

Sept. 25, 1928.

A. M. LIFSHITZ

1,685,090

AUTOMATIC DRUM

Filed Sept. 27, 1927

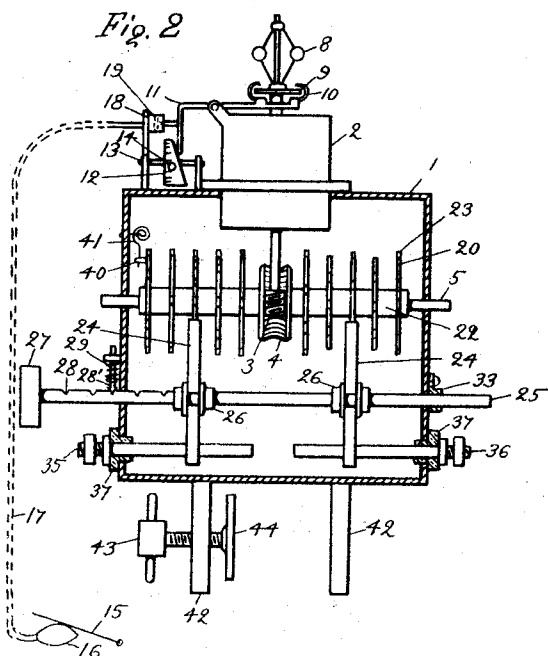
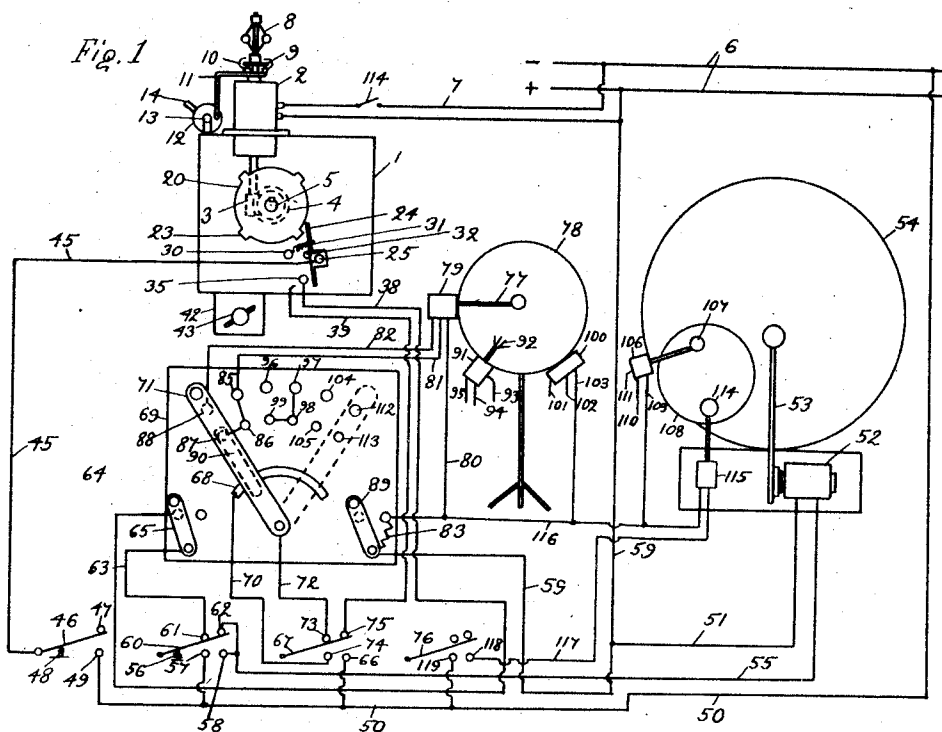


Fig. 3

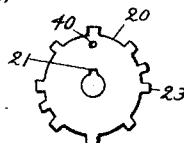
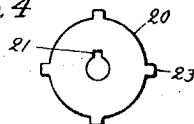


Fig. 4



ALEX M. LIFSHITZ

INVENTOR

BY John P. Nickerson

ATTORNEY

UNITED STATES PATENT OFFICE.

ALEX M. LIFSHITZ, OF BROOKLYN, NEW YORK.

AUTOMATIC DRUM.

Application filed September 27, 1927. Serial No. 222,395.

My invention relates to automatic drums and has a particular reference to drum operating electrical mechanisms.

The object of my invention is to provide a mechanism for operating drums or similar musical instruments automatically in a predetermined rhythmic measure.

In my Patent No. 1,646,061, of Oct. 18, 1927, I described an electrical mechanism for operating drums and similar musical instruments. The present invention concerns an automatic controlling device for operating electrically drums and the like, in conjunction with the above mentioned electrical mechanism, or with any other suitable electrical device.

For this purpose I provide a rotatively mounted controller adapted to operate at predetermined periods of time electrical contacts which operate drums and similar musical instruments. The controller rotates at a constant speed being connected with a constant and adjustable speed electric motor.

My invention is more fully described in the accompanying specification and drawing in which—

Fig. 1 is a diagram of connection of my devices showing also diagrammatically the apparatus themselves, Fig. 2 is a sectional elevation of my controller, Fig. 3 is a view of a controlling disc, and Fig. 4 is a similar view of another disc.

My automatic controller 1 comprises a housing supporting an electric motor 2. The lower end of the motor shaft has a pinion 3 engaging a worm wheel 4 mounted on a shaft 5. The motor is connected with an electric line 6 by means of wire 7.

For maintaining the speed of the motor constant a centrifugal governor 8 is mounted on its shaft extension. This governor operates a frictional disc 9 placed between stationary brake plates 10. These brake plates may be raised or lowered in order to regulate or adjust the speed of the motor. The brake is connected with a crank lever 11 the lower end of which bears against a cam 12 mounted on a shaft 13. By turning the cam by hand, for which purpose it is provided with a handle 14, the crank lever 11 may be moved one way or the other, thereby raising or lowering the brake plate 10 and accordingly changing the speed of the motor 2. The cam wheel 12 has numbered divisions on its periphery for guiding the operator when adjusting the speed of the motor.

For changing the motor speed for short pe-

riods only, for instance, at the conclusion of a musical piece, a pedal 15 may be used, adapted to press on a rubber bulb 16 connected by means of a flexible tubing 17 with an air cylinder 18 operating air piston 19 which pushes the lever 11. This mechanism may be used for decreasing or increasing the motor speed, depending on the arrangement of the air piston and the cam in relation to the lever 11.

A plurality of discs 20 are mounted on the shaft 5, there being an equal number of them on both sides of the shaft. These discs are keyed on the shaft, being provided with key slots 21 for this purpose. They are evenly spaced by means of spacing bushings 22, and have on the periphery a plurality of teeth 23. These teeth press against resilient contact bars 24 rotatively mounted on a bar 25. On each side of the bar 24 on the bar 25 are placed bushings 26 which prevent the contact bars 24 from sliding longitudinally on the bar 25. The contact bars are spaced so that when one bar touches the third disc 20 on the left side of the shaft 5 (as shown in Fig. 2), then the right contact bar touches the corresponding disc on the right side, also the third. The bar 25 can slide longitudinally in the bearings in the walls of the housing 1 and is provided with a handle 27 at one end. The bar 25 has notches 28 equally spaced and at the same distances apart as between the discs 20. A latch 28' with a tapering end fits in the notches being pressed with a spring 29. This latch retains the bar 25 in a position when the contact bars 24 are located exactly opposite corresponding discs 20. This latch yields, however, when a strong pressure is applied on the handle 27. A second bar 30 is attached to the handle 27 and slides together with the bar 25. This second bar serves to support other ends of springs 31 which are attached to contact bars 24 and tend to press them against the disc teeth 23. A stationary bar 32 attached with its ends to the walls of the housing 1 prevents the contact bars from moving too far inside under action of springs 31. Sliding contact bushings 33 are provided for the bars 25 and 30 and are attached to the wall of the housing 1. These contact bushings serve to conduct the electric current to the bar 25 and contact bars 24 by means of a lead 45.

The lower ends of the contact bars 24 are placed opposite contact rods 35 and 36. These rods are fastened in the walls of the housing 1 and are insulated therefrom by means of insulation bushings 37. The ends of the rods

are provided with threads and nuts for clamping leads or wires 38 and 39.

The extreme left disc 20 is provided with a pin 40 which comes in contact with a spring 41 adapted to produce a slight ringing sound when struck by the pin 40.

The housing 1 is provided underneath with lugs 42 for attaching it to any suitable support, for instance, to the edge of a piano or similar musical instrument. A clamping screw with a thumb head 43 on one end and a pressure plate 44 on the other.

The rods 35 and 36 are placed so that the contact bars 24 can touch them only when deflected by the teeth 23 and are separated when the smooth edge of the disc 20 moves against the bar 24.

The contact bars 24 through the bar 25, contact bushing 33 and a wire or lead 45 are connected with a pedal 46 which normally stays in the raised position against a stop 47 under action of a spring 48. This pedal when depressed can touch a contact point 49 connected by wire 50 with the line 6 (with the negative wire as shown in Fig. 1).

The wire 59 extends from the line 6 and is also connected with a wire 51 which is connected with a magnet coil 52 operating a mallet 53 of a large drum 54. The other end of this coil is connected by a wire 55 with a contact button 62. A second contact button 61 is placed next to it and is connected with a wire 63, a switch 65 and a wire 38.

A pedal 60, when depressed, is adapted to electrically connect the buttons 57 and 58, connected with wires 50 and 55 respectively. In its free position it is raised by a spring 56 and touches buttons 61 and 62. The wire 50 is also connected with the lower button 66 of a pedal 67. The other lower button 74 of this pedal is connected with a contact plate 68 of a controller 69 through a wire 70. The contact handle 71 of the controller is connected by a wire 72 with an upper button 73 of the pedal 67. The other upper button 75 is connected with the wire 39. In its upper position the pedal 67 closes the circuit between the buttons 73 and 75, and in its lower position it closes the circuit between the buttons 66 and 74.

A mallet 77 of a small drum 78 is operated by an electromagnetic device 79 with three wires, 80, 81 and 82 leading therefrom. The wire 80 represents a common lead and is connected through a rheostat 83 with the wire 59. The wire 81 leads from a vibrating mechanism in the magnet 79 and is connected with buttons 85, 86 and 87, all three connected together. The wire 82 leads from a single action (single strike) contact points of the magnet 79 and is connected with a button 88 of the controller 69.

The gong 108 has a soft mallet 114 which may be used to muffle or to deaden its sound. This mallet is operated by a magnet 115 con-

nected by a wire 117 with a button 118. A second button 119 is connected with the wire 50. A pedal 76 is used to close the circuit on the magnet 115. The upper buttons of this pedal may be used to connect the magnet 115 with the controller 1 in a manner similar to other connections through special buttons on the controller 69 (not shown) and additional handle 71.

The mechanism 79 may be such as described in my above identified patent, or of any similar nature.

A contact handle 89, when turned to the right (Fig. 1), may be used to short circuit the rheostat 83.

The contact handle 71 may be turned on its pivot to the extreme right position, indicated with dotted lines in Fig. 1. It establishes electrical connections between its pivot, where the wire 72 is attached, and the upper row of buttons, such as 85 and 88. It is insulated, however, from the lower buttons, such as 86 and 87, and from the contact plate 68. The connections between these lower buttons and the contact plate 68 is established by means of a contact brush plate 90, insulated from the handle 71.

An electromagnetic device 91, similar to the device 79, operates a brush 92. It has three wires, 93, 94 and 95. The wire 95 is connected with a wire 80, wire 93 with a button 96 and wire 94 with buttons 97, 98 and 99. The connections are not shown, being identical with connections for the device 79.

A similar device 100 operates a pair of wooden blocks and has wires 101, 102 and 103, wire 103 being connected with the wire 80, wire 101—with a button 104 and wire 102—with a button 105. A similar device 106 operates a mallet 107 of a gong 108 and has wires 109, 110 and 111 connected similarly with the wire 80 and buttons 112 and 113.

The operation of my device is as follows.

The operator first closes switch 114 thereby starting the motor 2. By listening to the light clicks of the teeth 23 striking springs 24 and the ringing of the spring 41, he determines the desired measure or time intervals between the contacts for his music and adjusts accordingly the motor speed by turning the cam 12 by the handle 14. In this adjustment he may be also guided by observing divisions on the cam wheel. The cam turns the crank arm 11 thereby raising or lowering the brake plate 10 which controls the speed of the motor through movable plate 9 on the governor 8.

Then the operator sets the handles of the controller 69 in positions according to the devices he wishes to use. In positions shown in Fig. 1 the handle 65 is turned to the left so that the large drum will be included in the operations of the automatic mechanism. The handle 89 is turned to the left, so that the

rheostat is included in the circuit, producing piano effect (forte will be produced by turning this handle to the right). The handle 71 is placed over buttons 87 and 88 thereby including the small drum in the operation.

According to his music the operator pulls the handle 27 so as to place in operation the desired discs 20. For instance, the left disc 20, controlling the large drum, may have four teeth, one for each half measure, and the right disc may have eight teeth, one for each quarter measure, for the small drum or other musical devices. For special effects a combination of discs may be selected in which the small drum will also have beats between the others at regular intervals, for instance, by using disc shown in Fig. 3.

I found that five combinations of discs will cover all the requirements of the contemporary dancing music for which my mechanism is especially adapted, although, of course, any number of such combinations may be used.

When everything is set right, the operator watches for the next ringing of the spring 41 and then starts playing piano, violin or other musical instrument with which he leads his band or orchestra. The drums will beat then in a perfect time in a desired measure, as soon as he presses the pedal 46 with his left foot thereby closing the circuit through the automatic controller.

If the operator presses now the pedal 60, then the large drum will be disconnected from the automatic controller 1 and, if the pedal touches buttons 57 and 58, will produce a single sound.

In the position of the controller handle 71 as shown, the small drum will be operated by the automatic controller 1 and the mallet 77. By pressing the pedal 67 the current will be disconnected from the single beat connections of the magnet 79 and vibrating mechanism will operate through contacts 66 and 74 continuously as long as the operator's foot is on this pedal. The automatic controller 1 will be then disconnected.

If the handle 71 is turned on the buttons 85 and 86, then the vibrating mechanism of the magnet 79 will operate from the automatic controller 1. The action of the pedal will be the same as in the previous position of the handle 71.

If the handle 71 is placed over buttons 96 and 99, then the brush 92 will operate from the controller with single beats, and with vibrating beats when handle is placed on buttons 97 and 98. Depression of the pedal 67 will produce single continuous vibrations.

With the handle over buttons 104 and 105 the wooden blocks 100 will operate, but without vibration from the automatic controller. By placing the handle over buttons 112 and 113 the gong mallet 107 will be operating

from the automatic controller. Its sound may be muffled by pressing the pedal 76.

The extreme right position of the handle 71 is indicated with dotted lines. An additional handle may be provided, however, for separately operating gong and the blocks.

Important advantages of my automatic mechanism are that it provides the musicians with a perfect timing for their music, giving an automatic operation for band drums and other similar instruments. With my device it is not necessary to have a drummer in the orchestra. The timing and the measure can be changed instantly while the orchestra is playing, also selection of the drums and their accompanying instruments.

I claim as my invention:

1. In an automatic drum, the combination with an electromagnetic device for operating said drum, of an automatic controller for said device, a motor for said controller, and manually operated means for adjusting the operation of said controller.

2. In an automatic drum, the combination with a plurality of electromagnetic devices for operating said drum, of an automatic controller for said devices, a motor adapted to operate said controller, means to control the speed of said motor, and means to control the operation of said controller.

3. In an automatic drum, the combination with a plurality of electromagnetic devices for operating said drum, of an automatic controller for said devices, a motor adapted to operate said controller, a plurality of electrical connections for said devices, and manually operated means to control said connections.

4. In an automatic drum, the combination with a plurality of electromagnetic devices for operating said drum, a plurality of contact members for said devices, a cylindrical member adapted to operate said contact members in a predetermined order, means to rotate said cylindrical member at a constant speed, and means to control said speed.

5. In an automatic drum, the combination with a plurality of electromagnetic devices for operating said drum, a plurality of contact members for said devices, a cylindrical member, a plurality of sections on said cylindrical member, said sections being adapted to operate said contact members in a predetermined order, means to change the relative position of said sections and said contact members thereby changing the order of operation of said devices, electrical connections for said contact members, and manually operated means to change said electrical connections.

6. In an automatic drum, the combination with a plurality of electromagnetic devices for operating said drum, a plurality of contact members for said devices, a cylindrical member, a plurality of sections on said cylindrical member, said sections being adapted to

operate said contact members in a predetermined order, a motor adapted to rotate said cylindrical member at a constant speed, electrical connections for said contact members, and a plurality of pedals adapted to operate said electrical connections.

7. In an automatic drum, the combination with a plurality of electromagnetic devices for operating said drum, a plurality of contact members for said devices, a cylindrical member, a plurality of sections on said cylindrical member, said sections being adapted to operate said devices through said contact

members in a predetermined order, a motor adapted to rotate said cylindrical member at a constant speed, means to shift said cylindrical member lengthwise thereby changing the order of operation of said devices, electrical connections for said contact members, and manual means for controlling said electrical connections.

Signed at Brooklyn in the county of Kings and State of New York this 22d day of September, A. D. 1927.

ALEX M. LIFSHITZ.