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CLOCKWORK MUSIC MOVEMENT

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Fig. 1

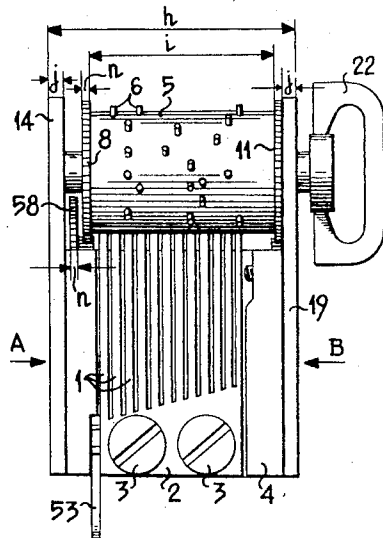


Fig. 2

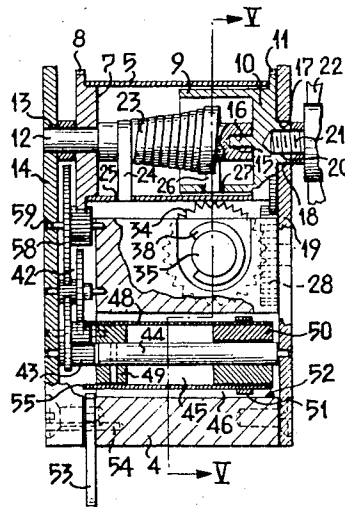


Fig. 3

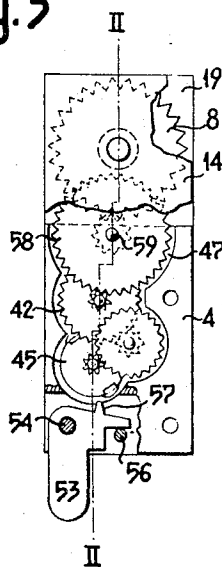


Fig. 4

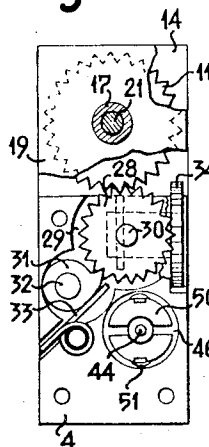
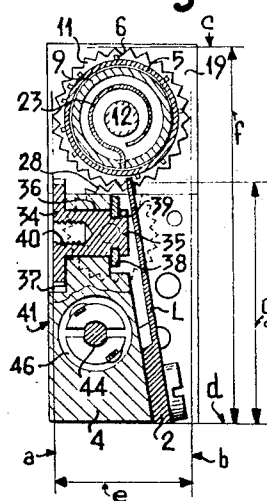


Fig. 5



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The present invention relates to a clockwork music movement which comprises, like many known clockwork music movements, a motor connected to a speed governor and driving a cylinder fitted with needles actuating the tuned vibrating blades of a keyboard rigidly fastened by its foot to a frame. This clockwork music movement differs from the known clockwork music movements in that all the moving parts of the movement as well as the keyboard are contained within a space whose shape is that of a parallelepiped surrounding the cylinder and the keyboard and bounded by a first pair of parallel planes each separated from the other by a distance almost equal to the diameter of the cylinder fitted with its needles, by a second pair of parallel planes perpendicular to the first pair and whose distance apart is fairly equal to the diameter of the cylinder fitted with its needles and increased by the length of the keyboard, and finally by a third pair of parallel planes, perpendicular to the aforementioned first and second pairs as well as to the axis of rotation of the cylinder and containing bearings carrying the cylinder, the distance apart of this third pair of planes being fairly equal to the cylinder's length increased by the length of the bearings carrying the cylinder and three times the width of a toothed wheel carried by the first axle of the multiplying gearing.

The attached drawing shows diagrammatically and by way of example an embodiment of the clockwork music movement in accordance with the invention.

Fig. 1 is a top view of same.

Fig. 2 is a cross section view taken along line II—II of Fig. 3.

Fig. 3 is a side view in the direction of the arrow A, certain parts being cut away and others seen in cross section.

Fig. 4 is a side view in the direction of the arrow B, certain parts being cut away.

Fig. 5 is a cross section view along the line V—V of Fig. 2.

In accordance with the attached drawing, the clockwork music movement comprises a keyboard of tuned vibrating blades 1, of which the foot 2 is rigidly fixed by screws 3 onto a pedestal 4. A cylinder 5, fitted with needles 6 cooperating with the free end of the tuned blades, is fastened rigidly onto an end wall 7 fastened to a toothed wheel 8. The second end of the cylinder revolves freely on a skirt 9 carried by an end wall 10 provided with a toothed wheel 11.

This cylinder is carried, on the one hand, by an axle 12, of which one of the ends is engaged in a bearing 13 provided in a side wall 14 fastened to the pedestal, whilst the other end is carried by a head 16 fastened to the wall 10 and engaged in an axial drilling 15 of the axle 12 and, on the other hand, by a journal 17 fastened to the end wall 10 and revolving freely in a bearing 18 provided in a side wall 19 rigidly fixed onto the pedestal 4.

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A winding organ 22 provided with a threaded shank 21 is screwed into a threaded axial drilling 20 of the journal 17.

The motor consists of a spring 23, wound around the axle 12, and of which one 24 of the ends is engaged in a housing 25 provided in the cylinder, while its other end 26 is engaged in a housing 27 provided in the skirt 9.

The clockwork music movement comprises a retaining device of the skirt 9 in its angular position. This device comprises a pinion 28 meshing with the toothed wheel 11 and housed in a hollow 29 made in the pedestal 4. This pinion 28 is fastened to an axle 30 parallel to the axle 12 of the cylinder and revolving in bearings provided in the side wall 19 and in the pedestal. A retaining pawl 31, mounted on a pivot 32 fastened to the pedestal 4 is subjected to the action of a spring 33 tending to keep it in mesh with the toothing of the pinion 28.

In the embodiment shown on the drawing, the pinion 28 further meshes with a pinion 34 fastened to an axle 35 perpendicular to the axle 12 of the cylinder 5 and revolving freely in a bearing 36 provided in the pedestal 4. The pinion 34 is housed in a housing 37 and the axial position of the axle 35 is fixed by an elastic ring 38 engaged in a circular groove 39 of this axle. This axle 35 presents an axial threaded drilling 40 opening on the lower face 41 of the pedestal and intended for receiving the control organ 22, if desired.

A gearing 42 connects mechanically the toothed wheel 8 to a pinion 43 fastened to the driving axle 44 of a speed governor 45. The governor is housed in a hollow 46 made in the pedestal 4 below the keyboard, and its axle 44 is parallel to the axle 12 of the cylinder. The gearing 42, on the contrary, is housed in a side housing 47 provided between the pedestal and the side wall 14.

The speed governor comprises two elastic arms 48 fixed by one of their ends to a ring 49 fastened to the driving axle 44. A mass 50 is fixed to the free end of each arm 48. Each mass carries a braking organ 51, preferably of plastic material, which under the action of the centrifugal force acting on the masses 50, cooperates with the internal surface 52 of the housing 46.

The clockwork movement comprises a starting and stopping device constituted by a lever 53 hinged on an axle 54 fastened to the pedestal 4 and capable of oscillating between a position "Stop," for which a finger 57, carried by a lever, is situated on the path of the extensions 55 of the arms 48, and a position "Go" defined by a stop 56.

The operation of the described clockwork music movement is the following:

The lever 53 being displaced by hand as far as a "Stop" position, its stop finger 57 is then situated on the path of the extensions 55 and prevents the revolving of the speed governor. Thus, the torque exerted by the end 24 of the driving spring 23 on the cylinder 5 remains without effect. The operator, by actuating the winding organ 22, causes the winding-up of the driving spring 23, and the skirt 9 is retained against the torque exerted on it by the end 26 of this spring, by the retaining pawl 31, maintained, by its return spring 33, in mesh with the toothing of the pinion 28.

When the driving spring is wound up, it is sufficient to push the lever 53 as far as the position "Go" to remove the stop finger 57 from the path of the extensions 55 and thus to release the governor. The latter is then driven in rotation by means of the gearing 42 of the cylinder 5. The centrifugal force acting on the masses 50 causes the parting of the masses 50 against the elastic action of the arms 48 and the braking organs 51 slide

along the cylindrical surface 52 and thus limit the revolving speed of the axle 44 to a defined and constant value.

The cylinder is therefore driven in a revolving movement of constant speed and its needles 6 successively act on the tuned vibrating blades 1. This operation is therefore similar to that of the known clockwork music movements. However, as shown on the attached drawing, the speed governor and the keyboard are housed, one above the other, in a space bounded, on the one hand, by two parallel planes *a* and *b* tangent to the toothed wheels 8 and 11 and, on the other hand, by two parallel planes *c* and *d* perpendicular to the planes *a* and *b*, of which one is tangent to the toothed wheels 8 and 11, while the other passes through the end of the foot of the keyboard. It should be noted that, practically, the diameter of the toothed wheels 8 and 11 is fairly equal to the diameter of the cylinder fitted with its needles.

The retaining device and the multiplying gearing being housed in lateral hollows provided between the pedestal 4 and the lateral walls 14 and 19, the result is that all the parts of the clockwork music movement are housed in a space whose shape is that of a parallelepiped bounded by the planes *a*, *b*, *c*, *d* and by its two lateral walls. These two lateral walls 14 and 19 are in planes perpendicular to the planes *a*, *b*, *c*, *d* and to the revolving axle of the cylinder 5. These walls contain bearings 13 and 18 carrying the cylinder and the wall 19 is adjacent to the end wall 10 carrying the toothed wheel 11, while the wall 14 can be adjacent to the toothed wheel 58 carried by the first axle 59 of the gearing 42 driven by the cylinder 5. The depth *e* of this parallelepiped is fairly equal to the diameter of the cylinder 5 fitted with its needles, while the length *f* of this parallelepiped equals the length *g* of the keyboard increased by the diameter of the cylinder 5. Finally, the width *h* of the clockwork music movement does not much exceed the length *i* of the cylinder. The ratio *h/i* is an obvious variable in accordance with the length of the cylinder 5 and can vary, for instance, from 1.1 in the case of cylinders of a length exceeding 5 cm., to 1.3 for instance, and 1.5 at the most, in the case of cylinders of a length less than 1 cm. This results, on the one hand, from the fact that the depth *j* of each lateral wall cannot be reduced below a certain value which is necessary for providing bearings having a span sufficient for avoiding a premature wear and, on the other hand, from the fact that the width of the toothed wheels 8 and 11 cannot be reduced below a certain value which is necessary for avoiding a premature wear of their toothing.

To these depths, it is further necessary to add a minimum width at least equal to the width *n* of the first big toothed wheel 58 of the multiplying gearing 42. Thus, the total width *h* is, in reality, smaller than that shown on the drawing, the spaces between the toothed wheel 58, the wall 14 and the toothed wheel 8 having been voluntarily exaggerated for the sake of greater clarity of the drawing. The width *n* of the toothed wheel 58 is preferably equal to the width of each of the toothed wheels 8 and 11, so that the spacing of the external faces of the walls 14 and 19 is fairly equal to the length of the cylinder increased by the length of the bearings 13, 18 and by three times the width of the toothed wheel carried by the first axle 59 of the multiplying gearing.

Thus, due to the fact that the motor is housed within the cylinder and to the fact that the speed governor and the keyboard are arranged one above the other, all the organs and elements of the clockwork music movement can be housed in a volume of maximum bulk having the shape of a parallelepiped, of which the dimensions are fixed by those of the main organs of the movement, namely the cylinder, fitted with its needles, and the key-

board. Indeed, the diameter and the length of the cylinder depend on the number of the different notes of this melody. On the contrary, the width of the keyboard and its length depend on the number of the different notes of the melody to reproduce and on the sound volume desired.

Thus, the described special arrangement enables to cut down the bulk volume of the clockwork music movement practically to the sole volume of the parallelepiped surrounding the two main parts of the movement.

An embodiment of the clockwork music movement, object of the invention, has been described here by way of example and with reference to the attached drawing, but it goes without saying that many modifications can be provided for, without departing from the scope of the claimed protection. Thus, for instance, the speed governor with masses could be replaced by a speed governor with wings.

I claim:

1. A music device comprising a pedestal having a middle part having a back face and a front face and first and second side parts on either side of said middle part, said side parts being of greater thickness than said middle part and having their back faces substantially in the plane of the back face of said pedestal, whereby the front faces of said side parts extend above the front face of said pedestal, a keyboard rigidly fastened to the front face of said pedestal and between said first and second side parts, tuned vibrating blades carried by said keyboard and lying within said first and second side parts, lateral walls secured to the outside of said first and second side parts, said walls being substantially coextensive with said side parts, depthwise, and extending beyond the ends of said side parts and generally in the direction of said vibrating blades, a cylinder supported between the outwardly extending ends of said lateral walls and adjacent to the ends of said vibrating blades, needles carried by said cylinder and cooperating with said vibrating blades, spring motor means for rotating said cylinder, said pedestal having a recess, a speed governor rotatably mounted within said recess, said first side part having a first recess, a first gearing housed in said first recess and journaled in the corresponding lateral wall and in the side part, said first gearing mechanically connecting said cylinder to said speed governor, said second side part having a second lateral recess, and a winding device for the aforesaid spring motor means housed in said second recess and journaled in the corresponding lateral wall and in said second side part; said pedestal and the lateral walls constituting a parallelepiped frame surrounding the cylinder, keyboard, governor, motor, and gears.

2. A music device as in claim 1, said winding device comprising a gear parallel to and journaled in said lateral wall carried by said second side part, said gear having a stem extending through said side wall, and means on said stem to receive a winding key.

3. A music device as in claim 1, said winding device comprising a gear journaled in said pedestal and carried in a recess in the rear face thereof, and means on said gear for receiving a winding key.

4. A music device as in claim 1, said pedestal having a bottom face opposite to said cylinder, said pedestal having a recess extending transversely of the plane of said bottom face, a lever journaled to said pedestal in said transverse recess, one arm of said lever being movable into a position in which it engages in said first gearing to prevent operation thereof, the other end of said lever extending from said transverse recess.

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