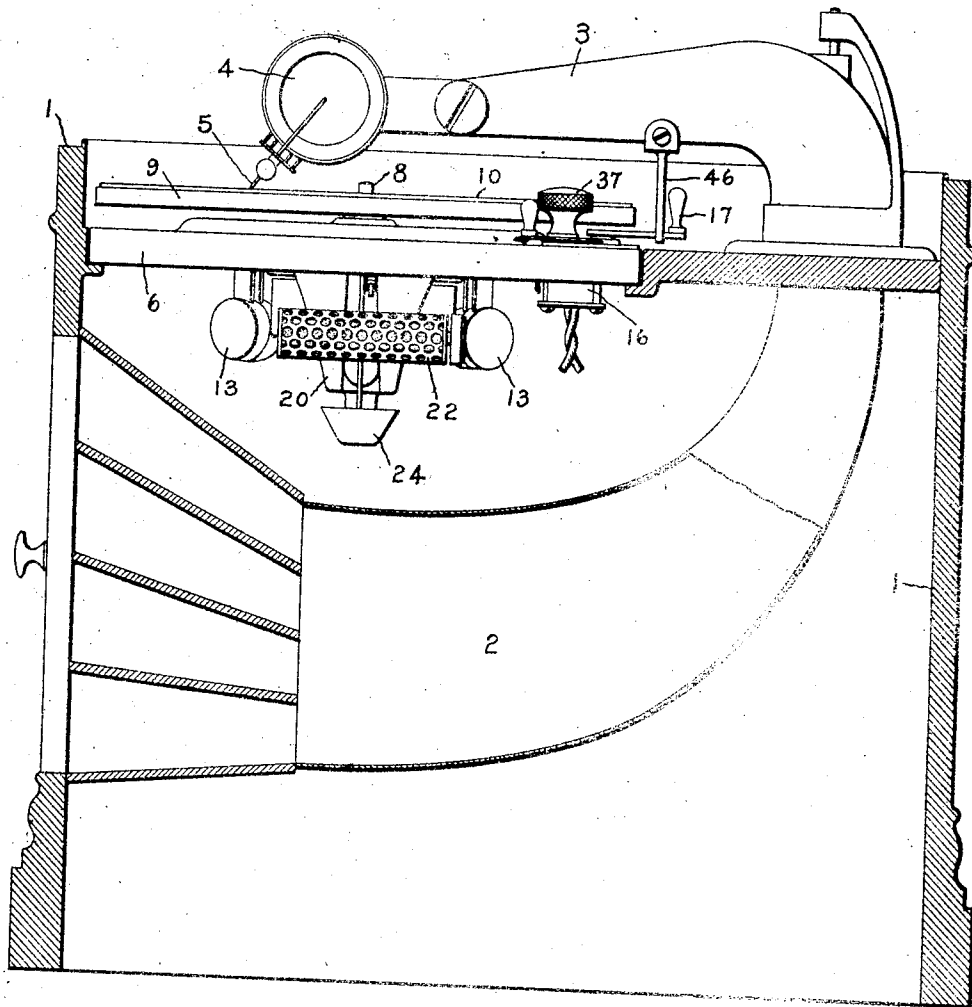


J. J. WOOD,
TALKING MACHINE.
APPLICATION FILED MAY 6, 1915.

1,304,233.

Patented May 20, 1919.
4 SHEETS—SHEET 1.

Fig. 1.



Inventor:
James J. Wood.
by *Alfred Davis*
His Attorney.

1,304,233.

Patented May 20, 1919.
4 SHEETS—SHEET 2.

FIG. 2

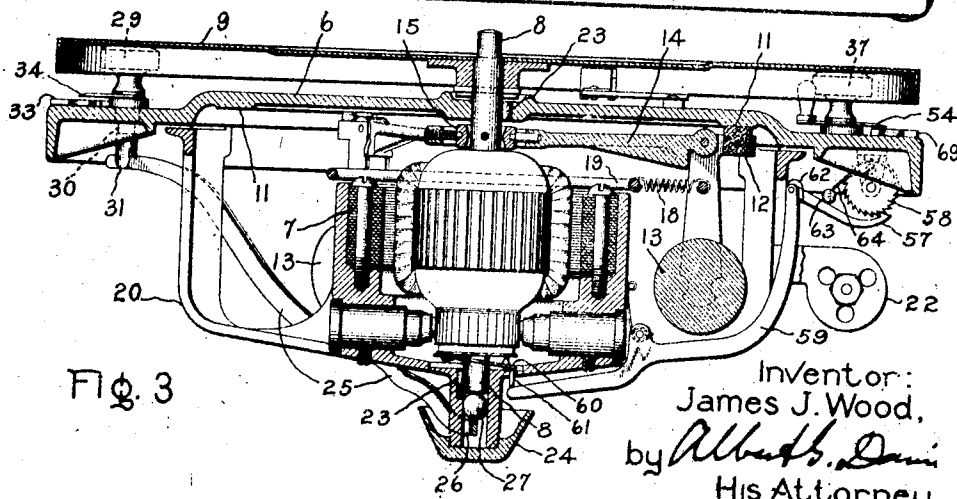
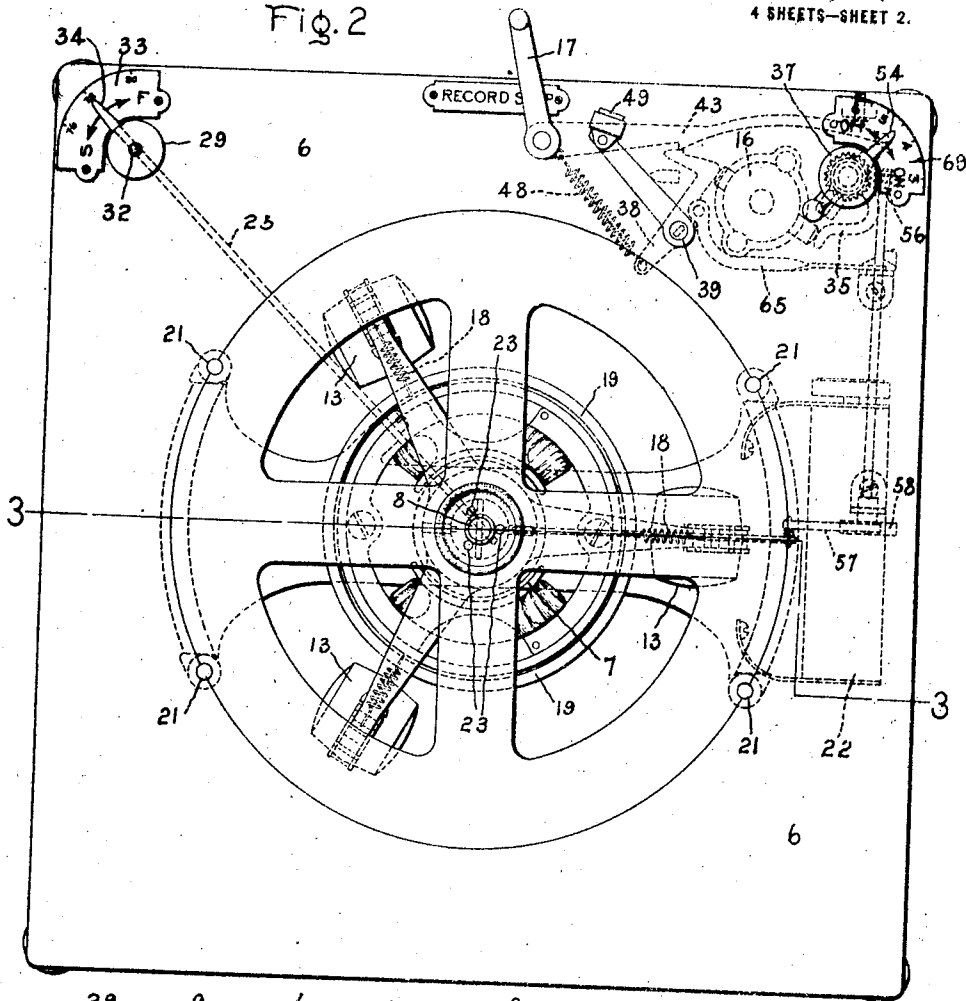


FIG. 3

Inventor:
James J. Wood,
by *Albert B. Davis*
His Attorney.

1,304,233.

J. J. WOOD,
TALKING MACHINE.
APPLICATION FILED MAY 6, 1915.

Patented May 20, 1919.
4 SHEETS--SHEET 3.

Fig. 5

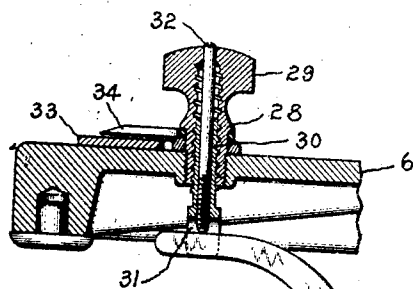
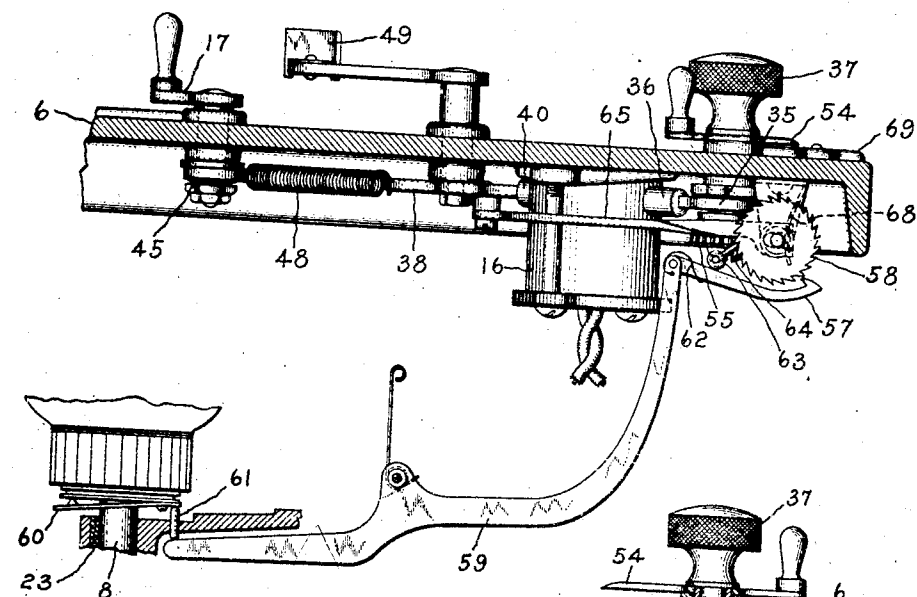


Fig. 4

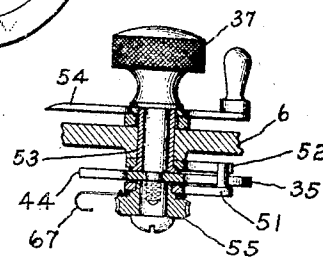


Fig. 6



Fig. 8

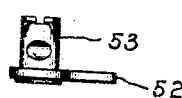
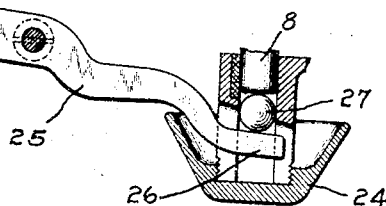


Fig. 7

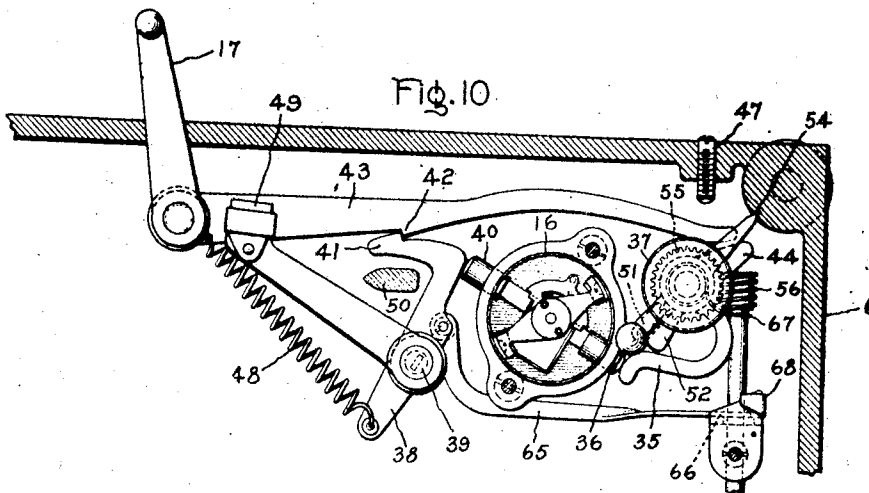
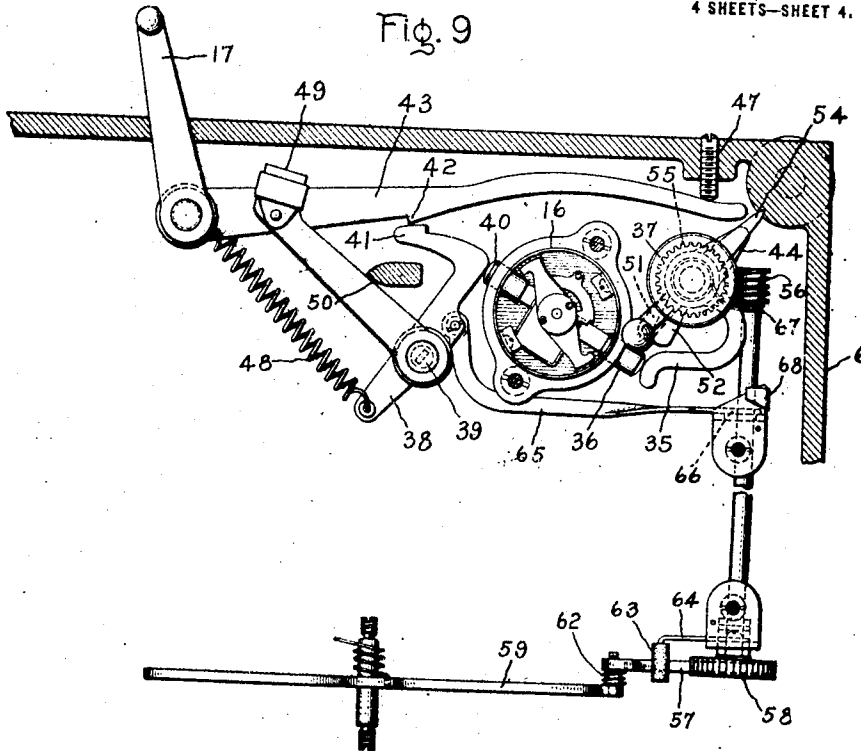


Inventor:
James J. Wood,
by *Alfred B. Davis*
His Attorney.

J. J. WOOD.
TALKING MACHINE.
APPLICATION FILED MAY 6, 1915.

1,304,233.

Patented May 20, 1919.
4 SHEETS—SHEET 4.



Inventor:
James J. Wood,
by *Albert B. Davis*
His Attorney.

UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

BEST AVAILABLE COPY

TALKING-MACHINE.

1,304,233.

Specification of Letters Patent.

Patented May 20, 1919.

Application filed May 6, 1915. Serial No. 26,278.

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, county of Allen, State of Indiana, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

My invention relates to talking machines or similar apparatus and is particularly applicable to talking machines of the disk type. It has for its object to provide a novel form of electric drive for such machines. My invention comprises a novel and simple apparatus, in which, first, the motor is directly connected to the record carrying plate and drives the plate with constant angular velocity; second, the speed of the motor is easily controlled; and third, the motor, after being started, may be stopped by manual means, by a record stop, or after a definite number of revolutions of the motor. My invention, as comprised in the apparatus for driving the record carrying plate with constant angular velocity and for controlling the speed of the motor, forms the subject matter of a divisional application, S. N. 207,828, filed Dec. 19, 1917.

The various features of novelty, which characterize my invention, are pointed out in the claims annexed to and forming part of this specification. For a better understanding of my invention reference may be had to the following description, taken in connection with the accompanying drawings, in which Figure 1 is a sectional view of a talking machine embodying my invention; Fig. 2 is a plan view of my motor drive; Fig. 3 is a sectional view taken on the line 3-3 of Fig. 2; Fig. 4 is an enlarged view of the speed controlling mechanism; Fig. 5 is an enlarged view, in elevation, of the mechanism for starting and stopping the motor; Fig. 6 is a sectional view of a detail; Figs. 7 and 8 are views of a detail, and Figs. 9 and 10 are plan views of the mechanism of Fig. 5.

In Fig. 1 of the drawings, I have shown my invention applied to a talking machine of the disk type having a cabinet 1, a horn 2, and a sound box arm 3 on which is mounted a sound box 4. The sound box carries a stylus 5. A motor plate 6 is mounted in the cabinet. These parts may be of any usual or well known construction.

Supported from the motor plate 6 is an

electric motor 7 having a vertical shaft 8. A record carrying plate 9 is mounted on the shaft of the motor and carries a record 10, the grooves on which are engaged by the stylus 5. The speed and angular velocity of the motor are maintained constant by means of a centrifugal governor of novel design and mounting which comprises two coöperating members, one of which is preferably mounted on a universal joint for reasons which will be hereinafter set forth. One of these members is a track 11 which is shown as being formed on the under side of the motor plate. The other member comprises felt friction pads 12, weights 13 for moving the pads into more or less close engagement with the track 11, and a member 14 to which the weights are pivoted and which is shown as being mounted on a universal joint 15 on the motor shaft. By thus mounting one member of the governor on a universal joint, the pressure of the friction pads on the track may be maintained constant, even though the shaft of the motor is tilted so as to be at an angle to the vertical, the pressure also being maintained constant even though there are slight irregularities in the track. The speed of the motor is varied by means of a novel mechanism which operates to raise or lower the shaft of the motor and thus change the pressure of the friction pads 12 on the track 11. The current to the motor is turned on and off by means of a switch 16 of ordinary construction which may be operated into the on and off positions manually, and when in the on position, it may also be operated into the off position by means of a record stop 17, or after a definite number of revolutions of the motor by means of the novel mechanism hereinafter described.

The friction pads 12 are pivoted to the governor weights 13, which are retarded by springs 18 connected to an equalizing member 19, shown in the form of a ring. The springs and equalizing member together with the universal joint support for the weights, give an absolutely uniform pressure on the friction pads, thereby producing constant angular velocity under all conditions of operation. The universal joint in the arrangement shown comprises gimbals mounted at right angles to each other.

The electric motor 7 is suspended from the motor plate 6 by means of a bracket 20 fastened thereto by screws 21. The motor is

shown as a commutator motor of the series type, which can be operated on the commercial ranges of voltage of alternating current circuits and by the insertion of a resistance 22 in series with the motor can be operated on the same ranges of voltage of direct current circuits, the speed at different commercial frequencies and voltages being practically constant. In order to reduce vibration to a minimum and keep the bearings of the motor in the bracket 20 properly lubricated for a considerable period of time, they are fitted with felt rubbers 23 set 120 degrees apart. These rubbers 23 take up automatically any looseness that may be in the bearings tending to produce noise due to excessive vibration. A little oil basin 24 is provided at the bottom of the bracket 20 to catch any drip that may occur.

The shaft 8 of the motor is raised or lowered to vary the speed of the motor by means of a lever 25 which is operatively connected to the end of the motor shaft. This lever is rocked on its pivot by a compound screw 25 which engages one end of the lever 25 and which when turned in one direction, lowers the bearing and increases the speed, and when turned in the opposite direction raises the bearing to decrease the speed. The lever 25 is pivoted to the bracket 20. Between the end 26 of the lever and the shaft 8 is a ball 27 which acts as a ball thrust bearing therefor. The compound screw is constructed of three concentric parts one within the other. The first is a fine threaded screw 28 for causing a small motion in the direction of its axis when a knob 29, formed integrally therewith, is turned to the right or left. The second is a coarse threaded screw 30 which has a forked end 31 into which the lever 25 is fitted and which prevents the screw 30 from turning. This screw 30 travels rapidly for a slight motion of the knob 29 and presses on the end of the lever 25 to rock it on its pivot through the agency of the third screw, which is another fine threaded screw 32 of small diameter threaded into the coarse threaded screw and fitting loosely within the knob 29. This fine threaded screw 32 is used to adjust the position of the lever 25 with reference to the knob 29 so as to give the lever its initial adjustment. The motor plate 6 is provided with a dial 33 on which are marked certain speeds such as 76, 78 and 80 revolutions per minute. By moving the fine threaded screw, the lever 25 may be adjusted so as to give the exact speed marked on the dial 33 and to which a pointer 34, carried by the knob 29, points. After the initial adjustment has been made, the turning of the pointer 34 to any of the other speeds indicated on the dial will give the speed of the motor in accordance with that indicated on the dial.

The switch 16 is shown as being fastened to the under side of the motor plate 6 and the mechanism for operating it either manually, by the record stop, or after a definite number of revolutions is best shown in Figs. 9 and 10, which are views of this mechanism with the motor plate cut away. The switch is moved from the off position shown in Fig. 9 to the on position shown in Fig. 10 by a member 35 which engages a button 36 on one side of the switch and is rotated by means of a knob 37 to which the member 35 is rigidly connected. A spring actuated latch lever 38 is operatively connected to the switch and is rotated about its pivot 39 by a second button 40 on the other side of the switch when the switch is moved to its on position. When the switch is in the on position, the latch 41 on the latch lever 38 is engaged by a projection 42 on a spring pressed trip lever 43 and holds the latch lever in the position shown in Fig. 10. The knob 37 carries a second member 44, which is shown as being integral with the member 35 and which when the knob 37 is turned in the opposite direction engages the end of the trip lever 43 so as to rotate it on its pivot and move the projection 42 out of engagement with the latch 41 on the latch lever, thereby permitting the latch lever to push the switch 16 to the off position. The record stop 17 is connected to the trip lever 43 but is movable relatively thereto by the application of more force than that required to trip the trip lever. This connection is made by means of a friction plate 45. This record stop is adjusted so that it is engaged by a member 46 carried by the sound box arm 3 of the talking machine when the stylus 5 reaches substantially the last groove of the record, moves the trip lever 43 out of engagement with the latch lever 38 and thereby opens the switch 16. An adjustable stop 47 is provided for the trip lever 43 for reducing the lost motion of the trip lever to a minimum and consequently the record stop can be set exactly to the place at which it is desired to stop the machine. The levers 38 and 43 are preferably both actuated by a single spring 48 which is connected to the lever 38 at a distance from its pivot and to the lever 43 close to its pivot, because the force required to be exerted by the spring to retain the lever 43 in the latched position is small compared with the force required to be exerted by the spring to move the lever 38 and open the switch 16. An ordinary brake 49 for engaging the record carrying plate 9 is mounted on the latch lever 38 and is applied when the trip lever 43 is moved out of engagement with the latch lever 38 and the switch 16 is opened. A stop 50 on the motor plate 6 limits the movement of the brake.

The apparatus for opening the switch 16

after a certain number of revolutions of the motor operates on the trip lever 43 and comprises an arm 51 which is moved into engagement with the trip lever 43 so as to release the latch lever 38 and open the switch 16, and an adjustable stop 52 for the arm 51. As will be seen from Figs. 6, 7 and 8, the stop 52 is mounted on a sleeve 53 which is frictionally mounted in the motor plate 6 and in which the knob 37 is loosely mounted. This stop may be moved by means of a pointer 54 mounted on the upper portion of the sleeve 53. The arm 51 is mechanically connected to a worm wheel 55 which is rotatably mounted on the knob 37.

This worm wheel is revolved by a worm 56 through the action of a pawl 57 and a ratchet wheel 58, which pawl is operated by an oscillating lever 59. The lever 59 derives its motion from a wobble plate 60 mounted on the shaft 8, the wobble plate causing a small pin 61 to move up and down and rock the lever 59 to which the ratchet is pivoted. The motion of this ratchet mechanism is therefore dependent upon the number of revolutions of the motor. The ratchet is held against the ratchet wheel by a spring 62. In order that the ratchet shall operate silently, when dropping into a tooth it is cushioned by a felt rubber 63 which is also mounted on a spring 64. The arm 51 flies back to zero every time the switch 16 is operated, whether by hand or automatically. This is necessary in order that the record will run for at least the number of revolutions for which the arm 51 is set every time the motor is started, and thereby prevent the possibility of the motor stopping in the middle of a record. This is accomplished by means of a lever 65 having a forked end 66 pivoted to the latch lever 38. When the lever 38 opens the switch and puts on the brake, it forces this forked lever 65 forward and automatically throws the worm out of gear, and the arm 51 together with the worm wheel are rotated by a spring 67 until the arm 51 engages the stop 52. When this forked lever is moved in the opposite direction by the latch lever being moved into its latched position, a spring 68 presses the worm into engagement with the worm wheel. The arm 51 is shown as frictionally mounted on the worm wheel 55, so that in case it were moved into engagement with the trip lever 43 and the switch 16 failed to open the circuit of the motor, the arm would rotate on the worm wheel and do no injury to the mechanism. The pointer 54 moves over a plate 69 which may be graduated in number of revolutions, but since usually a talking machine runs at speeds which vary only by a few revolutions per minute, I have shown the plate 69 graduated in minutes. This graduation has been made on the basis of 76 revolutions per minute, which is the

normal speed of the particular talking machine illustrated. The records now being manufactured are of such size that they run from three to five minutes at normal speed, and I have arranged my timing apparatus so that it may be adjusted to stop the motor after any interval up to six minutes, the plate 69 being graduated from 3 to 6 minutes.

I desire it to be understood that my invention is applicable to any talking machine or similar apparatus and is not limited to the particular arrangement shown and described and I aim in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, a record stop connected to said trip lever but movable relatively thereto by the application of more force than that required to trip said trip lever, said record stop being adapted to be engaged so as to move said trip lever out of engagement with said latch lever whereupon said latch lever moves to open said switch, and a knob having a member rotatable therewith and operatively connected to said switch for closing it and a second member rotatable with said knob for moving said trip lever so as to unlatch said latch lever and open said switch.

2. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, a record stop connected to said trip lever but movable relatively thereto by the application of more force than that required to trip said trip lever, said record stop being adapted to be engaged so as to move said trip lever out of engagement with said latch lever whereupon said latch lever moves to open said switch, a knob having a member rotatable therewith and operatively connected to said switch for closing it and a second member rotatable with said knob for moving said trip lever so as to unlatch said latch lever and open said switch, and a stop for said trip lever for limiting its movement after it becomes disengaged from said latch lever.

3. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a pivoted latch lever operatively connected with said switch, a pivoted trip lever for holding said latch lever, a spring attached

at one end to said latch lever at a distance from its pivot and at the other end to said trip lever close to its pivot, a knob having a member rotatable therewith and operatively
 5 connected with said switch for closing it and a second member rotatable with said knob for moving said trip lever so as to unlatch said latch lever and open said switch, and a record stop connected to said trip lever
 10 but movable relatively thereto by the application of more force than that required to trip said trip lever, said record stop being adapted to be engaged so as to move said trip lever out of engagement with said latch
 15 lever whereupon said latch lever moves to open said switch.

4. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a pivoted
 20 latch lever operatively connected with said switch, a pivoted trip lever for holding said latch lever, a spring attached at one end to said latch lever at a distance from its pivot and at the other end to said trip lever close
 25 to its pivot, a knob having a member rotatable therewith and operatively connected with said switch for closing it and a second member rotatable with said knob for moving said trip lever so as to unlatch said latch
 30 lever and open said switch, a record stop connected to said trip lever but movable relatively thereto by the application of more force than that required to trip said trip lever, said record stop being adapted to be
 35 engaged so as to move said trip lever out of engagement with said latch lever whereupon said latch lever moves to open said switch, and a stop for said trip lever for limiting its movement after it becomes disengaged from
 40 said latch lever.

5. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively con-
 45 nected with said switch, a spring actuated trip lever for holding said latch lever, manually operable means for closing said switch, an arm, an adjustable stop for said arm, and means for moving said arm into engagement
 50 with said trip lever and thereby move said trip lever out of engagement with said latch lever, said means being actuated by the revolution of said motor.

6. In a talking machine, a record carrying
 55 plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, manu-
 60 ally operable means for closing said switch, an arm, an adjustable stop for said arm, means for moving said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch
 65 lever, said means being actuated by the revo-

lutions of said motor, and means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever.

7. In a talking machine, a record carrying
 70 plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, manu-
 75 ally operable means for closing said switch, an arm, an adjustable stop for said arm, a ratchet mechanism operated by the revolutions of said motor for rotating said arm into engagement with said trip lever and
 80 thereby move said trip lever out of engagement with said latch lever, and means for returning said arm to its initial position after said trip lever has moved out of en-
 85 gagement with said latch lever.

8. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively con-
 90 nected with said switch, a spring actuated trip lever for holding said latch lever, manually operable means for closing said switch, an arm, an adjustable stop for said arm, a worm wheel mechanically connected to said arm, a worm normally in engagement
 95 with said worm wheel, a ratchet mechanism operated by the revolutions of said motor for rotating said worm and thereby said arm into engagement with said trip lever, and means for returning said arm to its initial
 100 position after said trip lever has moved out of engagement with said latch lever.

9. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a
 105 spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, manually operable means for closing said switch, an arm, an adjustable stop for said arm, a
 110 worm wheel mechanically connected to said arm, a worm normally in engagement with said worm wheel, a ratchet mechanism operated by the revolutions of said motor for rotating said worm and thereby said arm
 115 into engagement with said trip lever, and means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever comprising a lever connected with said latch
 120 lever for throwing said worm out of mesh with said worm wheel and a spring tending to rotate said arm and said worm wheel toward its initial position.

10. In a talking machine, a record carry-
 125 ing plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, a
 130

manually operable knob having a member rotatable therewith and operatively connected to said switch for closing it and a second member rotatable therewith for moving said trip lever so as to unlatch said latch lever and open said switch, an arm, a worm wheel mechanically connected to said arm, said worm wheel being mounted on said knob but movable relatively thereto, an adjustable stop for said arm also mounted on said knob but movable relatively thereto, a worm normally in engagement with said worm wheel, a ratchet mechanism operated by the revolutions of said motor for rotating said worm and thereby said arm into engagement with said trip lever, and means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever.

11. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, a manually operable knob having a member rotatable therewith and operatively connected to said switch for closing it and a second member rotatable therewith for moving said trip lever so as to unlatch said latch lever and open said switch, an arm, a worm wheel mechanically connected to said arm, said worm wheel being mounted on said knob but movable relatively thereto, an adjustable stop for said arm also mounted on said knob but movable relatively thereto, a worm normally in engagement with said worm wheel, a ratchet mechanism operated by the revolutions of said motor for rotating said worm and thereby said arm into engagement with said trip lever, and means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever, comprising a lever connected with said latch lever for throwing said worm out of mesh with said worm wheel and a spring tending to rotate said arm and worm wheel toward its initial position.

12. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, manually operable means for closing said switch, an arm, an adjustable stop for said arm, means for moving said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch lever, said means being actuated by the revolution of said motor, and a brake mounted on said latch lever for engaging said record carrying plate when said trip lever moves out of engagement with said latch lever.

13. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, manually operable means for closing said switch, an arm, an adjustable stop for said arm, a ratchet mechanism operated by the revolutions of said motor for rotating said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch lever, means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever, and a brake mounted on said latch lever for engaging said record carrying plate when said trip lever moves out of engagement with said latch lever.

14. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for said motor, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, a manually operable knob having a member rotatable therewith and operatively connected to said switch for closing it and a second member rotatable therewith for moving said trip lever so as to unlatch said latch lever and open said switch, an arm, a worm wheel mechanically connected to said arm, said worm wheel being mounted on said knob but movable relatively thereto, an adjustable stop for said arm also mounted on said knob but movable relatively thereto, a worm normally in engagement with said worm wheel, a ratchet mechanism operated by the revolutions of said motor for rotating said worm and thereby said arm into engagement with said trip lever, means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever comprising a lever connected with said latch lever for throwing said worm out of mesh with said worm wheel and a spring tending to rotate said arm and worm wheel toward its initial position, and a brake mounted on said latch lever for engaging said record carrying plate when said trip lever moves out of engagement with said latch lever.

15. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for closing the motor circuit, and means for opening the motor circuit depending upon the number of revolutions of said motor comprising a switch operating mechanism, a ratchet mechanism for operating the same, a wobble plate on the motor shaft, and an operative connection between said wobble plate and said ratchet mechanism.

16. In a talking machine, a record carrying plate, an electric motor for driving said

plate, an electric switch for closing the motor circuit, and means for opening the motor circuit depending upon the number of revolutions of said motor comprising a switch operating mechanism, a ratchet mechanism for operating the same, a wobble plate on the motor shaft, and an oscillating lever operatively connected at one end to said wobble plate and at the other end with said ratchet mechanism.

17. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for closing the motor circuit, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, an arm, an adjustable stop for said arm, a ratchet mechanism for rotating said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch lever, a wobble plate on the motor shaft, and an operative connection between said wobble plate and said ratchet mechanism.

18. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for closing the motor circuit, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, an arm, an adjustable stop for said arm, a ratchet mechanism for rotating said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch lever, a wobble plate on the motor shaft, an operative connection between said wobble plate and said ratchet mechanism, and means for returning said arm to its initial position after said

trip lever has moved out of engagement with said latch lever.

19. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for closing the motor circuit, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, an arm, an adjustable stop for said arm, a ratchet mechanism for rotating said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch lever, a wobble plate on the motor shaft, and an oscillating lever operatively connected at one end with said wobble plate and at the other end with said ratchet mechanism.

20. In a talking machine, a record carrying plate, an electric motor for driving said plate, an electric switch for closing the motor circuit, a spring actuated latch lever operatively connected with said switch, a spring actuated trip lever for holding said latch lever, an arm, an adjustable stop for said arm, a ratchet mechanism for rotating said arm into engagement with said trip lever and thereby move said trip lever out of engagement with said latch lever, a wobble plate on the motor shaft, an oscillating lever operatively connected at one end with said wobble plate and at the other end with said ratchet mechanism, and means for returning said arm to its initial position after said trip lever has moved out of engagement with said latch lever.

In witness whereof, I have hereunto set my hand this 1st day of May, 1915.

JAMES J. WOOD.