is pivoted to the plate 1 by a post 68.

The flange 70 of the roll 63 is maintained in frictional contact with the face of the disk 46 by the spring 44 on the shaft 38 above described, and thus rotation of the shaft 55, roll 63 and cam 56 is effected from the spring 16 through the gears 19, 27, 28, 31, 33, 35, 37, 42, 46 and 70.

The pulley 11, Figs. 3, 4, carries at its inner end a cam flange 71, which bears against a roll 72 on the end of a cam lever 73, pivoted at its upper end on the hub 67 of the lever 66, and lockable adjustably to the lever 66 by a set screw 74 thereon, and extended through an elongated aperture 744 in the lever 73, so that when the pulley 13 is rotated by the hub 15 on the dial plate, and belt spring 12, the cam 71, in contact with the roll 72 on the cam lever 73 on lever 66 will move the roll 63 toward or from the center of the disk 46, and thus increase or decrease the radius of the path of travel of the flange of the roll 63, and adjust or determine the speed at which the shaft 55 and roll 56 will rotate.

The lever 73 is still further made more delicately adjustable on the lever 66 by means of a stud 75 with an eccentric head forced into the lever 66, the stud headed therein to turn hard, and bearing against the edge of the lever 73, so that by turning the stud 75 slightly, and loosening the screw 74, which passes through the elongated slot 744 in the lever 73, dotted lines Figs. 6, 14, the position of the lever 73 relative to the lever 66 may be adjusted on its pivot 67, and the position of the lever 66 when engaged by the cam 71 changed, also the throw of the lever 73 and the position of the roll 63 on the disk 46 changed, and the circumferential path of travel of the roll 63, and its speed increased or decreased, and the frequency of the beat of the pointer 8 increased or decreased. The hub 67 of the lever 66 and the lever 73 are locked to the stud or post 68 by a pin 76, and the roll 72 kept in contact with cam flange 71 by the spring 722. The foregoing elements, as described beginning on page 5, line 1, together with the driving shaft 55 and connections to the baton, constitute a beat-frequency determining means, which by the adjustment of certain elements as described, enables the frequency of the beats of the baton to be changed at will by the adjustment of the disk 71 on the pulley 11, by means of the pulley 15.

To govern the speed of the spring motor, Fig. 10, and effect substantially even action thereof and the pointer 8, a governor, of the fly ball or any desired type, may be provided, and such is shown herein, Figs. 4, 10, mounted in a plate 78 at the top of the frame, Fig. 2, and at the bottom in a plate 79, inwardly extended from the plate 1, where its shaft 80 is shown with a worm thread 81 thereon, and meshing with the spiral governor gear 42. A brake shoe, Figs. 4, 10, for the governor is shown as a block 82, slidable on a pin 83 in the plate 78, with a coiled spring 84 thereon acting to resiliently hold the block in the position determined by the movement of an adjusting screw 85 in the plate 78, the screw being threaded into the block 82. The block is thereby adjusted to the desired point relative to the collar 86 slidable on shaft 80 with the sleeve 869, in response to the upward pressure exerted upon it by the out-swinging of the weights 77 from centrifugal action, and which weights are pivotally mounted upon the shaft 80 and operative upon the collar for that purpose, in the usual manner to stop upward travel thereof by friction of the block with the collar, as is usual in such cases, as it rises with the increased speed of the shaft 80, and reduce the speed of the mechanism, when the desired limit is attained.

To initially adjust the baton beats, the regulator is adjusted so that the disk 46 will make 70 revolutions per minute with the spring about one-half wound. Then, with the indicator at 40 and spring one-half wound, turn stud 75 until the baton makes 40 beats per minute, and the rest of the scale will be correct.

Obviously, after a continued period of operation of the metronome, the spring may lose a little of its force, which may result in a slight unevenness of motion and throw of the pointer 8. To avoid this difficulty, it sems best to limit the initial period of operation from one winding to such time as the operation will be substantially

uniform, this period in turn being dependent of course upon the strength of the spring.

To that end, I have provided an automatic stop member for the purpose. On an overhanging support 87, Figs. 2, 10, at the top of the plate 1, there is pivoted by a pin 88 a pawl 89, which is normally pressed with frictional contact against the face of the gear 19 by a spring 90 coiled about the pin 88, the opposite ends of the spring being seated respectively against the edge of the support 87, and the face of an arm 91 downwardly extended from the pawl. To determine the time, however, when the pawl shall act, the arm 91, Fig. 10, is extended downward far enough to receive between two ears 92 on its lower end the upwardly extended spur 93 on a double collar 94, Figs. 2, 3, threaded on the screw 17, and which collar automatically travels forwardly on the screw 17 as the spring is wound up, and then similarly travels rearwardly as the spring unwinds and the gear 19 rotates in the opposite direction to automatically operate the device. The above described mechanism is proportioned and adjusted to cause the pawl 89 to swing laterally and to drop into a slot 95 on the face of the gear 19, Fig. 10, at the desired time: preferably, in the present instance, about thirty-five minutes.

A manually operative stop or brake device is also provided. Upon the face of the dial plate 6, Fig. 1, near the lower right-hand corner, there is pivoted on a pin 96 an arm 97, with the supporting sleeve 98 for the pin, Figs. 6 and 8, on the rear face of the plate, the pin carrying an arm 99 on its inner end and seated on the sleeve end, the arm having a laterally-turned end or shoe 100, and an upwardly-turned finger 101, the former adapted, when the arm 97 is swung upward, to engage the lower face of the disk 46, Fig. 6, and the finger 101, to engage the edge of the disk, to stop the mechanism. Swinging the arm 97 downward, of course, releases the stop device.

Some students cannot use a metronome with an audible beat or tick of the pointer, as it confuses them, while others find the audible beat either as a signalling of the baton beat or as supplemental thereto, a great help, and sometimes it is a necessity for best results. There is a full, complete and beneficial cooperation between the baton beat and the signallizing of the same to the player. The baton beat is important, but if not seen, it is of no advantage, and unless its movement is signified to the player, its advantage may be lost entirely. Accordingly, while the baton beat may be effective when its movement should be indicated by an audible signal to that effect, to guard against possible oversight by the player, I have provided an optional, audible beat signalling device for use when desired.

Even though the student is relying upon the visible beat of the baton for guidance, his eye may stray away momentarily, and then, without assistance, he would miss the beat of the baton. In such case, the audible tick which signalizes each beat of the baton informs him that the movement of the baton is effected, and, cooperating with the movement of the baton, brings to the student the signal of the beat which he missed seeing, and enables him to continue his playing in time with the action of the baton.

Near the lower edge of the dial face 6, Figs. 1, 11, 12, is an inwardly extended pin 102, Fig. 8, and adjacent the same is a similarly positioned tick controlling screw 103 with a knurled head 104, Fig. 1. On the rear face of the plate 6, both screw and pin extend through the lower end of a tapper or tick member 105, and a plate 106, thereby holding them in position, and the latter has upon its upper end a cam or tooth engaging arm 107 to engage the cams 108 on the shaft 55, Figs. 8, 11, just behind the dial plate 6, while the tapper 105 is provided on one face with a small metal boss or head 109. The screw 103 carries a threaded spacing block 110, which also is slidable on the pin 102, and, resting against the block 110 is one end, Fig. 8, of a U-shaped spring 111, the opposite end of which is seated against the lower end of the plate 106. This spring 111 acts to maintain the block 110 steady in an adjusted position adjacent the outer ends of the pin 102 and screw 103. To retain the screw 103 in proper position, Fig. 8, and act as a bearing for the outer end of the same, there is provided a yoke member 113, one end of which is seated against a block 114 on the inner end of the screw 103, and is drilled to receive the screw 103 and pin 102, while the opposite and outer end, narrowed, receives only the screw 103.

Normally, the arm 107 does not contact with the teeth 108, but, by turning up on the screw 103 and causing the block 110 to be fed inward toward the block 114 on the screw 103, and thus to feed forward and compress the spring 111 upon the plate 106, the arm 107 will be brought into position where it will be engaged and put under tension by the cams 108 as they rotate, and as the arm slips from each cam during rotation of the shaft 55, the spring 111 will cause the ticker or tapper 109 to strike the dial plate with sufficient force to be heard either faintly or plainly, according to the degree of tension imposed upon the tapper by the spring 111 to signal to the player the completion of the baton beat to enable him, in case he did not or could not see the baton, to maintain time correctly. Obviously, by omitting one of the cams 108, the tapper 109 will be actuated only by every other beat of the pointer 8, and by increasing the number of the cams, more frequent taps may be heard. This, of course, would necessitate certain changes in size, number and proportion of several of the elements producing and controlling the ticks. A modified form of construction for producing an elective number of ticks is described later on.

To prevent any ticking or tapping action, if desired, a silencing device is provided and comprises, Fig. 8, an arm 115 pivoted to the rear of the dial face at 116, and actuated by the arm 117 on the dial face, Fig. 1, to be moved beneath the tapper 109, Figs. 8, 11 and 12, so that the tapper will not strike the dial plate even though the spring adjustment would otherwise cause it to do so. A spring member 118 on the pivot 116, Fig. 8, maintains sufficient frictional contact with the rear face of the dial plate to cause the lever 115 to remain in adjusted position.

The element of timing which so generally enters into all human activities is notably important in the expression of the art of music.

There is, of necessity, among musicians a recognized standard of the rates of timing, and it was long ago discovered that a mechanical device of some sort was necessary for standardization.

In training students to become musicians, it is necessary to employ some expression of timing, so that those with whom the sense of timing is weak may have a model to which they may conform, and so be corrected and their timing sense developed.

The conventional Maezel metronome in general use, has, to some degree only, met the requirement. Its continued use is a nerve-racking strain, and to sensitive ears unbearable, and greatly limits its use.

It is a carefully balanced device, like a clock, and if it does not stand exactly level, the tick becomes uneven, and it becomes useless, and may even stop. To change and vary the tempo, it is necessary to stop the metronome and wait an appreciable time for the tick to again become even. The object of the present device is to provide a metronome that will more fully meet all requirements.

The beat or tick is silent, unless preferred otherwise, and is thus comprehended by the eye, as in the case of a conductor of an orchestra. The student does not need to listen to the tick, unless he wishes to, and if he does, it can be adjusted to give him an audible beat or tick instantly to signal the end of the baton beat, without stopping the device, and it will be of the loudness he wishes, to be heard throughout a large room, or scarcely audible.

The teacher may be relieved of the strain of counting aloud, or beating audibly, and cease to be the mechanical model with which some pupils must be provided.

To vary the tempo, it is not necessary to stop the device, and it need not stand perfectly level. The improved device is compact in construction, readily carried in the hand or packed in a bag, or even a large music case if desired. Furthermore, there is need of practice by the student at times in the use of a fractional part or portion of the baton beats, that is, counting and marking time by every other beat, or every third, or other fractional proportion of the baton beats, and in such work, the ticker signal is a most important element for signalling to the player the proportional part of the baton beats that is to guide him in his playing.

In Figs. 15 to 24 are illustrated certain modifications in the foregoing described construction, designed to provide a selective beat signalling tick frequency means relative to the baton beat frequency. In such case, the frame, Fig. 17, with its front plate 1, and rear plate 2, suitably connected are the same. The dial is practically the same, except that the tick controlling means, including the arm 141 has a graduated degree of adjustment to be described.

In this modification, part of the described winding mechanism is omitted, and the spring 16, secured to the shaft 17 and housing 18, is wound outward from the shaft 17, and not inward from the housing 18, as in the former case. The spring 16, Fig. 17, is wound by means of a suitable key, not shown, which is inserted in the outer end of the hollow shaft 120, carried by the plate 2 and a gear housing 121 on said plate, the shaft carrying a pinion 122 meshing with a winding gear 123, these features causing the spring operated mechanism to operate in the reverse direction from that shown in Fig. 3.

The modified form of tick producing and frequency means shown in Figs. 15–24 may be described as follows:

In Figs. 16, 18, the left-hand end of the cam drive shaft 55, mounted in bearing 51, has no cams 103 as in the case of Figs. 6, 7, 8, but carries, a pinion 124, in mesh with and driving a gear 125, on a ratchet shaft 126 in bearing 127 on modified plate 51, and new bearing 128 on the plate 1. The pinion 124 has 8 teeth, and the gear 125 has 48 teeth, so that the former makes 6 revolutions to 1 of the latter. The shaft 126, Figs. 16 and 18, carries a sleeve 129, splined thereon, which, in turn, carries a series of four tick producing ratchet wheels: 130, Fig. 19, on which the teeth are of equal length; 131, Fig. 20, wherein every other tooth 132 is a long one; 133, Fig. 21, in which every third tooth 134 is a long one; and Fig. 22, 135, in which every fourth tooth 136 is a long one.

On the sleeve 129 and adjacent the gear 130, Figs. 16, 18, is a ratchet-shifting collar 137, with a groove 138 in its edge to receive the upper, inturned end of an arm 139 on the inner end of a stud 140, extended through the dial face, Figs. 16, 18, and operated by a lever 141, corresponding in function in part to the screw 103 in Figs. 11, 12. By means of this arm and the construction described, a ratchet selected, to give the baton beat signal of desired frequency, can be moved with the sleeve 129 on the shaft 55 to the right to operative position relative to a ticker, or hammer to be described.

Just above the stub shaft 140, Figs. 16, 18, the inner plate 142 in this construction, adjacent the dial plate 6, is provided with a parallel plate 143, with an inturned lip 144 on its lower end, having notches 145 therein to receive the upper end of the arm 139 and lock it and the selected ratchet in position relative to the hammer to be described. Adjacent the ratchet 130, Fig. 16, and below the stub shaft 140, the inner plate 142 has struck inward from it a horizontal rib with a depressed central edge section with a knife edge 147, dotted lines Figs. 16, 24. The opposite end sections of this lip, Fig. 24, are extended slightly further inwardly from the main rib, to provide two narrow lips 148, which are adapted to receive, Fig. 16, in hinge-like manner two notches 149 on the opposite edges of the lower end of an upwardly extended hammer 150.

The upper edge of each notch rests upon the lips 148, and the hammer rests and moves upon the knife edge 147 to reduce the friction. The hammer 150, Figs. 16, 19 to 22, has a suitable head 151, as steel.

The hammer also has an arm 152, extended forwardly in position to engage the long teeth of the selected ratchet positioned in turn by the lever 141 and arm 139 to produce the desired tick.

To impose sufficient tension upon the hammer 150 to cause it to hit the plate 142 and make a loud signal tick when the arm 152 slips from a long tooth on any ratchet, Fig. 24, a stud 153 with an arm 154 thereon is provided on the dial face to operate the stud to desired position, and corresponding substantially to the function of the elements 103, 117, Fig. 1. On the inner end of the shaft 53, Figs. 16, 24, is carried a spring 155, corresponding in function to spring 111, Figs. 8, 11, 12, which lies normally against the hammer below the rib or knife edge 147, and near the hammer end, and consequently imposes no operating pressure upon the hammer action, and no tick signal of the baton beat is produced under these conditions when the arm 152 slips from a long tooth on either ratchet. If, however, Fig. 16, the arm 154 is swung upward, and the spring 155 caused to bear upon the hammer 150 above the lips 148, then the hammer will be under compression, and, when released by a long tooth, will strike the plate 142 with a force proportionate to the pressure imposed upon the hammer by the spring's position on the hammer. Obviously, if the

spring **155** engages the hammer relatively high above the lips **148**, the hammer will produce a louder tick signal of the baton beat when released by the ratchet than if it engaged the hammer only slightly above the lips **148**.

Further, the hammer may be so adjusted that it will produce a slight tick signal of the baton beat when released from the short teeth on the ratchet and a loud tick when released from the long teeth. Or this result can be effected by properly proportioning the length of the short teeth.

The foregoing modified construction, therefore, provides a loud tick signal for every beat of the baton, or every other beat, or every third beat, or every fourth beat, as elected by the operator at the end of its oscillatory movement.

Many detailed modifications of the foregoing construction can be made, all within the spirit of my invention and scope of the appended claims.

I claim:

1. A metronome comprising a frame, a dial face thereon, a time beating baton mounted for oscillation across the dial face, and means for effecting the oscillations including a motor, a driving shaft, a cam thereon, a roll therein on the baton end, a train of gears connecting said motor with the driving shaft including a driving disk, and a driving roll on the shaft operatively contacting with the disk.

2. A metronome comprising a frame with a dial face, speed indicating characters on the dial, a time-beating baton mounted to oscillate across the dial, and means for operating the baton comprising a motor, a cam driving shaft with a driving cam thereon, having a race therein, a roll in said cam race and on the baton end; a train of gears connecting the motor with the driving shaft and including a driving disk, a driving roller on the shaft and operatively contacting the disk; the last-mentioned roller also having a race therein, and a cam lever carrying a roll in said race, and means having an adjustable cam engaging said cam lever to effect adjustment of the speed of the driving disk and baton beat, said cam adjusting member acting also to register said adjustment with the beat indicating characters.

3. A device of the class described comprising a frame with a dial face having speed indicating characters thereon, a time-beating baton mounted to oscillate across the dial, and means for operating the baton, comprising a motor, a driving shaft with a driving cam thereon, a cam roll in said driving cam and on the baton end; a train of gears connecting the motor with the driving shaft and including a driving disk, a driving roller on said shaft with a race therein and operatively contacting the disk; and means for adjusting the speed of the baton beat and registering the same with the speed indicating characters comprising a speed changing pulley on the frame, with a speed identifying member thereon cooperating with the indicating characters, a control pulley connected with the speed changing pulley, a cam on the speed changing pulley, a cam lever adjustable by said cam and carrying a roll in said driving roller, to position the driving roller on the disk and thereby determine the speed of the baton beats and cause the speed identifying member to point to the proper speed indicating characters; additional adjusting means for and on the cam lever; a governor for said driving means, and a stop device comprising a brake member mounted on the frame and operable from the dial to engage the driving disk to stop it.

4. A device of the class described comprising a frame with a dial face having speed indicating characters thereon, a time-beating baton mounted to oscillate across the dial, and means for operating the baton, comprising a motor, a driving shaft with a driving cam thereon, a cam roll in said driving cam and on the baton end; a train of gears connecting the motor with the driving shaft and including a driving disk, a driving roller on said shaft with a race therein and operatively contacting the disk; and means for adjusting the speed of the baton beat and registering the same with the speed indicating characters and comprising a speed changing pulley on the frame, with a speed identifying member thereon cooperating with the indicating characters, a control pulley connected with the speed changing pulley, a cam on the speed changing pulley, a cam lever adjustable by said cam and carrying a roll in said driving roller, to position the driving roller on the disk and thereby determine the speed of the baton beats and cause the speed identifying member to point to the proper speed indicating characters; additional adjusting means on the cam lever comprising a pivoted arm movable over and adjustable on said cam lever relative to said cam on the speed-changing pulley, and means for holding said cam lever in contact with the speed-changing pulley cam.

ANALDO M. ENGLISH.