

H. COULLERY.
METRONOME.

APPLICATION FILED FEB. 24, 1908.

1,058,659.

Patented Apr. 8, 1913.

3 SHEETS—SHEET 1.

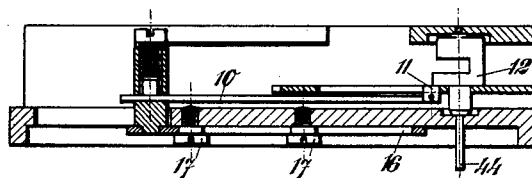
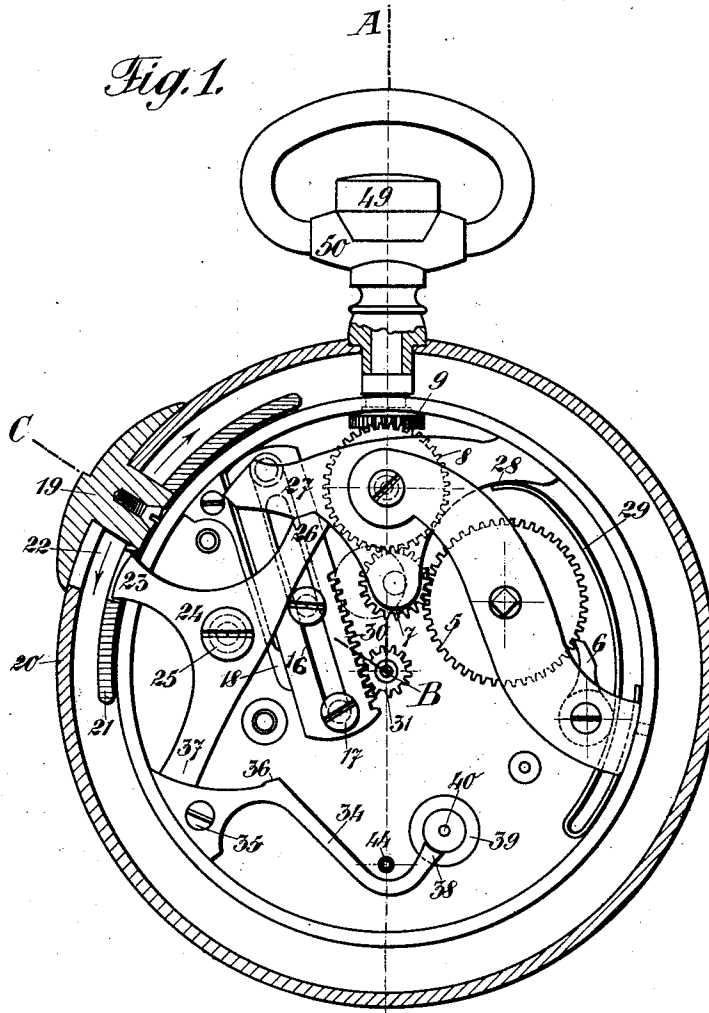


Fig. 5.

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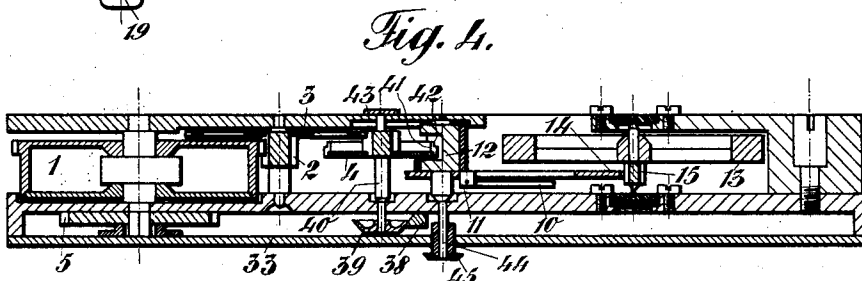
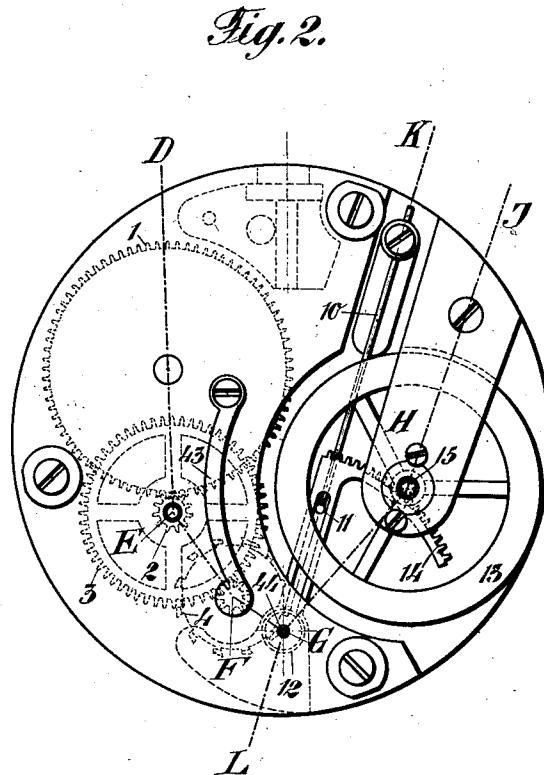
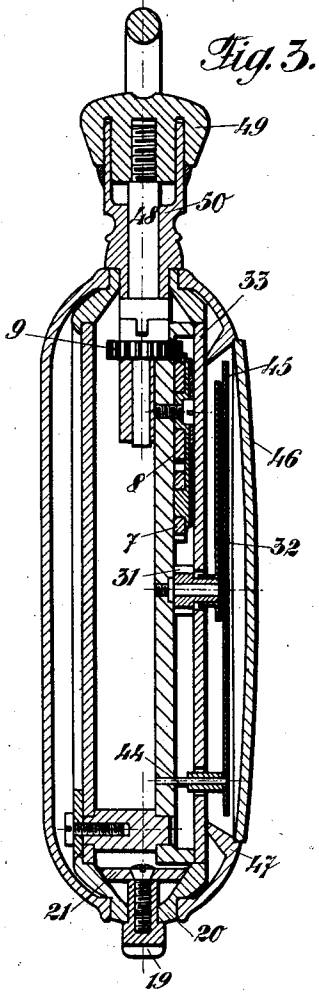
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3 SHEETS—SHEET 2.



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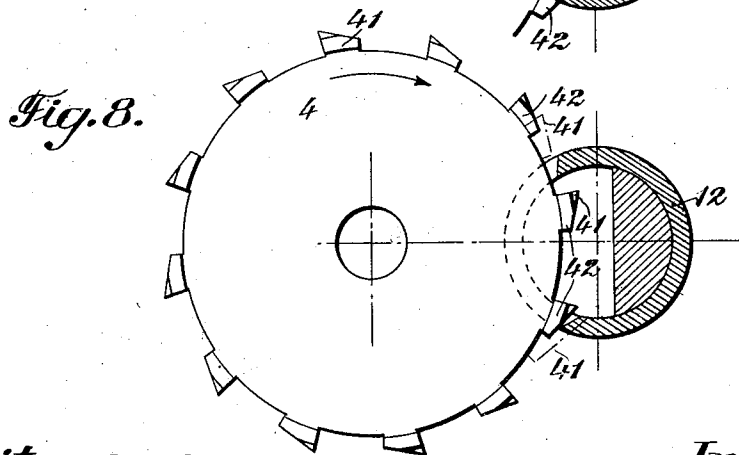
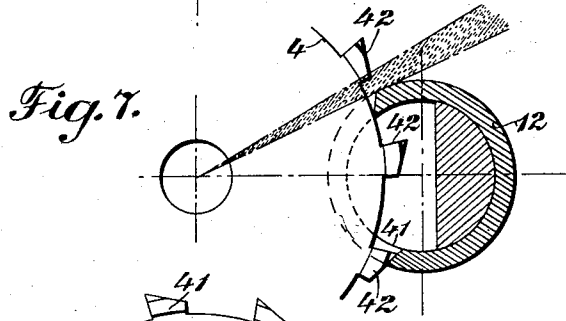
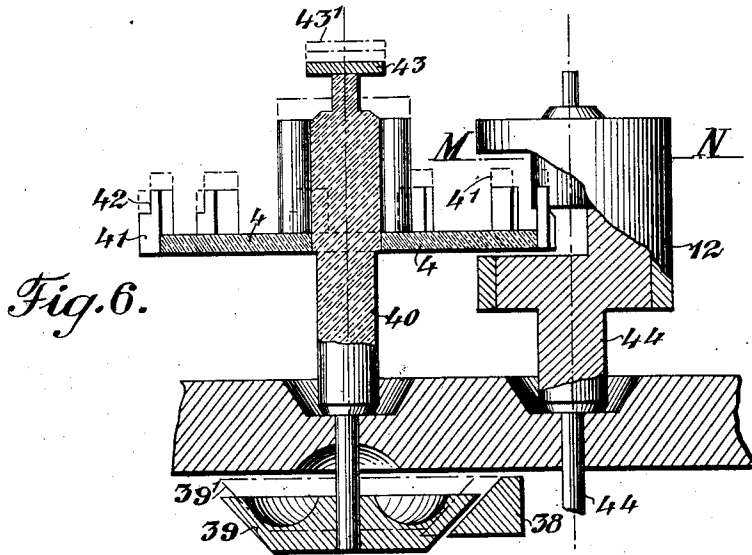
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3 SHEETS—SHEET 3.



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METRONOME.

1,058,659.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed February 24, 1908. Serial No. 417,509.

To all whom it may concern:

Be it known that I, HENRI COULLERY, engineer, citizen of Switzerland, residing at La Chaux-de-Fonds, Canton of Neuchatel, Switzerland, have invented new and useful Improvements in and Relating to Metronomes, of which the following is a specification.

The present invention has for its object an improved metronome.

This instrument differs essentially from the pendulum metronomes hitherto constructed; as compared therewith, it presents the advantage of acting in all positions and it may also be made of very small volume, say in the form of a watch, which renders it very readily portable. In addition, the duration of the beats may be regulated during running and with great precision. Finally, the beats may be rendered sonorous or silent at will, this adjustment likewise being possible while the metronome is running.

A constructional form of metronome in accordance with the present invention is illustrated by way of example in the accompanying drawing in which:—

Figures 1 and 2 represent each of the two sides of the movement in plan. Fig. 3 is a partial section along the broken line A—B—C of Fig. 1. Fig. 4 is a partial section along the broken line D—E—F—G—H—J of Fig. 2. Fig. 5 is a section on the line K—L of Fig. 2. Fig. 6 is an enlarged vertical section on the axes of the escapement wheel and the cylinder. Figs. 7 and 8 are sections on line M—N of Fig. 6 and illustrate the members of the escapement when interacting and producing either sonorous or silent beats; the former being obtained by the fall of the teeth of the escapement wheel upon the cylinder (Fig. 7) and the latter by preventing this fall.

A spring driving barrel 1 drives the pinion 2 solid with the wheel 3 which in its turn drives the wheel 4 of a special escapement; the duration of the vibration of this escapement may vary within very wide limits. The motor spring of the barrel is wound up by lever pendant winding mechanism, with ratchet 5, pawl 6, idle pinion 7, wheel 8 and pinion 9. In this escapement the variation of the duration of the oscillation is obtained by the displacement of the regulating spring 10 in such a manner that its extremity 11 acts at variable

distances from the axis of the rocking cylinder 12, connected with the balance 13 by a toothed sector 14 and the pinion 15. This regulated spring is fixed to a small bar 16 (Figs. 2 and 5) guided by screws 17 which bar is held by friction of the spring 18 and is actuated at will by the idle pinion 7 of the lever of the winding mechanism.

The position of the parts represented in Fig. 1 of the accompanying drawing is that in which the barrel is being wound up. A bolt 19 capable of sliding in a slot on the outer part of the case of the metronome is solid with a part 21 located inside the frame and in an orifice 22 in which the arm 23 of a lever 24 pivoted at 25 is engaged. One extremity 26 of the lever 24 is able to act upon an inclined surface 27 of the lever 28 which a spring 29 constantly tends to maintain in contact with the said extremity 26 of the lever 24.

The small bar 16 is provided with rack teeth 30 in which the idle pinion 7 carried by the lever 28 is able to mesh, and in which a pinion 31 solid with a hand 32 constantly meshes; this hand is displaceable in front of divisions on the dial 33 and intended for indicating the number of beats made by the metronome per minute.

A spring 34, fixed at 35, is provided with a nose 36 against which the extremity 37 of the lever 24 is able to bear; the free extremity 38 of this spring is beveled (Fig. 4) and acts beneath a conical washer 39 fixed to one extremity of the spindle 40 of the escapement wheel 4, which is capable of slight displacement with its spindle in the longitudinal direction of the latter, so that the teeth of the said wheel 4 acts upon the cylinder either by their base 41 which works with absolutely the minimum jump necessary, or by their upper extremity 42 which is largely chamfered in order to obtain a very great jump. A spring 43 tends to keep the spindle of the wheel 4 constantly in its lower position (Fig. 4) but the spring 34 is stronger than the spring 43 and the wheel 4 is thus supported, generally in its highest position corresponding to the minimum jump which insures almost silent running of the escapement. By the word "jump" is meant the distance traveled by the escapement wheel between the successive engagements thereof by the rocking cylinder.

Upon the spindle 44 of the cylinder 12, there is fixed the hand 45, beating the time

upon the dial 33 and (like the hand 32) visible through the window 46 set in the rim 47 fixed by means of a notch on the frame 20 of the case.

5 The pinion 9 is fixed to the winding rod 48 carrying the crown 49 fitted freely upon the pendant 50 of the case.

The parts being in the position represented in Fig. 1, if the crown 49 be rotated, 10 the barrel 1 is wound up. In order to obtain beats of the desired duration, the bolt 19 actuating the lever 24 must be depressed; the extremity 26 of this lever causes the lever 28 to turn through a fraction of a 15 revolution, its idle pinion 7 ceasing to mesh with the ratchet 5 but meshing with the rack 30 of the bar 16; the crown 49 is then acted upon and the bar 16 is brought into the proper position, indicated by the hand 32 20 during the running of the instrument.

By pressing the bolt 19 right home in the downward direction, the extremity 37 of the lever 24 is caused to rest upon the nose 36 25 of the spring 34, the extremity 38 of which acts upon the conical washer 39 and arranges the escapement wheel 4 in its lowest position, which corresponds to the maximum of jump and renders the beats sonorous.

The form and the dimensions of the parts 30 described and the relative positions of these parts may vary. The escapement may be of any suitable kind provided that it presents the property of being capable of regulation within wide limits during the operation of 35 the instrument.

The instrument described is generally utilized in music as a metronome proper, nevertheless it may be used for other purposes, for example, as a revolution meter, 40 vibration counter, etc., it is only necessary to regulate it until it runs synchronously

with the engines of which it is desired to arrive at these running factors, which may be read upon the dial.

Having now described my invention I 45 claim as new and desire to secure by Letters Patent:—

1. In a metronome, the combination of a balance, a rocking part connected therewith, an escapement wheel adapted to be moved 50 from one to the other of two operable positions and having teeth adapted to engage said rocking part, said teeth being adapted to make a louder sound when engaging said part when in one of said positions than 55 when in the other position, and means for moving said escapement wheel from one position to the other.

2. A metronome controlled by a circular spring-balance, an escapement-wheel dis- 60 placeable longitudinally to its axis and provided with chamfered teeth, a rocking cylinder connected with the balance and engaging the escapement wheel, in combination with means for producing the acoustic 65 indication by displacing the escapement wheel and varying the jump between the engagements of the escapement mechanism.

3. In a pocket metronome, a circular balance escapement, a displaceable spring con- 70 trolling the oscillation of said escapement, a winding-crown, in combination with an idle wheel actuated by the winding crown and controlling the displacement of the said spring. 75

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRI COULLERY.

Witnesses:

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