No. 618,336. Patented Jan. 24, 1899.

J. C. DOERFER.

METRONOME.

(Application filed July 8, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

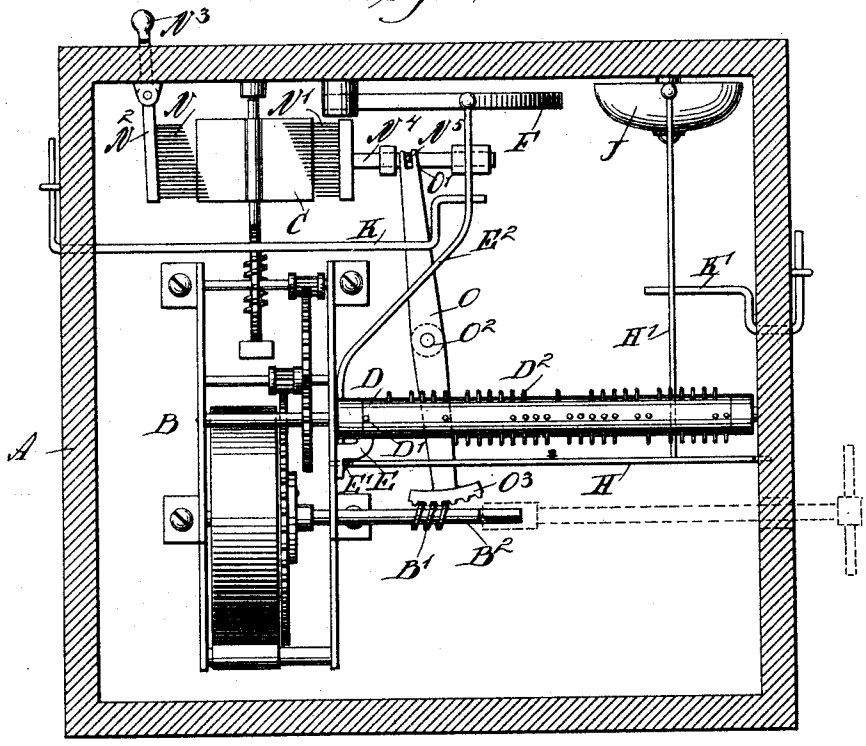
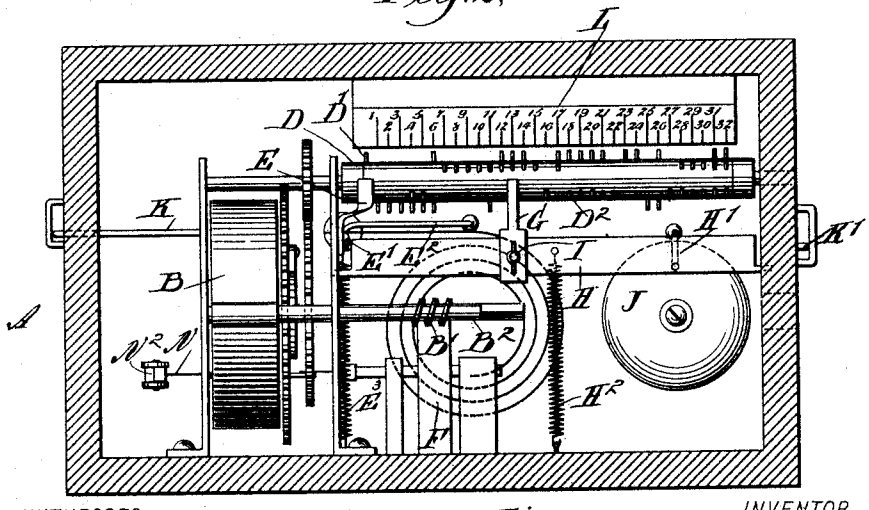


Fig. 2.



WITNESSES

Edward Thorpe.

Rud. J. Hoster Jr.

Fig. 6.



Fig. 7.



INVENTOR

J. C. Doerfer.

BY

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

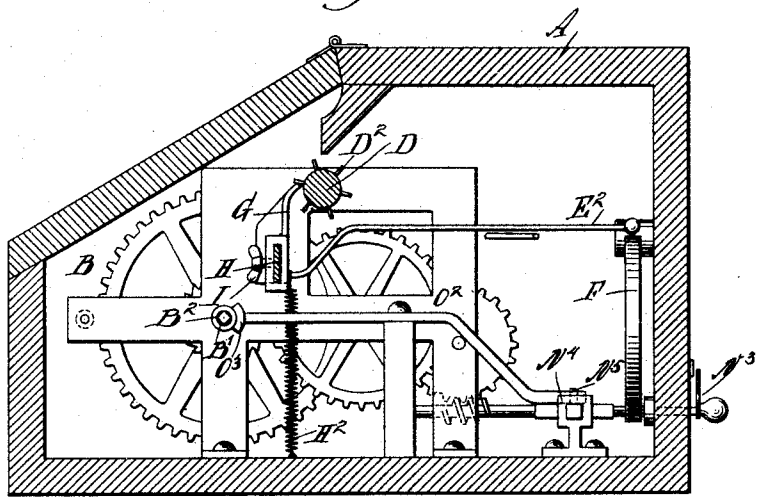


Fig. 4.

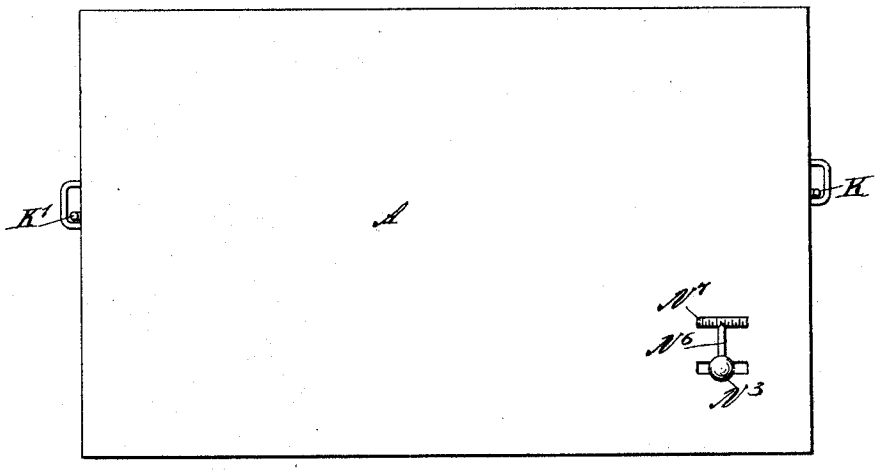
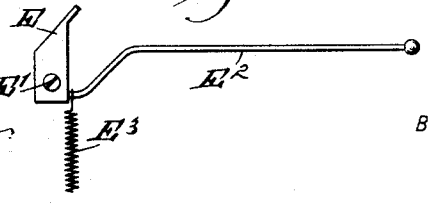


Fig. 5.



WITNESSES:

Edward Thorpe.

Rud. J. Hoskins

INVENTOR

J. C. Doerfer.

BY

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JACOB C. DOERFER, OF DENVER, COLORADO.

METRONOME.

SPECIFICATION forming part of Letters Patent No. 618,336, dated January 24, 1899.

Application filed July 8, 1897. Serial No. 643,819. (No model.)

To all whom it may concern:

Be it known that I, JACOB C. DOERFER, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and Improved Metronome, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved metronome which is simple and durable in construction and arranged to permit the user to readily set the instrument to beat any desired time, so as to enable a scholar or a performer on a musical instrument to readily count and keep proper time according to the music to be performed or to the lesson on hand.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional plan view of the improvement. Fig. 2 is a sectional front elevation of the same. Fig. 3 is a transverse section of the same. Fig. 4 is a rear end elevation of the same. Fig. 5 is a side elevation of the sounding device for beating regular time, and Figs. 6 and 7 show bars of music.

The improved metronome is mounted in a suitably-constructed box A, containing a motor B of any approved construction, preferably of a spring pattern, as indicated in the drawings, the motor having a suitable wind-wheel or governor C for governing the speed of the motor. The motor B is adapted to drive a pin-cylinder D, containing a set of pins D′, consisting of two pins placed diametrically opposite each other and adapted to act alternately on an arm E, fulcrumed at E′ on the frame of the motor and pressed on by a spring E^3, said bar supporting a striker E^2, adapted to sound a sounding device F in the form of a gong or the like. On the pin-cylinder D are also arranged sets of pins D^2 for beating the time of any bar of music, it being understood that each set has a number of pins placed such distances apart as correspond to the beats of the music indicated on the bar of music.

Each set of pins D^2 is adapted to engage an arm G, held longitudinally adjustable on a rock-shaft H, journaled in suitable bearings in the casing A, the said arm G being fitted to slide on the said rock-shaft and adapted to be fastened in place by a suitable set-screw I. On the rock-shaft H is secured a striker H′, adapted to sound a sounding device J in the form of a gong or the like, but preferably different in pitch from that of the sounding device F, both sounding devices being supported in the casing A. Suitable throw-out devices K K′ are provided for the strikers E^2 H′ for throwing the same out of action relatively to their sounding devices whenever desired.

The sets of pins D^2 indicate on an indicator L, held stationary in the casing A and preferably arranged as shown in Fig. 2, the said indicator having lines numbered consecutively and in alinement with the sets of pins D^2.

Now in order to enable the user to at once set the arm G to a set of pins D^2 to beat the time of a certain bar of music I provide a book, sheet, or the like containing various bars of music corresponding to the sets of pins D^2 and numbered correspondingly to the latter. Thus, as shown in Figs. 6 and 7, the bars of music represented therein correspond to the sets of pins indicated by the numerals 8 and 26 on the indicator L, and hence if it is desired to set the instrument to beat the irregular rhythm represented by the bar shown in Fig. 6 it is necessary to move the arm G laterally on the shaft H until the arm G is over the set of pins D^2 indicated by the numeral 8 on the indicator L. In a like manner if it is desired to beat time according to the bar of music shown in Fig. 7 it is necessary to adjust the arm G on the shaft H until the said arm is on the set of pins D^2 indicated by the numeral 26 on the indicator L. The arm G, after proper adjustment is made, is secured in place on the shaft H by the set-screw I, as previously referred to.

It will be understood that the pins of each set D^2 are differently arranged—that is, in some cases the pins are equidistant, (corresponding to a rhythm such as indicated in Fig. 7,) while in other cases (see Fig. 6) the distance between the pins of the same set will vary, so that the intervals between the strikes or beats of the instrument will be of different

length. I thus obtain a rhythmic beat. I desire, further, to observe that the instrument has two different beats, one caused by the set of pins D′ and the other by one of the sets of pins D^2. The beat on the gong F is regular and cannot be changed except by altering the speed of the motor. The beat on the gong J is regular or not and is representative of the rhythm of the music, while the gong F is struck only to indicate the time, such as four-four, six-eight, or other. The gong F is always sounded at regular intervals of time. In the example illustrated by Fig. 7 both gongs will be sounded at regular intervals; but the intervals will be different for each gong—that is, while there are six beats on the gong F (indicating six-eight time) the gong J will be sounded only twice. The instrument by its two gongs or sounding devices therefore indicates simultaneously or separately both the time and the rhythm of the music to be played. This latter result is obtained, as described, by placing the pins D^2 of the same set at equal or at different distances from each other and by a proper relation of the distances between the pins D^2 to that between the pins D′.

Now it is evident that when the machine is in motion the arm G is engaged by the pins D^2 of any one of the sets, so that a swinging motion is given to the arm G, the inward or return motion being accomplished by a spring H^2 pressing on the shaft H. As soon as one of the pins engages the arm G it causes the same to swing outward and turn the shaft H, so as to lift the striker H′ away from the sounding device J, and when the pin passes off the end of the arm G then the spring H^2 insures a certain return movement to cause the striker H′ to sound the sounding device J. In a similar manner the regular time-beater, consisting of the pins D′, arm E, and striker E^2 for sounding the device F, is actuated to beat regular time; but it is expressly understood that either one of the sounding devices can be rendered inactive by manipulating the corresponding stop K or K′ accordingly.

In order to decrease the speed of the governor C, and consequently that of the motor B and pin-cylinder D, I provide the following device: Brushes N N′, having graduated bristles, as shown in Fig. 1, are adapted to be moved in and out of engagement with the fans or blades of the wind-wheel C to retard the movement of the latter correspondingly. The brush N is mounted on a lever N^2, fulcrumed on the casing A and extending through an opening in the wall thereof to the outside to carry at its outer end a handle N^3 under the control of the operator. Thus by imparting a swinging motion to the lever N^2 the brush N, with its graduated bristles, can be moved with more or less force in contact with the wind-wheel C to retard the movement of the same correspondingly. The bristles are sufficiently soft to readily yield to the rotating force of the wheel C, so as not to stop the motor. The other brush N′ is mounted on an arm N^4, mounted to slide in suitable bearings on the casing A, and on the said arm is secured a pin N^5, engaged by the forked end O′ of a lever O, fulcrumed at O^2 in the casing and extending forwardly, as is plainly shown in the drawings. On the forward end of the lever O is formed a worm-segment O^3 in mesh with a worm-wheel B′, secured on the winding-up shaft B^2 for the motor B.

When the machine is running or is started and attains a regular speed, the brush N′ is shifted by the mechanism referred to, so as to retard the movement of the wind-wheel C and insure a proper uniform speed of the same.

In order to regulate the movement of the brush N, I provide the outer end of the lever N^2 with a pointer N^6, indicating on a graduation N^7, attached to the back of the casing A, as shown in Fig. 4. By this means the operator can set the motor to the desired speed, so as to insure a proper beating of the sounding devices F and J as long as the strikers E^2 and H′ are in an active position.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A metronome having a motor, a wind-wheel, a movable retarding mechanism adapted to check said wheel more or less, and a connection from the motor to the retarding mechanism to shift the same during the operation of the motor so as to gradually decrease the retarding action of said mechanism.

2. A metronome having a motor, a wind-wheel, a retarding device movable toward and from the wind-wheel and provided adjacent thereto with an oblique engaging edge, and a connection from the motor to the retarding device to shift the latter during the operation of the motor so as to gradually decrease the retarding action of said device.

3. In a metronome, the combination with a motor, a pin-cylinder operated by the motor, sounding devices, and means for operating the sounding devices from the pin-cylinder, of a governor of the wind-wheel type, a flexible retarding device having an oblique engaging edge, and means for moving the retarding device from the motor, toward and from the governor, substantially as and for the purpose set forth.

4. In a metronome, the combination with a motor, a pin-cylinder operated by the motor, sounding devices, and means for operating the sounding devices from the pin-cylinder, of a governor of the wind-wheel type, a movable brush having its bristles gradually varying in length, and means for moving the brush toward and from the governor from the motor, substantially as described.

5. In a metronome, the combination with a motor, a pin-cylinder operated by the motor, sounding devices, and means for operating

the sounding devices from the pin-cylinder, of a governor of the wind-wheel type, a brush having its bristles gradually varying in length, a sliding arm carrying the brush, a pivoted lever having one end engaging the sliding arm, and provided at its other end with a worm-segment, and a worm-wheel on the shaft of the motor and with which the worm-segment meshes, substantially as described.

6. A metronome, comprising a motor, a cylinder operated by the motor and provided with two diametrically opposite pins and with sets of pins, two gongs, a pivoted and spring-pressed arm adapted to be alternately engaged by the said two pins and carrying a striker for engaging one of the gongs, a spring-pressed rock-shaft provided with an adjustable arm for engaging the sets of pins, and with a striker for engaging the other gong, a governor for the motor, and a retarding device for the governor, substantially as described.

JACOB C. DOERFER.

Witnesses:
EDWARD KENT,
CORNELIUS FERRIS, Jr.