

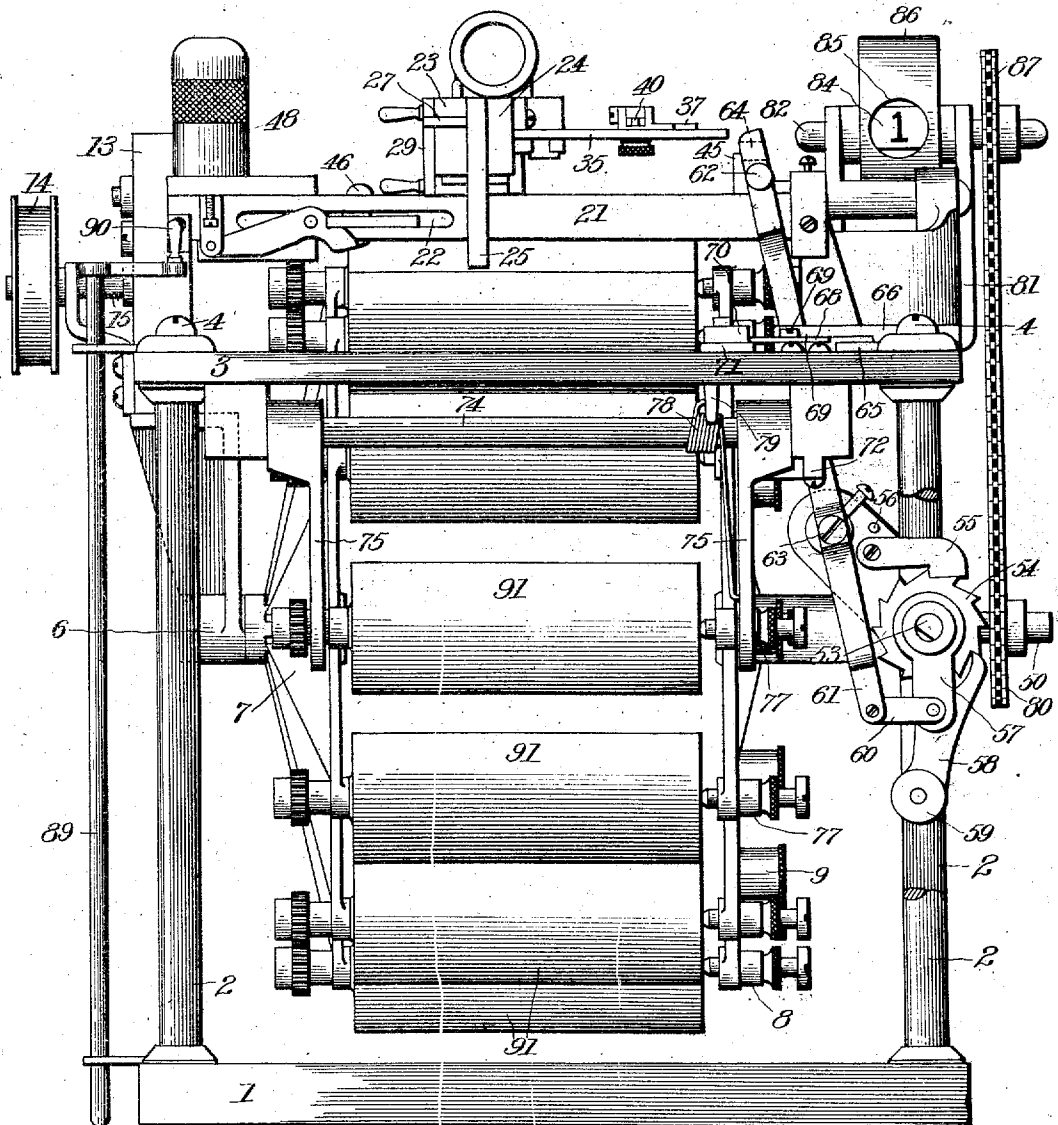
H. E. MARKLE.
MULTIPLEX GRAPHOPHONE.
APPLICATION FILED MAY 18, 1907.

962,446.

Patented June 28, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

C. H. Wacker
J. M. Dykroop

Inventor

By *Hyman E. Markle*
Edwin S. Clarkson

Attorney

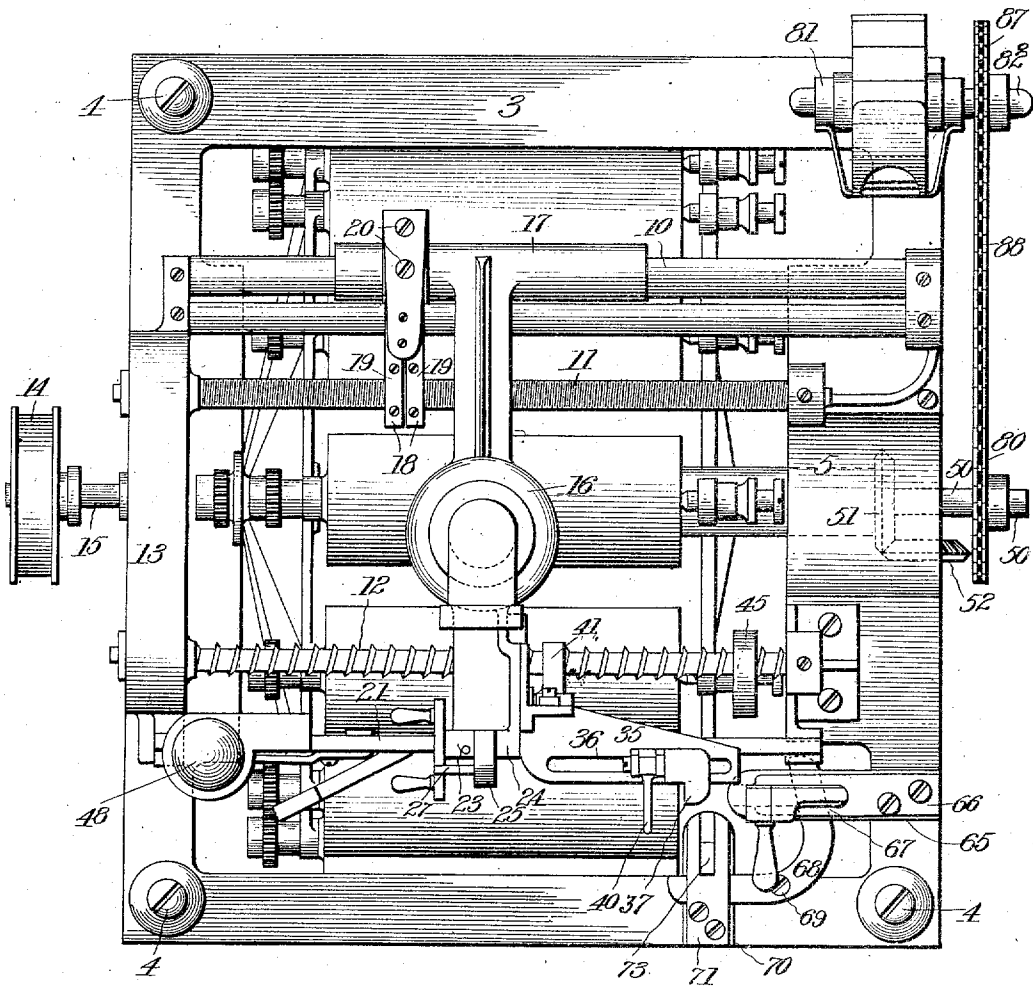
H. E. MARKLE.
 MULTIPLEX GRAPHOPHONE.
 APPLICATION FILED MAY 16, 1907.

962,446.

Patented June 28, 1910.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses

C. H. Walker,
J. W. Hynkeofo,

Inventor
Hyman E. Markle

By

Edwin S. Clarkson

Attorney

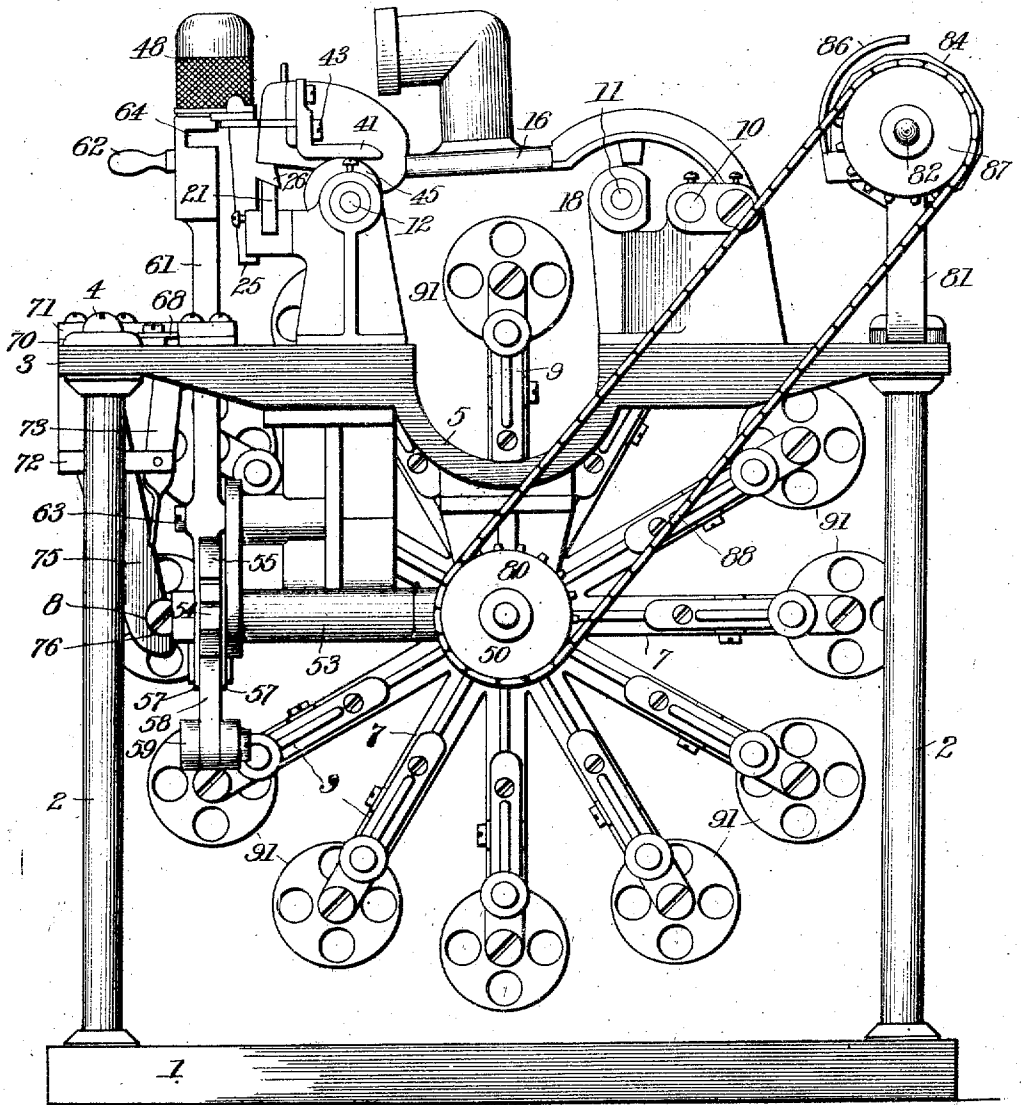
H. E. MARKLE.
MULTIPLEX GRAPHOPHONE.
APPLICATION FILED MAY 16, 1907.

962,446.

Patented June 28, 1910.

4 SHEETS—SHEET 3.

Fig. 3.



Witnesses
C. W. Walker.
J. N. Hynkoop.

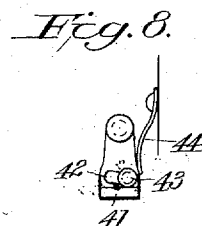
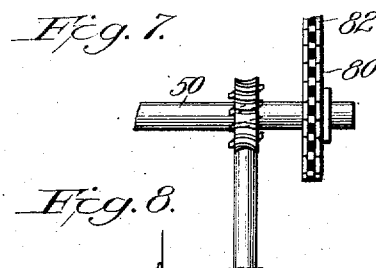
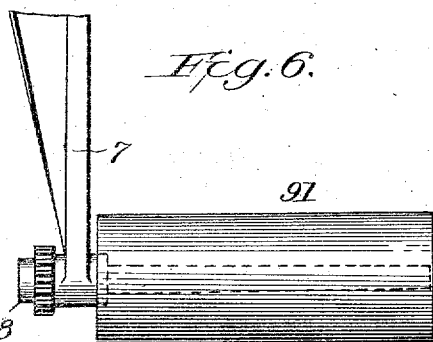
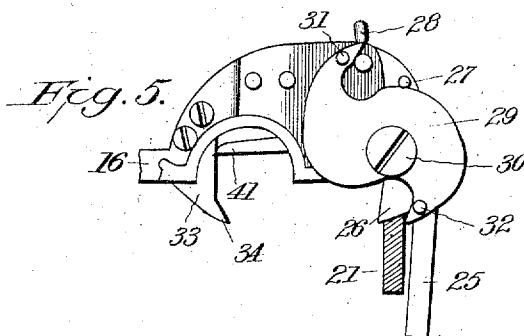
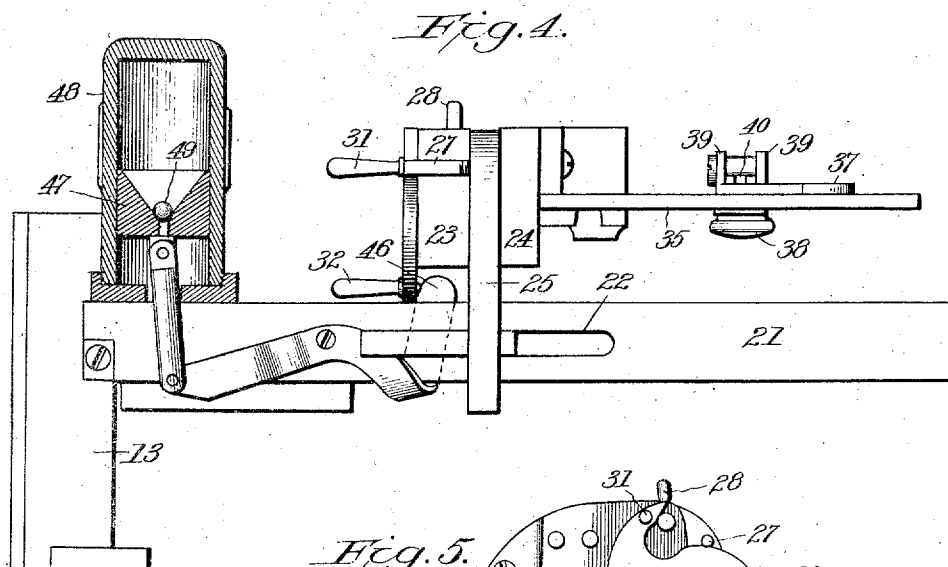
Inventor
Herman E. Markle
By
Sam S. Clarkson
Attorney

H. E. MARKLE.
 MULTIPLEX GRAPHOPHONE.
 APPLICATION FILED MAY 16, 1907.

962,446.

Patented June 28, 1910.

4 SHEETS—SHEET 4.



Witnesses
C. M. Walker.
J. M. Hynkeofo.

Inventor
Hyman E. Markle
 By *James S. Clarkson*
 Attorney

UNITED STATES PATENT OFFICE.

HYMAN E. MARKLE, OF NASHVILLE, TENNESSEE.

MULTIPLEX GRAPHOPHONE.

962,446.

Specification of Letters Patent. Patented June 28, 1910.

Application filed May 18, 1907. Serial No. 374,013.

To all whom it may concern:

Be it known that I, HYMAN E. MARKLE, citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Multiplex Graphophones, of which the following is a specification.

This invention is an improvement on the machine shown in my application filed August 27, 1906, Serial Number 332,224.

The object of my present invention is to simplify and improve the mechanism shown in my former application; a further object of my invention is to provide a machine of this character wherein the bringing of the successive records into playing position does not materially increase the work on the motor and consequently I am enabled to use a motor, spring or electric, of the size that would ordinarily be used in a single record machine; and with these and minor objects in view my invention consists in the parts and combination of parts as will be hereinafter more fully set out.

In the drawings—Figure 1 is a front elevation of a multiplex graphophone embodying my invention; Fig. 2 is a top plan view of the same; Fig. 3 is a side elevation; Fig. 4 is a detail elevation, parts being in section; Fig. 5 is a detail elevation of part of the carriage returning mechanism; Fig. 6 is a detail view of a slight modification of the magazine wheel; Fig. 7 is a detail view of a modification of part of the driving mechanism; Fig. 8 is a detail view of the carriage elevating pawl.

1 represents a suitable base upon which standards 2 are secured. A frame 3 is mounted upon the top of said standards and secured thereto by means of the bolts or screws 4. One of the side members of the frame is depressed at its center as at 5 which permits of the ready removal of a cylinder record from the magazine wheel. Suitable bearings 6 are hung from the frame 3 in which the magazine wheel 7 is journaled. The magazine wheel is of spider construction, the spokes on one side of the wheel having hinged members 8 which are

kept in locked position by means of the levers 9.

10 is the carriage rod and 11 the feed screw mounted in the frame 3 toward the rear of the machine.

12 is the return or repeating screw mounted near the front of the machine.

13 is a gear casing in which is journaled a suitable gear train.

14 is the band or power wheel connected by means of a shaft 15 to the gear train.

16 is the reproducing carriage having a suitable slide 17 mounted upon the rod 10.

18 are feed nuts adapted to engage the feed screw 11. These nuts are mounted upon spring rods or stems 19, which in turn are mounted upon the slide 17 and secured thereto by means of the screws 20.

21 is a rod or bar secured near the front of the machine adapted to support the front end of the reproducer carriage 16. This bar or rod is provided with an elongated slot 22 to be hereinafter referred to. The carriage 16 is provided at its front end with lugs 23 and 24 between which is pivoted an arm 25, said arm depending from the carriage and provided with a shoulder 26. This arm is provided with a pin 27 adapted to contact with the pin 28 in the lug 23, whereby the arm is prevented from falling back toward the center of the machine, thus insuring the arm at all times depending from the front of the carriage.

29 is a double cam mounted upon a carriage by means of the screw 30, said double cam being provided with operating pins 31 and 32. This double cam, when in the positions shown in Figs. 4 and 5, permits the front of the carriage to rest directly upon the bar or rod 21. If for any reason, such as transferring records, it is desirable to raise the front of the carriage, the double cam is swung upon its pivot whereby one of the cam faces is brought into engagement with the rod 21, thereby elevating the front of the carriage. If the carriage is raised without the aid of this cam the arm 25 has a tendency to swing inward until its shoulder 26 rests upon the top of the bar 21. When the cam 29 is used the pin 27 of the

arm is engaged by one of the cam faces, whereby it is prevented from engaging the rod 21.

33 is a tooth-bar depending from the front of the carriage and provided with the tooth 34, which is adapted to engage, under certain conditions, the return or repeating screw 12.

35 is an arm extending from one side of the front of the carriage over the bar 21, said arm being provided with an elongated slot 36.

37 is a flat hook secured upon the arm 35 by means of the set screw 38 which passes through the elongated slot 36. This hook is provided with lugs 39 between which is pivoted a stop 40. By means of the stop 40 I am enabled to limit the movement of the carriage by reason of the fact that it is adjustably mounted through the medium of the flat hook 37 and the slot 36. The carriage is provided with a loosely hung pawl 41 having an elongated slot 42 in which a screw 43 is secured to limit the side movement of said pawl. The pawl in Fig. 8 is normally pressed from the carriage toward one side by means of the flat spring 44.

45 is a cam mounted upon the right hand end of a repeating or return screw 12. Any suitable means may be employed to lock said cam at any desired point on the screw 12 according to the length of the record to be reproduced.

In the operation of the machine the carriage is fed toward the right and as the end of the record is approached the pawl 41 contacts with the cam 45, but, by reason of the flat spring 44 and the slot 42, said pawl is adapted to give until the limit of compression of the spring 44 is reached, when, the friction between the two parts is sufficient to enable the pawl to climb the eccentric when the lowest point of the eccentric is reached, whereupon the energy stored up in spring 44 causes the pawl 41 to slide upon the periphery of the eccentric. By reason of this lateral movement of the pawl it is adapted to have a wide point of contact with the eccentric, whereby it is prevented from accidentally slipping off of the eccentric. As soon as the pawl is in engagement with the highest point of the eccentric or cam, the front of the carriage is elevated and the arm 25 permitted, by gravity, to fall against the bar 21, whereupon the shoulder 26 rests upon the top of the bar 21. In this position of the carriage the feeding nuts 18 are disengaged from the feed screw 11 and the tooth 34 is in engagement with the repeat or return bar 12. The machine continuing to run in the forward direction, the carriage is returned to its initial position

by the screw 12 and when approaching the starting point the arm 25 is forced outward by contact with the trip 46 set at an angle to the bar 21, until the shoulder 26 is pulled from the top of the bar 21, whereupon the carriage is free to descend in contact with its feed screw for repeating a record or reproducing a new record. This trip 46 is adjustably secured in the elongated slot 22 of the bar 21 whereby the depression of the carriage may be varied.

I have found that heretofore the carriages upon being dropped into engagement with the feed screw at the initial starting point, have frequently damaged or broken the records, therefore, it is my intention to use the buffer 48^a at this point, said buffer being connected to a suitable piston 47 mounted in the cylinder 48, said piston having a ball valve 49.

50 is the shaft of the magazine wheel upon which is mounted a bevel gear 51, which is adapted to be engaged by a bevel gear 52 keyed to the shaft 53. On the end of the shaft 53 is a ratchet wheel 54.

55 is a dog suitably mounted on the frame of the machine.

56 is a pin to limit the upward movement of the dog 55.

57 is an arm loosely hung from the shaft 53. There are two of these arms, one on each side of the ratchet wheel 54.

58 is a pawl having a counterweight 59, said pawl being pivotally mounted between the arms 57 in position for engagement with the ratchet wheel 54.

60 is a link pivoted to the arms 57 and to the lower end of a lever 61, said lever being provided with a handle 62 near its upper end. This lever is pivoted at 63 and is provided at its upper end with a slot 64 through which the arm 35 of the carriage passes in the forward movement of the carriage.

65 is a plate secured to the top of the frame and provided with an elongated slot through which the lever 61 extends.

66 is a plate secured upon the plate 65 and provided with forked ends 67, which register with each side of the elongated slot in the plate 65.

68 is a bell-crank lever pivoted at 69 to the top of the frame 3, one end of which extends between the plates 65 and 66, as clearly shown in Figs. 1 and 2, and is adapted to contact with the lever 61.

70 and 71 are two forked end plates superimposed, the forked ends of which are spaced apart in order that the other arm of the bell crank lever 68 may freely move between them.

72 is a bracket upon which a lever 73 is pivoted, the upper end of said lever being

positioned in the forked ends of the plates 70 and 71 and adapted for engagement with one arm of the bell crank lever 68.

74 is a shaft journaled at the front of the machine, to which are keyed the arms 75, the lower ends of which are notched as at 76 for engagement with the outer ends 77 of the arms 7 of the wheel (magazine wheel).

78 is a coiled spring positioned around the shaft 74, one end of which is attached to the stud 79 on the frame of the machine and the other end to one of the arms 75, whereby the normal position of the arm 75 is in engagement with the ends 77 of the wheel-arm. The lower end of lever 73 is forked and adapted for engagement with one of the arms 75.

When the carriage is at the initial position on the record the lever 61 is in the position shown in Fig. 1. As the carriage is fed along the record the hook 37 and the arm 35 pass through the slot 64 in the upper end of the lever 61, until the pawl 41 engages the periphery of the cam or eccentric 45, whereupon the front of the carriage is elevated by said cam and the arm and hook raised to a point above the slot 64 in the arm 61. The tooth 34 is now in engagement with the return screw 12 and as the carriage is fed in the return direction the hook 37 engages the upper end of the lever 61 and pulls it toward the left hand side of the machine. As the carriage is moving toward the right hand side of the machine and the hook 37 has passed through the slot in the upper end of the lever 61, the arm 40 engages the lever above the slot 64 and forces said lever toward the right of the machine thus drawing, through the link 60, the pawl 58 into engagement with another tooth on the ratchet wheel 54. The lever is now practically in a perpendicular position. As the lever is being pushed to the perpendicular position it engages the bell crank lever 68, thereby operating the lever 73 and forcing the arms 75 out of engagement with the magazine wheel. As the machine is being returned to its initial position by means of the screw 12, the arm 40 moves the lever toward the left of the machine a slight distance and the hook 37 following engages the lever above the slot 64 and forces it toward the left of the machine until the arm of the movement of the lever is below the hook whereupon the hook is free to move toward the left of the machine without further engagement with the lever. The lever is being forced toward the left of the machine revolves the shaft 53 one tooth of the ratchet wheel 54, by means of the weighted pawl 58. This movement, through the bevel gear wheels 51 and 52 revolves the magazine

wheel a sufficient distance to bring the next succeeding record in position under the stylus of the reproducer, whereupon the arms 75, under tension of the spring 78, snap into engagement with the outer ends of the arms of the wheel, thus holding the wheel against revolution while the record is being reproduced. During a certain period of the movement of the lever 61 the arms 75 are out of engagement with the magazine wheel, but the reverse movement of the wheel is prevented by reason of the dog 55 engaging the ratchet wheel 54.

80 is a sprocket wheel mounted upon the shaft 50.

81 is a frame mounted upon the top of the frame 3 at the rear, in which is journaled a shaft 82 upon which is keyed an indicator 84, on which are successive numbers which appear through the opening 85 in the hood 86.

87 is a sprocket wheel journaled on the shaft 82, said sprocket wheel being connected to the sprocket wheel 80 by means of the sprocket chain 88.

As the lever 61 is forced toward the left of the machine and the shaft 50 revolved and a succeeding record brought into playing position the sprocket wheel 80 is revolved, which, by means of the chain 88, revolves the sprocket wheel 87, whereupon the shaft 82 and the indicator 84 are simultaneously revolved with the magazine wheel and the number of the record being reproduced is indicated through the opening 85 in the hood 86.

As soon as the twelve records are played or reproduced and it is desired to reload the machine the lock is removed from the hinged end of the arm of the wheel, said hinged arm being thrown down into the depression or yoke 5 in one of the sides of the frame 3, whereupon the record may be removed from the cylinder immediately opposite said yoke or depression. The successive cylinders are moved into this position until the wheel is reloaded with new records.

While I have shown the magazine wheel adapted for twelve records it will, of course, be understood that in practice I may make it to hold three, six, nine or twelve records, more or less.

The shaft 89 having the knob 90 or handle is adapted for connection with the motor (not shown), whereby the motor may be started or stopped.

It is my intention to have an ornamental wooden case around the machine extending up to the frame 3.

In Fig. 6 I have shown a slight modification of the construction of the magazine wheel, by means of which I am enabled to dispense with the spokes on one side of the

wheel. In order to do this, I increase the bearing in the end of the spokes of the wheel so as to give an increased bearing to the shaft upon which the cylinders 91 are mounted. Naturally the size of the shaft on which the cylinder is mounted would be increased in this construction inasmuch as the outer end of the shaft will not have a support.

10 In Fig. 7 I have shown a worm as a substitute for the shaft 53. In cases where I elect to use the worm in place of the shaft 53, I will omit the dog 55 inasmuch as the worm will be sufficient to prevent a backward movement of the magazine wheel.

15 In the event that it is not desired to repeat a record the arm 40 is thrown back from the position shown in Fig. 2, but in all cases when it is desired to repeat the same record the arm is thrown into the position shown in Fig. 2.

The object of mounting the nuts 18 on the spring arms 19 is to protect the thread on the rod 11. For instance, in the event that 25 the carriage is let down at the beginning of a record in such position that the thread in the nuts does not exactly register with the thread on the rod 11, the nut may, by resiliency of the arm, give and automatically adjust itself to said thread, besides which 30 slight wear in the thread of the nuts and the rod is taken up by the resiliency of these arms.

The trip 46 determining the depression 35 of the carriage after its return to the beginning of a record and the hook 37 determining the automatic return of the carriage being mounted in elongated slots are adjustable to accommodate records of different lengths.

I am aware that slight changes may be made in the details of construction without departing from the spirit of my invention, and hence, I would have it understood that 45 I do not wish to be limited to the details shown.

What I claim and desire to secure by Letters Patent is:

1. In a sound reproducing machine, the 50 combination with the carriage, of means to elevate the carriage at the end of its forward movement, means to return it to its initial position, means to lower the carriage and cushioning means resisting the sudden 55 descent of the carriage from its elevated position.

2. The combination with a graphophone of a carriage, one end of which is free to be raised, a rod supporting said free end, of 60 means cushioning the descent of the carriage to its supporting rod.

3. The combination with a graphophone

having a carriage one end of which is free to be elevated, and a rod to support the free end, of cushioning means to gradually lower 65 the carriage from its elevated position to its position on its supporting rod.

4. The combination with a graphophone, having a carriage one end of which is free to be elevated, and a rod for supporting the 70 free end of the carriage in its normal position, of an air chamber, a piston therein, and means connected with said piston and interposed in the path of the carriage as it is lowered from an elevated position to absorb the shock incident to the descent of the carriage. 75

5. The combination with a graphophone having a carriage, one end of which is free to be elevated, and a rod for supporting said free end, of a lever interposed in the path 80 of the carriage as it is lowered to its supporting rod, and a cushioning medium controlling the movement of said lever.

6. The combination with a graphophone 85 having a carriage, one end of which is free to be elevated, and a rod for supporting said free end, of an air chamber, a piston in said chamber, a lever connected with said piston at one end, while its other end is interposed in the path of the carriage as it is 90 lowered from an elevated position to its supporting rod, whereby all shock incident to the descent of the carriage is absorbed.

7. The combination with a graphophone 95 having a carriage, one end of which is free to be elevated, and a rod for supporting said free end, of a lever pivoted to said rod, one end of which is deflected into the path of the carriage, an air chamber, a piston in said chamber with which the other end of the lever is attached. 100

8. The combination with a graphophone, having a carriage, one end of which is free to be elevated, and a rod for supporting said free end, of a lever pivoted to said rod, one 105 end of which is deflected into the path of the carriage, an air chamber, a link connecting the piston and the other end of said lever. 110

9. In a duplex graphophone, the combination with the carriage, of a supporting bar for the free end of the carriage having a slot near one end and an arm adjustably mounted in said slot. 115

10. In a sound reproducing machine, the combination with the carriage, of a supporting rod for the free end of the carriage, a slot in said rod and an arm adjustably secured in said slot at an angle less than a 120 right angle to said rod.

11. In a sound reproducing machine, the combination with the carriage, of a supporting rod for the free end of the carriage pro-

vided with a slot, an arm pivotally mounted on and depending from the free end of the carriage, and adapted to rest upon the supporting rod, an arm adjustably mounted in the slot of the supporting rod and adapted to engage the arm depending from the carriage to disengage it from the supporting rod.

12. In a sound reproducing machine, the combination with the carriage, of a pawl loosely pivoted thereon and provided with an elongated slot, a stud on the carriage projecting into said slot, a spring tending to move the pawl away from the carriage and means engaged by the pawl to elevate the carriage at a predetermined point.

13. In a sound reproducing machine, the combination with the carriage, of a pawl loosely pivoted thereon, a spring tending to move the pawl from the carriage, a return screw, a cam mounted on said screw adapted to engage the pawl and gradually press it against the carriage, said pawl engaging the perimeter of the cam when its spring is fully compressed and thus elevate the carriage at a predetermined point.

14. In a duplex graphophone the combination with the carriage, and a magazine record carrying wheel, of an operating lever for revolving said wheel, an arm on said carriage adapted to engage the lever on the return movement of the carriage, a ratchet wheel mounted on a shaft geared to the shaft of the magazine wheel, a pawl pivoted to the frame of the machine and adapted to engage said ratchet wheel, and a link connecting the said pawl with the said lever.

15. In a duplex graphophone the combination with the carriage, and a magazine record carrying wheel, of an operating lever for revolving said wheel, an arm on said carriage adapted to engage the lever on the return movement of the carriage, a ratchet wheel mounted on a shaft geared to the shaft of the magazine wheel, a pawl pivoted to the frame of the machine, and adapted to engage said ratchet wheel, a yoke loosely mounted on the shaft of the ratchet wheel with its lower end pivoted to the said pawl and a link connecting said pawl and operating lever.

16. In a duplex graphophone the combination with the carriage, and a magazine record carrying wheel, of an operating lever for

revolving said wheel, an arm on said carriage adapted to engage the lever on the return movement of the carriage, a ratchet wheel mounted on a shaft geared to the shaft of the magazine wheel, a pawl pivoted to the frame of the machine, and adapted to engage said ratchet wheel, a yoke loosely mounted on the shaft of the ratchet wheel with its lower end pivoted to the said pawl, a link connecting said pawl and operating lever, and a dog engaging the ratchet wheel holding it against reverse movement.

17. In a duplex graphophone the combination with a magazine record wheel of a carriage, a lever operated by the return movement of the carriage, means holding the wheel against revolution, and means operated by said lever for releasing the wheel for revolution.

18. In a duplex graphophone the combination with a magazine record wheel, of a carriage, means holding the wheel against revolution, a lever operated by the return movement of the carriage a bell crank lever operated by said first named lever and means operated by the bell crank lever to release the wheel for revolution.

19. In a duplex graphophone the combination with a carriage and magazine record wheel, of an arm secured to the machine adapted to engage said wheel, and hold it against revolution, an operating lever operated by the return movement of the carriage, a bell crank lever, operated by the operating lever, said arm being operated by the bell crank lever to release the magazine wheel for revolution.

20. In a duplex graphophone the combination with a carriage, a magazine record wheel and means for revolving the wheel of an arm secured to the carriage and provided with an elongated slot, a slide adjustably mounted in said slot, and a stop arm hinged on said slide whereby it may be thrown back to prevent engagement with the means for revolving the magazine wheel when it is desired to repeat a record.

In testimony whereof I affix my signature in presence of two witnesses.

HYMAN E. MARKLE.

Witnesses:

ROBT. J. LEUTZ,
JOSEPH SIMON.